

January 24, 2024 AVO 37449

Ms. Ramie Hammonds
Development Services Director/Building Official
City of Sanger
201 Bolivar Street
P.O. Box 1729
Sanger, Texas 76266

Re: Marley Meadows - Drainage Study in support of the Final Plat

3rd Review

Dear Ms. Hammonds,

Halff Associates, Inc. was requested by the City of Sanger to provide a review of the drainage study and downstream assessment in support of the Preliminary Plat for the Marley Meadows development. The drainage study was prepared by iCivil Engineering and is dated January 2023. Comments were provided February 7, 2023. A second submittal was provided May 16, 2023 and comments were provided May 30, 2023. A third submittal was received June 28, 2023. A fourth submittal was received September 14, 2023. Please refer to the Denton County Subdivision Rules and Regulations dated July 2009 for drainage criteria; hereafter referred to as Criteria Manual.

We have completed our review. <u>The drainage study is acceptable for preliminary platting</u>. Please address the comments below with the drainage study in support of the final plat/construction plans.

#### General:

- 1. <u>1st 5th Review Comment:</u> Plans and plat are reviewed separately. Please note an accepted drainage study is required prior to plat acceptance.
- 2. <u>1st 5th Review Comment:</u> Please address comments on attached markups and provide <u>annotated responses on markups</u>.
- 3. Please provide minimum finished floor elevations 2' above fully developed 100-yr water surface elevation for lots adjacent to proposed channels/roadside ditches on the plat.

1<sup>st</sup> Review Response: No Response.

2<sup>nd</sup> Review Comment: Address comments on preliminary plat.

2<sup>nd</sup> Review Response: Noted

<u>3rd Review Comment:</u> It appears the Ultimate 100yr WSEL's used to determine the min FFE do not match the Ultimate Conditions RAS model at some locations.

- a. Please reconcile WSEL's on Grading Sheets with the RAS model.
- b. Please provide the reference cross section on the Grading Sheet.
- c. Please show all RAS cross sections on the Hydraulic Workmap/s.

4th & 5th Review Comment: Please update all relevant information based of any changes due to comments.

4. <a href="1st-3rd Review Comment:">1st - 3rd Review Comment:</a> Please note, additional comments may result once models and additional info is provided.

4th & 5th Review Comment: Please note, additional comments may result once final drainage study/construction plans/ final plats are provided.

#### **Hydrology and Hydraulics:**

Please apply the existing conditions C values to the proposed conditions runoff calculations for the offsite areas; for a pre- and post- development analysis, the offsite runoff stays constant. Please Ms. Ramie Hammonds January 24, 2024 Page 2 of 4

update the outfall discharge summaries according to the changes in the calculated existing and proposed runoff. Verify any flow increases.

1st Review Response: Offsite modeled using UH method

2<sup>nd</sup> Review Comment: Addressed.

6. It appears proposed flow is increased at the south outfall (DP "C"), please extend the hydrologic and hydraulic analysis through the zone of influence per the 10% rule and demonstrate no adverse impacts to downstream properties (no significant increases in water surface elevation and velocities). A proposed development of 19.65 acres will require an overall analysis of 196.5 acres.

1st Review Response: With UH method, no increase in peak discharge at the d/s.

<u>2<sup>nd</sup> Review Comment:</u> Please include onsite drainage area maps showing the flowpaths in greater detail. Please include the time of concentration parameters, calculations, and assumptions. Reconcile with HMS model.

2<sup>nd</sup> Review Response: HMS Reconciled, Calculation added

3<sup>rd</sup> Review Comment: Noted.

7. Please provide a pre- and post- HEC-RAS analysis for receiving creek thru the zone of influence and demonstrate no significant increase in water surface elevation and velocity in existing channels. Also, verify no increases to the backwater at upstream culvert. Include RAS model with next submittal.

1st Review Response: With SCS UH method, no increase in peak discharge at the d/s. RAS model included

2<sup>nd</sup> Review Comment: Noted. Verify after addressing HMS comments.

2<sup>nd</sup> Review Response: Updated.

3rd Review Comment: Noted

8. Please provide an Ultimate Conditions Drainage Area Map. Provide calculated runoff for a fully developed condition and design the channel going through the site to contain the fully developed 100-year flow with 1-ft. freeboard. Provide an ultimate conditions RAS model as well.

1st Review Response: HEC-RAS model included for existing, proposed and ultimate condition

<u>2<sup>nd</sup> Review Comment:</u> It appears that only existing and proposed RAS models were included in the submittal. Please include Ultimate Conditions Flows with Proposed Geometry.

2<sup>nd</sup> Review Response: ULTIMATE CONDITION ADDED TO MODELS.

<u>3rd Review Comment:</u> Addressed. Address comments on the RAS workmaps and provide annotated responses.

4th Review Comment: Addressed

9. Please provide channel cross sections with hydraulic parameters for proposed channels. Please note, a HEC-RAS model is required to confirm water surface profiles in channels, roadside diches and culverts. Please provide RAS model and verify proposed channels contain the fully developed 100-yr flow with 1' freeboard. Use n=.04 for earthen channel. Include a RAS workmap or add RAS cross sections to the grading plans.

1st Review Response: HEC RAS model included for channels, roadside ditch and culverts 2nd Review Comment: Noted.

10. Channels must be designed to standards. Please refer to criteria manual Section IV-B and section IV3.4 (trapezoidal, 4:1 SS, 1' freeboard from 100-yr fully developed water surface elevation to top of bank, etc). Provide drainage easements with adequate access; include 10' beyond top of bank on both sides.

1st Review Response: Revised the slopes to 4:1

2<sup>nd</sup> Review Comment: Please address comments on channel profile sheets and hydraulic workmap.

2<sup>nd</sup> Review Response: Addressed.

3rd Review Comment: Please address comments on hydraulic workmap and grading plan.

4th Review Comment: Please address comment on Sheet 12-8

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5th Review Comment: Addressed

11. Provide RAS model for all proposed roadside ditches (Criteria Manual Section IV.3.4) including Sam Bass Road. Include proposed culverts and driveway culverts and verify the 100-yr fully developed flow is contained within the right of way. If not contained within ROW, additional DE must be dedicated to contain the fully developed 100-yr water surface elevation.

1st Review Response: HEC RAS model included for channels, roadside ditch and culverts 2<sup>nd</sup> Review Comment: Noted.

12. Please ensure side yard swales contain the 100yr WSEL and do not drain to the adjacent lots. Provide a typical section with hydraulic parameters. Ensure the typical section is feasible in each of the lots according to the grading plan.

1st Review Response: side ditch sized to contain 100 yr discharge

2<sup>nd</sup> Review Comment: Address side yard swales comment on grading sheets (sheet 8)

2<sup>nd</sup> Review Response:

3rd Review Comment: Addressed.

13. Verify the roadside ditch on Sam Bass Road does not drain to the proposed Street A roadside ditch.

1st Review Response: Samross culvert does not drain to the proposed street, flow is only 1.23 cfs 2<sup>nd</sup> Review Comment: Noted.

14. Show and label proposed culvert crossing on street plan and profile. Include 100-yr HGL. Please use a min of 18". Design culvert to pass the fully developed 100-yr flood event with 1' freeboard. Use RAS to evaluate backwater and tailwater at proposed culvert.

1st Review Response: culvert crossing is included in plan set 2<sup>nd</sup> Review Comment: Noted.

15. Provide Plan and profile for all proposed channels. Show and label the fully developed 100-yr water surface profile and left and right top of bank; verify 1' freeboard. Include culverts and verify 1' freeboard to top of road.

1st Review Response: Channel profile with 100 yr wse is included in plan set

2<sup>nd</sup> Review Comment: Please use the Ultimate 100yr flow to design the channels.

2<sup>nd</sup> Review Response: Ultimate Condition Utilized.

3rd Review Comment: (a) It appears the flow change at cross section 5551 does not match the HMS model. Please verify, reconcile and revise. (b) Address comments on sheet 9 and 13 and provide annotated responses.

4th Review Comment: a) Addressed b) Please address comments on Sheets 7, 9, 12-8, and 13B 5th Review Comment: Addressed

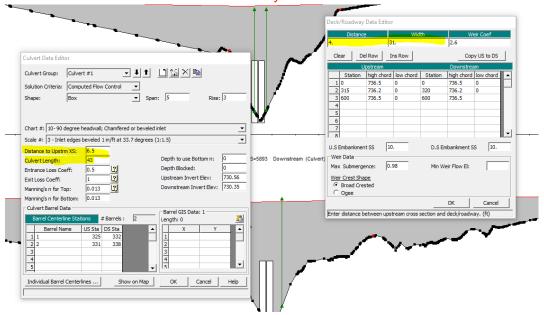
16. The proposed infrastructure (ie inlets, SD, swales, driveway culverts, channels, etc.) included in the drainage study to support the preliminary plat will be reviewed again once the construction plans are available. Update calculations as necessary to correspond to plans.

1st Review Response: All proposed infrastructure calculation are included in plan set 2<sup>nd</sup> Review Comment: Addressed.

- 17. 4th Review Comment: Please review and revise HEC-RAS models for the following comments DCSRR IV.3.4:
  - a. Channel bank stations should be adjusted for all cross sections and all channels. OK
  - b. All cross sections must contain the computed water surface elevations.
    - i. 5th Review Comment XS 2000 & 2200. Recommend cutting off HEC-RAS model approximately 1,000 ft downstream of project area.

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- c. For Channel-A, why does the n-value decrease (0.04 to 0.035) when transitioning from engineered ditch to the natural, existing channel? Please revie and revise as necessary for all HEC-RAS models. OK.
- d. Ineffective flow areas should not be located within the conveyance area of the proposed culverts (Channel-A structure cross section 5893). OK
- e. Flow profiles should not cross (Channel-A 6473 6601) OK
- f. Cross sections should not curve (Channel-A 5866 and 5922). Please revise. OK
- g. Please review and revise all structure data in the HEC-RAS models. Distance and width should be the same in both the Deck/Roadway editor and culvert editor. OK



h. 5th Review Comment- N-values should be defined for the left overbank, channel, and right overbank at a minimum. One (1) n-value should not be used for the entire length of the cross section.

The Engineer shall revise the hydrologic study and/or plans in accordance with the above comments and/or provide a written response that addresses each comment. If you have any questions or need additional information, please do not hesitate to call me at (214) 937-3953.

Sincerely, HALFF

TBPELS Firm No. 312

Parker C. Moore, P.E., CFM Project Manager

all C. An

#### Attachment:

Plan Markups

# CIVIL PLANS **FOR** MARLEY MEADOWS SAM BASS ROAD SANGER, TEXAS

# **LEGEND**

# RETAINING WALL EXIST. CONTOUR -10 — PROPOSED CONTOUR EXISTING FENCE EXIST. WATER MAIN EXIST. SEWER MAIN EXIST. STORM MAIN - FLOW DIRECTION

PROP 6" RIP-RAP

PROP PAVEMENT

# **PROJECT OWNER:**

REDEEMED ASSETS LLC 2701 WIND RIVER LN, DENTON, TX, 76210-2965

PROPERTY ADDRESS: 8949 SAM BASS ROAD SANGER, TX 76266

TOPOGRAPHIC SURVEY BY: TRINITY LAND SURVEYING LLC 1222 GREENBRIAR ST. DENTON, TX 76201 FIRM NO.: 10194687 TEL. NO. (940) 293-3180

# **ABBREVIATION**

TOP OF CURB TOP OF PAVEMENT FINISH SURFACE FINISH GRADE CURB FACE FLOWLINE HIGH POINT LOW POINT TOP OF GRATE GRADE BREAK PROPERTY LINE RIGHT OF WAY TOP OF RETAINING WALL TOP OF FOOTING RETAINED HEIGHT SIDEWALK OVERHEAD ELECTRICITY WATER METER POWER POLE TOP OF CLEANOUT SHLD SHOULDER UTILITY EASEMENT TOP OF DITCH REINFORCED CONCRETE BLOCK

TOP OF BANK

DRAINAGE EASEMENT

B.W.S. BOLIVAR WATER SUPPLY

# PREPARED BY:

**ICIVIL ENGINEERING** 1001 W EULESS BLVD, STE 412H EULESS,TX 76040 TEL.(972) 523-5493 TBPE:F-19293

HARBERSON ROAD PROJECT SITE VICINITY MAP

> BENCHMARK: TBM#1 "X" SET ON A 15'RCP HEADWALL 8'± NORTH OF THE EASTERLEY SOUTH PROPERTY LINE AND 18'± WEST OF THE CENTERLINE OF SAM BASS ROAD. ELEV: 735.46'

TBM#2 5/8" IRON ROD SET ON THE SOUTH SIDE OF A GRAVEL ROAD, 37'± SOUTH OF THE NORTH PROPERTY LINE AND 654'± EAST OF THE WEST PROPERTY LINE. ELEV: 741.70'

