THE COUNTY OF GALVESTON

RUFUS G. CROWDER, CPPO, CPPB
PURCHASING AGENT

GWEN MCLAREN, CPPB
ASST. PURCHASING AGENT

COUNTY COURTHOUSE
722 Moody (21st Street)
Fifth (5th) Floor
GALVESTON, TEXAS 77550
(409) 770-5371

November 28, 2018

PROJECT NAME: Bel Road Extension & Linear Detention Ditch

BID NO: B191024

RE: ADDENDUM #1

To All Prospective Bidders:

The following information is being provided to aid in preparation of your bid submittal(s):

AMENDED PURPOSE:
The Purpose in the original bid packet contained incorrect information. Below you will find the corrected version:

This project entails clearing and grubbing for a new City right of way for the purpose of constructing two (2) new 28 feet wide concrete roads, approximately 2,000 feet long with sidewalk alongside. A linear detention ditch will be expanded to make the new runoff for the roads and the dirt shall be spread on site and graded to drain.

Ancillary items will be constructed such as storm sewer, relocated force main air release valve, fire hydrant installation, and turf establishment.

This project entails coordination with TxDOT, Pipelines, CenterPoint, the County of Galveston, and the City of Kemah.

Please send bid submittals to:
Galveston County Purchasing Agent
Attention: Rufus Crowder, CPPO CPPB
722 Moody (21st Street), Fifth (5th) Floor
Galveston, Texas 77550

As a reminder, all questions regarding this proposal must be submitted in writing to:

Rufus G. Crowder, CPPO CPPB
Galveston County Purchasing Agent
722 Moody, Fifth (5th) Floor
Galveston, Texas 77550
E-mail: purchasing.bids@co.galveston.tx.us

If you have any further questions regarding this proposal, please address them to Rufus Crowder, CPPO CPPB, Purchasing Agent, via e-mail at purchasing.bids@co.galveston.tx.us, or contact the Purchasing Department at (409) 770-5371.

Please excuse us for any inconvenience that this may have caused.

Sincerely,

Rufus G. Crowder, CPPO CPPB
Purchasing Agent
Galveston County

GALVESTON COUNTY

CONTRACT No. 18-1100

GALVESTON COUNTY COMMISSIONERS' COURT

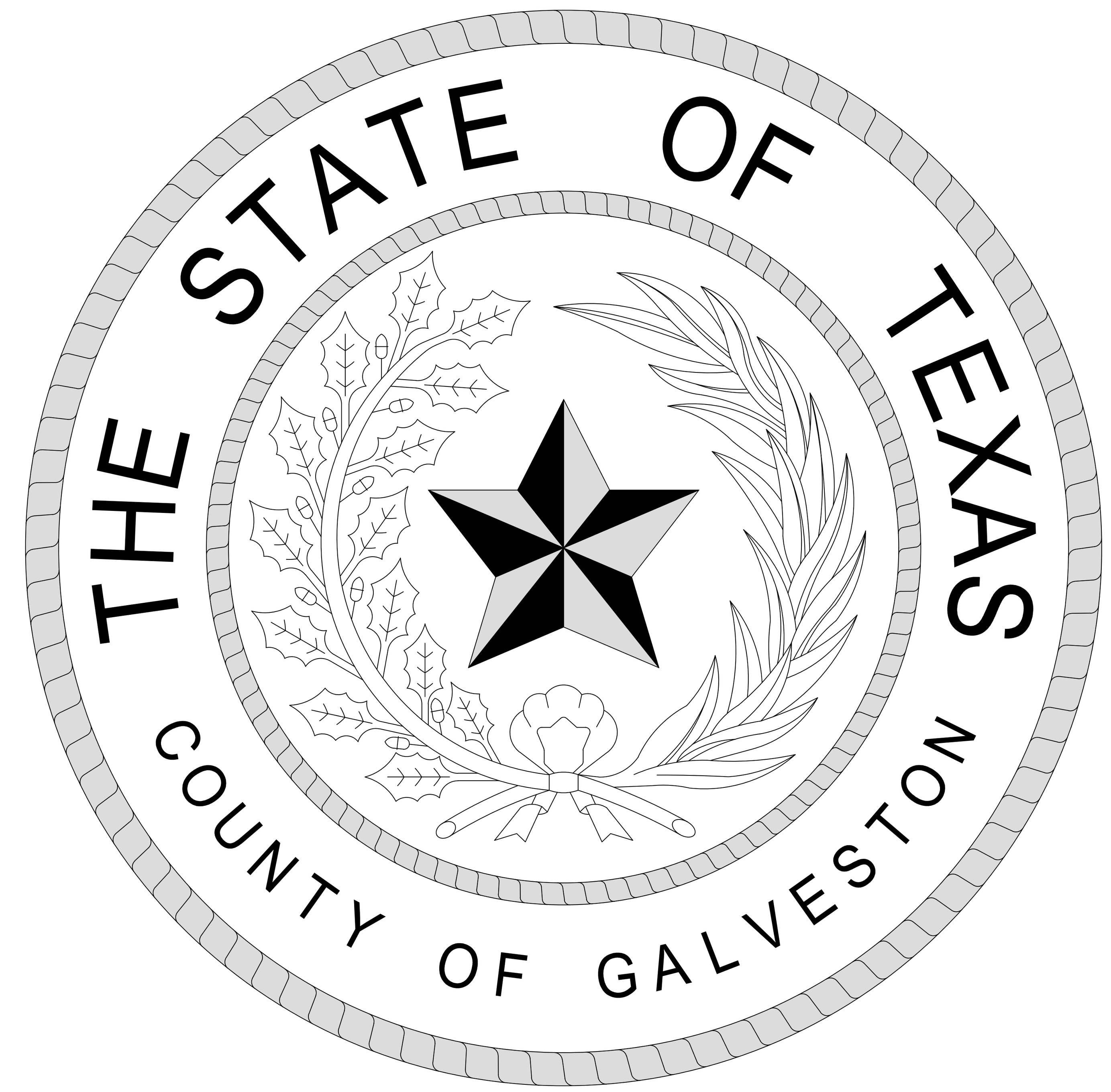
MARK HENRY
COUNTY JUDGE

DARRELL APFFEL
PRECINCT 1

JOE GIUSTI
PRECINCT 2

STEPHEN D. HOLMES
PRECINCT 3

KEN CLARK
PRECINCT 4



DRAWING INDEX

CITY OF KEMAH

CARL JOINER
MAYOR

TERESA VAZQUEZ-EVANS
POSITION 1

WANDA ZIMMER
POSITION 2

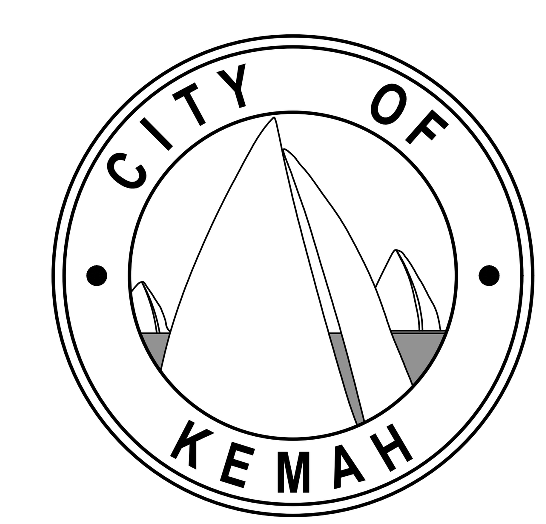
KYLE BURKS
POSITION 3

ROBIN COLLINS
POSITION 4

MATT WIGGINS
POSITION 5

CONSTRUCTION PLANS FOR:

BEL ROAD EXTENSION & LINEAR DETENTION DITCH



STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED
PROFESSIONAL ENGINEER
11-20-18

NOVEMBER, 2018

LJA PROJECT No. E135-0320 & E135-0340

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

11/20/18

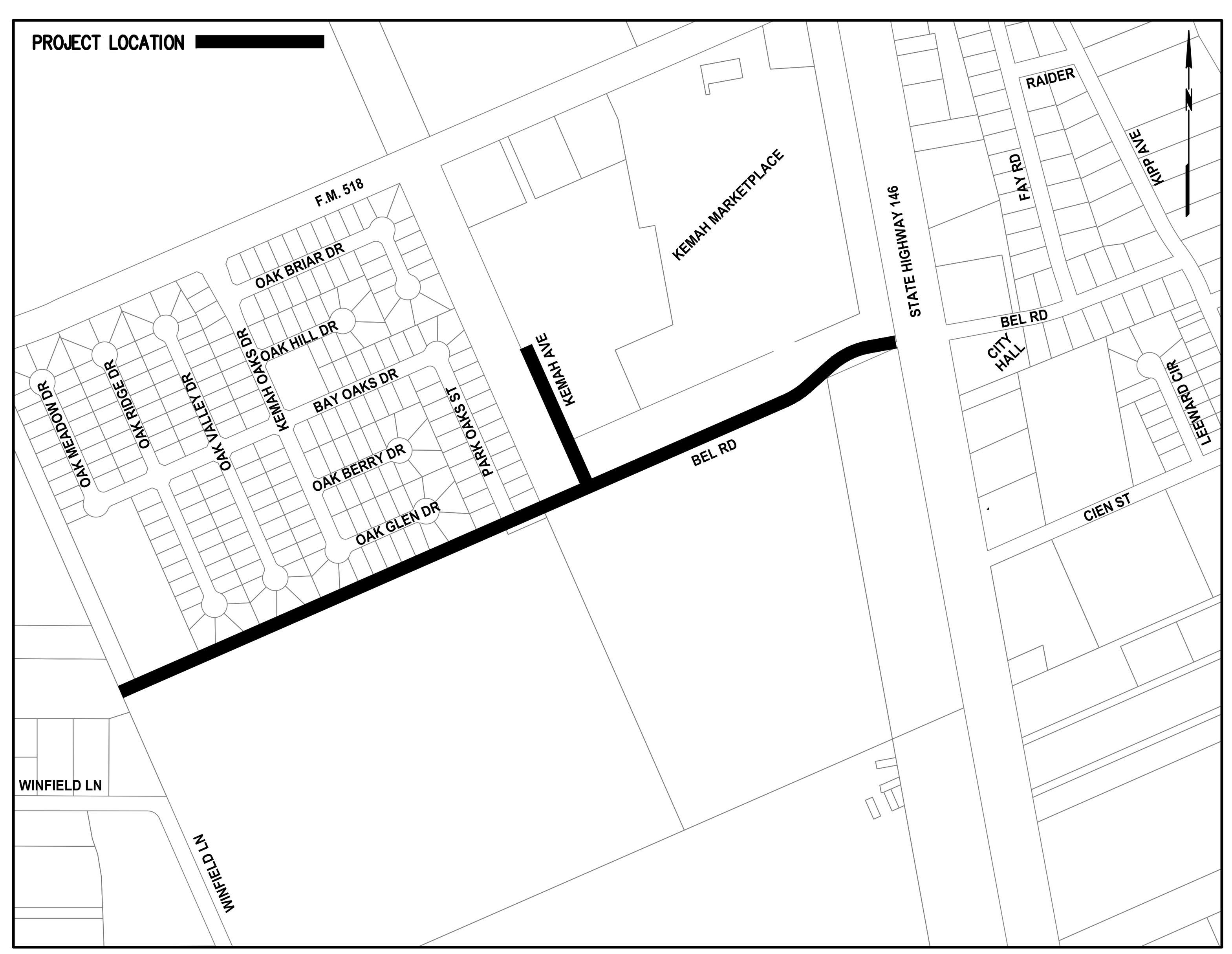
H:\ACAD\Clients\135\0320\Design\135-0320-01 Cover.dwg (XREF)

GENERAL NOTES:

1. CONTRACTOR SHALL CONTACT LJA ENGINEERING, MR. LES DODSON AT (713) 450-1300 AT LEAST 24 HOURS PRIOR TO CONSTRUCTION FOR NOTIFICATION OF COMMENCEMENT.
2. CONTRACTOR SHALL CONTACT CITY OF KEMAH, MR. JIM THOMPSON, 281-334-1611, AT LEAST FORTY EIGHT (48) HOURS PRIOR TO CONSTRUCTION FOR NOTIFICATION OF COMMENCEMENT.
3. CONTRACTOR SHALL CONTACT GALVESTON COUNTY, MR. MICHAEL SHANNON, 409-770-5453, AT LEAST FORTY EIGHT (48) HOURS PRIOR TO CONSTRUCTION FOR NOTIFICATION OF COMMENCEMENT.
4. LOCATION OF EXISTING UNDERGROUND UTILITIES AND SERVICE LINES (WATER, SEWER, GAS, TELEPHONE, ELECTRICAL, ETC.) ARE DETERMINED FROM AVAILABLE RECORDS AND ARE APPROXIMATE. CONTRACTOR TO LOCATE LINES AND/ OR OBSTRUCTIONS AHEAD OF EXCAVATION.
5. CONTRACTOR TO MAKE ARRANGEMENTS WITH THE APPROPRIATE UTILITY COMPANY FOR SECURING POLES, IF NECESSARY, WHILE CONSTRUCTION PASSES BY POLES. COST OF SECURING POLES WILL BE PAID FOR BY THE CONTRACTOR.
6. CONSTRUCTION STAKING (ALIGNMENT AND GRADE) TO BE PROVIDED BY THE CONTRACTOR AT NO SEPARATE PAY.
7. CONTRACTOR TO USE CAUTION WHEN CROSSING ALL EXISTING FACILITIES. ANY DAMAGE TO BE REPAIRED AT THE CONTRACTORS EXPENSE WITH NO SEPARATE PAY.
8. SURPLUS EXCAVATED MATERIAL SHALL BE REMOVED AND DISPOSED OFF SITE BY THE CONTRACTOR (NO SEPARATE PAY). IF THE ENGINEER NOTIFIES THE CONTRACTOR THAT THE OWNER HAS USE FOR THIS MATERIAL, THE MATERIAL WILL BE HAULED TO A SITE AS DIRECTED BY THE OWNER WITHIN THE CITY. NO FILL SHALL BE PLACED WITHIN ANY FLOODPLAIN HAZARD AREA WITHOUT APPROVAL FROM THE CITY.
9. WHERE CONTRACTOR'S WORK AND/ OR EQUIPMENT CAUSES AN OBSTRUCTION TO TRAFFIC, CONTRACTOR SHALL PROVIDE AND INSTALL TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH PART IV OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (TEXAS M.U.T.C.D., MOST RECENT EDITION AS REVISED) DURING CONSTRUCTION.
10. ALL WORK SHALL BE DONE IN ACCORDANCE WITH APPLICABLE LOCAL REQUIREMENTS.
11. CONTRACTOR SHALL PROTECT EXISTING FACILITIES DURING INSTALLATION OF PROPOSED WORK.
12. ALL WORK IN THE TEXAS DEPARTMENT OF TRANSPORTATION AND COUNTY RIGHT-OF-WAYS SHALL CONFORM TO THE STANDARDS OF THOSE GOVERNMENTAL ENTITIES. CONTRACTOR IS RESPONSIBLE FOR THE REPLACEMENT AND/ OR REPAIR OF ANY DAMAGE TO TxDOT MARKERS.
13. CONTRACTOR SHALL MAINTAIN DRAINAGE TO ORIGINAL OR BETTER CONDITION THROUGHOUT THE CONSTRUCTION OF THE PROJECT. NO SEPARATE PAY.
14. PAVED SURFACES SHALL BE PROTECTED FROM DAMAGE FROM TRACKED EQUIPMENT.
15. OBTAIN ALL PERMITS, NOT PROVIDED BY OWNER, PRIOR TO STARTING CONSTRUCTION.
16. CONTRACTOR TO MAINTAIN ACCESS FOR PROPERTY OWNERS, POST OFFICE VEHICLES, GARBAGE TRUCKS AND EMERGENCY VEHICLES AT ALL TIMES.
17. NOTIFY ALL PROPERTY OWNERS A MINIMUM OF TWENTY FOUR (24) HOURS PRIOR TO BLOCKAGE OF DRIVEWAYS OR ENTERING OF UTILITY EASEMENTS.
18. PROPERTY OWNERS SHALL BE NOTIFIED, IN WRITING, BY CONTRACTOR, WITH DOOR HANGERS 2 WEEKS BEFORE CONSTRUCTION BEGINS. (PROPERTY OWNER SHALL BE PROVIDED THE MINIMUM FOLLOWING INFORMATION: WORK TO BE PERFORMED, STARTING AND ENDING DATES, AND THE NAME AND NUMBER OF CONTRACTOR'S REPRESENTATIVE & CITY OF KEMAH OFFICIAL TO BE CONTACTED FOR QUESTIONS. WRITTEN NOTICES SHALL BE APPROVED BY THE CITY OF KEMAH PRIOR TO DISTRIBUTION).
19. ALL ITEMS OF WORK REQUIRED UNDER THIS CONTRACT NOT SPECIFICALLY CALLED FOR IN THE PROPOSAL AS PAY ITEMS SHALL BE CONSIDERED INCIDENTAL TO VARIOUS BID ITEMS AND NO SEPARATE PAYMENT SHALL BE MADE FOR SAME.
20. ADJUST MANHOLE RINGS, VALVE BOXES, GRATES, ETC. AS REQUIRED FOR NEW PAVEMENT, AND/OR TO FINISHED GRADE OUTSIDE PAVEMENT.
21. ALL TRAFFIC SIGNS AND STRIPING SHALL CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
22. IT IS IMPERATIVE THAT CONSTRUCTION IN PROJECT AREA INCONVENIENCE RESIDENTS AND BUSINESSES AS LITTLE AS POSSIBLE. COMPLETE CLEAN-UP NOT GREATER THAN ONE BLOCK BEHIND ACTIVE CONSTRUCTION AREA. CLEAN-UP INCLUDES COMPACTION OF BACKFILL, CLOSURE OF BORE PITS, RESHAPING OF DITCHES, SURFACE RESTORATION, REMOVAL OF ALL EXCESS EXCAVATED MATERIAL, REMOVAL OF EQUIPMENT AND CONSTRUCTION MATERIALS, AND SWEEPING OF STREETS.
23. CONTRACTOR SHALL NOTIFY CITY OF KEMAH AMBULANCE, POLICE, FIRE, MAIL, TRASH AND OTHER EMERGENCY SERVICE AGENCIES AT LEAST 48 HOURS PRIOR TO CLOSURE OF ANY STREET, INTERSECTION, OR LANE OF TRAFFIC. CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO ALLOW ACCESS TO EMERGENCY VEHICLES AT ALL TIMES.
24. CONTRACTOR TO CONTACT "DIG-TESS" AT 1-800-344-8377 AT LEAST 48 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION FOR LOCATION AND MARKING OF UNDERGROUND CABLE.
25. CONTRACTOR TO SAW-CUT ALL TIE-INS AND DRIVEWAY RECONNECTIONS FOR CLEAN EDGE THROUGHOUT ENTIRETY OF PROJECT AS DESIRED BY ENGINEER. (NO EXTRA PAY)
26. EXISTING DRIVEWAYS THAT ARE NOT SPECIFICALLY CALLED OUT TO BE REPLACED WITH CONCRETE SHALL BE RECONNECTED TO PROPOSED PAVEMENT AT LIKE CONDITIONS OR BETTER THAN BEFORE CONSTRUCTION BEGAN.
27. THE CONTRACTOR SHALL COORDINATE, MOVE, AND RELOCATE ALL EXISTING MAILBOXES, SIGNS, POLE, UTILITIES, ETC. THAT CONFLICT WITH THE CONSTRUCTION OF THE CONCRETE PAVING.
28. PAYMENT FOR EXCAVATION AND FILL WILL BE BASED ON THE QUANTITIES SHOWN ON THE BID PROPOSAL. IF THE CONTRACTOR THINKS THAT MORE OR LESS EXCAVATION OR FILL IS REQUIRED THAN CALLED FOR IN THE BID ITEM, IT SHOULD ADJUST THE UNIT PRICES ON ITS BID PROPOSAL ACCORDINGLY. NO ADDITIONAL COMPENSATIONS WILL BE ALLOWED FOR EXCAVATING OR FILLING LESS THAN THE INDICATED CUBIC YARDS OF MATERIAL AS LONG AS THE PROJECT IS COMPLETED IN ACCORDANCE WITH THE LINES AND GRADES SHOWN IN THE CONSTRUCTION DRAWINGS. IF DURING THE COURSE OF THIS CONTRACT, AND IN THE OPINION OF THE ENGINEER, IT BECOMES NECESSARY TO ADJUST THE LINES AND GRADES OF THE DRAWINGS, THE RESULTING CHANGE IN EXCAVATION OR FILL QUANTITIES WILL BE CALCULATED BY THE ENGINEER AND AN APPROPRIATE CHANGE ORDER WILL BE ISSUED REFLECTING THE CHANGE IN THE EXCAVATION OR FILL QUANTITIES.

PAVEMENT NOTES:

1. THE PAVEMENT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATIONS AS SHOWN IN THE CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS FOR CONSTRUCTION OF BEL ROAD EXTENSION & LINEAR DETENTION DITCH.
2. TYPICAL ROADWAY SHALL BE 7-INCH REINFORCED CONCRETE PAVEMENT. THE CONCRETE SHOULD CONTAIN A MINIMUM OF 5.5 SACKS OF PORTLAND CEMENT PER CUBIC YARD OF CONCRETE AND A COMPRESSIVE STRENGTH OF 3500 PSI AT 28 DAYS.
3. EXISTING SUBGRADE SHALL BE 8-INCH THICK LIME STABILIZED SUBGRADE BY DRY WEIGHT. THE EXACT PERCENTAGES WILL BE SPECIFIED AFTER SAMPLING THE ROUGH GRADED SITE AND RUNNING THE STABILIZATION TEST IN THE LABORATORY AND APPROVED BY THE GEOTECHNICAL ENGINEER.
4. ALL REINFORCEMENT STEEL TO BE No. 4 BARS, GRADE 60 STEEL.
5. CONTRACTOR TO USE APPROPRIATE SIZE REBAR CHAIRS IN ORDER TO CENTER THE REINFORCING IN THE PROPOSED CONCRETE PAVEMENT.
6. STRIP THE SURFICIAL SOILS TO A SUITABLE DEPTH (MINIMUM 7-INCHES) TO REMOVE ALL SURFICIAL VEGETATION AND ACHIEVE GRADE. IN ISOLATED AREAS WHERE SOFT, COMPRESSIBLE, OR VERY LOOSE SOILS ARE ENCOUNTERED, ADDITIONAL STRIPPING MAY BE REQUIRED. IN THIS AREA, THE EXISTING SOFT SOILS SHOULD BE REMOVED AND REPLACED WITH SELECT FILL MATERIAL PRIOR TO STABILIZATION. STRIPPING SHOULD EXTEND TO A MINIMUM OF TWO FEET BEYOND THE EDGE OF THE PAVEMENT.
7. AFTER STRIPPING, THE EXPOSED SURFACE SHOULD BE PROOF-ROLLED WITH A MINIMUM OF 3 PASSES OF A 30-TON PNEUMATIC-TIRED ROLLER OR A PARTIALLY LOADED TRUCK UTILIZING A TIRE PRESSURE OF APPROXIMATELY 90 PSI. IF RUTTING DEVELOPS, THE TIRE PRESSURE SHOULD BE REDUCED. THE PURPOSE OF THE PROOF-ROLLING OPERATION IS TO IDENTIFY ANY UNDERLYING ZONES OR POCKETS OF SOFT SOILS SO THESE WEAK MATERIALS CAN BE REMOVED AND REPLACED. THE GEOTECHNICAL ENGINEER MUST BE ON SITE TO WITNESS PROOF-ROLLING AND APPROVE.
8. LIME STABILIZATION OF COHESIVE SUBGRADE SHOULD BE PERFORMED IN ACCORDANCE WITH CITY OF HOUSTON STANDARD SPECIFICATIONS ITEM No. 02336, "LIME-STABILIZED SUBGRADE," WHERE CITY OF KEMAH STANDARD SPECIFICATION IS NOT AVAILABLE.
9. SHOULD ANY STRUCTURAL FILL BE REQUIRED TO RAISE THE GRADE IT SHOULD CONSIST OF LEAN CLAY OR SANDY LEAN CLAY WITH A LIQUID LIMIT LESS THAN 40 AND A PLASTICITY INDEX BETWEEN 10 AND 20. THE STRUCTURAL FILL SHOULD BE COMPACTED AT MOISTURE CONTENT WITHIN THREE PERCENT ABOVE OPTIMUM TO REDUCE SWELLING POTENTIAL OF THE COMPACTED FILL. THE FILL MATERIAL SHOULD BE PLACED IN LOOSE LIFTS NOT EXCEEDING EIGHT INCHES AND SHOULD BE COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698. THE STRUCTURAL FILL PAD SHOULD EXTEND AT LEAST TWO FEET OUTSIDE THE PAVING AREA. THE SURFICIAL CLAY IS NOT SUITABLE FOR STRUCTURAL FILL UNLESS STABILIZED WITH SUFFICIENT LIME.
10. TYPICAL PAVEMENT SECTIONS ARE SHOWN ON SHEET 07.
11. ALL ROAD WIDTHS, LANE WIDTHS, CURB RADII, CURB ALIGNMENTS, OFFSET DIMENSIONS ARE TO THE EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.
12. CONTRACTOR TO COORDINATE ALL STREET CLOSURES AND TEMPORARY DETOURS WITH THE CITY OF KEMAH.
13. DOUBLE REFLECTORIZED BLUE TRAFFIC MARKERS SHALL BE PLACED 1 FOOT OFFSET OF THE CENTERLINE AT ALL FIRE HYDRANT LOCATIONS BY THE PAVING CONTRACTOR. HYDRANTS LOCATED AT INTERSECTIONS SHALL HAVE A BUTTON PLACED ON EACH STREET. NO SEPARATE PAY.



LOCATION MAP
SCALE: N.T.S.

UTILITY NOTES

1. LOCATION OF EXISTING UNDERGROUND UTILITY SERVICE LINES (WATER, SEWER, GAS, TELEPHONE, ELECTRICAL, ETC.) ARE DETERMINED FROM AVAILABLE RECORDS AND ARE APPROXIMATE. CONTRACTOR TO LOCATE LINES AND/OR OBSTRUCTIONS AHEAD OF EXCAVATION.
2. CONTRACTOR TO MAKE ARRANGEMENTS WITH APPROPRIATE UTILITY COMPANY FOR SECURING POLES, IF NECESSARY, WHILE CONSTRUCTION PASSES BY POLES. COSTS OF SECURING POLES WILL BE PAID FOR BY THE CONTRACTOR AND IS INCIDENTAL TO THE COST OF CONSTRUCTION.

CAUTION: FRONTIER COMMUNICATIONS

THE LOCATION OF FRONTIER FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. SERVICE LINES ARE NOT SHOWN. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES. THE CONTRACTOR SHALL CONTACT DIGTESS @ 800-344-8377 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND TELEPHONE LINES FIELD LOCATED. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF FRONTIER FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHENEVER FRONTIER FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT SHOULD BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON CABLE AND / OR CONDUIT DUCTS. CONTACT NETWORK ENGINEERING @ 281-338-2221 OR 281-229-0849 FOR QUESTIONS REGARDING FRONTIER FACILITIES.

CAUTION: UNDERGROUND GAS FACILITIES

LOCATIONS OF CENTERPOINT ENERGY MAIN LINES (TO INCLUDE CENTERPOINT ENERGY, INTRASTATE PIPELINE, LLC. WHERE APPLICABLE) ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. SERVICE LINES ARE USUALLY NOT SHOWN. OUR SIGNATURE ON THESE PLANS ONLY INDICATES THAT OUR FACILITIES ARE SHOWN IN APPROXIMATE LOCATION. IT DOES NOT IMPLY THAT A CONFLICT ANALYSIS HAS BEEN MADE. THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT 1-800-545-6005 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

- WHEN CENTERPOINT ENERGY PIPELINE MARKINGS ARE NOT VISIBLE, CALL (713) 945-8036 OR (713) 945-8037 (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
- WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.
- WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
- FOR EMERGENCIES REGARDING GAS LINES CALL (713) 659-3552 OR (713) 207-4200.

THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

WARNING: OVERHEAD ELECTRIC FACILITIES

OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION OF OVERHEAD LINES HAS NOT BEEN SHOWN ON THESE DRAWINGS AS THE LINES ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH & SAFETY CODE, FORBIDS ACTIVITIES THAT OCCUR IN CLOSE PROXIMITY TO HIGH VOLTAGE LINES, SPECIFICALLY:

- ANY ACTIVITY WHERE PERSON OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES; AND
- OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN 10 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES

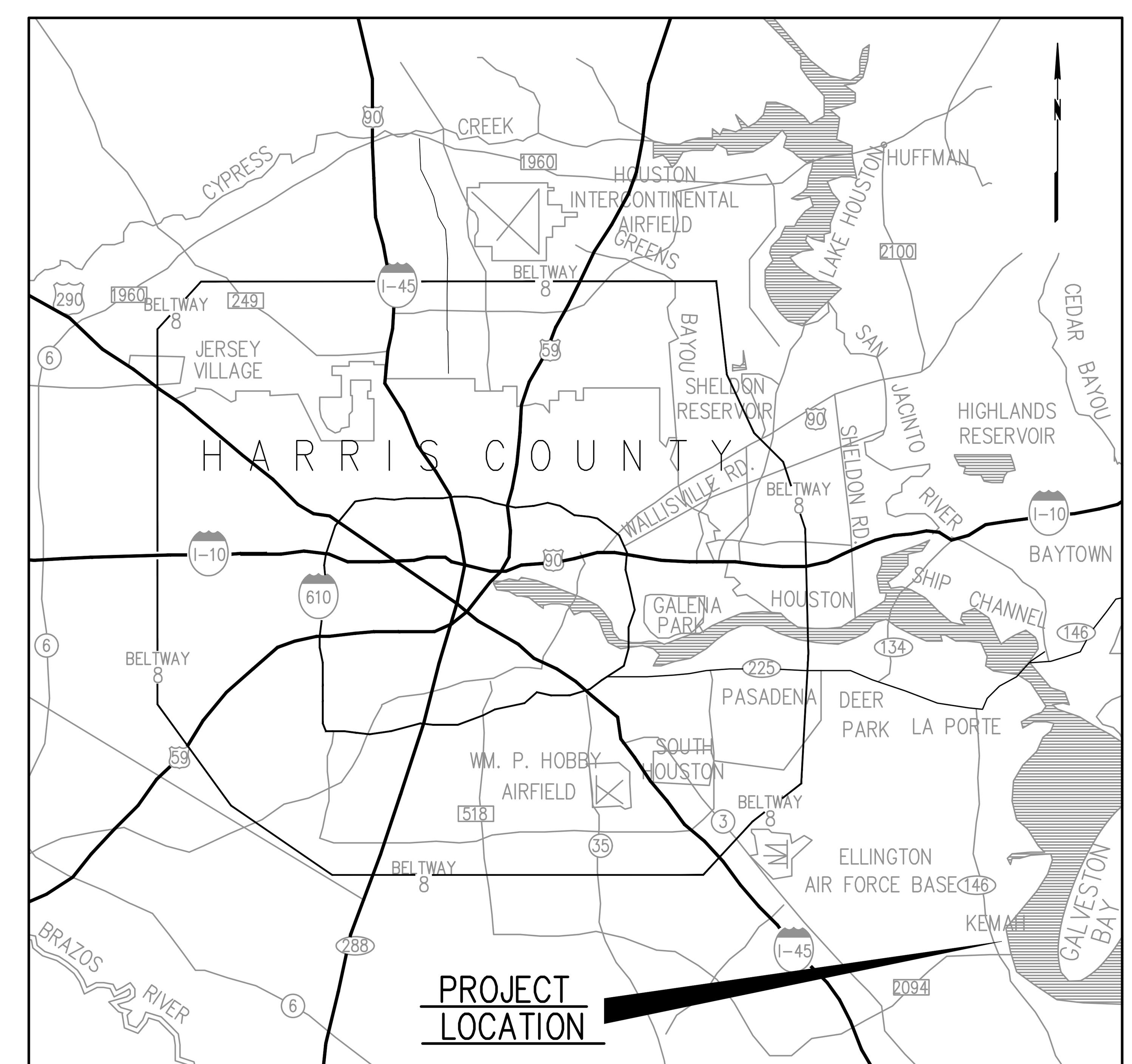
PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS, ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED CALL CENTERPOINT ENERGY AT (713) 207-2222.

ACTIVITIES ON OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY

NO APPROVAL TO USE, CROSS OR OCCUPY CENTERPOINT FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE CENTERPOINT PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT (713) 207-6348 OR (713) 207-5769.

CAUTION: UNDERGROUND PIPELINES

UNDERGROUND PIPELINES ARE SHOWN ACCORDING TO BEST AVAILABLE INFORMATION. CONTRACTOR TO PROCEED WITH CAUTION DURING EXCAVATION. CONTRACTOR TO COORDINATE WITH PIPELINE OWNER IN CASE OF CONFLICTS OR QUESTIONS.



VICINITY MAP
SCALE: N.T.S.

STORM SEWER NOTES

1. THE STORM SEWER SYSTEM SHALL BE CONSTRUCTED IN ACCORDANCE WITH GALVESTON COUNTY STANDARD SPECIFICATIONS, LATEST PRINTING AND AMENDMENTS THERETO.
2. REINFORCED CONCRETE PIPE STORM SEWER SHALL BE IN ACCORDANCE WITH ASTM C-76, CLASS III, WALL B, WITH RUBBER GASKET.
3. REINFORCED CONCRETE BOX CULVERTS SHALL CONFORM TO ASTM C-1433, WITH RUBBER GASKET.
4. BEDDING AND BACKFILL SHALL CONFORM TO GALVESTON COUNTY SPECIFICATIONS AND DETAILS ON PLANS.
5. EXISTING EXCAVATED INLETS, CURB AND GUTTER SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND REMOVED FROM THE CONSTRUCTION SITE.
6. CONTRACTOR TO MAINTAIN ADEQUATE DRAINAGE AT ALL TIMES AND SHALL RESHAPE AND REGRADE ANY DITCHES DISTURBED DURING CONSTRUCTION, AT NO SEPARATE PAY.
7. CONTRACTOR TO FILL OPEN DITCH SYSTEMS BEING REPLACED BY BOX CULVERT AND INLET SYSTEMS. GRADE AREAS TO DRAIN TO TOP OF GRATE ELEVATIONS AND THROAT ELEVATIONS SHOWN ON PLANS.
8. ALL UTILITIES SHALL BE INSTALLED PER COUNTY STANDARDS FOR UTILITIES UNDER PAVEMENT WHERE FUTURE PAVEMENT IS PLANNED BY CITY.

STREET NAMES:

1. STREET NAMES ARE TENTATIVELY TO BE CALLED KEMAH AVENUE AND BEL ROAD. SHOULD THE CITY CHOOSE TO CHANGE STREET NAMES DURING THE CONTRACT IT SHALL BE DONE AT NO EXTRA PAY FOR ANY PAY ITEMS

TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED, CALL CENTERPOINT AT 713-207-2222

NOTICE:

For your safety, you are required by Texas law to call 811 at least 48 hours before you dig so that underground lines can be marked. This signature does not fulfill you obligation to call 811.

VERIFICATION OF PRIVATE UTILITIES

DATE 8-16-18
CenterPoint Energy/Natural Gas Facilities Verifications ONLY
CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not to be used for conflict verification.
Signature Valid for six months

DATE 8-16-18
CenterPoint Energy/UNDERGROUND Electrical Facilities Verifications ONLY
(This Signature verifies existing underground facilities – not to be used for conflict verification)
Signature Valid for six months

DATE 8/23/18
FRONTIER COMMUNICATIONS
(Approved for Underground Facilities only)
Signature Valid for one year

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED
PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

GENERAL NOTES LOCATION & VICINITY MAPS

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 02 Of 39

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11/20/18

GENERAL NOTES:

1. KOCH PIPELINE
1.1. USE MATS WHEN REQUIRED FOR HEAVY EQUIPMENT

2. THE DOW CHEMICAL COMPANY
2.1. FACILITY OWNER MUST NOTIFY COMPANY'S FIELD TECHNICIAN AT LEAST 72 HOURS PRIOR TO ANY WORK NEAR COMPANY'S PIPELINE(S). CONTACT FOR COMPANY IS:
MICAH CHOATE, FIELD TECH – 713-858-2448 (MOBILE)
CHRIS PERKINS, FIELD TECH – 832-205-5035 (MOBILE)

2.2. MACHINE EXCAVATION OVER COMPANY'S PIPELINE(S) MAY ONLY BE DONE WITH A BUCKET THAT HAS SMOOTH SIDES AND MOUTH OR HAS THE DIGGING TEETH BARRED. ALL DIGGING WITH A BUCKET MUST BE PARALLEL WITH THE PIPELINE(S). DIGGING MAY NOT BE PERFORMED ACROSS OR PERPENDICULAR TO COMPANY'S PIPELINE(S). EXCAVATION BY MECHANICAL MEANS WILL ONLY BE ALLOWED OVER AND ALONGSIDE COMPANY'S PIPELINE(S) TO WITHIN 24" OF COMPANY'S PIPELINE(S). EXCAVATION CLOSER THAN 24" TO COMPANY'S PIPELINE(S) MUST BE PERFORMED BY HAND.

2.3. FACILITY OWNER WILL TAKE ALL NECESSARY PRECAUTIONS, AS DETERMINED BY COMPANY'S ON-SITE REPRESENTATIVE, TO PREVENT STRESS, MOVEMENT OR DAMAGE TO COMPANY'S EXISTING PIPELINE(S). SUCH PRECAUTIONS OR PROCEDURES MAY INCLUDE THE PLACEMENT OF MATS OVER COMPANY'S RIGHT-OF-WAY.

2.4. DOUBLE LAYER MATTING WILL BE REQUIRED WHEN CROSSING COMPANY'S EXISTING PIPELINE AND RIGHT-OF-WAY WITH EXTREME LOADS AND EQUIPMENT. COMPANY'S ON-SITE REPRESENTATIVE WILL DETERMINE IF LOAD OR EQUIPMENT IS EXTREME.

2.5. FACILITY OWNER MAY INSTALL PROPOSED FACILITY OVER COMPANY'S PIPELINE, PROVIDED 5 FEET MINIMUM COVERAGE WILL BE MAINTAINED BETWEEN THE TOP OF FACILITY AND THE TOP OF THE COMPANY'S PIPELINE.

3. INEOS USA
3.1. INEOS REQUIRES A 2 FOOT CLEARANCE AROUND PIPELINES. POTHOLING MAY BE REQUESTED BY INEOS, AT ITS SOLE DISCRETION. FURTHERMORE, INEOS MAY REQUEST THAT THE OPERATOR PROVIDE A "WINDOW"FOR THE DAMAGE TECHS TO ENSURE THAT OUR PIPE IS NOT EXPOSED OR NICKED. A 72-HOUR NOTICE PRIOR TO WORK COMMENCEMENT IS REQUIRED. MAINTAIN A COPY OF THIS LONO WHILE IN THE FIELD. AN INEOS DAMAGE PREVENTION REPRESENTATIVE IS REQUIRED TO BE ON-SITE FOR ALL CONSTRUCTION ACTIVITIES.

4. EXXONMOBIL PIPELINE COMPANY
4.1. NO WORK MAY COMMENCE IN OR AROUND EMPCo'S RIGHT OF WAY UNTIL AN EMPCo REPRESENTATIVE HAS AUTHORIZED IT TO BEGIN. NOTICE OF DESIRED WORK START DATE SHOULD BE GIVEN TO EMPCo A MINIMUM OF 72 HOURS IN ADVANCE (JAVIER ROBLES, AT 281-705-6106).

4.2. PLACE STANDARD 6-8 INCH THICK TIMBER MATS OVER THE EMPCo PIPELINE AND EASEMENT DURING CONSTRUCTION TO ASSIST IN LOAD DISTRIBUTION AND THE SAFETY OF THE EMPCo PIPELINE.

4.3. EMPCo'S RIGHT OF WAY SHOULD NOT BE USED AS TEMPORARY WORKSPACE (WHICH INCLUDES ITS USE FOR THE STAGING, STORAGE OR LAY DOWN OF EQUIPMENT, MATERIALS OR SPOIL) WITHOUT PROPER APPROVAL FROM EMPCo.

5. ENTERPRISE PRODUCTS

5.1. CONTRACTOR TO CONTACT ENTERPRISE A MINIMUM OF 48 HOURS PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES RELATING TO THE ENCROACHMENT, CONFIRM THE THE ONE-CALL HAS BEEN NOTIFIED OF CONSTRUCTION ACTIVITIES, AND CONTACT REPRESENTATIVE JOHN WALTSON 281-478-2106

5.2. CONTRACTOR TO CONTACT ENTERPRISE A MINIMUM OF 72 HOURS NOTICE PRIOR TO CROSSING THE PIPELINE WITH ANY HEAVY CONSTRUCTION EQUIPMENT. PLACE MINIMUM 8 INCH THICK TIMBER MATS OVER THE PIPELINE WHERE CROSING

6. CHEVRON PIPELINE COMPANY
6.1. FACILITY OWNER MUST NOTIFY COMPANY'S FIELD TECHNICIAN AT LEAST 72 HOURS PRIOR TO ANY WORK NEAR COMPANY'S PIPELINE(S). CONTACT FOR COMPANY IS: CALL FELIPE SALINAS 936-346-1043

6.2. AN AUTHORIZED CHEVRON REPRESENTATIVE MUST BE ON-SITE AT CHEVRON'S DISCRETION DURING ANY WORK PERFORMED ON CHEVRON RIGHT-OF-WAY.

6.3. BACKFILLING MUST MEET REQUIREMENTS OF DOT 49 CFR 195.252 BACKFILLING. WHEN A DITCH DITCH FOR A PIPELINE IS BACKFILLED, IT MUST BE BACKFILLED IN MANNER THAT: (A) PROVIDES FIRM SUPPORT UNDER THE PIPE; AND (B) PREVENTS DAMAGE TO THE PIPE AND PIPE AND PIPE COATING FROM EQUIPMENT OR FROM THE BACKFILL MATERIAL.

6.4. SIGNS MUST BE PLACED AT EACH EDGE OF THE RIGHT-OF-WAY TO MARK THE UNDERGROUND LINE AND ITS ANGLE OF CROSSING. THESE SIGNS ARE TO BE FURNISHED AND INSTALLED BY THE APPLICANT.

6.5. APPLICANT MUST BE RESPONSIBLE FOR ANY COATING REPAIR, PIPE REPLACEMENT, OR PRODUCT LOSS CAUSED BY AN ACTION BY APPLICANT, ITS AGENTS OR EMPLOYEES DURING THE CONSTRUCTION, OPERATION, OR MAINTENANCE OF PROPOSED PIPELINE.

6.6. APPLICANT MUST ABIDE BY ALL REQUIREMENTS SET FORTH BY THE RELEVANT PIPELINE CROSSING AGREEMENT.

6.7. NORMAL LOADS ACCEPTABLE TO THE STATE HIGHWAY DEPARTMENT MAY CROSS THE PIPELINE WHERE A MINIMUM OF 5.5 FEET OF COVER IS PROVIDED. HEAVY EQUIPMENT SUCH AS CONSTRUCTION LOGGING, ETC., MUST CROSS PIPELINE ONLY AT APPROVED LOCATIONS WHERE COVER HAS BEEN CHECKED AND DETERMINED ADEQUATE TO MEET LOAD REQUIREMENTS.

6.8. ALL EXCAVATION WORK WITHIN 2 FEET OF THE PIPELINE MUST BE APPROACHED WITH DUE CAUTION REGARDING THE SAFETY AND INTEGRITY OF CPL'S PIPELINES AND RELATED FACILITIES. THE SOIL SURROUNDING THE PIPELINE MUST BE LOOSENED WITH HAND TOOLS BEFORE IT IS REMOVED BY MECHANICAL EQUIPMENT AS SPECIFIED BY THE DAMAGE PREVENTION LAWS OF THE STATE. ANY HEAVY EQUIPMENT USED FOR EXCAVATION MUST BE POSITIONED SO THAT NO DAMAGE OCCURS TO THE PIPELINE.

6.9. ANY CHANGE IN THE AMOUNT OF EXISTING MATERIAL (SOIL) ON AND OVER THE RIGHT-OF-WAY MUST BE APPROVED IN ADVANCE.

7. MARATHON
7.1. AN 811 MUST BE PLACED PRIOR TO THE START OF THE WORK.

7.2. A MARATHON REPRESENTATIVE MUST BE ON SITE DURING ALL WORK WITHIN FIFTY (50) FEET ON MARATHON'S PIPELINE(S). PLEASE CONTACT MIKE MCCAFFERY (281-753-3164) TO COORDINATE ON SITE WORK.

7.3. CONSTRUCTION ACTIVITIES THAT CROSS OVER THE PIPELINES WILL REQUIRE THE USE OF MATS FOR CONCRETE TRUCKS AND ANY OTHER HEAVY EQUIPMENT ON WHEELS TO PROTECT THE PIPELINES FROM DAMAGE PER THE MARATHON REPRESENTATIVE ON SITE.

7.4. VIBRATING EQUIPMENT SHALL BE TURNED OFF WHILE TRAVELING OVER THE PIPELINES.

8. NUSTAR ENERGY PIPELINE
8.1. NO ACTIVITY SHALL BE PERFORMED WITHIN THE NUSTAR EASEMENT OR IN THE VICINITY OF THE NUSTAR PIPELINE WITHOUT PROVIDING NUSTAR WITH 48 HOURS' NOTICE. PLEASE CONTACT GEORGE KORNECK (C) 832-244-9699.

9. MAGELLAN PIPELINE COMPANY
9.1. NOTIFY MAGELLAN REPRESENTATIVE 48 HOURS IN ADVANCE OF ANY ENCROACHMENT ACTIVITIES

9.2. IF EXCAVATING WITHIN 2 FEET OF ANY MAGELLAN PIPELINE OR DEEMED NECESSARY BY ON-SITE REPRESENTATIVE, EXCAVATION OR ANY NECESSARY DIGGING MUST BE DONE BY HAND

10. TRINITY RIVER ENERGY
10.1. CONTRACTOR TO VERIFY PIPELINE ABANDONMENT

11. WILLIAMS PURITY PIPELINE COMPANY
11.1. CONTRACTOR TO CONTACT COMPANY REPRESENTATIVE RAUL SAAVEDRA AT 346-321-8264 PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES

12. CELANESE
12.1. REQUIRE 48-HOUR NOTICE BEFORE CONSTRUCTION BEGINS

12.2. NOTICE IS REQUIRED BEFORE CROSSING THE PIPELINE WITH HEAVY EQUIPMENT

12.3. RESERVE THE RIGHT TO HAVE A PIPELINE REPRESENTATIVE STATIONED ALONG PIPELINE RIGHT-OF-WAY WHEN WORK IS BEING DONE

12.4. REQUIRE AT LEAST 4 FEET OF COVER ABOVE THE PIPELINE AT LOCATIONS WHERE CONSTRUCTION ACTIVITIES WILL TAKE PLACE OVER THE PIPELINE

12.5. REQUIRE PHYSICAL VERIFICATION OF THE PIPELINE PRIOR TO OPEN CUT NEAR THE CELANESE PIPELINE

12.6. REQUIRE THE USE OF MATTING OVER THE PIPELINE AT LOCATIONS WHERE CONSTRUCTION ACTIVITIES WILL TAKE PLACE OVER THE CELANESE PIPELINE, AT THE DISCRETION OF CELANESE'S FIELD REPRESENTATIVE

12.7. REQUIRE AT LEAST 5 FEET OF CLEARANCE FROM THE TOP OF THE ACCESS ROAD SURFACE TO THE TOP OF THE CELANESE PIPELINE

12.8. ALL MECHANICAL DIGGING EQUIPMENT APPROVED TO WORK WITHIN THE CELANESE EASEMENT MUST HAVE THE TEETH REMOVED OR BARRED WITH A PLATE WELDED ACROSS THE TEETH

12.9. NO PLACEMENT OF EXCAVATED MATERIAL OVER THE PIPELINE

12.10. NO LARGE VIBRATORY COMPACTION EQUIPMENT IS ALLOWED WITHIN THE PIPELINE RIGHT-OF-WAY, ONLY WALK-BEHIND VIBRATORY ROLLER/COMPACTOR IS ALLOWED WHEN WORKING OVER THE CELANESE PIPELINE

12.11. ANY EXCAVATION COMPLETED WITHIN 2 FEET OF THE PIPELINE WILL BE DONE BY HAND

12.12. RECORD DRAWINGS SHOULD BE PROVIDED TO CELANESE

PIPELINE CONTACTS

1. CONTRACTOR SHALL CONTACT PIPELINE OWNERS AT LEAST 48 HOURS PRIOR TO EXCAVATION NEAR RESPECTIVE PIPELINES

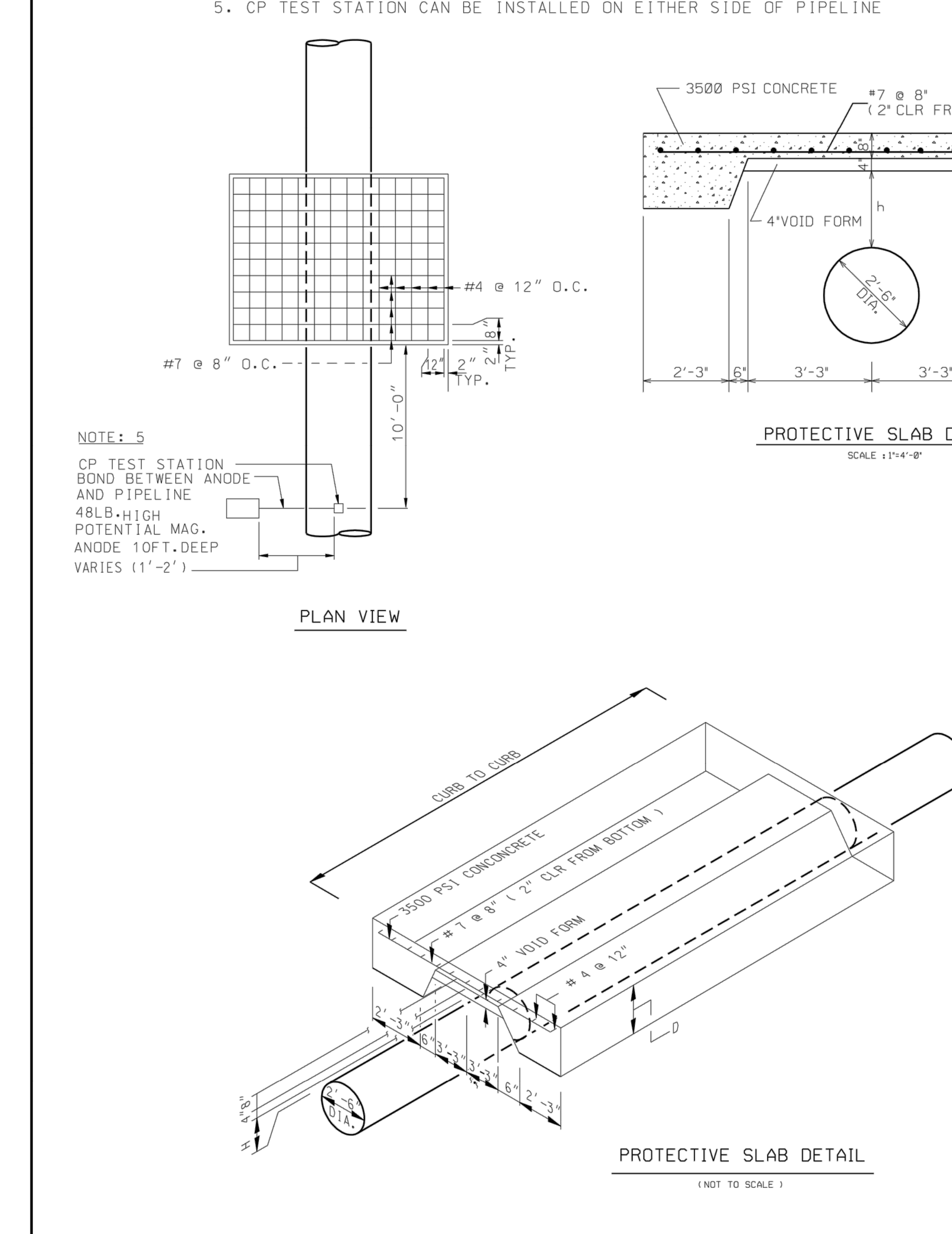
• CELANESE	DAN ERB	281-474-6419
• CHEVRON PIPELINE COMPANY	FELIPE SALINAS	936-346-1043
• THE DOW CHEMICAL COMPANY	MICAH CHOATE CHRIS PERKINS	713-858-2448 832-205-5035
• ENTERPRISE PRODUCTS	JOHN WALTSON	281-478-2106
• EXXONMOBIL PIPELINE COMPANY	JAVIER ROBLES	281-705-6106
• INEOS USA	SCOTT STRINGFELLOW KERVIN SANCHEZ	281-839-0514 281-839-0783
• KOCH PIPELINE	JOSHUA BRAZLE	830-623-1478
• MAGELLAN PIPELINE COMPANY	ERIN BRANTLEY	713-475-4303
• MARATHON PIPE LINE	MIKE MCCAFFERY	281-753-3164
• NUSTAR ENERGY PIPELINE	GREG KORNECK	832-244-9699
• TRINITY RIVER ENERGY	JOHN HAGEMAN	713-557-8348
• WILLIAMS PURITY PIPELINE COMPANY	RAUL SAAVEDRA	346-321-8264

2. NO EXCAVATION SHALL TAKE PLACE WITHOUT APPROVAL FROM RESPECTIVE PIPELINE OWNER AND VERIFICATION BY THE RESPECTIVE PIPELINE OWNER OF LOCATION AND DEPTH.

3. HEAVY EQUIPMENT IS NOT TO BE DRIVEN OVER PIPELINE CROSSINGS OR EASEMENTS. NO TRUCKS AND/OR MATERIALS ARE TO BE STAGED IN PIPELINE R.O.W. AT ANY TIME.

SITE	FREEPORT, TEXAS	TEXAS OPERATIONS	JOB NO. A3-234B-2463Y5
LOCATION	OUTSIDE		CHARGE 2463

1. CONCRETE STRENGTH @ 28 DAYS SHALL BE 3500 PSI MINIMUM.
2. REINFORCING STEEL SHALL BE GRADE 60 DEFORMED BARS.
3. SEAL ENDS OF VOID FORM TO PREVENT CONCRETE FROM FLOWING INTO VOIDS.
4. VOID FORM SHALL BE 4" SLAB VOID AS MANUFACTURED BY SUREVOID PRODUCTS, INC. INSTALL PER MFGR'S INSTRUCTIONS
5. CP TEST STATION CAN BE INSTALLED ON EITHER SIDE OF PIPELINE



H	D
1'-9"	2'-0"
1'-10"	2'-1"
1'-11"	2'-2"
2'-0"	2'-3"

	BY	DATE	THE DOW CHEMICAL COMPANY	DETAIL
SPEC	JF	2/13/13	ROAD CROSSING STANDARD ZERO LOAD TRANSFER CONCRETE SLAB	
CHKD	RR	11/2/98		
APPD				
DESIGN	L. SCHULZE	10/29/98		A3-234B-2463Y5
			REV DATE 3 4/21/06 4 1/3/07 5 2/13/13	
				SHEET: 1

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION
& LINEAR DETENTION DITCH

PIPELINE SAFETY & REQUIREMENTS

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 03 Of 39

H:\ACAD\Clients\135\0320\Design\135-0320-03 PIPELINE NOTES.dwg (XREF: 135-0320 Border)

11/14/18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

CLEARING & GRUBBING PLAN

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: AS SHOWN
APPROVED:	SHEET No. 04 Of 39

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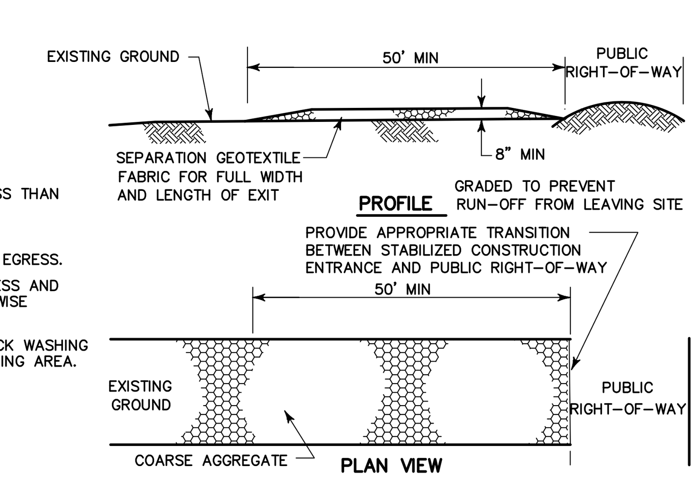
NOTE:
CLEARING AND GRUBBING MUST BE STARTED BY DECEMBER 31, 2018 ON "GORDY TRACT"

CONSTRUCTION NOTES:

LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN 50 FEET.
2. THICKNESS SHALL BE NOT LESS THAN 8 INCHES.
3. WIDTH SHALL BE NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
4. STABILIZATION FOR OTHER AREAS SHALL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS AS THE STABILIZED CONSTRUCTION EXIT, UNLESS OTHERWISE SHOWN ON THE CONSTRUCTION DRAWINGS.
5. STABILIZED AREA MAY BE WIDENED OR LENGTHENED TO ACCOMMODATE A TRUCK WASHING AREA. AN OUTLET SEDIMENT TRAP MUST BE PROVIDED FOR THE TRUCK WASHING AREA.
6. SEE COH STANDARD SPECIFICATION FOR STABILIZED CONSTRUCTION EXIT.
7. STABILIZED CONSTRUCTION EXIT SHALL BE MAINTAINED FREE OF SEDIMENT FOR THE DURATION OF THE PROJECT.



STABILIZED CONSTRUCTION EXIT
N.T.S.

CONSTRUCTION SEQUENCE:
1. CLEARING AND GRUBBING MUST BE STARTED BY DECEMBER 31, 2018 ON "GORDY TRACT".
2. CONTRACTOR TO FIELD VERIFY ALL PIPELINE DEPTHS.
3. SITE AND DRAINAGE DITCH SHALL BE CONSTRUCTED.
4. ALL UNDERGROUND UTILITIES AND STORM PIPE SHALL BE INSTALLED WITH APPROPRIATE APPURTENANCES.
5. PAVING SHALL BE PLACED STARTING ON THE EAST SIDE OF THE PROJECT AND COORDINATE WITH TXDOT AND ALL PIPELINES FIRST.

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

CONSTRUCTION SEQUENCE PLAN

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1:100
APPROVED:	SHEET No. 4A Of 39

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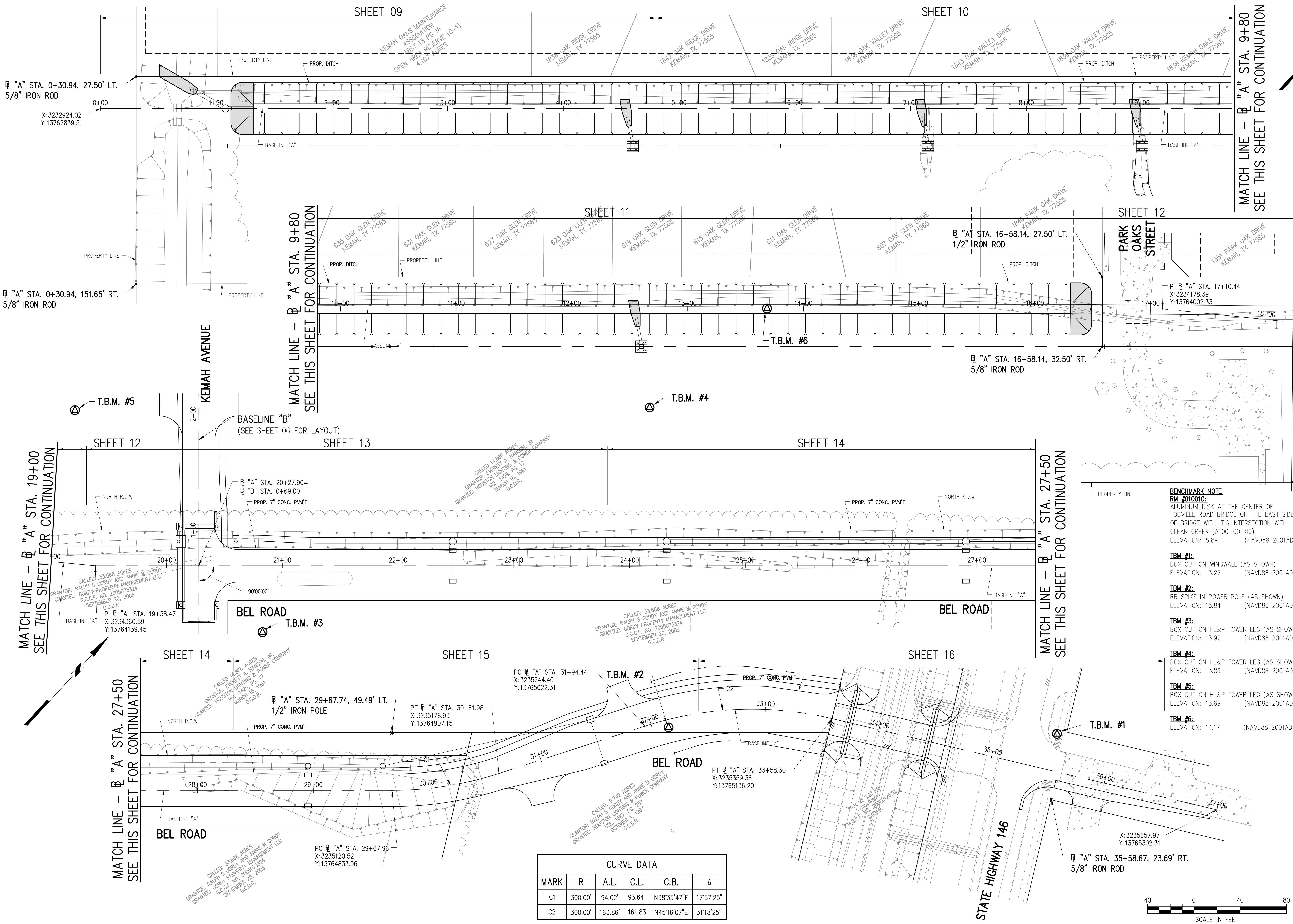
11/20/18



CURVE DATA					
MARK	R	A.L.	C.L.	C.B.	Δ
C1	300.00'	94.02'	93.64	N38°35'47"E	17°57'25"
C2	300.00'	163.86'	161.83	N45°16'07"E	31°18'25"

BENCHMARK NOTE
RM #010010:
ALUMINUM DISK AT THE CENTER OF TODVILLE ROAD BRIDGE ON THE EAST SIDE OF BRIDGE WITH IT'S INTERSECTION WITH CLEAR CREEK (A100-00-00).
ELEVATION: 5.89 (NAVD88 2001ADJ)

TBM #1:
BOX CUT ON WINGWALL (AS SHOWN)
ELEVATION: 13.27 (NAVD88 2001ADJ)

TBM #2:
RR SPIKE IN POWER POLE (AS SHOWN)
ELEVATION: 15.84 (NAVD88 2001ADJ)

TBM #3:
BOX CUT ON HL&P TOWER LEG (AS SHOWN)
ELEVATION: 13.92 (NAVD88 2001ADJ)

TBM #4:
BOX CUT ON HL&P TOWER LEG (AS SHOWN)
ELEVATION: 13.86 (NAVD88 2001ADJ)

TBM #5:
BOX CUT ON HL&P TOWER LEG (AS SHOWN)
ELEVATION: 13.69 (NAVD88 2001ADJ)

TBM #6:
ELEVATION: 14.17 (NAVD88 2001ADJ)

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

PROJECT LAYOUT HORIZONTAL & VERTICAL CONTROL - SHEET 1 OF 2

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
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DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: AS SHOWN
APPROVED:	SHEET No. 05 Of 39

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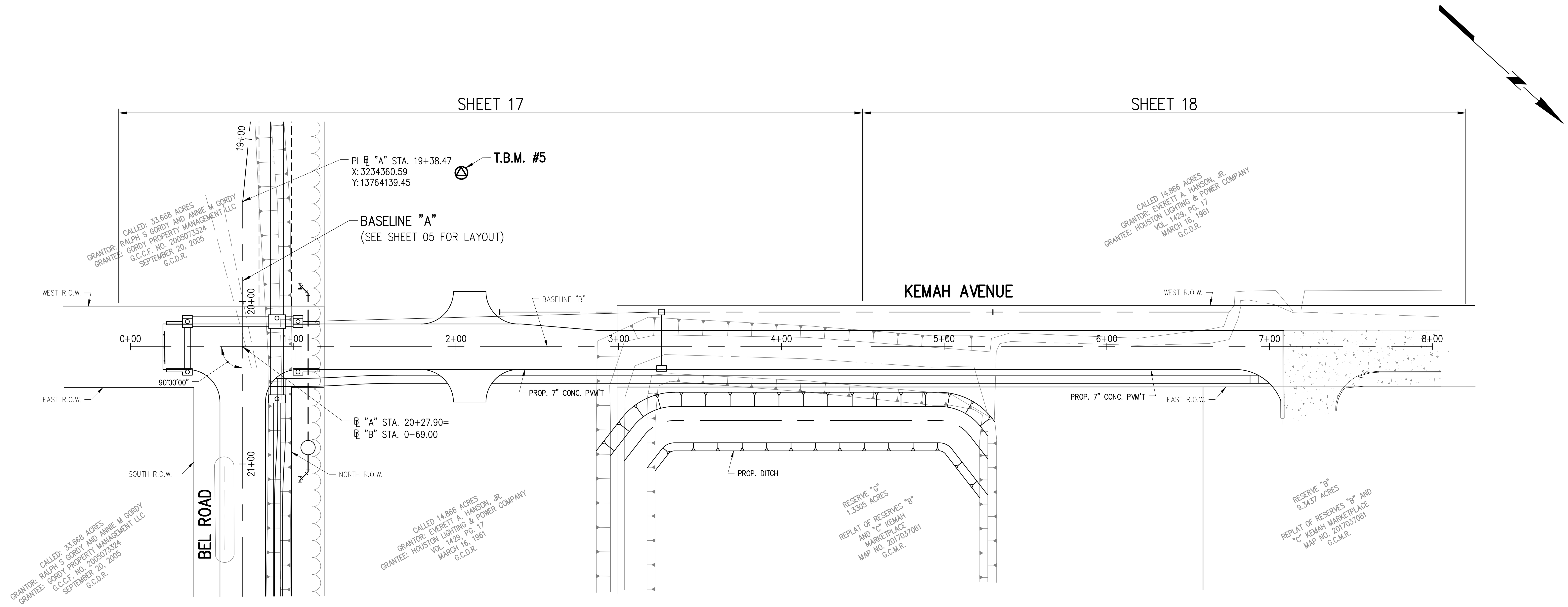
11/14/18



BENCHMARK NOTE
RM #010010:
ALUMINUM DISK AT THE CENTER OF TODVILLE ROAD BRIDGE ON THE EAST SIDE OF BRIDGE WITH IT'S INTERSECTION WITH CLEAR CREEK (A100-00-00).
ELEVATION: 5.89 (NAVD88 2001ADJ)

TBM #1:
BOX CUT ON WINGWALL (AS SHOWN)
ELEVATION: 13.27 (NAVD88 2001ADJ)

TBM #2:
RR SPIKE IN POWER POLE (AS SHOWN)
ELEVATION: 15.84 (NAVD88 2001ADJ)

TBM #3:
BOX CUT ON HL&P TOWER LEG (AS SHOWN)
ELEVATION: 13.92 (NAVD88 2001ADJ)

TBM #4:
BOX CUT ON HL&P TOWER LEG (AS SHOWN)
ELEVATION: 13.86 (NAVD88 2001ADJ)

TBM #5:
BOX CUT ON HL&P TOWER LEG (AS SHOWN)
ELEVATION: 13.69 (NAVD88 2001ADJ)

TBM #6:
ELEVATION: 14.17 (NAVD88 2001ADJ)

40 0 40 80
SCALE IN FEET

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

PROJECT LAYOUT HORIZONTAL & VERTICAL CONTROL - SHEET 2 OF 2

LJA Engineering, Inc.
11821 East Freeway
Suite 360
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Phone 713.450.1300
Fax 713.450.1385
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DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: AS SHOWN
APPROVED:	SHEET No. 06 Of 39

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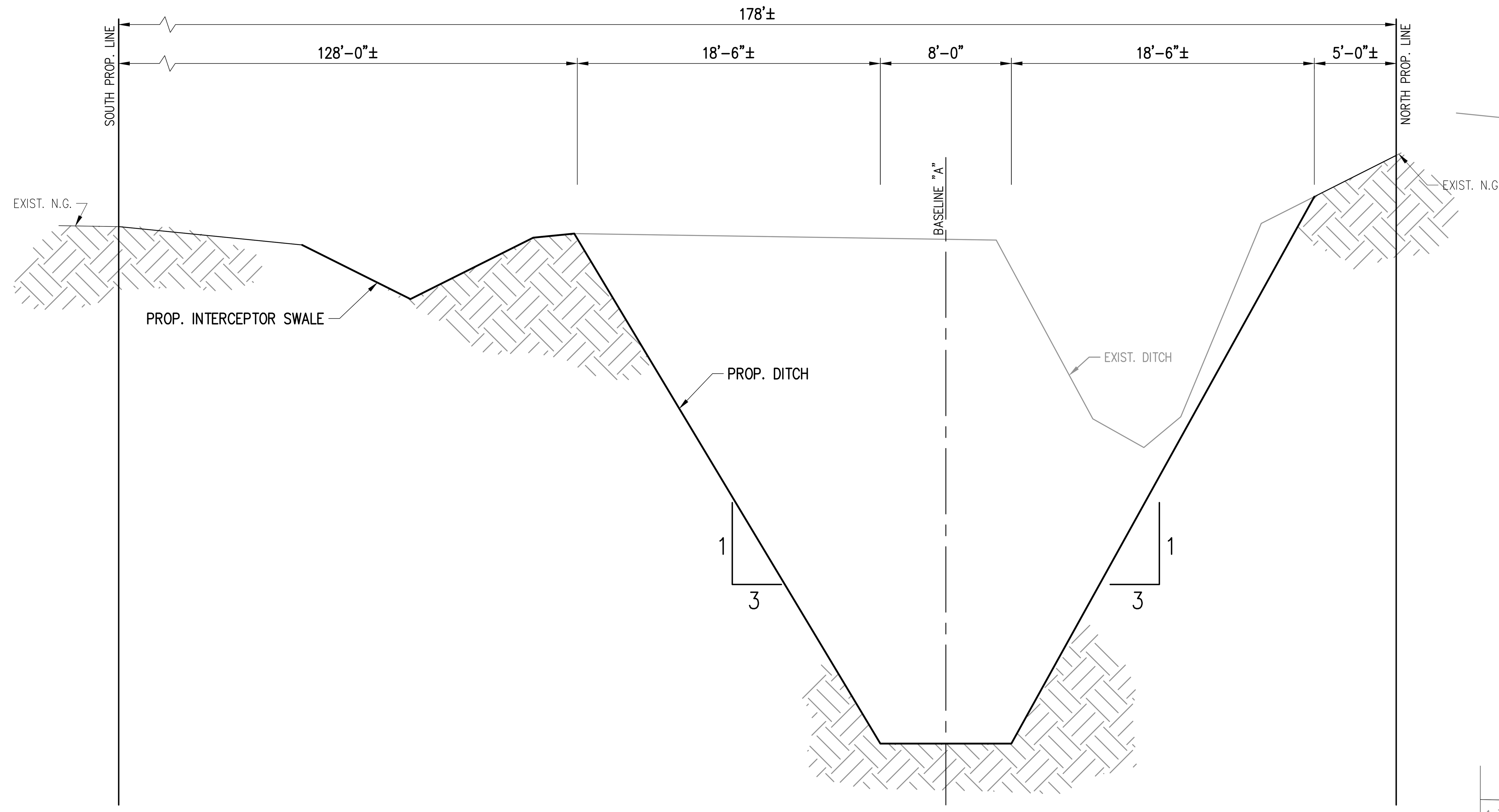
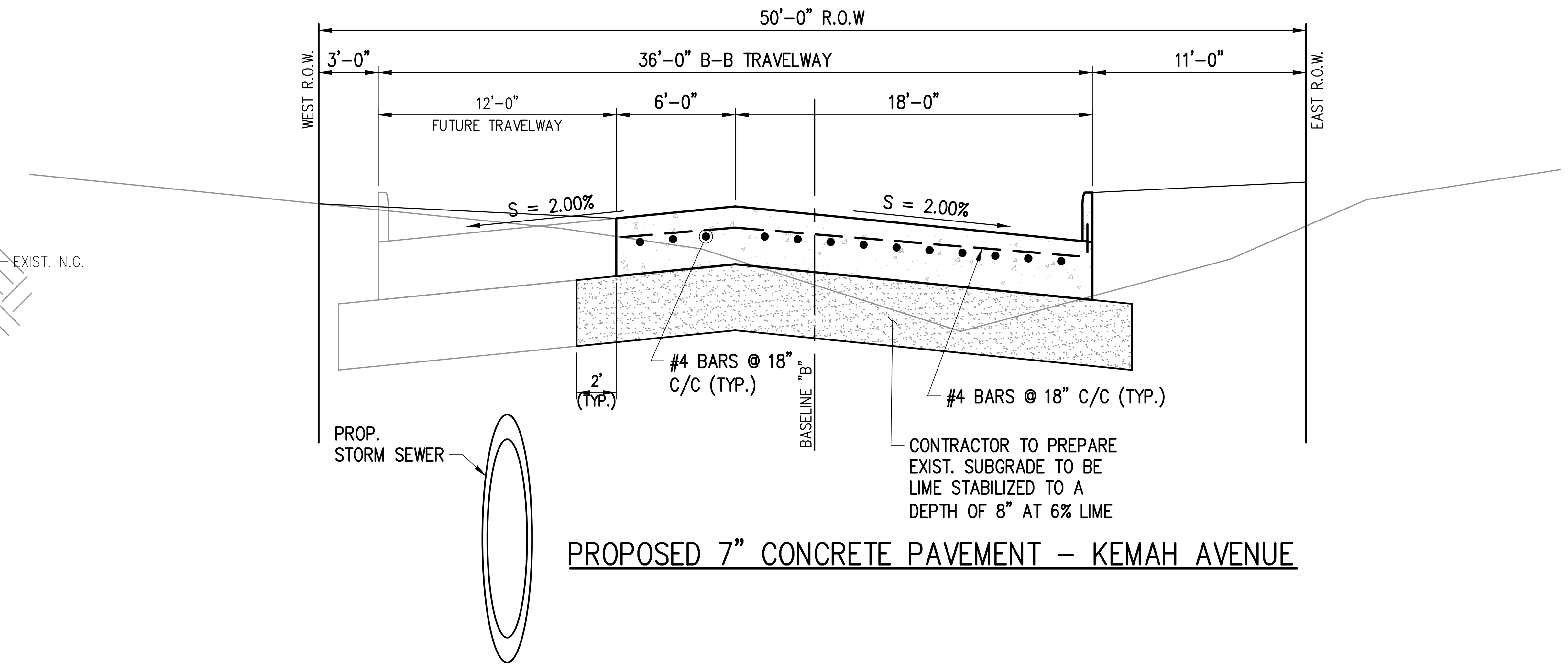
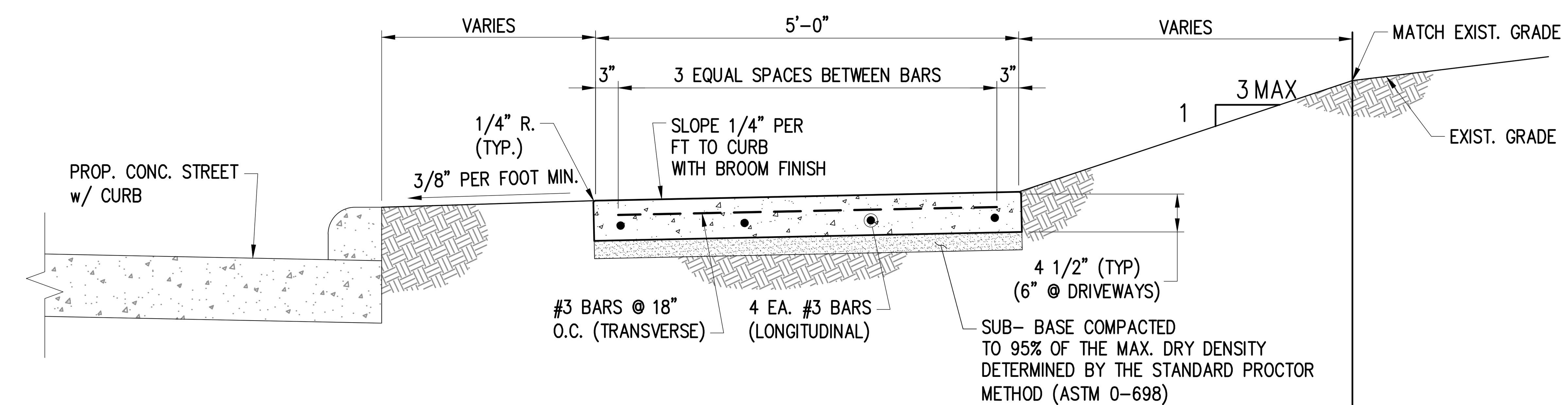
11/14/18



PROPOSED DITCH

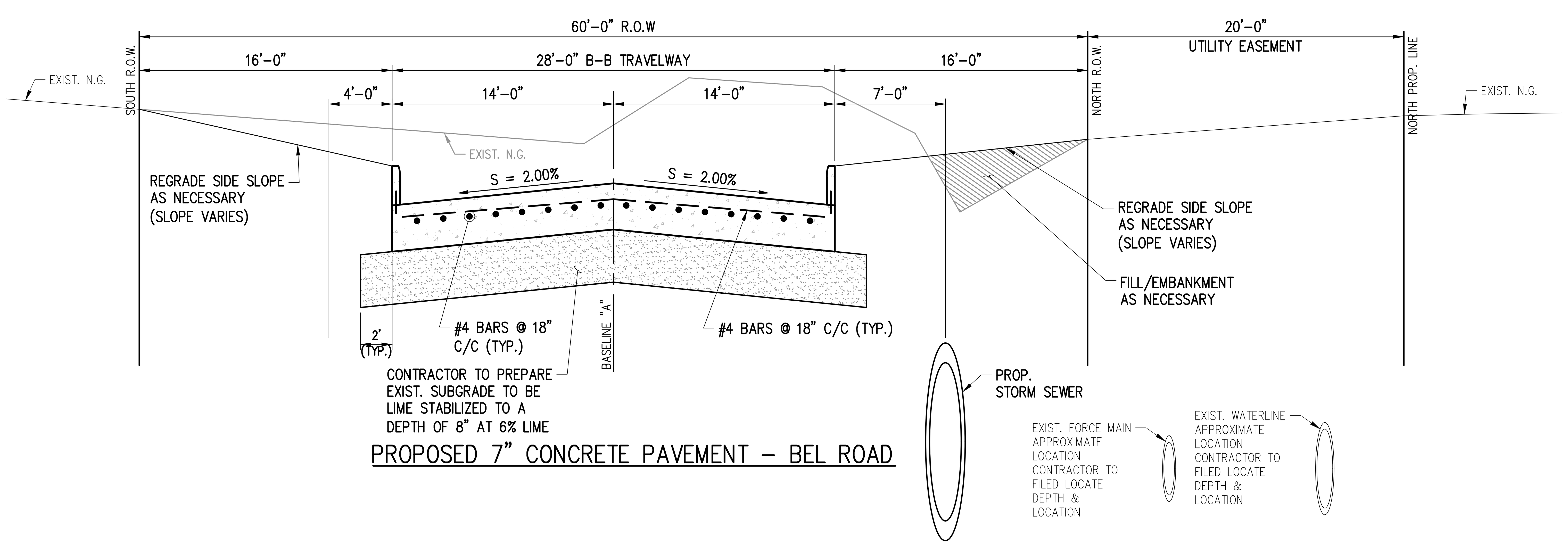


PROPOSED 7" CONCRETE PAVEMENT – KEMAH AVENUE

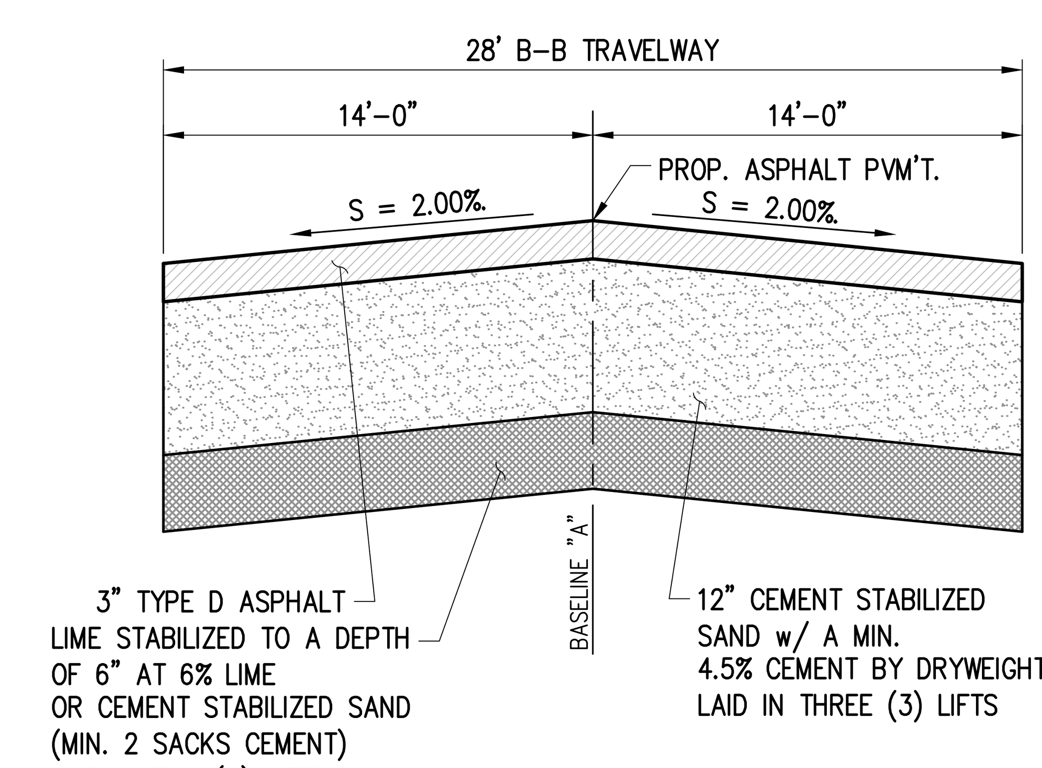


PROPOSED CONCRETE SIDEWALK

MARK E. HAVRAN
118610
STATE OF TEXAS
LICENSED PROFESSIONAL ENGINEER
11-20-18



PROPOSED 7" CONCRETE PAVEMENT – BEL ROAD



PROPOSED 3" ASPHALT PAVEMENT – BEL ROAD

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

TYPICAL SECTIONS

LJA Engineering, Inc.
11821 East Freeway
Suite 360
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Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 07 Of 39

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11/20/18

3 YEAR

WinStorm (STORM DRAIN DESIGN) Version 3.05, Jan. 25, 2002
Run @ 11/19/2018 9:34:55 AM

PROJECT NAME : Bel Road
JOB NUMBER : 135-0320
PROJECT DESCRIPTION : City of Kemah, Bel Road Extension
DESIGN FREQUENCY : 3 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 3 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A-1	0.96	0.16	10.00	10.00	5.38	0.000	0.827
	0.96	0.16	Pavement				
A-2	0.96	0.17	10.00	10.00	5.38	0.000	0.878
	0.96	0.17	Pavement				
B-1	0.55	1.53	10.00	10.00	5.38	0.000	4.540
	0.55	1.53	Single family				
B-2	0.96	0.12	10.00	10.00	5.38	0.000	0.610
	0.96	0.12	Pavement				
C-1	0.55	4.17	10.00	10.00	5.38	0.000	12.327
	0.55	4.17	Single family				
C-2	0.96	0.22	10.00	10.00	5.38	0.000	1.157
	0.96	0.22	Pavement				
D-1	0.55	0.81	10.00	10.00	5.38	0.000	2.394
	0.55	0.81	Single family				
D-2	0.96	0.09	10.00	10.00	5.38	0.000	0.465
	0.96	0.09	Pavement				
E-1	0.55	2.11	10.00	10.00	5.38	0.000	6.245
	0.55	2.11	Single family				
E-2	0.96	0.23	10.00	10.00	5.38	0.000	1.168
	0.96	0.23	Pavement				
F-1	0.96	0.03	10.00	10.00	5.38	0.000	0.165
	0.96	0.03	Pavement				
F-2	0.96	0.03	10.00	10.00	5.38	0.000	0.165
	0.96	0.03	Pavement				
F-3	0.96	0.03	10.00	10.00	5.38	0.000	0.165
	0.96	0.03	Pavement				
F-4	0.96	0.03	10.00	10.00	5.38	0.000	0.165
	0.96	0.03	Pavement				
G-1	0.96	0.37	10.00	10.00	5.38	0.000	1.927
	0.96	0.37	Pavement				
G-2	0.96	0.30	10.00	10.00	5.38	0.000	1.570
	0.96	0.30	Pavement				
K	0.55	1.83	10.00	10.00	5.38	0.000	5.422
	0.55	1.83	Single family				

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
A-1	Curb	0.960	0.16	10.00	5.38	0.000	0.00	0.827
A-2	Curb	0.960	0.33	10.32	5.33	0.000	0.00	1.689
B-1	Curb	0.550	1.53	10.00	5.38	0.000	0.00	4.540
B-2	Curb	0.579	1.65	10.12	5.36	0.000	0.00	5.131
C-1	Curb	0.550	4.17	10.00	5.38	0.000	0.00	12.327
C-2	Curb	0.571	4.39	10.10	5.37	0.000	0.00	13.446
D-1	Curb	0.550	0.81	10.00	5.38	0.000	0.00	2.394
D-2	Curb	0.591	0.90	10.14	5.36	0.000	0.00	2.847
E-1	Curb	0.550	2.11	10.00	5.38	0.000	0.00	6.245
E-2	Curb	0.590	2.34	10.11	5.36	0.000	0.00	7.388
F-1	Curb	0.960	0.03	10.00	5.38	0.000	0.00	0.165
F-2	Curb	0.960	0.06	10.34	5.33	0.000	0.00	0.327
F-3	Curb	0.960	0.03	10.00	5.38	0.000	0.00	0.165
F-4	Curb	0.960	0.06	10.34	5.33	0.000	0.00	0.327
MH1	CircMh	0.960	0.33	10.32	5.33	0.000	0.00	1.689
MH2	CircMh	0.643	1.98	12.14	5.06	0.000	0.00	6.446
MH3	CircMh	0.593	6.37	13.14	4.93	0.000	0.00	18.617
MH4	CircMh	0.593	7.27	14.44	4.76	0.000	0.00	20.524
MH5	CircMh	0.592	9.61	15.39	4.65	0.000	0.00	26.438
JNC6	JnctBx	0.592	9.61	15.39	4.65	0.000	0.00	26.438
JNC7	JnctBx	0.597	9.73	15.39	4.65	0.000	0.00	27.009
JNC8	JnctBx	0.590	11.57	17.22	4.45	0.000	0.00	30.323
K	JnctBx	0.550	1.83	10.00	5.38	0.000	0.00	5.422
OUT	Outlt	0.590	11.57	17.22	4.45	0.000	0.00	30.323

Conveyance Configuration Data

Run#	Node I.D. US	DS	Flowline US (ft)	Elev. DS (ft)	Shape	#	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	A-1	A-2	8.93	8.83	Circ	1	0.00	2.00	40.00	0.25	0.013
2	A-2	MH1	8.83	8.48	Circ	1	0.00	2.00	185.00	0.19	0.013
3	MH1	MH2	8.48	8.38	Circ	1	0.00	2.00	65.00	0.15	0.013
4	MH2	MH3	8.38	8.02	Circ	1	0.00	2.00	198.00	0.18	0.013
5	MH3	MH4	8.02	7.74	Circ	1	0.00	3.00	267.00	0.10	0.013
6	MH4	MH5	7.74	7.58	Circ	1	0.00	3.50	186.00	0.09	0.013
7	MH5	JNC6	7.58	7.40	Circ	1	0.00	3.50	188.00	0.10	0.013
8	JNC6	JNC7	7.40	7.30	Box	1	7.00	3.00	48.00	0.21	0.013
9	JNC7	JNC8	7.30	7.21	Box	1	7.00	4.00	135.00	0.07	0.013
10	JNC8	OUT	7.21	7.03	Box	1	7.00	4.00	250.00	0.07	0.013
11	B-1	B-2	8.68	8.58	Circ	1	0.00	2.00	28.00	0.36	0.013
12	B-2	MH2	8.58	8.38	Circ	1	0.00	2.00	7.00	2.86	0.013
13	C-1	C-2	8.32	8.22	Circ	1	0.00	2.00	28.00	0.36	0.013
14	C-2	MH3	8.22	8.02	Circ	1	0.00	2.00	7.00	2.86	0.013
15	D-1	D-2	8.04	7.94	Circ	1	0.00	2.00	28.00	0.36	0.013
16	D-2	MH4	7.94	7.74	Circ	1	0.00	2.00	7.00	2.86	0.013
17	E-1	E-2	7.88	7.78	Circ	1	0.00	2.00	28.00	0.36	0.013
18	E-2	MH5	7.78	7.58	Circ	1	0.00	2.00	7.00	2.86	0.013
19	F-1	F-2	7.60	7.50	Circ	1	0.00	3.00	28.00	0.36	0.013
20	F-2	JNC7	7.50	7.30	Box	1	5.00	3.00	68.00	0.29	0.013
21	F-3	F-4	7.60	7.50	Circ	1	0.00	3.00	28.00	0.36	0.013
22	F-4	JNC7	7.50	7.30	Box	1	5.00	3.00	5.00	4.00	0.013
23	K	JNC8	7.23	7.21	Circ	1	0.00	4.00	34.00	0.06	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline US Elev (ft)	DS Elev (ft)	Fr.Slope (%)	Depth Unif. (ft)	Actual (ft)	Velocity Unif. (f/s)	Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
1	10.49	10.49	0.001	0.37	1.66	2.09	0.30	0.83	11.31	0.000
2	10.49	10.49	0.006	0.56	2.00	2.33	0.54	1.69	9.84	0.000
3	10.49	10.48	0.006	0.59	2.00	2.16	0.54	1.69	8.87	0.000
4	10.48	10.32	0.081	1.19	2.00	3.32	2.05	6.45	9.65	0.000
5	10.32	10.10	0.078	2.16	2.36	3.42	3.12	18.62	21.60	0.000
6	10.10	9.99	0.042	2.19	2.41	3.24	2.91	20.52	29.51	0.000
7	9.99	8.98	0.069	2.41	2.41	3.75	3.75	26.44	31.14	0.000
8	8.69	8.68	0.011	0.89	1.38	4.24	2.75	26.44	113.19	0.000
9	8.68	8.59	0.005	1.38	1.38	2.81	2.81	27.01	97.05	0.000
10	8.59	8.41	0.007	1.38	1.38	3.15	3.15	30.32	100.86	0.000
11	10.49	10.49	0.040	0.80	1.91	3.89	1.47	4.54	13.52	0.000
12*	10.49	10.48	0.051	0.50	2.00	8.47	1.63	5.13	38.25	0.000
13	10.43	10.35	0.297	1.50	2.00	4.88	3.92	12.33	13.52	0.000
14*	10.35	10.32	0.353	0.82	2.00	11.12	4.28	13.45	38.25	0.000
15	10.10	10.10	0.011	0.57	2.00	3.24	0.76	2.39	13.52	0.000
16*	10.10	10.10	0.016	0.37	2.00	7.14	0.91	2.85	38.25	0.000
17	10.02	9.99	0.076	0.95	2.00	4.23	1.99	6.25	13.52	0.000
18*	9.99	9.99	0.107	0.60	2.00	9.41	2.35	7.39	38.25	0.000
19*	8.68	8.68	0.000	0.14	1.18	1.38	0.06	0.17	39.87	0.000
20	8.68	8.68	0.000	0.07	1.38	0.99	0.05	0.33	89.07	0.000
21*	8.68	8.68	0.000	0.14	1.18	1.38	0.06	0.17	39.87	0.000
22*	8.68	8.68	0.000	0.03	1.38	2.18	0.05	0.33	328.61	0.000
23	8.59	8.59	0.001	1.06	1.38	2.03	1.42	5.42	34.84	0.000

=====END=====

* Super critical flow.

100 YEAR

WinStorm (STORM DRAIN DESIGN) Version 3.05, Jan. 25, 2002
Run @ 11/15/2018 3:58:48 PM

PROJECT NAME : Bel Road
JOB NUMBER : 135-0320
PROJECT DESCRIPTION : City of Kemah, Bel Road Extension
DESIGN FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 100 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A-1	0.96	0.16	10.00	10.00	11.66	0.000	1.791
	0.96	0.16	Pavement				
A-2	0.96	0.17	10.00	10.00	11.66	0.000	1.903
	0.96	0.17	Pavement				
B-1	0.55	1.53	10.00	10.00	11.66	0.000	9.836
	0.55	1.53	Single family				
B-2	0.96	0.12	10.00	10.00	11.66	0.000	1.321
	0.96	0.12	Pavement				
C-1	0.55	4.17	10.00	10.00	11.66	0.000	26.706
	0.55	4.17	Single family				
C-2	0.96	0.22	10.00	10.00	11.66	0.000	2.507
	0.96	0.22	Pavement				
D-1	0.55	0.81	10.00	10.00	11.66	0.000	5.187
	0.55	0.81	Single family				
D-2	0.96	0.09	10.00	10.00	11.66	0.000	1.007
	0.96	0.09	Pavement				
E-1	0.55	2.11	10.00	10.00	11.66	0.000	13.529
	0.55	2.11	Single family				
E-2	0.96	0.23	10.00	10.00	11.66	0.000	2.529
	0.96	0.23	Pavement				
F-1	0.96	0.03	10.00	10.00	11.66	0.000	0.358
	0.96	0.03	Pavement				
F-2	0.96	0.03	10.00	10.00	11.66	0.000	0.358
	0.96	0.03	Pavement				
F-3	0.96	0.03	10.00	10.00	11.66	0.000	0.358
	0.96	0.03	Pavement				
F-4	0.96	0.03	10.00	10.00	11.66	0.000	0.358
	0.96	0.03	Pavement				
G-1	0.96	0.37	10.00	10.00	11.66	0.000	4.175
	0.96	0.37	Pavement				
G-2	0.96	0.30	10.00	10.00	11.66	0.000	3.402
	0.96	0.30	Pavement				
K	0.55	1.83	10.00	10.00	11.66	0.000	11.747
	0.55	1.83	Single family				

Conveyance Configuration Data

Run#	Node I.D. US	DS	Flowline US (ft)	Elev. DS (ft)	Shape	#	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	A-1	A-2	8.93	8.83	Circ	1	0.00	2.00	40.00	0.25	0.013
2	A-2	MH1	8.83	8.48	Circ	1	0.00	2.00	185.00	0.19	0.013
3	MH1	MH2	8.48	8.38	Circ	1	0.00	2.00	65.00	0.15	0.013
4	MH2	MH3	8.38	8.02	Circ	1	0.00	2.00	198.00	0.18	0.013
5	MH3	MH4	8.02	7.74	Circ	1	0.00	3.00	267.00	0.10	0.013
6	MH4	MH5	7.74	7.58	Circ	1	0.00	3.50	186.00	0.09	0.013
7	MH5	JNC6	7.58	7.40	Circ	1	0.00	3.50	188.00	0.10	0.013
8	JNC6	JNC7	7.40	7.30	Box	1	7.00	3.00	48.00	0.21	0.013
9	JNC7	JNC8	7.30	7.21	Box	1	7.00	4.00	135.00	0.07	0.013
10	JNC8	OUT	7.21	7.03	Box	1	7.00	4.00	250.00	0.07	0.013
11	B-1	B-2	8.68	8.58	Circ	1	0.00	2.00	28.00	0.36	0.013
12	B-2	MH2	8.58	8.38	Circ	1	0.00	2.00	7.00	2.86	0.013
13	C-1	C-2	8.32	8.22	Circ	1	0.00	2.00	28.00	0.36	0.013
14	C-2	MH3	8.22	8.02	Circ	1	0.00	2.00	7.00	2.86	0.013
15	D-1	D-2	8.04	7.94	Circ	1	0.00	2.00	28.00	0.36	0.013
16	D-2	MH4	7.94	7.74	Circ	1	0.00	2.00	7.00	2.86	0.013
17	E-1	E-2	7.88	7.78	Circ	1	0.00	2.00	28.00	0.36	0.013
18	E-2	MH5	7.78	7.58	Circ	1	0.00	2.00	7.00	2.86	0.013
19	F-1	F-2	7.60	7.50	Circ	1	0.00	3.00	28.00	0.36	0.013
20	F-2	JNC7	7.50	7.30	Box	1	5.00	3.00	68.00	0.29	0.013
21	F-3	F-4	7.60	7.50	Circ	1	0.00	3.00	28.00	0.36	0.013
22	F-4	JNC7	7.50	7.30	Box	1	5.00	3.00	5.00	4.00	0.013
23	K	JNC8	7.23	7.21	Circ	1	0.00	4.00	34.00	0.06	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline US Elev (ft)	DS Elev (ft)	Fr.Slope (%)	Depth Unif. (ft)	Actual (ft)	Velocity Unif. (f/s)	Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)
1	13.24	13.24	0.006	0.54	2.00	2.62	0.57	1.79	11.31	0.000
2	13.24	13.19	0.026	0.84	2.00	2.90	1.16	3.66	9.84	0.000
3	13.19	13.17	0.026	0.91	2.00	2.64	1.16	3.66	8.87	0.000
4	13.17	12.42	0.379	2.00	2.00	4.43	4.43	13.93	9.65	0.000
5	12.42	11.45	0.365	3.00	3.00	5.70	5.70	40.28	21.60	0.000
6	11.45	11.08	0.198	3.50	3.50	4.65	4.65	44.76	29.51	0.000
7	11.08	9.79	0.330	3.50	3.50	6.01	6.01	57.81	31.14	0.000
8	9.79	9.78	0.054	1.50	2.48	5.51	3.34	57.81	113.19	0.000
9	9.78	9.71	0.024	2.25	2.50	3.67	3.31	57.84	97.05	0.000
10	9.71	9.53	0.031	2.50	2.50	3.81	3.81	66.62	100.86	0.000
11	13.24	13.19	0.189	1.27	2.00	4.69	3.13	9.84	13.52	0.000
12*	13.19	13.17	0.241	0.74	2.00	10.55	3.54	11.11	38.25	0.000
13	12.93	12.54	1.393	2.00	2.00	8.50	8.50	26.71	13.52	0.000
14*	12.54	12.42	1.660	1.31	2.00	13.41	9.28	29.15	38.25	0.000
15	11.47	11.45	0.053	0.86	2.00	4.02	1.65	5.19	13.52	0.000
16*	11.45	11.45	0.074	0.54	2.00	8.94	1.96	6.17	38.25	0.000
17	11.22	11.12	0.358	1.63	2.00	4.95	4.31	13.53	13.52	0.000
18*	11.12	11.08	0.500	0.90	2.00	11.63	5.09	16.00	38.25	0.000
19	9.78	9.78	0.000	0.20	2.28	1.74	0.06	0.36	39.87	0.000
20	9.78	9.78	0.000	0.11	2.48	1.34	0.06	0.71	89.07	0.000
21	9.78	9.78	0.000	0.20	2.28	1.74	0.06	0.36	39.87	0.000
22*	9.78	9.78	0.000	0.05	2.48	2.98	0.06	0.71	328.61	0.000
23	9.71	9.71	0.007	1.63	2.50	2.45	1.42	11.75	34.84	0.000

=====END=====

* Super critical flow.

100 0 100 200
SCALE IN FEET

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED
PROFESSIONAL ENGINEER
11-20-18

LEGEND

PROPOSED STORM SEWER & MANHOLE
PROPOSED STORM SEWER, MANHOLE & TYPE "B-B" INLETS
PROPOSED TYPE "C-2A" INLETS
PROPOSED STORM SEWER & JUNCTION BOX
PROPOSED PAVEMENT
INDICATES SHEET FLOW DIRECTION
INDICATES PAVEMENT FLOW DIRECTION
AREA A — INDICATES DRAINAGE AREA
INDICATES SYSTEM LINE NUMBER
INDICATES MANHOLE NUMBER
INDICATES DRAINAGE SYSTEM
INDICATES ACCUMULATED AREA
INDICATES ACCUMULATED C.F.S.
INDICATES ACCUMULATED AREA
INDICATES ACCUMULATED C.F.S.

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

DRAINAGE AREA MAP

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1:100
APPROVED:	SHEET No. 08 Of 39

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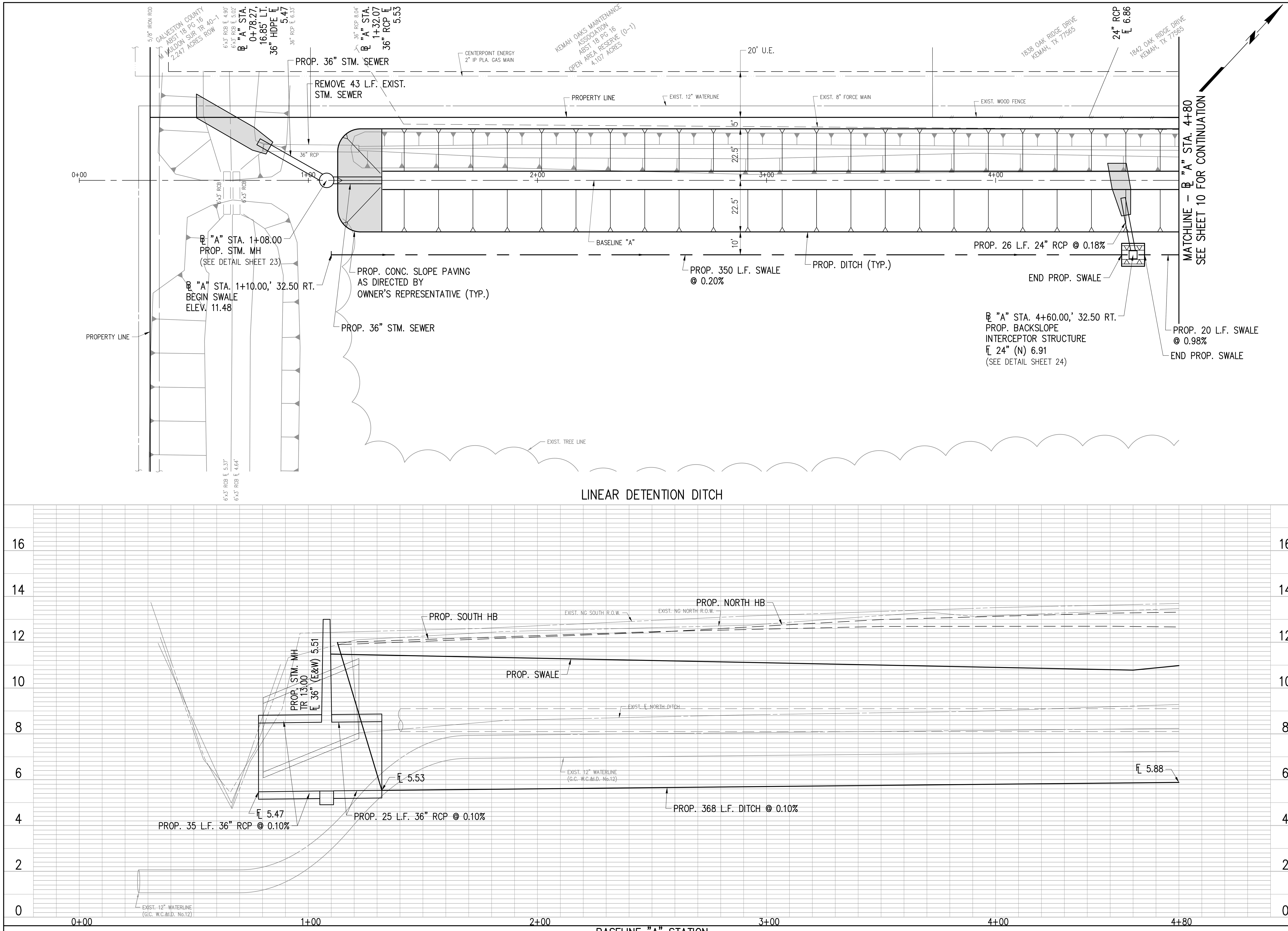
11/19/18



10/10/18

BENCHMARK NOTE
RM #010010:
ALUMINUM DISK AT THE CENTER OF TODVILLE ROAD BRIDGE ON THE EAST SIDE OF BRIDGE WITH IT'S INTERSECTION WITH CLEAR CREEK (A100-00-00).
ELEVATION: 5.89 (NAVD88 2001ADJ)

NOTES:

1. LINEAR DETENTION DITCH TURF ESTABLISHMENT TO FOLLOW SPECIFICATION 2107 FOR DRY APPLICATION TURF ESTABLISHMENT
2. CITY EXCAVATION/SPOILS TO BE PLACED SOUTH OF DITCH AS SHOWN ON SPOIL LOCATION MAP SHEET 20A. IF DIRECTED, CONTRACTOR TO HAUL SPOIL OFFSITE IN WRITING FROM OWNER'S REPRESENTATIVE.

20 0 20 40
SCALE IN FEET

TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED, CALL CENTERPOINT AT 713-207-2222

NOTICE:
For your safety, you are required by Texas law to call 811 at least 48 hours before you dig so that underground lines can be marked. This signature does not fulfill you obligation to call 811.

VERIFICATION OF PRIVATE UTILITIES

DATE 8-16-18
CenterPoint Energy/Natural Gas Facilities Verifications ONLY
CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not to be used for conflict verification.
Signature Valid for six months

DATE 8-16-18
CenterPoint Energy/UNDERGROUND Electrical Facilities Verifications ONLY
(This Signature verifies existing underground facilities – not to be used for conflict verification)
Signature Valid for six months

DATE 8/23/18
FRONTIER COMMUNICATIONS
(Approved for Underground Facilities only)
Signature Valid for one year

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

LINEAR DETENTION DITCH PLAN & PROFILE
BEGINNING TO BL "A" STA. 4+80

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1"=20' HORIZ.; 1"=2' VER.
APPROVED:	SHEET No. 09 Of 39

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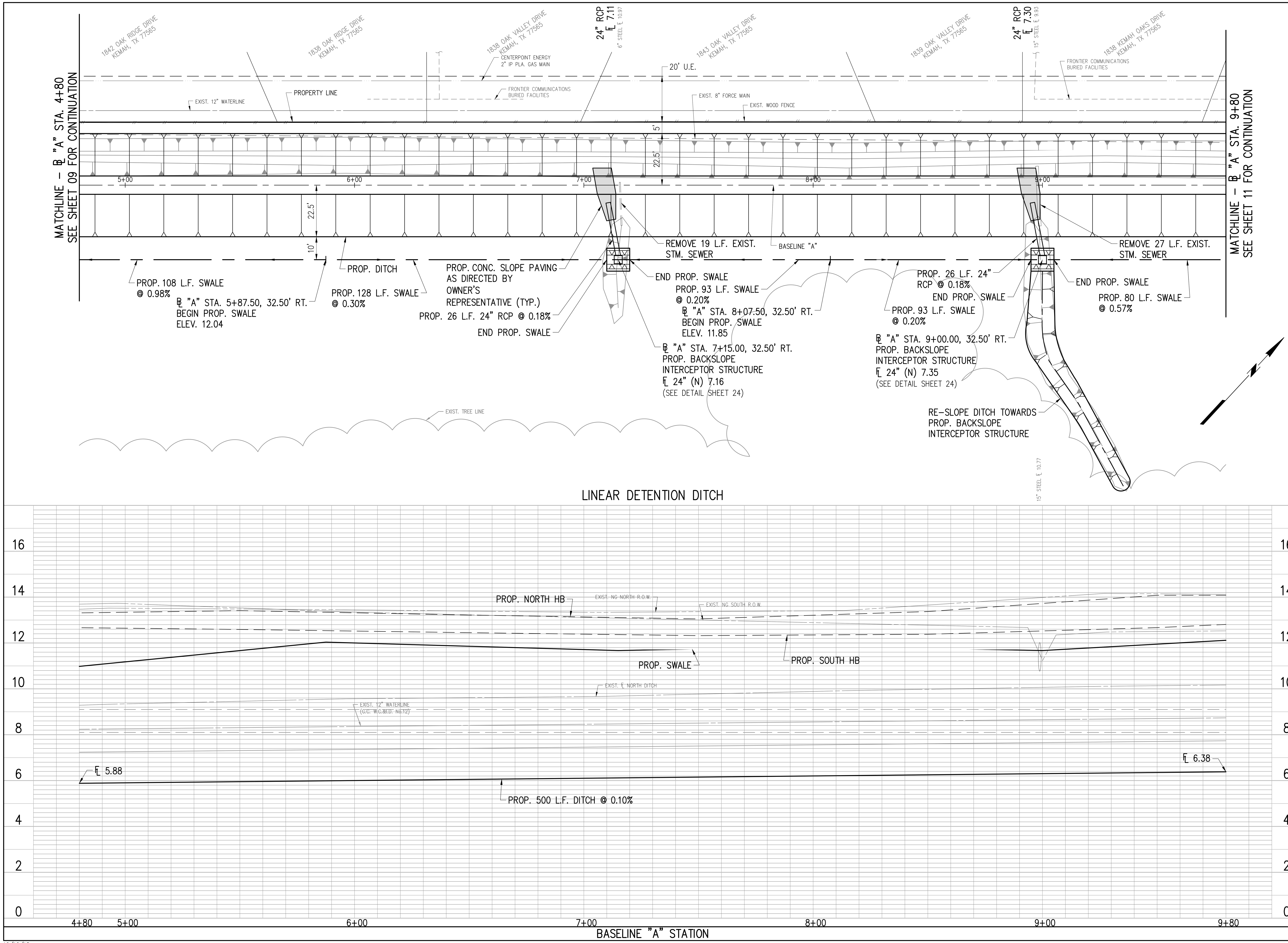

BENCHMARK NOTE
RM #010010:
ALUMINUM DISK AT THE CENTER OF TODVILLE ROAD BRIDGE ON THE EAST SIDE OF BRIDGE WITH IT'S INTERSECTION WITH CLEAR CREEK (A100-00-00).
ELEVATION: 5.89 (NAVD88 2001ADJ)

NOTES:
1. LINEAR DETENTION DITCH TURF ESTABLISHMENT TO FOLLOW SPECIFICATION 2107 FOR DRY APPLICATION TURF ESTABLISHMENT.
2. CITY EXCAVATION/SPOILS TO BE PLACED SOUTH OF DITCH AS SHOWN ON SPOIL LOCATION MAP SHEET 20A. IF DIRECTED, CONTRACTOR TO HAUL SPOIL OFFSITE IN WRITING FROM OWNER'S REPRESENTATIVE.

20 0 20 40
SCALE IN FEET

TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED, CALL CENTERPOINT AT 713-207-2222

NOTICE:

For your safety, you are required by Texas law to call 811 at least 48 hours before you dig so that underground lines can be marked. This signature does not fulfill you obligation to call 811.

VERIFICATION OF PRIVATE UTILITIES

DATE 8-16-18
CenterPoint Energy/Natural Gas Facilities Verifications ONLY
CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not to be used for conflict verification.
Signature Valid for six months

DATE 8-16-18
CenterPoint Energy/UNDERGROUND Electrical Facilities Verifications ONLY
(This Signature verifies existing underground facilities – not to be used for conflict verification)
Signature Valid for six months

DATE 8/23/18
FRONTIER COMMUNICATIONS
(Approved for Underground Facilities only)
Signature Valid for one year

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED
PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

LINEAR DETENTION DITCH PLAN & PROFILE
BL "A" STA. 4+80 TO BL "A" STA. 9+80

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1"=20' HORIZ.; 1"=2' VER.
APPROVED:	SHEET No. 10 Of 39

10/10/18

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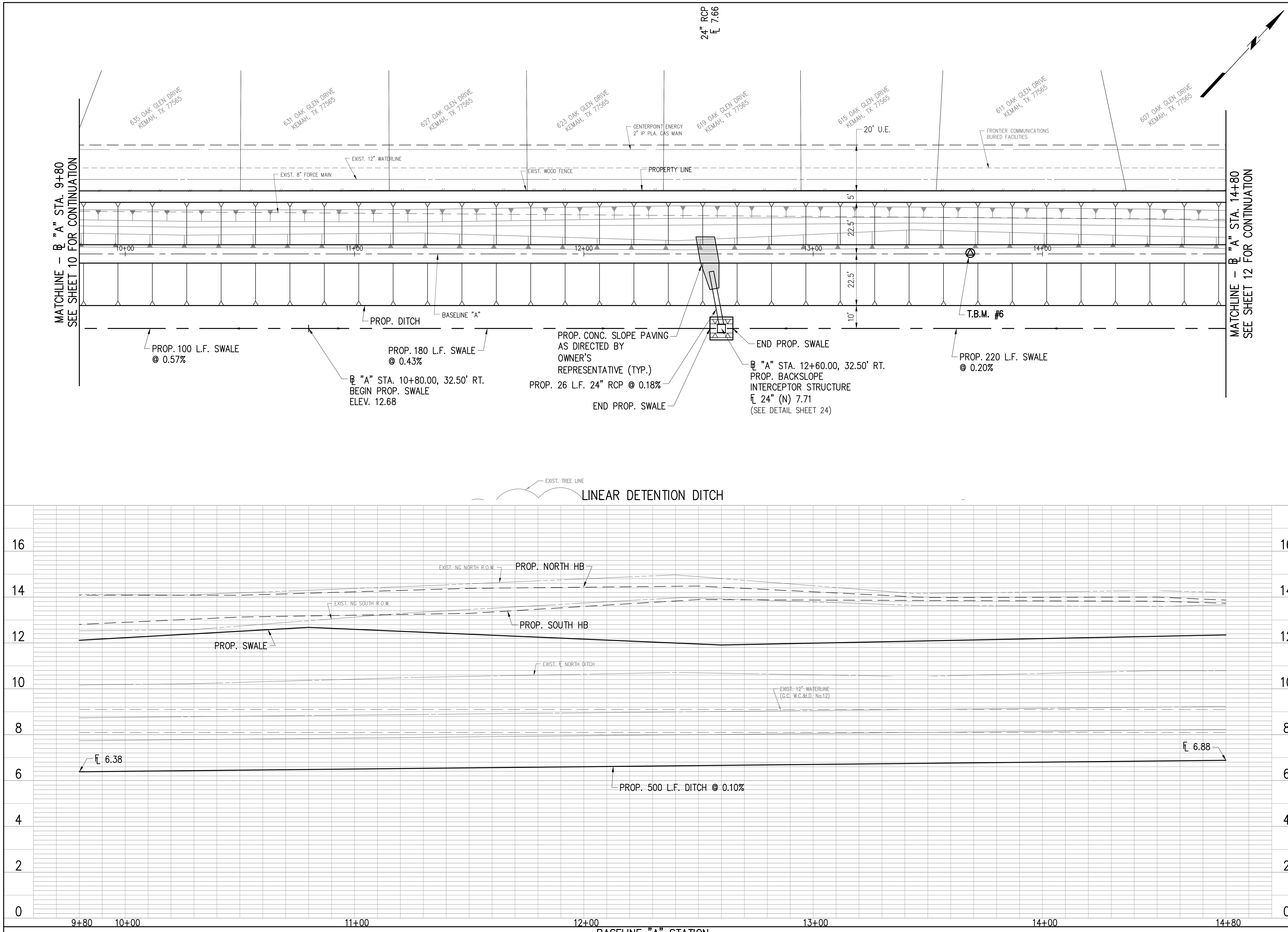

10/10/18

BENCHMARK NOTE

RM #010010:

ALUMINUM DISK AT THE CENTER OF TODVILLE ROAD BRIDGE ON THE EAST SIDE OF BRIDGE WITH IT'S INTERSECTION WITH CLEAR CREEK (A100-00-00).

ELEVATION: 5.89 (NAVD88 2001ADJ)

TBM #6

ELEVATION: 14.17 (NAVD88 2001ADJ)

NOTES:

1. LINEAR DETENTION DITCH TURF ESTABLISHMENT TO FOLLOW SPECIFICATION 2107 FOR DRY APPLICATION TURF ESTABLISHMENT
2. CITY EXCAVATION/SPOILS TO BE PLACED SOUTH OF DITCH AS SHOWN ON SPOIL LOCATION MAP SHEET 20A. IF DIRECTED, CONTRACTOR TO HAUL SPOIL OFFSITE IN WRITING FROM OWNER'S REPRESENTATIVE.

20 0 20 40

SCALE IN FEET

TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED, CALL CENTERPOINT AT 713-207-2222

NOTICE:

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VERIFICATION OF PRIVATE UTILITIES

DATE 8-16-18

CenterPoint Energy/Natural Gas Facilities Verifications ONLY

CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not to be used for conflict verification.

Signature Valid for six months

DATE 8-16-18

CenterPoint Energy/UNDERGROUND Electrical Facilities Verifications ONLY

(This Signature verifies existing underground facilities – not to be used for conflict verification)

Signature Valid for six months

DATE 8/23/18

FRONTIER COMMUNICATIONS

(Approved for Underground Facilities only)

Signature Valid for one year

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED
PROFESSIONAL ENGINEER

11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

LINEAR DETENTION DITCH PLAN & PROFILE
BL "A" STA. 9+80 TO BL "A" STA. 14+80

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1"=20' HORIZ.; 1"=2' VER.
APPROVED:	SHEET No. 11 Of 39

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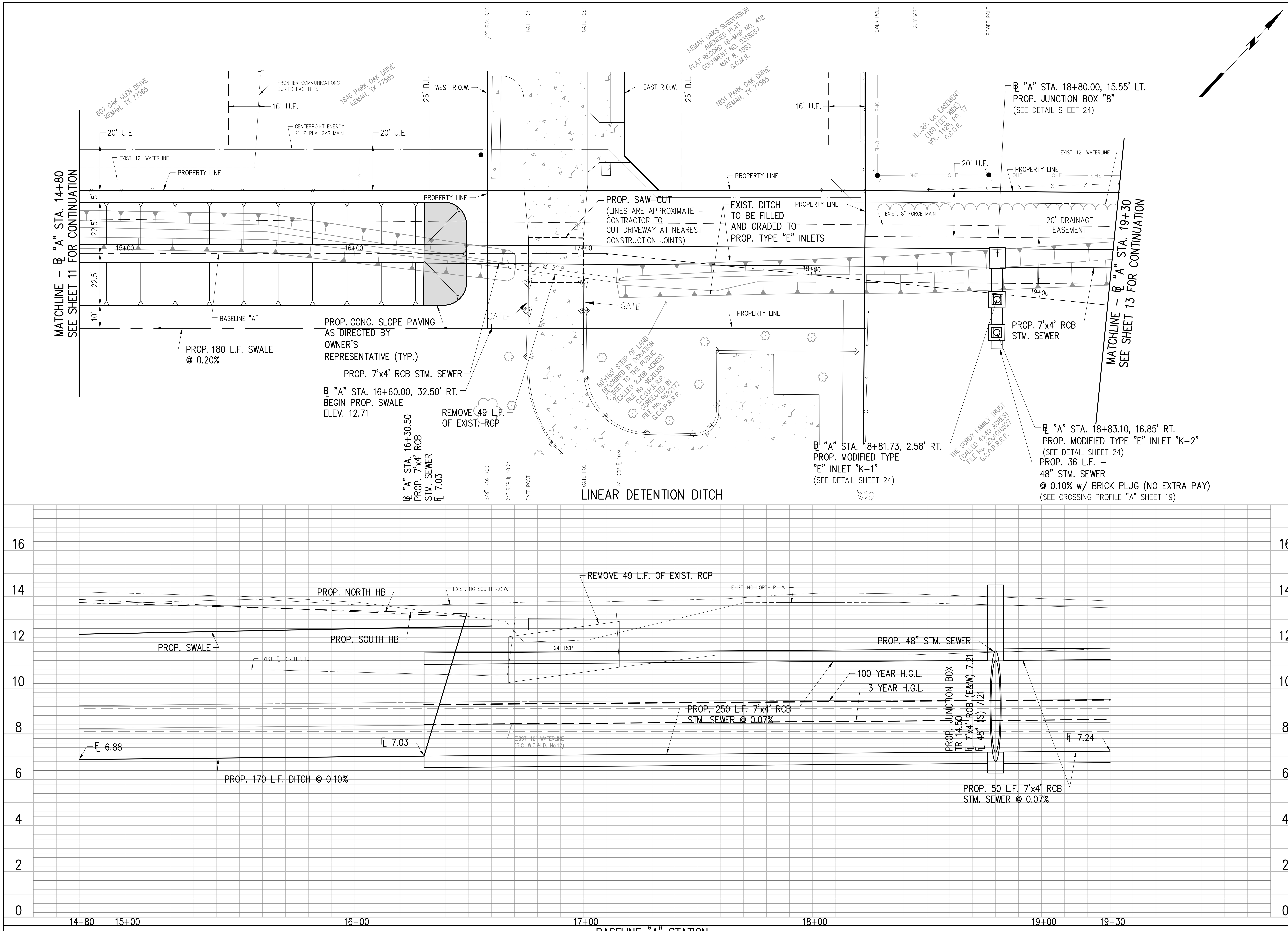

BENCHMARK NOTE
RM #010010:
ALUMINUM DISK AT THE CENTER OF TODVILLE ROAD BRIDGE ON THE EAST SIDE OF BRIDGE WITH IT'S INTERSECTION WITH CLEAR CREEK (A100-00-00).
ELEVATION: 5.89 (NAVD88 2001ADJ)

NOTES:

1. LINEAR DETENTION DITCH TURF ESTABLISHMENT TO FOLLOW SPECIFICATION 2107 FOR DRY APPLICATION TURF ESTABLISHMENT
2. CITY EXCAVATION/SPOILS TO BE PLACED SOUTH OF DITCH AS SHOWN ON SPOIL LOCATION MAP SHEET 20A. IF DIRECTED, CONTRACTOR TO HAUL SPOIL OFFSITE IN WRITING FROM OWNER'S REPRESENTATIVE.

TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED, CALL CENTERPOINT AT 713-207-2222

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DATE 8/23/18
FRONTIER COMMUNICATIONS
(Approved for Underground Facilities only)
Signature Valid for one year

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

LINEAR DETENTION DITCH PLAN & PROFILE
BL "A" STA. 14+80 TO BL "A" STA. 19+30

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1"=20' HORIZ.; 1"=2' VER.
APPROVED:	SHEET No. 12 Of 39

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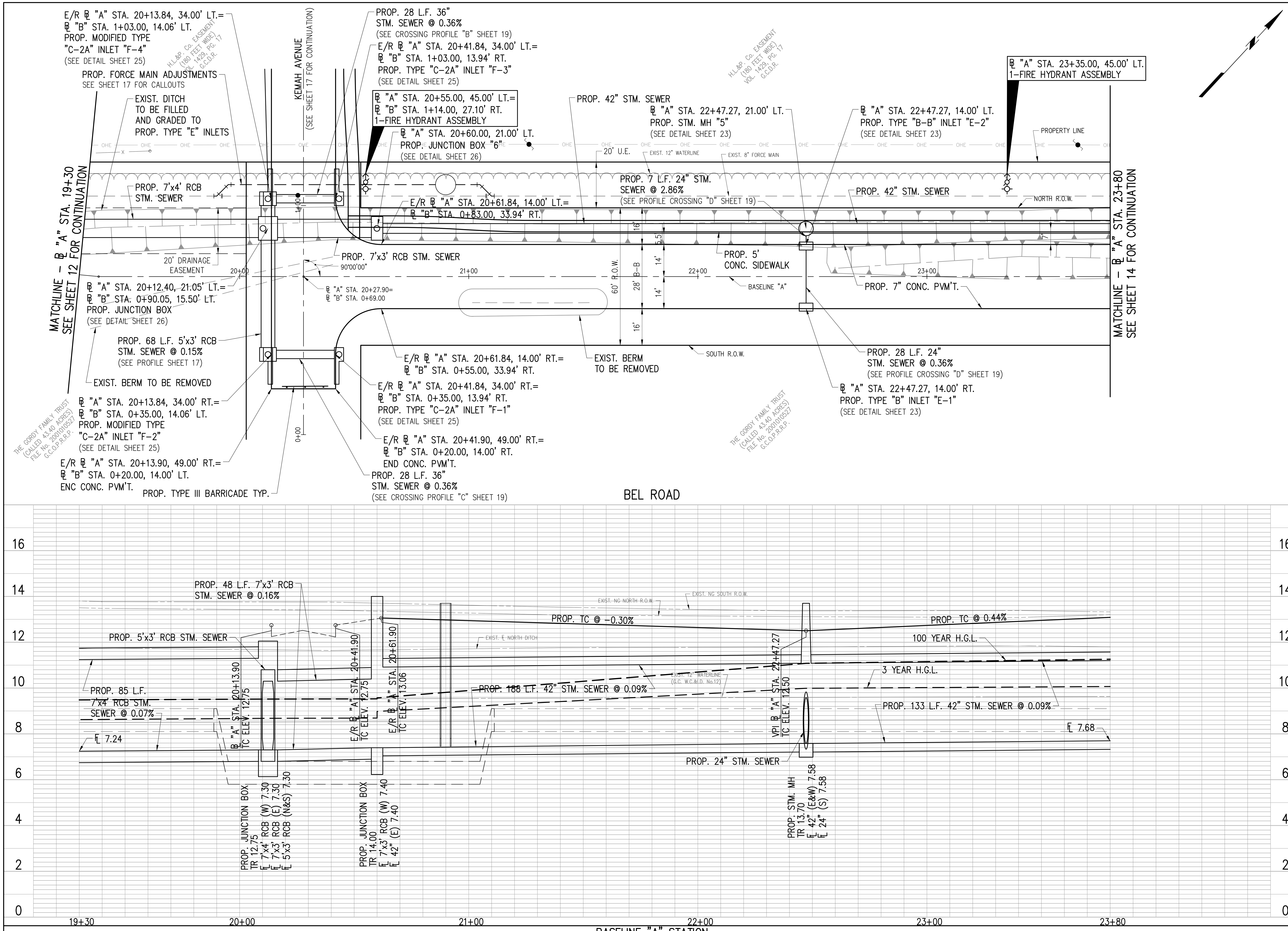
11/05/18



BENCHMARK NOTE
RM #010010:
ALUMINUM DISK AT THE CENTER OF TODVILLE ROAD BRIDGE ON THE EAST SIDE OF BRIDGE WITH IT'S INTERSECTION WITH CLEAR CREEK (A100-00-00).
ELEVATION: 5.89 (NAVD88 2001ADJ)

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DATE 8-16-18
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Signature Valid for six months

DATE 8/23/18
FRONTIER COMMUNICATIONS
(Approved for Underground Facilities only)
Signature Valid for one year

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED
PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH
BEL ROAD PLAN & PROFILE
BL "A" STA. 19+30 TO BL "A" STA. 23+80

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1"=20' HORIZ.; 1"=2' VER.
APPROVED:	SHEET No. 13 Of 39

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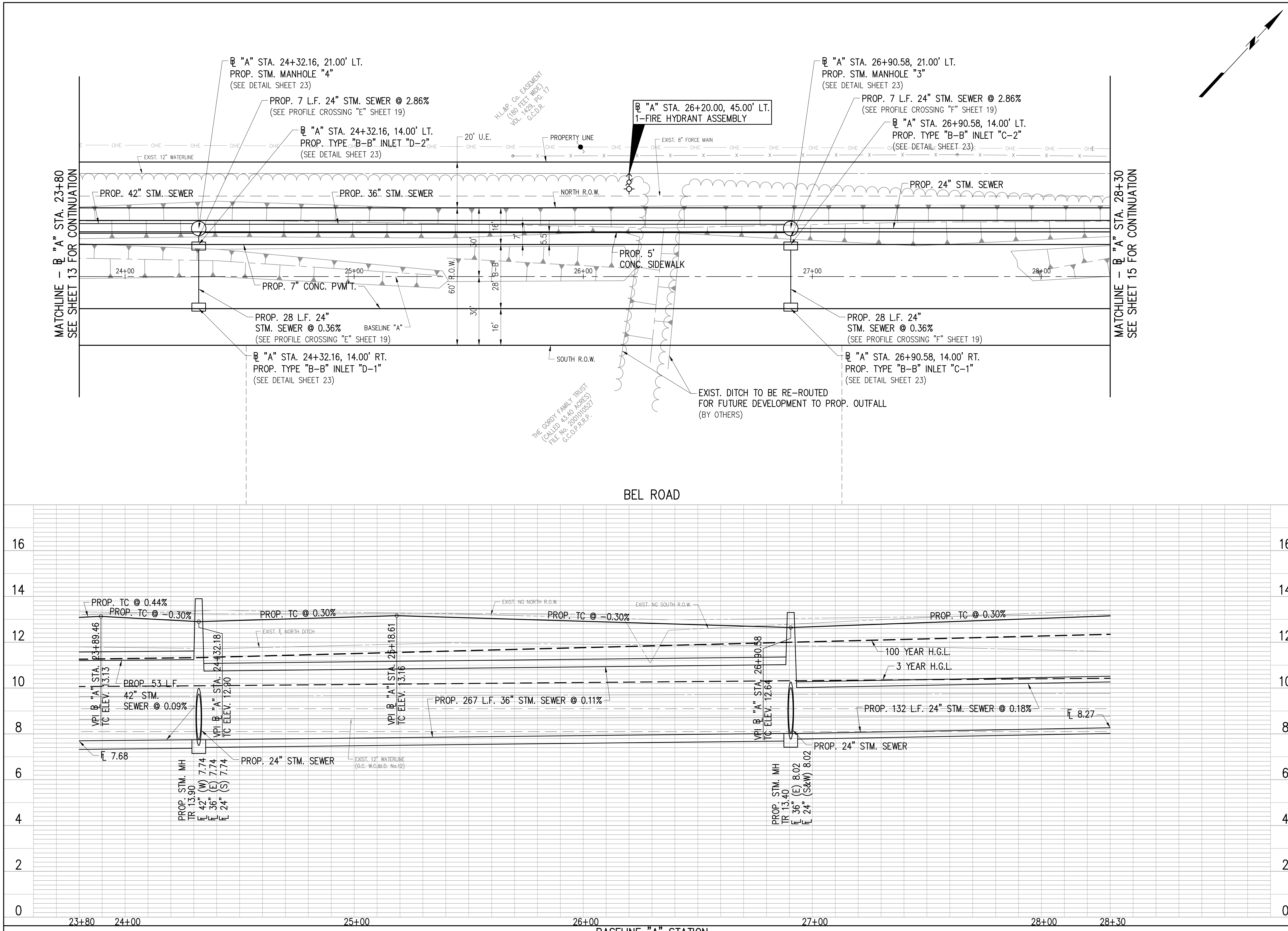
11/05/18



BENCHMARK NOTE
RM #010010:
ALUMINUM DISK AT THE CENTER OF TODVILLE ROAD BRIDGE ON THE EAST SIDE OF BRIDGE WITH IT'S INTERSECTION WITH CLEAR CREEK (A100-00-00).
ELEVATION: 5.89 (NAVD88 2001ADJ)

TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED, CALL CENTERPOINT AT 713-207-2222

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CenterPoint Energy/UNDERGROUND Electrical Facilities Verifications ONLY
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DATE 8/23/18
FRONTIER COMMUNICATIONS
(Approved for Underground Facilities only)
Signature Valid for one year

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH
BEL ROAD PLAN & PROFILE
BL "A" STA. 23+80 TO BL "A" STA. 28+30

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1"=20' HORIZ.; 1"=2' VER.
APPROVED:	SHEET No. 14 Of 39

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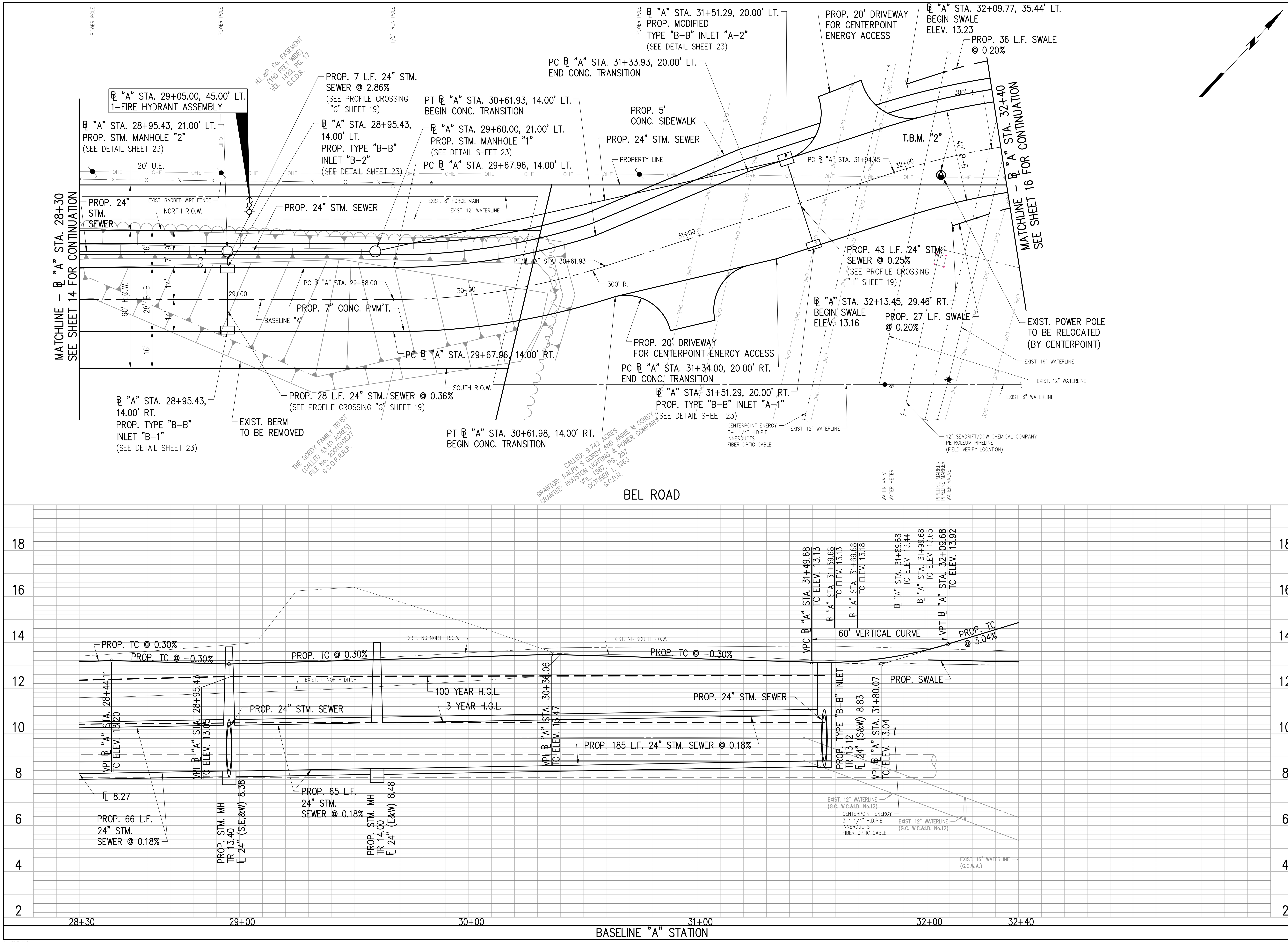
11/05/18



BENCHMARK NOTE

RM #010010:
ALUMINUM DISK AT THE CENTER OF TODVILLE ROAD BRIDGE ON THE EAST SIDE OF BRIDGE WITH IT'S INTERSECTION WITH CLEAR CREEK (A100-00-00).
ELEVATION: 5.89 (NAVD88 2001ADJ)

TBM #2:
RR SPIKE IN POWER POLE (AS SHOWN)
ELEVATION: 15.84 (NAVD88 2001ADJ)

SCALE IN FEET

TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED, CALL CENTERPOINT AT 713-207-2222

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DATE 8/23/18
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(Approved for Underground Facilities only)
Signature Valid for one year

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

BEL ROAD PLAN & PROFILE
BL "A" STA. 28+30 TO BL "A" STA. 32+40

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1"=20' HORIZ.; 1"=2' VER.
APPROVED:	SHEET No. 15 Of 39

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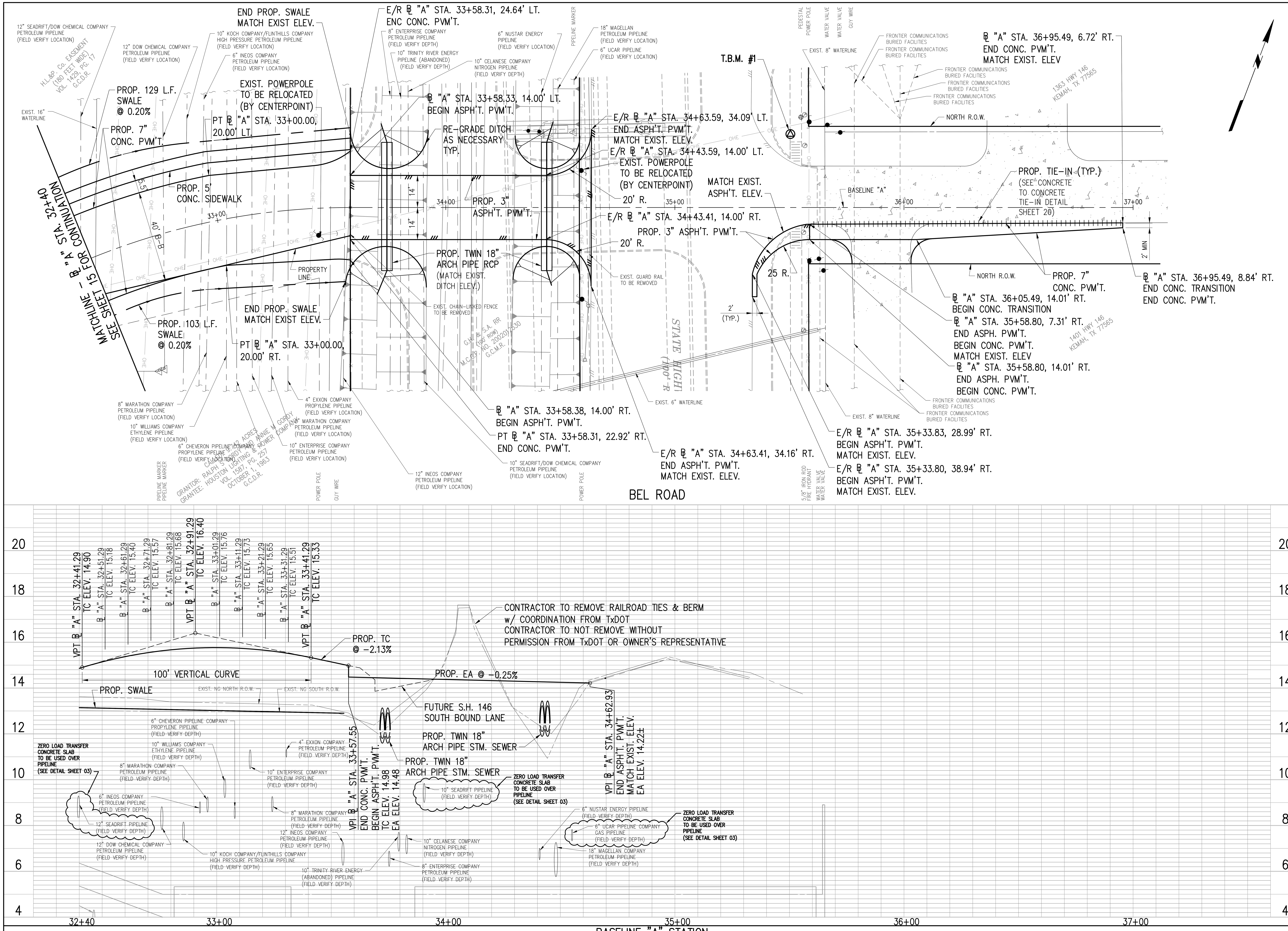
11/05/18



11/08/18

BENCHMARK NOTE
RM #010010:
ALUMINUM DISK AT THE CENTER OF TODVILLE ROAD BRIDGE ON THE EAST SIDE OF BRIDGE WITH IT'S INTERSECTION WITH CLEAR CREEK (A100-00-00).
ELEVATION: 5.89 (NAVD88 2001ADJ)

TBM #1:
BOX CUT ON WINGWALL (AS SHOWN)
ELEVATION: 13.27 (NAVD88 2001ADJ)

20 0 20 40
SCALE IN FEET

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(Approved for Underground Facilities only)
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STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

BEL ROAD PLAN & PROFILE
BL "A" STA. 32+40 TO END

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1"=20' HORIZ.; 1"=2' VER.
APPROVED:	SHEET No. 16 Of 39