**SHEET INDEX** 

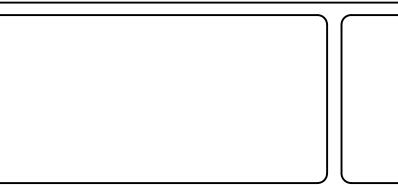
SHEET NO	DESCRIPTION
C.1	COVER SHEET
C.2	GENERAL NOTES
C.3	SURVEY AND PLAT
C.4	DEMOLITION PLAN
C.5	STREET PLAN
C.6	STREET PLAN
C.7	GRADING PLAN
C.8	GRADING PLAN
C.9	GRADING PLAN
C.10-A	PRE PROJECT TOC CALCULATION
C.10-B	PRE DEVELOPMENT DRAINAGE AREA MAP
C.11-A	POST AND ULTIMATE TOC CALCULATION
C.11-B	POST AND ULTIMATE DRAINAGE AREA MAP
C.12-A	DITCH AND CULVERT CALCULATIONS
C.12-B	DITCH AND CULVERT CALCULATIONS
C.13-A	HYDRAULIC WORK MAP
C.13-B	HYDRAULIC WORK MAP
C.13-C	HYDRAULIC WORK MAP
C.13-D	HYDRAULIC WORK MAP
C.14	CHANNEL PROFILE
C.15	CHANNEL PROFILE
C.16	CHANNEL PROFILE
C.17	CULVERT PLAN AND PROFILE
C.18	WATER MAIN PLAN
C.19	WATER MAIN PLAN
C.20	EROSION CONTROL PLAN
C.21	STANDARD DETAILS
C.22	STANDARD DETAILS
C.23	STANDARD DETAILS

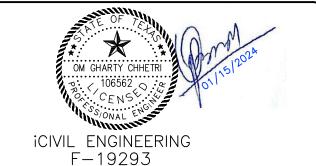
EMAIL:INFO@ICIVILENG.COM



**iCIVIL ENGINEERING** 1001 W EULESS BLVD, STE 412H **EULESS, TX 76040** PH: (972) 523-5493 TBPE: F-19293 EMAIL: INFO@ICIVILENG.COM

revision	by	date	JAN 2024
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SANGER, TEXAS **COVER SHEET MARLEY MEADOWS**  PROJECT NO sheet

## GENERAL NOTES

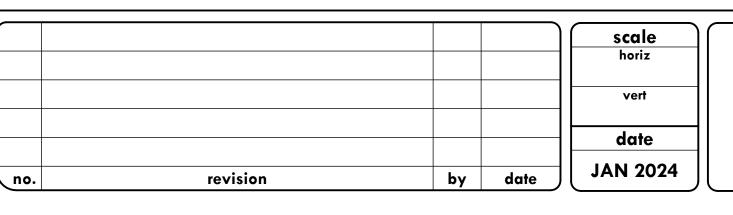
- 1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CURRENT CITY OF SANGER STANDARDS, DENTON COUNTY & TXDOT SPECIFICATIONS. A COPY OF THE CONTRACT DOCUMENTS AND PLANS SHALL BE AVAILABLE ON—SITE AT ALL TIMES BY THE CONTRACTOR.
- 2. ALL COMMUNICATION BETWEEN THE CITY AND THE CONTRACTOR SHALL BE THROUGH THE ENGINEERING CONSTRUCTION INSPECTOR AND ENGINEER OF RECORD ONLY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE APPROPRIATE DEPARTMENT FOR INSPECTIONS OF WORK NOT FALLING UNDER THE PUBLIC WORKS CONSTRUCTION PERMIT.
- THE LOCATION AND DEPTH OF ALL UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE AND THERE MAY BE OTHER UNKNOWN EXISTING UTILITIES NOT SHOWN ON THE PLANS. ALL EXISTING UTILITIES SHALL BE FIELD VERIFIED AND PROTECTED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. (ALSO SEE GENERAL NOTE NO. 4.4) THE CONTRACTOR SHALL CONTACT THE RESPECTIVE UTILITY COMPANIES 72 HOURS PRIOR TO DOING ANY WORK IN THE AREA: 4. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PERFORM THE FOLLOWING:
- 4.1. PREVENT ANY PROPERTY DAMAGE TO PROPERTY OWNER'S POLES, FENCES, SHRUBS, MAILBOXES, ETC
- 4.2. LOCATE, VERIFY WORKING CONDITION AND PROTECT ALL EXISTING SPRINKLER SYSTEMS LINES AND HEADS (IF ANY) WITHIN AREAS DISTURBED BY CONSTRUCTION ACTIVITIES. REMOVE, ADJUST AND REINSTALL IN GOOD CONDITION EQUAL TO OR BETTER THAN EXISTING CONDITION; REPLACE, IF IN DIRECT CONFLICT, WITH THE SAME OR BETTER QUALITY MATERIAL AND APPURTENANCES, ALL AT THE CONTRACTOR'S OWN EXPENSE.
- 4.3. PROVIDE ACCESS TO ALL DRIVES DURING CONSTRUCTION.
- 4.4. PROTECT ALL UNDERGROUND AND OVERHEAD UTILITIES AND REPAIR ANY DAMAGES. (ALSO SEE GENERAL NOTE NO. 3.)
- 4.5. NOTIFY ALL UTILITY COMPANIES AND VERIFY LOCATION OF ALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
- 4.6. PROVIDE CONSTRUCTION STAKING OF PUBLIC IMPROVEMENTS CONSTRUCTED WITHIN ANY RIGHT-OF-WAY. STAKING SHALL BE PERFORMED BY A SURVEYOR LICENSED IN THE STATE OF TEXAS.
- 4.7. COOPERATE WITH THE UTILITY COMPANIES WHERE UTILITIES ARE REQUIRED OR SPECIFIED TO BE RELOCATED.
- 4.8. WORK IN CLOSE PROXIMITY TO AND PROTECT EXISTING UTILITY MAINS, TRAFFIC LIGHTS AND POLES.
- 4.9. ANY ITEM NOT SPECIFICALLY CALLED OUT TO BE REMOVED SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER OF RECORD PRIOR TO REMOVING THAT ITEM OR IT SHALL BE REPLACED AT THE CONTRACTOR'S OWN EXPENSE.
- 4.10. ANY TREE, SHRUB, OR GRASSED AREAS DAMAGED BY THE CONTRACTOR'S WORK SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE TO EXISTING OR BETTER CONDITION. 5. IN THE PREPARATION OF THE PLANS AND SPECIFICATIONS, THE ENGINEER OF RECORD HAS ENDEAVORED TO INDICATE THE LOCATION OF EXISTING UNDERGROUND UTILITIES. IT IS NOT GUARANTEED THAT ALL LINES OR STRUCTURES HAVE BEEN SHOWN ON THE PLANS. THE CONTRACTOR SHALL REQUEST FOR LINE LOCATES AS DIRECTED IN ITEM #3. THE ENGINEER OF RECORD SHALL BE NOTIFIED ABOUT ANY CONFLICTS TO PROVIDE WRITTEN DIRECTION AND REVISED PLANS AS REQUIRED.
- 6. VERIFICATION OF THE CONDITION OF EXISTING COUNTY UTILITIES PRIOR TO CONNECTIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL REQUEST FOR LINE LOCATES AS DIRECTED IN ITEM #3.
- 7. THE LOCATION FOR THE DISPOSAL OF CONSTRUCTION MATERIAL AND SPOILS SHALL BE ACCEPTED BY THE COUNTY PRIOR TO THE START OF CONSTRUCTION AS REFLECTED WITHIN THE STORMWATER POLLUTION PREVENTION PLAN. 8. ALL PHASES OF CONSTRUCTION MUST BE COORDINATED WITH THE ENGINEER OF RECORD. ALSO, THE CONTRACTOR IS REQUIRED TO COORDINATE WITH THE ADJACENT PROPERTY OWNERS AND THE COUNTY IN ORDER TO MINIMIZE CONFLICTS IN
- TRAFFIC FLOW OR OTHER OPERATIONS. 9. IT SHALL BE UNLAWFUL FOR ANY PERSON TO LAY, CONSTRUCT, BUILD, GRADE, GRAVEL, PAVE, SURFACE, OR DO ANY WORK IN OR UPON ANY PUBLIC STREET, ALLEY, EASEMENT, THOROUGHFARE, PUBLIC PLACE, OR
- CONNECT TO PUBLIC WATER AND WASTEWATER MAINS WITHIN THE COUNTY, WITHOUT FIRST HAVING OBTAINED A PERMIT TO DO SUCH WORK FROM THE DIRECTOR OF PUBLIC WORKS, AND WITHOUT HAVING PAID A PERMIT FEE TO THE COUNTY. THE PERMITTEE SHALL NOTIFY THE COUNTY OF THE CONSTRUCTION STARTUP DATE AND AN EXPECTED COMPLETION DATE. 10. FIELD ADJUSTMENTS MAY BE NECESSARY AND SHALL BE CARRIED OUT AS DIRECTED IN WRITTEN FORM, AND REVISED PLANS AS NEEDED, BY THE ENGINEER OF RECORD. THE ADJUSTMENTS SHALL BE COORDINATED WITH THE CONTRACTOR AND
- THE ENGINEERING CONSTRUCTION INSPECTOR. 11. THE CONTRACTOR SHALL VERIFY, LOCATE, AND PROTECT EXISTING WATER, WASTEWATER, FIBER OPTIC CABLE/PATHWAYS (COUNTY AND FRANCHISE UTILITY), TRAFFIC SIGNALS AND APPURTENANCES, STORM DRAINAGE, NATURAL GAS, PETROLEUM
- PIPELINES, ELECTRIC AND TELEPHONE MAINS AND SERVICES AND RESTORE SERVICE IN CASE OF ANY DAMAGE. 12. THE PERMITTED CONTRACTOR MAKING CONNECTIONS/EXTENSIONS TO EXISTING PUBLIC UTILITIES SHALL BE SOLELY RESPONSIBLE FOR BACKFILL OF THE UTILITY TRENCH, AND ANY PAVING REPAIRS REQUIRED FOR COMPLETION OF THE
- CONNECTION/EXTENSION. ALL PAVING REPAIRS SHALL COMPLY WITH THE CURRENT COUNTY STANDARD DETAILS. THIRD PARTY WORK, NOT COVERED BY THE PERMITTEES PERMIT AND MAINTENANCE BOND, SHALL NOT BE ACCEPTED.
- 13. SHEETING, SHORING, AND BRACING: THE CONTRACTOR WILL ABIDE BY ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS GOVERNING EXCAVATION. TRENCH'S SIDE SLOPES SHALL MEET OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS THAT ARE IN EFFECT AT THE TIME OF CONSTRUCTION. SHEETING SHORING AND BRACING SHALL BE REQUIRED IF SIDE SLOPE STANDARDS ARE NOT MET. A PULL BOX, MEETING OSHA STANDARDS, WILL BE ACCEPTABLE. THE CONTRACTOR SHALL SUBMIT SITE SPECIFIC, DETAILED PLANS AND SPECIFICATIONS FOR TRENCH SAFETY SYSTEMS THAT MEET OSHA STANDARDS HAT ARE IN EFFECT AT THE TIME OF DEVELOPMENT OF PROJECT WHEN TRENCH EXCAVATION WILL EXCEED A DEPTH OF FIVE (5) FEET. THESE PLANS WILL BE SEALED BY AN ENGINEER REGISTERED BY THE STATE OF TEXAS AND SUBMITTED TO THE COUNTY PRIOR TO OBTAINING RELEASE OF THE PUBLIC WORKS CONSTRUCTION PERMIT.
- 14. THE ROAD OR STREETS SHALL CONSIST OF AT LEAST 2" OF HOT-MIX ASPHALTIC CONCRETE OVERLAY.THE FLEXIBLE BASE SHALL BE MIN OF 22' WIDE AND BE TO A DEPTH OF 4" COMPACTED TO 95% OF STANDARD PROCTOR DENSITY.THE FLEXIBLE BASE SHALL BE EITHER:

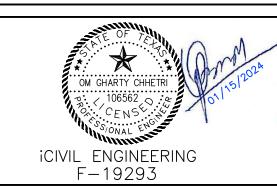
A.COVERED WITH A PRIMER AT AN APPLICATION RATE OF 3 GALLON PER SQUARE YARD

- 15. THE CONTRACTOR SHALL SUBMIT MIX DESIGNS FOR REVIEW AND ACCEPTANCE BY THE COUNTY PRIOR TO ANY PLACEMENT FOR ANY PUBLICLY DEDICATED INFRASTRUCTURE.
- 16. ALL EXISTING GRADES SHOWN ON THE PLANS ARE APPROXIMATE AND ARE BASED ON THE BEST INFORMATION AVAILABLE. GRADES SHALL BE VERIFIED AND ANY DISCREPANCY BROUGHT TO THE ATTENTION OF THE ENGINEER OF RECORD FOR EVALUATION AND ADJUSTMENTS AS NEEDED.
- 17. ALL BACKFILL FOR DITCH LINES ARE TO BE MECHANICALLY TAMPED TO 95% STD PROCTOR DENSITY (ASTM D698), AT A MOISTURE CONTENT NEAR OPTIMUM (-2% TO +2%, OR AS SPECIFIED BY THE ENGINEER OF RECORD). COSTS OF TESTING SERVICES FOR PRIVATE DEVELOPMENT, ON INFRASTRUCTURE THAT IS TO BE DEDICATED TO THE COUNTY, SHALL BE PAID BY THE DEVELOPER/CONTRACTOR. TESTING SHALL COMPLY WITH THE COUNTY STANDARDS AND THE CURRENT STANDARD DETAILS. ALL TEST REPORTS FOR PUBLIC INFRASTRUCTURE SHALL BE PROVIDED TO THE COUNTY IN A TIMELY MANNER. COSTS FOR RE-TESTING AFTER NOTED FAILURES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- 18. CONTRACTOR TO FILL ALL VOIDS UNDER EXISTING PAVEMENT WHEN INSTALLING NEW LINE. ALSO ALL DITCH LINES MUST BE FILLED AT THE END OF EACH DAY'S WORK. CONTRACTOR SHALL OBTAIN APPROVAL FROM THE PROPER COUNTY DEPARTMENTS FOR ANY TRENCHES THAT ARE TO LEFT OPEN OVERNIGHT AND SHALL PROPERLY MARK AND PROTECT THE TRENCH.
- 19. ALL PIPES SHALL BE KEPT FREE OF TRASH AND DIRT AT ALL TIME. AT THE END OF EACH DAY, THE PIPE SHALL BE TEMPORARILY SEALED/CONNECTED. ALL PIPE INSTALLATION SHALL BE PERFORMED AS RECOMMENDED PER THE PIPE MANUFACTURER.
- 20. THE CONTRACTOR SHALL KEEP THE EXISTING FIRE HYDRANT(S), IF ANY IN SERVICE AT ALL TIMES, TO THE EXTENT POSSIBLE. THE CONTRACTOR SHALL BAG OR MARK FIRE HYDRANTS PROPERTY AND NOTIFY THE FIRE DEPARTMENT UPON REMOVING ANY HYDRANT FROM SERVICE. CONSTRUCTION THAT CAUSES THE INTERRUPTION OF WATER SUPPLY FOR FIRE SUPPRESSION MAY REQUIRE A FIRE WATCH TO BE PERFORMED BY THE FIRE DEPARTMENT. COSTS FOR FIRE WATCH SERVICES ARE AT THE CONTRACTOR'S EXPENSE.
- 21. THE CONTRACTOR SHALL MAINTAIN THE EXISTING WATER MAINS IN SERVICE DURING ALL PHASES OF CONSTRUCTION. LEAKS CAUSED BY THE CONTRACTOR SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE. LEAKS ALONG THE EXISTING WATER MAIN CLOSE TO THE WORKING AREA, CAUSED BY VIBRATION, ETC. (DURING WORKING HOURS) SHALL BE REPAIRED BY THE CONTRACTOR WITH THE COUNTY ONLY PROVIDING THE REQUIRED PARTS. THE COUNTY WILL REPAIR ALL LEAKS IF THE CONTRACTOR IS NOT ON THE JOB-SITE (PRIMARILY AFTER WORKING HOURS): IF THE LEAK IS DIRECTLY CAUSED BY THE CONTRACTOR AND NOT REPAIRED. ALL CHARGES INCURRED SHALL BE BILLED TO THE CONTRACTOR.
- 22. ALL CUTTING AND PLUGGING OF THE EXISTING WATER MAIN, WHERE SPECIFIED ON THE PLANS, SHALL INCLUDE ALL LABOR, FITTINGS AND APPURTENANCES REQUIRED TO PERFORM THIS WORK.
- 23. THE CONTRACTOR SHALL CONTACT THE ASSIGNED INSPECTOR FOR THE OPERATION OF ALL WATER VALVES & SCHEDULING OF SERVICES BY WATER/WASTEWATER. 24. THE CONTRACTOR SHALL MAINTAIN THE EXISTING WATER MAINS AND SERVICES IN OPERATION WHEN INSTALLING NEW WATER MAINS. THIS SHALL INCLUDE ANY TEMPORARY CONNECTIONS, IF REQUIRED.
- 25. THE CONTRACTOR MUST NOTIFY EACH PROPERTY OWNER A MINIMUM OF 24 HOURS PRIOR TO SHUTTING OFF WATER FOR CONNECTION TO NEW MAIN. THE CONTRACTOR SHALL NOTIFY THE ENGINEERING CONSTRUCTION INSPECTOR A MINIMUM OF
- 72 HOURS IN ADVANCE FOR ALL WATER OR WASTEWATER LOCATES OR SHUT OFFS OF WATER. THE LENGTH OF TIME FOR WATER SHUTDOWNS SHALL BE LIMITED TO AS NEEDED TO PERFORM THE REQUIRED WORK. 26. THE CONTRACTOR SHALL MAINTAIN THE EXISTING WASTEWATER MAINS AND SERVICES IN OPERATION WHEN INSTALLING NEW WASTEWATER MAINS. THIS SHALL INCLUDE ANY TEMPORARY CONNECTIONS, IF REQUIRED.
- 27. THE MAXIMUM DEFLECTION OF PIPE JOINTS SHALL NOT EXCEED THAT RECOMMENDED BY THE PIPE MANUFACTURE. IF IT IS NECESSARY TO DEFLECT THE PIPE (GREATER THAT THE RECOMMENDED AMOUNT) THE CONTRACTOR SHALL PROVIDE
- FITTINGS AS NEEDED. 28. PRIOR TO THE START OF CONSTRUCTION, COUNTY WATER/WASTEWATER REPRESENTATIVE AND THE CONTRACTOR SHALL MAKE A DRY RUN TO THE SYSTEM TO INSURE, TO THE EXTENT POSSIBLE, THAT THE UTILITY CAN BE FOUND AND SECURED. ANY ISSUES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER OF RECORD TO PROVIDE WRITTEN DIRECTION AND PROVIDE REVISED PLANS AS NEEDED.
- 29. TRAFFIC CONTROL PLANS SHALL BE SUBMITTED TO THE COUNTY. THE TRAFFIC CONTROL PLAN AND BARRICADES SHALL MAINTAIN TRAFFIC FLOW AND SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE TMUTCD AND PREPARED BY A WORK ZONE CERTIFIED TECHNICIAN. TRAFFIC CONTROL PLANS SHALL BE SUBMITTED A MINIMUM OF TWO WEEKS IN ADVANCE OF WORK COMMENCING. TEMPORARY STREET CLOSURE REQUESTS SHALL
- BE SUBMITTED IN WRITING. 30. ALL PAVEMENT MARKINGS, INCLUDING RAISED PAVEMENT MARKERS, LANE STRIPING, TRANSVERSE MARKINGS, SIGNS AND OTHER TRAFFIC CONTROL DEVICES, DISTURBED DURING CONSTRUCTION SHALL BE MAINTAINED, REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE.
- 31. SEED/SOD SHALL BE FURNISHED TO ESTABLISH GROUND COVER OVER ALL DISTURBED AREAS AS AN EROSION CONTROL MEASURE. THE CONTRACTOR SHALL NOT WAIT UNTIL THE COMPLETION OF THE ENTIRE PROJECT BEFORE DOING THIS WORK.
- 32. ALL SANITARY SEWER AND WATER MAIN CONSTRUCTION WITHIN PUBLIC RIGHT-OF-WAY OR EASEMENT SHALL CONFORM TO THE REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) GUIDELINES FOR CONSTRUCTION OF PUBLIC WATER AND SEWER SYSTEMS. CONTRACTOR SHALL MAINTAIN A COPY OF THE DESIGN DOCUMENTS AT THE JOBSITE AT ALL TIMES. 33. THE CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE DEVELOPMENT PLANS RELEASED FOR CONSTRUCTION. THE CONTRACTOR SHALL INSURE THAT ALL EROSION CONTROL MEASURES ARE
- MAINTAINED AT ALL TIMES IN A CONDITION ACCEPTABLE TO THE PUBLIC WORKS ENGINEERING INSPECTOR.
- 34. THE CONTRACTOR SHALL NOT ALLOW SOIL AND DEBRIS TO ENTER EXISTING INLETS. ALL INLETS SHALL BE PROTECTED DURING CONSTRUCTION.
- 35. THE CONTRACTOR SHALL NOT DISPOSE OF WASTE OR ANY OTHER MATERIALS INTO STREAMS OR WATERWAYS. EXCESS MATERIAL SHALL BE HAULED OFF-SITE EACH DAY AND WILL NOT BE ALLOWED TO ACCUMULATE.
- 36. THE CONTRACTOR SHALL NOT BURY RUBBISH OR WASTE MATERIALS ON-SITE. BURNING MATERIALS WILL NOT BE ALLOWED WITHOUT PROPER WRITTEN AUTHORIZATION FROM THE RUSK FIRE DEPARTMENT.
- 37. THE CONTRACTOR SHALL WET DOWN THE CONSTRUCTION SITE AS DIRECTED BY THE COUNTY TO PREVENT BLOWING DUST.
- 38. THE CONTRACTOR SHALL CLEAN STREETS ADJACENT TO THE CONSTRUCTION SITE TO REMOVE MATERIALS DEPOSITED BY CONSTRUCTION VEHICLES ENTERING AND LEAVING THE CONSTRUCTION SITE.
- 39. THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE AND MONITOR ALL WARNING AND SAFETY DEVICES (FLASHING LIGHTS, BARRICADES, SIGNS, ETC.) AS DEEMED NECESSARY BY THE COUNTY. WARNING AND SAFETY DEVICES SHALL CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- 40. THE LOCATIONS OF EXISTING UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND VERIFY IN THE FIELD THE LOCATIONS, ELEVATIONS AND SIZES OF CONFLICTING AND / OR ADJACENT UTILITIES IN ADVANCE OF BEGINNING CONSTRUCTION.
- 41. THE COUNTY STANDARD DETAILS SHALL SUPERSEDE ANY DETAILS CONTAINED WITHIN THE PLAN SET.
- 42. THE CONTRACTOR SHALL COMPLY TO RULES AND REGULATIONS OF NEW SUBDIVISIONS IN DENTON COUNTY, TEXAS EFFECTIVE AS OF APRIL 24, 2018.



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WATER GENERAL NOTES

THE JOBSITE AT ALL TIMES.

1. UNLESS OTHERWISE NOTED ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE APPLICABLE

3. CONTRACTOR SHALL MAINTAIN EXISTING WATER SERVICE AT ALL TIMES DURING CONSTRUCTION

2. ALL WATER MAIN CONSTRUCTION WITHIN PUBLIC RIGHT-OF-WAY OR EASEMENT SHALL CONFORM TO THE

REQUIREMENTS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) GUIDELINES FOR CONSTRUCTION

4. THE LOCATIONS, ELEVATIONS AND DIMENSIONS OF EXISTING UTILITIES SHOWN ON THE PLANS WERE OBTAINED FROM

AVAILABLE CITY AND UTILITY COMPANY RECORDS AND PLANS, AND ARE CONSIDERED APPROXIMATE. IT SHALL BE

CONFLICTING UTILITIES SUFFICIENTLY IN ADVANCE OF CONSTRUCTION IN ORDER THAT ADJUSTMENTS CAN BE MADE

TO PROVIDE ADEQUATE CLEARANCES. THE CONTRACTOR SHALL PRESERVE AND PROTECT PUBLIC UTILITIES AT ALL TIMES DURING CONSTRUCTION. ANY DAMAGE TO UTILITIES RESULTING FROM CONTRACTOR'S OPERATIONS SHALL BE

RESTORED AT HIS EXPENSE. THE CITY OF SANGER ENGINEERING DEPARTMENT SHALL BE NOTIFIED WHEN

8. ALL WATER MAINS SHALL HAVE A MINIMUM COVER OF FORTY-EIGHT INCHES (48") TO THE TOP OF PIPE.

10. ALL PROPOSED WATER MAINS SHALL BE PRESSURE TESTED, FLUSHED AND STERILIZED AND MEET ALL FEDERAL

PROPOSED WATER LINE GRADES CONFLICT WITH EXISTING UTILITY LINES. AT LEAST FORTY-EIGHT (48) HOURS

PRIOR TO BEGINNING CONSTRUCTION IN THE VICINITY OF EXISTING UTILITIES, THE CONTRACTOR SHALL NOTIFY

THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL LOCATIONS, ELEVATIONS AND DIMENSIONS OF ADJACENT AND/OR

OF PUBLIC WATER AND SEWER SYSTEMS. CONTRACTOR SHALL MAINTAIN A COPY OF THE DESIGN DOCUMENTS AT

SPECIFICATIONS AND STANDARDS OF THE BOLIVER WATER SUPPLY CORPORATION.

5. ALL DIMENSIONS SHOWN ARE TO CENTERLINE OF PIPE UNLESS NOTED OTHERWISE

9. ALL WATER MAIN FITTINGS SHALL BE MECHANICAL AND SHALL BE POLYWRAPPED

7. THE CONTRACTOR SHALL PROVIDE A TRENCH SAFETY PLAN PRIOR TO BEGINNING HIS WORK

UTILITY COMPANIES TO LOCATE ALL UNDERGROUND UTILITIES.

6. ALL WATER MAINS SHALL BE C-900, DR-14 PVC PIPE.

AND STATE TESTING REQUIREMENTS.