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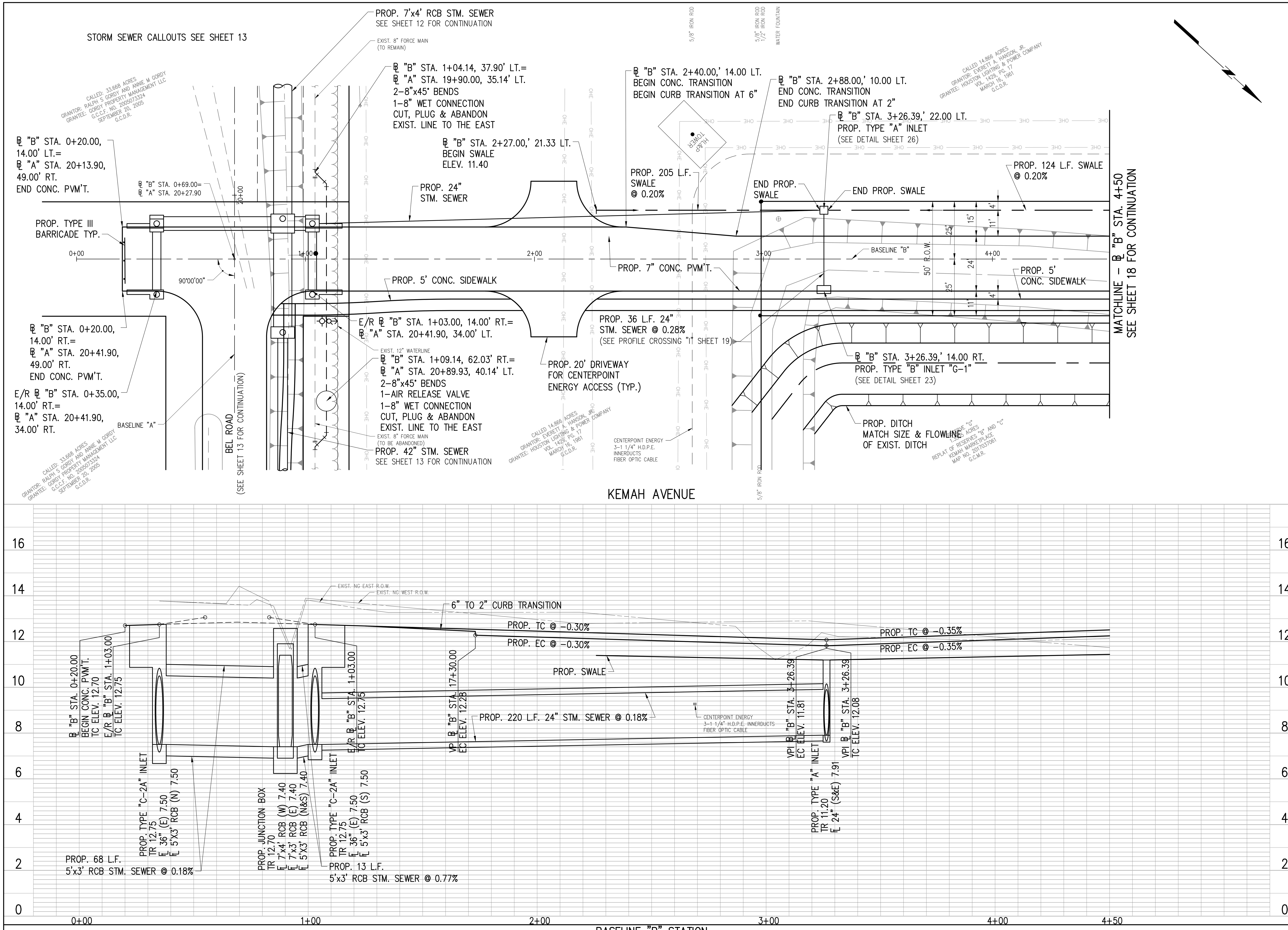

BENCHMARK NOTE
RM #010010:
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ELEVATION: 5.89 (NAVD88 2001ADJ)

SCALE IN FEET

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DATE 8/23/18
FRONTIER COMMUNICATIONS
(Approved for Underground Facilities only)
Signature Valid for one year

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED
PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH
KEMAH AVENUE PLAN & PROFILE
BEGINNING TO BL "B" STA. 4+50

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1"=20' HORIZ.; 1"=2' VER.
APPROVED:	SHEET No. 17 Of 39

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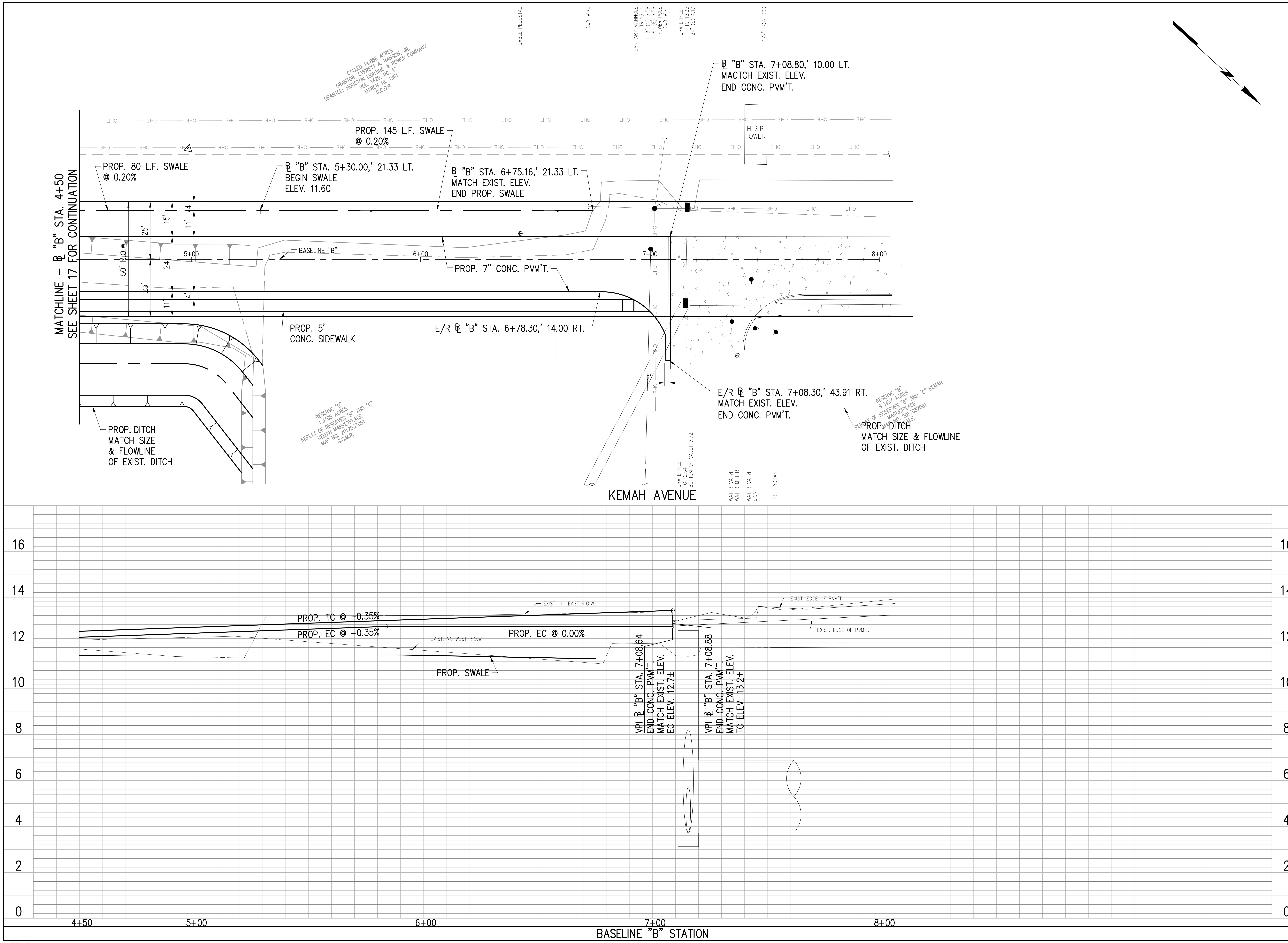
11/05/18



BENCHMARK NOTE
RM #010010:
ALUMINUM DISK AT THE CENTER OF TODVILLE ROAD BRIDGE ON THE EAST SIDE OF BRIDGE WITH IT'S INTERSECTION WITH CLEAR CREEK (A100–00–00).
ELEVATION: 5.89 (NAVD88 2001ADJ)

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DATE 8-16-18
CenterPoint Energy/UNDERGROUND Electrical Facilities Verifications ONLY

DATE 8/23/18
FRONTIER COMMUNICATIONS

STATE OF TEXAS — MARK E. HAVRAN — 118610 — LICENSED PROFESSIONAL ENGINEER
11-20-18

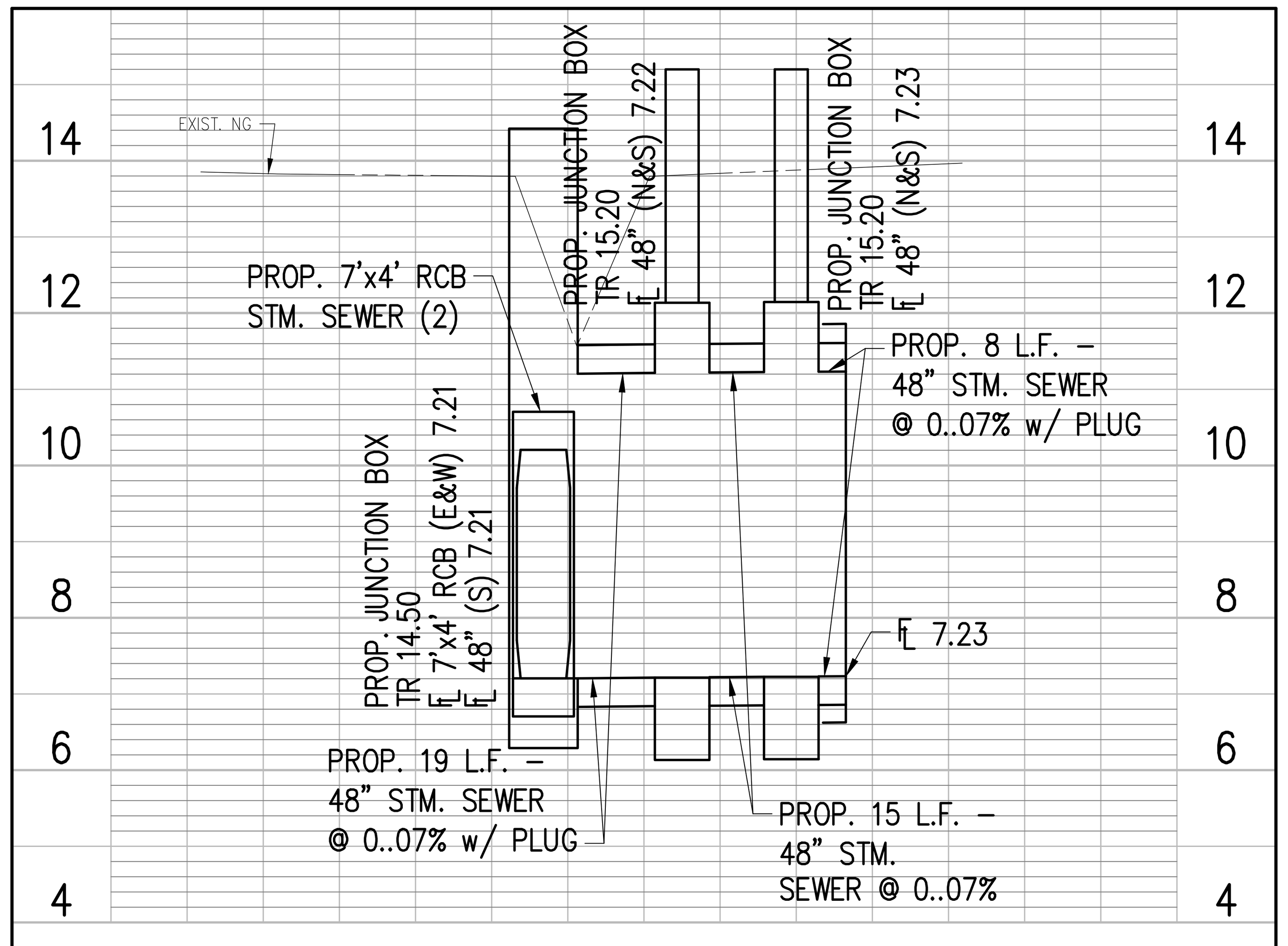
Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH
KEMAH AVENUE PLAN & PROFILE
BL "B" STA. 4+50 TO END

LJA Engineering, Inc.
11821 East Freeway, Suite 360, Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135–0320 & E135–0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1"=20' HORIZ.; 1"=2' VER.
APPROVED:	SHEET No. 18 Of 39

11/05/18



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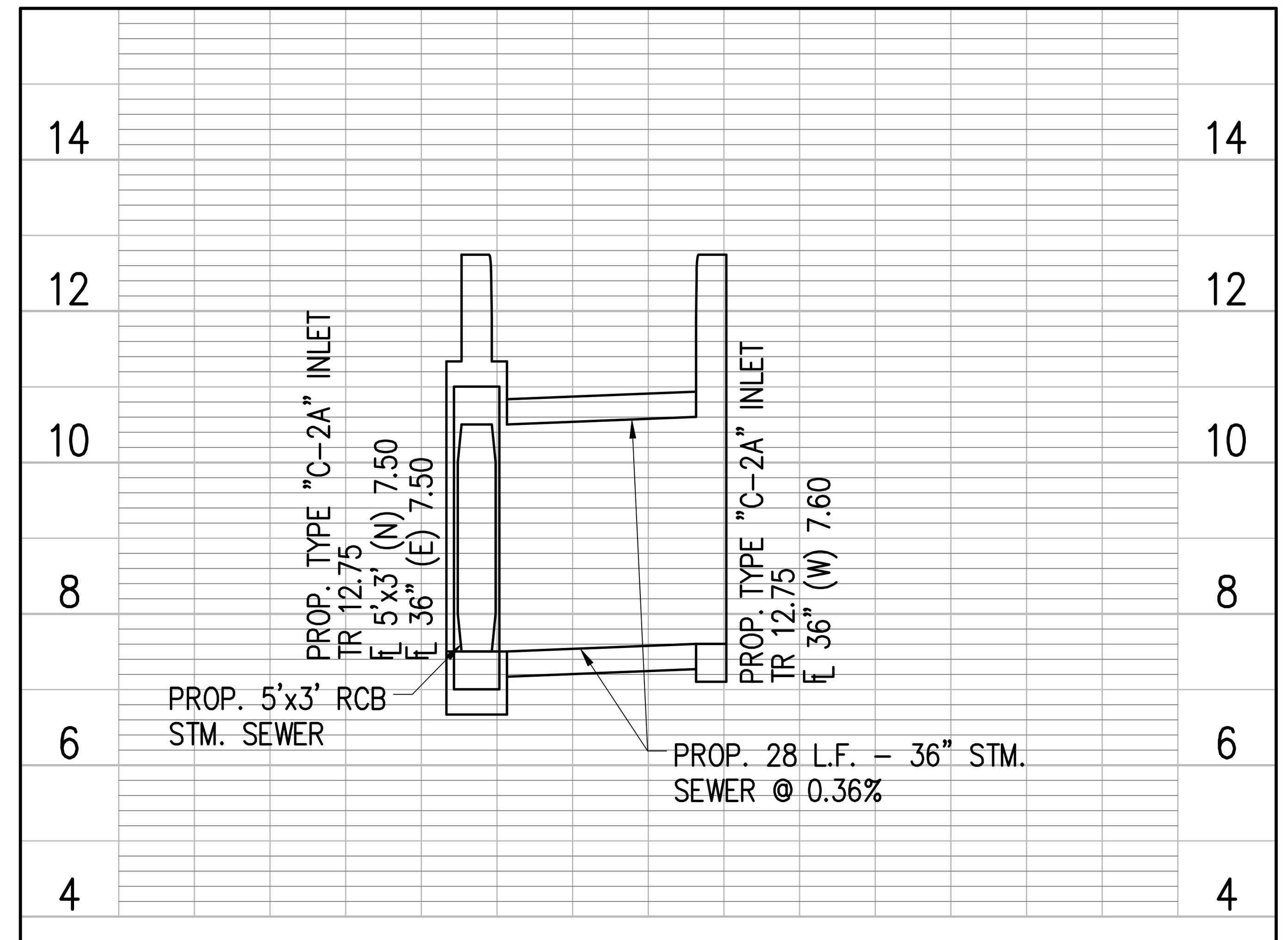

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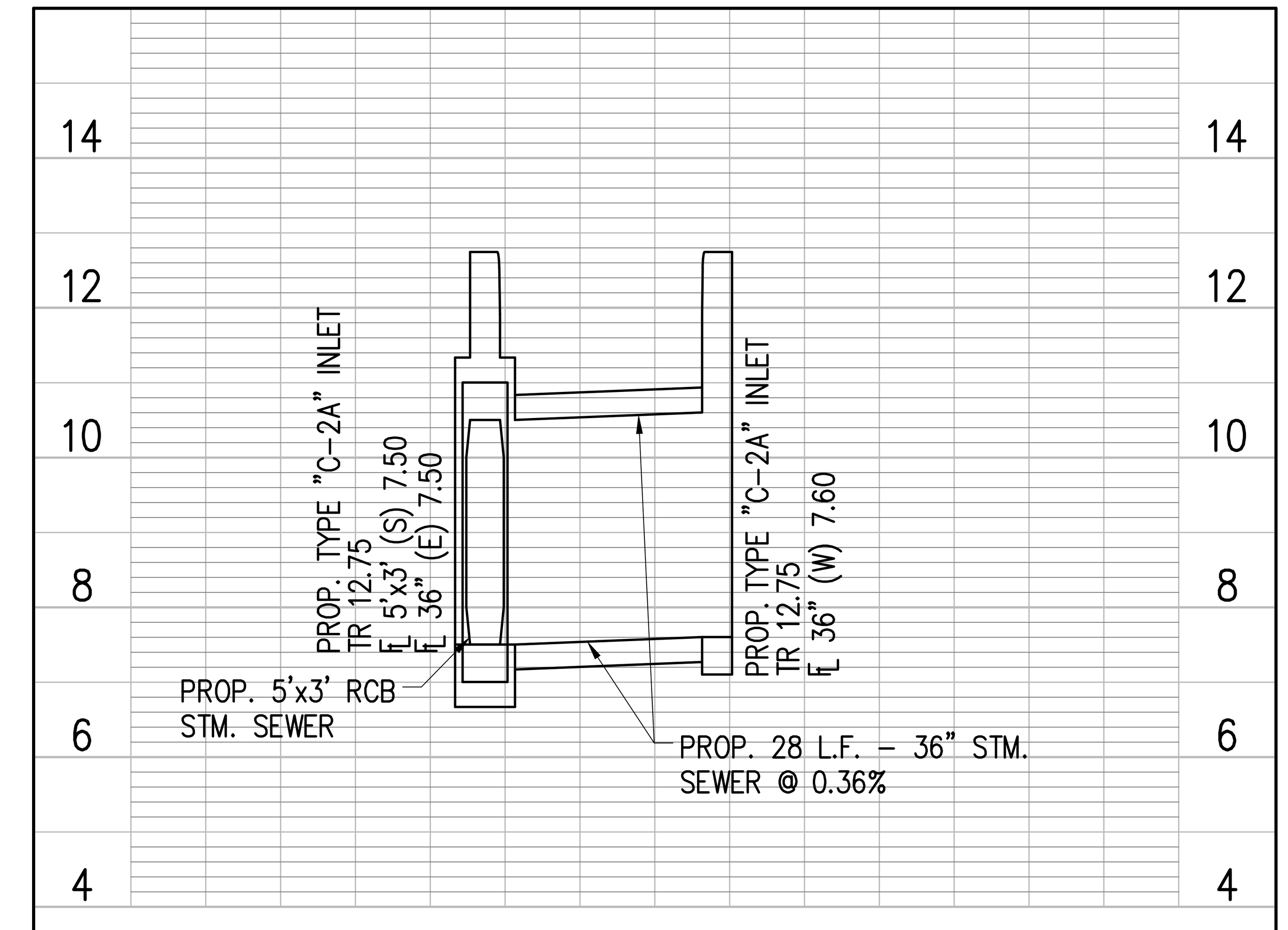

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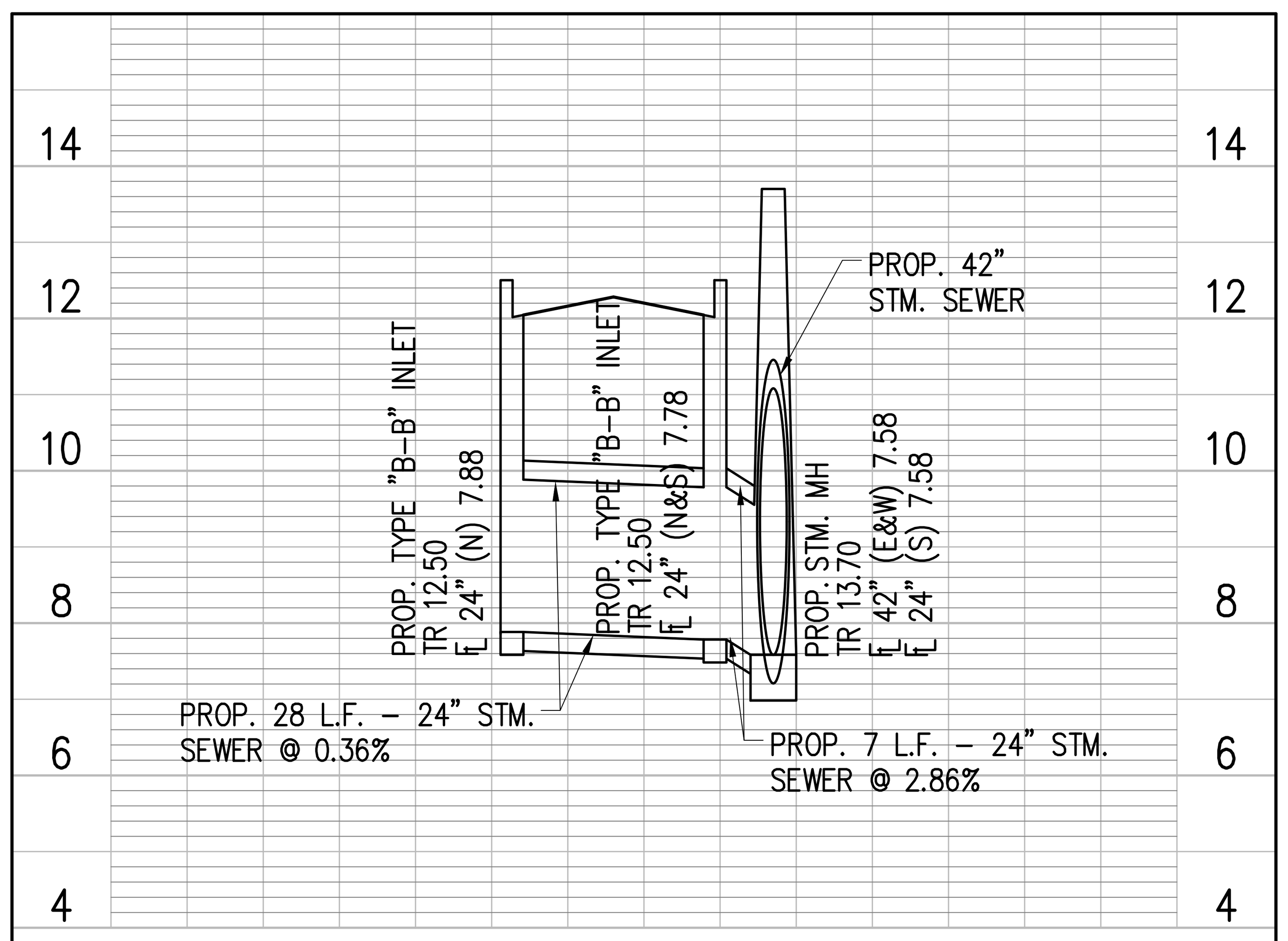

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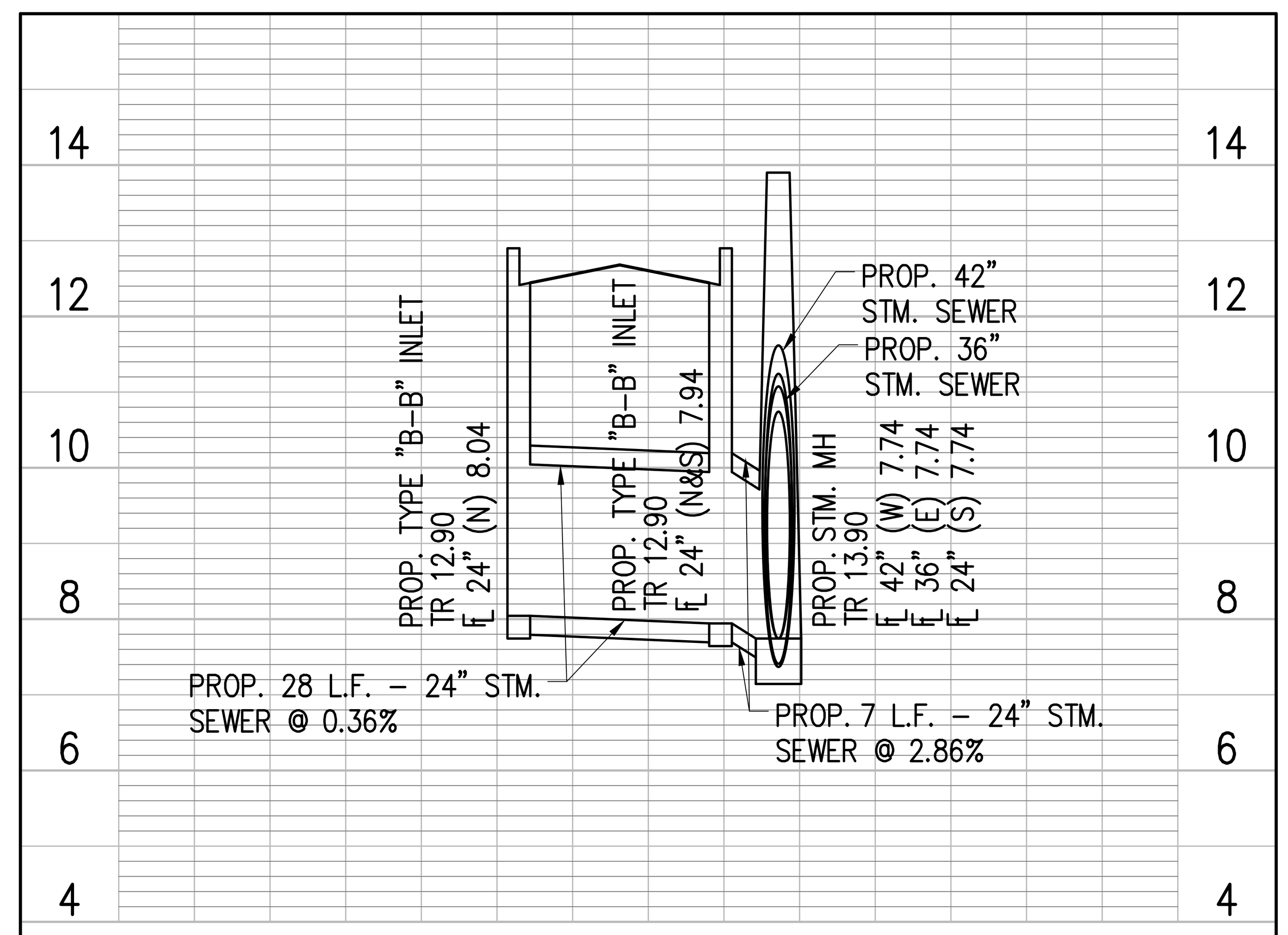

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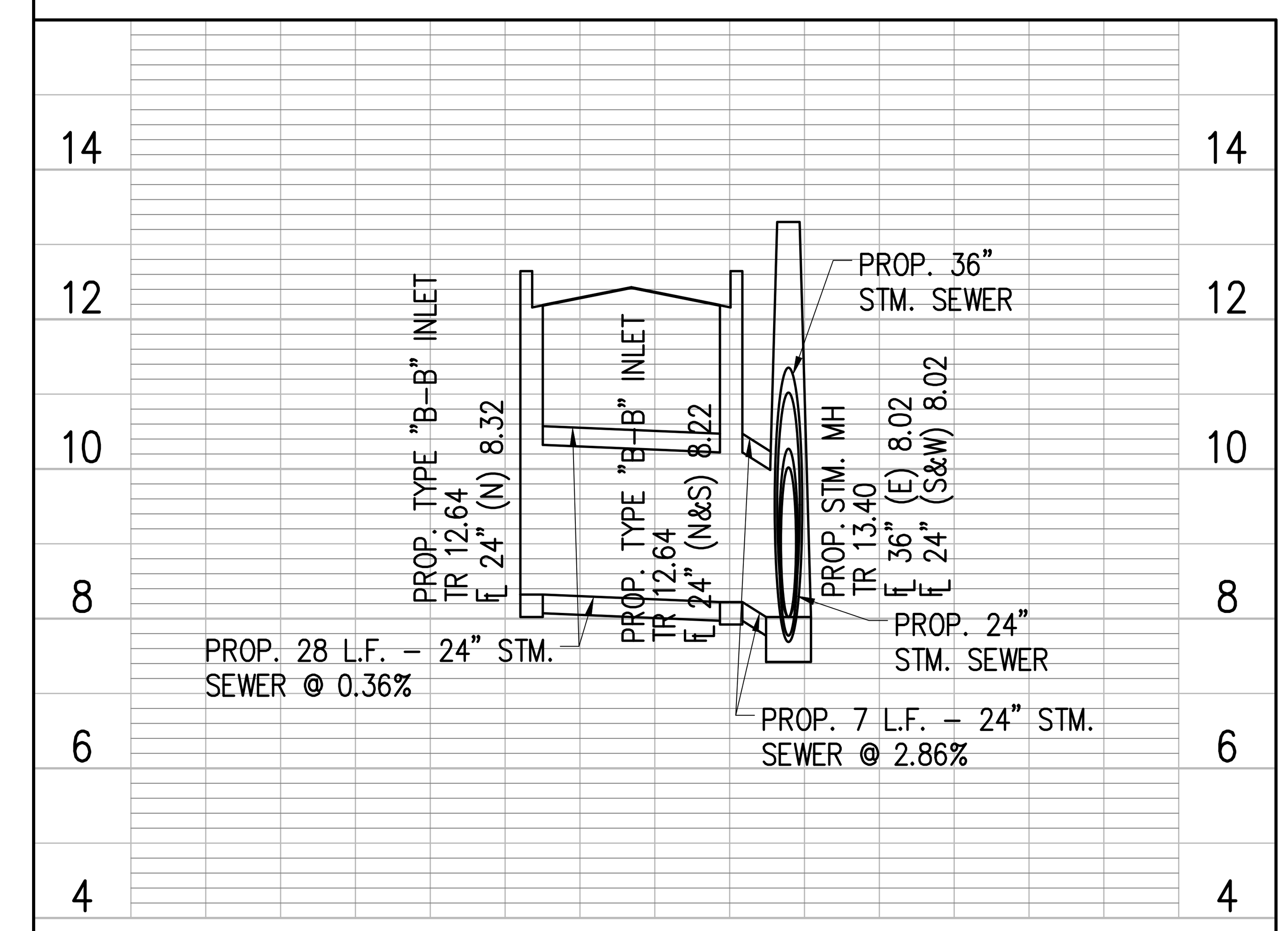

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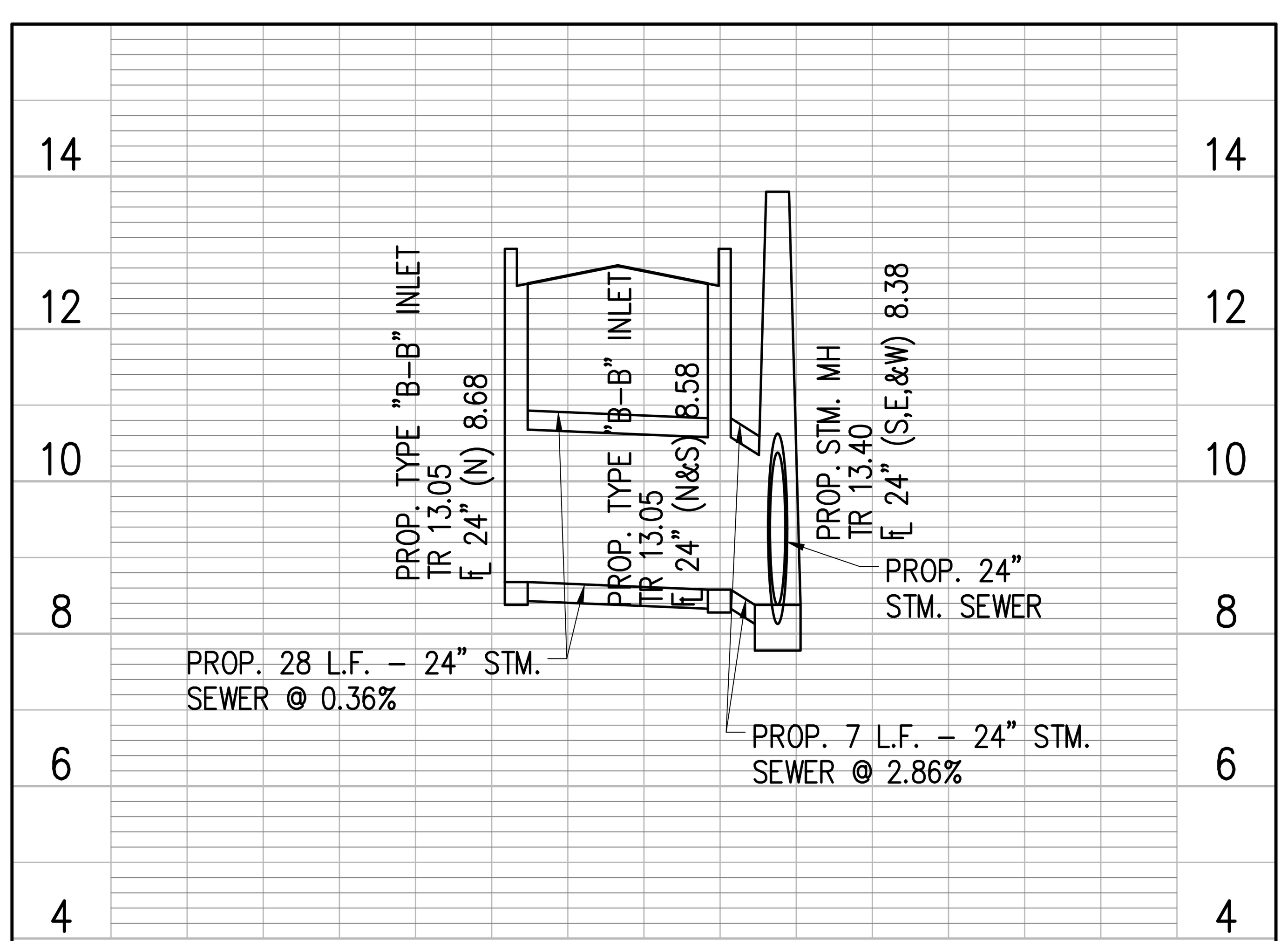

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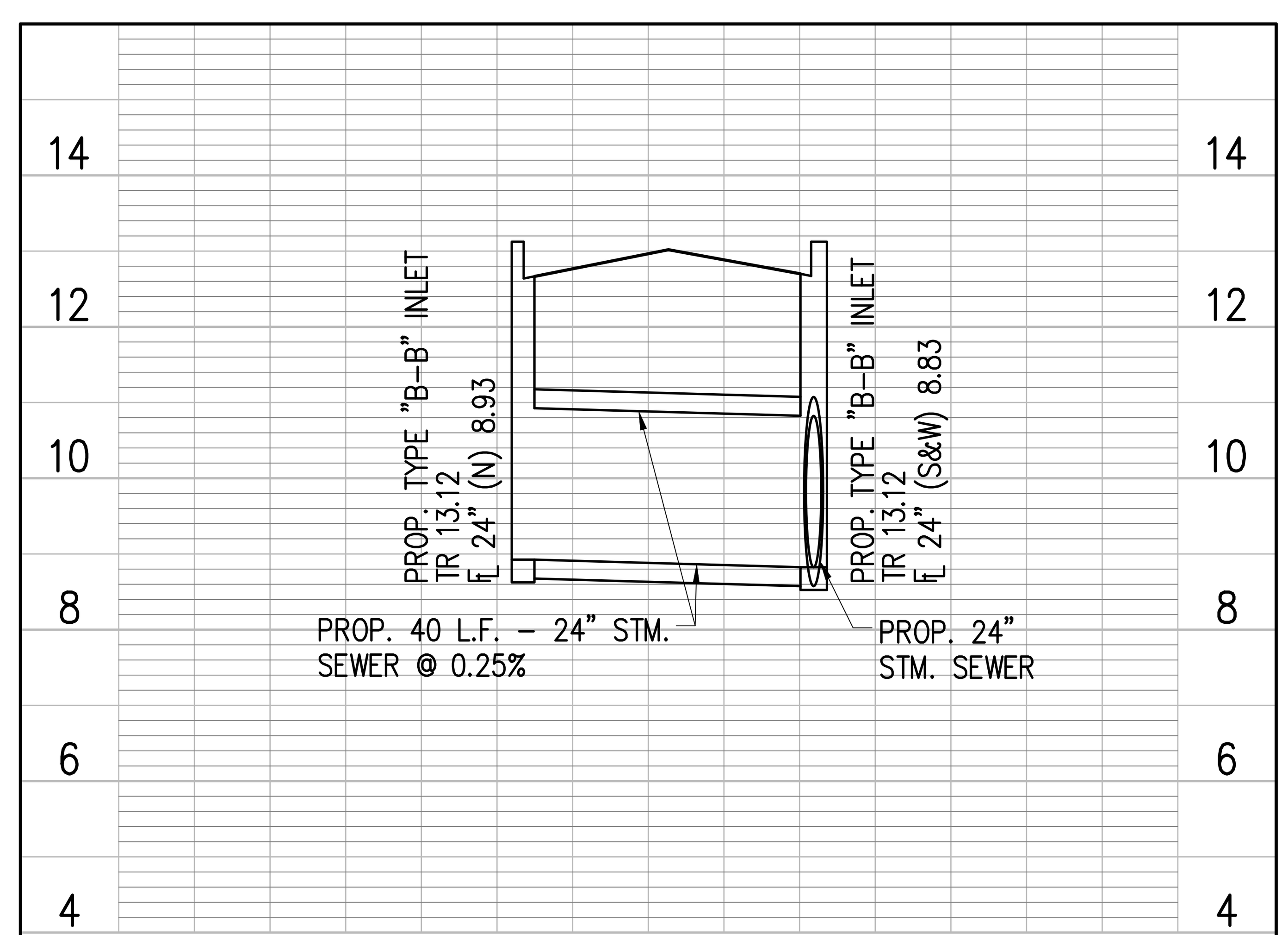

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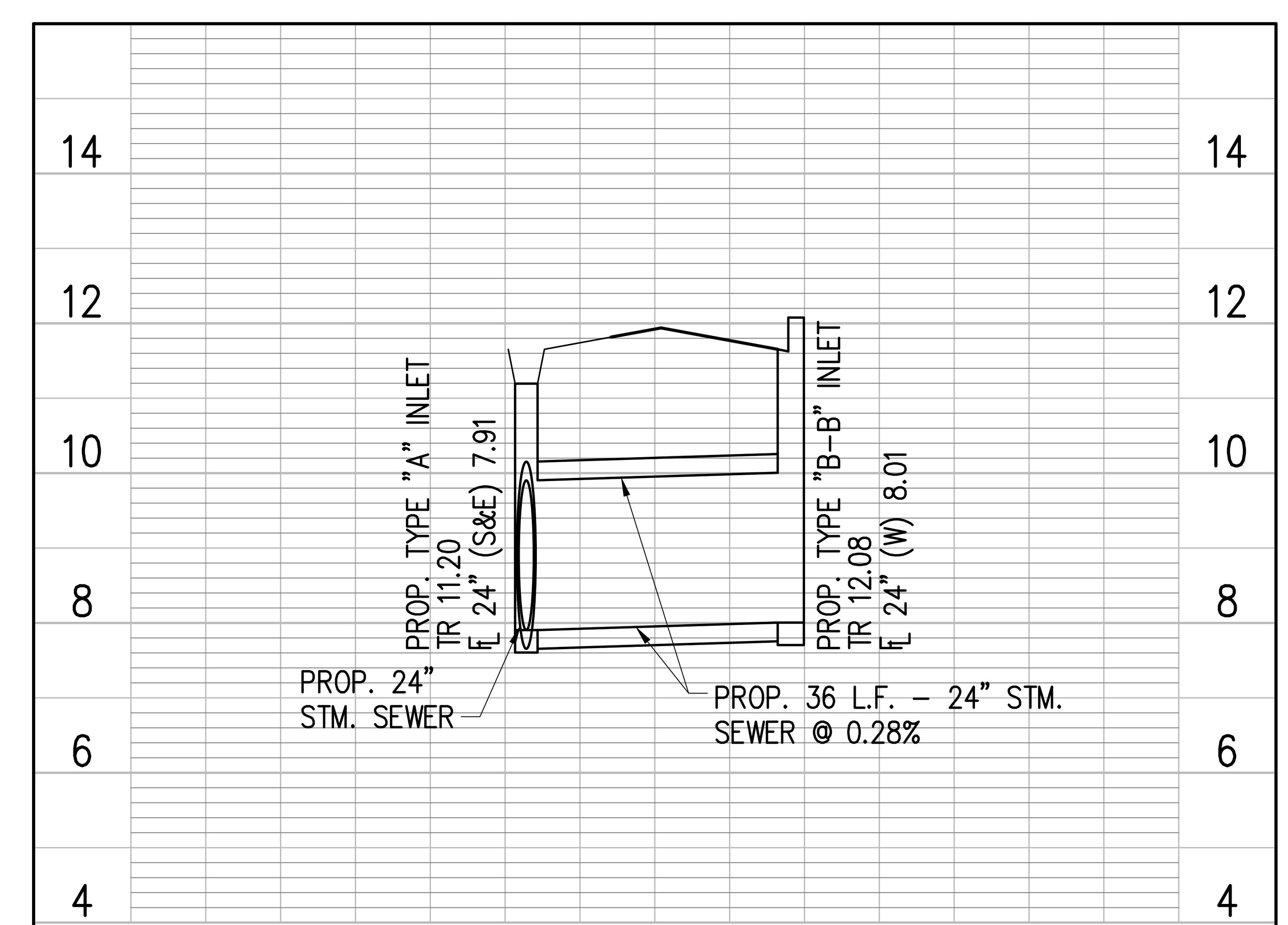

PROFILE CROSSING "I"

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED
PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

PROFILE CROSSINGS

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1"=20' HORIZ.; 1"=2' VER.
APPROVED:	SHEET No. 19 Of 39

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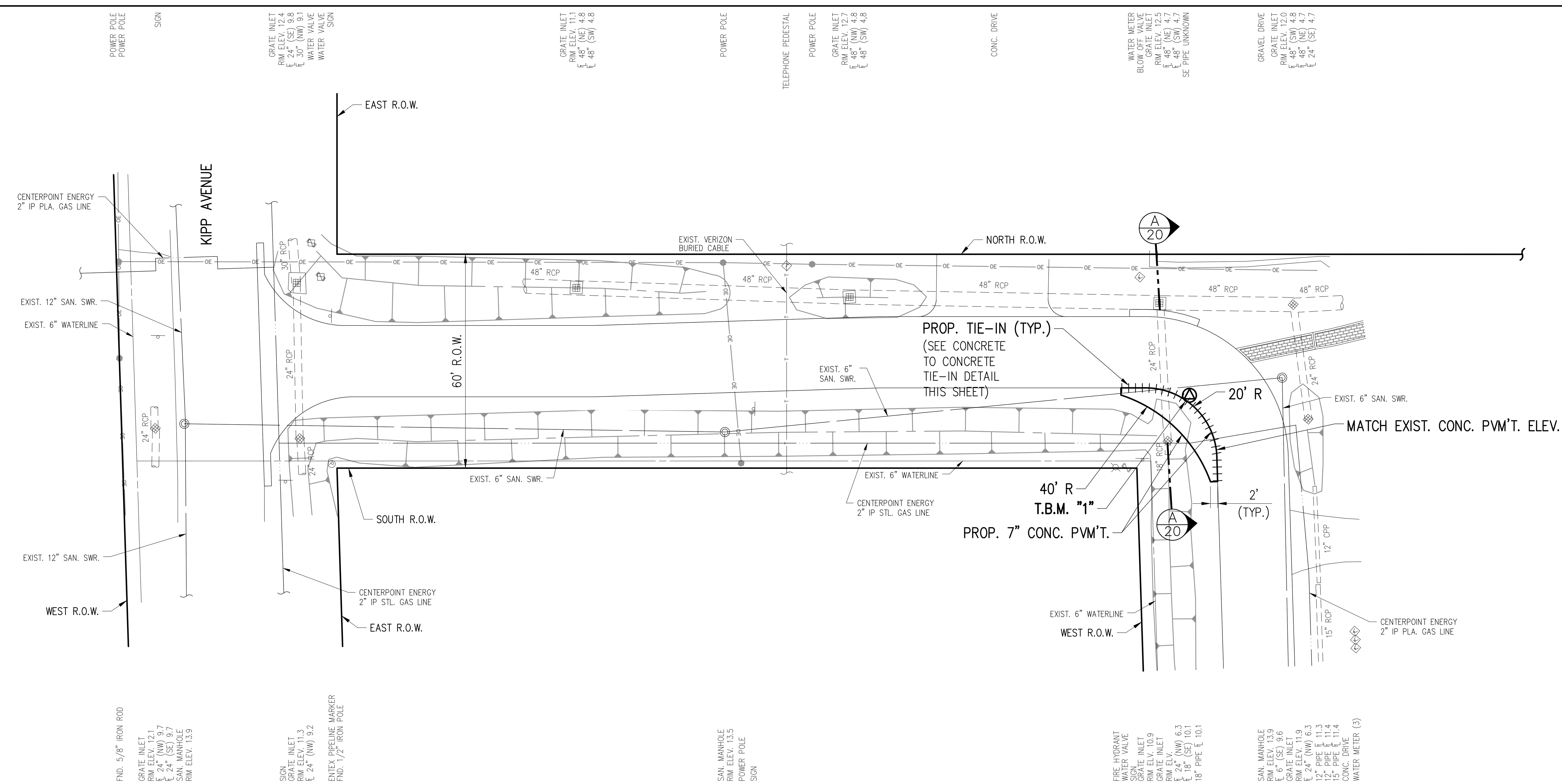
11/14/18



BENCHMARK

FLOODPLAIN RM No. 010010

FLOODPLAIN REFERENCE MARK NUMBER 010010 IS AN ALUMINUM DISC STAMPED 010010 IN DOWNSTREAM SIDE BRIDGE OVER CLEAR CREEK IN KEYMAP 620T IN THE CLEAR CREEK WATERSHED NEAR STREAM A100-00-00

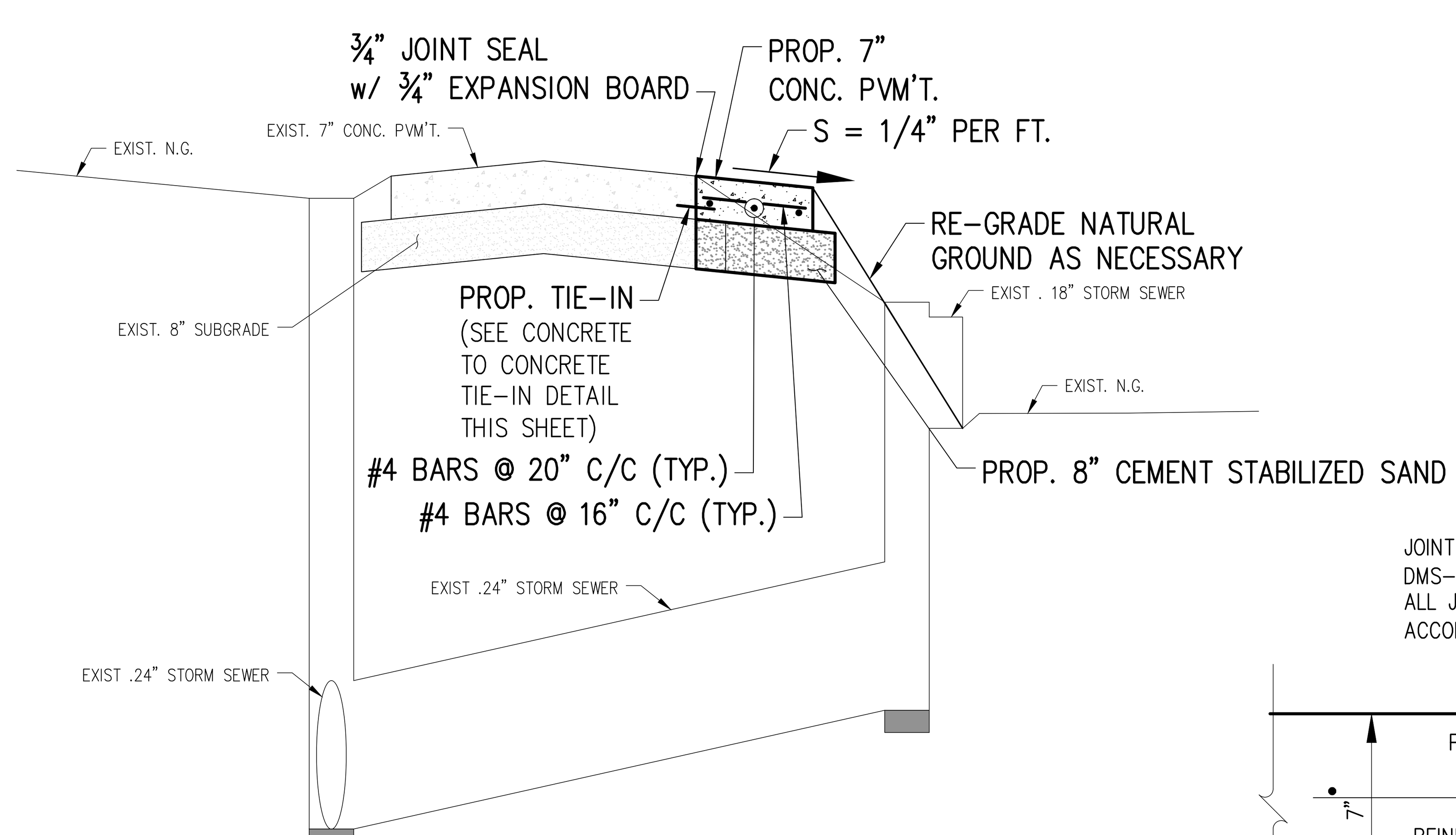
ELEV. 5.88 (NAVD 1988, 2001 ADJ.)

NOTE:

1. CONTRACTOR TO CONFIRM CONCRETE LOCATION WITH OWNER'S REPRESENTATIVE BEFORE CONCRETE IS POURED.

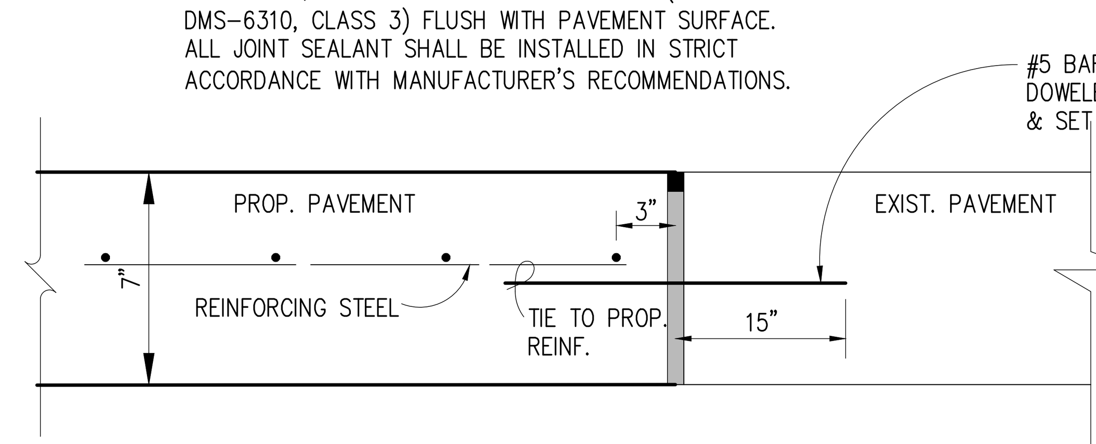
20 0 20 40

SCALE IN FEET



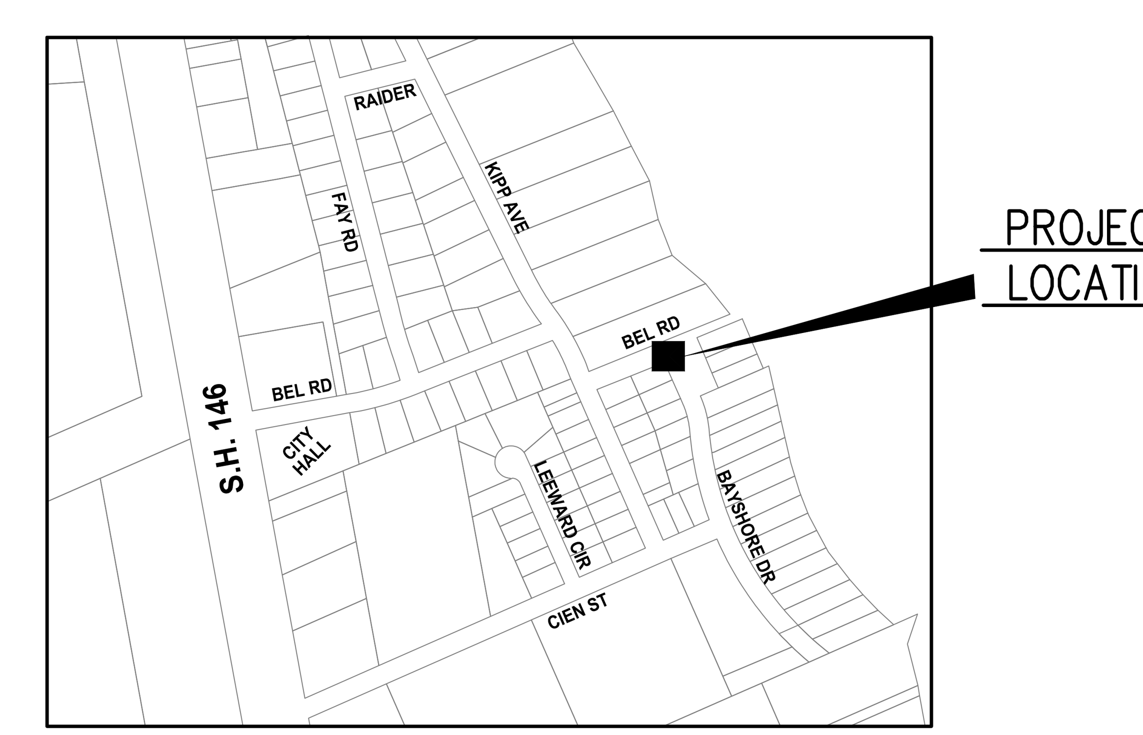
SECTION A / 20

JOINT SEAL, HOT POURED RUBBER ASPHALT (TxDOT DMS-6310, CLASS 3) FLUSH WITH PAVEMENT SURFACE. ALL JOINT SEALANT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.



CONCRETE TO CONCRETE TIE-IN

N.T.S.



LOCATION MAP

N.T.S.

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NOTICE:

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VERIFICATION OF PRIVATE UTILITIES

DATE 8-16-18

CenterPoint Energy/Natural Gas Facilities Verifications ONLY

CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not to be used for conflict verification. Signature Valid for six months

DATE 8-16-18

CenterPoint Energy/UNDERGROUND Electrical Facilities Verifications ONLY

(This Signature verifies existing underground facilities – not to be used for conflict verification) Signature Valid for six months

DATE 8/23/18

FRONTIER COMMUNICATIONS

(Approved for Underground Facilities only) Signature Valid for one year

STATE OF TEXAS MARK E. HAVRAN 118610 LICENSED PROFESSIONAL ENGINEER

11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

BAYSHORE DRIVE LAYOUT

LJA Engineering, Inc.

11821 East Freeway Suite 360 Houston, Texas 77029

Phone 713.450.1300 Fax 713.450.1385 FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1"=20'
APPROVED:	SHEET No. 20 Of 39

H:\ACAD\Clients\135\0320\Design\135-0320-20 Bayshore.dwg (XREF: 135-0320 Border; Bayshore Base)

08/16/18

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED
PROFESSIONAL ENGINEER
11-20-18

SPOIL NOTE:

DESIRABLE SPOIL IS TO BE DETERMINED BY OWNER'S REPRESENTATIVE NOT THE CONTRACTOR. ANY SPOIL DEEMED UNDESIRABLE BY OWNER'S REPRESENTATIVE, INCLUDING BUT NOT LIMITED TO ROCK, TREE, BRUSH, ROAD BASE, ROOT, CONCRETE, ETC. SHALL BE HAULED OUTSIDE CITY OF KEMAH CITY LIMITS AT NO EXTRA PAY AND SHALL BE PAID IN BID ITEM 3.

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

SPOIL LOCATION MAP

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135–0320 & E135–0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: 1:100
APPROVED:	SHEET No. 20A Of 39

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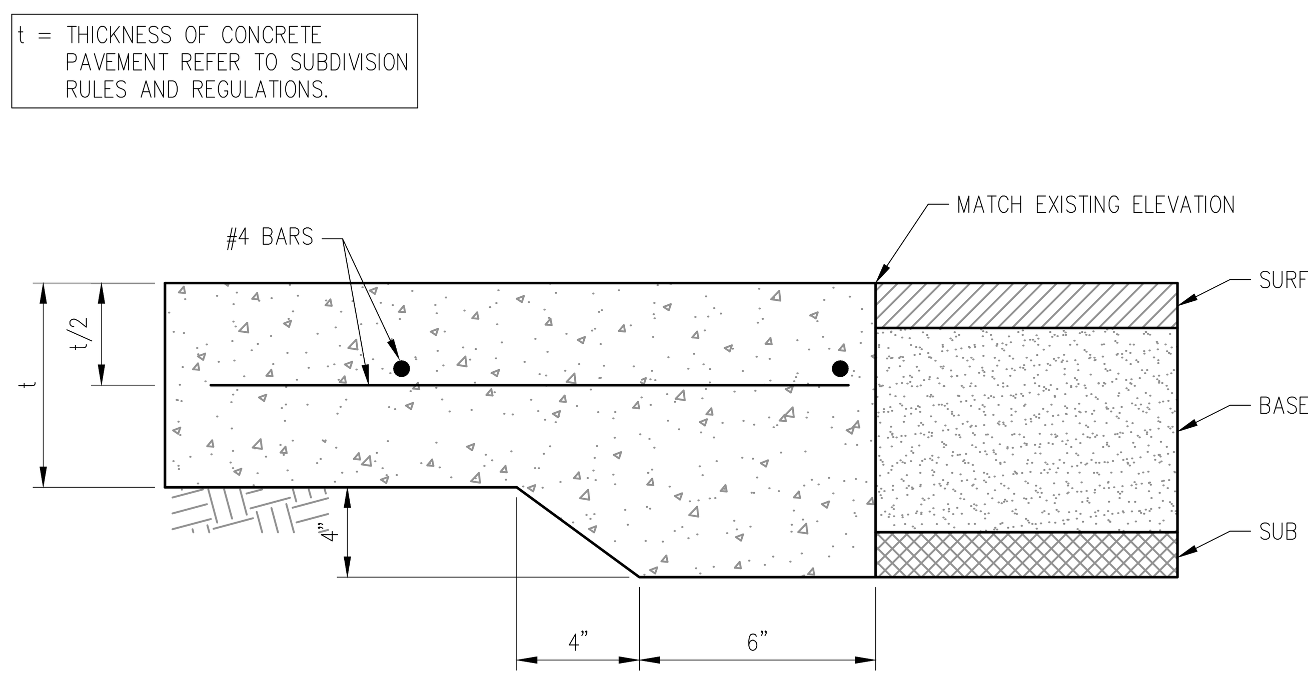
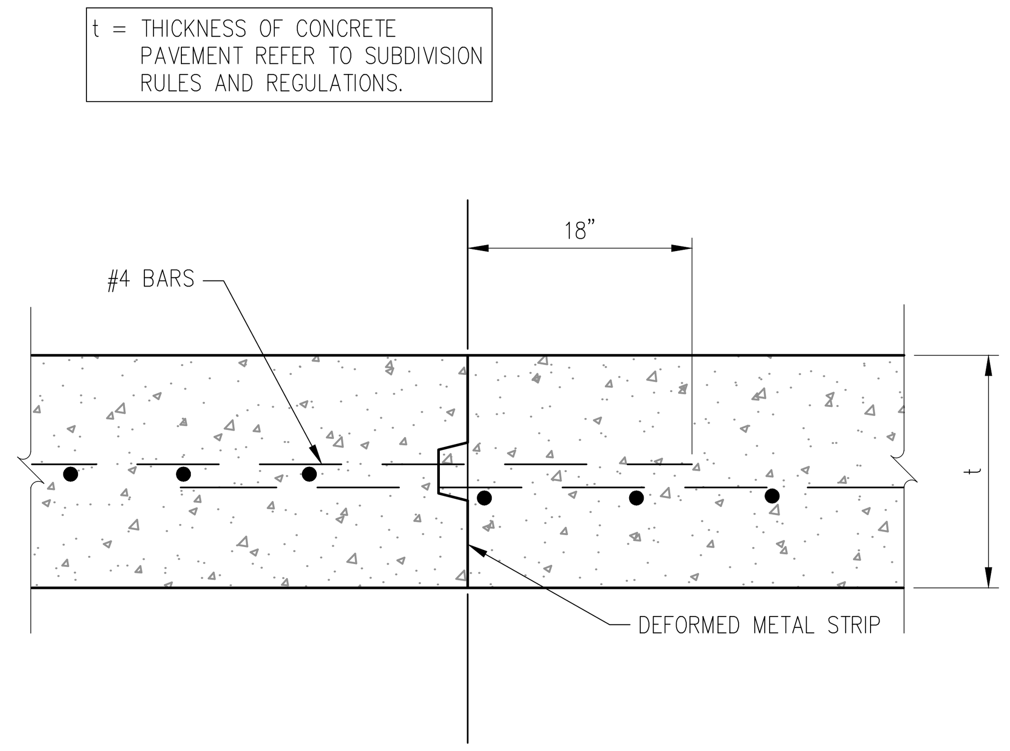
11/20/18



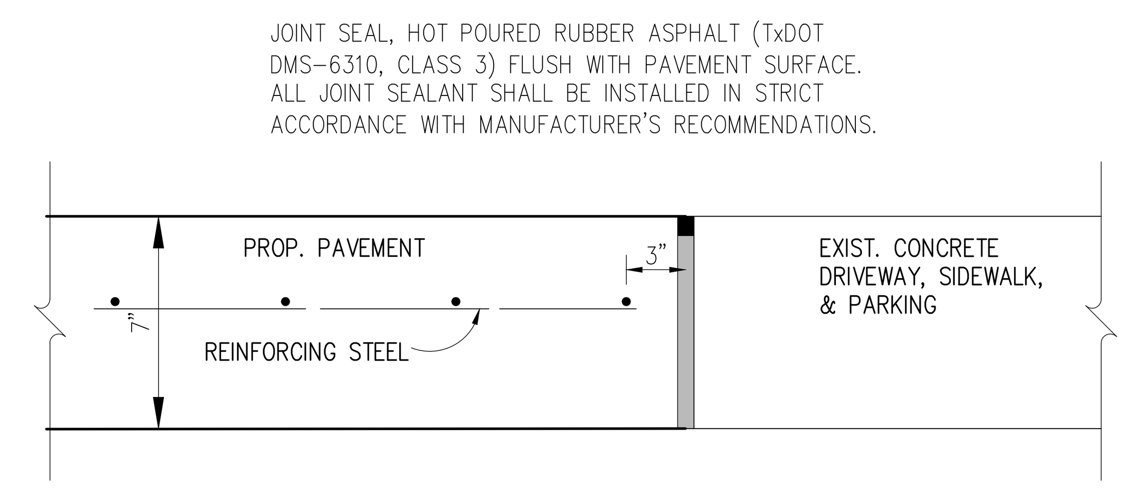
CONCRETE TO ASPHALT STANDARD PAVING HEADER

N.T.S.



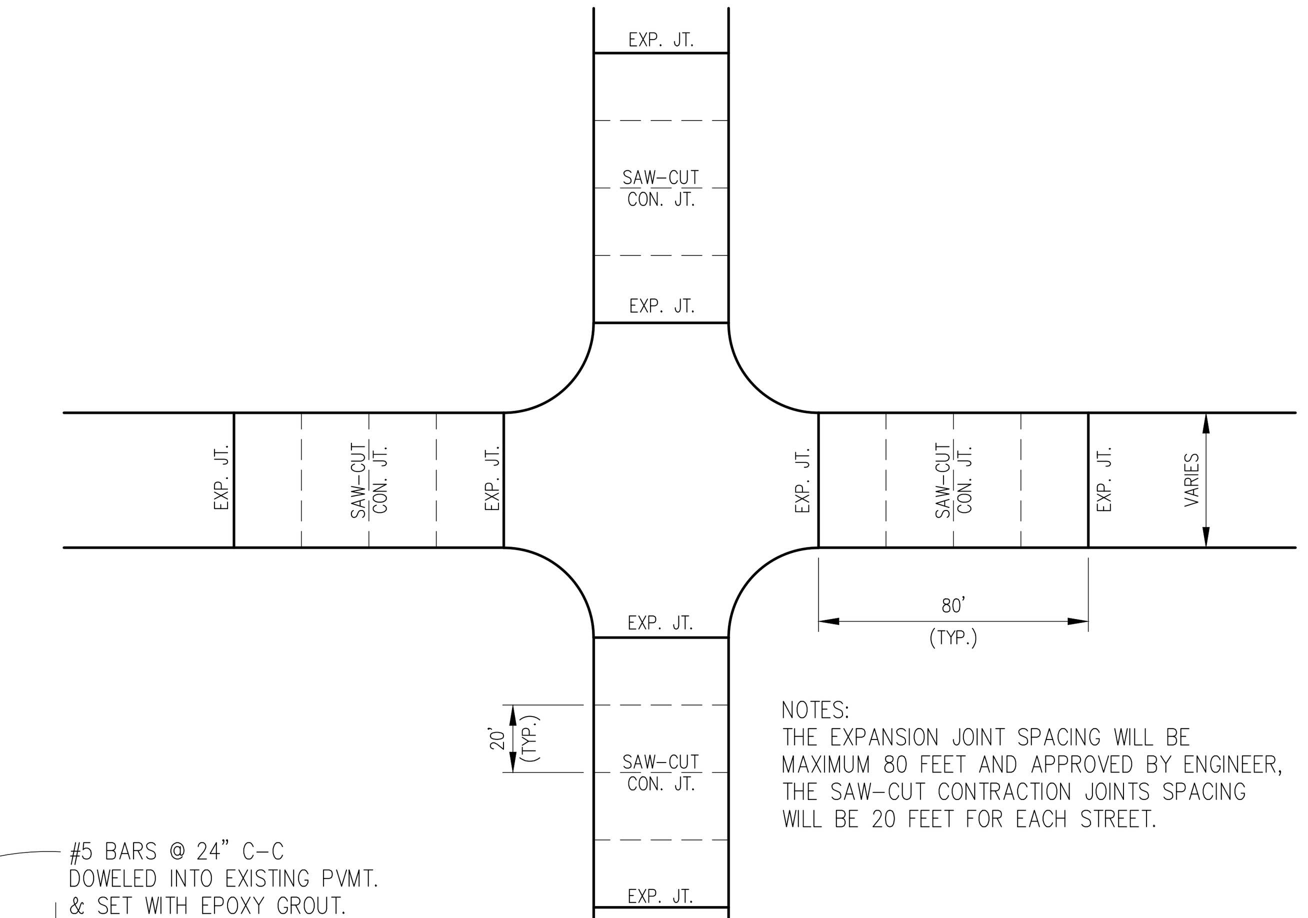
CONSTRUCTION JOINT DETAIL

N.T.S.



PROPOSED CONCRETE PAVING TO EXISTING CONCRETE SIDEWALK & PARKING EXPANSION JOINT DETAIL

N.T.S.

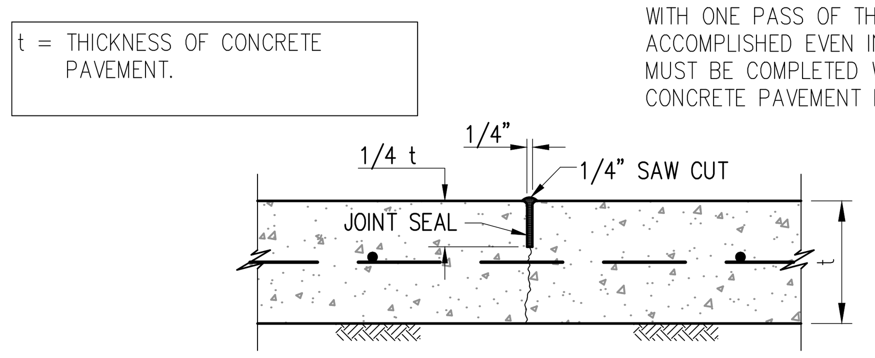


NOTES:
THE EXPANSION JOINT SPACING WILL BE MAXIMUM 80 FEET AND APPROVED BY ENGINEER, THE SAW-CUT CONTRACTION JOINTS SPACING WILL BE 20 FEET FOR EACH STREET.

TYPICAL EXPANSION JOINT LAYOUT

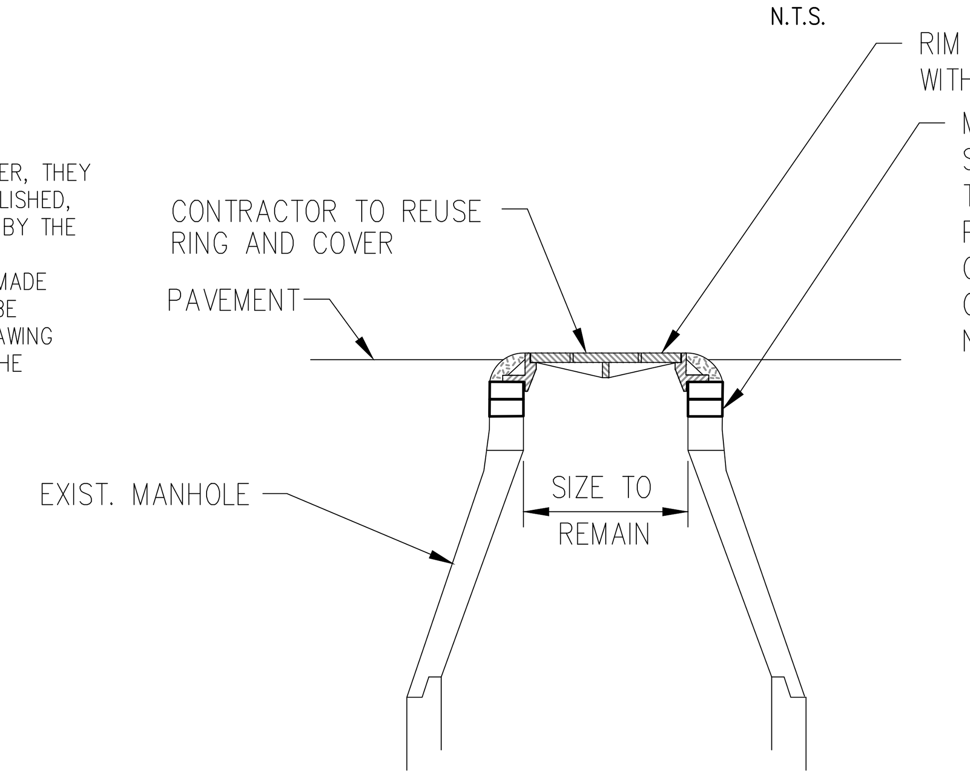
N.T.S.

NOTES:
1. WHERE SAWED JOINTS ARE PERMITTED BY THE ENGINEER, THEY SHALL BE SAWED AS SOON AS SAWING CAN BE ACCOMPLISHED, WITHOUT DAMAGE TO THE PAVEMENT, AND AS DIRECTED BY THE ENGINEER. ONCE SAWING HAS COMMENCED, IT SHALL BE CONTINUED UNTIL COMPLETED. THE SAW CUT SHALL BE MADE WITH ONE PASS OF THE CONCRETE SAW. SAWING MUST BE ACCOMPLISHED EVEN IN RAIN OR COLD WEATHER. ALL SAWING MUST BE COMPLETED WITHIN TWENTY-FOUR HOURS OF THE CONCRETE PAVEMENT PLACEMENT.



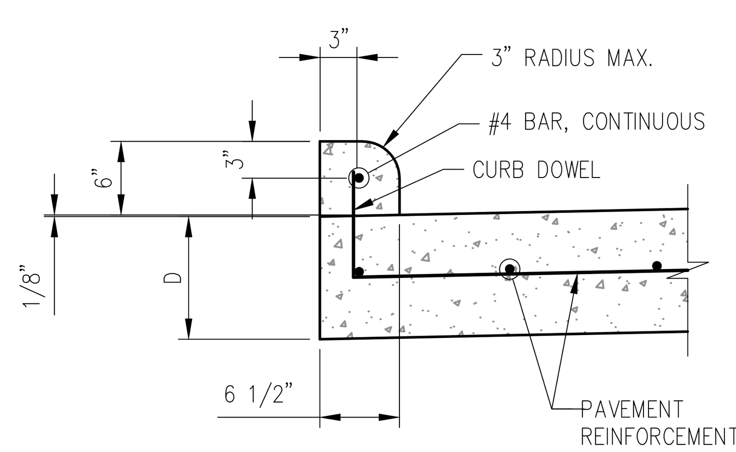
SAW CUT CONTRACTION JOINT DETAIL

N.T.S.



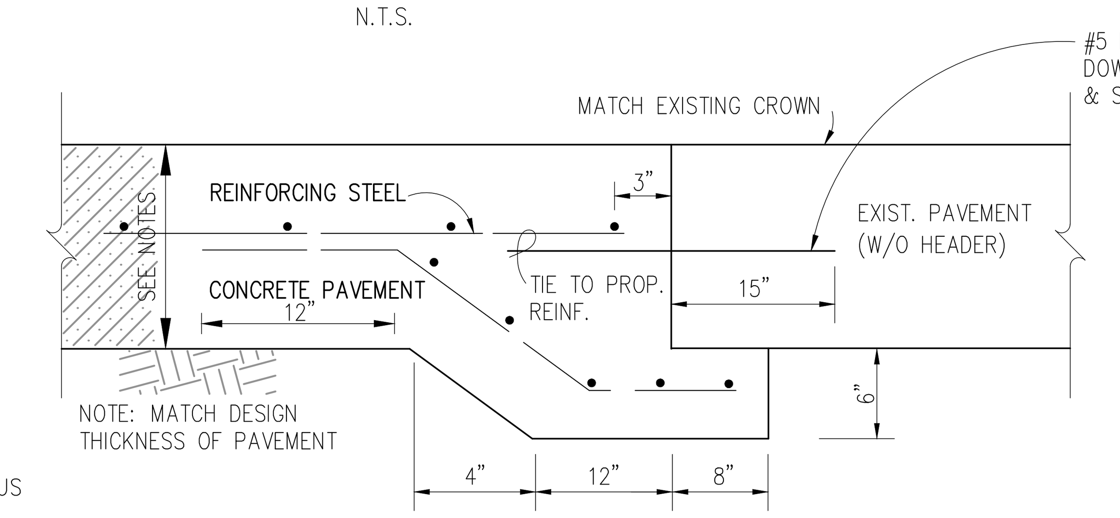
MANHOLE ADJUSTMENT DETAIL

N.T.S.



TYPICAL CONCRETE CURB REINFORCING DETAILS

N.T.S.

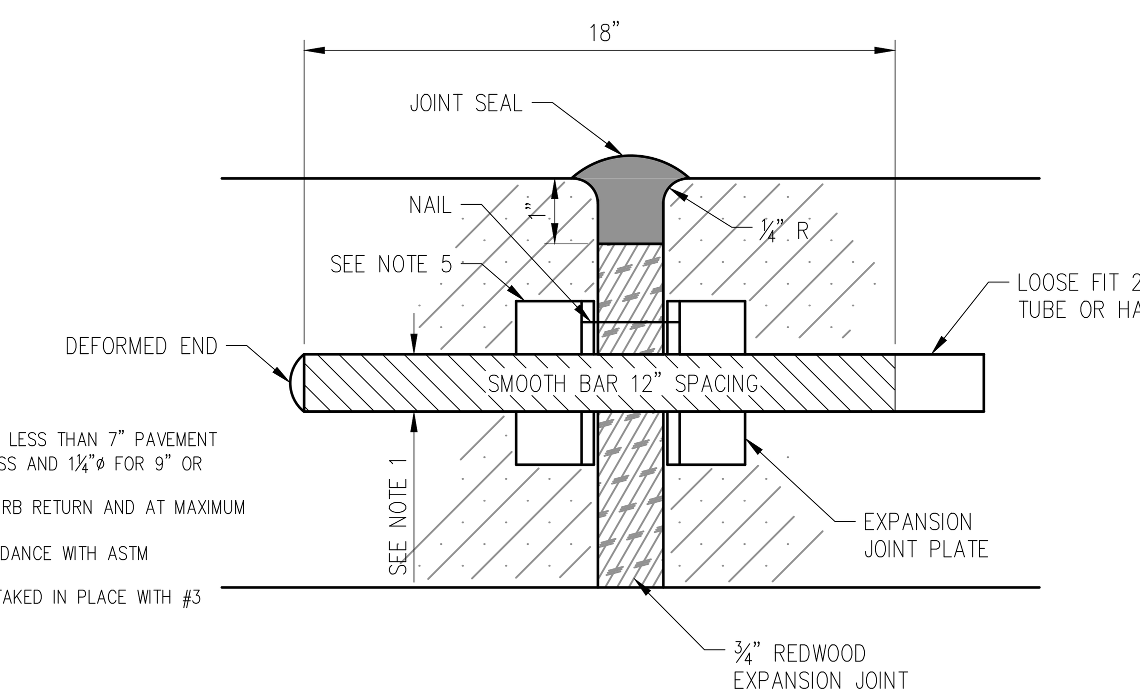


CONCRETE TO CONCRETE STANDARD PAVING HEADER

N.T.S.

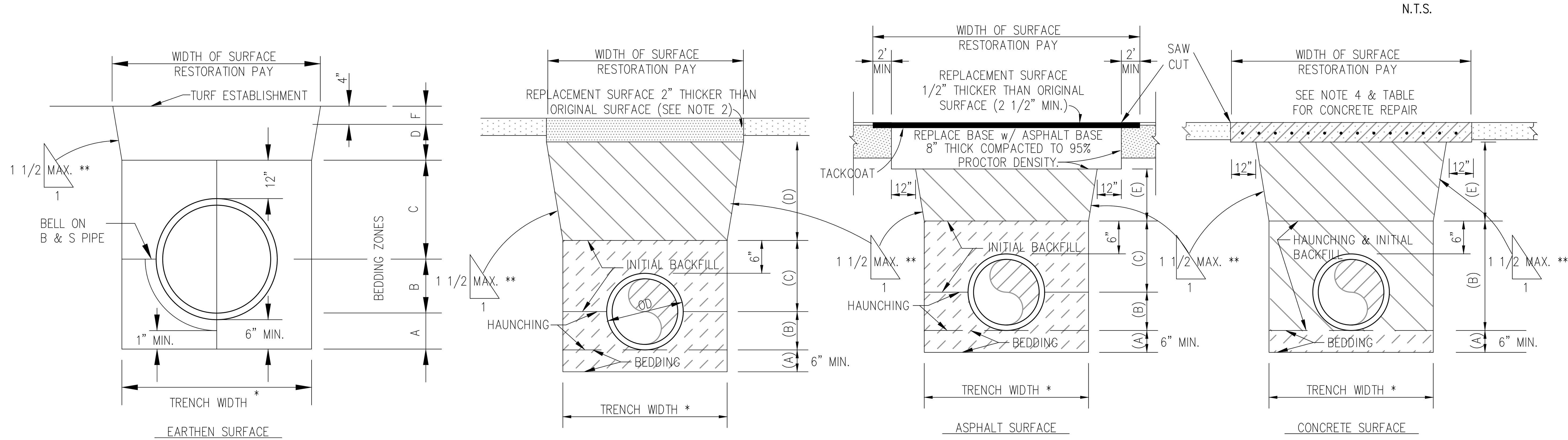
NOTES:

1. DOWELS FOR PAVEMENT EXPANSION SHALL BE ¾"ø FOR 6" TO LESS THAN 7" PAVEMENT THICKNESS, 1"ø FOR 7" TO LESS THAN 9" PAVEMENT THICKNESS AND 1¼"ø FOR 9" OR GREATER PAVEMENT THICKNESS.
2. EXPANSION JOINT SHALL BE PLACED AT THE END OF EACH CURB RETURN AND AT MAXIMUM 80' SPACING.
3. ALL JOINT SEAL MATERIAL SHALL BE ASPHALT RUBBER ACCORDANCE WITH ASTM DESIGNATION D3405.
4. IF DEFORMED METAL STRIPS ARE ALLOWED, THEY SHALL BE STAKED IN PLACE WITH #3 BARS.
5. PRE-MANUFACTURED JOINT PLATE.



EXPANSION JOINT DETAIL

N.T.S.



* PIPE LESS THAN 30"
MAX. 1'-6" + DIAMETER
MIN. 1'-0" + DIAMETER

PIPE 30" AND LARGER
MAX. 2'-0" + DIAMETER
MIN. 1'-4" + DIAMETER

** SLOPE FOR PAYMENT CALCULATIONS

ZONE MATERIALS

AS- AGGREGATE STONE (MAY BE USED INLIEU OF CS IF APPROVED BY ENGINEER).
BS- BANKSAND.
CS- CEMENT STABILIZED SAND.
EF- EARTH FILL (PLACED AFTER PIPE IS LAID)
ES- EARTH FILL SELECT (PLACED WITH PIPE LAYING).
TS- TOP SOIL.

PIPE MATERIAL	ZONE MATERIALS A	B	C	D	E	F
CORRUGATED METAL PIPE	CS	CS	CS	EF	CS	TS
REINFORCED CONCRETE PIPE	CS	CS	CS	EF	CS	TS
DUCTILE IRON (PRESSURE PIPE)	BS	BS	BS	EF	CS	TS
DUCTILE IRON (GRAVITY PIPE)	CS	CS	CS	EF	CS	TS
PVC (PRESSURE PIPE)	BS	BS	BS	EF	CS	TS
PVC (GRAVITY PIPE)	CS	CS	CS	EF	CS	TS
STEEL	BS	BS	BS	EF	CS	TS

EMBEDMENT, BACKFILL AND SURFACE RESTORATION NOTES

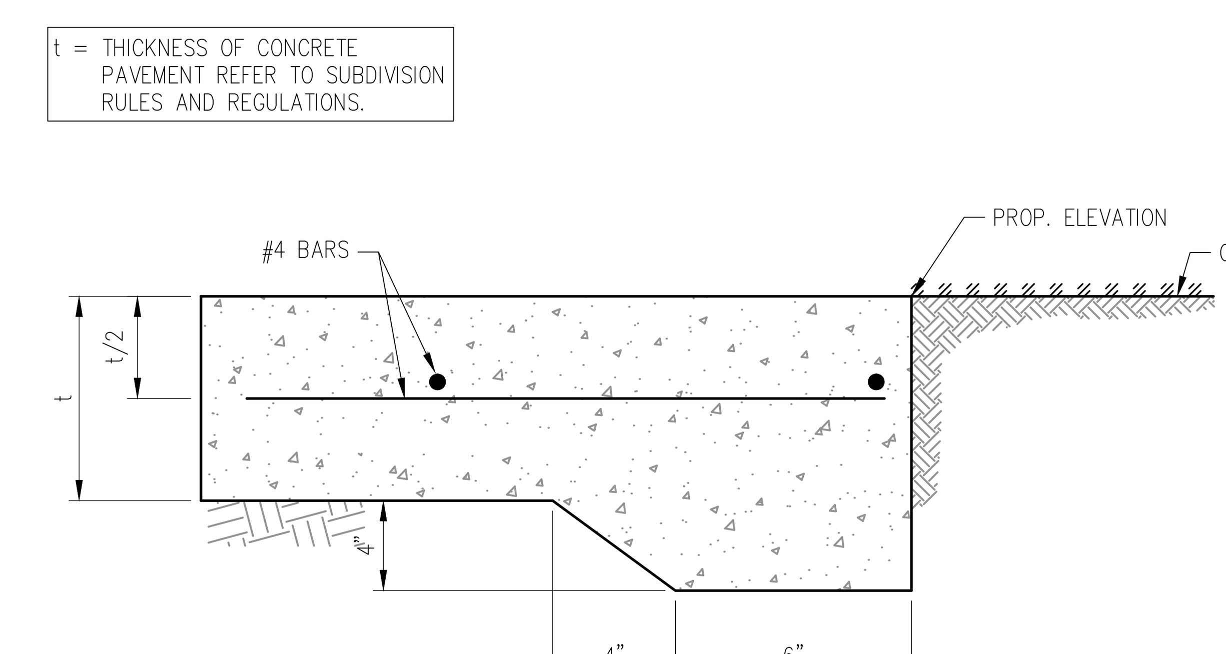
1. PAVEMENT REPAIRS SHALL BE MADE WITH LIKE MATERIALS TO THE EXISTING PAVEMENT UNLESS OTHERWISE NOTED.
2. UNPAVED DRIVEWAYS (NOT SURFACED WITH ASPHALT) SHALL BE REPAIRED WITH A MINIMUM OF 6 INCHES OF CRUSHED LIMESTONE.
3. PAVEMENT REPAIR SHALL EXTEND A MINIMUM OF 12 INCHES OUTSIDE THE TRENCH LINE ONTO UNDISTURBED SOIL.
4. CONCRETE PAVEMENT REPAIR TO INCLUDE:
   A. SAW CUT (1" DEPTH) EXISTING CONCRETE PAVEMENT
   B. CUT AND BEND REINFORCEMENT STEEL OUT OF PATH OF TRENCH
   C. COMPLETE PIE LAYING BACKFILL OPERATION.
   D. BEND STEEL BACK TO ORIGINAL LOCATION, SPLICE AS NECESSARY. SEE TABLE FOR BAR SIZES AND LENGTH OF SPLICE BAR.
   E. REPLACEMENT CONCRETE SHALL BE 2 INCHES THICKER THAN THE ORIGINAL PAVEMENT.
5. SEE SPECIFICATION ITEM 2221 FOR SPECIFIC REQUIREMENTS FOR ZONE MATERIALS.

TABLE OF SLAB DEPTH & REINFORCEMENT

Min. Depth of Slab	Width of Trench	Size of Bar	Spacing	Length of Bar
8"	18"	4	9"	40"
8"	24"	4	8"	46"
8"	30"	4	7"	52"
8"	36"	4	6"	58"
10"	42"	4	8 1/2"	64"
10"	48"	4	7 1/2"	70"
10"	54"	4	7"	76"
10"	60"	4	6 1/2"	82"
10"	66"	5	9"	88"
10"	72"	6	8 1/2"	94"
10"	78"	6	8"	100"
10"	84"	6	7 1/2"	106"

EMBEDMENT, BACKFILL AND SURFACE RESTORATION

N.T.S.



CONCRETE TO GRASS STANDARD PAVING HEADER

N.T.S.

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED
PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

STANDARD PAVING DETAILS

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 21 Of 39

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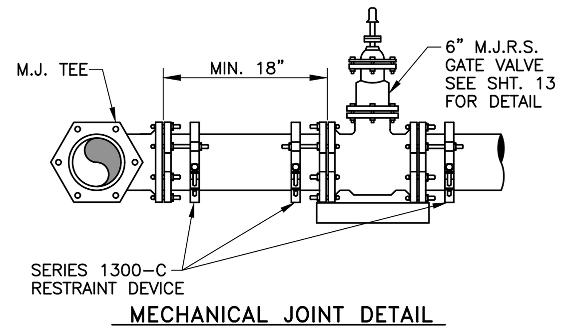
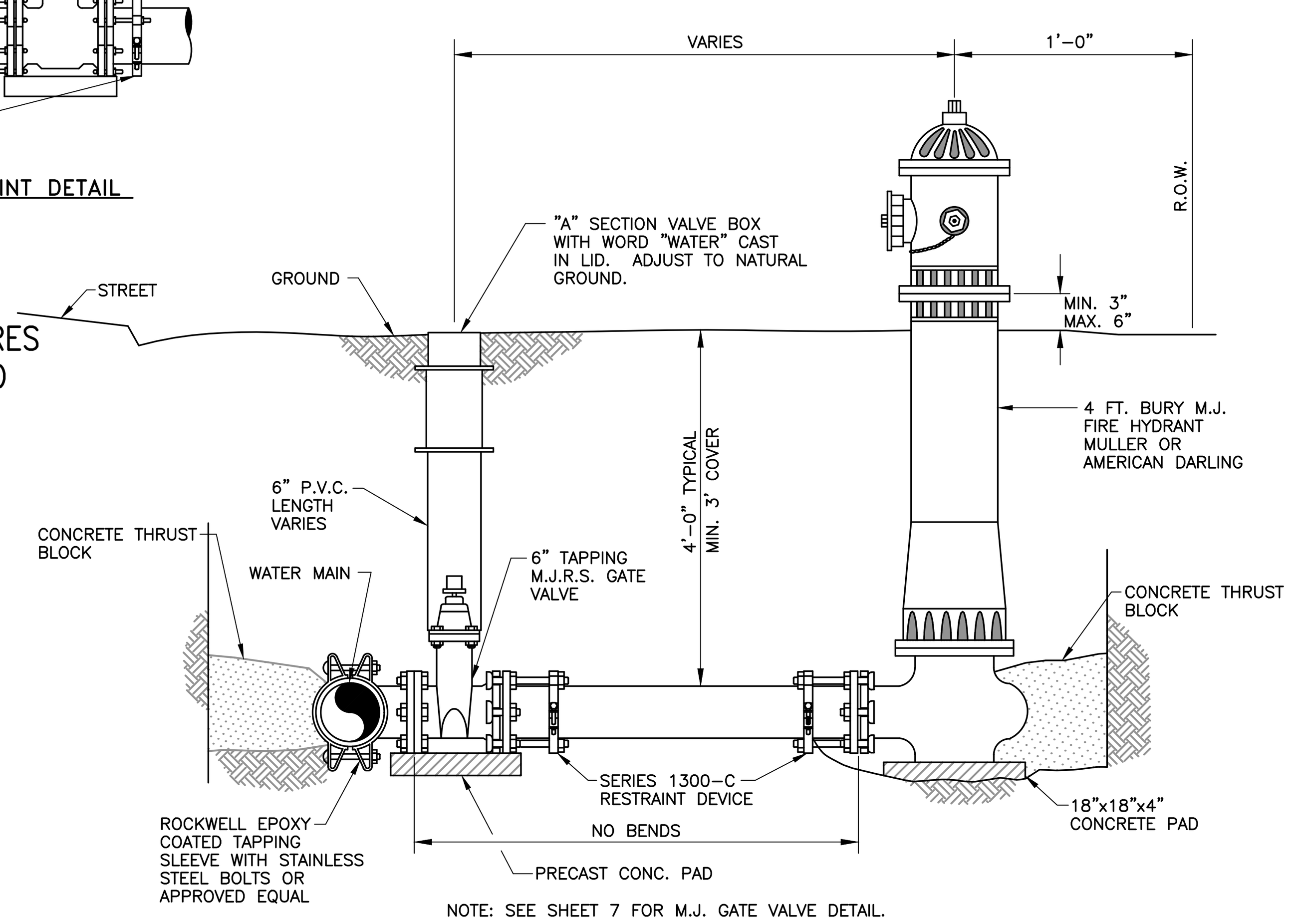
11/14/18



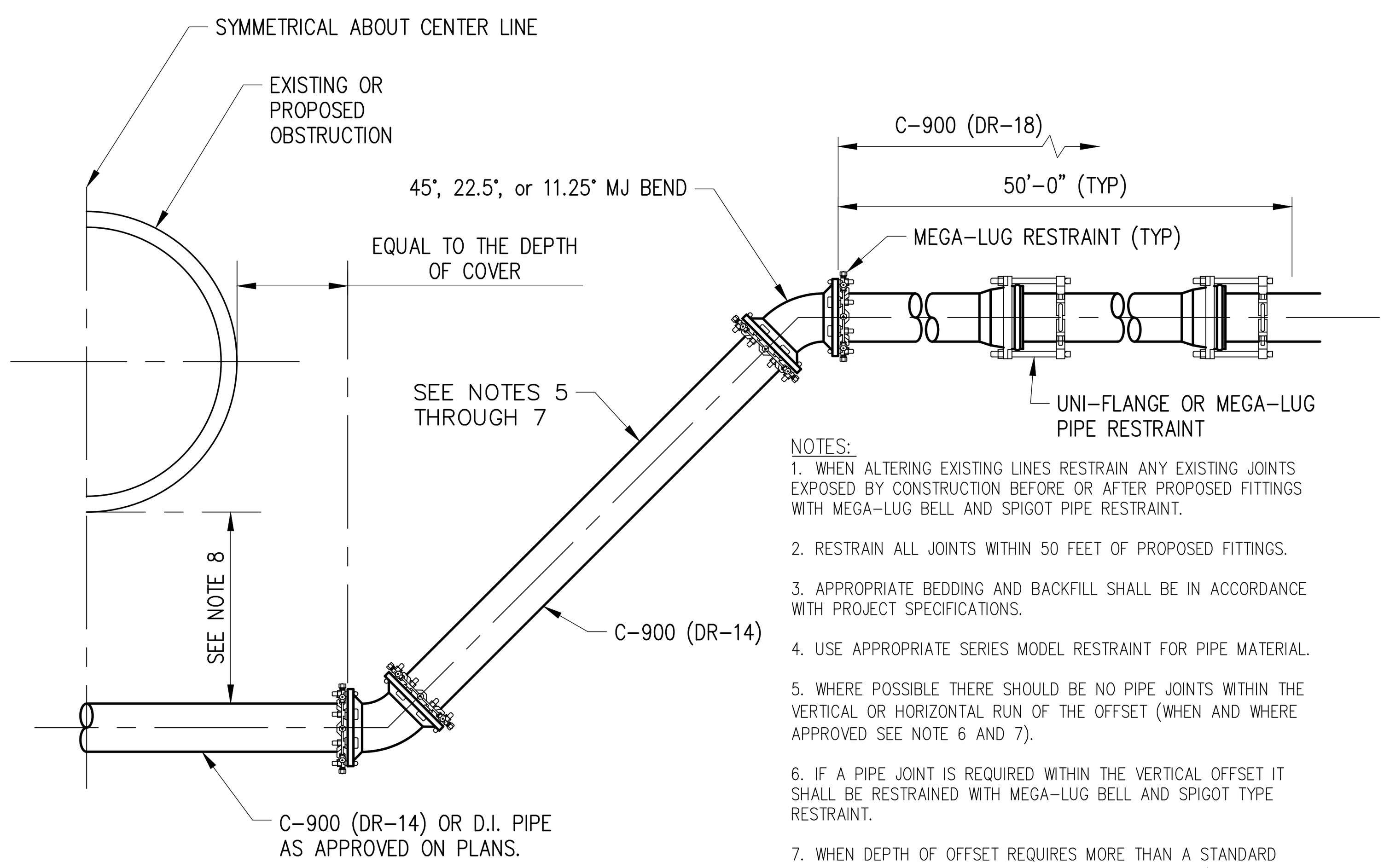
MECHANICAL JOINT DETAIL

SPECIAL FIRE HYDRANT NOTE:
*GALVESTON COUNTY W.C.&I.D. No. 12 REQUIRES A STORZ CONNECTION TO BE INCLUDED AND INSTALLED ON THE STEAMER NOZZLE. FIRE HYDRANTS TO BE MUELLER.



FIRE HYDRANT & VALVE DETAIL

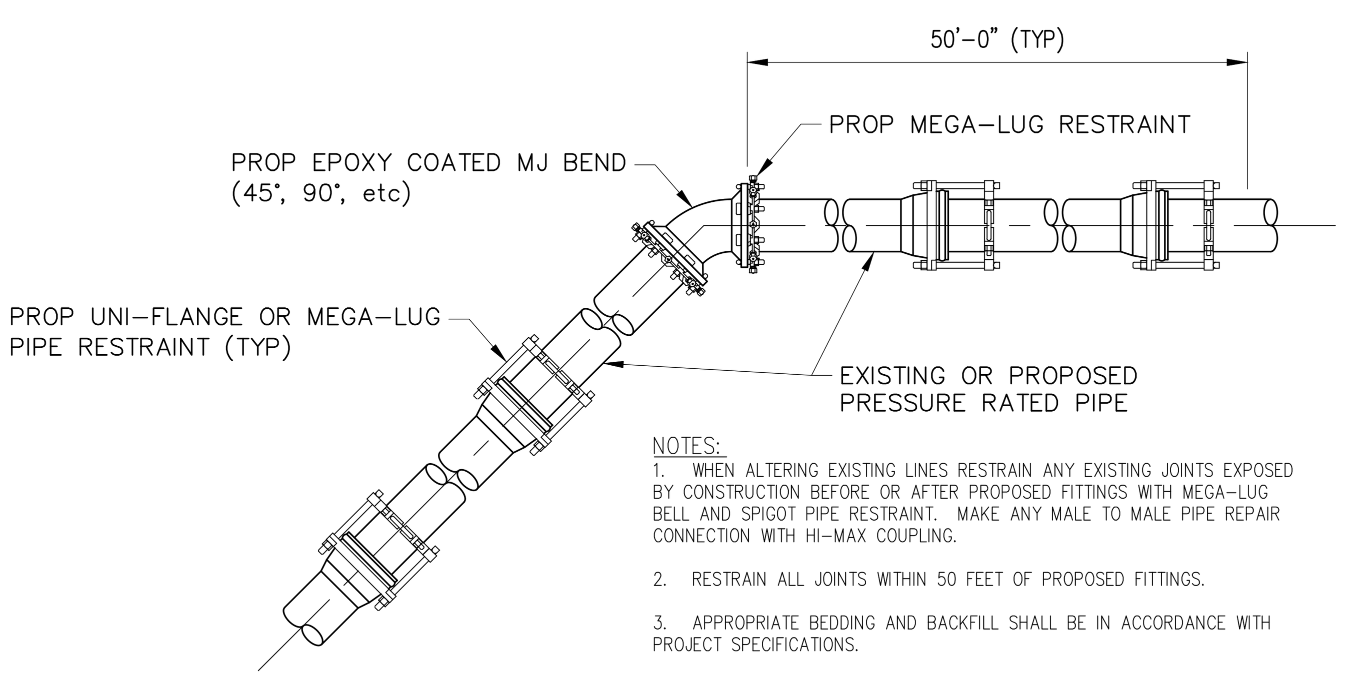
N.T.S.



NOTES:
1. WHEN ALTERING EXISTING LINES RESTRAIN ANY EXISTING JOINTS EXPOSED BY CONSTRUCTION BEFORE OR AFTER PROPOSED FITTINGS WITH MEGA-LUG BELL AND SPIGOT PIPE RESTRAINT.
2. RESTRAIN ALL JOINTS WITHIN 50 FEET OF PROPOSED FITTINGS.
3. APPROPRIATE BEDDING AND BACKFILL SHALL BE IN ACCORDANCE WITH PROJECT SPECIFICATIONS.
4. USE APPROPRIATE SERIES MODEL RESTRAINT FOR PIPE MATERIAL.
5. WHERE POSSIBLE THERE SHOULD BE NO PIPE JOINTS WITHIN THE VERTICAL OR HORIZONTAL RUN OF THE OFFSET (WHEN AND WHERE APPROVED SEE NOTE 6 AND 7).
6. IF A PIPE JOINT IS REQUIRED WITHIN THE VERTICAL OFFSET IT SHALL BE RESTRAINED WITH MEGA-LUG BELL AND SPIGOT TYPE RESTRAINT.
7. WHEN DEPTH OF OFFSET REQUIRES MORE THAN A STANDARD LENGTH OF PIPE NO SEGMENT SHALL BE LESS THAN 5' IN LENGTH.
8. THE MINIMUM CLEARANCE SHALL BE DETERMINED BY THE AMOUNT OF BEDDING AND BACKFILL REQUIRED BY THE PROSPECTIVE PIPE AND THEIR USAGE. SEE THE BEDDING AND BACKFILL DETAILS FOR DIMENSIONS.

RESTRAINED MECHANICAL JOINT VERTICAL OFFSET

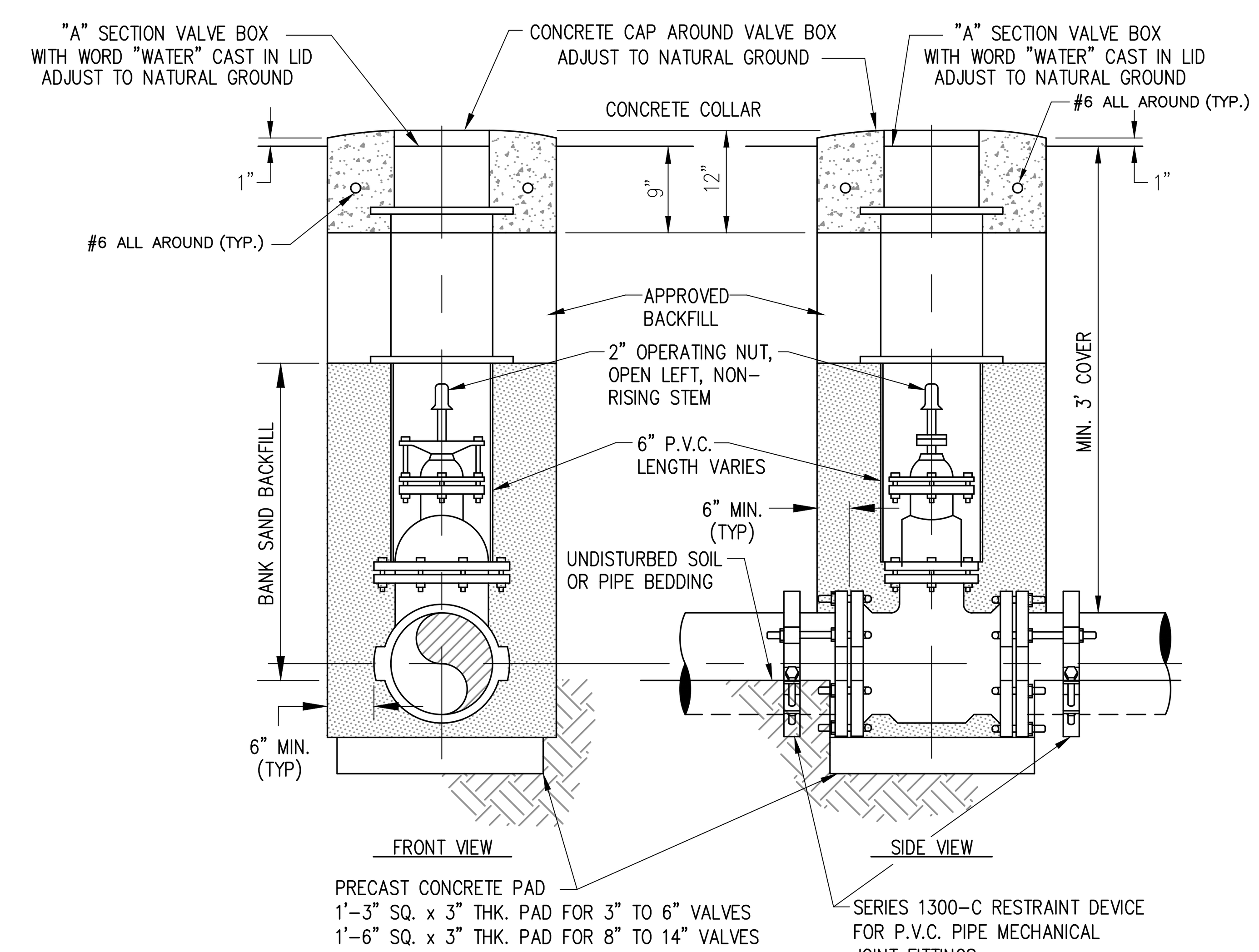
N.T.S.



NOTES:
1. WHEN ALTERING EXISTING LINES RESTRAIN ANY EXISTING JOINTS EXPOSED BY CONSTRUCTION BEFORE OR AFTER PROPOSED FITTINGS WITH MEGA-LUG BELL AND SPIGOT PIPE RESTRAINT. MAKE ANY MALE TO MALE PIPE REPAIR CONNECTION WITH HI-MAX COUPLING.
2. RESTRAIN ALL JOINTS WITHIN 50 FEET OF PROPOSED FITTINGS.
3. APPROPRIATE BEDDING AND BACKFILL SHALL BE IN ACCORDANCE WITH PROJECT SPECIFICATIONS.
4. USE APPROPRIATE SERIES MODEL RESTRAINT FOR PIPE MATERIAL.

RESTRAINT DETAIL FOR PRESSURE LINE WITH BEND-HORIZONTAL ADJUSTMENT

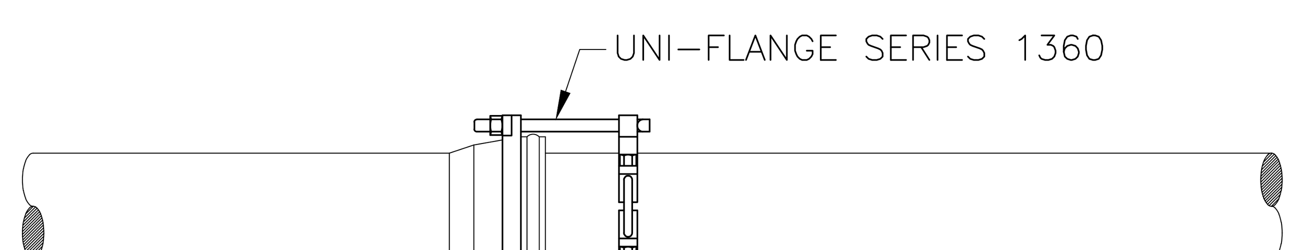
N.T.S.



RESILENT SEAT GATE VALVE INSTALLATION DETAIL

N.T.S.

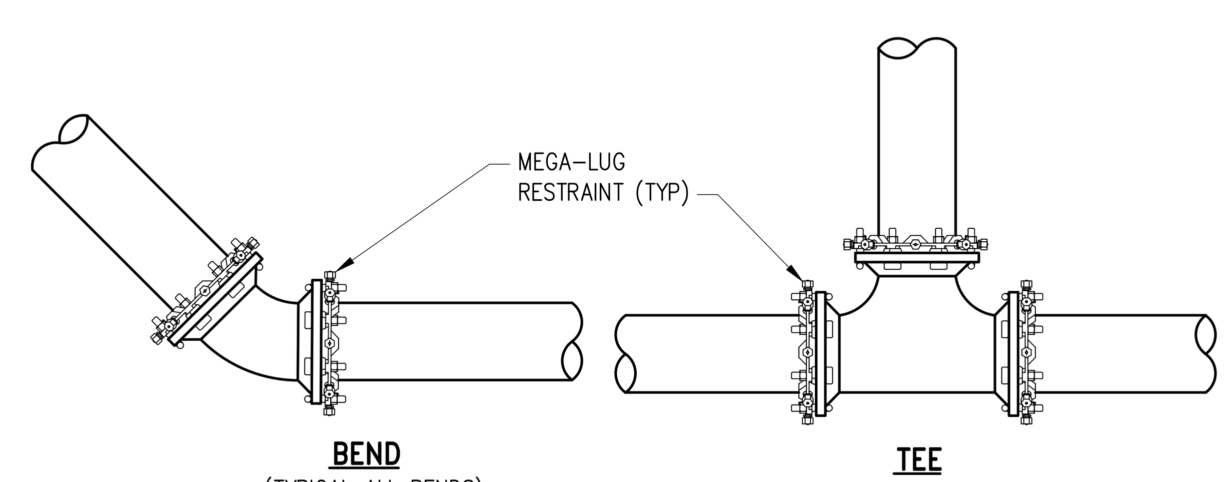
NOTE
ALL GATE VALVES TO BE MECHANICAL JOINT, RESILIENT SEAT, MUELLER OR APPROVED EQUAL.



SPECIFICATIONS:
1. RESTRAINT DEVICES FOR P.V.C. (AWWA C-900) AND P.V.C. PRESSURE FITTINGS (AWWA C-907) SHALL CONSIST OF A SPLIT RING INSTALLED ON THE PIPE SPIGOT, CONNECTED TO A SPLIT BACK-UP RING SEATED BEHIND THE FITTING BELL.
2. THE SPLIT RESTRAINT RING SHALL INCORPORATE A SERIES OF MACHINED SERRATIONS (NOT "AS CAST") ON THE INSIDE DIAMETER TO PROVIDE POSITIVE RESTRAINT, EXACT FIT, AND 360° CONTACT AND SUPPORT OF THE PIPE WALL.
3. THE TWO HALVES OF THE SPLIT BACK UP RING SHALL INTER-LOCK WITHOUT THE NEED FOR ADDITIONAL BOLTS AND SHALL FORM A BEVELED LEADING EDGE TO ASSURE EXACT FIT BEHIND THE FITTING BELL.
4. RESTRAINT DEVICES SHALL BE OF DUCTILE IRON, ASTM A536, GRADE 65-45-12 AND CONNECTING BOLTS SHALL BE OF HIGH STRENGTH, LOW ALLOY MATERIAL IN ACCORDANCE WITH ANSI/AWWA C111/21.11
5. RESTRAINT DEVICES SHALL BE UNI-FLANGE SERIES 1360 OR APPROVED EQUAL.

UNI-FLANGE RESTRAINT

N.T.S.

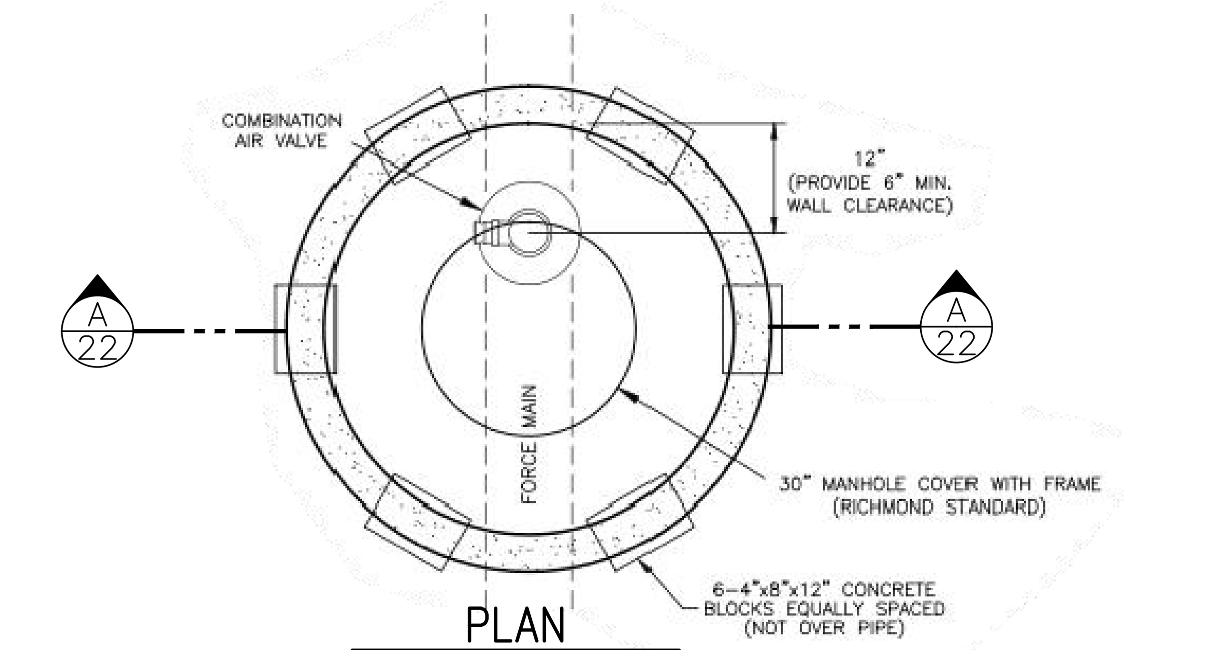


BEND
(TYPICAL ALL BENDS)

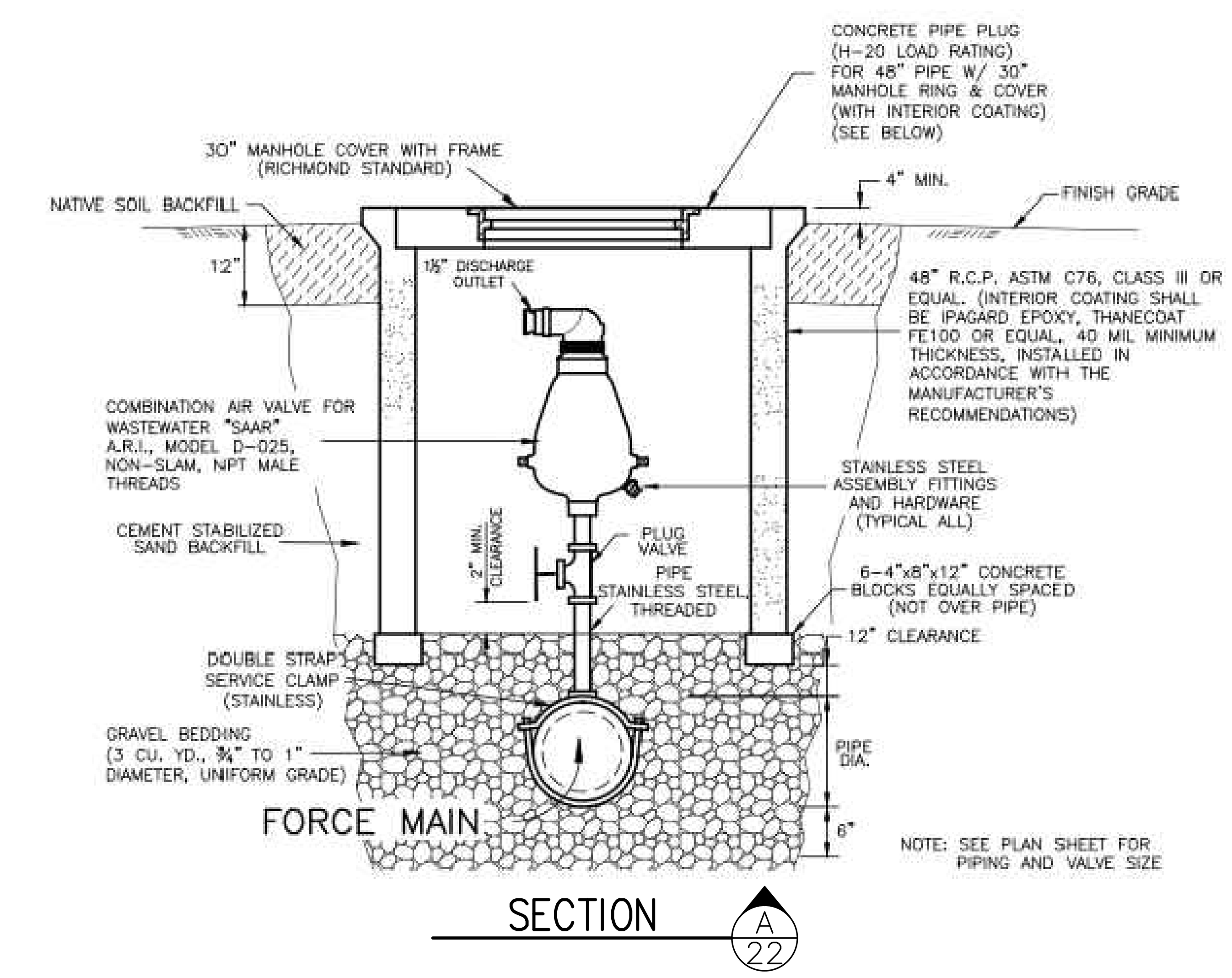
TEE

FITTING ANCHOR DETAILS

N.T.S.



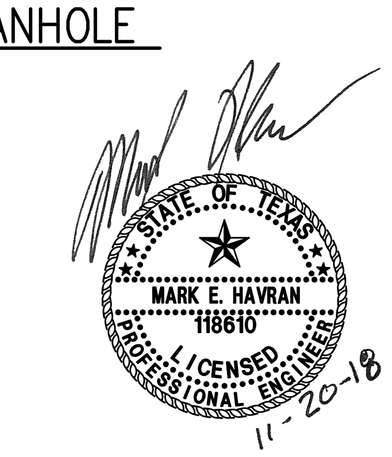
PLAN



SECTION A 22

SEWERAGE AIR RELEASE VALVE MANHOLE

N.T.S.



Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION
& LINEAR DETENTION DITCH

STANDARD WATERLINE DETAILS

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 22 Of 39

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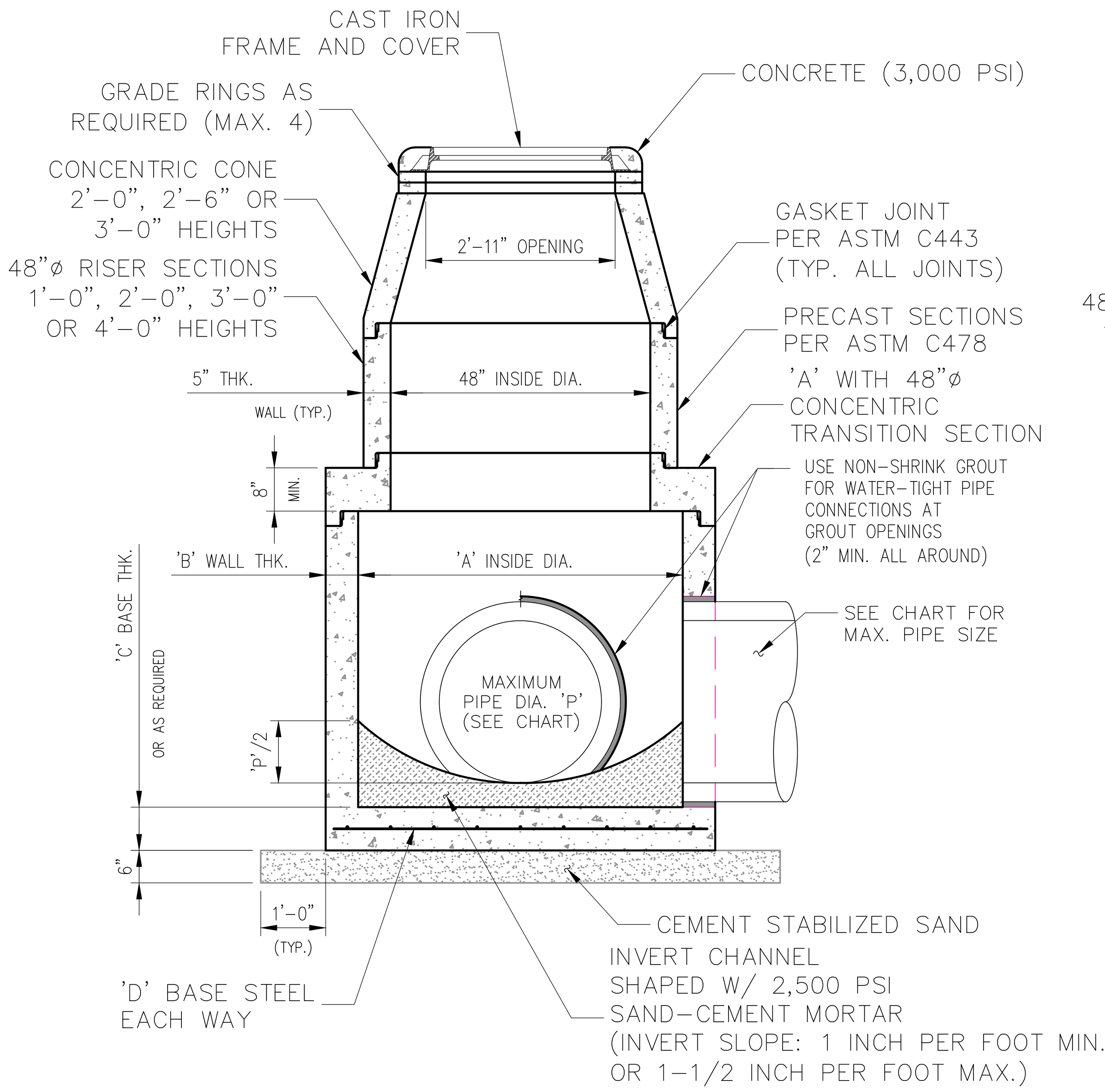
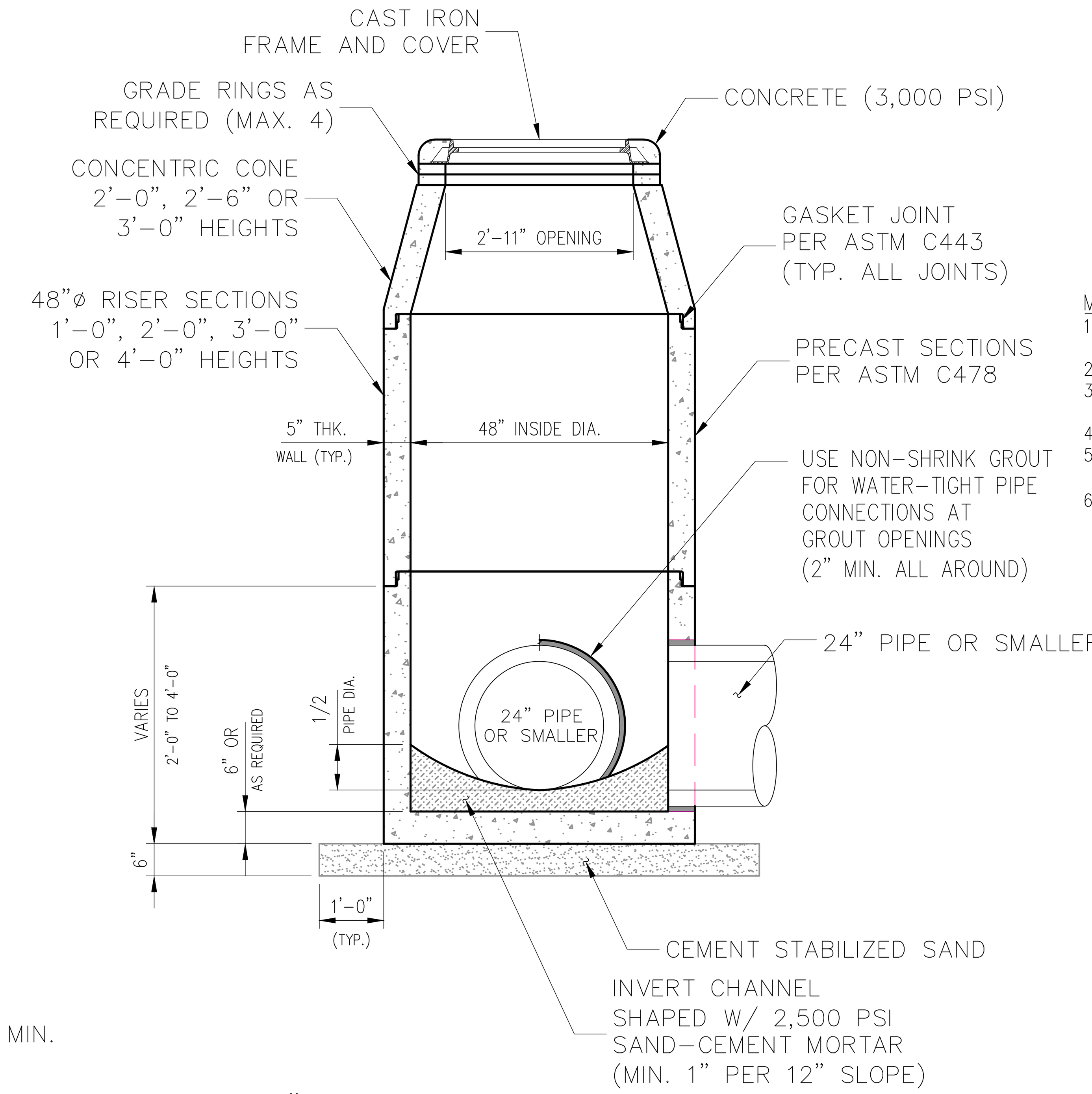
11/14/18



PRECAST CONCENTRIC MANHOLE FOR PIPE SIZES GREATER THAN 24"

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



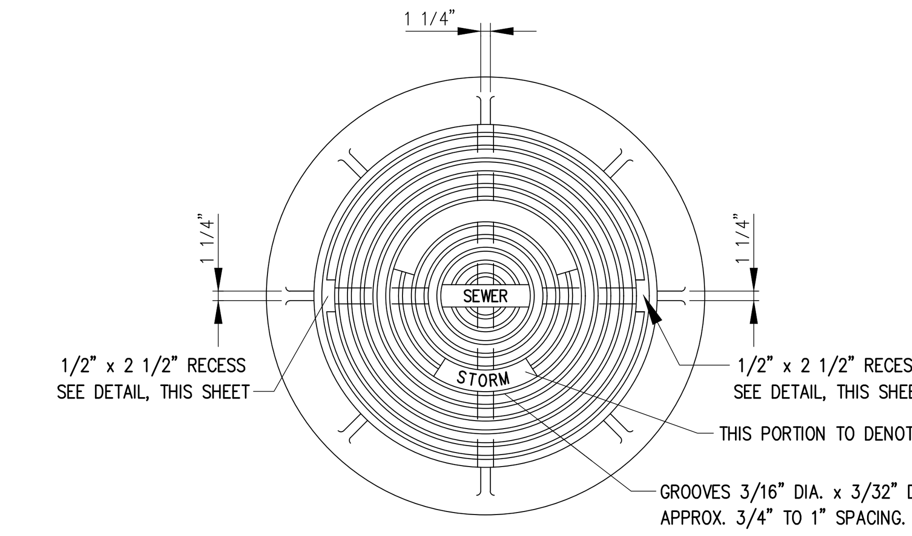
48"ø PRECAST CONCENTRIC MANHOLE FOR PIPE SIZES 24" OR SMALLER

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

MAXIMUM PIPE DIA. 'P'	INSIDE DIA. 'A'	WALL THICKNESS 'B'	BASE THICKNESS 'C'	BASE STEEL 'D'
30"	5'-0"	6"	8"	#5 @ 8"
42"	6'-0"	7"	8"	#5 @ 8"
54"	7'-0"	8"	10"	#6 @ 12" (2 LAYERS)
60"	8'-0"	9"	10"	#6 @ 12" (2 LAYERS)

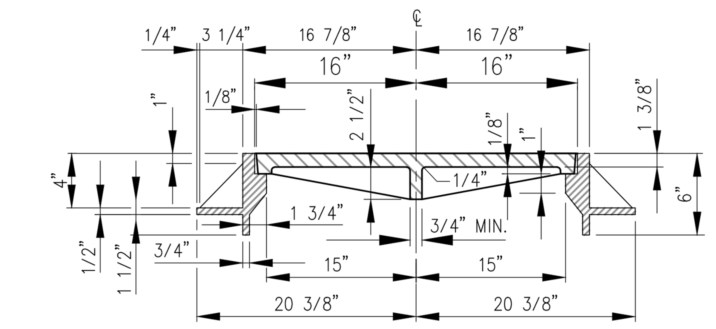
MANHOLE NOTES:

1. CONSTRUCTION AND MATERIALS SHALL MEET REQUIREMENTS OF SPEC 465.
2. CONCRETE FOR MANHOLE: MINIMUM 4,000 PSI IN 28 DAYS
3. HS-20 LOADING; MANHOLE DESIGN SHALL MEET OR EXCEED ASTM C478 REQUIREMENTS.
4. GASKET JOINT: PER ASTM C443
5. FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS MODEL V-1420 OR APPROVED EQUAL.
6. SHOP DRAWINGS WITH MANUFACTURER'S CERTIFICATION SHALL BE SUBMITTED FOR ENGINEER'S APPROVAL.



PLAN
MANHOLE COVER w/ FRAME

N.T.S.

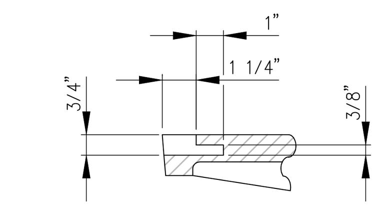


SECTIONAL ELEVATION
MANHOLE COVER w/ FRAME

N.T.S.

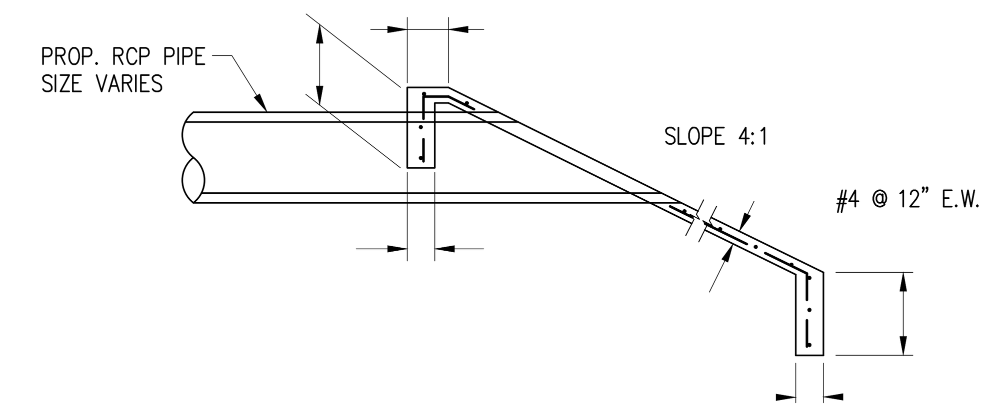
MANHOLE COVER NOTES:

1. MATERIAL SPECIFICATION SHALL BE ASTM A-48 CLASS 30.
2. COVER TO BE SOLID, WITHOUT HOLES AND WITH NON-PENETRATION RIM ACCESS RECESSES ONLY.
3. HORIZONTAL BEARING SURFACES TO BE MACHINED AND SEALED AT INSTALLATION WITH WATERPROOF GREASE COATING.
4. LOAD RATING TO BE HEAVY-DUTY.
5. NEENAH PATTERN BREAKDOWN; V-1418 COVER, WEIGHT 130 lbs., V-1418-2 FRAME, WEIGHT 170 lbs.
6. ALL LETTERING TO BE 2" HIGH AND RAISED 1/8". LINE WIDTH FOR LETTERS SHALL BE 1/4" WIDE.



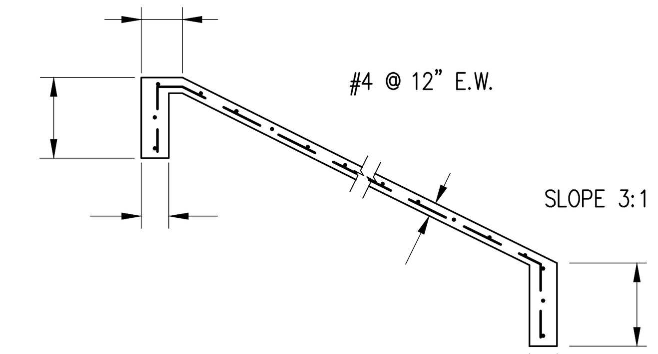
PICKHOLE DETAIL

N.T.S.



SLOPE PAVING DETAIL AT RCP

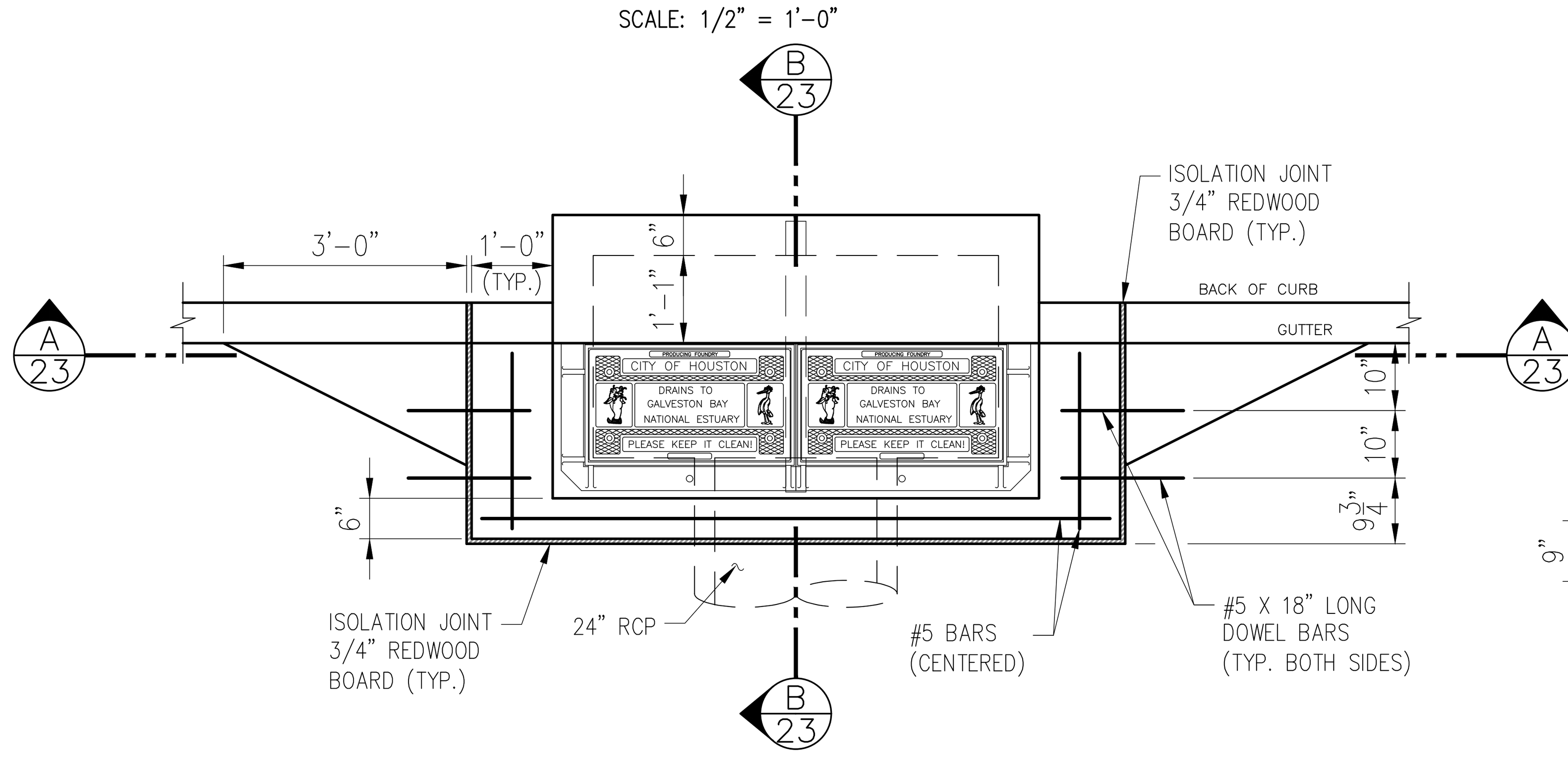
N.T.S.



SLOPE PAVING DETAIL

CONCRETE SLOPE PAVEMENT

1. ADJUST LENGTH AND WIDTH IN FIELD AS NECESSARY.
2. 2-FEET DEEP X 8-INCH WIDE TOE ALL AROUND THE STRUCTURE.
3. STEEL REINFORCING-#4 BARS (GRADE 40) AT 12 INCHES ON CENTER EACH WAY.
4. MATCH TOP OF CONCRETE WITH NATURAL GROUND.



PLAN

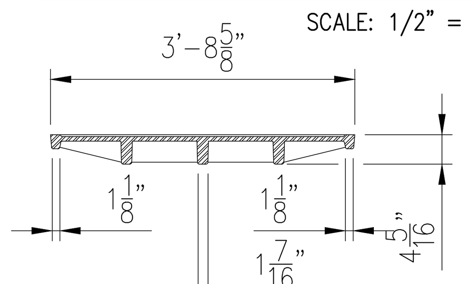
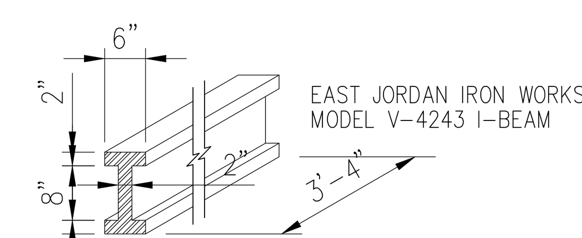
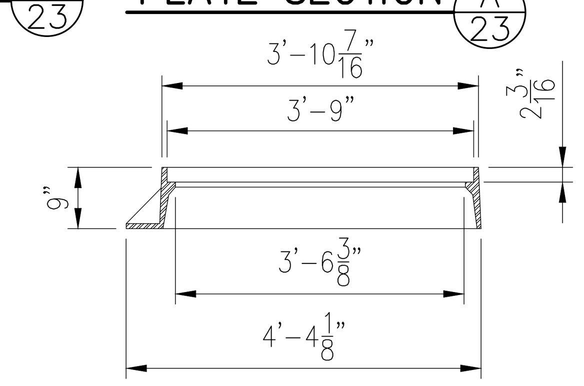


PLATE SECTION



I-BEAM SECTION

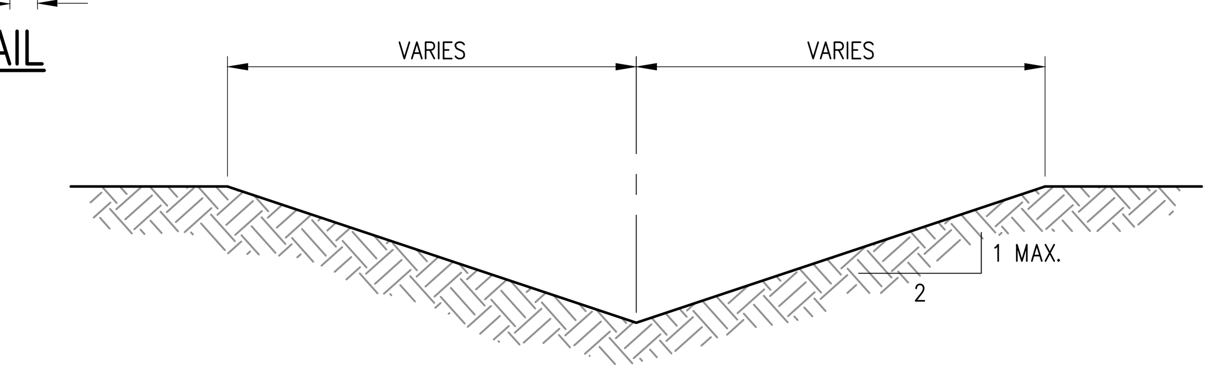


LEFT FRAME SECTION

RIGHT FRAME IS OPPOSITE HAND

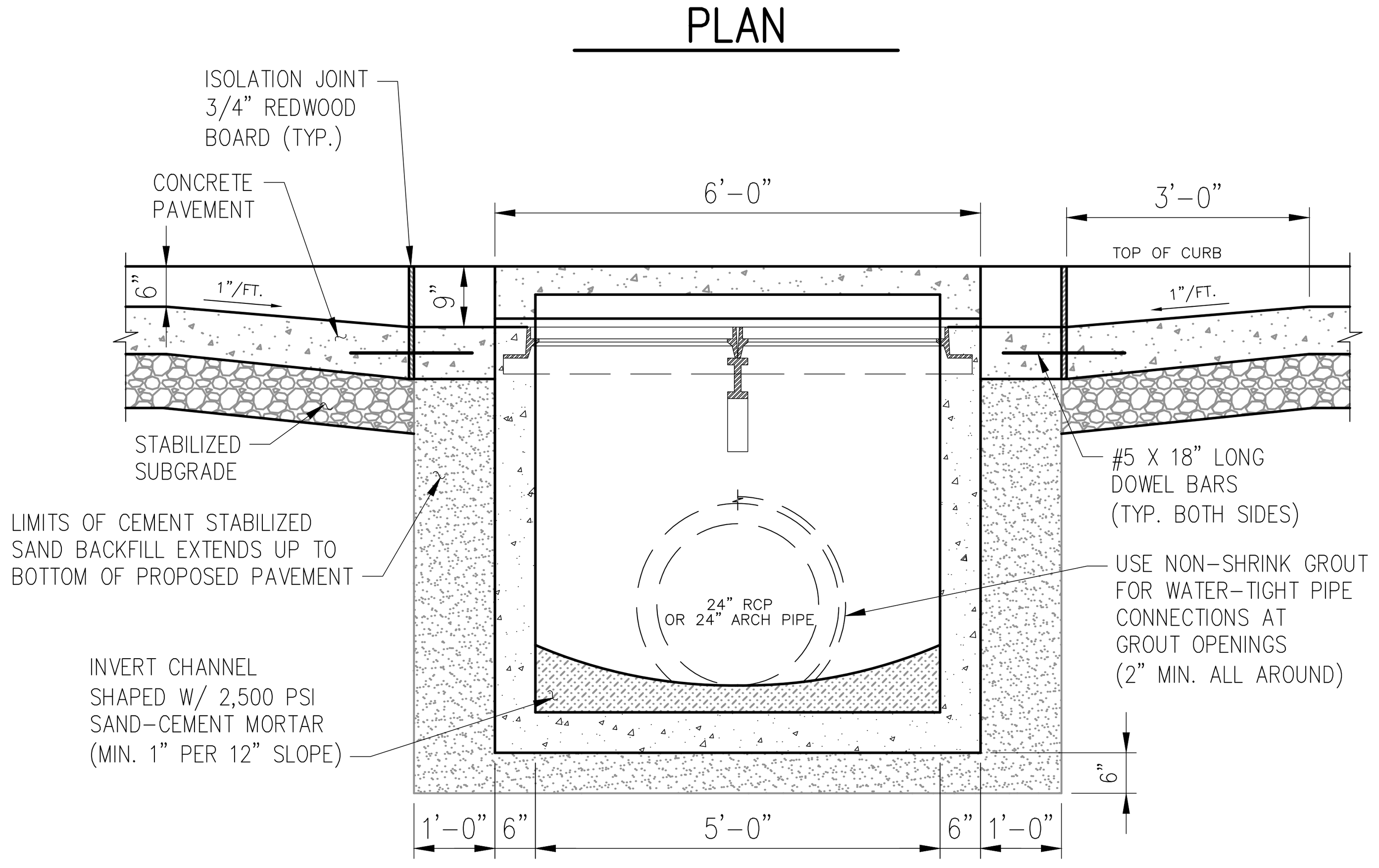
TYPE "B-B" INLET NOTES:

1. CONSTRUCTION AND MATERIALS SHALL MEET REQUIREMENTS OF SPEC 465.
2. CONCRETE FOR INLET: MINIMUM 4,000 PSI IN 28 DAYS
3. PRECAST STRUCTURE TO MEET ASTM C913.
4. FRAME WITH EITHER SOLID PLATE OR GRATE SHALL BE EAST JORDAN IRON WORKS MODEL V-4243 OR APPROVED EQUAL.
5. IF THE ENGINEER OF RECORD SPECIFIES A CAST-IN-PLACE INLET, HE/SHE SHALL INCORPORATE A DETAILED DRAWING INTO THE CONTRACT DOCUMENTS. HOWEVER, IF THE CONTRACTOR ELECTS TO CONSTRUCT A CAST-IN-PLACE INLET, THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING A DETAILED DRAWING, SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS.
6. SHOP DRAWINGS WILL BE REQUIRED FOR PRECAST CONSTRUCTION OF INLET.
7. KNOCK-OUTS ARE NOT PERMISSIBLE FOR PRECAST CONSTRUCTION OF INLET.
8. 5'-2" MINIMUM OR AS SPECIFIED BY THE ENGINEER OF RECORD.