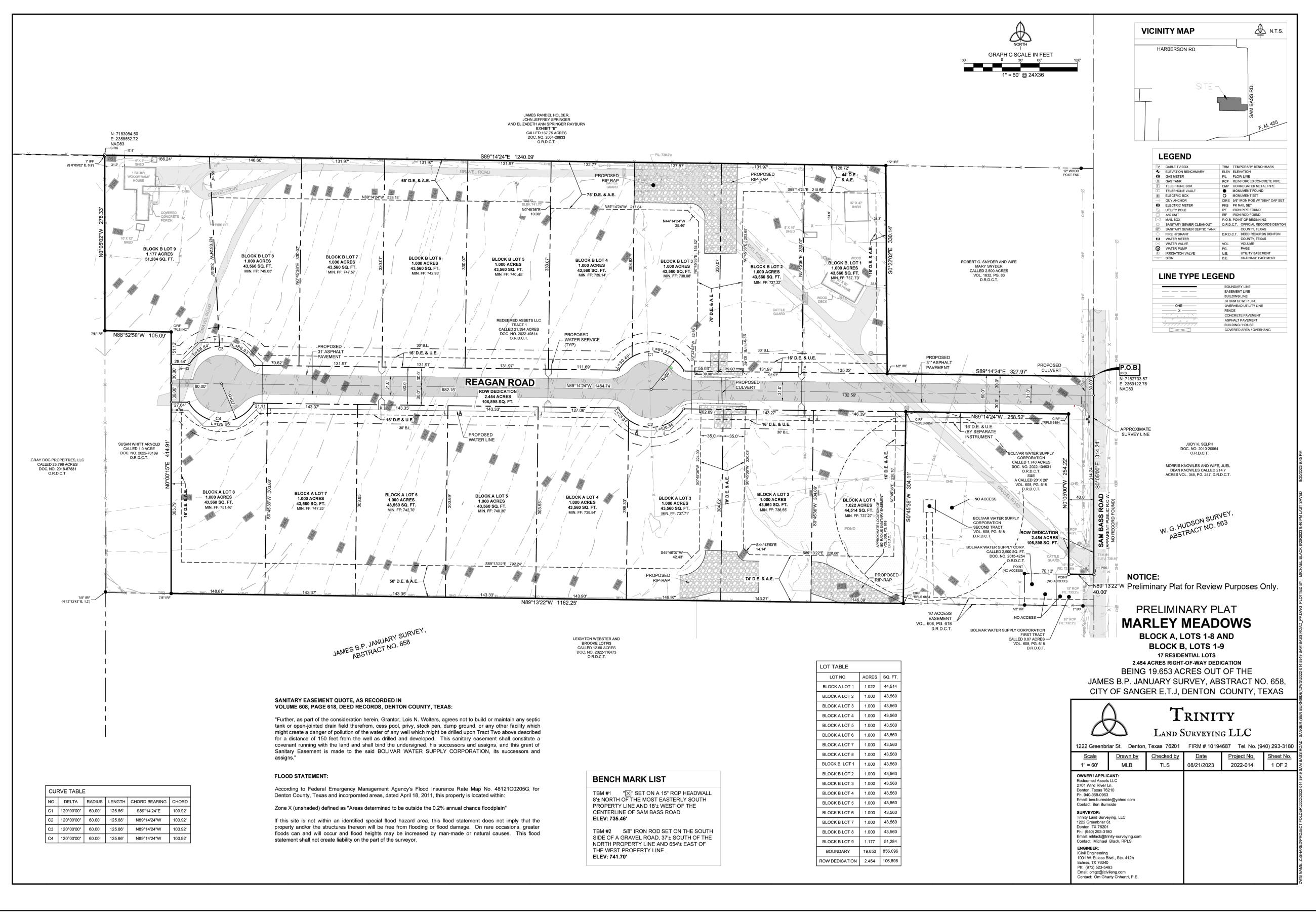
SANGER, TEXAS

GENERAL NOTES

MARLEY MEADOWS

PROJECT NO

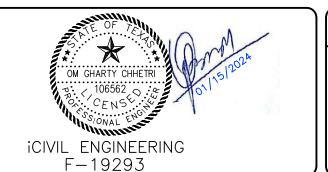
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SANGER, TEXAS

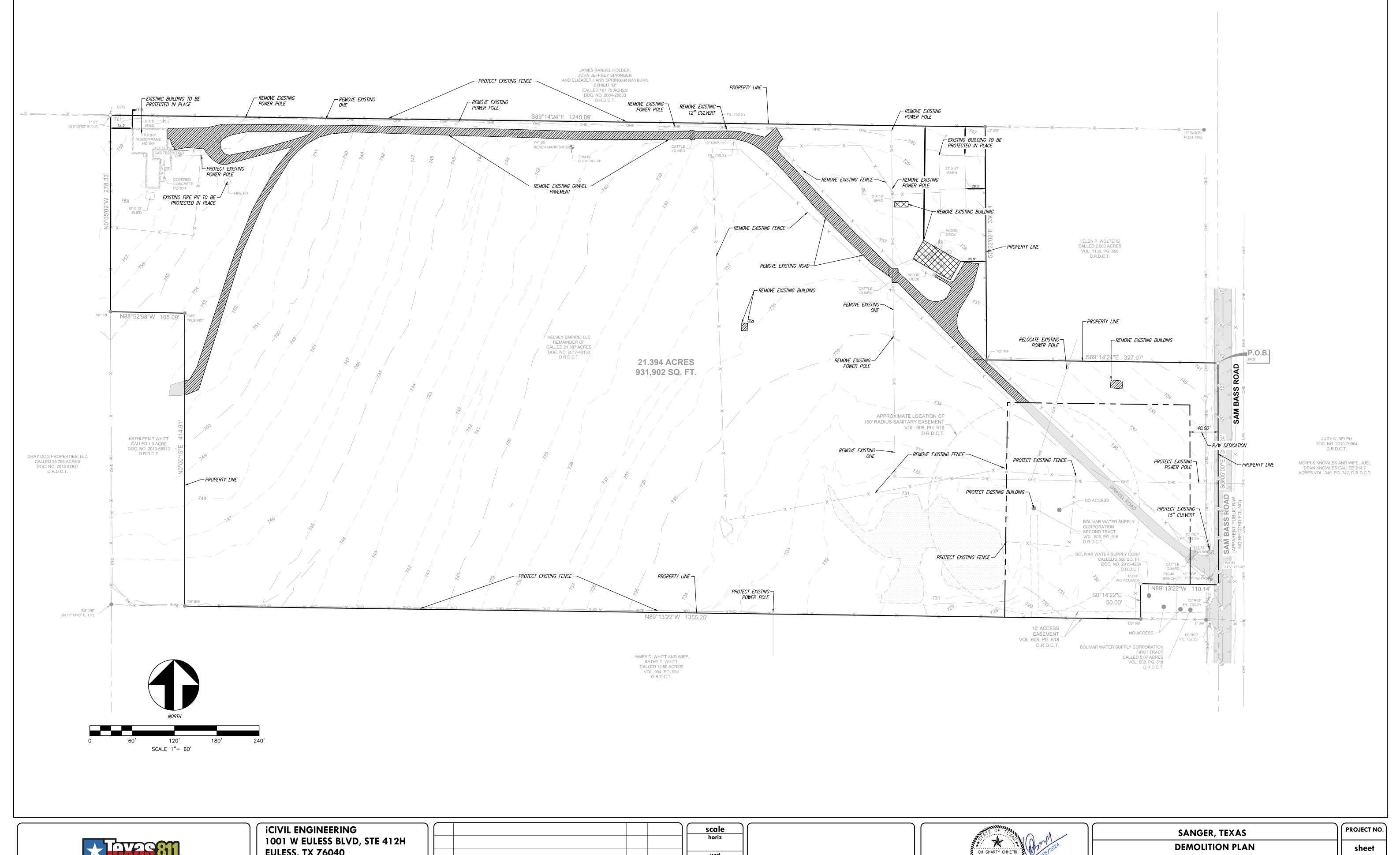
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FOR

MARLEY MEADOWS

sheet 3 of 23

PROJECT NO.