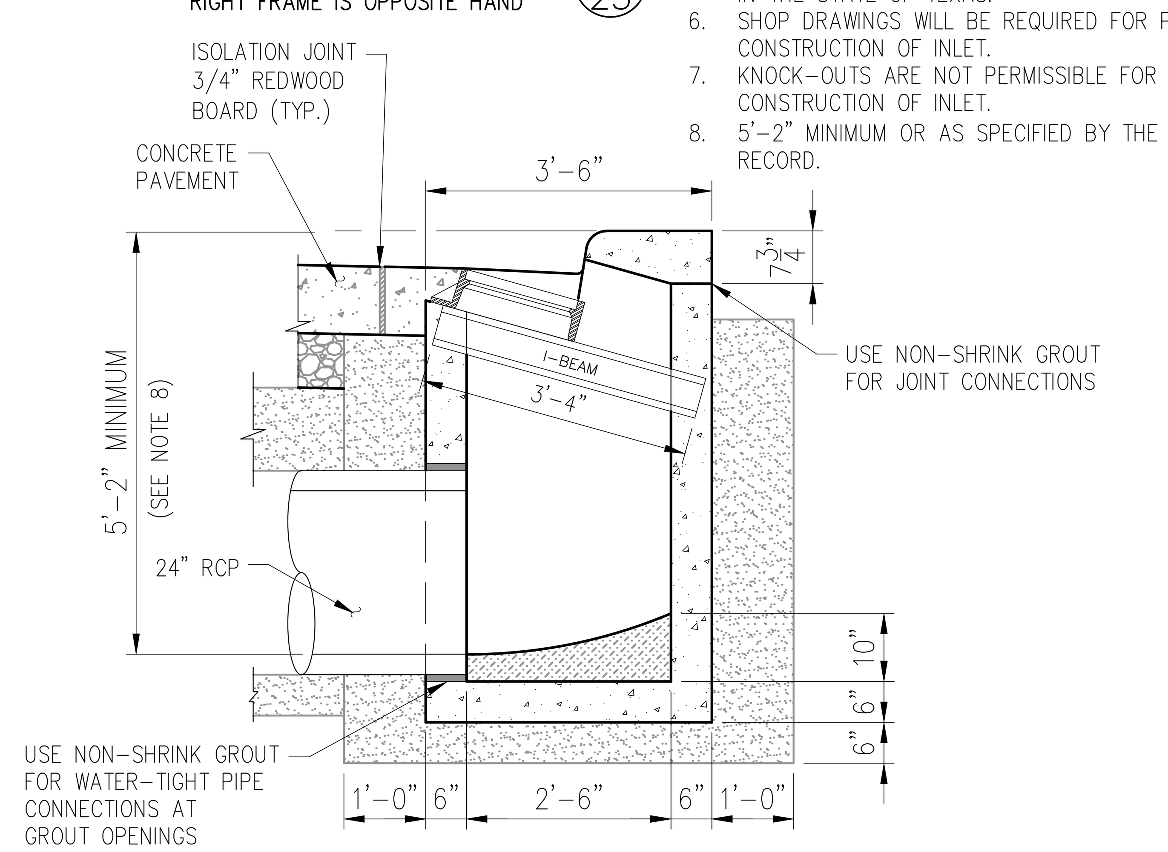


TYPICAL SWALE DETAIL

N.T.S.



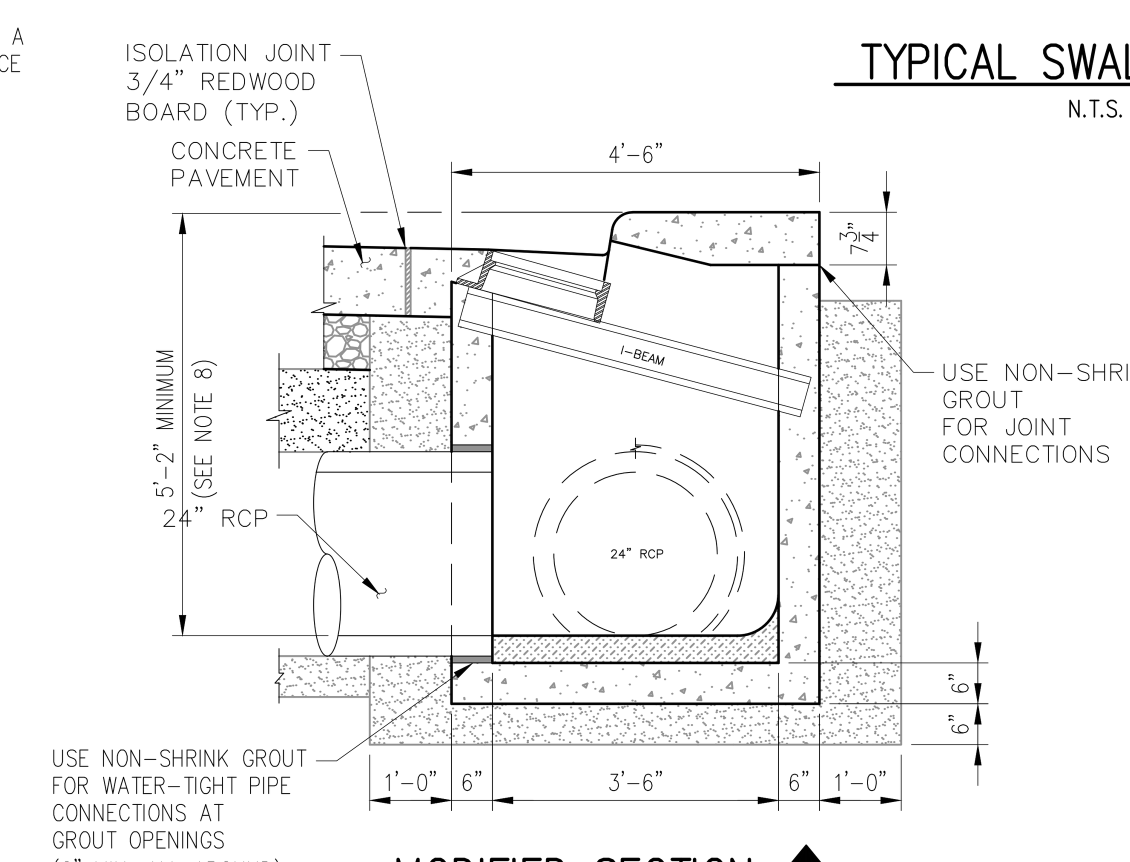
SECTION



SECTION

TYPE "B-B" INLET

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



MODIFIED SECTION

MODIFIED TYPE "B-B" INLET

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

11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH
STANDARD STORM SEWER DETAILS SHEET 1 OF 4

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DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: AS SHOWN
APPROVED:	SHEET No. 23 Of 39

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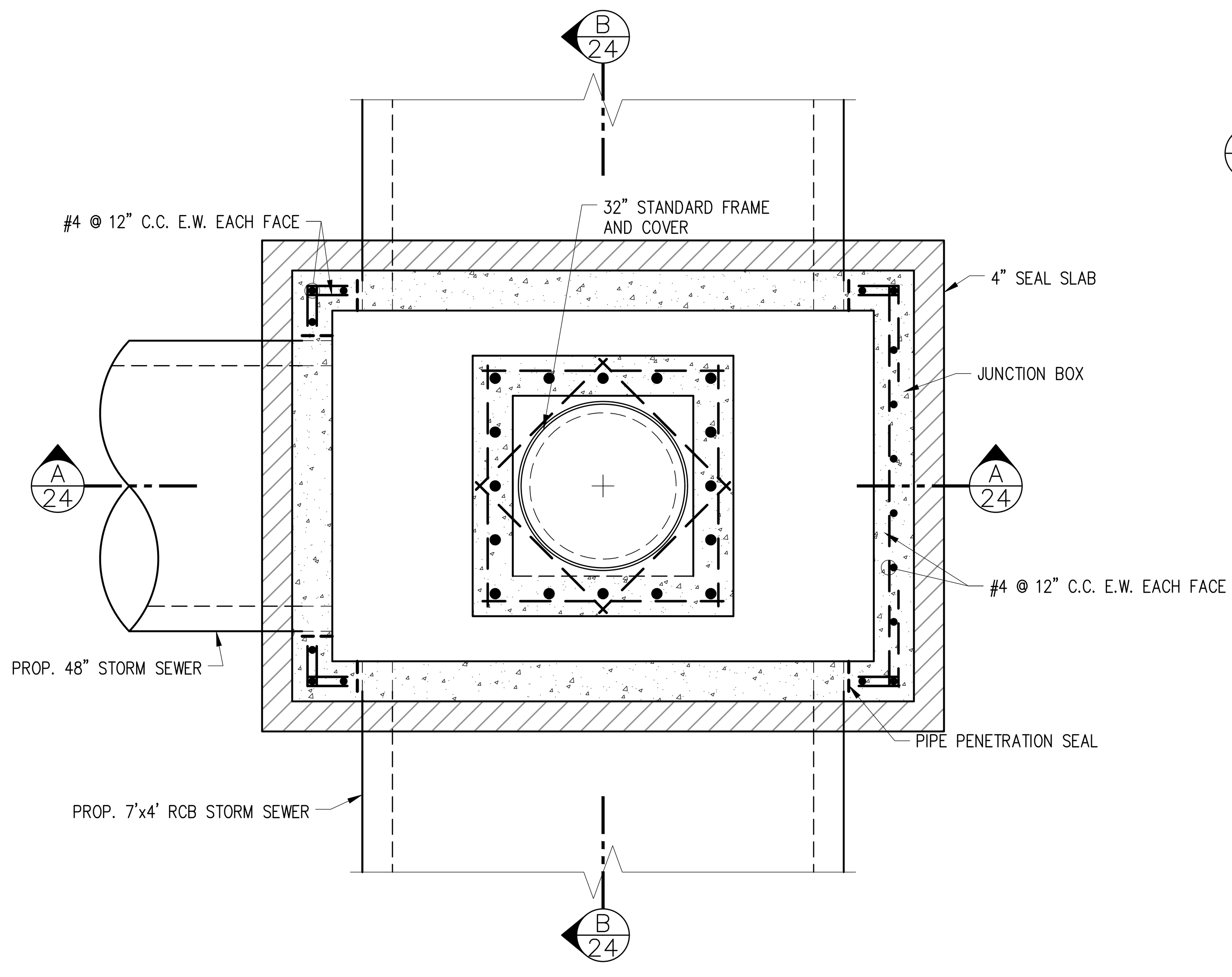
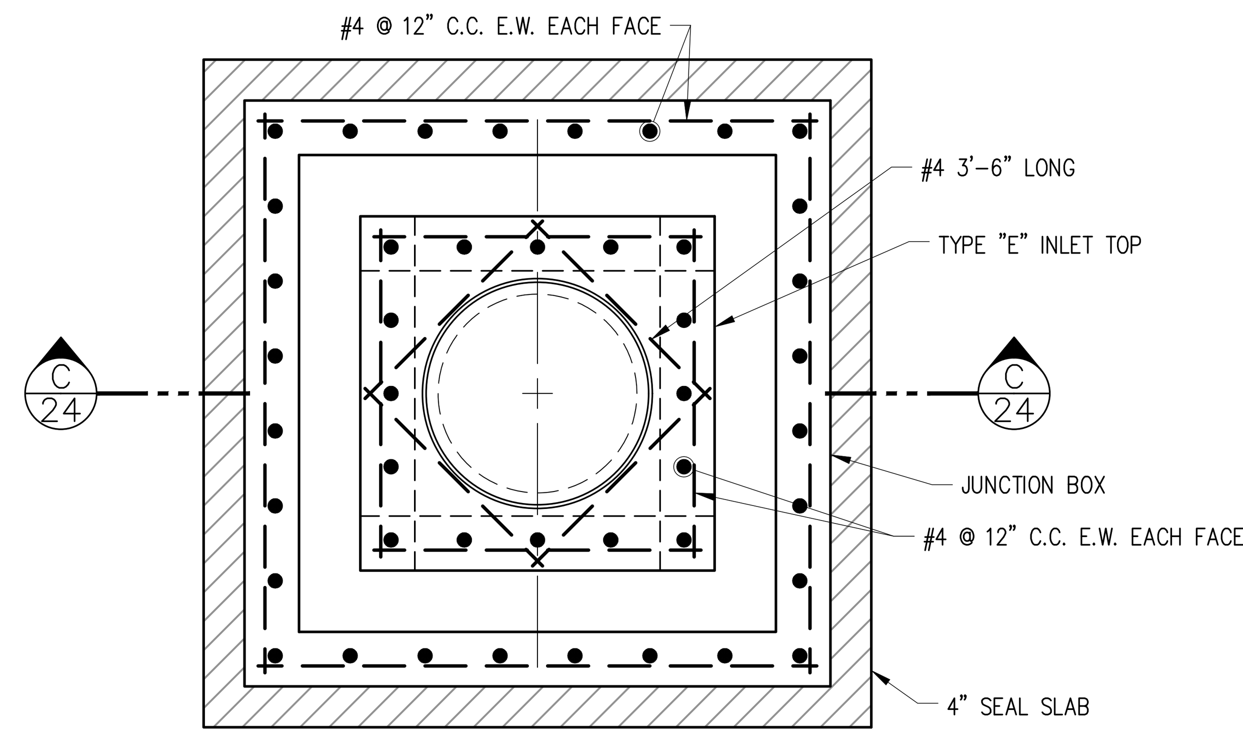
11/20/18

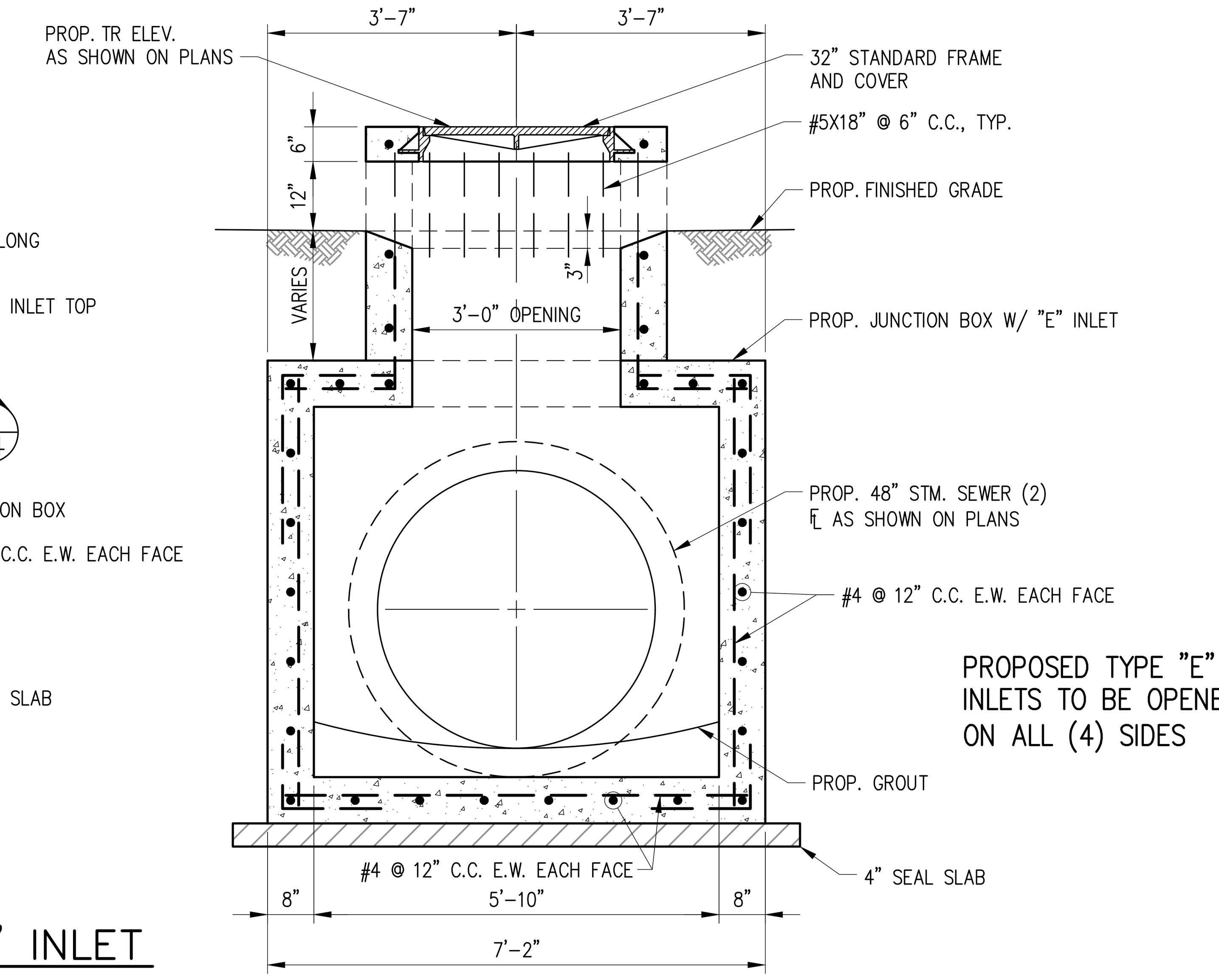


PLAN



PLAN

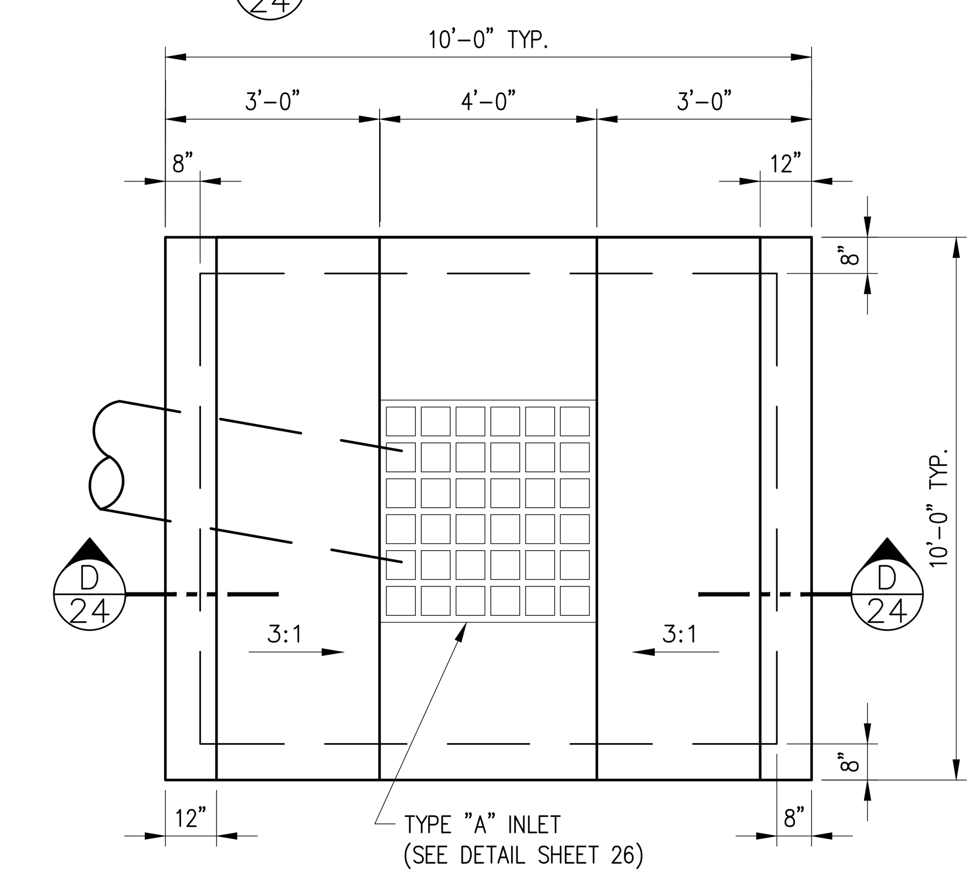
PROP. JUNCTION BOX w/ TYPE "E" INLET
SCALE: 1" = 1'-0"



PROPOSED TYPE "E" INLETS TO BE OPENED ON ALL (4) SIDES

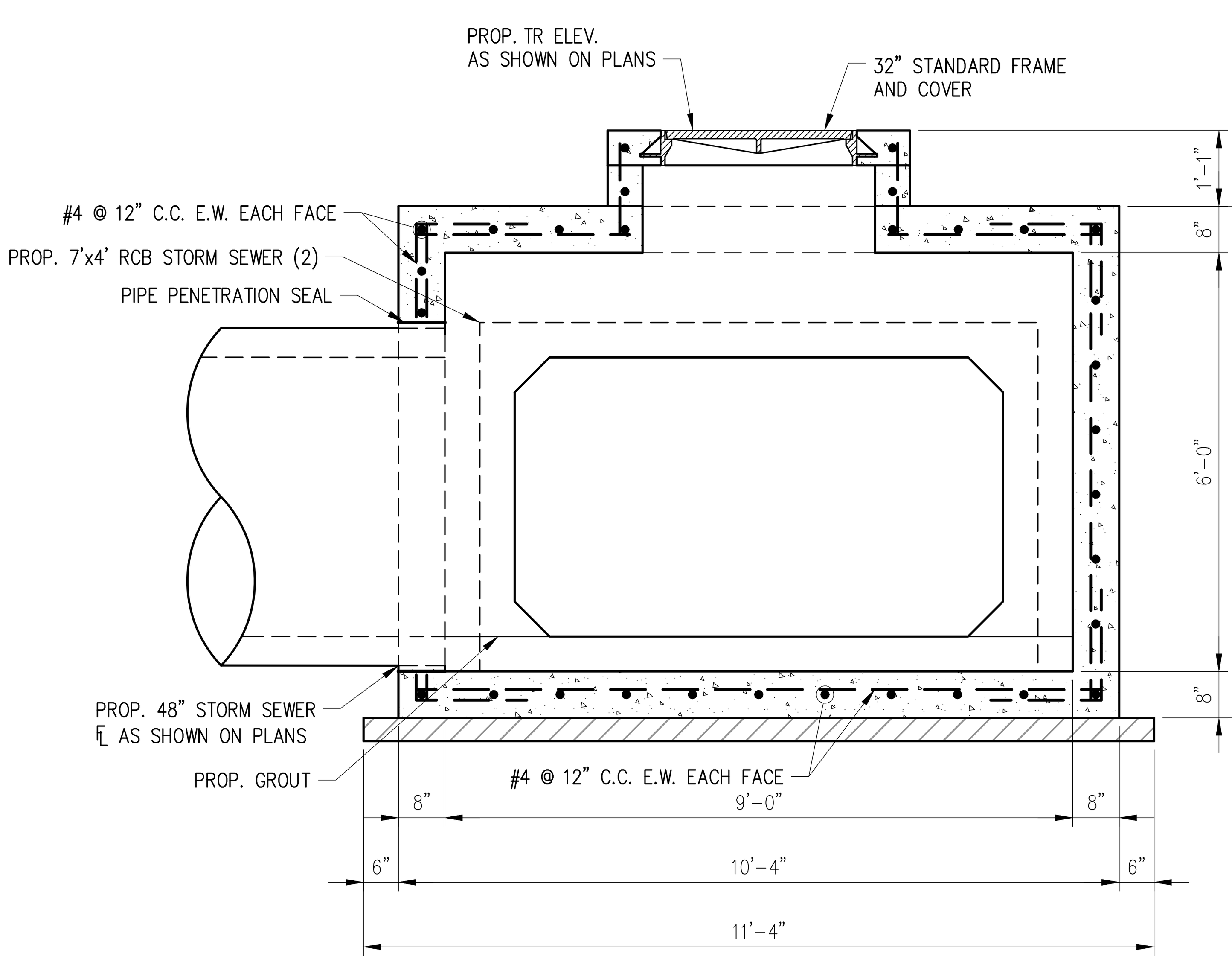
SECTION C 24

BACKSLOPE INTERCEPTOR STRUCTURE NOTES:
1. EXCAVATION, FILL AND BACKFILL FOR STORM SEWER OUTFALLS SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 02316–STRUCTURAL EXCAVATING AND BACKFILLING.
2. CONCRETE SHALL BE STRUCTURAL CONCRETE IN ACCORDANCE WITH SPECIFICATION 360.
3. INTERCEPTOR STRUCTURES:
   A. ADJUST LENGTH AND WIDTH IN FIELD AS NECESSARY.
   B. 2–FEET DEEP X 8–INCH WIDE TOE WALL AROUND THE STRUCTURE.
   C. STEEL REINFORCING–#4 BARS (GRADE 40) AT 12 INCHES ON CENTER, EACH WAY.
   D. ANY INTERCEPTOR OUTFALL PIPE LARGER THAN MAXIMUM SIZE INDICATED REQUIRES A SEPARATE DETAIL.
   E. MATCH TOP OF CONCRETE WITH NATURAL GROUND.

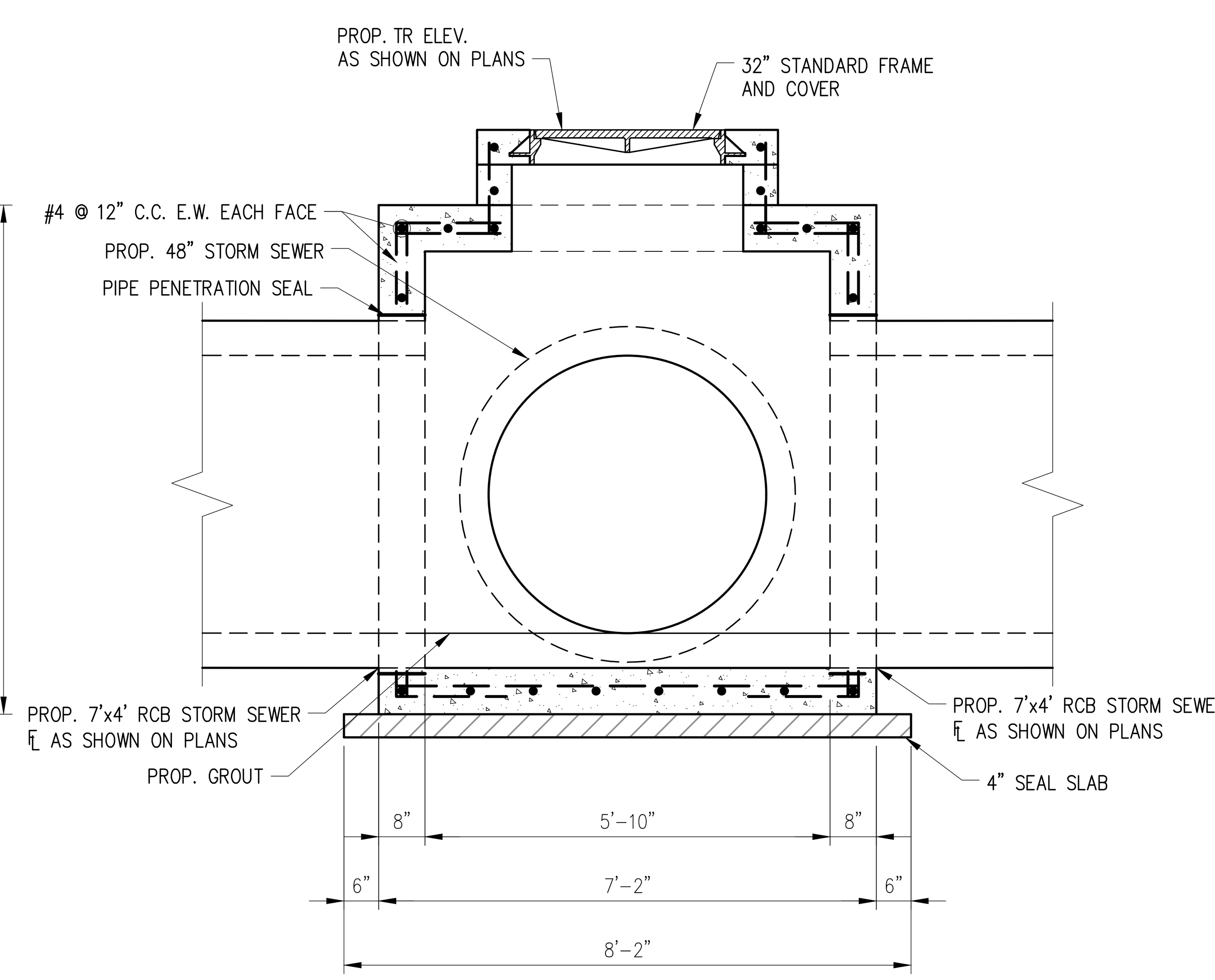


PLAN

11-20-18

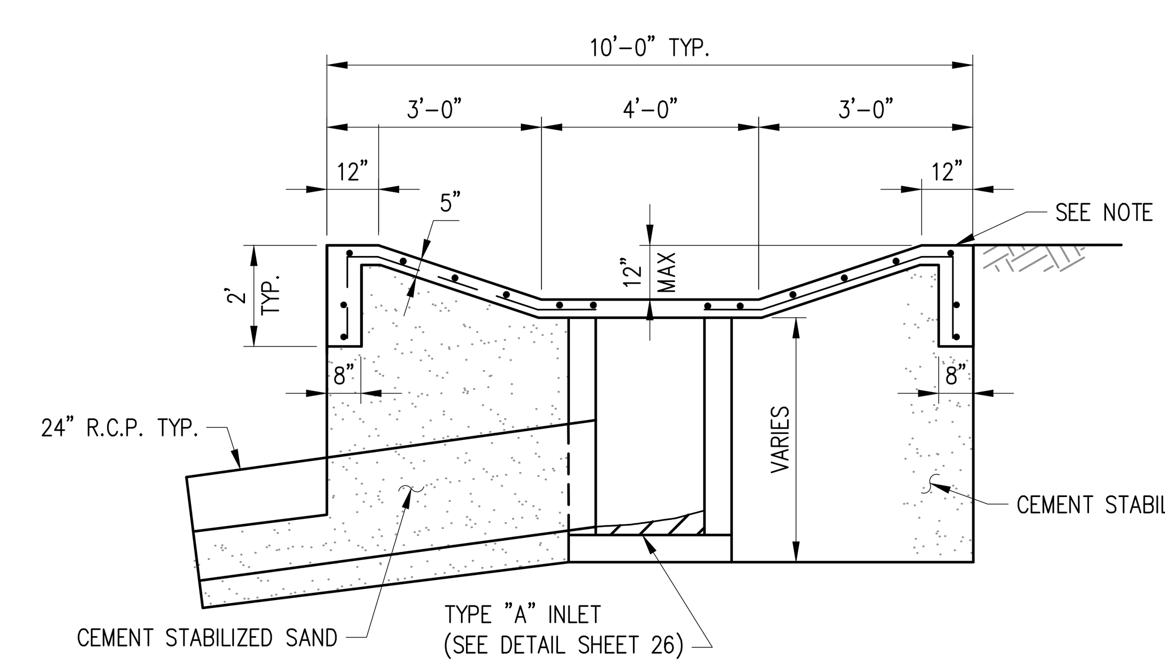


SECTION A 24



SECTION B 24

PROP. JUNCTION BOX "8"
SCALE: 1" = 1'-0"



SECTION D 24

BACKSLOPE INTERCEPTOR STRUCTURE
N.T.S.

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

STANDARD STORM SEWER DETAILS SHEET 2 OF 4

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DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: AS SHOWN
APPROVED:	SHEET No. 24 Of 39

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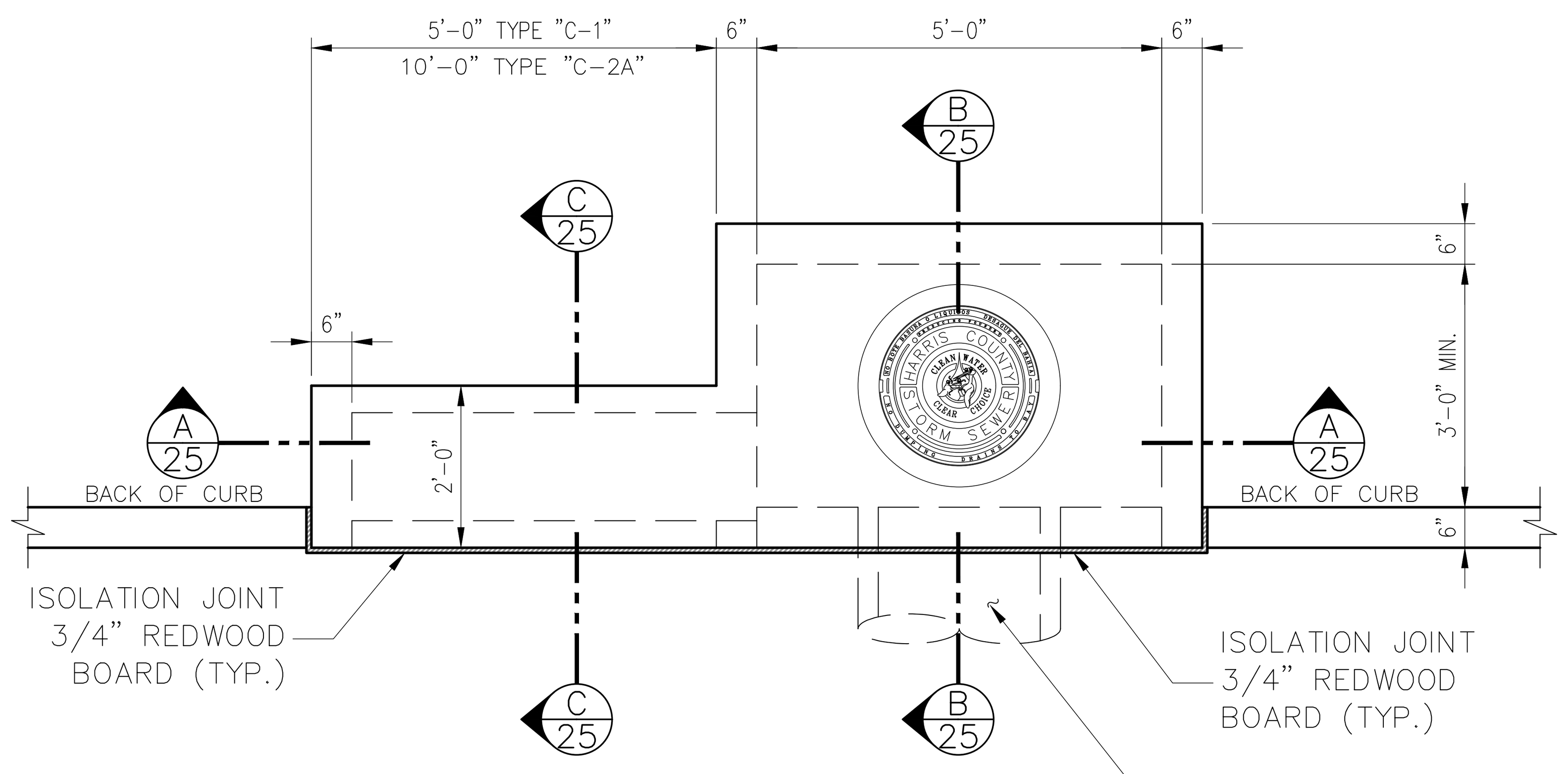
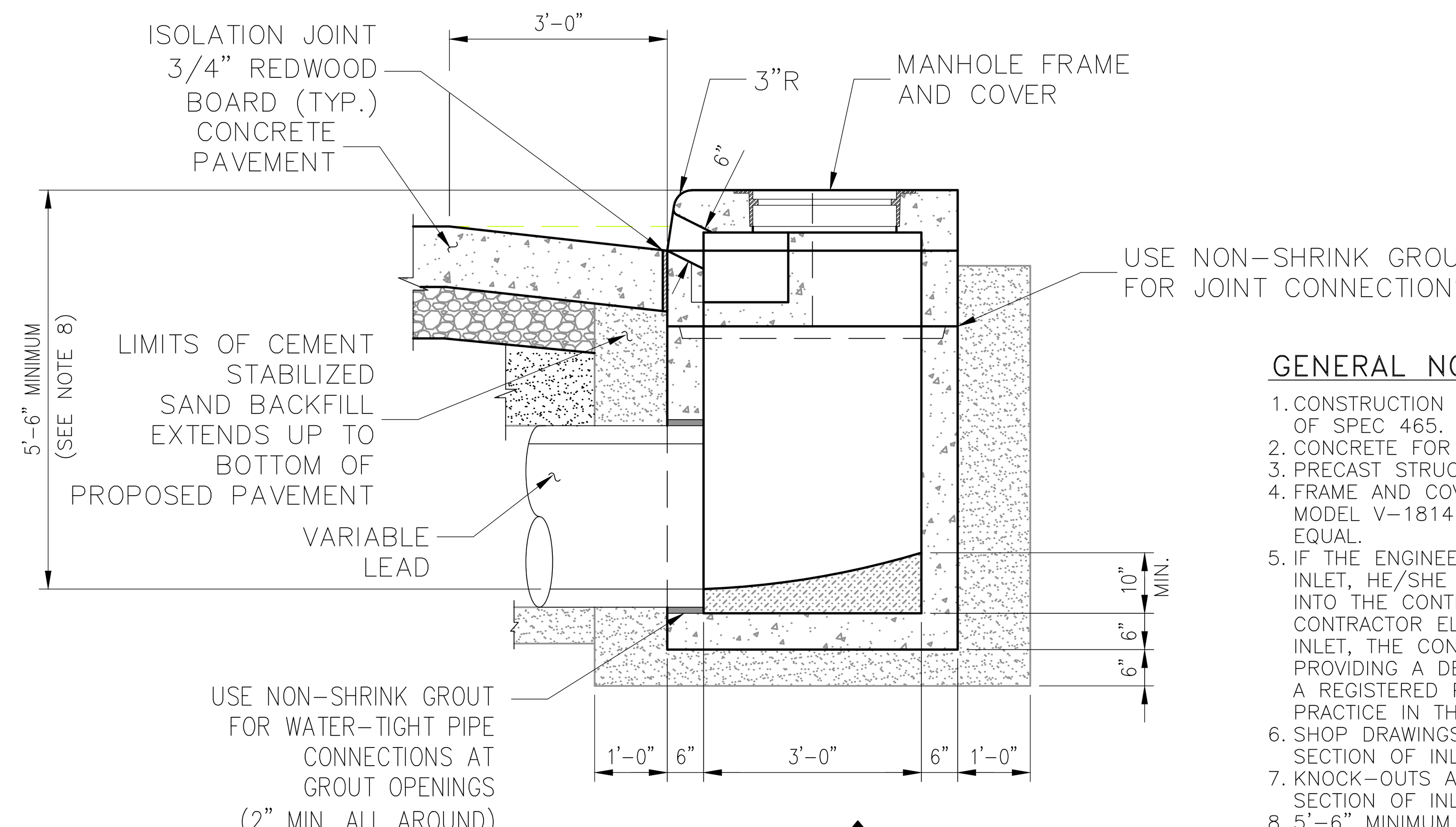
11/20/18



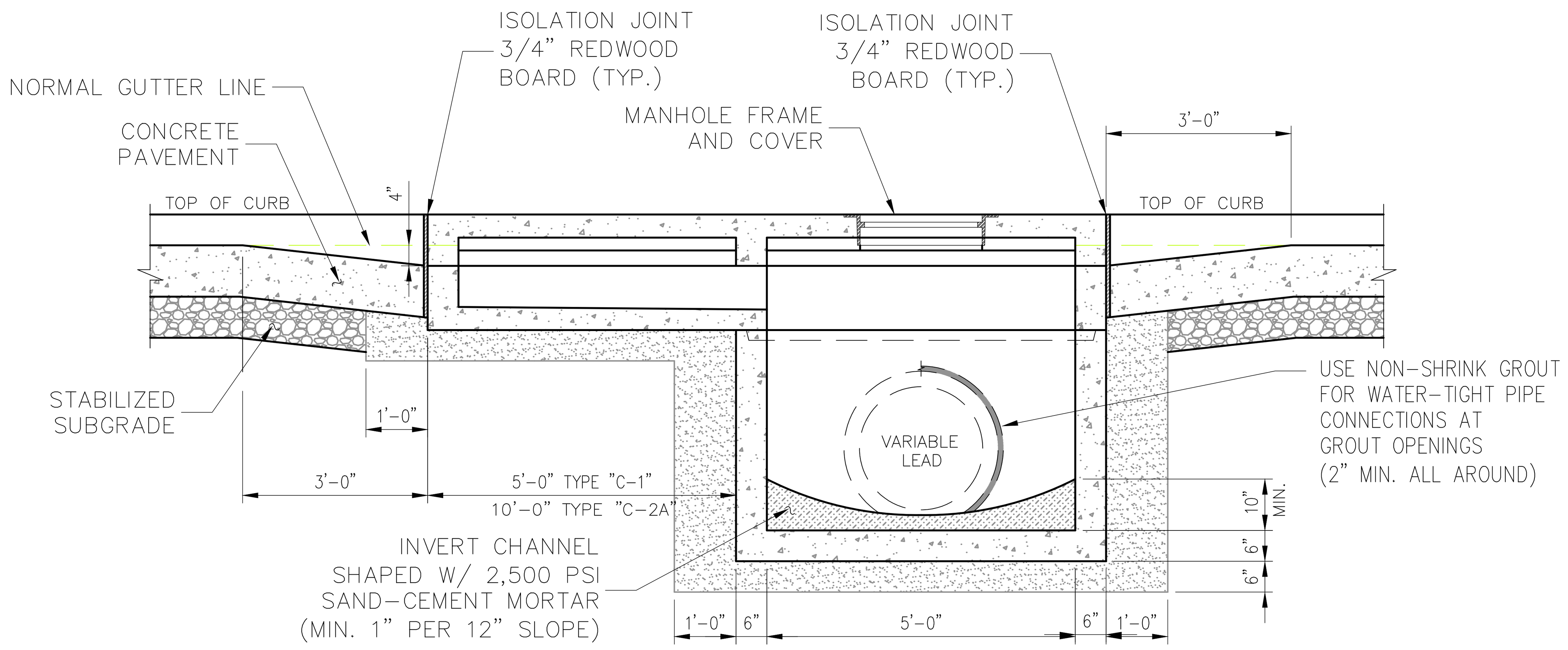
PLAN VIEW



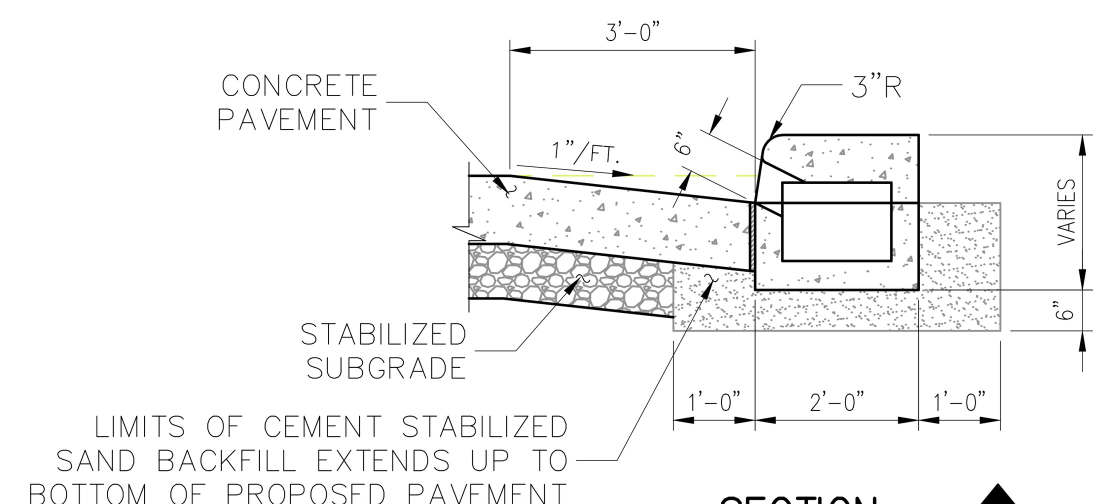
SECTION B 25

GENERAL NOTES:

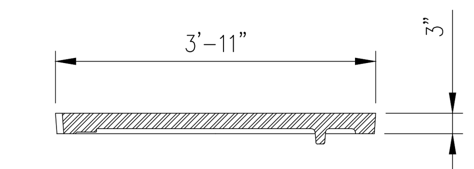
1. CONSTRUCTION AND MATERIALS SHALL MEET REQUIREMENTS OF SPEC 465.
2. CONCRETE FOR INLET: MINIMUM 4,000 PSI IN 28 DAYS
3. PRECAST STRUCTURE TO MEET ASTM C913.
4. FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS MODEL V-1814 FRAME AND V-1418 COVER OR APPROVED EQUAL.
5. IF THE ENGINEER OF RECORD SPECIFIES A CAST-IN-PLACE INLET, HE/SHE SHALL INCORPORATE A DETAILED DRAWING INTO THE CONTRACT DOCUMENTS. HOWEVER, IF THE CONTRACTOR ELECTS TO CONSTRUCT A CAST-IN-PLACE INLET, THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING A DETAILED DRAWING, SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS.
6. SHOP DRAWINGS WILL BE REQUIRED FOR THE PRECAST SECTION OF INLET.
7. KNOCK-OUTS ARE NOT PERMISSIBLE FOR THE PRECAST SECTION OF INLET.
8. 5'-6" MINIMUM OR AS SPECIFIED BY THE ENGINEER OF RECORD.



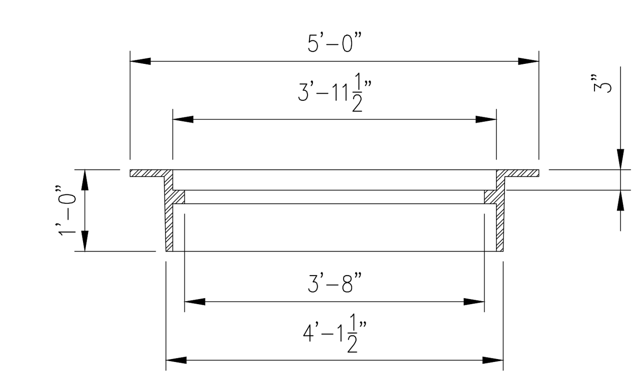
SECTION A 25



SECTION C 25



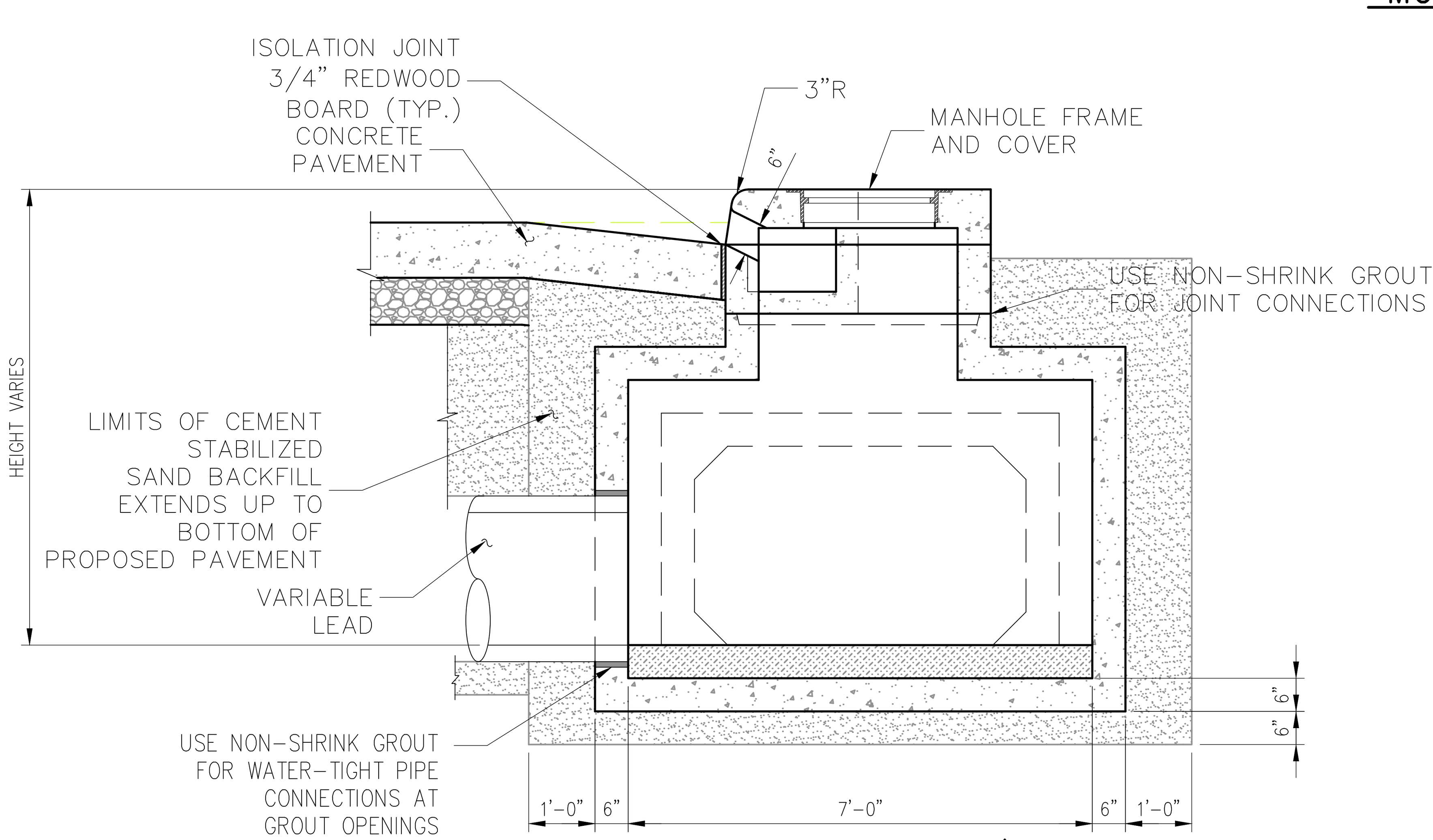
COVER SECTION A 25



FRAME SECTION A 25

MONOLITHIC TYPE "C", "C-1", "C-2", & "C-2A" INLET

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



MODIFIED SECTION B 25

MODIFIED TYPE "C-2A" INLET

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

11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH
STANDARD STORM SEWER DETAILS SHEET 3 OF 4

LJA Engineering, Inc.
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FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: AS SHOWN
APPROVED:	SHEET No. 25 Of 39

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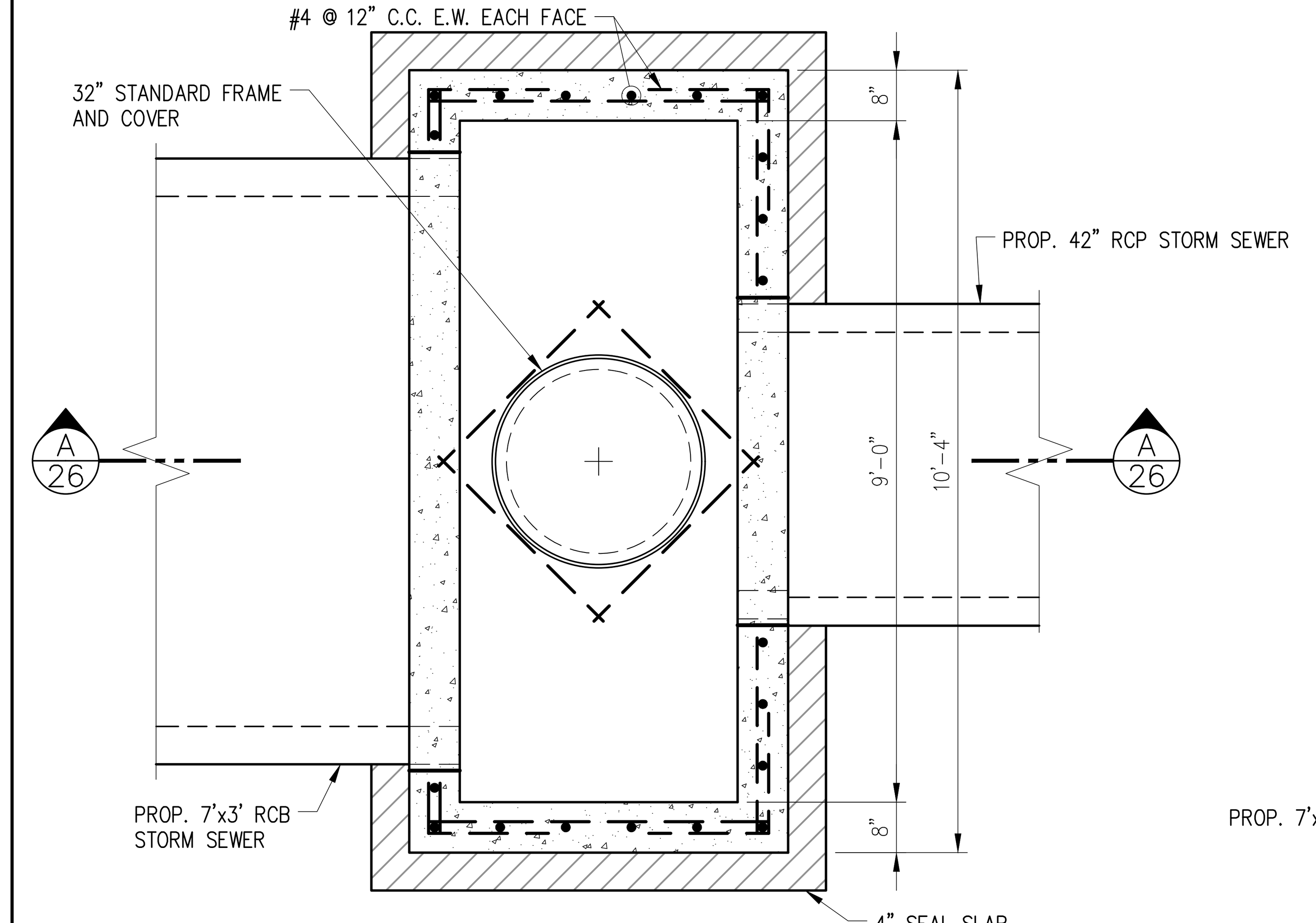
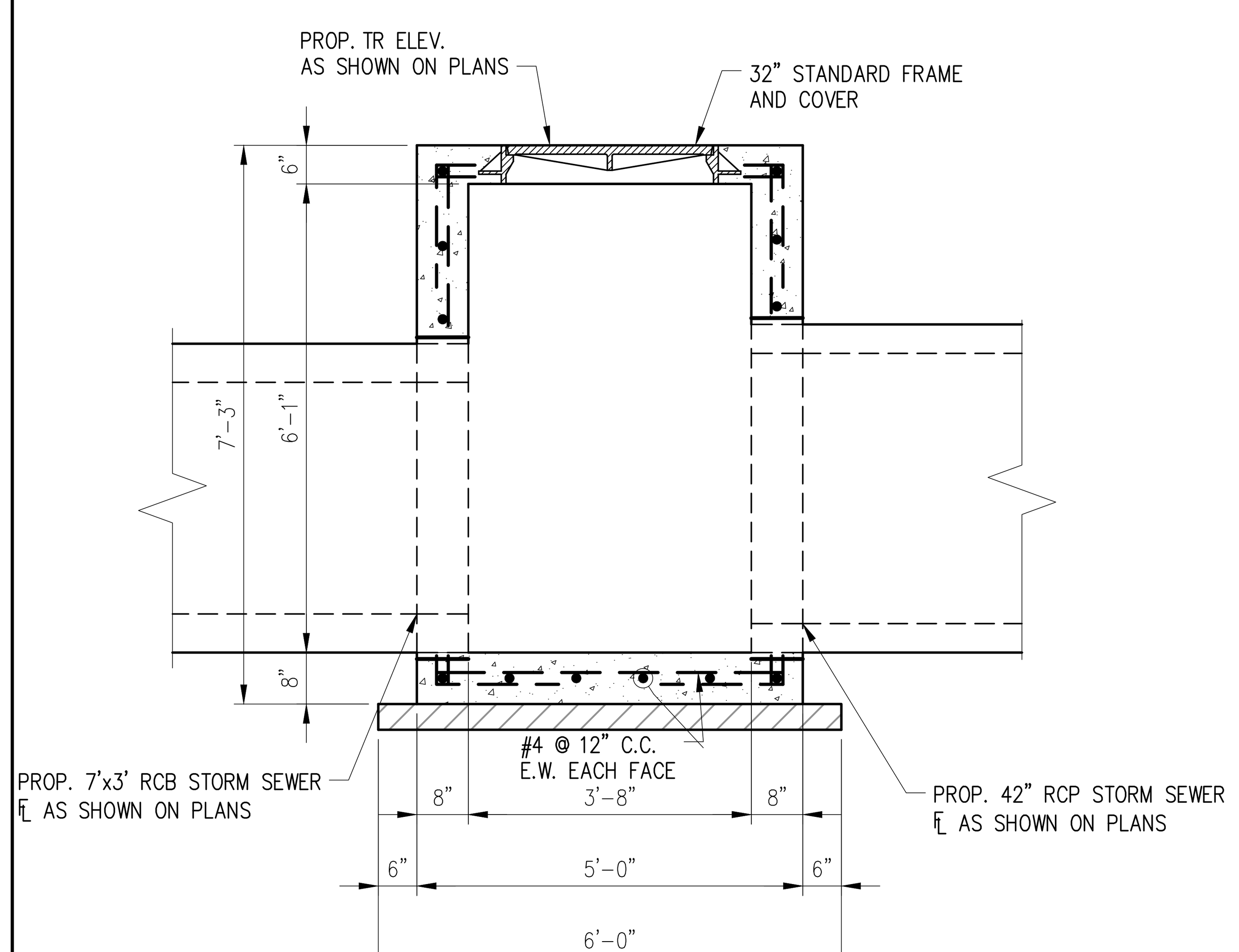
11/20/18



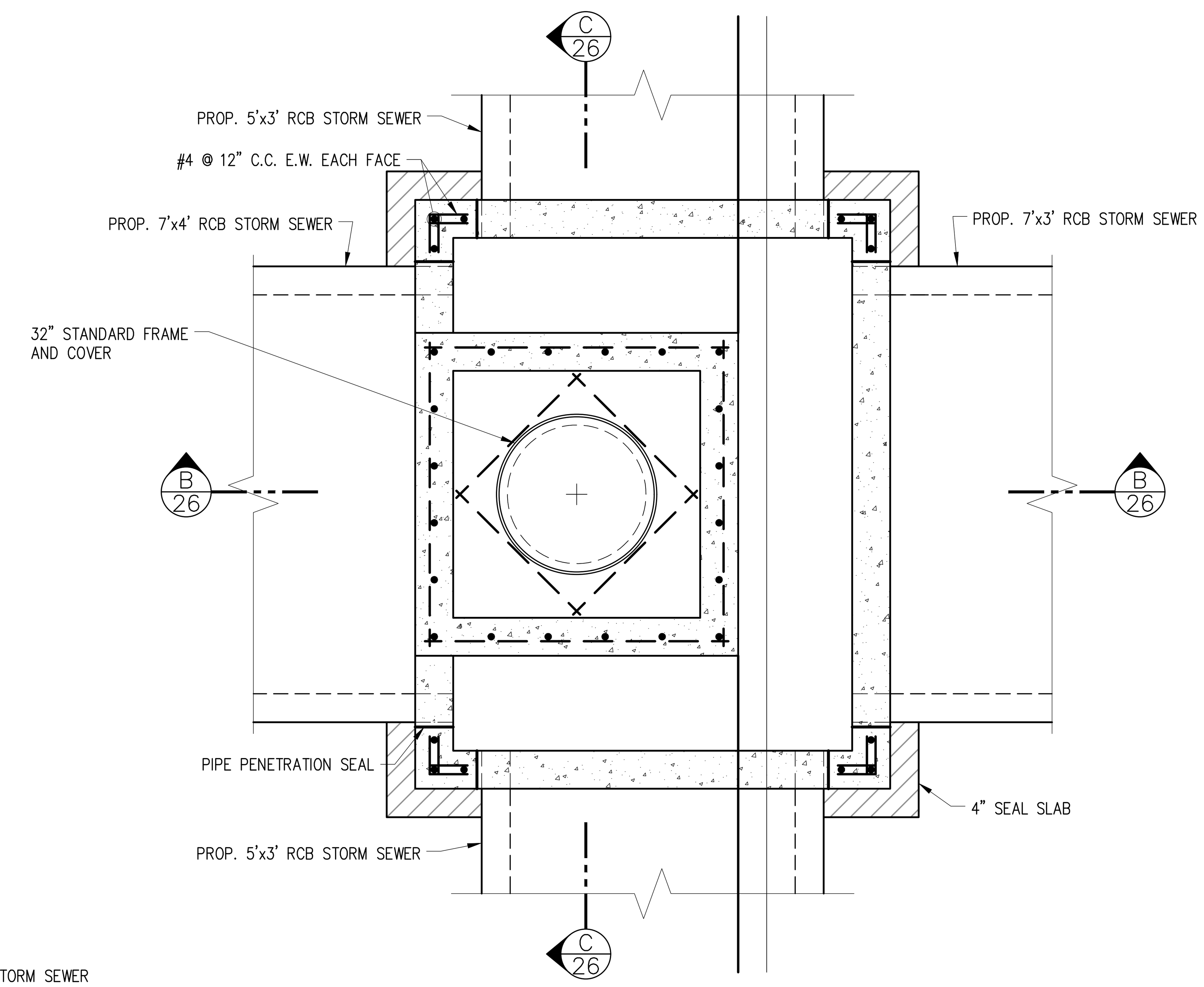
PLAN VIEW



SECTION A 26

PROP JUNCTION BOX "6"

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



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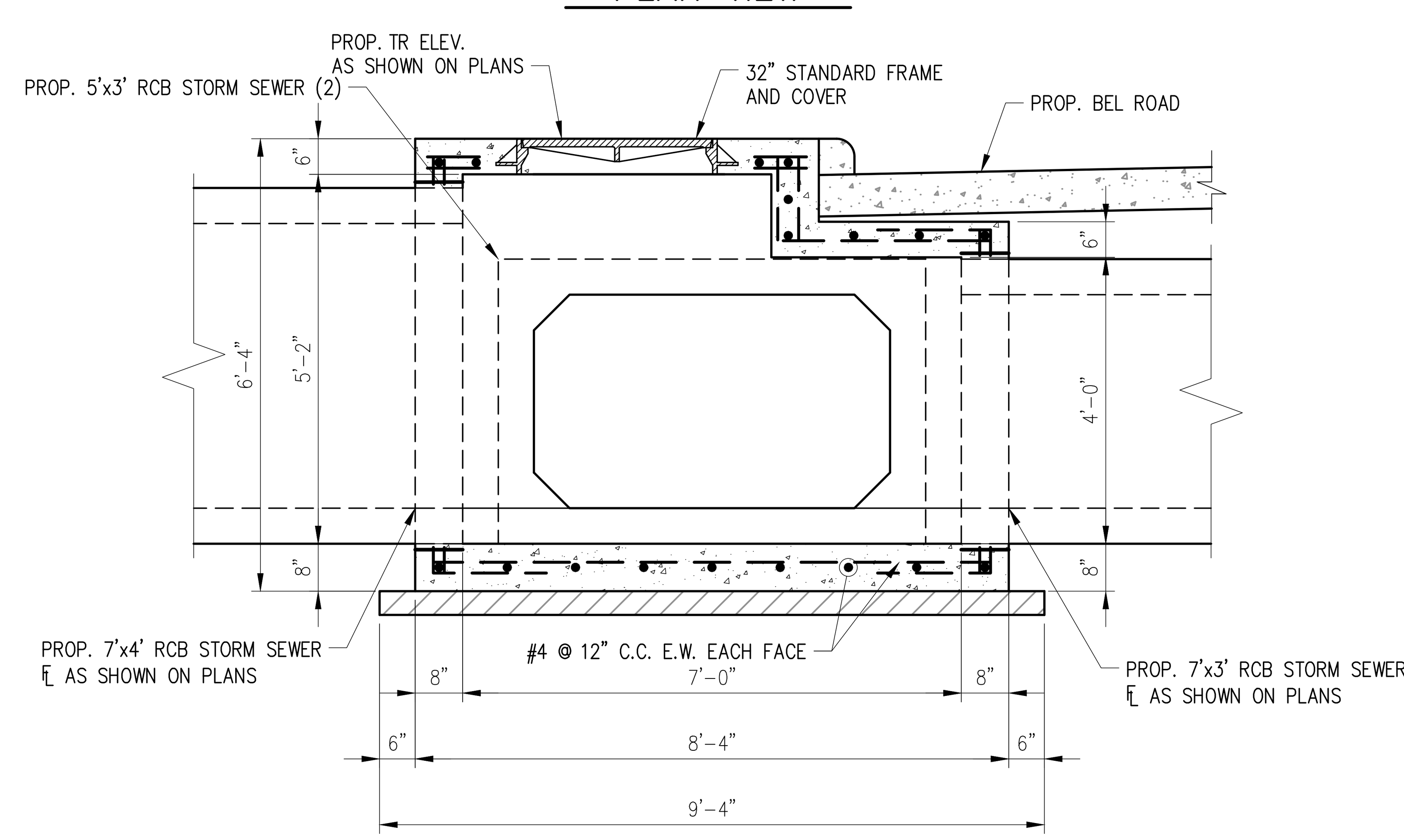
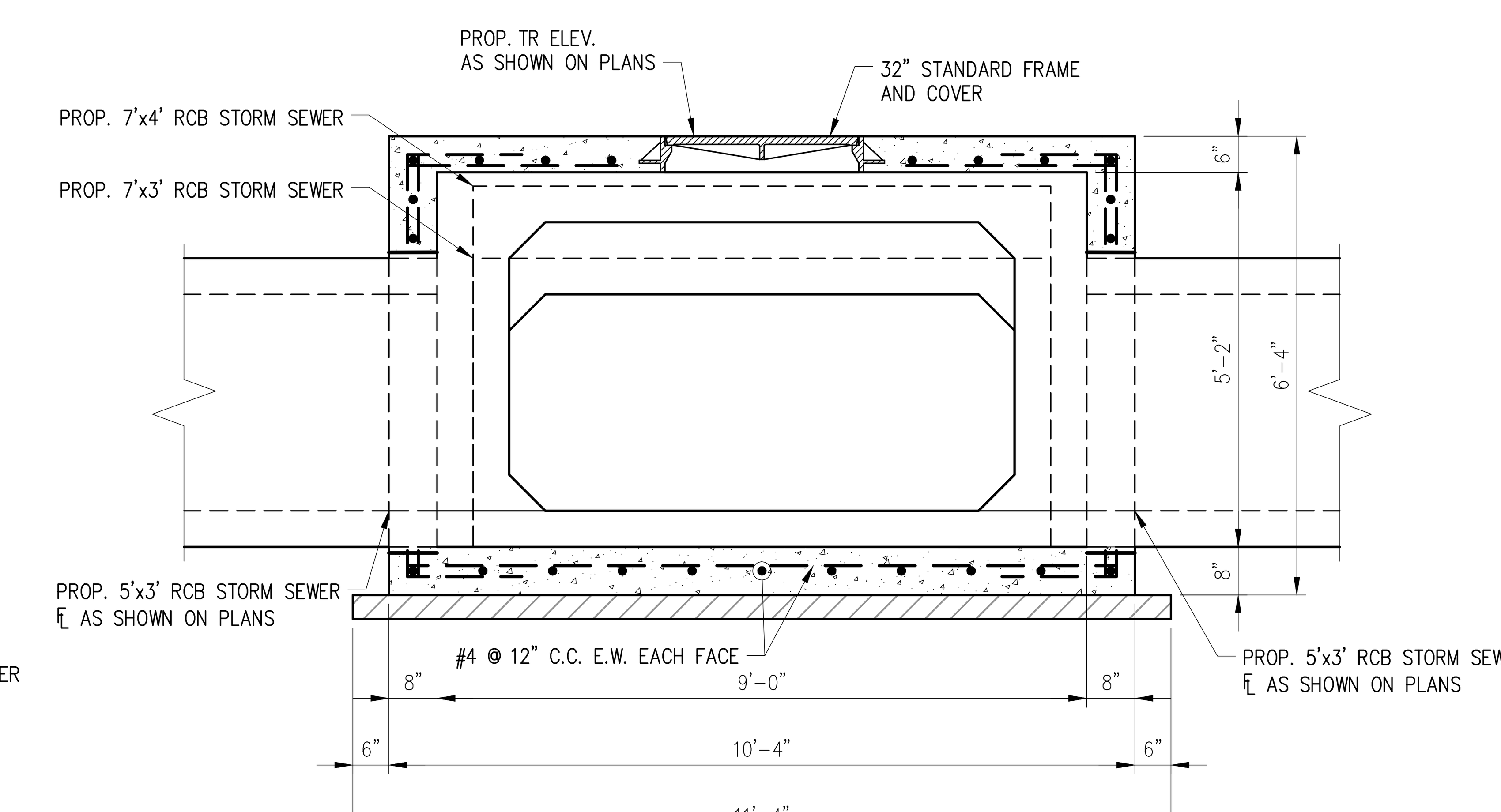


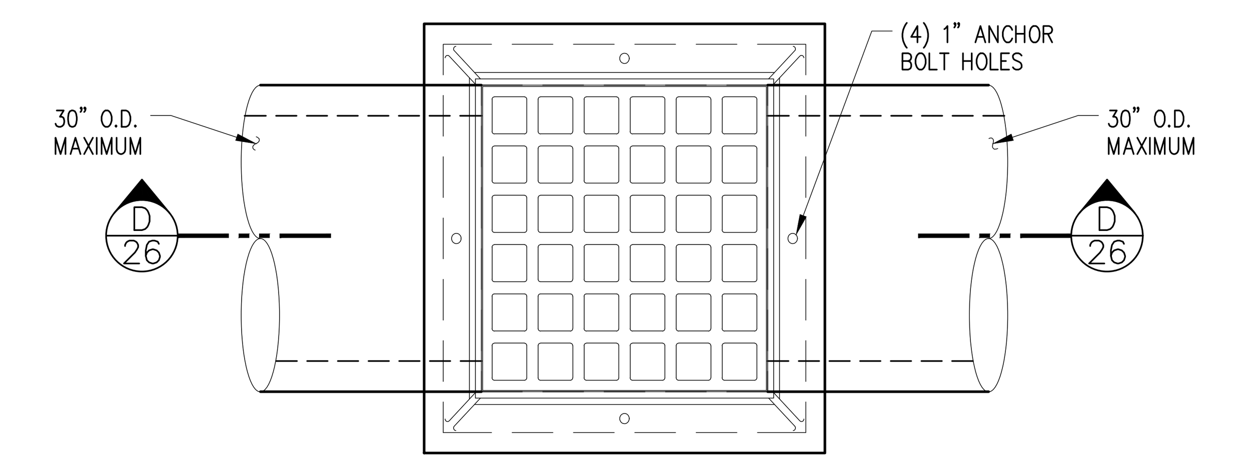
SECTION B 26



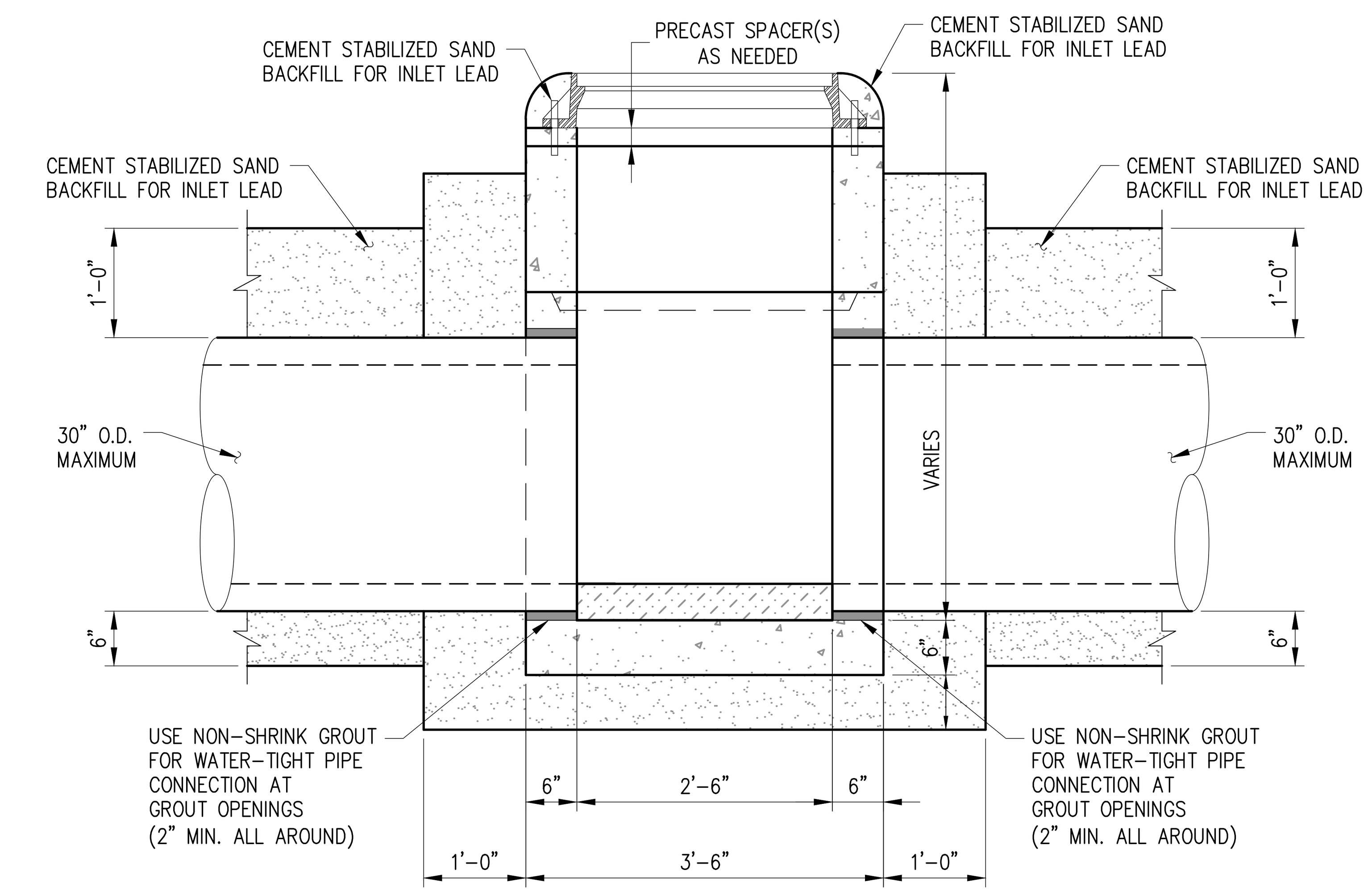
SECTION C 26

PROP JUNCTION BOX "7"

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



PLAN VIEW



SECTION D 26

TYPE "A" GRATE INLET

N.T.S.

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED PROFESSIONAL ENGINEER
11-20-18

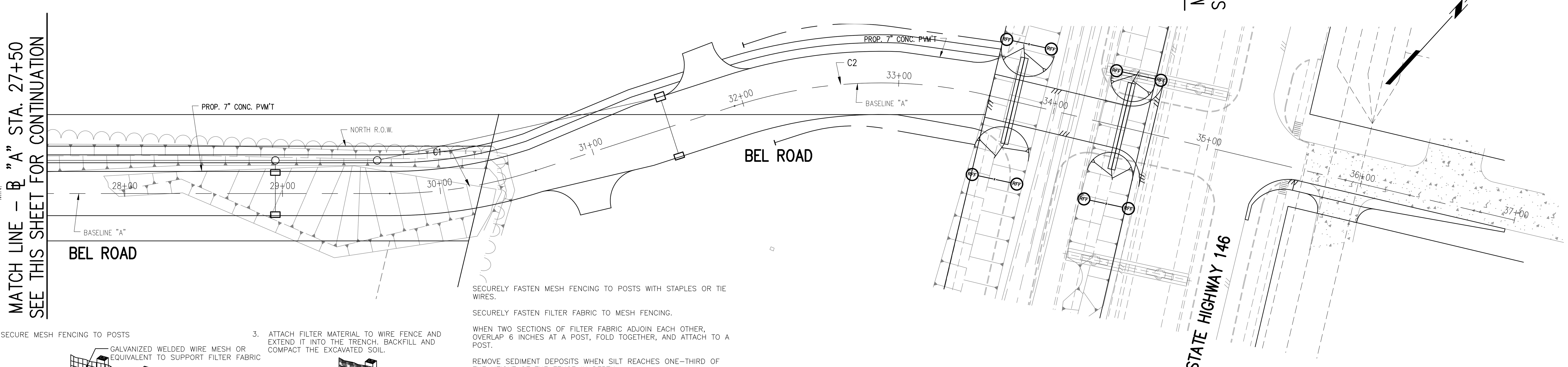
Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

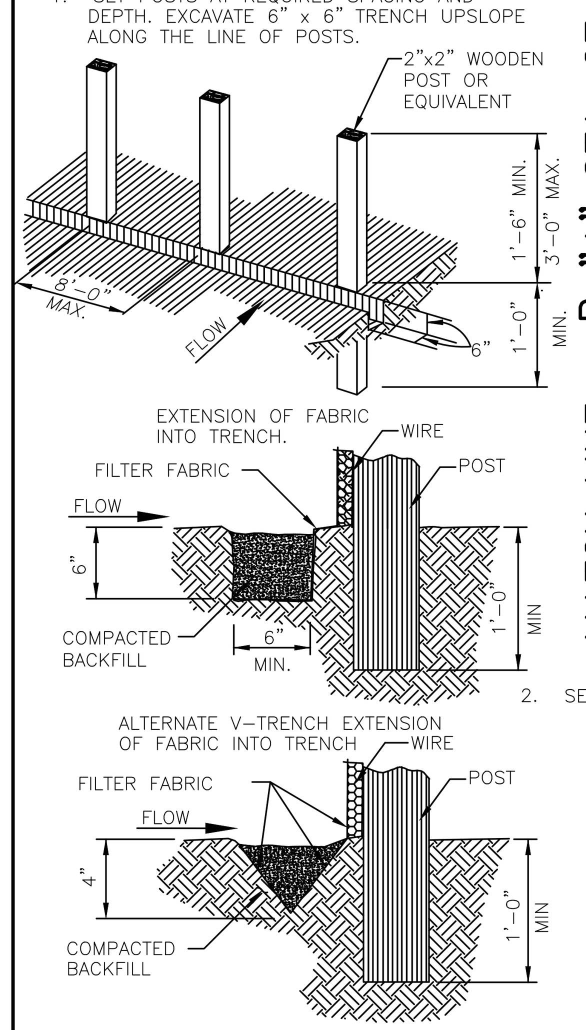
STANDARD STORM SEWER DETAILS SHEET 4 OF 4

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

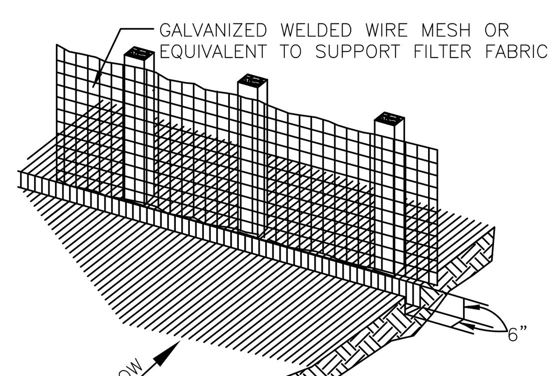
DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: AS SHOWN
APPROVED:	SHEET No. 26 Of 39



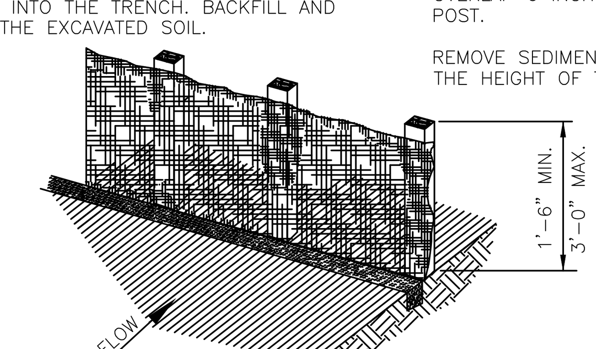
1. SET POSTS AT REQUIRED SPACING AND DEPTH. EXCAVATE 6" x 6" TRENCH UPSLOPE ALONG THE LINE OF POSTS.



2. SECURE MESH FENCING TO POSTS



3. ATTACH FILTER MATERIAL TO WIRE FENCE AND EXTEND IT INTO THE TRENCH. BACKFILL AND COMPACT THE EXCAVATED SOIL.



SECURELY FASTEN MESH FENCING TO POSTS WITH STAPLES OR TIE WIRES.

SECURELY FASTEN FILTER FABRIC TO MESH FENCING.

WHEN TWO SECTIONS OF FILTER FABRIC ADJOIN EACH OTHER, OVERLAP 6 INCHES AT A POST, FOLD TOGETHER, AND ATTACH TO A POST.

REMOVE SEDIMENT DEPOSITS WHEN SILT REACHES ONE-THIRD OF THE HEIGHT OF THE FENCE IN DEPTH.

REINFORCED FILTER FABRIC BARRIER

N.T.S.

LEGEND

(RFF) REINFORCED FILTER FABRIC BARRIER

STATE OF TEXAS — MARK E. HAVRAN — 118610 — LICENSED PROFESSIONAL ENGINEER — 11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH
STORM WATER POLLUTION PREVENTION PLAN & DETAILS - SHEET 1 OF 2

LJA Engineering, Inc.
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DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: AS SHOWN
APPROVED:	SHEET No. 27 Of 39

11/14/18

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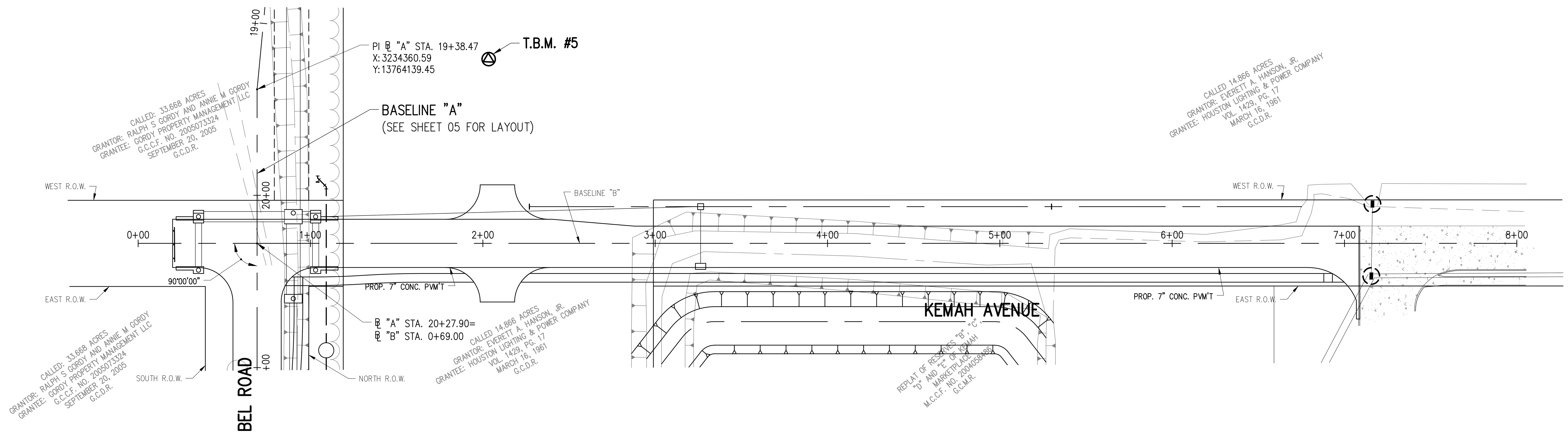


BENCHMARK NOTE
RM #010010:
ALUMINUM DISK AT THE CENTER OF TODVILLE ROAD BRIDGE ON THE EAST SIDE OF BRIDGE WITH IT'S INTERSECTION WITH CLEAR CREEK (A100-00-00).
ELEVATION: 5.89 (NAVD88 2001ADJ)

TBM #1:
BOX CUT ON WINGWALL (AS SHOWN)
ELEVATION: 13.27 (NAVD88 2001ADJ)

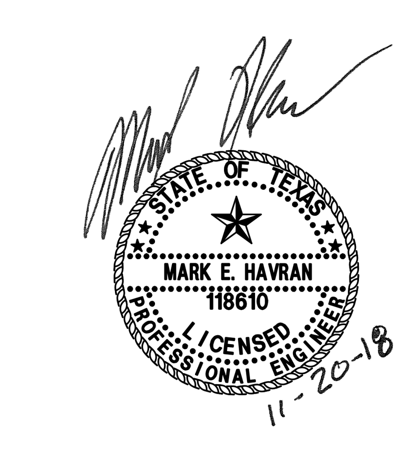
TBM #2:
RR SPIKE IN POWER POLE (AS SHOWN)
ELEVATION: 15.84 (NAVD88 2001ADJ)

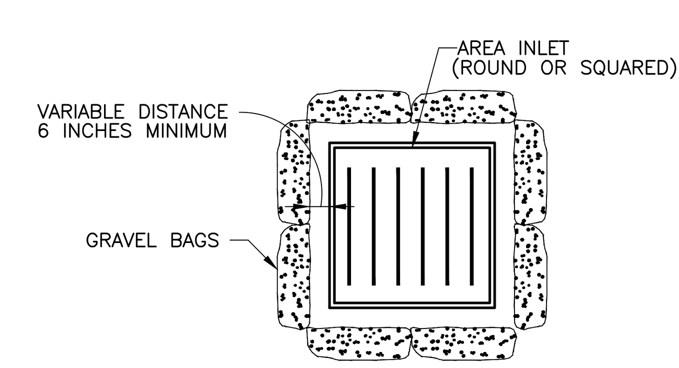
TBM #3:
BOX CUT ON HL&P TOWER LEG (AS SHOWN)
ELEVATION: 13.92 (NAVD88 2001ADJ)

TBM #4:
BOX CUT ON HL&P TOWER LEG (AS SHOWN)
ELEVATION: 13.86 (NAVD88 2001ADJ)

TBM #5:
BOX CUT ON HL&P TOWER LEG (AS SHOWN)
ELEVATION: 13.69 (NAVD88 2001ADJ)

TBM #6:
ELEVATION: 14.17 (NAVD88 2001ADJ)





AREA INLET
PROTECTION BARRIER
N.T.S.

INLET PROTECTION BARRIER NOTES:

1. GRAVEL BAGS ARE TO BE USED FOR THIS APPLICATION.
2. PROVIDE WOVEN OR UNWOVEN GEOTEXTILE FILTER FABRIC FOR BAGS.
3. PROVIDE COARSE SAND AND AGGREGATE MIX FOR FILL MATERIAL FOR BAGS. USE ONLY PARTICLES CONSISTING OF CLEAN, HARD, DURABLE MATERIALS FREE FROM ADHERENT COATINGS, SALT, ALKALI, DIRT, CLAY, LOAM, SHALE, SOFT OR FLAKY MATERIALS, OR ORGANIC AND INJURIOUS MATTER.
4. REMOVE SEDIMENT DEPOSIT WHEN THE SEDIMENT HAS ACCUMULATED TO ONE-THIRD THE HEIGHT OF THE BARRIER.

LEGEND

AREA INLET PROTECTION BARRIER

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH
STORM WATER POLLUTION PREVENTION PLAN & DETAILS - SHEET 2 OF 2

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DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: AS SHOWN
APPROVED:	SHEET No. 28 Of 39

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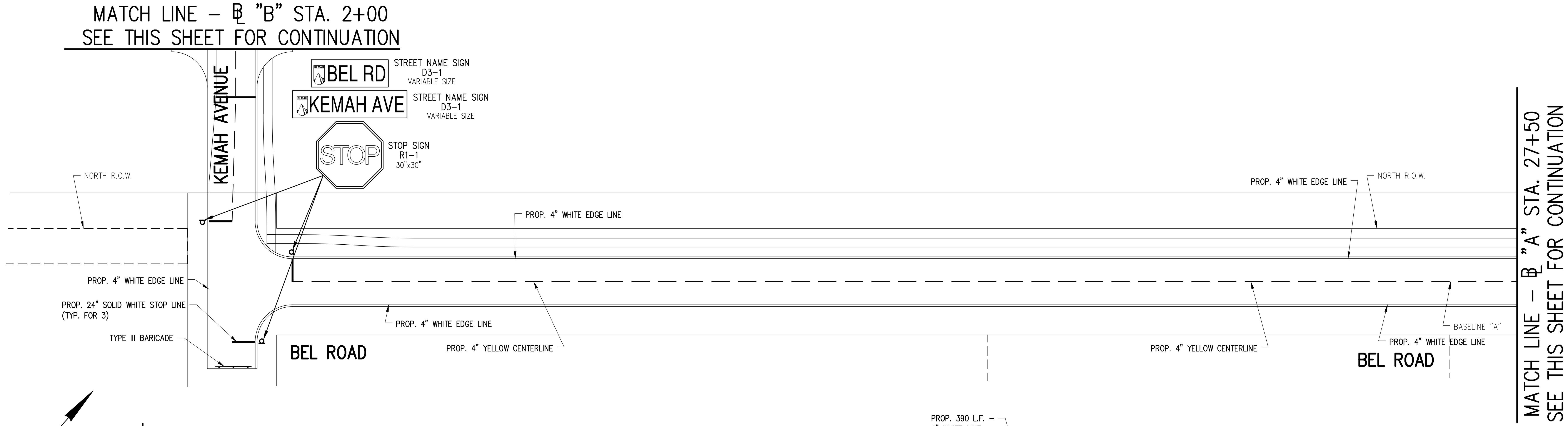
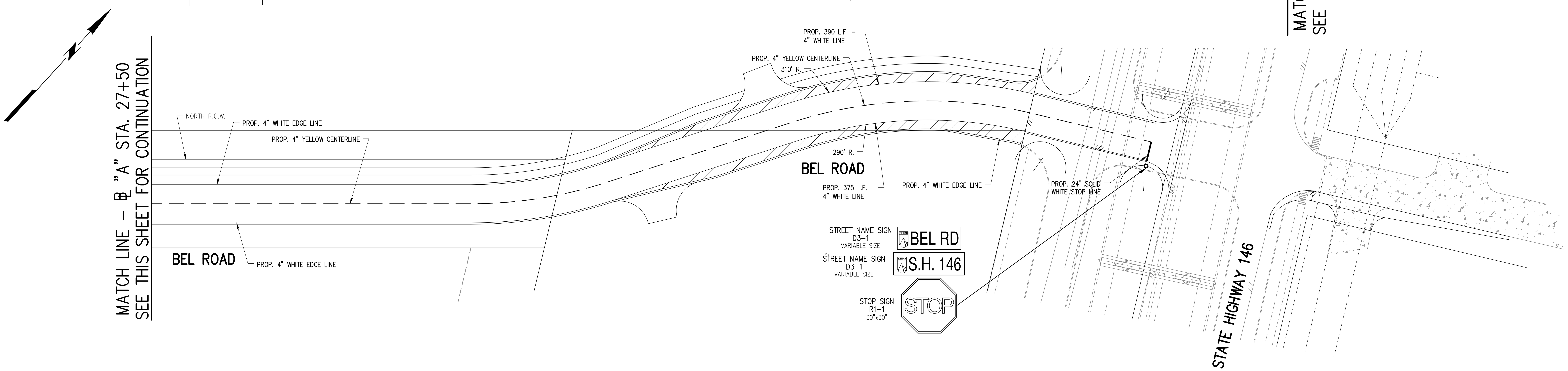
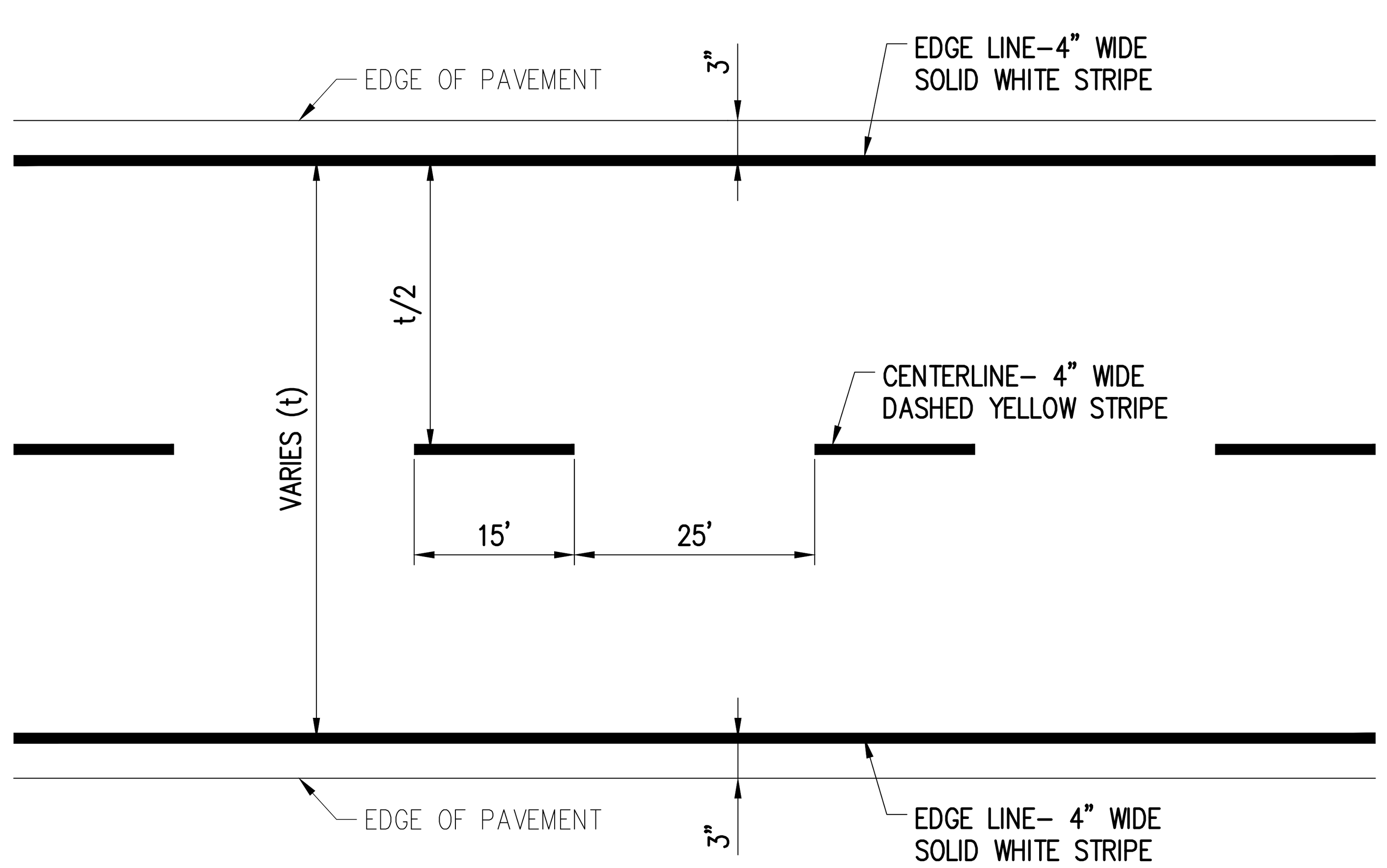
11/14/18



NOTES:

1. ALL TRAFFIC SIGNS SHALL CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
2. STOP SIGNS TO INCLUDE STREET NAME SIGNS.

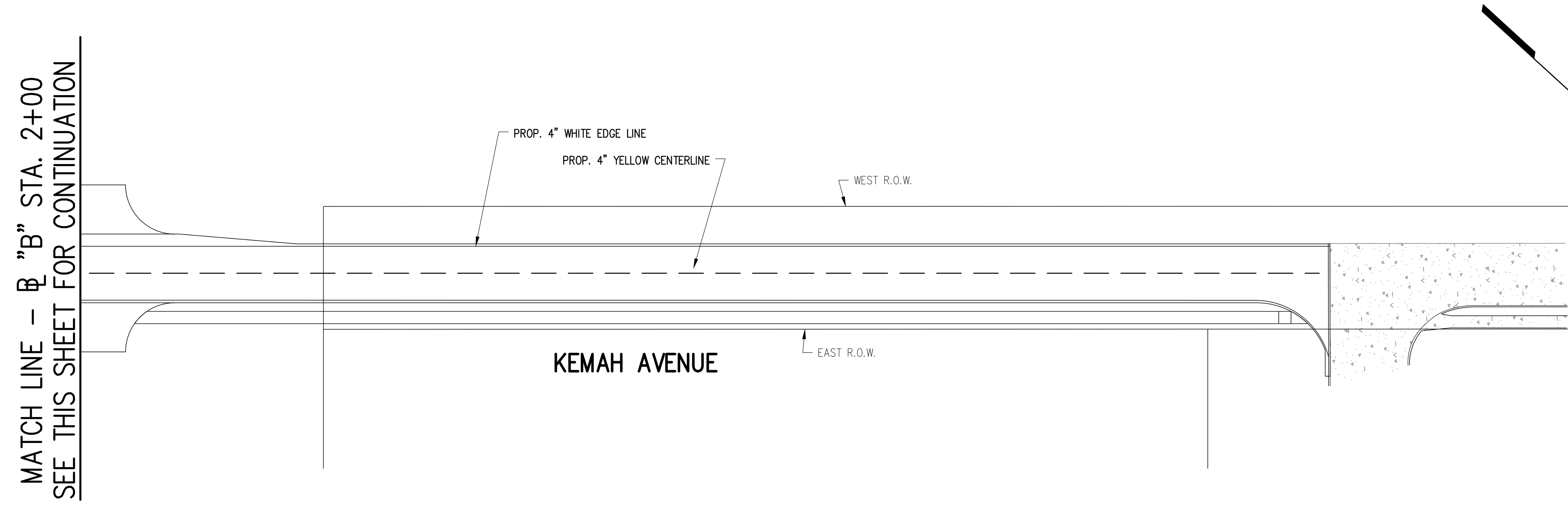




STRIPING AS DIRECTED BY ENGINEER.

TYPICAL STRIPING DETAIL

SCALE: N.T.S.



STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED
PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION
& LINEAR DETENTION DITCH

STRIPING PLAN

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DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: AS SHOWN
APPROVED:	SHEET No. 29 Of 39

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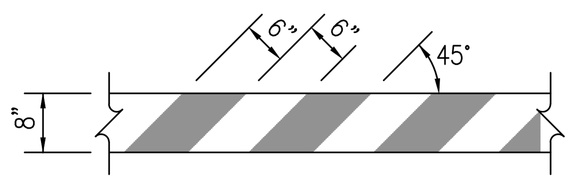
11/14/18



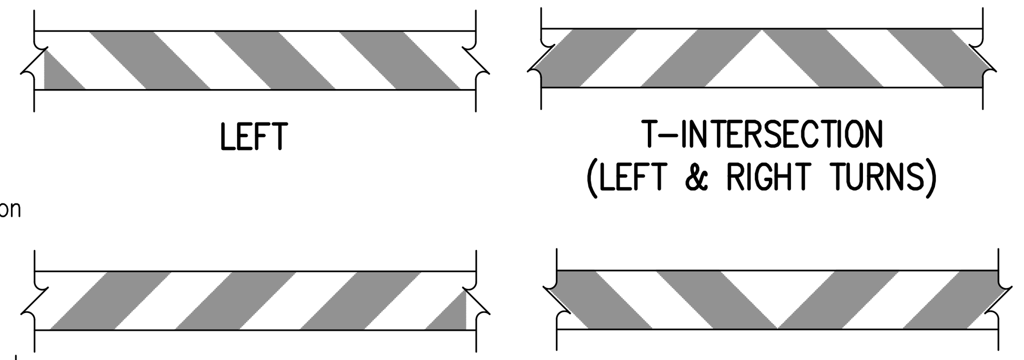
STRIPING FOR BARRICADE

For all types of barricades with rails less than 3'-0" long. Stripes 4" wide shall be used. Identification markings may be shown only on back side of barricade rails.

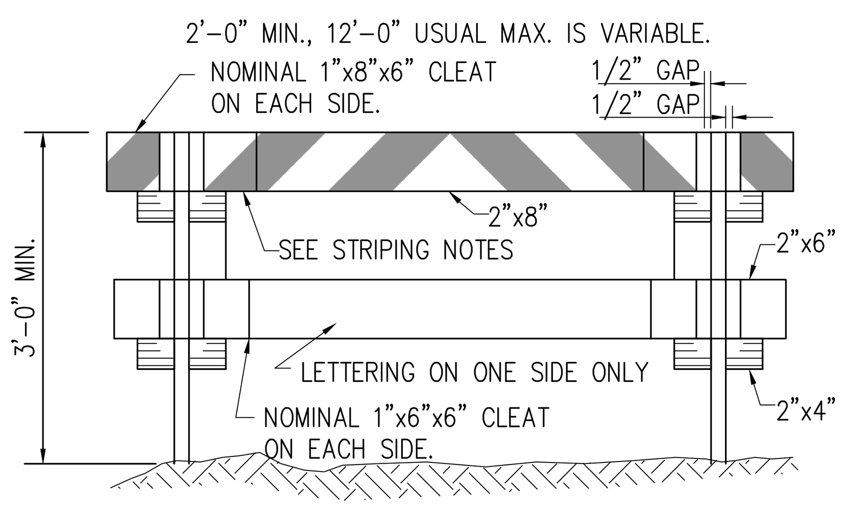
Striping should cover the full width of the rail striping of rails, panels, etc., should slope downward at an angle of 45 degrees in direction traffic is to pass.

Where a barricade extends entirely across a roadway, it is desirable that the stripes slope downward in the direction which traffic must turn in detouring. When both right and left turns are provided for, the chevron striping may slope downward in both directions from the center of the barricade.

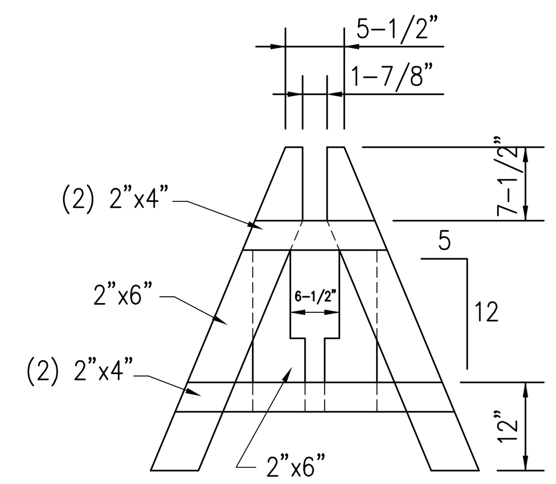
Barricades with stripes which begin at the upper right side and slope downward to the lower left side are to be designated as "Right" (R) Barricades. Barricades with stripes which begin at the upper left side and slope downward to the lower right side are to be designated as "Left" (L) Barricades.



STRIPING DIRECTION DETAILS

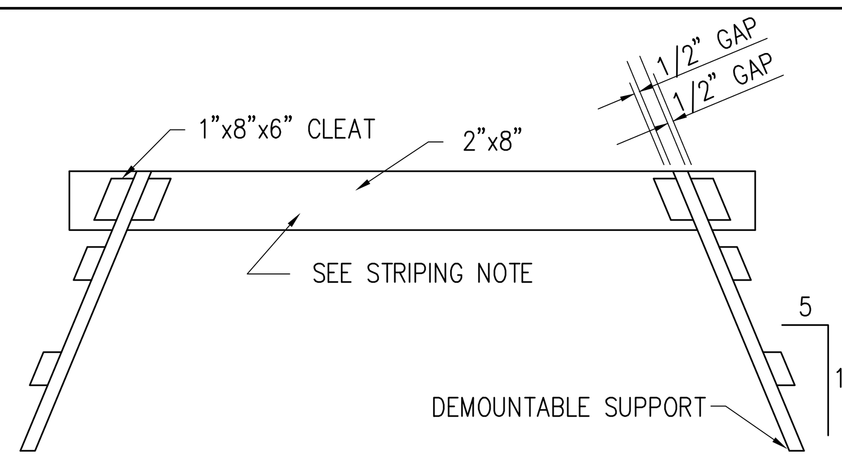


STANDARD DETAIL

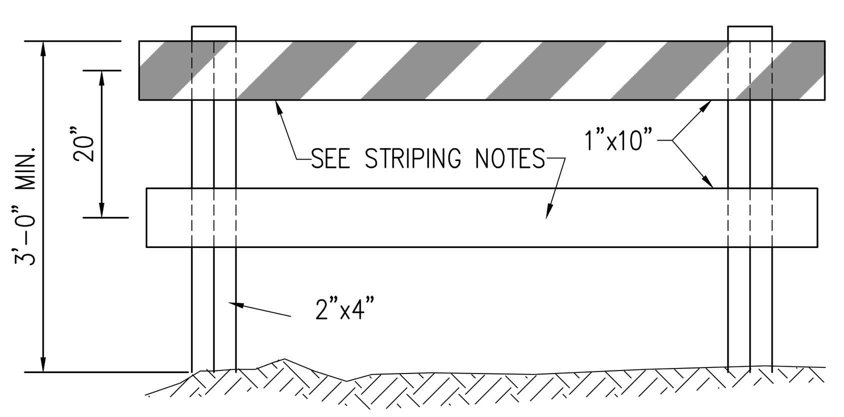


DEMOUNTABLE SUPPORT DETAIL

TYPE I BARRICADE

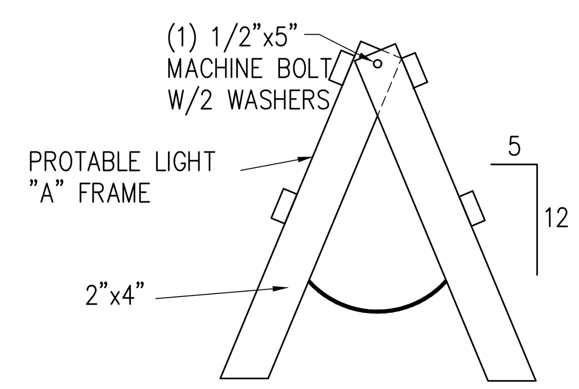


ALTERNATE DETAIL



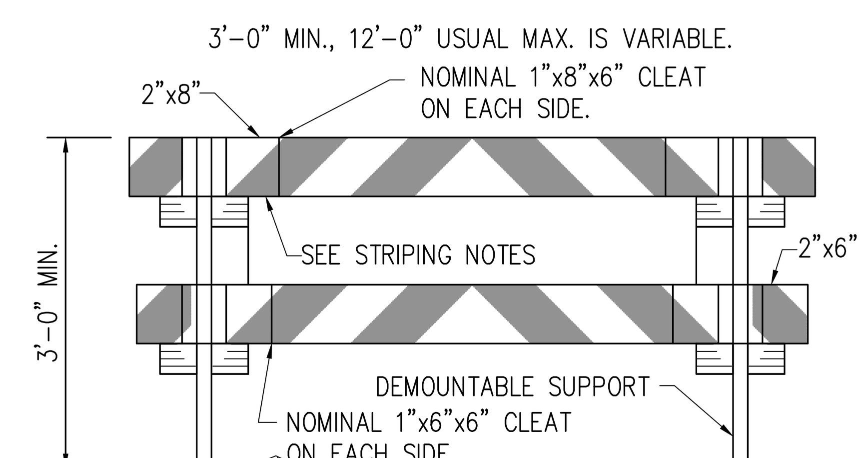
STANDARD DETAIL

* 3' MAX. WIDTH FOR "A" FRAME CONFIGURATION,
4' & LONGER USE DEMOUNTABLE SUPPORT SHOWN ABOVE.

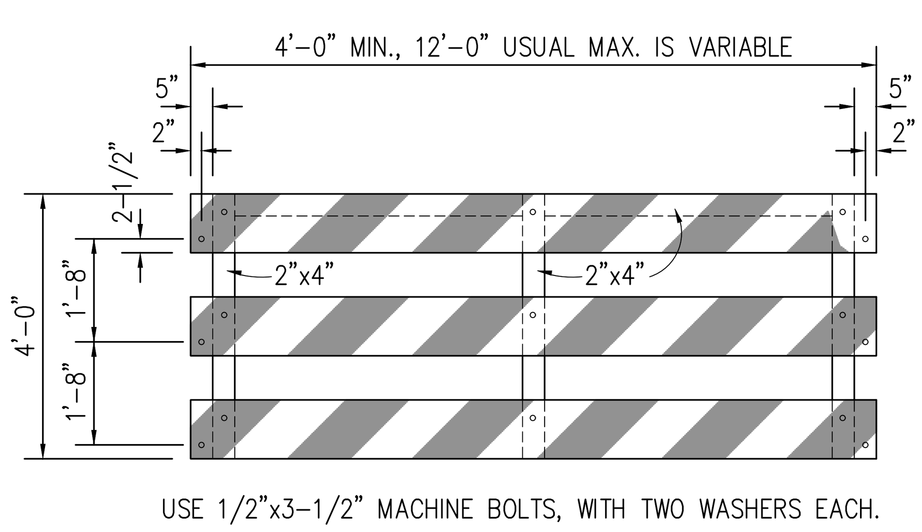


"A" FRAME SUPPORT DETAIL

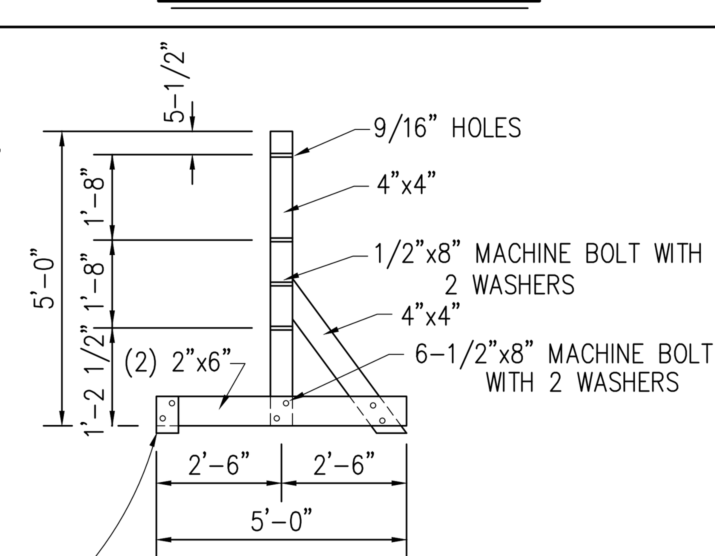
TYPE II BARRICADE



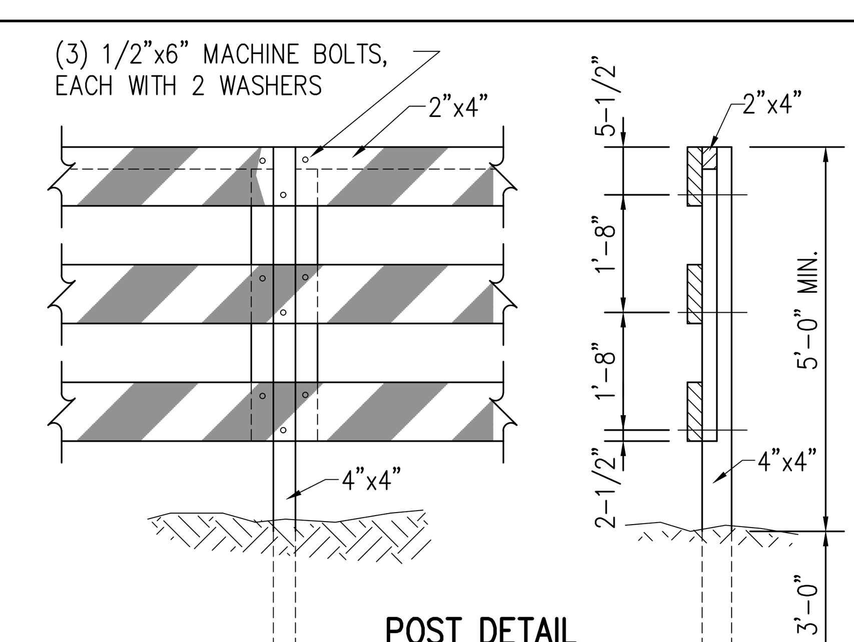
ALTERNATE DETAIL



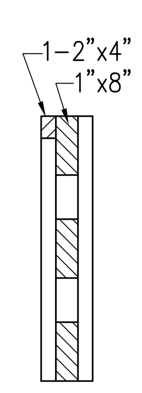
PANEL DETAIL



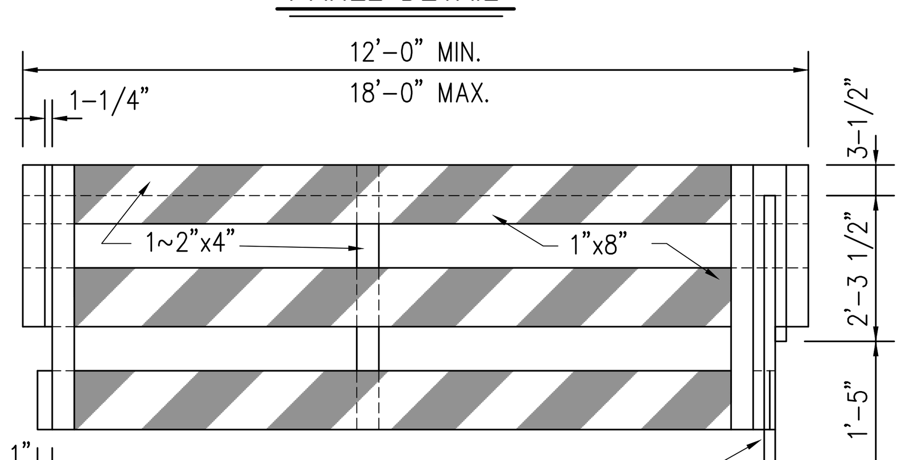
STAND DETAIL



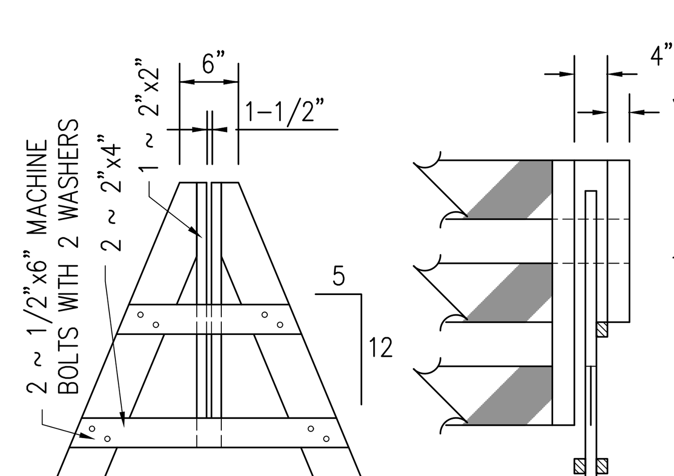
POST DETAIL



SECTION

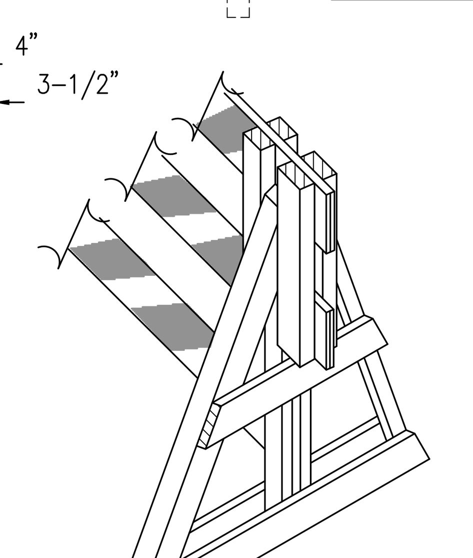


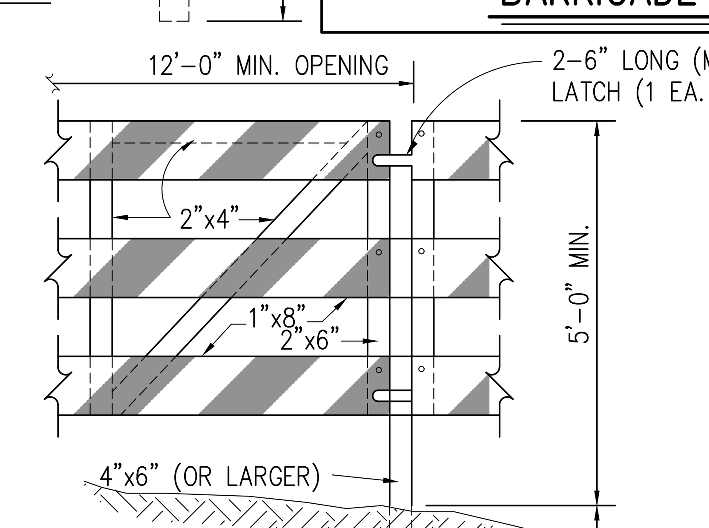
MOVEABLE PANEL DETAIL



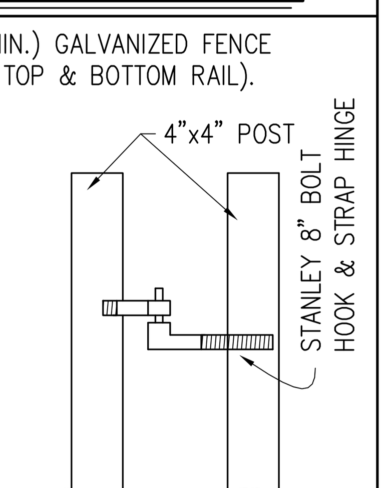
DEMOUNTABLE SUPPORT DETAIL

TYPE III BARRICADE

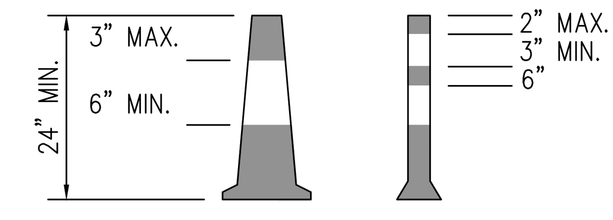

ASSEMBLY DETAIL



GATE DETAIL



GATE HINGE DETAIL

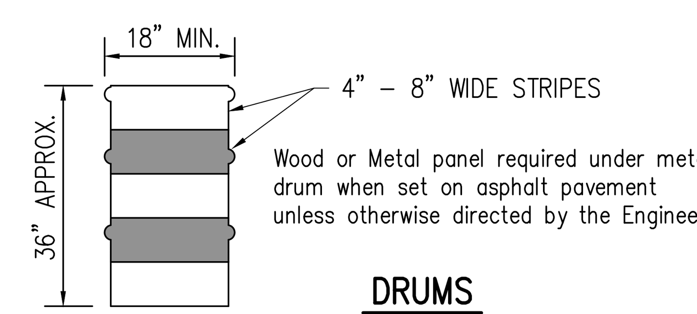


CONES

Traffic cones and tubular markers shall be a minimum of 24 inches in height with a broadened base and may be made of various materials to withstand impact without damage to themselves or to vehicles. Larger sizes should be used on freeways and other roadways where speeds are relatively high or wherever more conspicuous guidance is needed. Orange shall be the predominant color on cones and tubular markers. They should be kept clean and bright for maximum target value. For nighttime use they shall be reflectorized or equipped with lighting devices for maximum visibility. Reflectorized material shall have a smooth, sealed outer surface which will display the same approximate color day and night.

Reflectorization of tubular markers shall be a minimum of two three-inch bands placed a maximum of 2" from the top with a maximum of 6" between the bands. Reflectorization of cones shall be provided by a minimum 6" band placed a maximum of 3" from the top.

Cones or tubular markers are only suitable for temporary usage (up to 8 hours) with other channelization devices such as vertical panels or barricades preferred for longer term usage. Care should be taken to insure that they remain in their proper location and in an upright position.

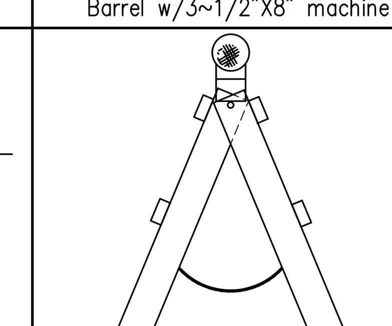


Wood or Metal panel required under metal drum when set on asphalt pavement unless otherwise directed by the Engineer.

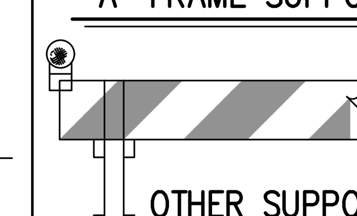
DRUMS

Drums, set on end, and used for traffic warning or channelization shall be approximately 35" in height and minimum of 18" in diameter. The contractor, at his option, may use drums made from steel barrels or black polyethylene plastic drum liners weighing approximately eight pounds each. The markings on drums shall be horizontal, circumferential, reflectorized orange and reflectorized white stripes, 4 to 8 inches wide. The first reflectorized stripe should start within two (2) inches of the top of the drum. There shall be at least two orange and two white stripes on each drum. If there are non-reflectorized spaces between the horizontal orange and white stripes, they shall be no more than 2 inches wide. Metal drums shall be painted black or orange before reflectorized stripes are added. All drums on a project will be the same color. When drums are placed in the roadway, appropriate warning signs should be used. During hours of darkness, a flashing warning light should be placed on drums used singly as a warning device. Steady burn electric lights of channelization should be placed on drums used in series for traffic channelization. Drums shall be weighted with sand.

CWI-8 CHEVRON signs, CWI-6A ARROW signs or VP-1 Vertical Panels mounted above drums may be used as supplements to drum delineation. (Vertical Panels w/ post shall be bolted to Barrel w/3~1/2"X8" machine bolts w/2 washers on 9" spacing.


"A" FRAME SUPPORT

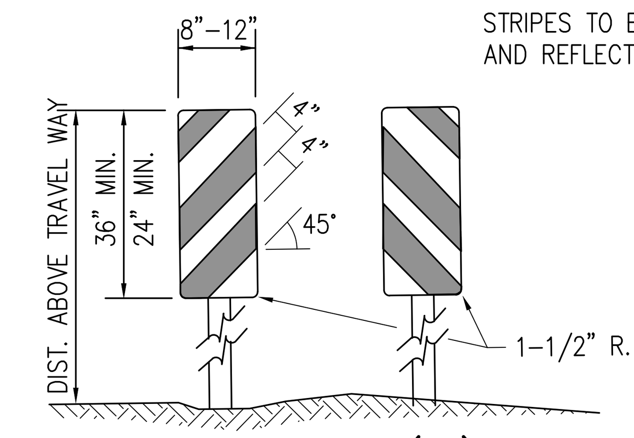
Mount light to machine bolt @ "A" Frame pivot point. Light shall be mounted on side of barricade which stripes point downward.


OTHER SUPPORT

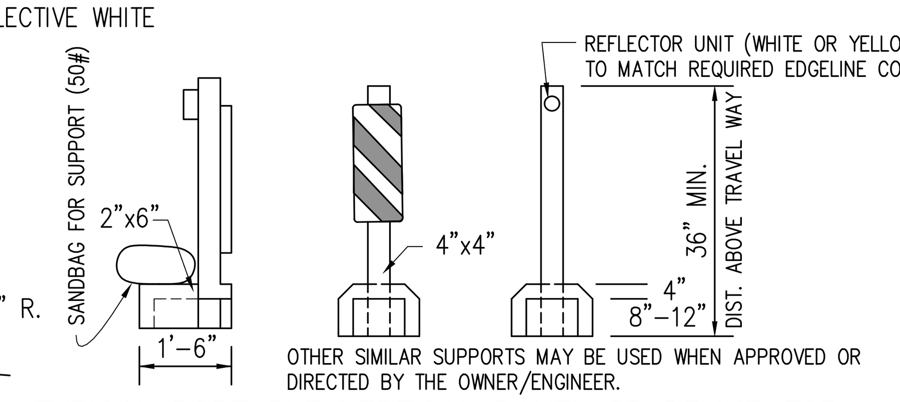
Mount light to rail w/machine bolt. Light shall be mounted on wide of barricade which stripes point downward.

BARRICADE W/LIGHT DETAIL

STRIPES TO BE REFLECTIVE ORANGE
AND REFLECTIVE WHITE



VERTICAL PANELS (VP)



TYPICAL PORTABLE VERTICAL PANEL OR DELINEATOR

Vertical Panels are normally used as channelizing devices to indicate tangent or nearly tangent roadway alignment where good target value of a device is needed in daytime as well as the nighttime. In addition, vertical panels should be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive day and night delineation may be required. Vertical Panels should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes should allways slope downward toward the traveled way.

CHANNELIZING DEVICES

BARRICADE NOTES

The most recent edition of the TEXAS Manual on Uniform Traffic Control Devices (MUTCD), and its revisions, shall govern the construction and use of all items herein described.

Channelizing devices other than barricades should normally be used for channelization purposes.

Barricades should be placed perpendicular to the traffic flow. Other channelizing devices, such as drums, vertical panels or portable barriers, should be used where needed to separate traffic from the work area. In all cases, the barricades should be located to warn and direct traffic.

Barricades may be designed and constructed from wolmanized wood or any other suitable material in a manner approved by the Owner/Engineer. The barricade shown hereon are typical and are suggested details for wood support systems. The details of rail width and striping, number and spacing of rails, minimum length and height (above pavement) of rails must be adhered to, whether or not the alternate designs are used. (See Detail This Sheet).

Barricades are to be constructed in a first-class workmanship manner of clean sound material. All surfaces above ground, which are not striped, shall be white except unpainted galvanized metal or aluminum components. Components made of lumber shall be painted with a minimum of two coats of an approved brand of exterior white paint to secure thorough coverage and a uniform white color.

The reflectorized white and reflectorized orange (reflectorized red) stripes for barricades, drums, and vertical panels shall be constructed of "High intensity sheeting and shall be maintained to meet the appearance, color, and reflectivity requirements set by the MUTCD.

The Contractor shall maintain each barricade in a clean and good condition.

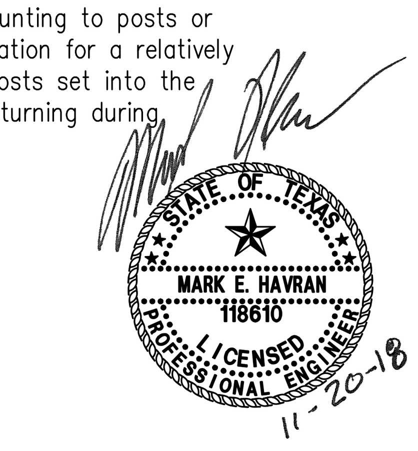
Barricades shall be removed upon completion of the work and/or the elimination of the hazard on any section.

Type I Barricades shall consist of a striped upper horizontal rail mounted on demountable supports at either end and fabricated in such manner that the rail or rails can be assembled or disassembled to or from the supports with ease. The standard Barricade design has a lower rail not required on the alternate design. A Type I Barricade is intended for use where the hazard is relatively small, for minor maintenance and repair work or for the continuous marking of a restricted roadway. Type I rails that are striped on both sides should be striped in opposite directions.

Type II Barricades shall consist of an upper an lower rail fastened to a support. The support should be of an "A" frame configuration, hinged or otherwise fastened at the top to permit convenient folding and stacking for transporting from one work site to another. Since portability is a prime consideration, the materials chosen for the barricades should be as light weight as possible and structurally sound. Sandbags should be used for ballast when required. A Type II Barricade is intended for use where the area is quite confined such as on city streets, or the continuous marking of a restricted roadway, or for temporary daytime use.

Type III Barricades should consist of three striped horizontal rails and assembled as a panel for mounting to posts or skids. Type III Barricades are typically permanent in nature and are required to function in one location for a relatively long time. When the Type III (Moveable) Barricades are constructed on bases or skids instead of posts set into the ground, it may be desirable to ballast the bases with sandbags to provide added resistance to overturning during periods of high winds.

An orange flag may be mounted on Type I, Type II and Type III Barricades for increased daytime emphasis. For night time use, it is desirable to add flashing warning light when barricades are used singly and a steady burn light when barricades are used in a series for channelization.



CONSTRUCTION OF BARRICADES

The barricades may be fixed or moveable, depending on the location and application.

Movable barricades are appropriate where the construction or maintenance operations are of short duration, and/or are progressively shifted along a roadway. The design of movable mounting must be such as to resist overturning by ordinary strong winds or by chance contact with vehicles. Fixed barricades are justified only for major construction or reconstruction.

Movable Type III Barricades are generally of heavy construction with a heavy base.

BARRICADE CHARACTERISTICS

TYPE	I	II	III
WIDTH OF RAIL	8 IN. MIN. – 12 IN. MAX.	8 IN. MIN. – 12 IN. MAX.	8 IN. MIN. – 12 IN. MAX.
LENGTH OF RAIL	2 FT. MIN. – VARIABLE MAX.	2 FT. MIN. – VARIABLE MAX.	2 FT. MIN. – VARIABLE MAX.
WIDTH OF STRIPES *	6 IN.	6 IN.	6 IN.
HEIGHT	3 FT. MIN.	3 FT. MIN	3 FT. MIN.
NUMBER OF REFLECTORIZED RAIL FACES	2 (ONE EACH DIRECTION)	4 (TWO EACH DIRECTION)	3 (IF FACING TRAFFIC IN ONE DIRECTION) OR 6 (IF FACING TRAFFIC IN TWO DIRECTIONS)

FOR WOODEN BARRICADES, NOMINAL LUMBER DIMENSIONS WILL BE SATISFACTORY.

* FOR RAILS LESS THAN 3 FT. LONG, 4 IN. WIDE STRIPES MAY BE USED.

Revision	By	Chk.	Appr.	Date

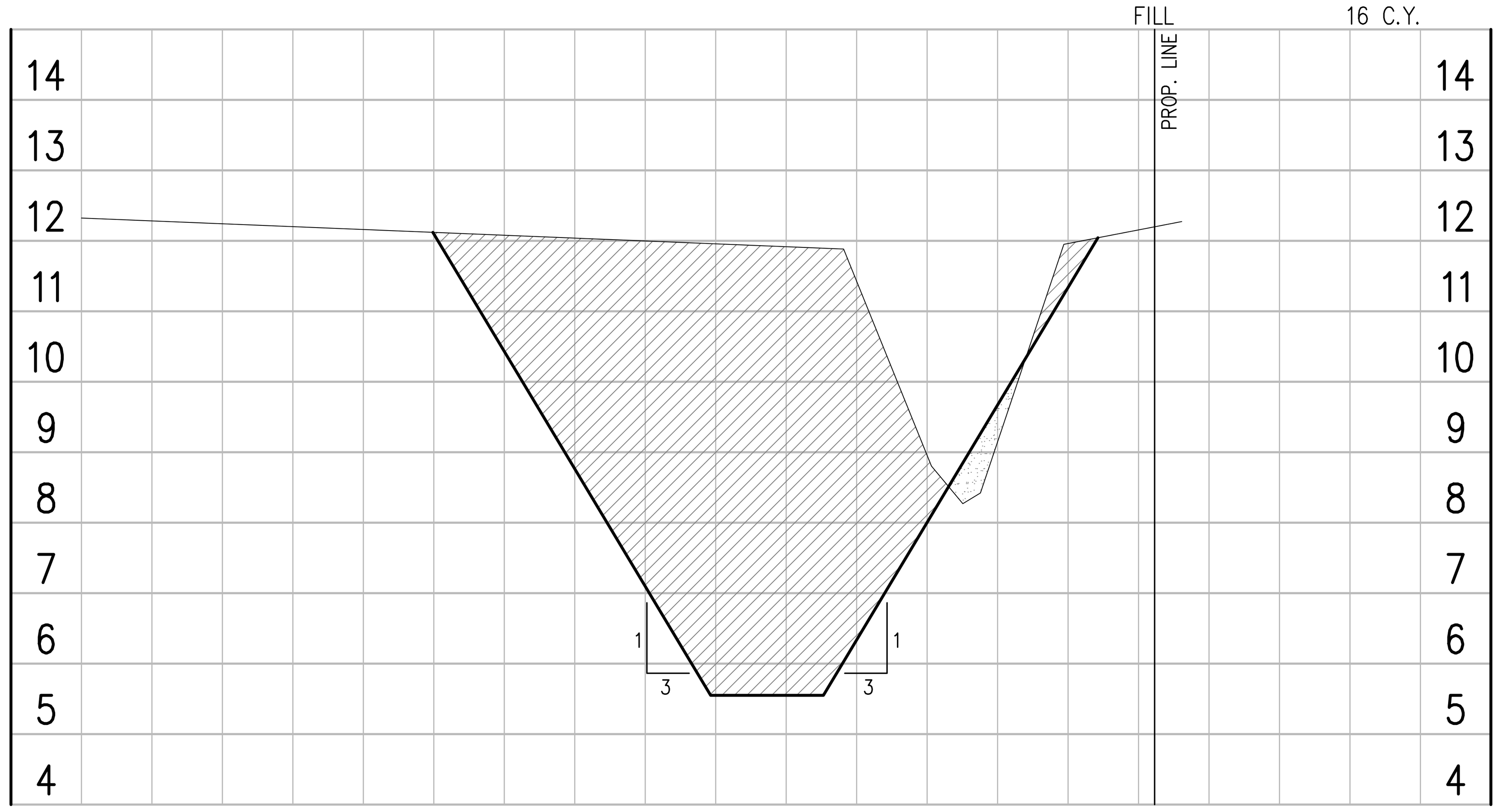
CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

STANDARD BARRICADE DETAILS

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

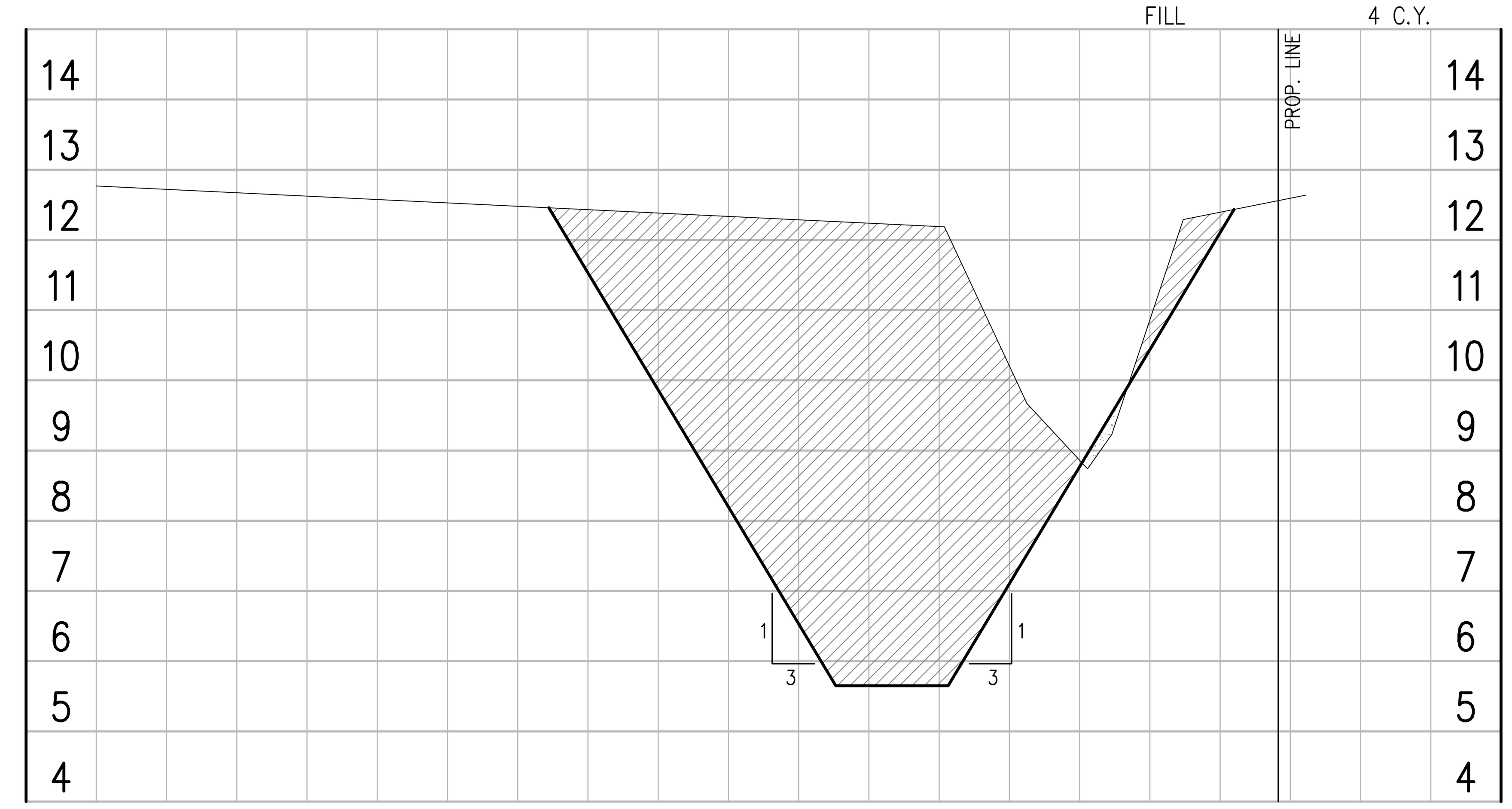
DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 30 Of 39

DITCH
EXCAVATE 754 C.Y.
FILL 16 C.Y.



BL "A" STA. 1+50.00

DITCH
EXCAVATE 564 C.Y.
FILL 4 C.Y.