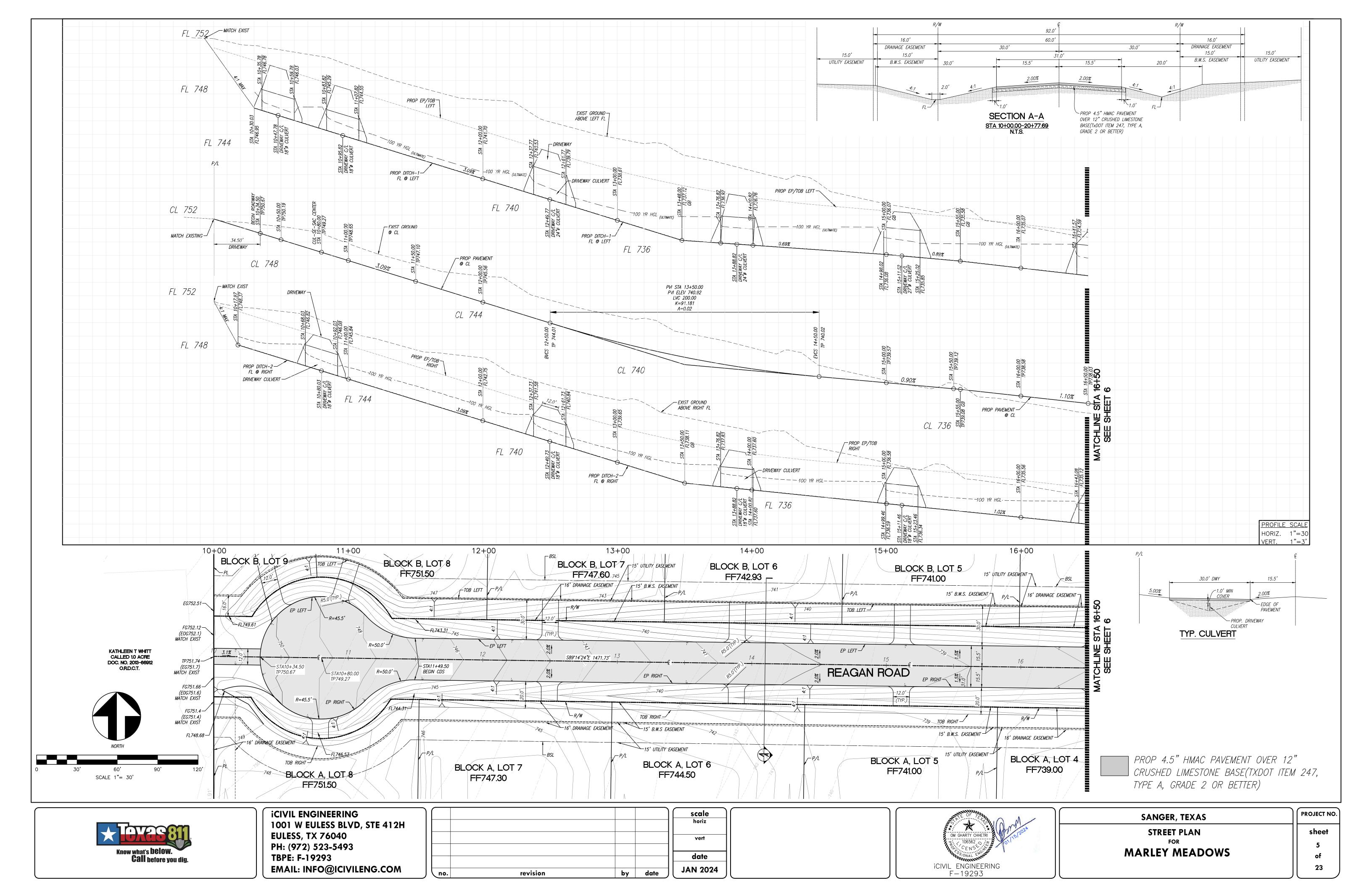


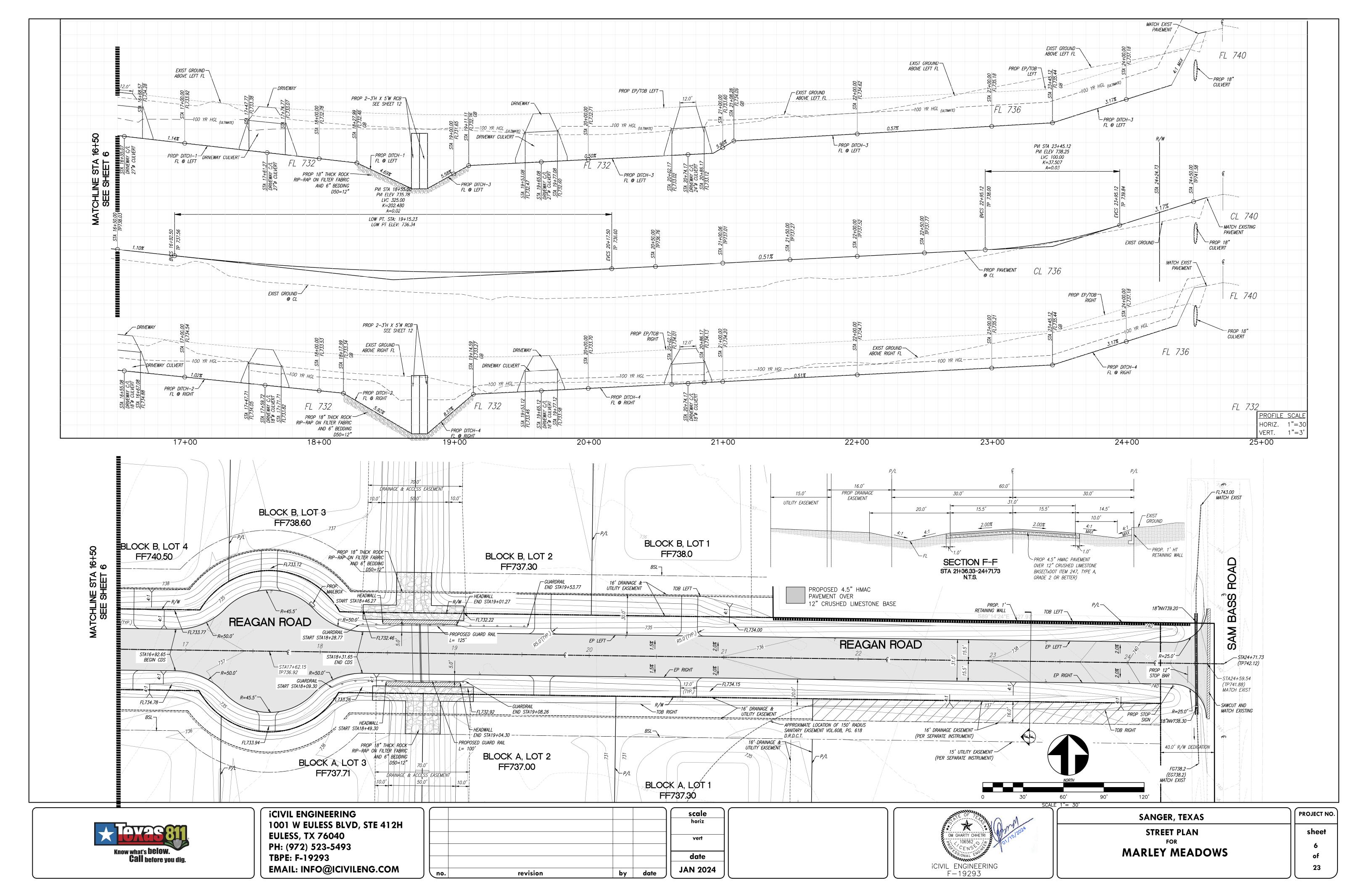
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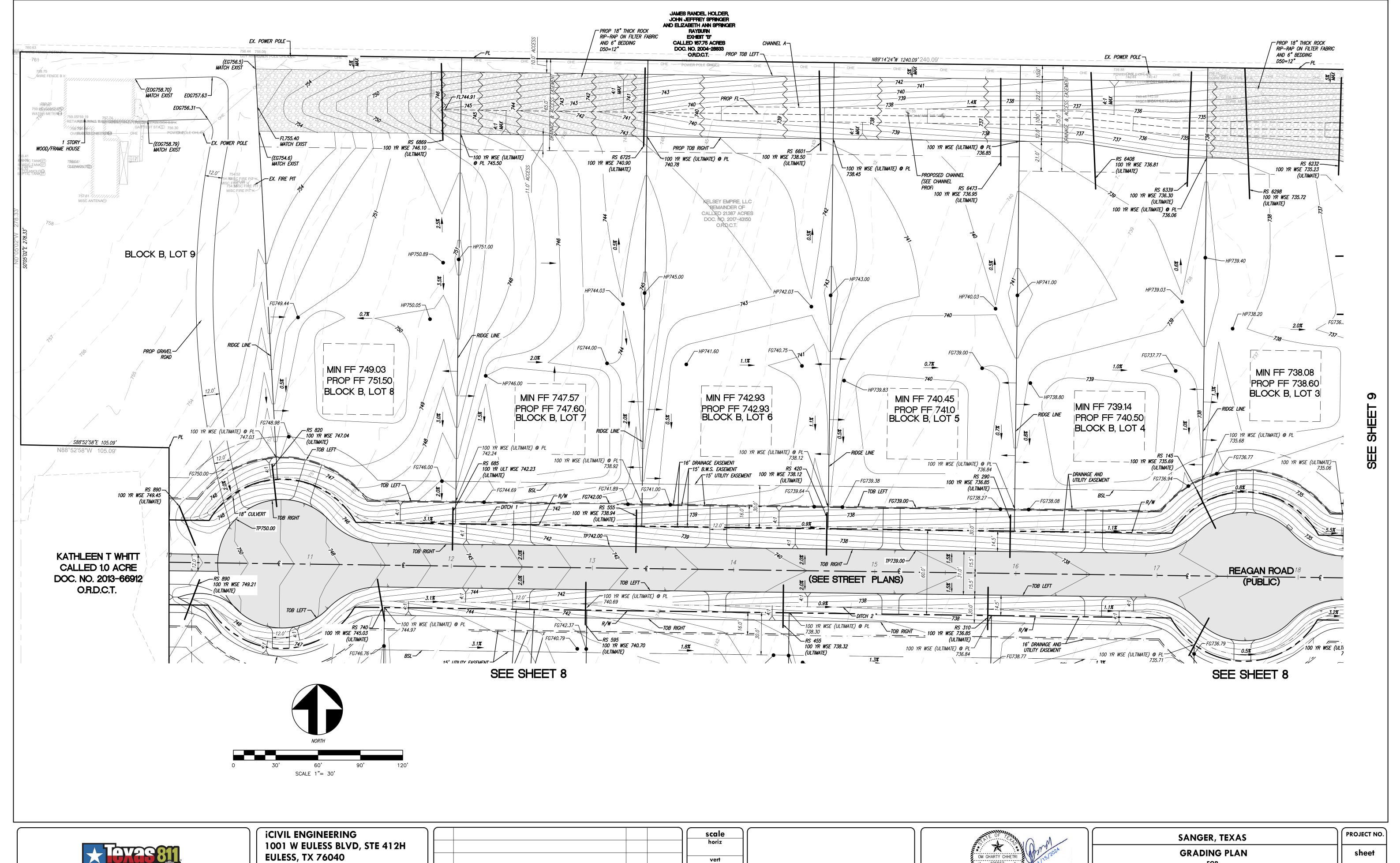
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FOR	
MARLEY MEADOWS	









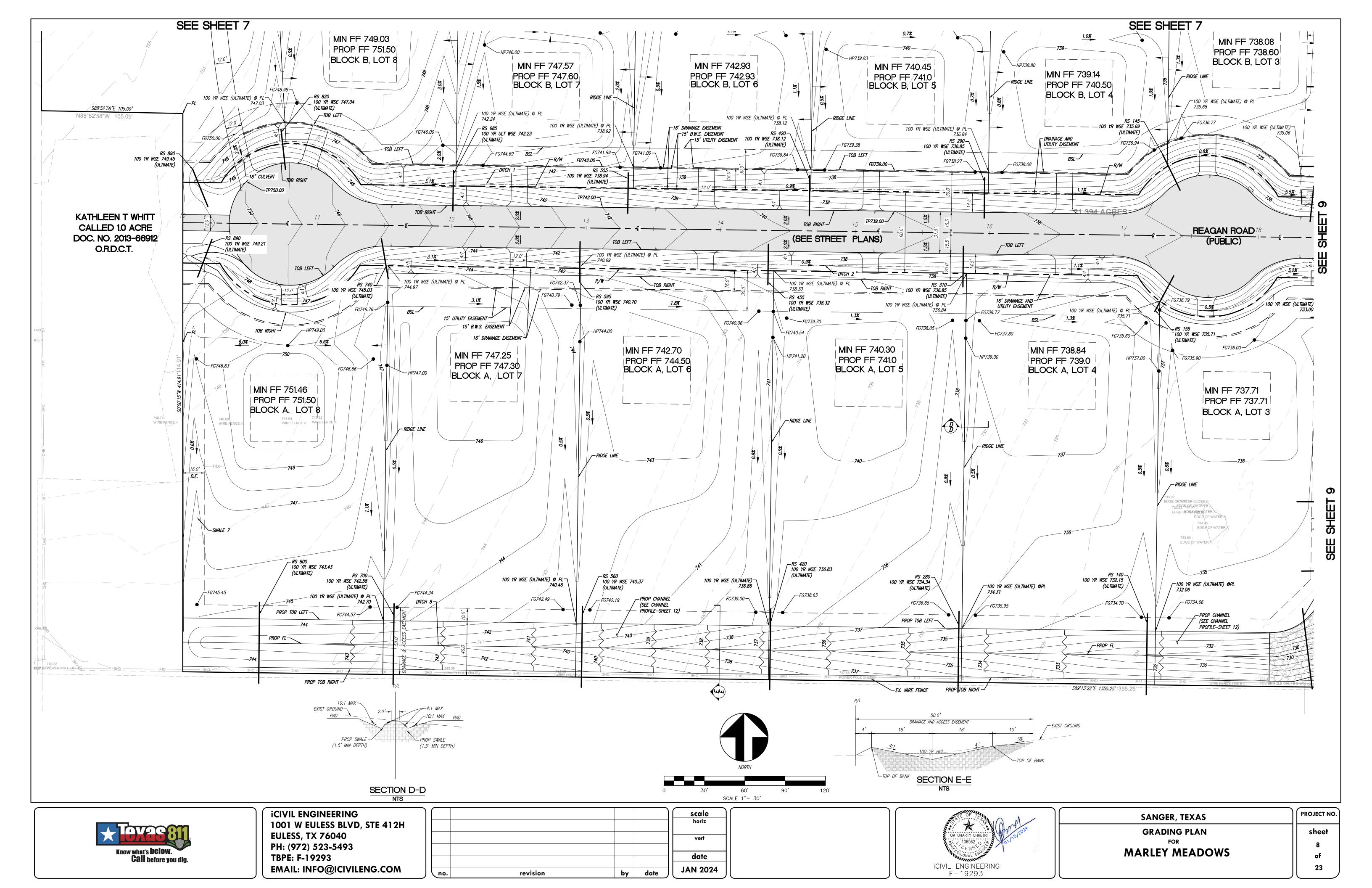
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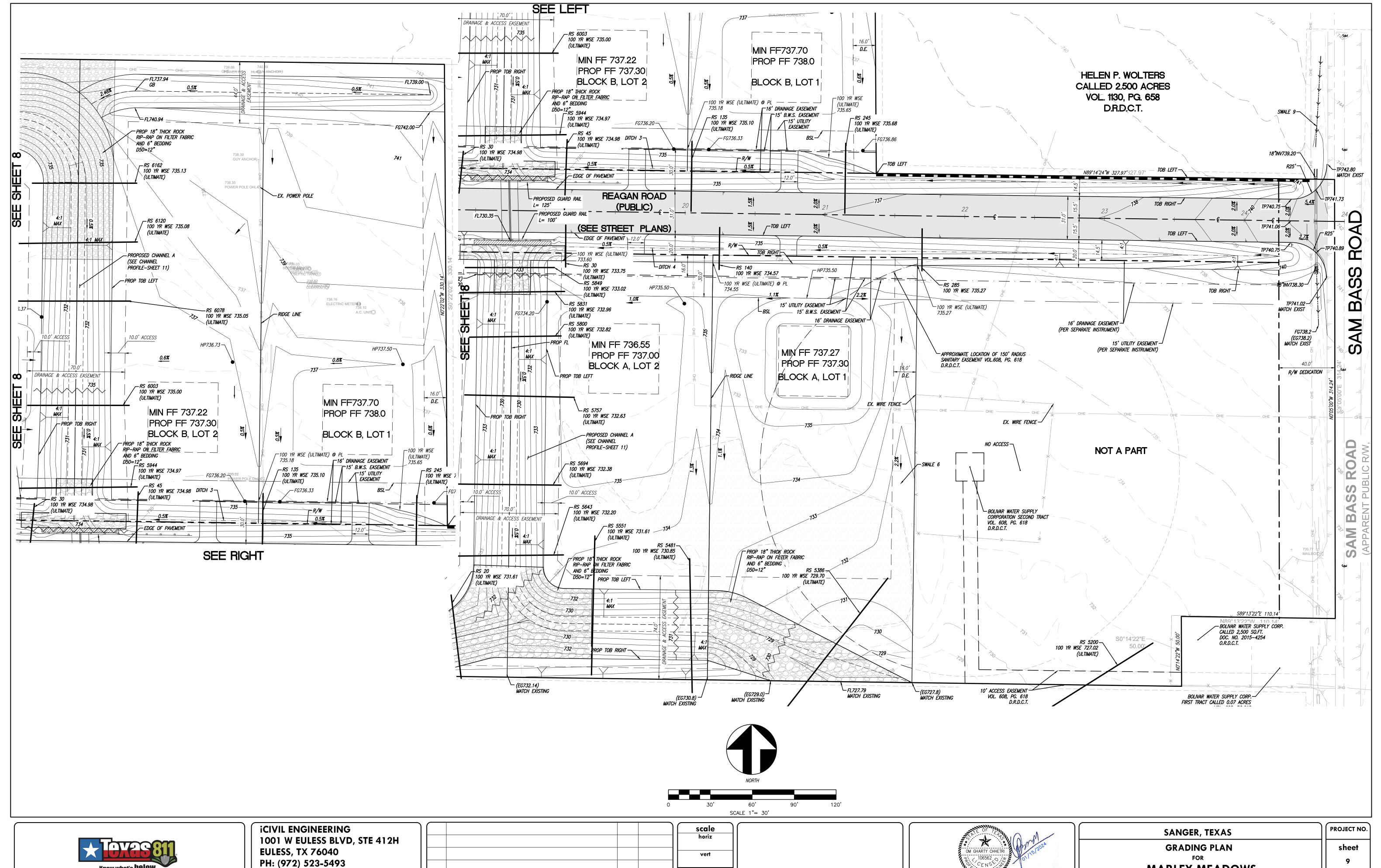
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GRADING PLAN
FOR
MARLEY MEADOWS





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**MARLEY MEADOWS** 

	TIME OF CONCENTRATION CALCULATION (PRE-PROJECT)									ROJECT)									
AREA CORE	AREA CODE SHALLOW CONCENTRATED FLOW											CHANN	IEL FLOW	TOC (TOTAL)	LAG TIME (min.)				
AREA CODE	LENGTH (ft)	MANNINGS'S N	P2 (inc.)	SLOPE (ft/ft)	TIME(hr.)	TIME(Min.)	HIGH ELEV	LOW ELEV	LENGTH(ft)	SLOPE(ft/ft)	VEL.(fps)	TOC(hr)	TOC(Min.)	VEL.(fps)	LENGTH	TOC(hr)	TOC(Min.)	(Min.)	LAG TIME (IIIII.)
Sub-Basin 1         100         0.15         3.36         0.01         0.21         12.62         756.0         750.0         660         0.01         1.60										0.11	6.88	3.12	1100.00	0.10	5.88	25.37	15.22		
													•			•			
NOTE:																			
1. VALUE OF MANNING'S N FOR SHEET FLOW = 0.15 (FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 56, TABLE IV.1-6 )																			
2. VELOCITY FOR SHALLOW CONCENTRATED FLOW IS TAKEN FROM TR 55 FIGURE 3-1																			
3. P2=3.36 FROM	DENTON COUN	TY SUBDIVISION RU	LES & REGULA	TIONS, PAGE 49,	TABLE IV.1-3														