BL "A" STA. 2+50.00

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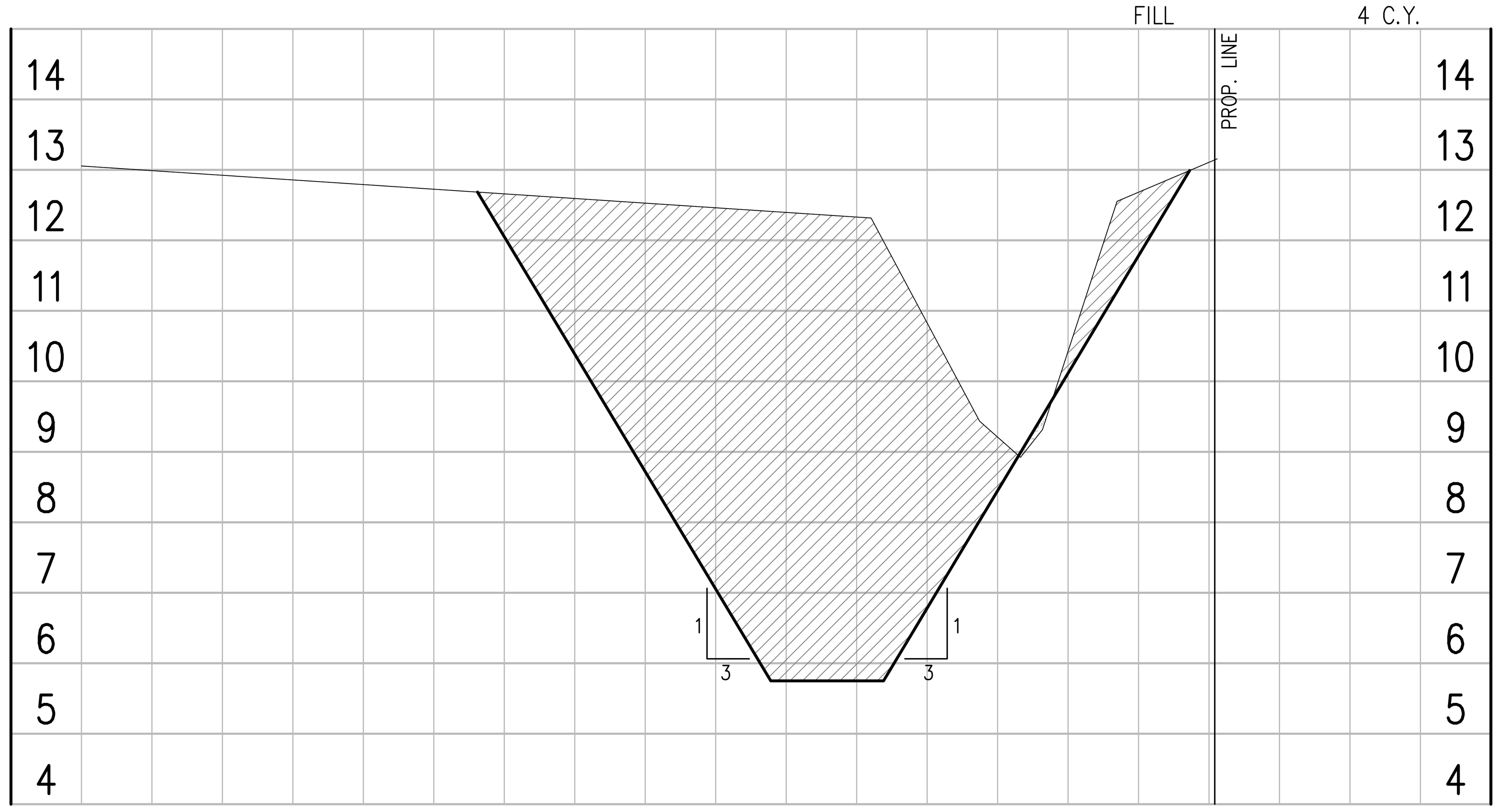
EXCAVATE 579 C.Y.
FILL 4 C.Y.



BL "A" STA. 3+50.00

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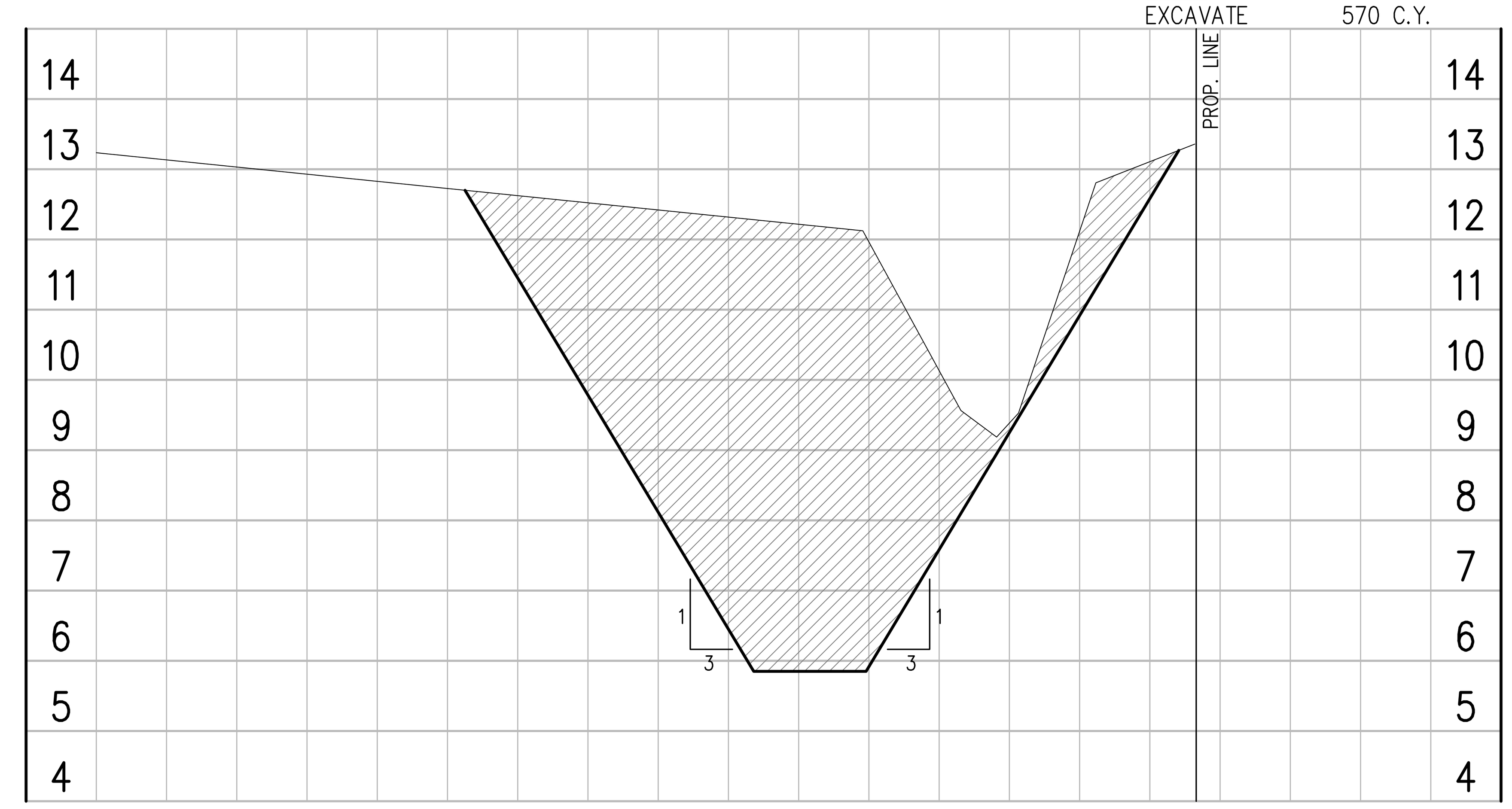

BL "A" STA. 4+50.00

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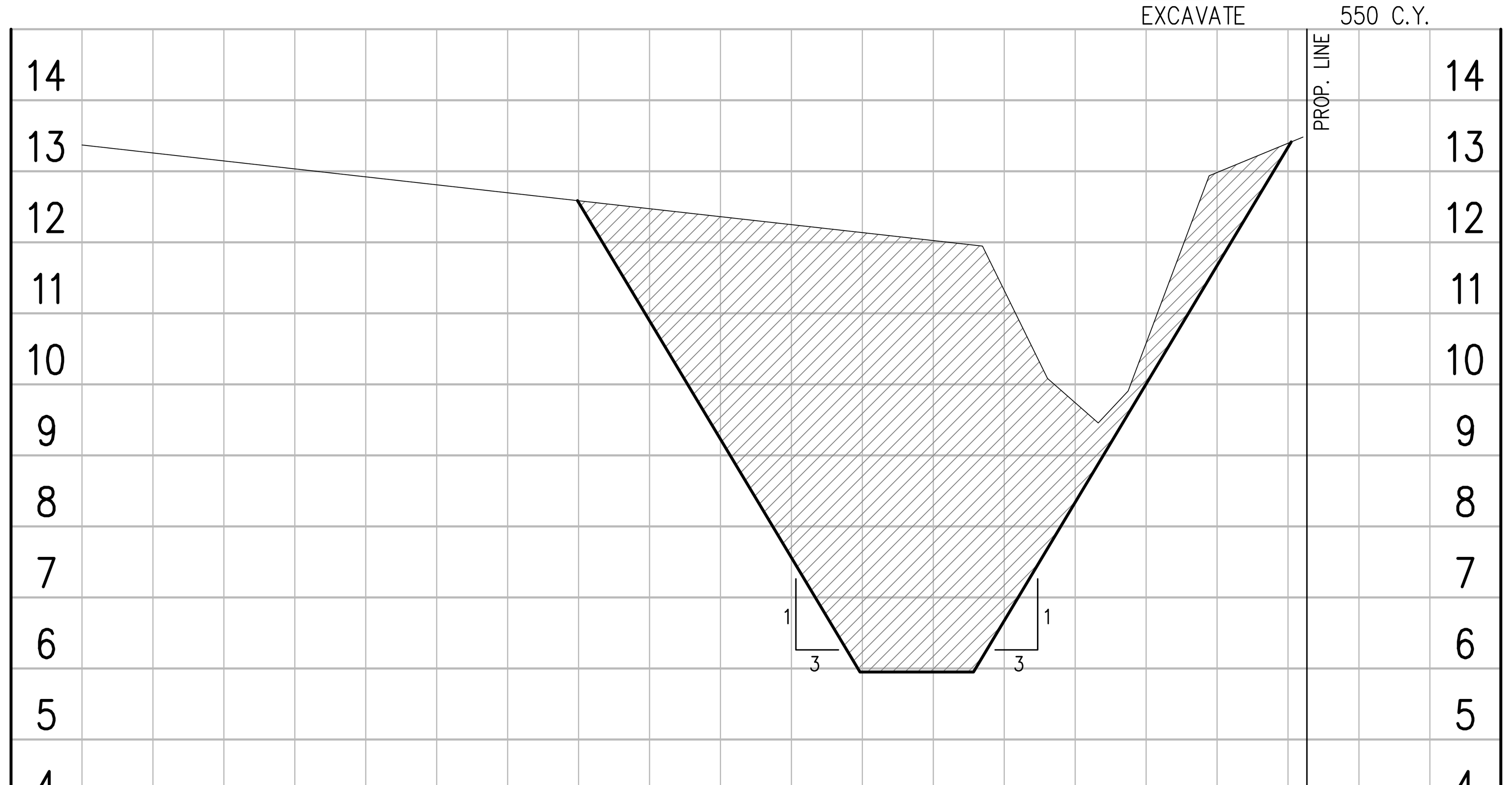
EXCAVATE 550 C.Y.



BL "A" STA. 5+50.00

SHEET TOTAL:

DITCH
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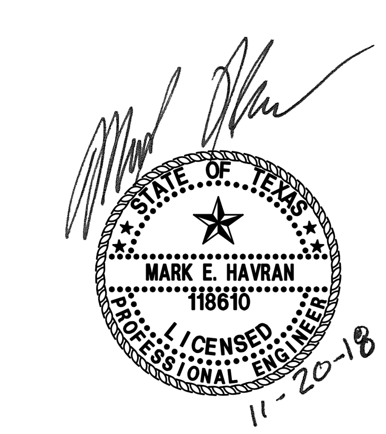

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH
LINEAR DETENTION DITCH CROSS SECTIONS
SHEET 1 OF 4

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 31 Of 39

11/20/18

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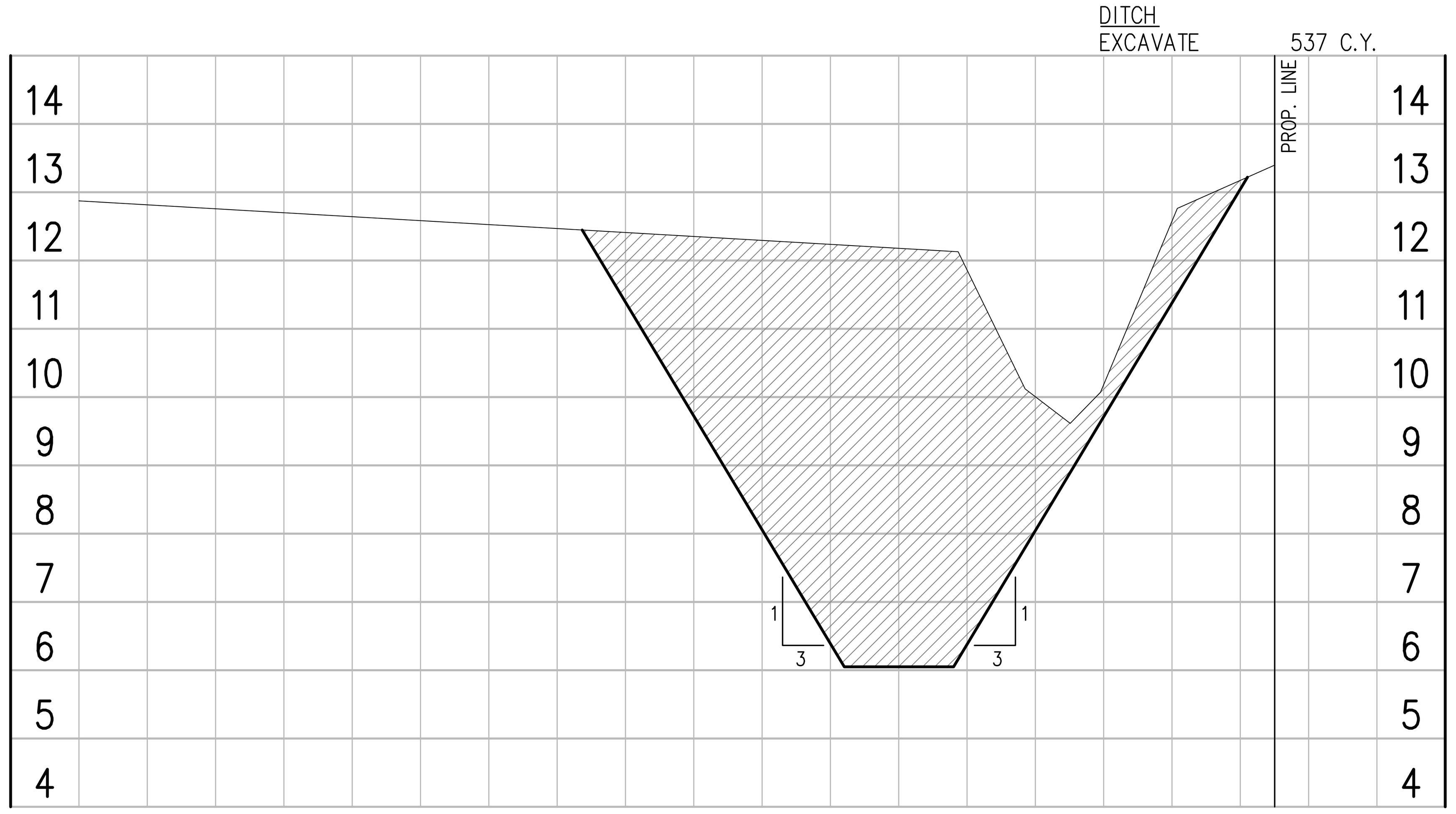

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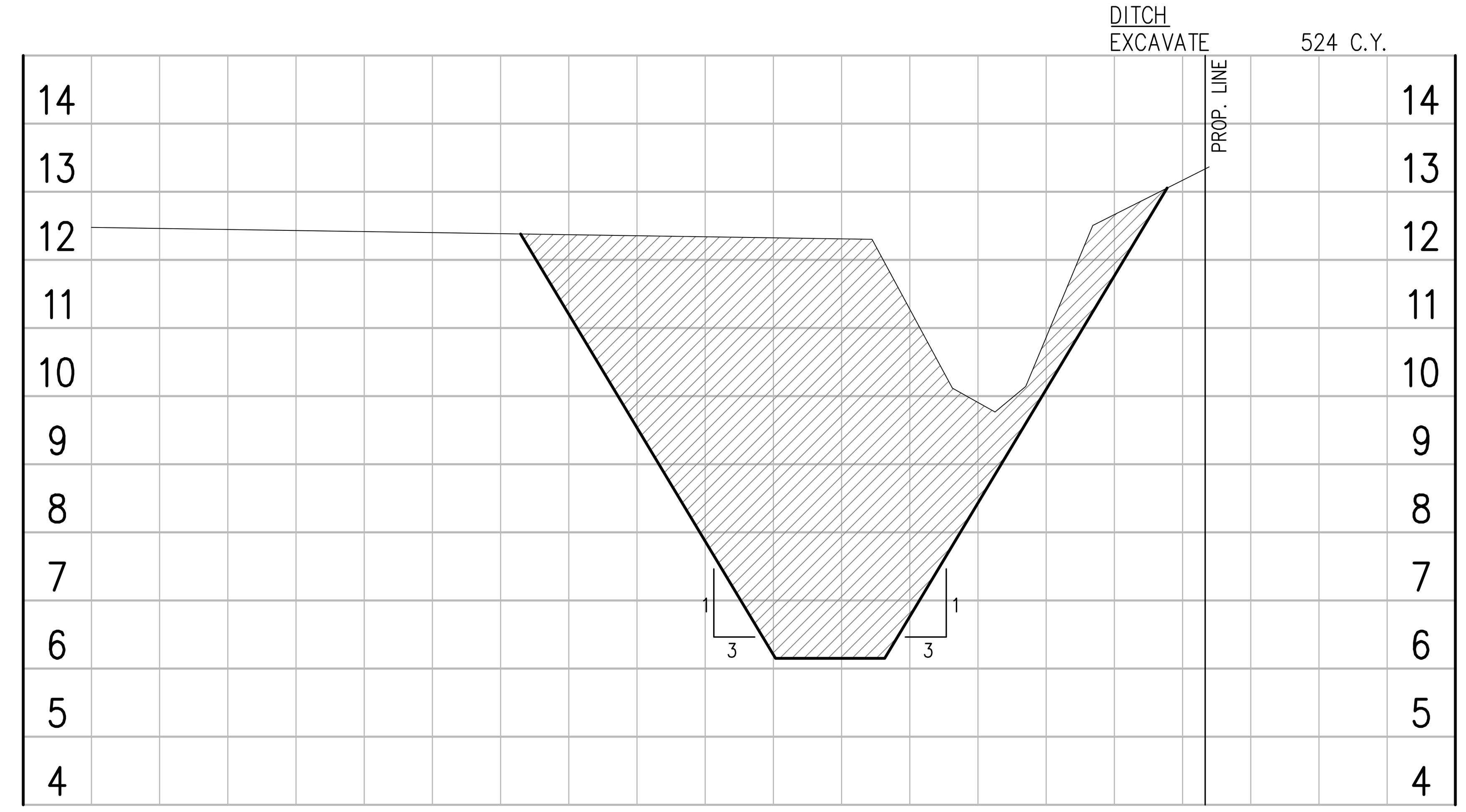

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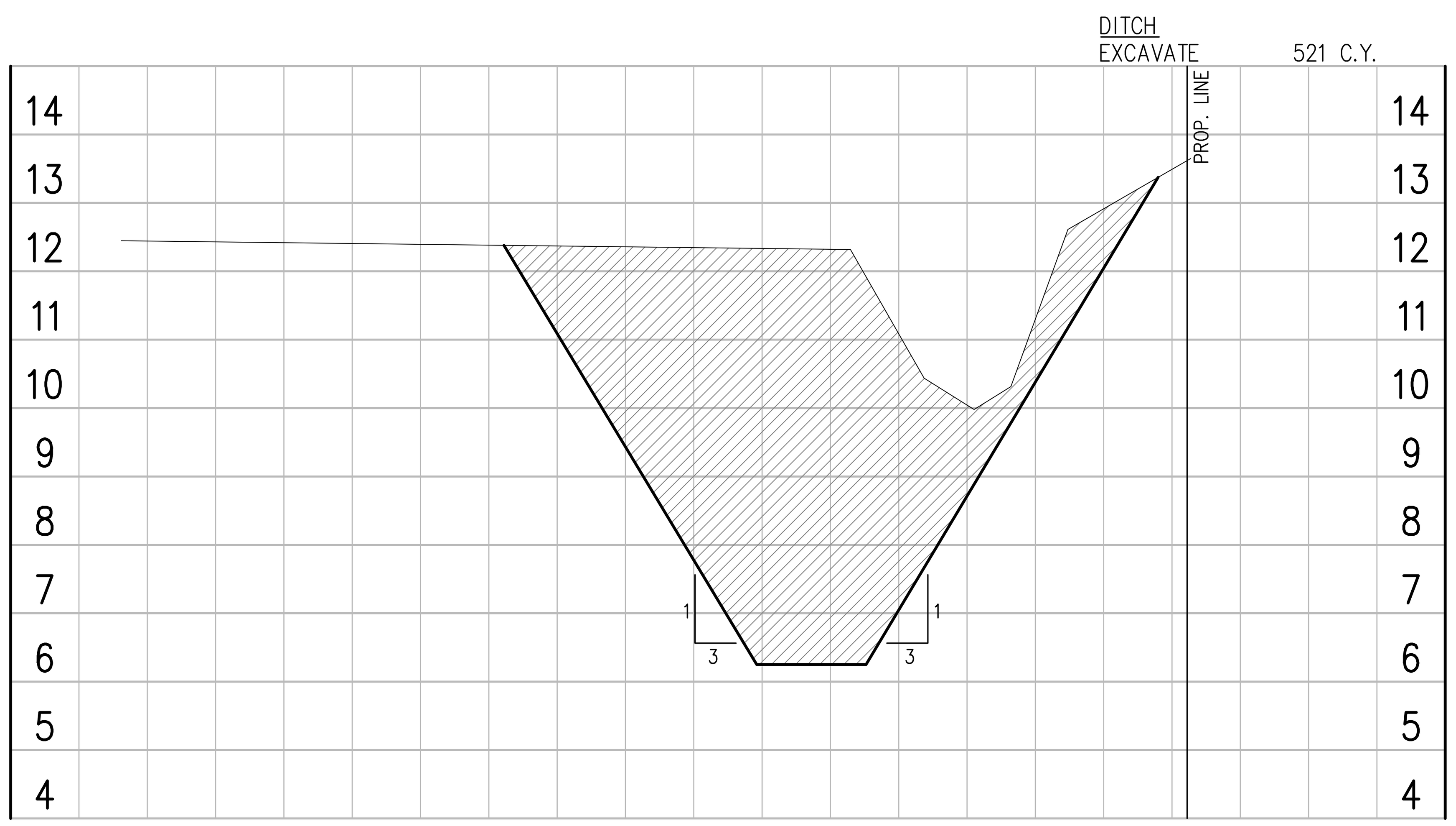

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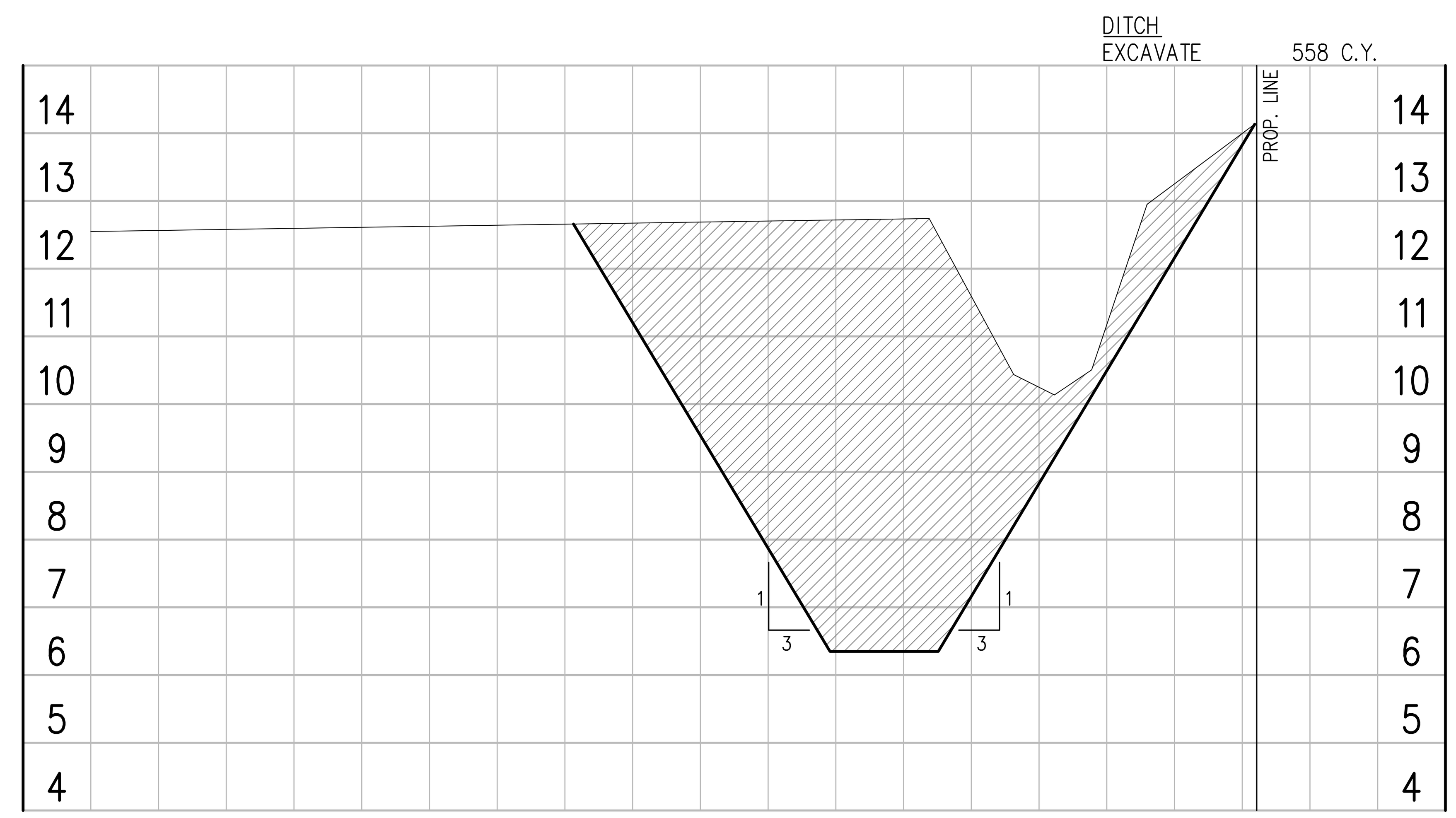
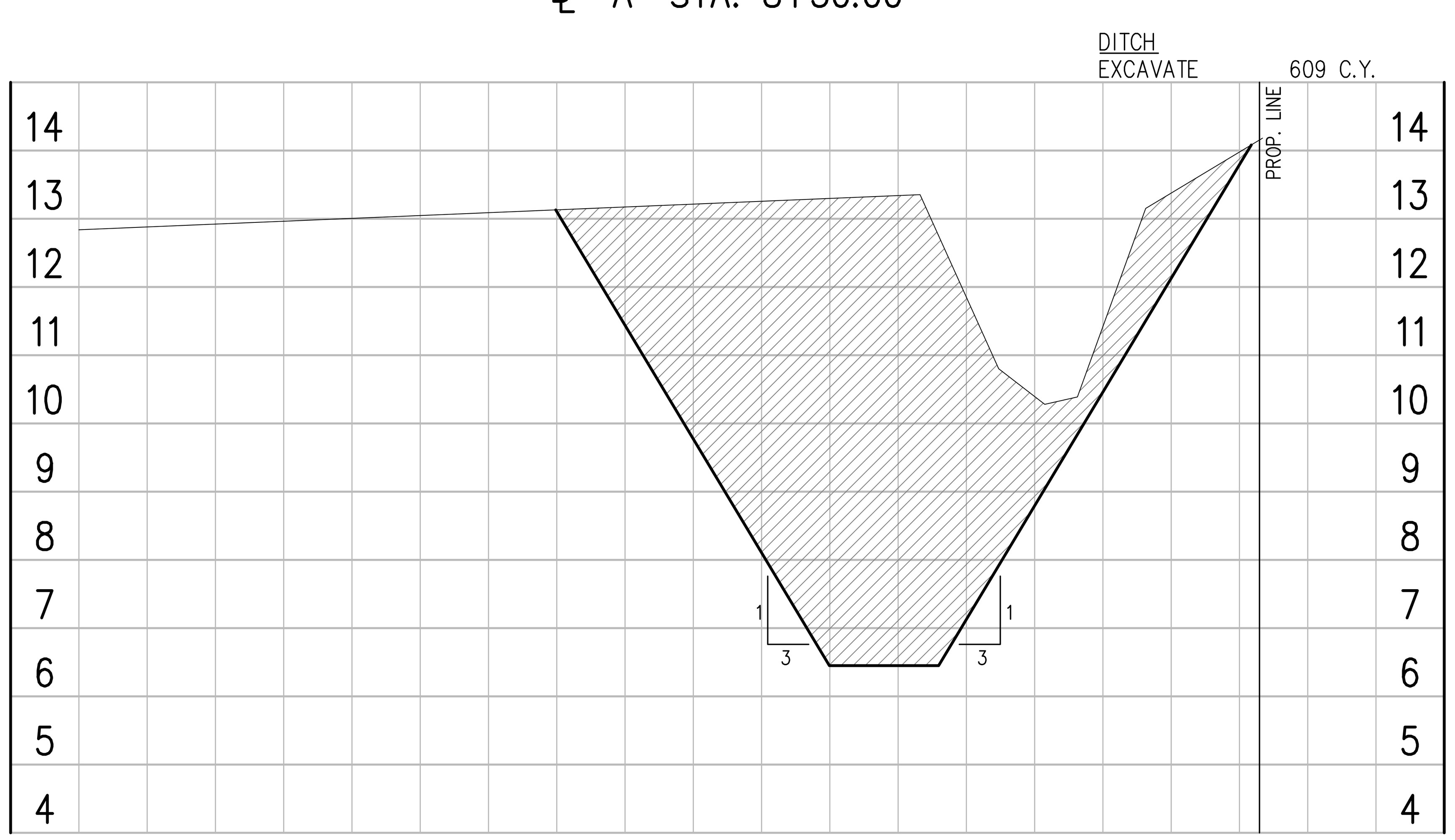


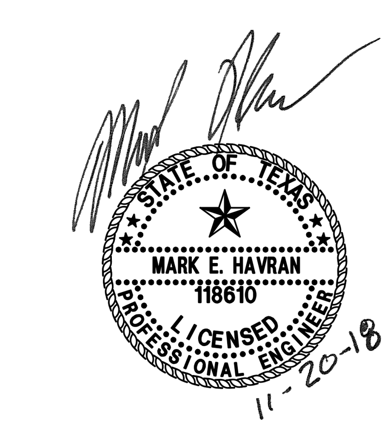
℄ "A" STA. 9+50.00



℄ "A" STA. 10+50.00

SHEET TOTAL:

DITCH
EXCAVATE 2749 C.Y.



Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

LINEAR DETENTION DITCH CROSS SECTIONS
SHEET 2 OF 4

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135–0320 & E135–0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 32 Of 39

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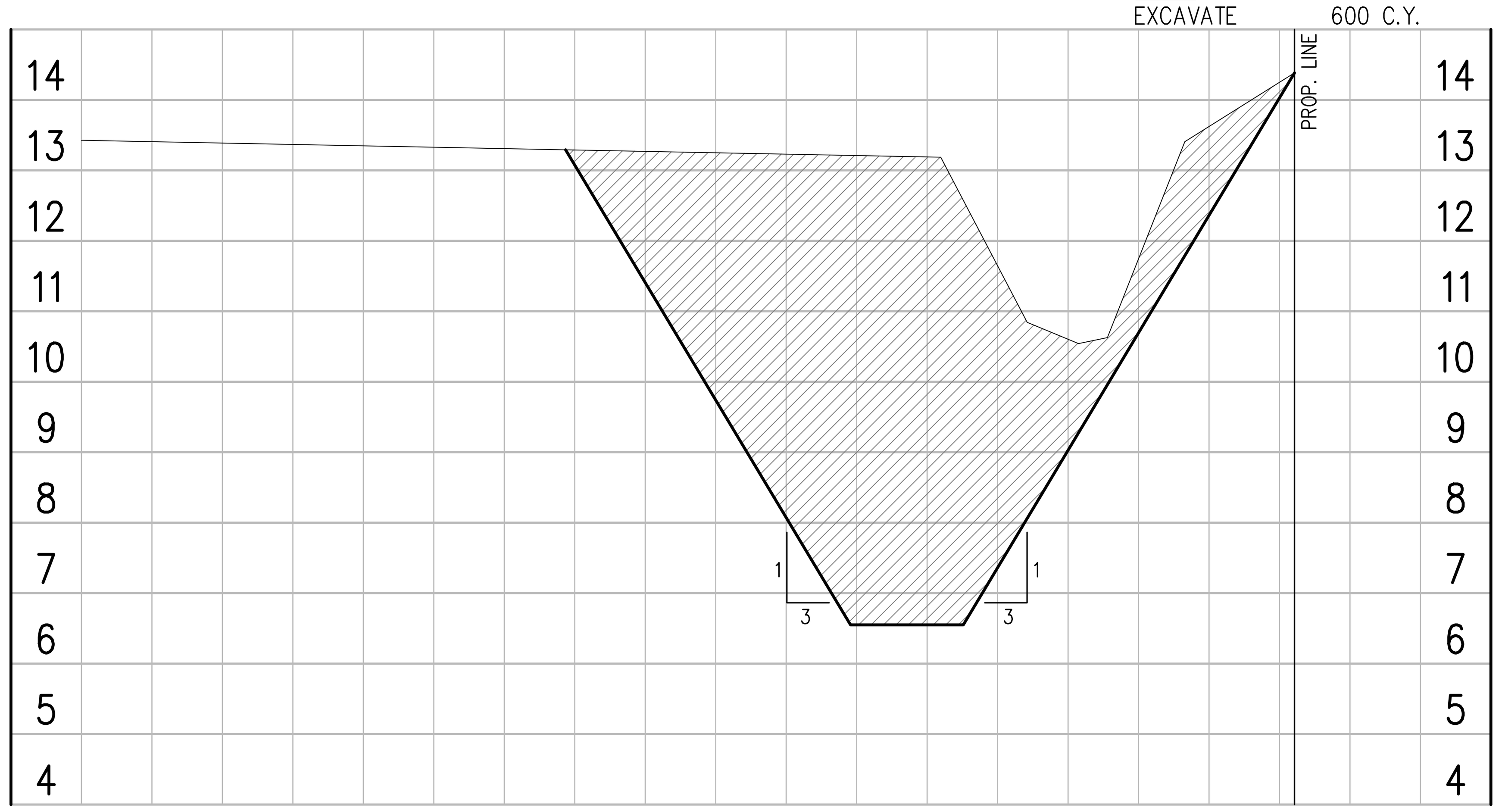
11/20/18

DITCH
EXCAVATE 600 C.Y.



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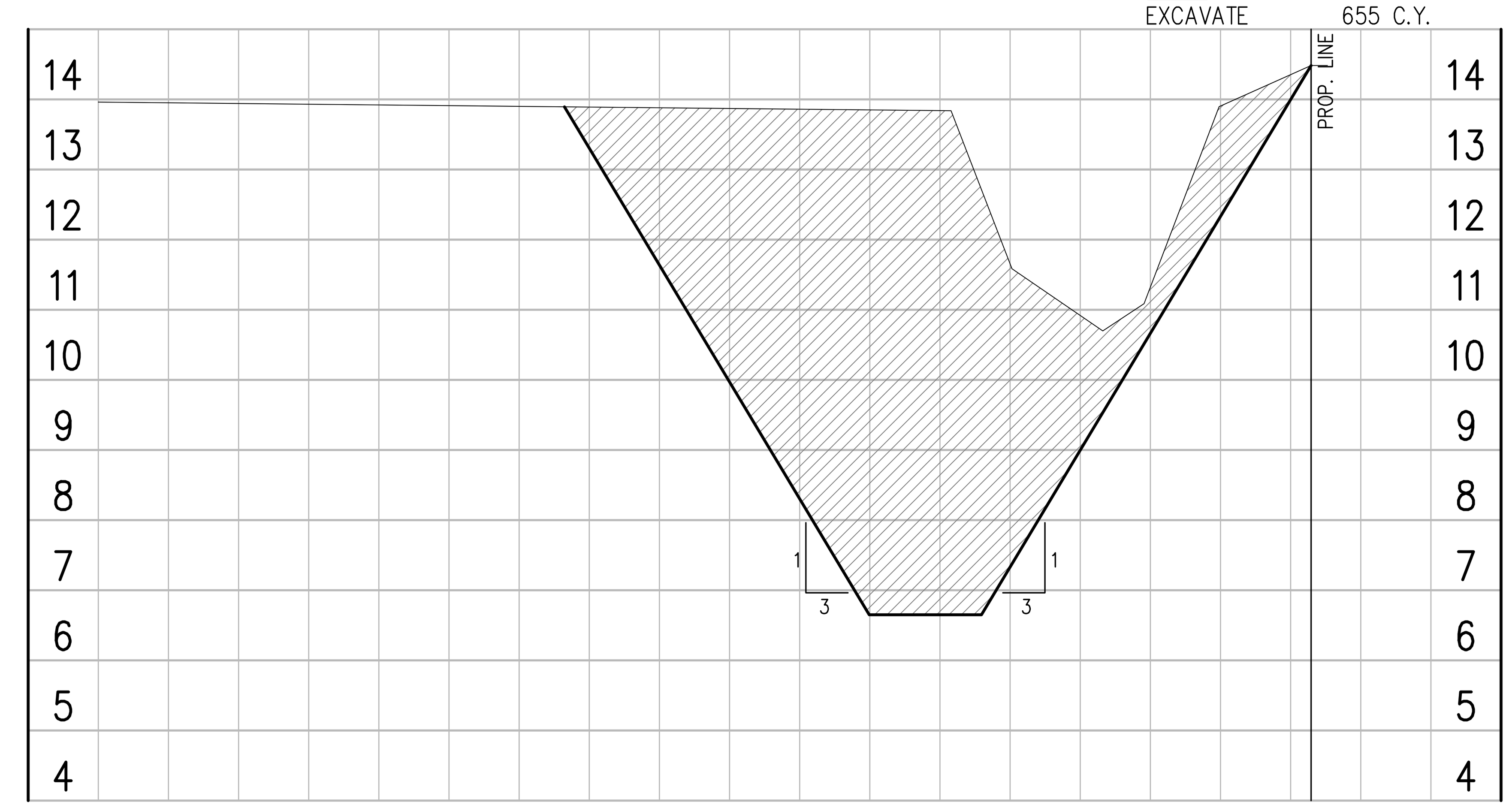
DITCH
EXCAVATE 655 C.Y.



℄ "A" STA. 12+50.00

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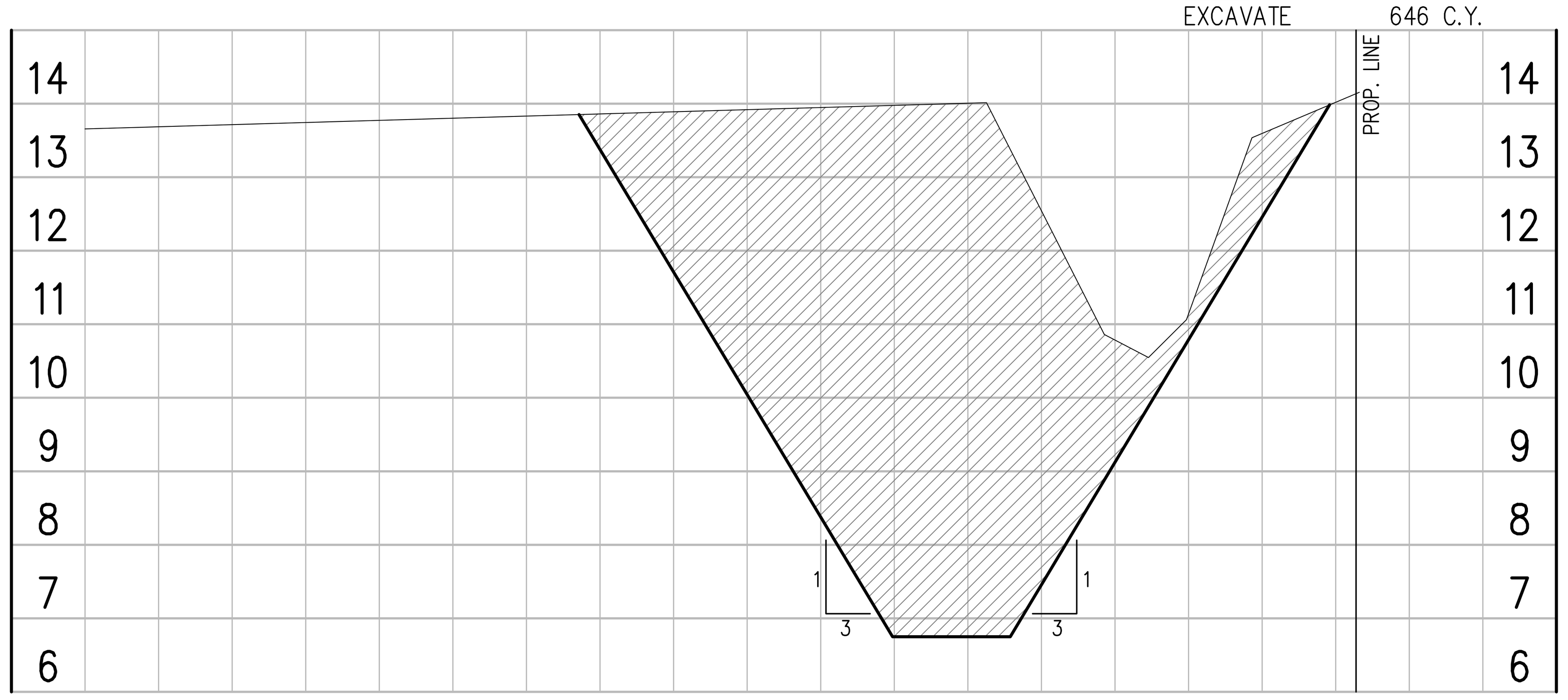

℄ "A" STA. 13+50.00

DITCH
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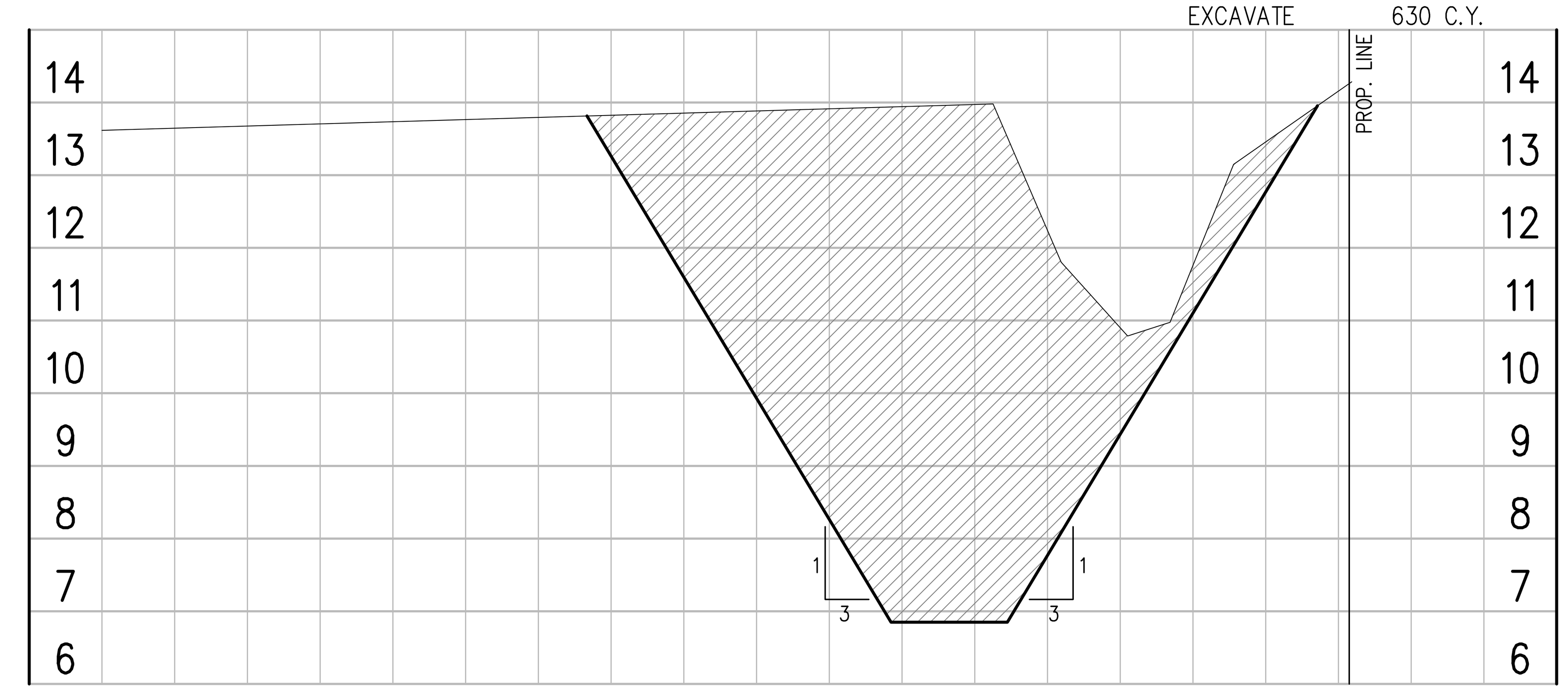

℄ "A" STA. 14+50.00

DITCH
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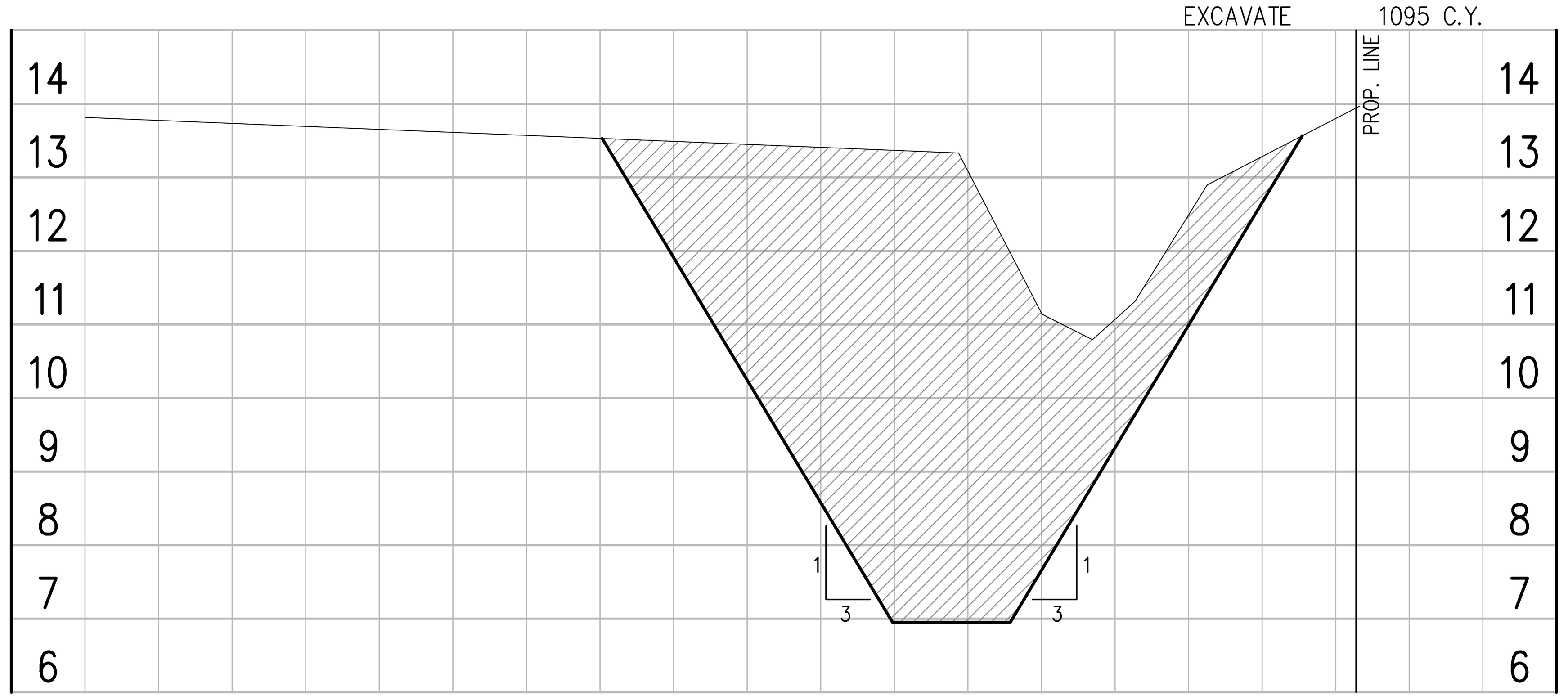

℄ "A" STA. 15+50.00

SHEET TOTAL:

DITCH
EXCAVATE 3626 C.Y.

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED
PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION
& LINEAR DETENTION DITCH

LINEAR DETENTION DITCH
CROSS SECTIONS
SHEET 3 OF 4

LJA Engineering, Inc.
11821 East Freeway
Suite 360
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Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 33 Of 39

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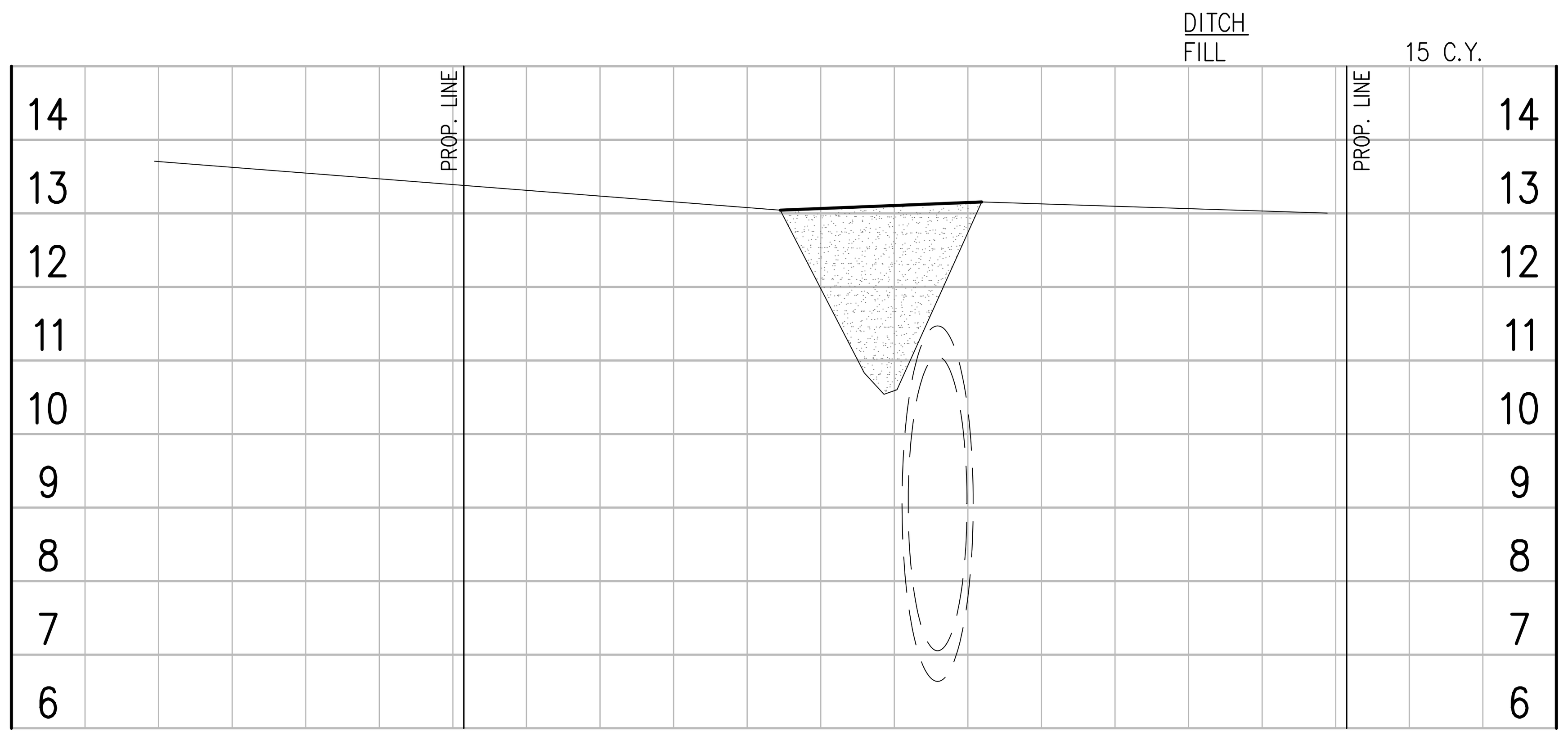
11/20/18



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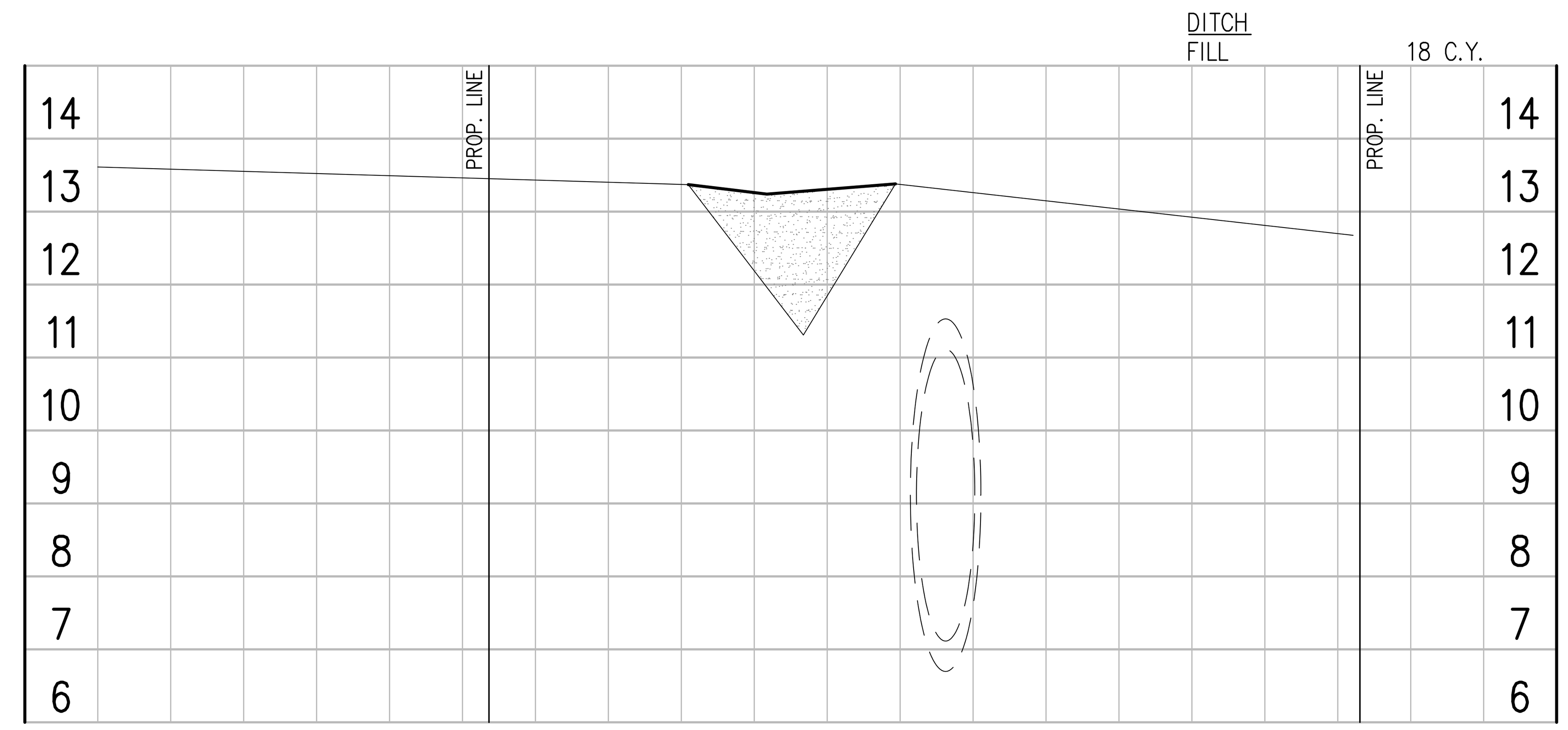

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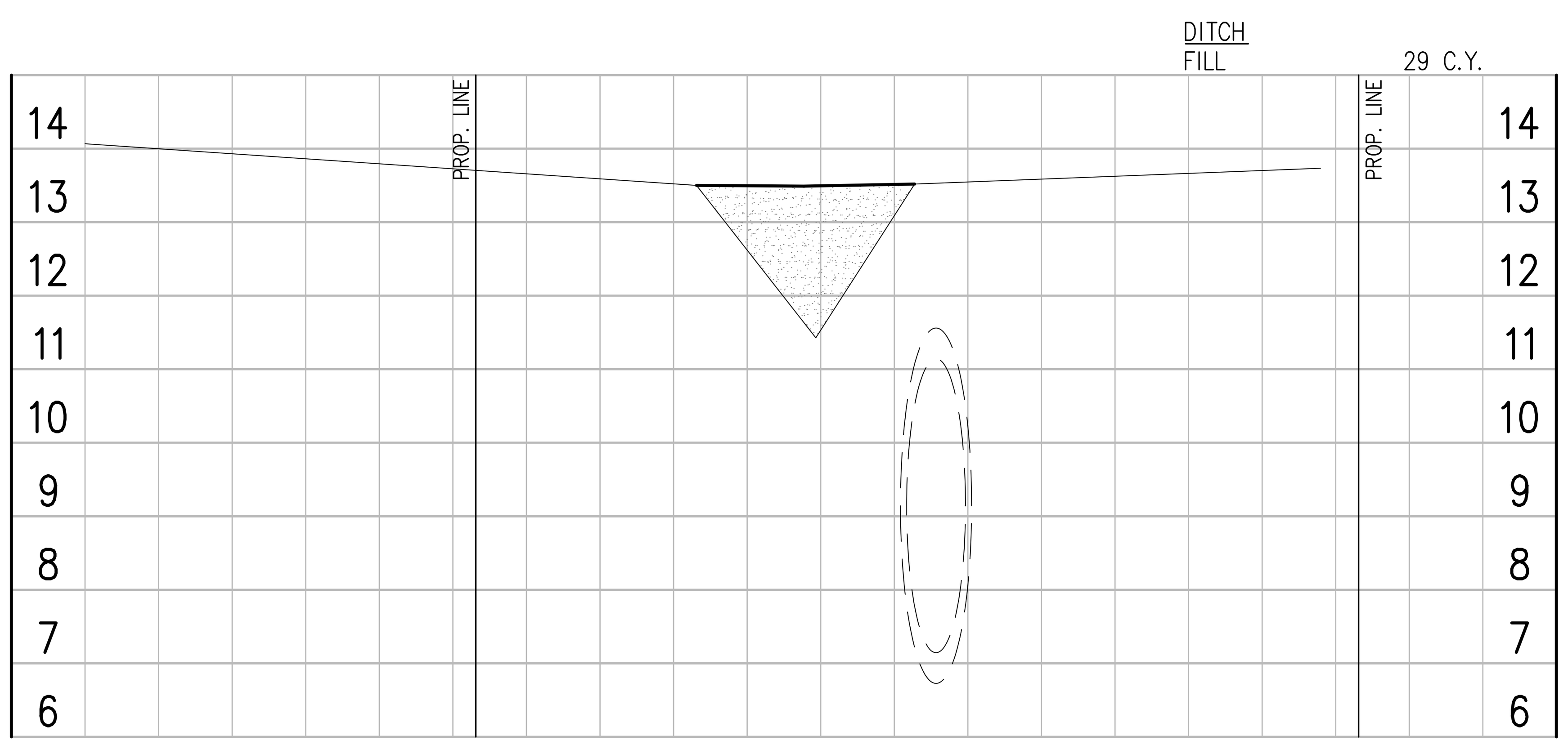

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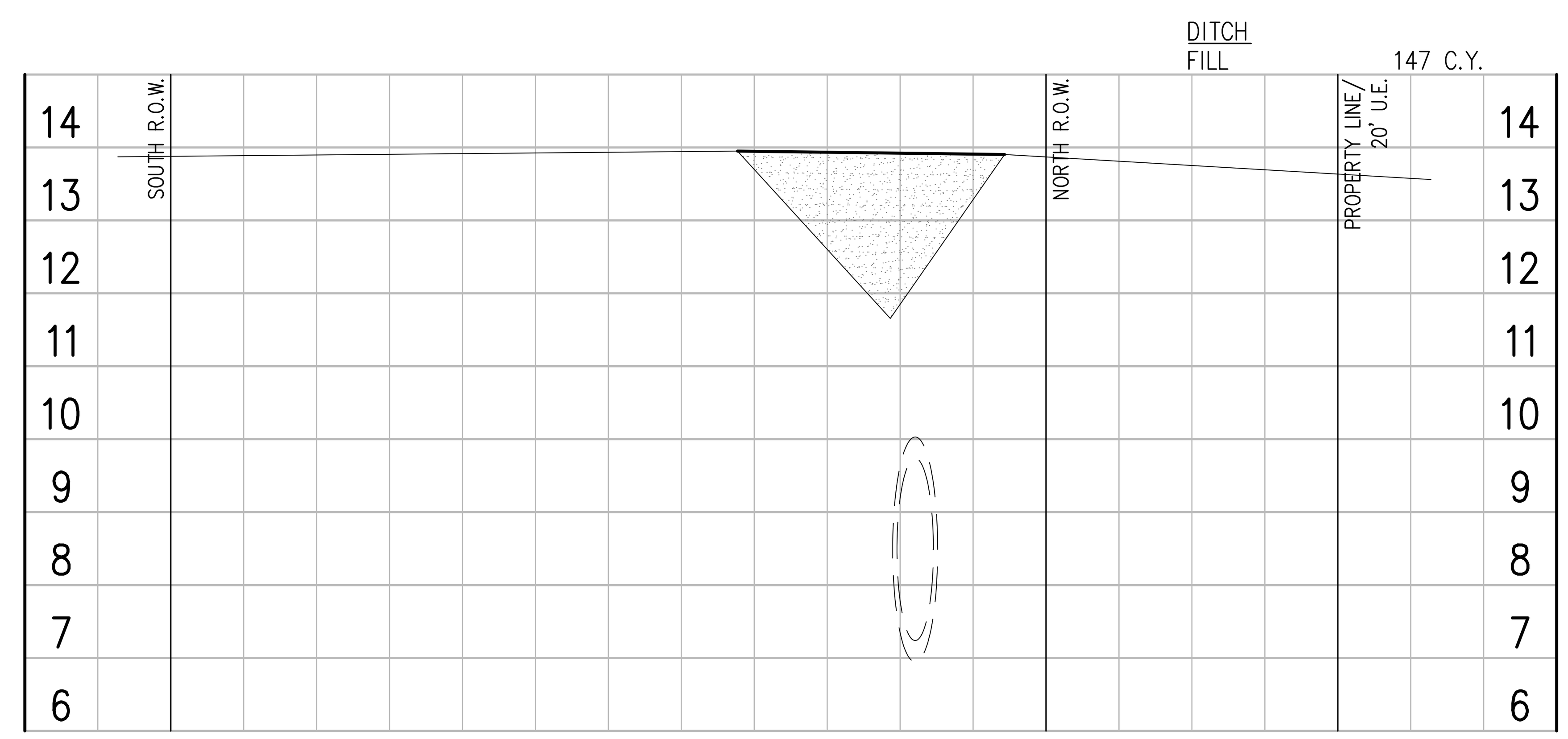

℄ "A" STA. 19+12.00

SHEET TOTAL:

DITCHFILL 209 C.Y.

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED
PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION
& LINEAR DETENTION DITCH

LINEAR DETENTION DITCH
CROSS SECTIONS
SHEET 4 OF 4

LJA Engineering, Inc.
11821 East Freeway
Suite 360
Houston, Texas 77029
Phone 713.450.1300
Fax 713.450.1385
FRN - F-1386

DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 34 Of 39

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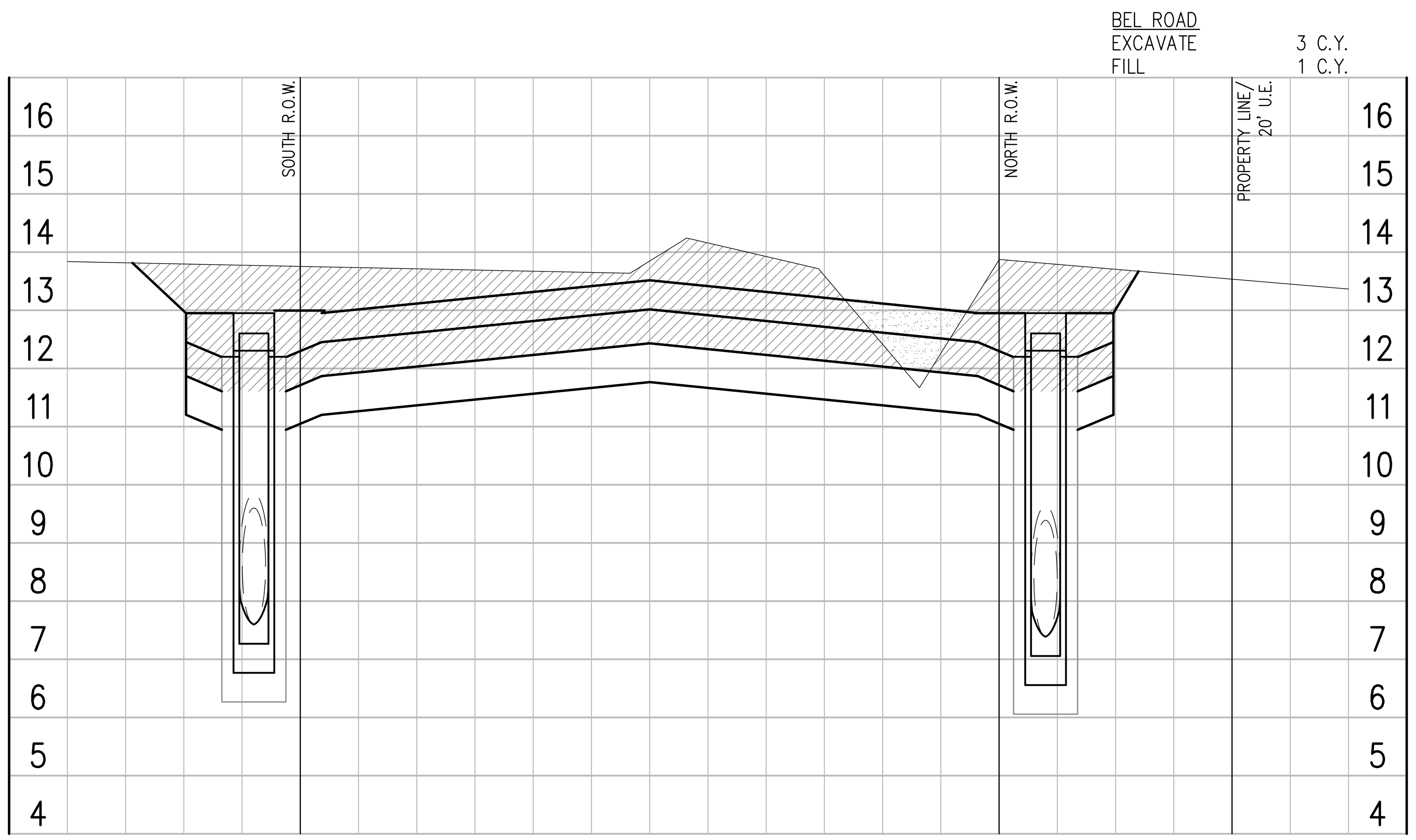
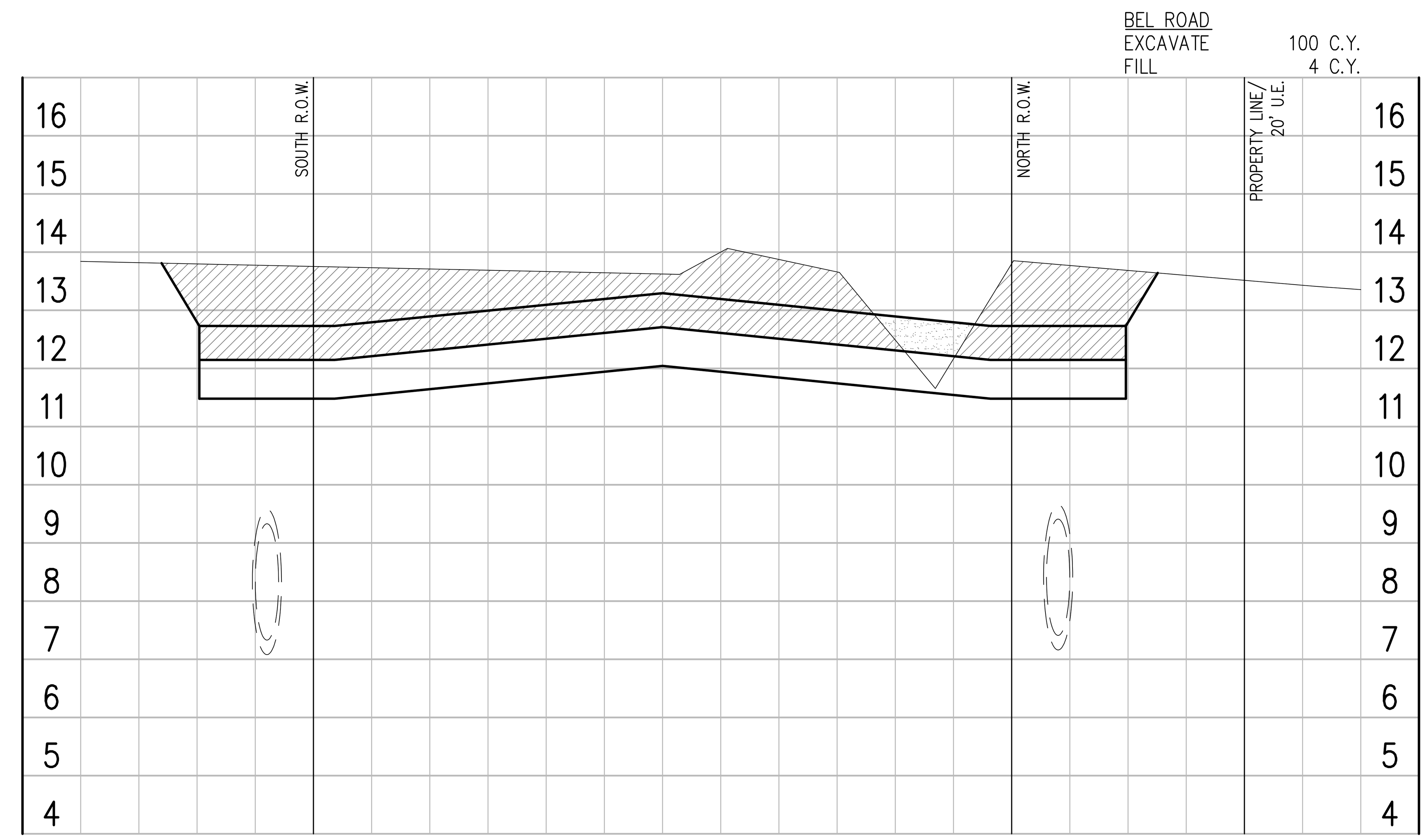
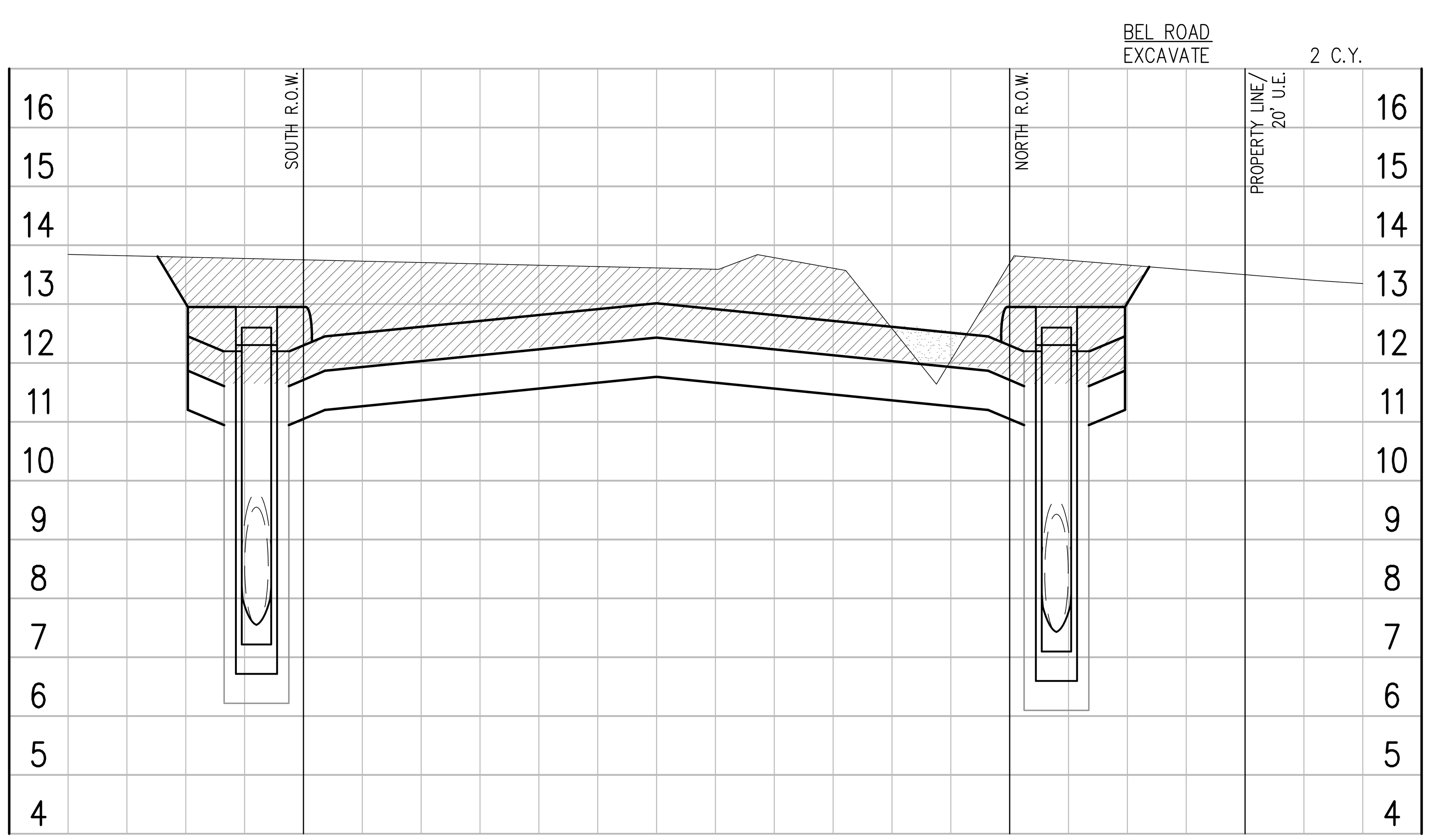
11/20/18



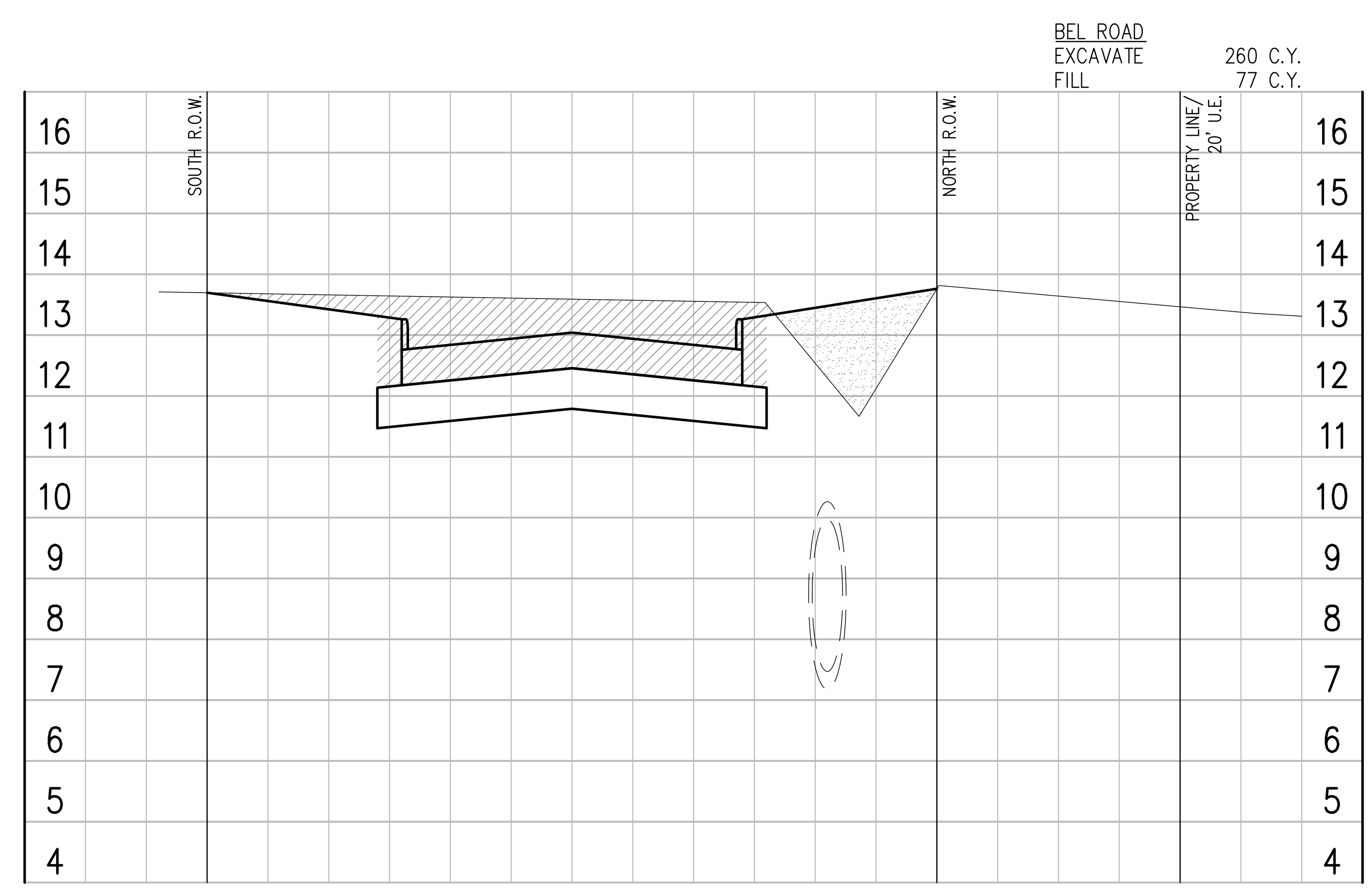
℄ "A" STA. 20+13.84



℄ "A" STA. 20+27.49



℄ "A" STA. 20+41.08



℄ "A" STA. 20+61.90

SHEET TOTAL:

ROADWAY	
EXCAVATE	365 C.Y.
FILL	82 C.Y.

STATE OF TEXAS
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CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

BEL ROAD CROSS SECTIONS
SHEET 1 OF 4

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DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 35 Of 39

11/20/18

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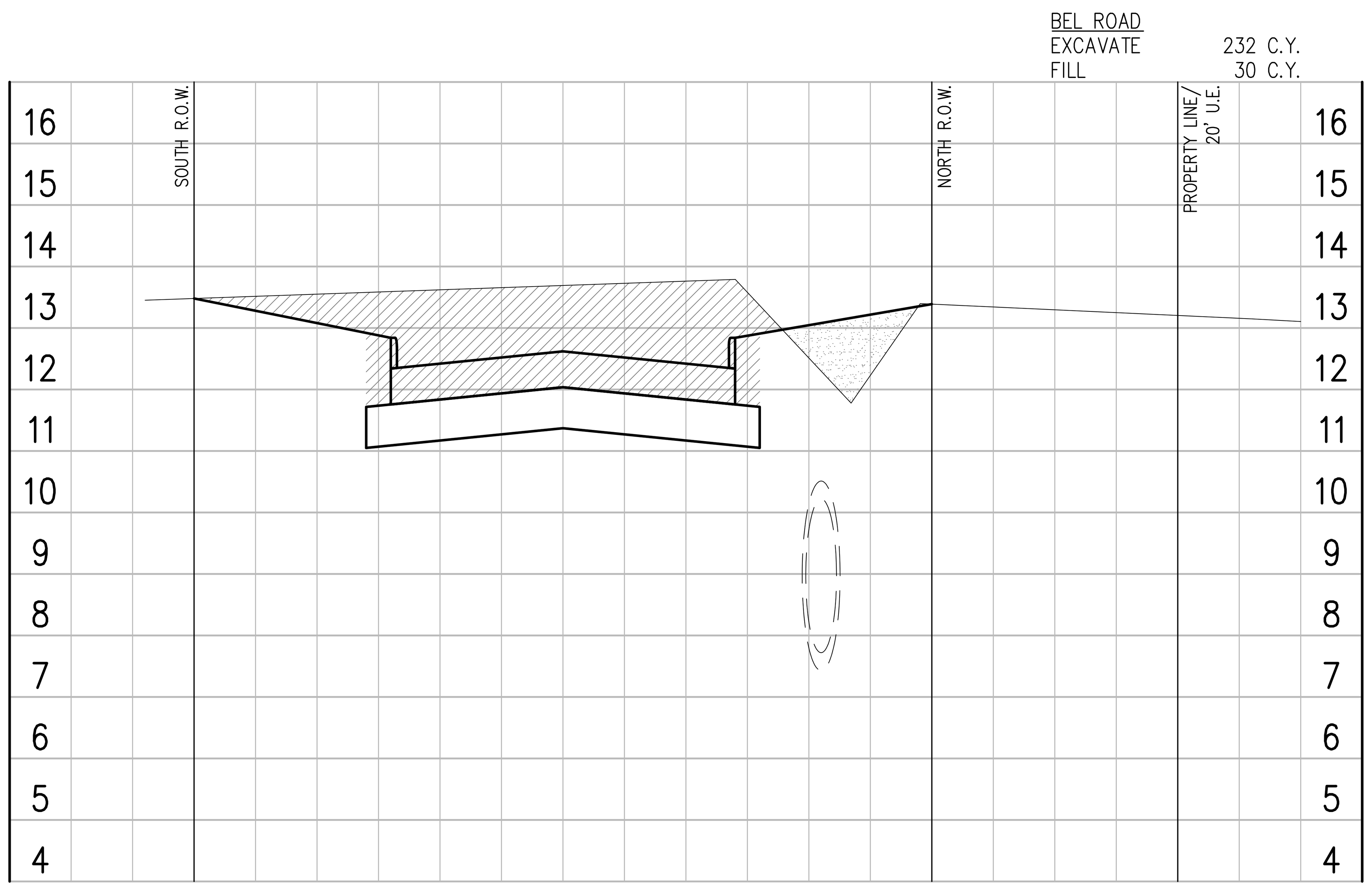
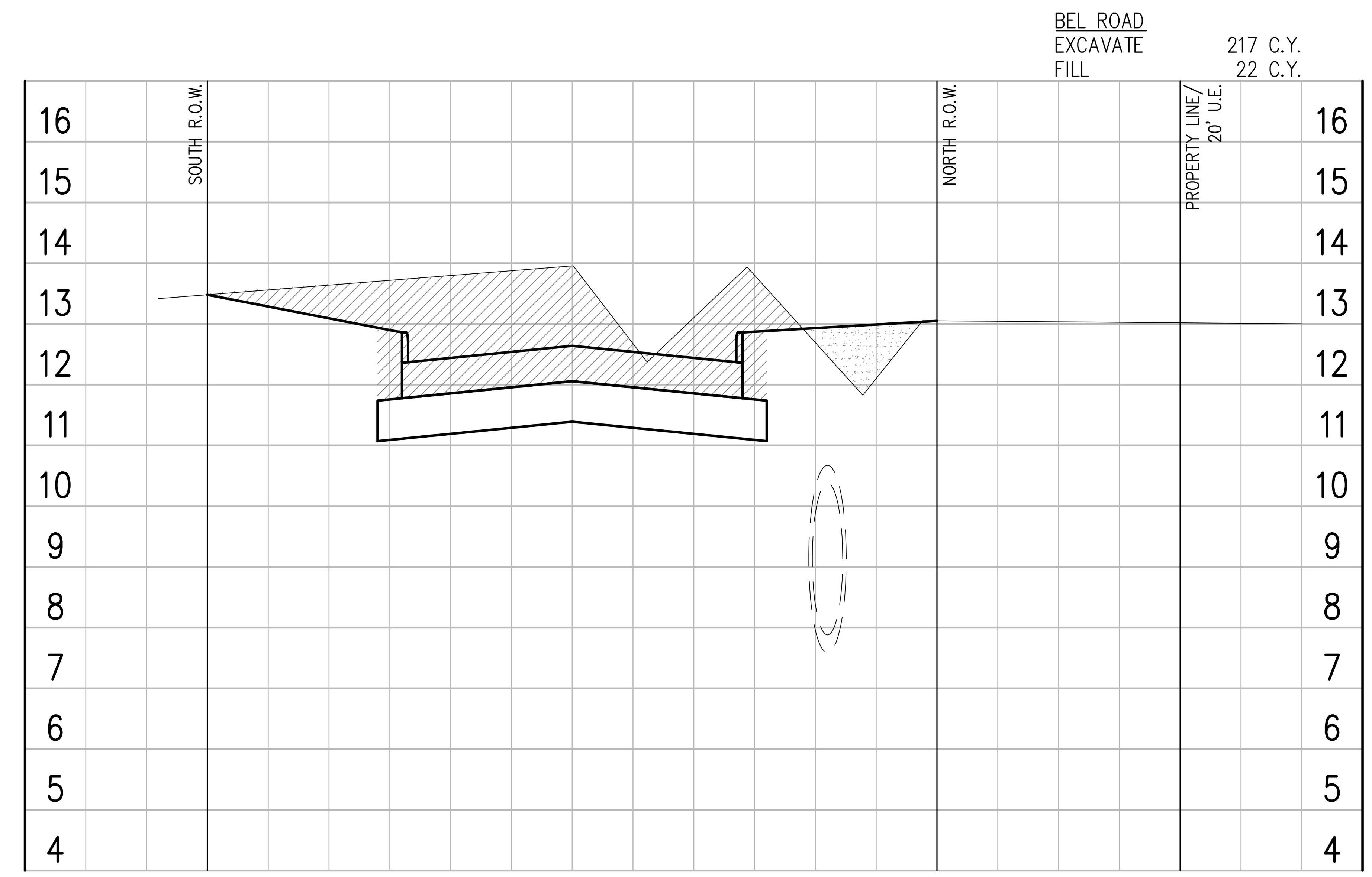
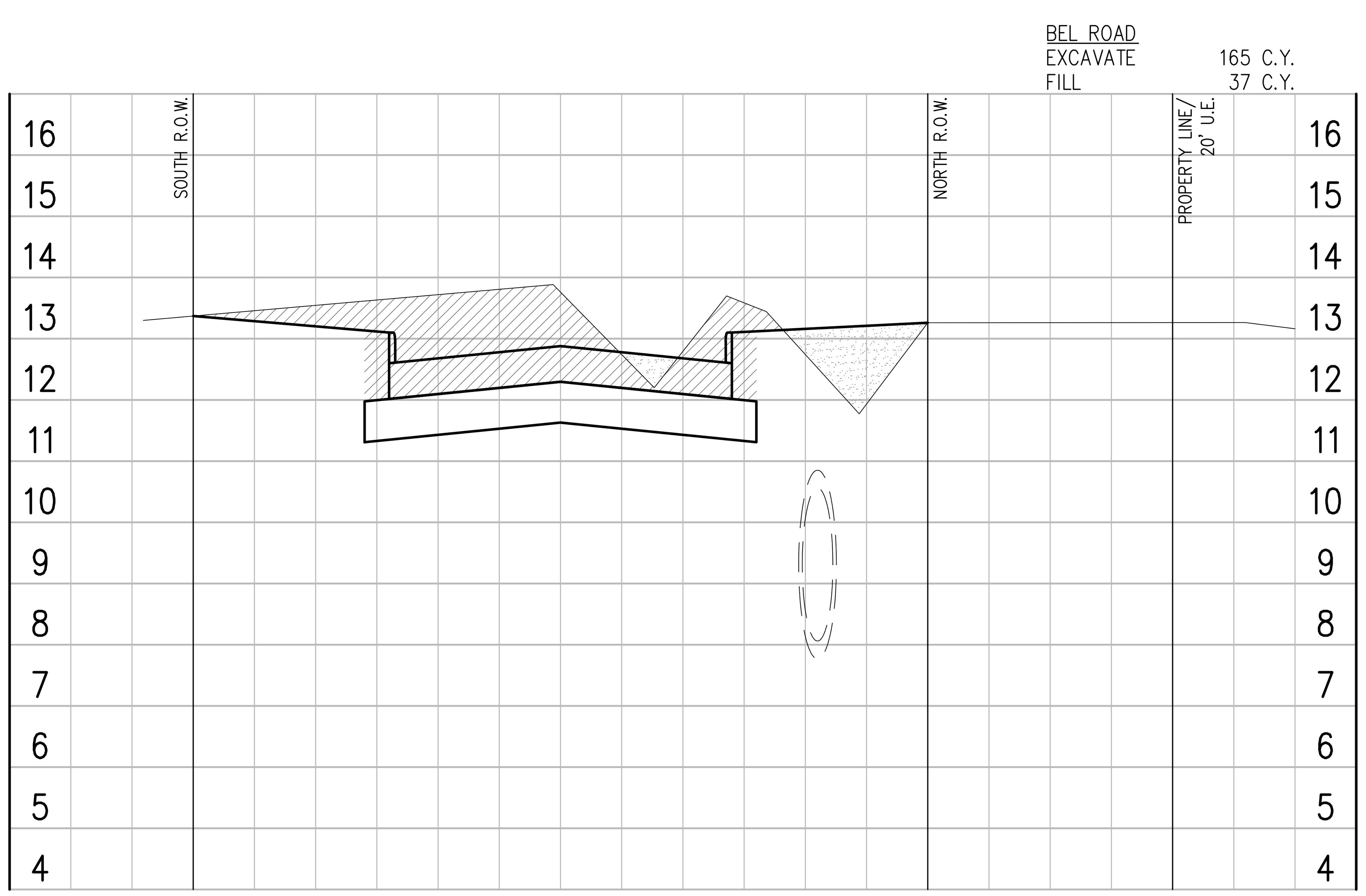


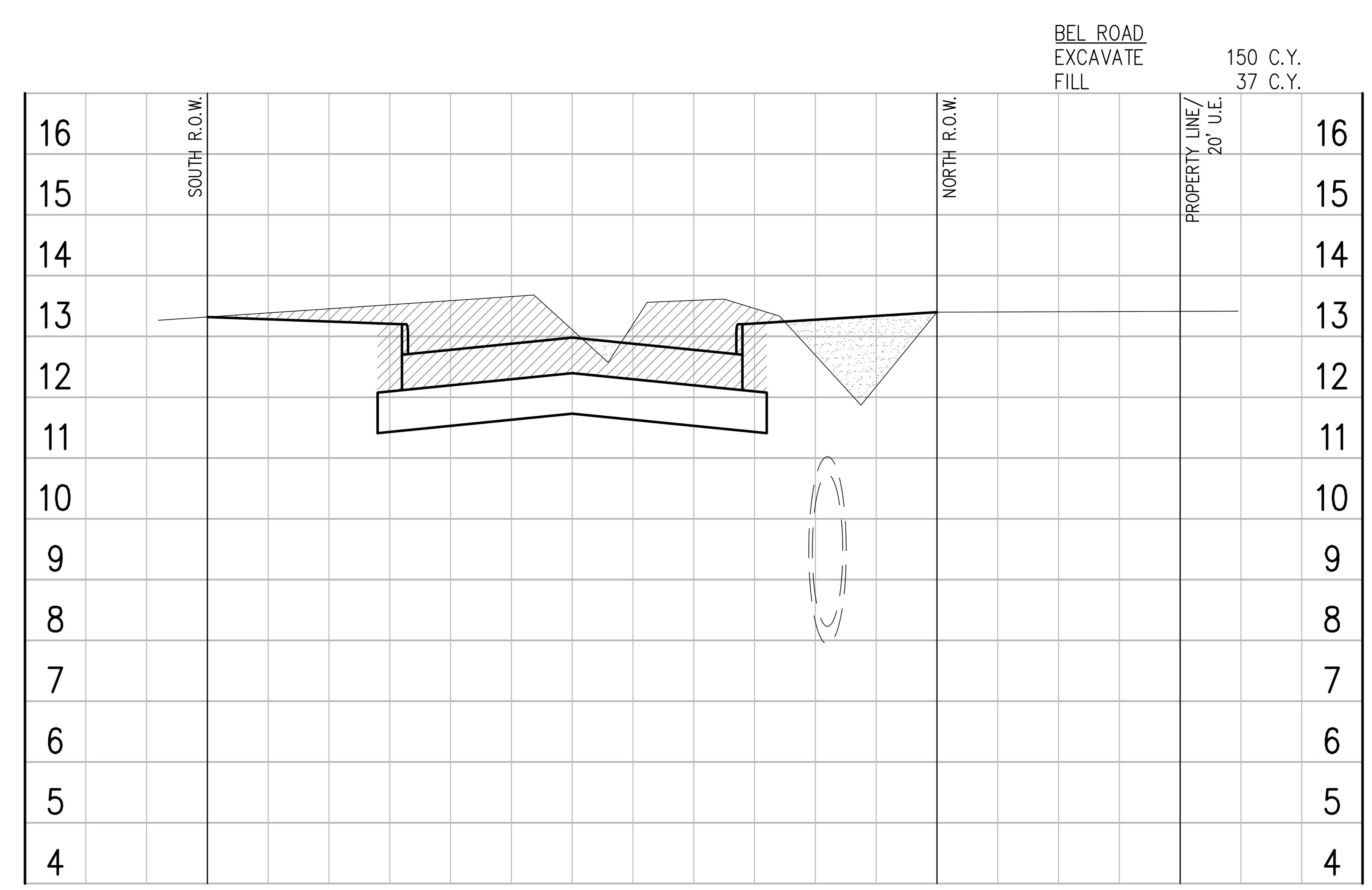
℄ "A" STA. 22+00.00



℄ "A" STA. 23+00.00



℄ "A" STA. 24+00.00

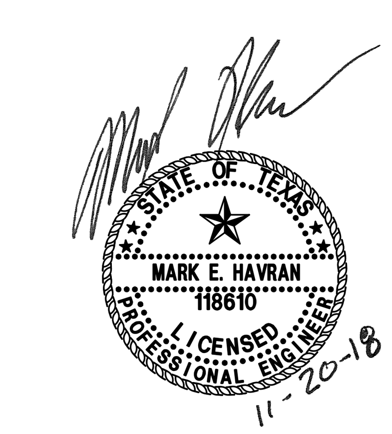


℄ "A" STA. 25+00.00

SHEET TOTAL:

ROADWAY

EXCAVATE		764 C.Y.
FILL		126 C.Y.



Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

BEL ROAD CROSS SECTIONS
SHEET 2 OF 4

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APPROVED:	SHEET No. 36 Of 39

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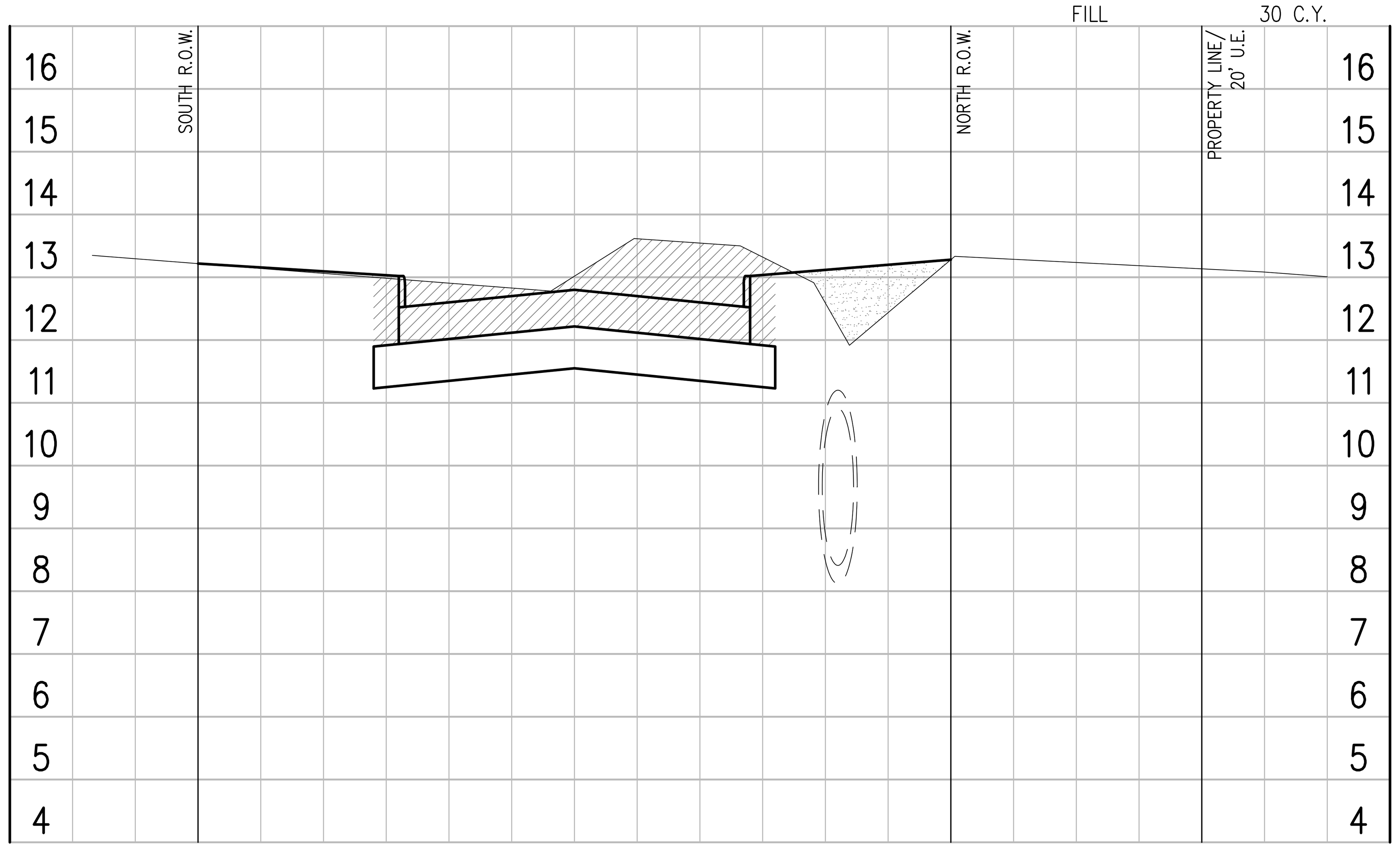
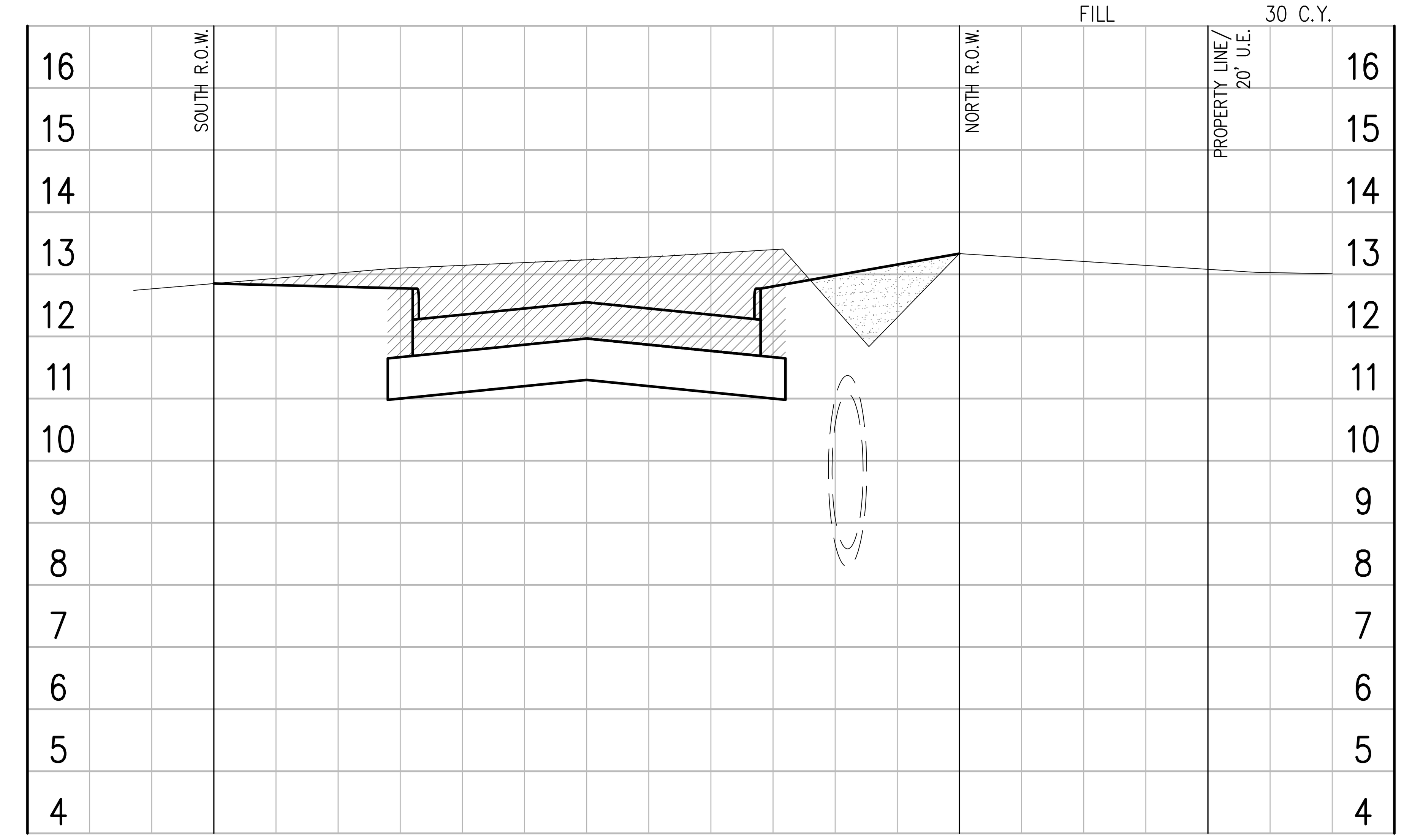
11/20/18

BEL ROAD
EXCAVATE 132 C.Y.
FILL 30 C.Y.



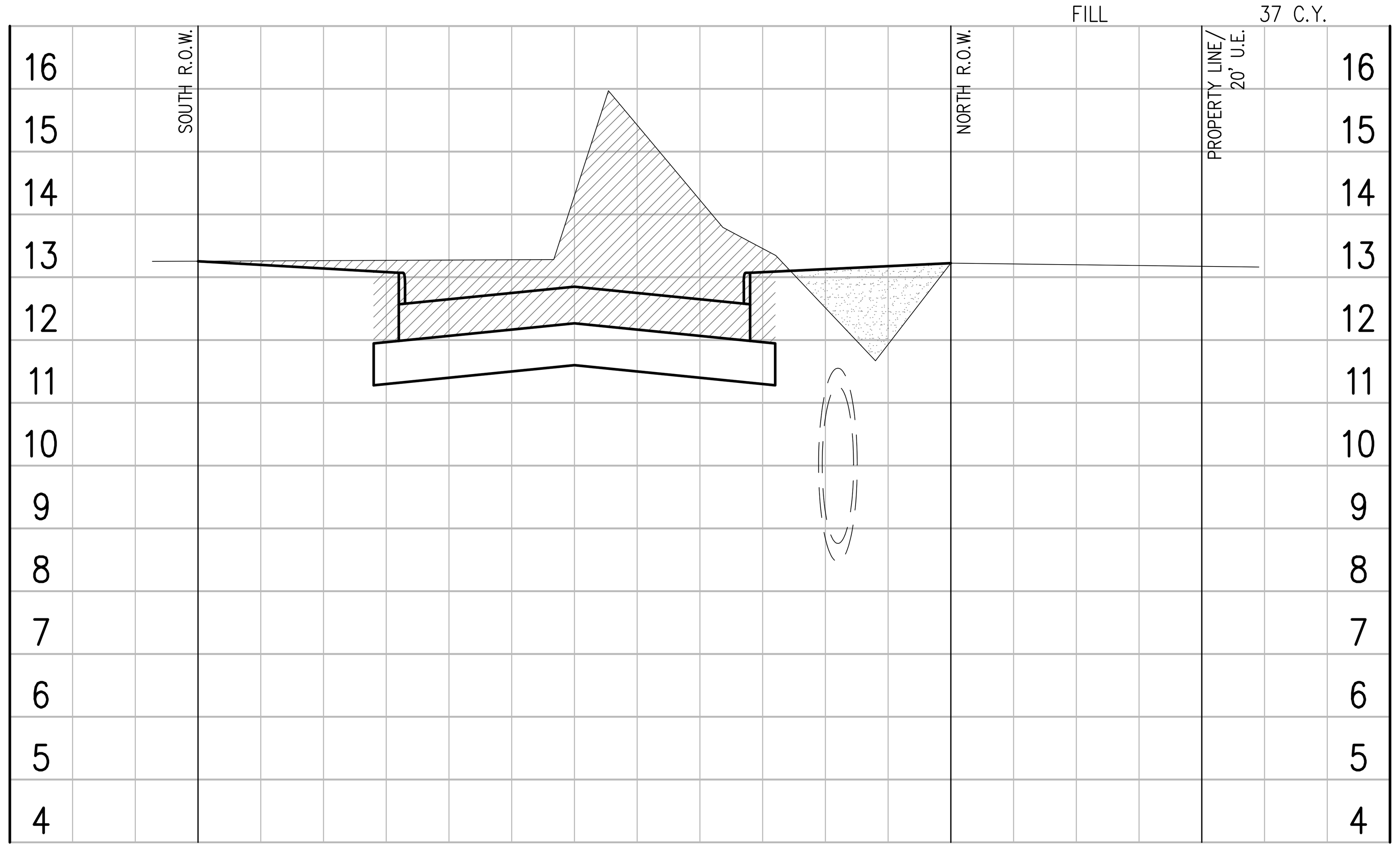
℄ "A" STA. 26+00.00

BEL ROAD
EXCAVATE 181 C.Y.
FILL 30 C.Y.



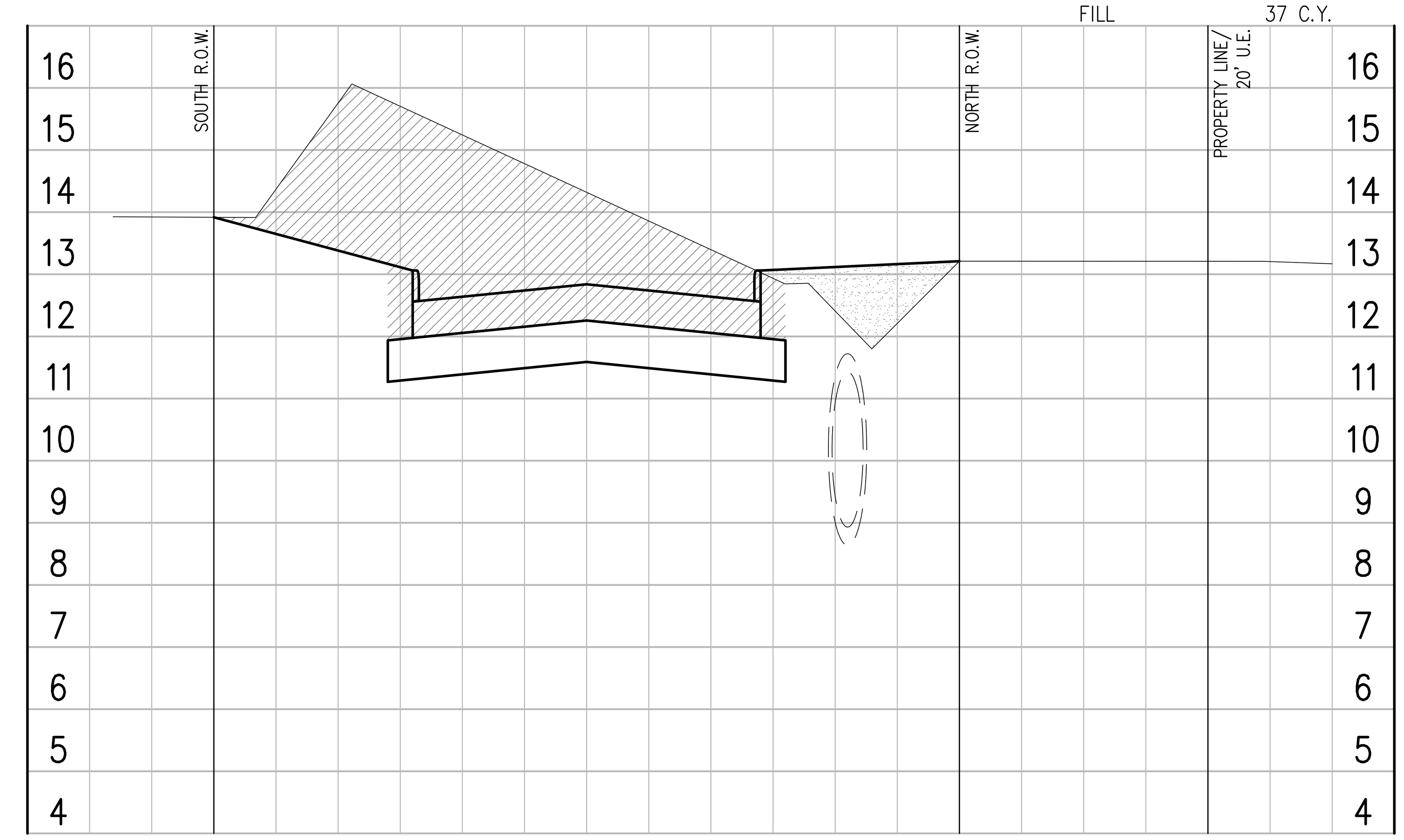
℄ "A" STA. 27+00.00

BEL ROAD
EXCAVATE 224 C.Y.
FILL 37 C.Y.



℄ "A" STA. 28+00.00

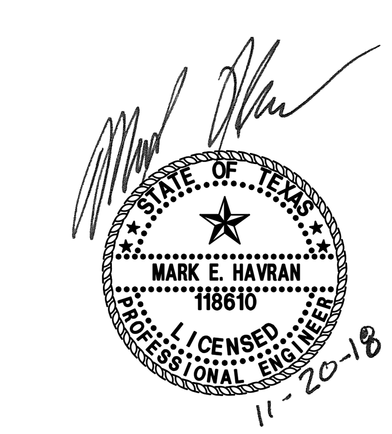
BEL ROAD
EXCAVATE 335 C.Y.
FILL 37 C.Y.



℄ "A" STA. 29+00.00

SHEET TOTAL:

ROADWAY
EXCAVATE 872 C.Y.
FILL 134 C.Y.



Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION
& LINEAR DETENTION DITCH

BEL ROAD
CROSS SECTIONS
SHEET 3 OF 4

LJA Engineering, Inc.
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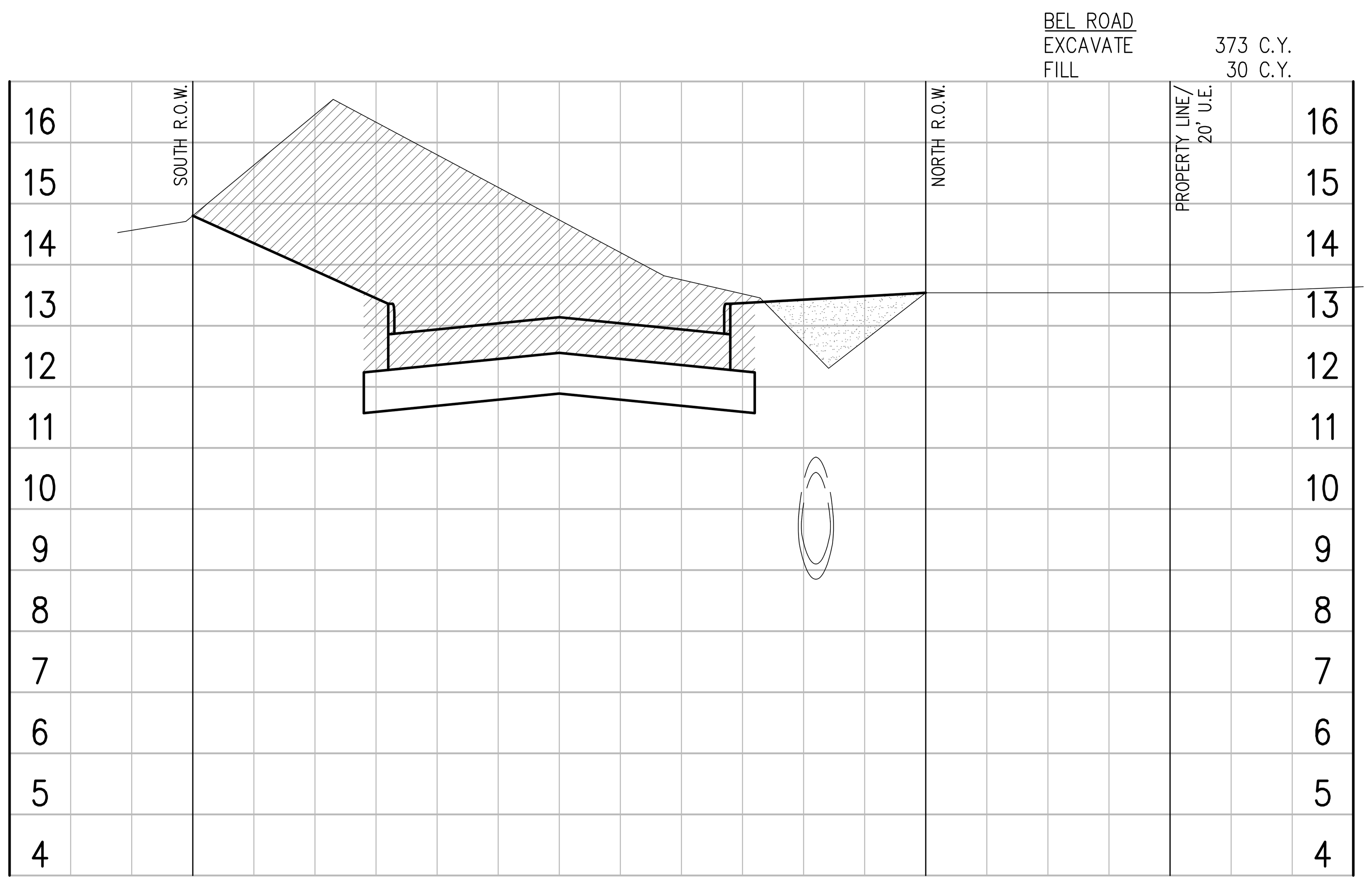
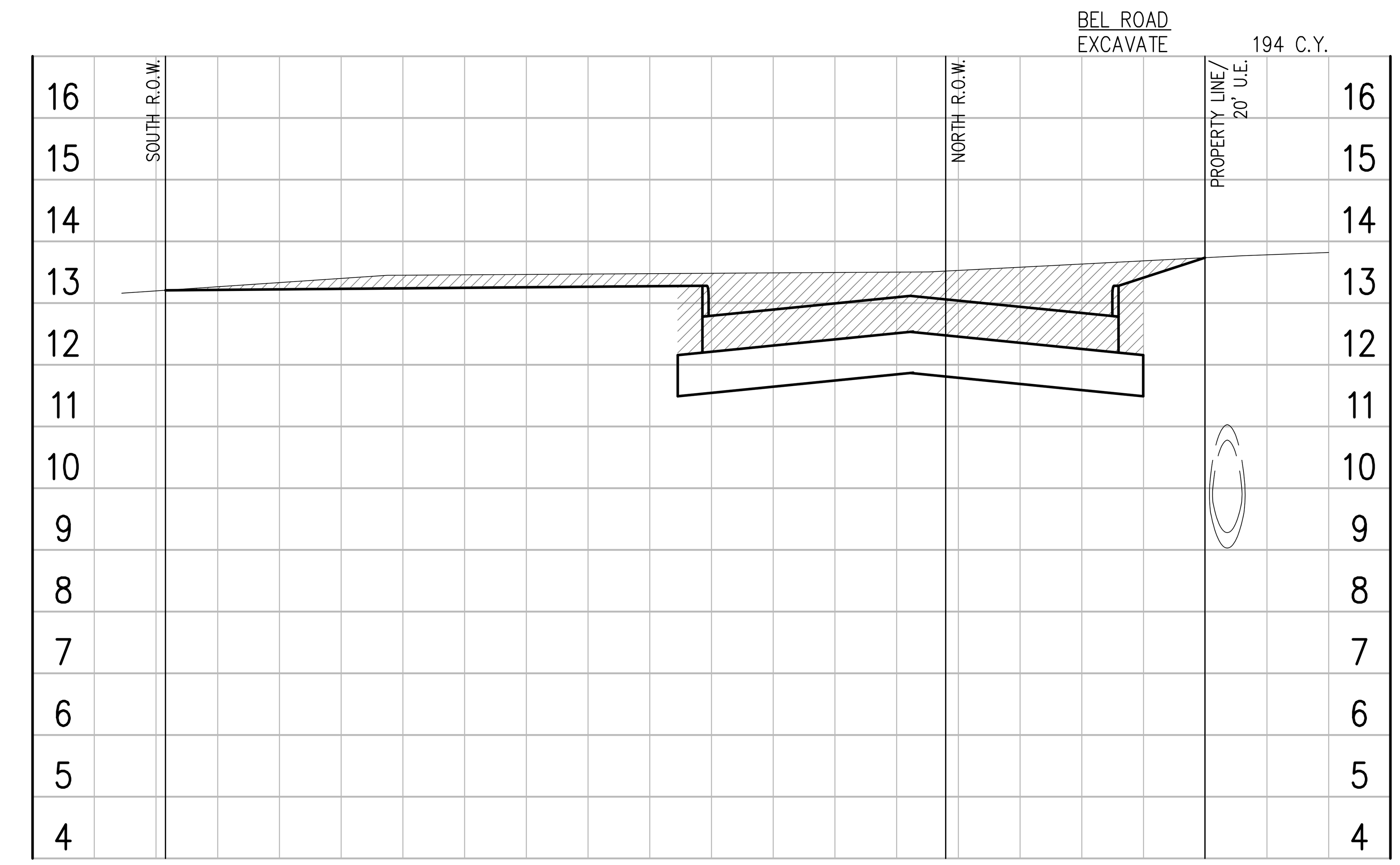
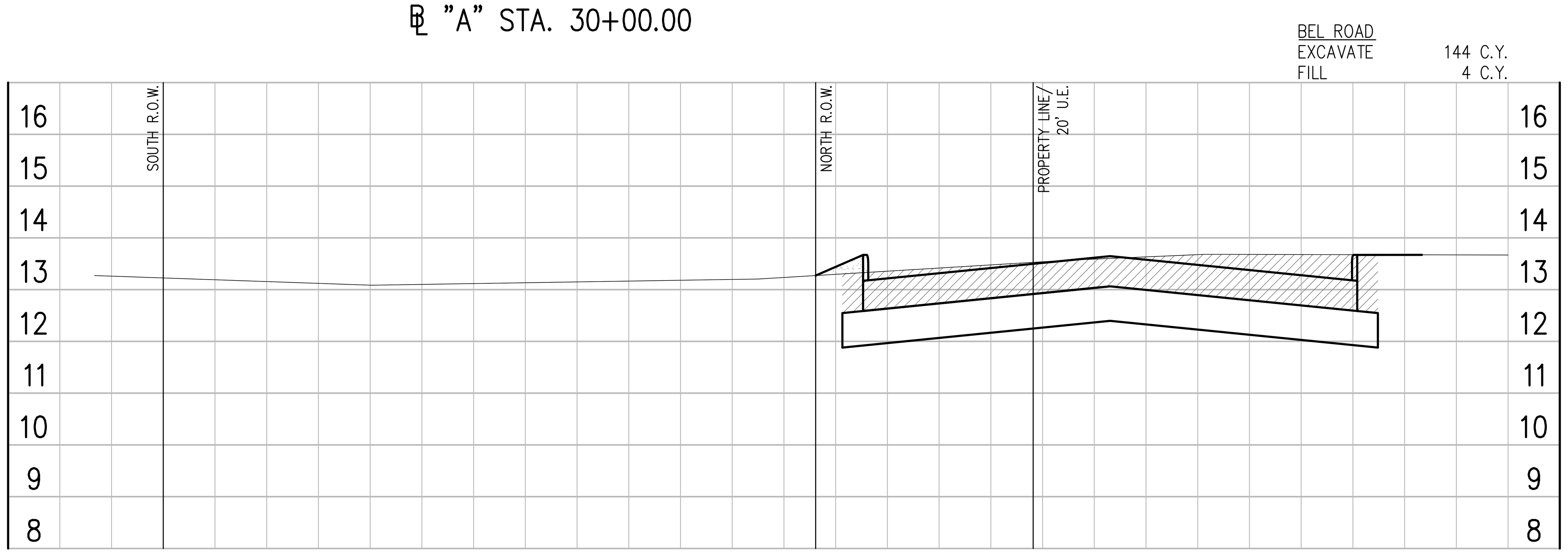
DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 37 Of 39



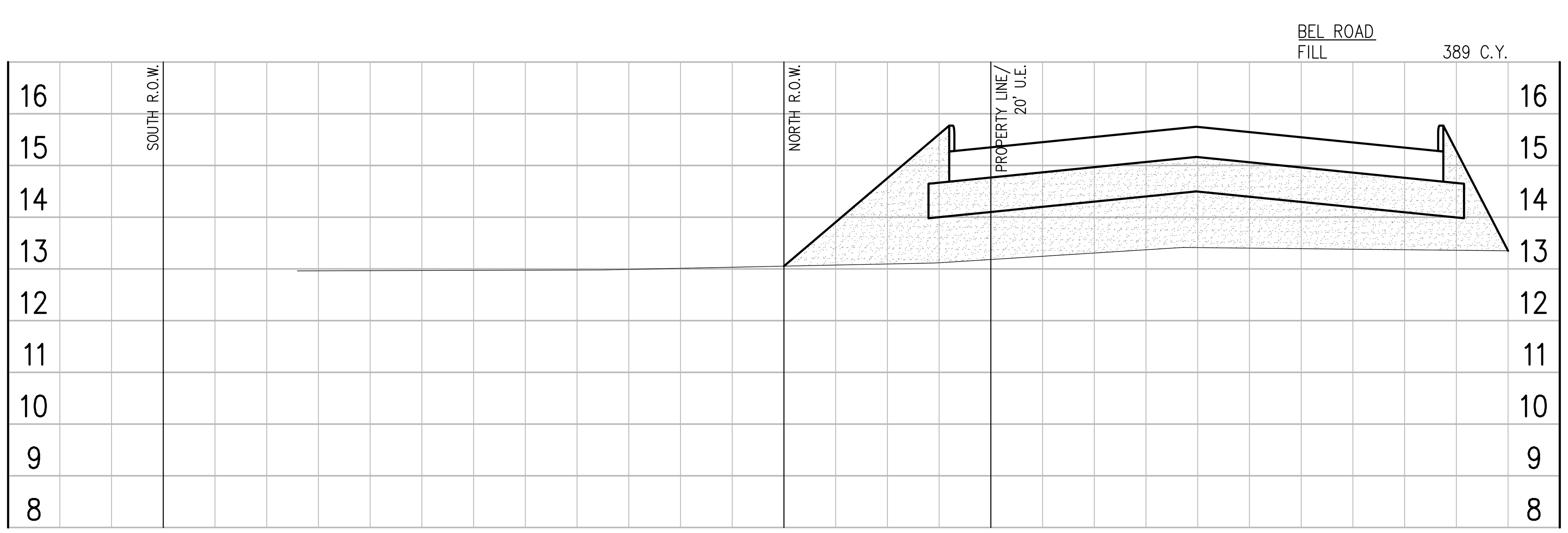
℄ "A" STA. 30+00.00



℄ "A" STA. 31+00.00



℄ "A" STA. 32+00.00

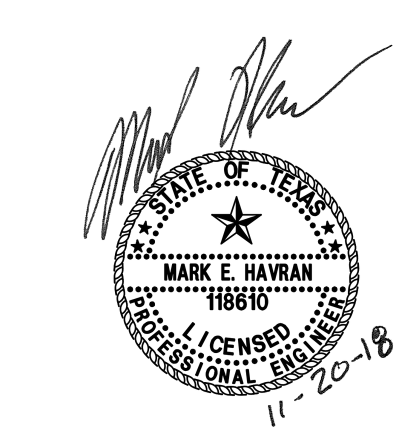


℄ "A" STA. 33+00.00

SHEET TOTAL:

ROADWAY

	EXCAVATE	711 C.Y.
	FILL	423 C.Y.



Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

BEL ROAD CROSS SECTIONS
SHEET 4 OF 4

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APPROVED:	SHEET No. 38 Of 39

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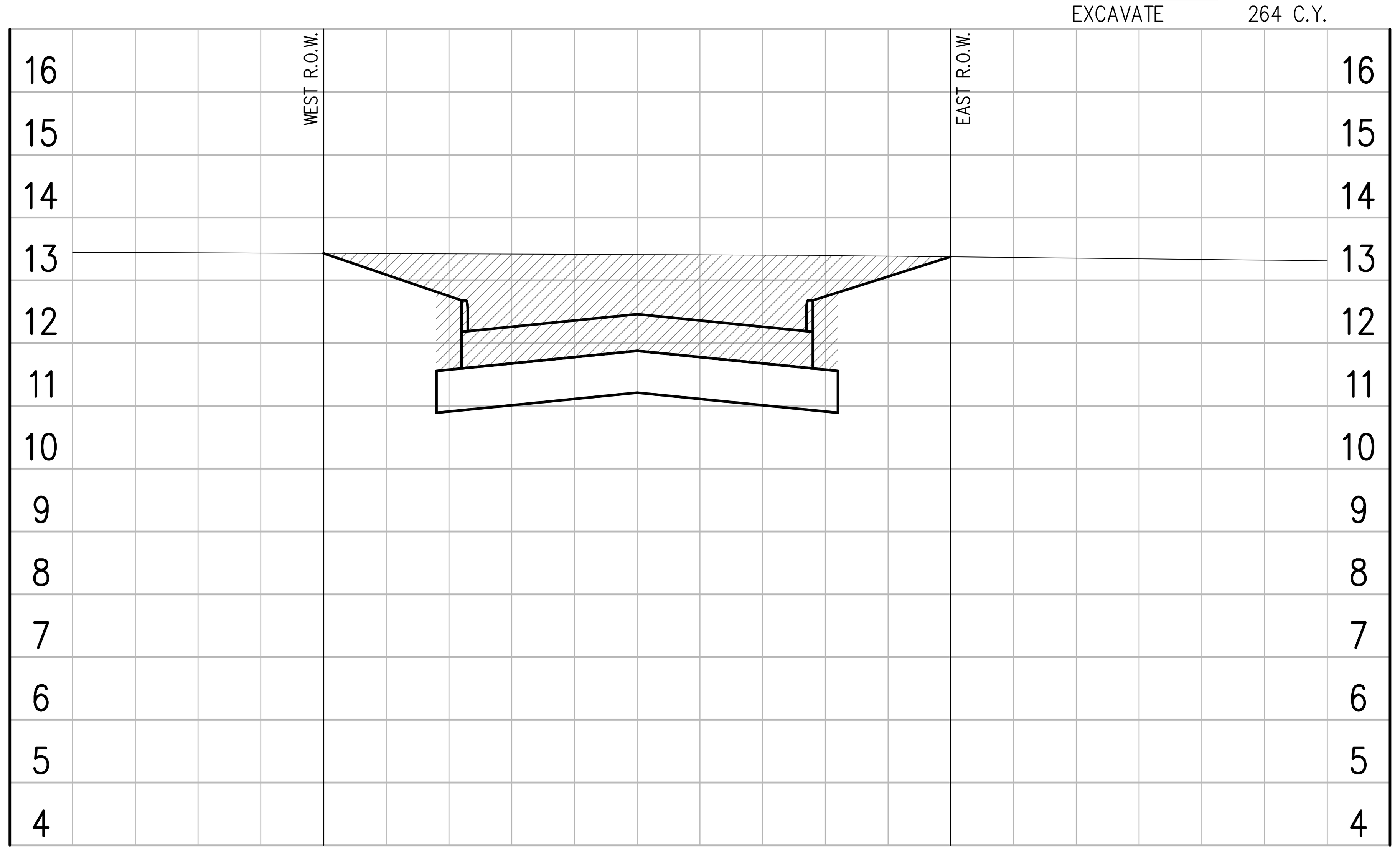
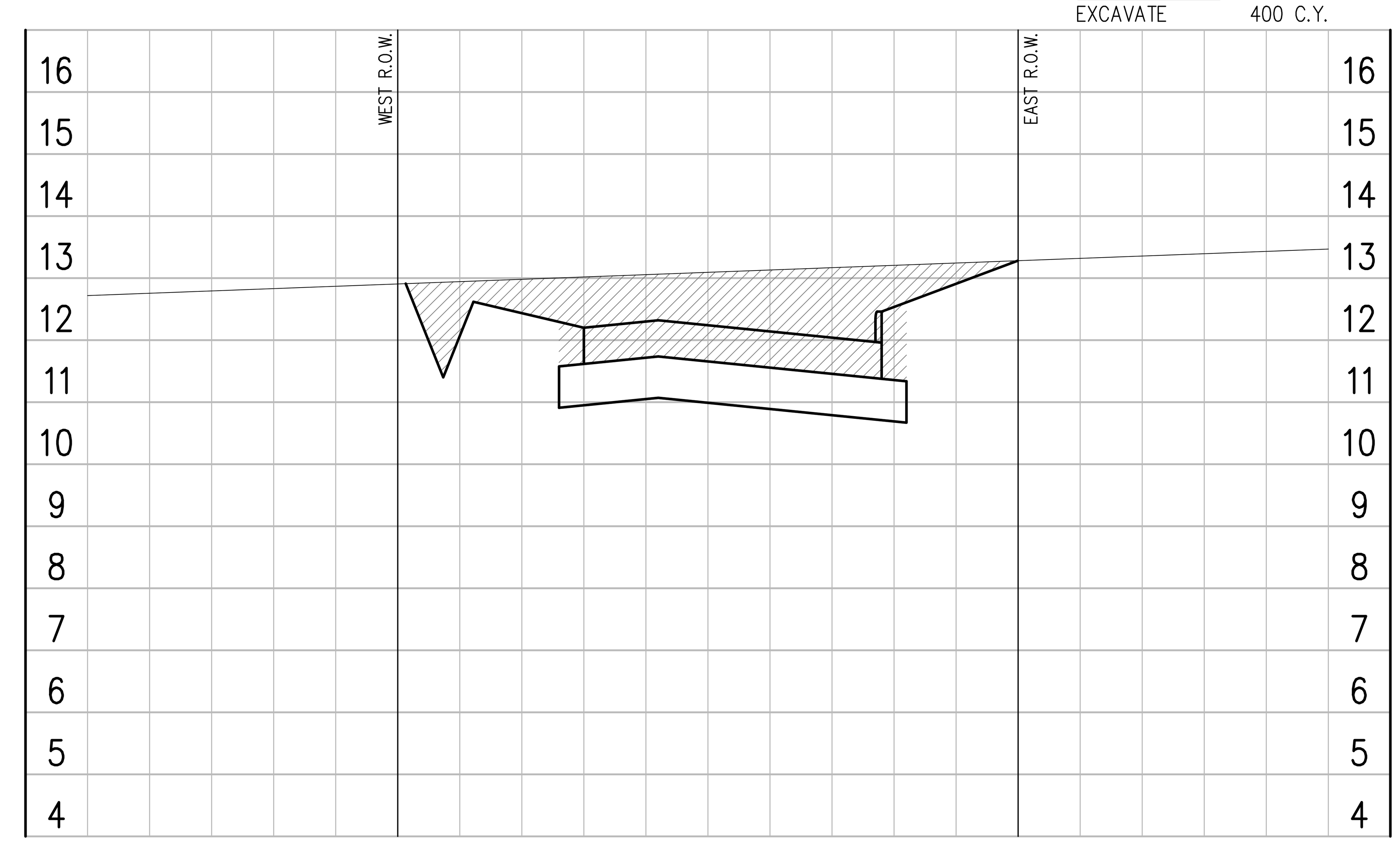
11/20/18

KEMAH AVENUE
EXCAVATE 264 C.Y.



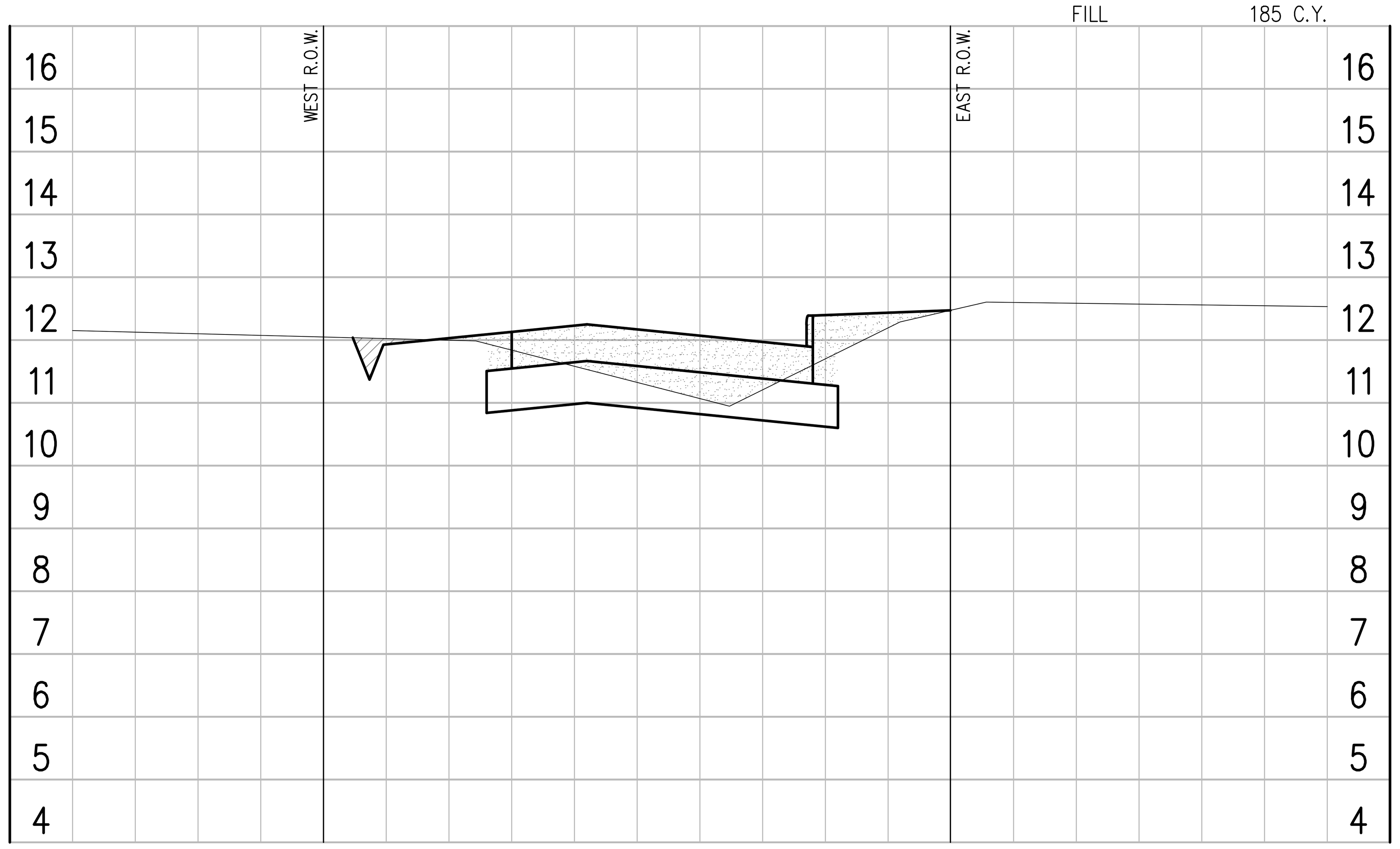
℄ "B" STA. 1+20.00

KEMAH AVENUE
EXCAVATE 400 C.Y.



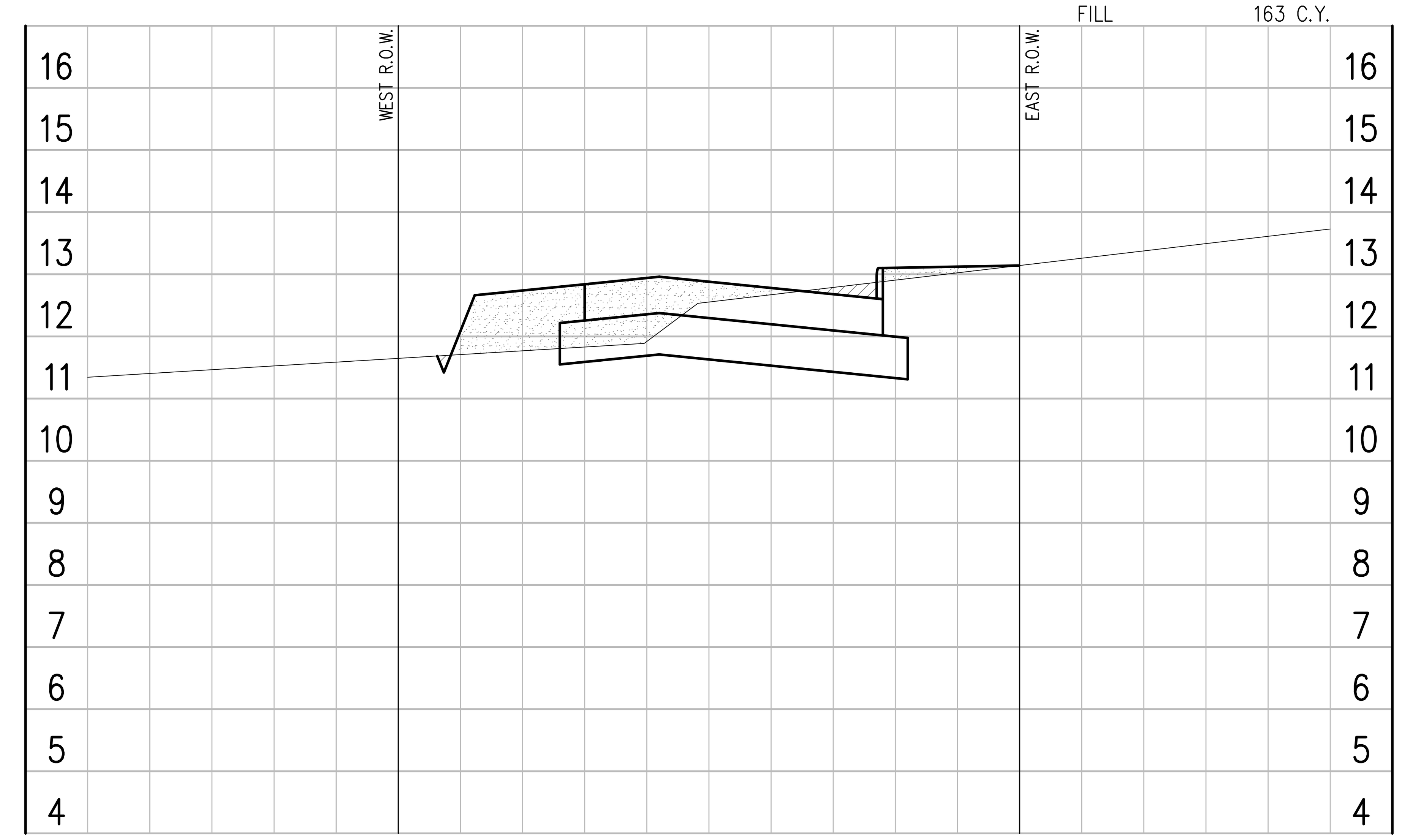
℄ "B" STA. 2+00.00

KEMAH AVENEUE
EXCAVATE 7 C.Y.
FILL 185 C.Y.



℄ "B" STA. 4+00.00

KEMAH AVENUE
EXCAVATE 7 C.Y.
FILL 163 C.Y.



℄ "B" STA. 6+00.00

SHEET TOTAL:

ROADWAY
EXCAVATE 678 C.Y.
FILL 348 C.Y.

STATE OF TEXAS
MARK E. HAVRAN
118610
LICENSED
PROFESSIONAL ENGINEER
11-20-18

Revision	By	Chk.	Appr.	Date

CITY OF KEMAH
BEL ROAD EXTENSION & LINEAR DETENTION DITCH

KEMAH AVENUE CROSS SECTIONS

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DESIGN: M.E.H.	JOB No. E135-0320 & E135-0340
DRAWN: P.R	DATE: NOVEMBER, 2018
CHECKED:	SCALE: N.T.S.
APPROVED:	SHEET No. 39 Of 39

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