AREA CODE    Shear   S	TIME OF CONCENTRATION CALCULATION (PRE-PROJECT)															
LENGTH (ft) MANNINGS'S N P2 (inc.) SLOPE (ft/ft) TIME(hr.) TIME(Min.) HIGH ELEV LOW ELEV LENGTH(ft) VEL.(fps) TOC(hr) TOC(Min.)	AREA CORE			SHEET F	LOW			SHALLOW CONCENTRATED FLOW							TOC (TOTAL)	LAG TIME (min.)
Sub-Basin 2 (Pre) 100 0.15 3.36 0.01 0.21 12.62 756.0 729.0 1282 0.021 2.60 0.14 8.22 20.83 12.50	AREA CODE	LENGTH (ft)	MANNINGS'S N	P2 (inc.)	SLOPE (ft/ft)	TIME(hr.)	TIME(Min.)	HIGH ELEV	LOW ELEV	LENGTH(ft)	SLOPE(ft/ft)	VEL.(fps)	TOC(hr)	TOC(Min.)	TOC (TOTAL)	LAG TIME (IIIII.)
	Sub-Basin 2 (Pre)	100	0.15	3.36	0.01	0.21	12.62	756.0	729.0	1282	0.021	2.60	0.14	8.22	20.83	12.50

NOTE:

1. VALUE OF MANNING'S N FOR SHEET FLOW = 0.15 (FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 56, TABLE IV.1-6)

2. VELOCITY FOR SHALLOW CONCENTRATED FLOW IS TAKEN FROM TR 55 FIGURE 3-1

3. P2=3.36 FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 49, TABLE IV.1-3

	TIME OF CONCENTRATION CALCULATION (PRE-PROJECT)																			
ADEA	A CODE	SHEET FLOW							SHALLOW CONCENTRATED FLOW						CHANNEL FLOW				TOC (TOTAL)	LAG TIME (min.)
AREA	REA CODE	LENGTH (ft)	MANNINGS'S N	P2 (inc.)	SLOPE (ft/ft)	TIME(hr.)	TIME(Min.)	HIGH ELEV	LOW ELEV	LENGTH(ft)	SLOPE(ft/ft)	VEL.(fps)	TOC(hr)	TOC(Min.)	VEL.(fps)	LENGTH	TOC(hr)	TOC(Min.)	(Min.)	LAG TIME (IIIII.)
Sub-E	Basin 3	100	0.15	3.36	0.02	0.16	9.56	743.0	724.0	1060	0.02	2.20	0.13	8.03	3.12	5092.00	0.45	27.20	44.793	26.88

NOTE:

1. VALUE OF MANNING'S N FOR SHEET FLOW = 0.15 (FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 56, TABLE IV.1-6)

2. VELOCITY FOR SHALLOW CONCENTRATED FLOW IS TAKEN FROM TR 55 FIGURE 3-1

3. P2=3.36 FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 49, TABLE IV.1-3



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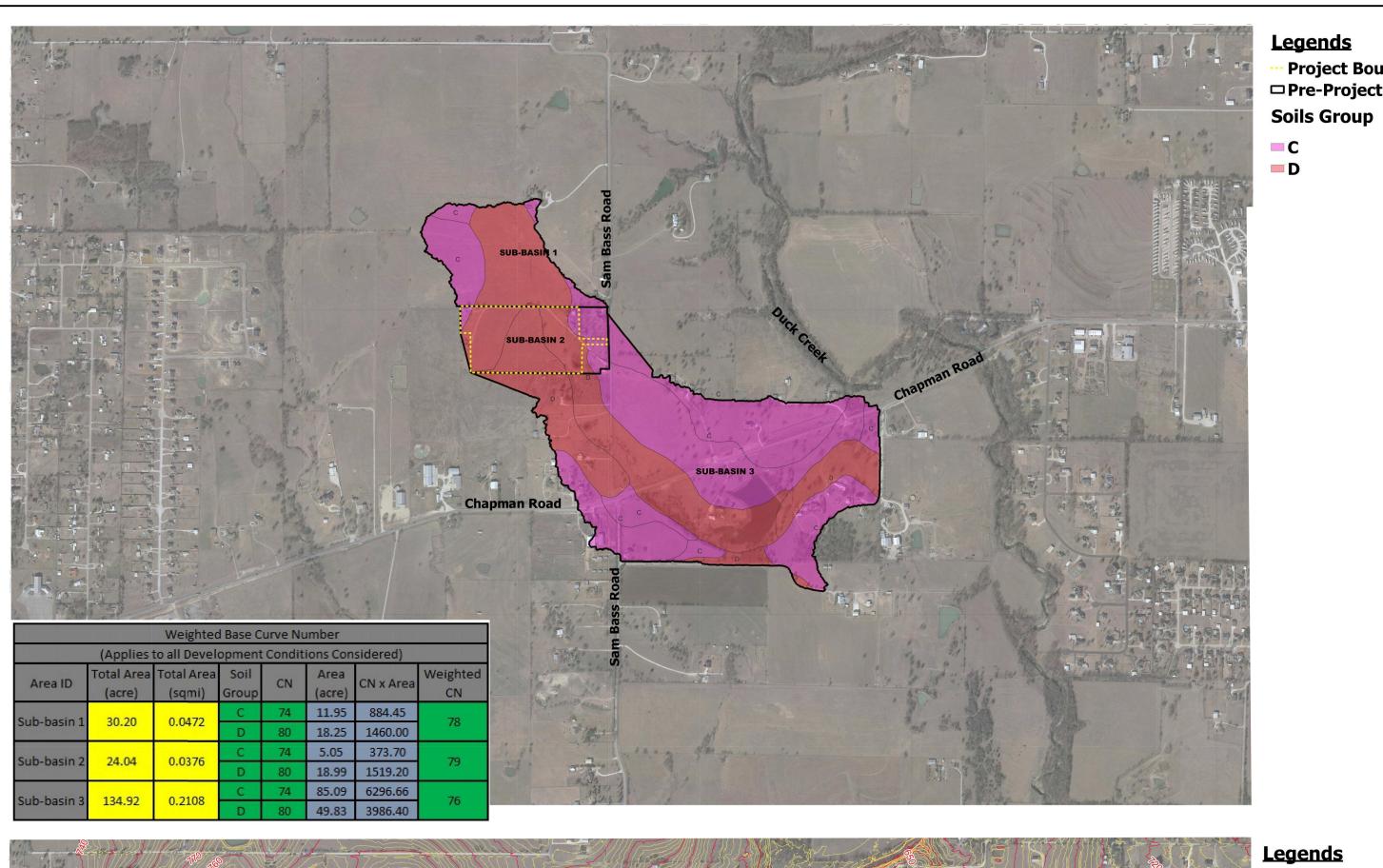
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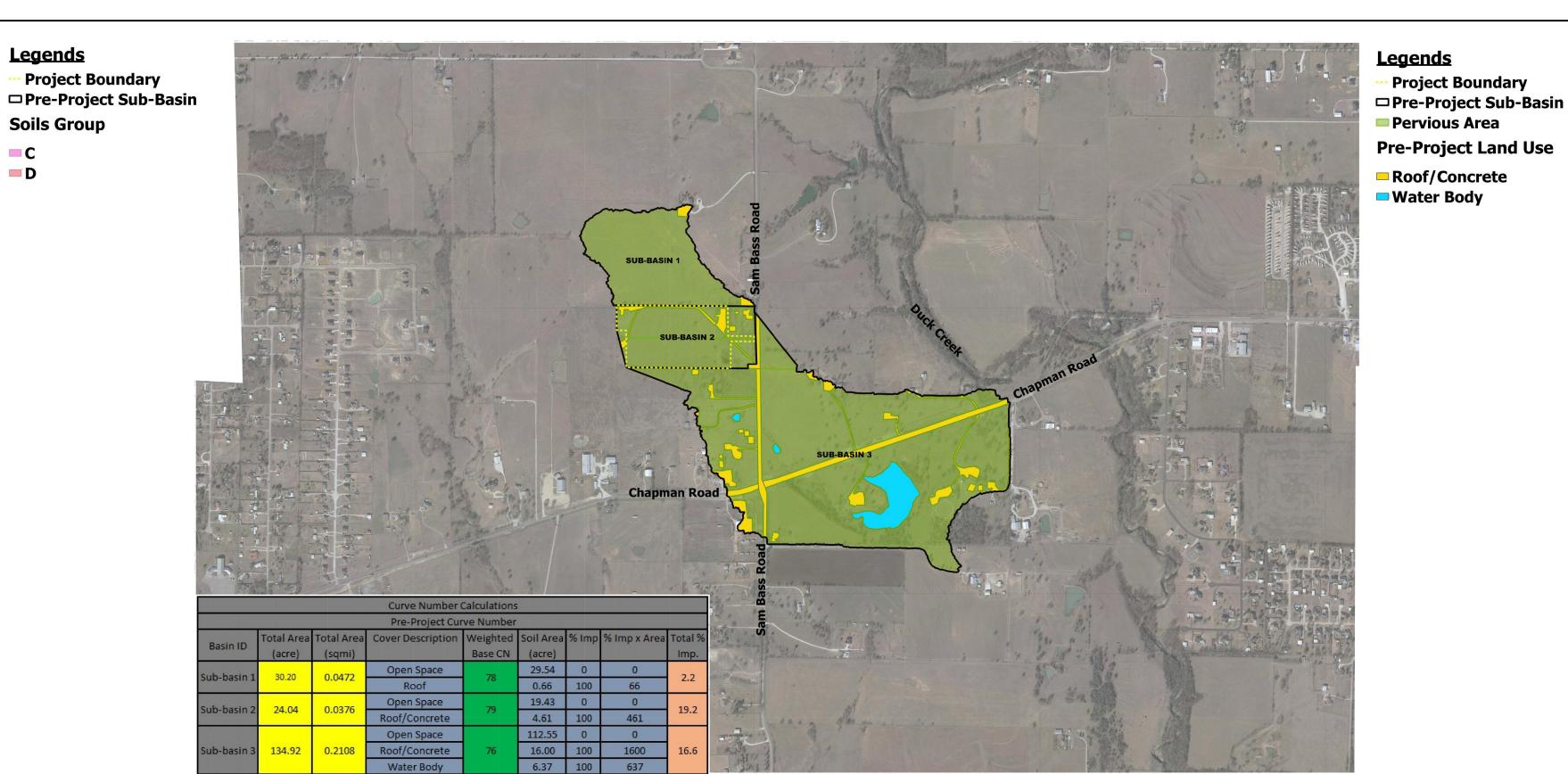


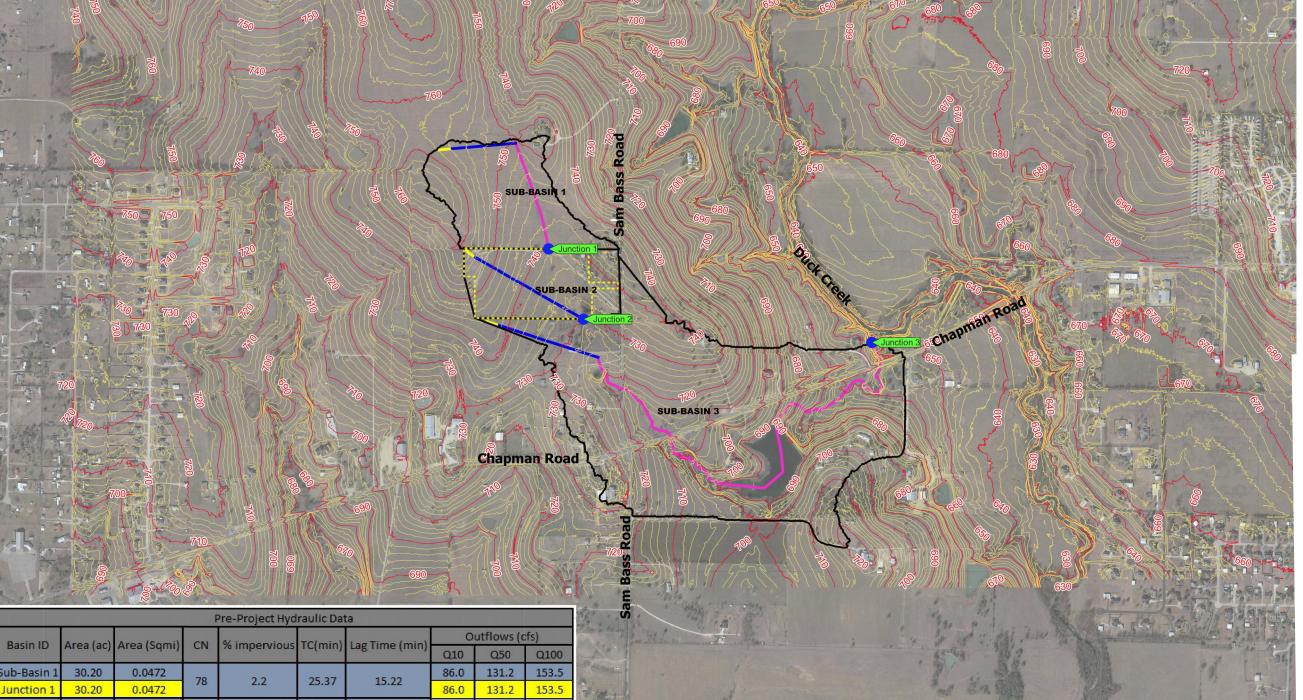


SANGER, TEXAS	PRO
PRE-PROJECT TIME OF CONCENTRATION CALCULATION	s
FOR	
MADIEV MEADOWC	

PROJECT NO.







# <u>Legends</u>

- --- Project Boundary
- Pre-Project Junction Point
- □ Pre-Project Sub-Basin

# **Contours**

- 10-Ft Interval 2-Ft Interval
- TC Flowpath
- Sheet Flow
- -Shallow Conc. Flow
- Channel Flow

2000' SCALE 1"= 1000'



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SANGER, TEXAS PRE DAM **MARLEY MEADOWS**  PROJECT NO. sheet 10-B

	TIME OF CONCENTRATION CALCULATION (POST-PROJECT & ULTIMATE DEVELOPMENT)																		
AREA CODE	SHEET FLOW SHALLOW CONCENTRATED FLOW														CHANN	EL FLOW		TOC (TOTAL)	LAC TIME (min.)
AREA CODE  LENGTH (ft) MANNINGS'S N P2 (inc.) SLOPE (ft/ft) TIME(hr.) TIME(Min.) HIGH ELEV LOW ELEV LENGTH(ft) SLOPE(ft/ft) VEL.(fps) TOC(hr) TOC(Min.) VEL.(fps) LENGTH TOC											TOC(hr)	TOC(Min.)	(Min.)	LAG TIME (IIIII.)					
Sub-Basin 1	100	0.15	3.36	0.01	0.21	12.62	756.0	750.0	660	0.01	1.60	0.11	6.88	3.12	1100.00	0.10	5.88	25.37	15.22

1. VALUE OF MANNING'S N FOR SHEET FLOW = 0.15 (FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 56, TABLE IV.1-6)

2. VELOCITY FOR SHALLOW CONCENTRATED FLOW IS TAKEN FROM TR 55 FIGURE 3-1

3. P2=3.36 FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 49, TABLE IV.1-3

TIME OF CONCENTRATION CALCULATION (POST-PROJECT & ULTIMATE DEVELOPMENT)														
ABEA CODE			SHEET F	LOW			CHANNE	L FLOW		TOC (TOTAL)	LAG TIME (min.)			
AREA CODE	LENGTH (ft)	MANNINGS'S N	P2 (inc.)	SLOPE (ft/ft)	TIME(hr.)	TIME(Min.)	VEL.(fps)	LENGTH	TOC(hr)	TOC(Min.)	(Min.)	LAG TIME (IIIII.)		
Sub-Basin 2A	100	0.15	3.36	0.03	0.14	8.13	7.85	731	0.03	1.55	9.68	5.81		

1. VALUE OF MANNING'S N FOR SHEET FLOW = 0.15 (FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 56, TABLE IV.1-6)

2. VELOCITY FOR SHALLOW CONCENTRATED FLOW IS TAKEN FROM TR 55 FIGURE 3-1

3. P2=3.36 FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 49, TABLE IV.1-3

						TIME C	F CONCENTRA	ATION CALCUL	ATION (POST-I	PROJECT & UL	TIMATE DEVE	LOPMENT)							
AREA CODE			LOW		SHALLOW CONCENTRATED FLOW								CHANNEL FLOW				LAC TIME (min.)		
AREA CODE	LENGTH (ft) MANNINGS'S N P2 (inc.) SLOPE (ft/ft) TIME(hr.) TIME(M							HIGH ELEV LOW ELEV LENGTH(ft) SLOPE(ft/ft) VEL.(fps) TOC(hr) TOC(Min.)					TOC(Min.)	VEL.(fps)	LENGTH	TOC(hr)	TOC(Min.)	(Min.)	LAG TIME (IIIII.)
Sub-Basin 2B	100	0.15	3.36	0.02	0.16	9.56	756.0	751.5	276	0.02	1.60	0.05	2.88	7.85	825	0.03	1.75	14.19	8.51

1. VALUE OF MANNING'S N FOR SHEET FLOW = 0.15 (FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 56, TABLE IV.1-6)

2. VELOCITY FOR SHALLOW CONCENTRATED FLOW IS TAKEN FROM TR 55 FIGURE 3-1

3. P2=3.36 FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 49, TABLE IV.1-3

	TIME OF CONCENTRATION CALCULATION (POST-PROJECT & ULTIMATE DEVELOPMENT)															
AREA CODE			SHEET F	LOW				CHANNI	EL FLOW 1			CHANNE	L FLOW 2		TOC (TOTAL)	LAG TIME (min.)
AREA CODE	LENGTH (ft)	MANNINGS'S N	P2 (inc.)	SLOPE (ft/ft)	TIME(hr.)	TIME(Min.)	VEL.(fps)	LENGTH	TOC(hr)	TOC(Min.)	VEL.(fps)	LENGTH	TOC(hr)	TOC(Min.)	(MIN.)	LAG TIME (MIN.)
Sub-Basin 2C	100	0.15	3.36	0.05	0.11	6.63	7.85	900.00	0.03	1.91	5.38	462	0.02	1.43	9.97	5.98

1. VALUE OF MANNING'S N FOR SHEET FLOW = 0.15 (FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 56, TABLE IV.1-6)

2. VELOCITY FOR SHALLOW CONCENTRATED FLOW IS TAKEN FROM TR 55 FIGURE 3-1

3. P2=3.36 FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 49, TABLE IV.1-3

	TIME OF CONCENTRATION CALCULATION (POST-PROJECT & ULTIMATE DEVELOPMENT)																		
AREA CODE		SHEET FLOW						SHALLOW CONCENTRATED FLOW								L FLOW		TOC (TOTAL)	LAG TIME (min.)
AREA CODE	LENGTH (ft)	MANNINGS'S N	P2 (inc.)	SLOPE (ft/ft)	TIME(hr.)	TIME(Min.)	HIGH ELEV	LOW ELEV	LENGTH(ft)	SLOPE(ft/ft)	VEL.(fps)	TOC(hr)	TOC(Min.)	VEL.(fps)	LENGTH	TOC(hr)	TOC(Min.)	(Min.)	LAG TIME (IIIII.)
Sub-Basin 3	100	0.15	3.36	0.02	0.16	9.56	743.0	724.0	1060	0.02	2.20	0.13	8.03	3.12	5092.00	0.45	27.20	44.793	26.88

1. VALUE OF MANNING'S N FOR SHEET FLOW = 0.15 (FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 56, TABLE IV.1-6)

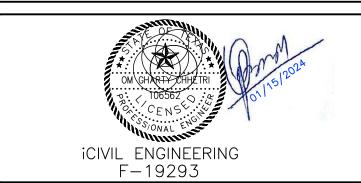
2. VELOCITY FOR SHALLOW CONCENTRATED FLOW IS TAKEN FROM TR 55 FIGURE 3-1

3. P2=3.36 FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 49, TABLE IV.1-3

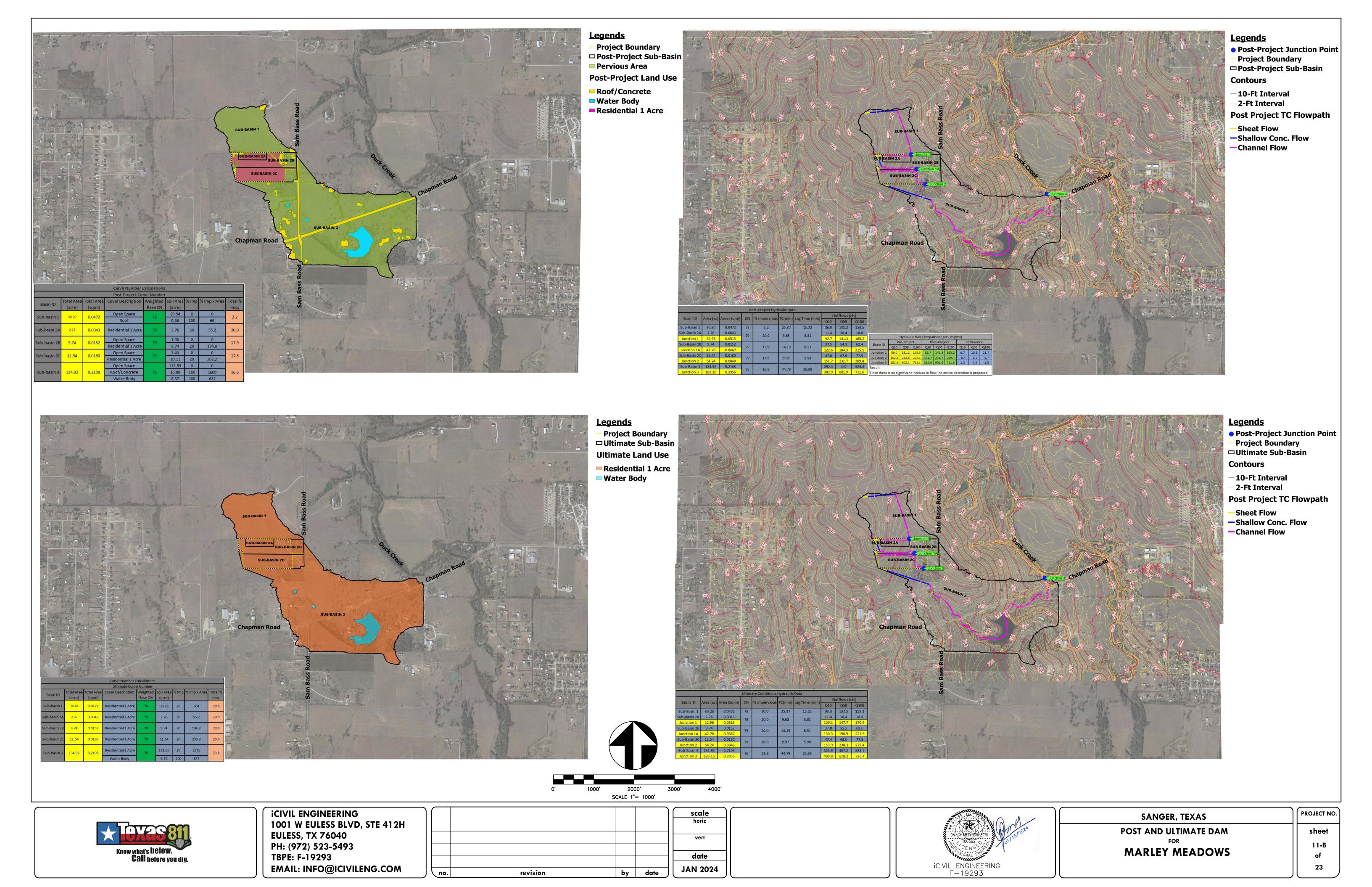


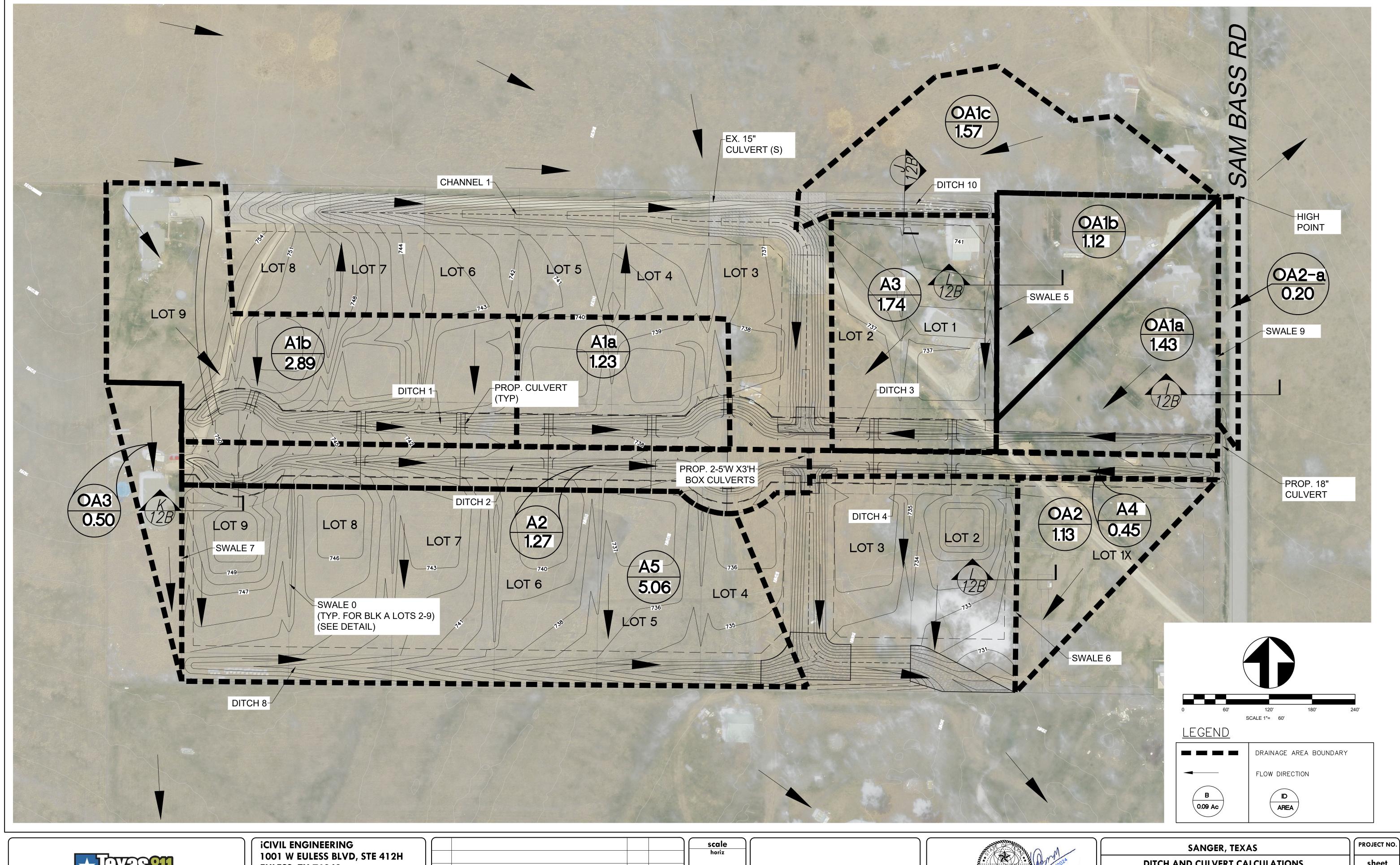
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POST-PROJECT & ULT. DEV. TIME OF CONCENTRATION	sheet
FOR	11-A
MARLEY MEADOWS	of

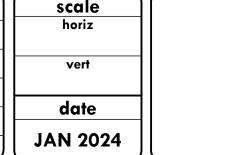






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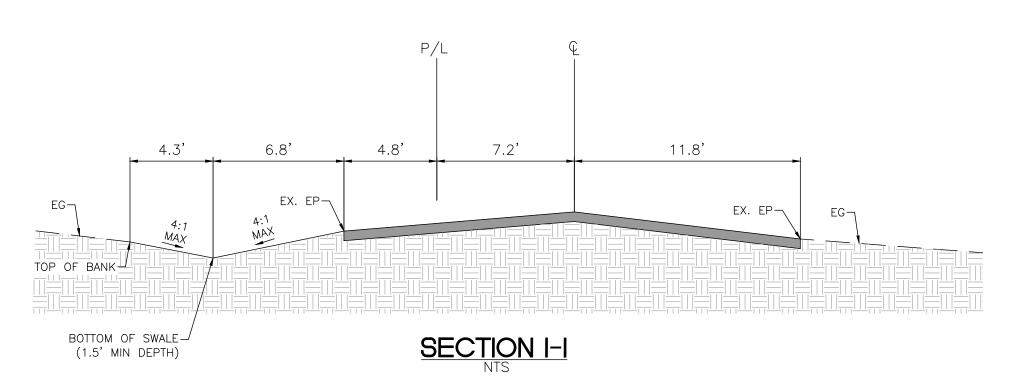
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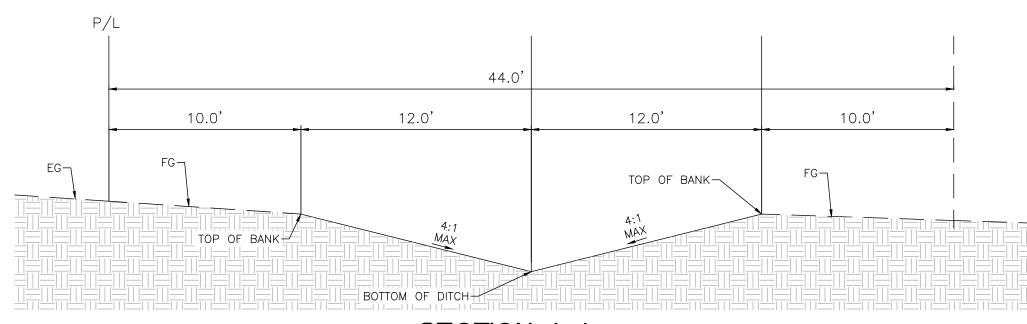


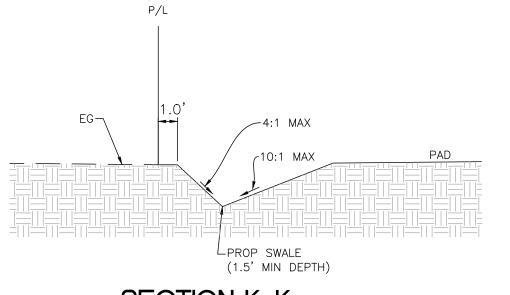


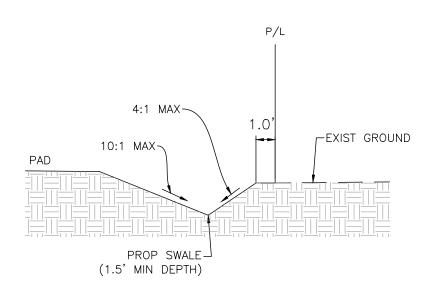
DITCH AND CULVERT CALCULATIONS
FOR
MARLEY MEADOWS

sheet 12-A of 23









<u>SECTION K-K</u>

SECTION L-L

	TIME OF CONCENTRATION CALCULATION																		
AREA CODE			SHEET F	LOW				SHALLOW CONCENTRATED FLOW							CHANNEL		TOC (TOTAL)	TOC USED	
AREA CODE	LENGTH (ft)	MANNINGS'S N	P2 (in.)	SLOPE (ft/ft)	TIME(hr.)	TIME(Min.)	HIGH ELEV	IIGH ELEV LOW ELEV LENGTH(ft) SLOPE(ft/ft) VEL.(fps) TOC(hr) TOC(Min.) VEL.(fps) LENGTH (ft) TOC(hr) TOC(Min.)										(Min.)	
A1a & A1b	100	0.15	3.36	0.02	0.16	9.56	753.0	751.0	185	0.01	1.60	0.03	1.93	7.85	825	0.03	1.75	13.24	15.00
NOTE:	NOTE:																		

1. VALUE OF MANNING'S N FOR SHEET FLOW = 0.15 (FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 56, TABLE IV.1-6)

2. VELOCITY FOR SHALLOW CONCENTRATED FLOW IS TAKEN FROM TR 55 FIGURE 3-1

3. P2 = 3.36 FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS TABLE IV .1-3

TIME OF CONC	ENTRATION CA	ALCULATION									_					
			SHEET I	FLOW				CHANNEL	FLOW 1			CHANNEL	FLOW 2		TOC (TOTAL)	TOC USED
AREA CODE	LENGTH (ft)	MANNINGS'S N	P2 (in.)	SLOPE (ft/ft)	TIME(hr.)	TIME(Min.)	VEL.(fps)	LENGTH (ft)	TOC(hr)	TOC(Min.)	VEL.(fps)	LENGTH (ft)	TOC(hr)	TOC(Min.)	(MIN.)	
A2	100	0.15	3.36	0.05	0.11	6.63	7.85	900.00	0.03	1.91	5.38	462	0.02	1.43	9.97	15.00
								NOTE:								

1. VALUE OF MANNING'S N FOR SHEET FLOW = 0.15 (FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 56, TABLE IV.1-6)

2. VELOCITY FOR SHALLOW CONCENTRATED FLOW IS TAKEN FROM TR 55 FIGURE 3-1

3. P2 = 3.36 FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS TABLE IV .1-3

							RUN	NOFF CAL	CULATIO	ON				
Area	DITCH ID	Area	С	CA	TC	I1	15	I10	I100	Q1	Q5	Q10	Q100	
ID	DITCHID	(acres)			(min.)	(in./hr.)	(in./hr.)	(in./hr.)	(in./hr.)	(cfs)	(cfs)	(cfs)	(cfs)	COMMENTS
SIDE YARD SWALE	SWALE 0	0.75	0.45	0.34	15	3.31	4.85	5.50	7.91	1.12	1.64	1.86	2.67	SWALE BETWEEN ANY TWO LOTS (TYP. FOR BLK A LOT 2-9 SEE DETAILS)
A1a & A1b	DITCH 1	4.12	0.55	2.27	15	3.31	4.85	5.50	7.91	7.50	10.99	12.46	17.92	HALF OF THE LOT DRAINS TO CHANNEL 1
A2	DITCH 2	1.27	0.71	0.90	15	3.31	4.85	5.50	7.91	2.98	4.37	4.96	7.13	COMPOSITE C=0.71 (CALCULATION PROVIDED ON THIS SHEET
OA1a, OA1b & A3	DITCH 3	4.29	0.45	1.93	15	3.31	4.85	5.50	7.91	6.39	9.36	10.62	15.27	AREA A3+OA1a+OA1b DRAINS TO DITCH 3
A4	DITCH 4	0.45	0.75	0.34	15	3.31	4.85	5.50	7.91	1.12	1.64	1.86	2.67	COMPOSITE C=0.71 (CALCULATION PROVIDED ON THIS SHEET
OA1b	SWALE 5	1.12	0.45	0.50	15	3.31	4.85	5.50	7.91	1.67	2.44	2.77	3.99	SWALE FOR OFFSITE AREA DRAINAGE
OA2	SWALE 6	0.96	0.45	0.43	15	3.31	4.85	5.50	7.91	1.43	2.10	2.38	3.42	SWALE FOR OFFSITE AREA DRAINAGE
OA3	SWALE 7	0.50	0.55	0.28	15	3.31	4.85	5.50	7.91	0.91	1.33	1.51	2.18	SWALE FOR OFFSITE AREA DRAINAGE
OA3 & A5	DITCH 8	5.56	0.45	2.50	15	3.31	4.85	5.50	7.91	8.28	12.13	13.76	19.79	1 ACRE LOTS
OA2-a	SWALE 9	0.20	0.78	0.16	15	3.31	4.85	5.50	7.91	0.52	0.76	0.86	1.23	ROADSIDE SWALE
OA1c	DITCH 10	1.57	0.30	0.47	15	3.31	4.85	5.50	7.91	1.56	2.28	2.59	3.73	DICTH FOR OFFSITE AREA DRAINAGE

NOTE:

C VALUE FOR SINGLE FAMILY RESIDENTIAL 1 ACRE LOTS = 0.45 (DENTON COUNTY SUBDIVISION RULES & REGULATIONS TABLE IV.1-4)

C VALUE FOR SINGLE FAMILY RESIDENTIAL 1/2 ACRE LOTS = 0.55 (DENTON COUNTY SUBDIVISION RULES & REGULATIONS TABLE IV.1-4)

C VALUE FOR STREET = 0.95 (DENTON COUNTY SUBDIVISION RULES & REGULATIONS TABLE IV.1-4)

C VALUE FOR CLAYEY SOIL, AVERAGE, 5-10% = 0.60 (DENTON COUNTY SUBDIVISION RULES & REGULATIONS TABLE IV.1-4)

THE VALUE FOR RAINFALL INTENSITY IS TAKEN FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 47-48-49, TABLE IV.1-3

DITCH ID Q100 (cfs) A\ DITCH 1 17.92 DITCH 2 7.13	0.020 0.020	MANNING'S N 0.040	WATER DEPTH (ft.)	VELOCITY (fps)	TOTAL DITCH/SWALE DEPTH (ft)	SECTION DETAILS
		0.040	0.91			
DITCH 2 7.13	0.020		• • •	3.47	3.5	SHEET 5 SECTION A-A
	0.020	0.040	0.80	2.77	2.5	SHEET 5 SECTION A-A
DITCH 3 15.27	0.020	0.040	1.07	3.32	2.5	SHEET 6 SECTION F-F
DITCH 4 2.67	0.020	0.040	0.55	2.07	2.5	SHEET 6 SECTION F-F
SWALE 5 3.99	0.005	0.040	0.70	1.25	1.5	SHEET 12-B SECTION L-L
SWALE 6 3.42	0.005	0.040	0.66	1.20	1.5	SHEET 12-B SECTION L-L
SWALE 7 2.18	0.005	0.040	0.56	1.06	1.5	SHEET 12-B SECTION K-K
DITCH 8 19.79	0.015	0.040	1.24	3.20	4.5	SHEET 8 SECTION E-E
SWALE 9 1.23	0.005	0.040	0.37	0.80	1.5	SHEET 12-B SECTION I-I
DITCH 10 3.73	0.0068	0.040	0.77	1.56	3.0	SHEET 12-B SECTION J-J

WEIGHTED RUNOFF COEFFICIENT (DITCH-2)							
LAND USE	TOTAL LAND AREA	RUNOFF COEF.	WEIGHTED RUNOFFF COEF.				
ASPHALT/CONCRETE	0.41	0.95	0.71				
CLAYEY SOIL 5-10%	0.86	0.60	0.71				

V	/EIGHTED RUNOFF	COEFFICIENT (DIT	CH-4)
LAND USE	TOTAL LAND AREA	RUNOFF COEF.	WEIGHTED RUNOFFF COEF.
ASPHALT/CONCRETE	0.19	0.95	0.75
CLAYEY SOIL 5-10%	0.26	0.60	0.75

WEIGHTED RUNOFF COEFFICIENT (DITCH-9)							
LAND USE	TOTAL LAND AREA	RUNOFF COEF.	WEIGHTED RUNOFFF COEF.				
ASPHALT/CONCRETE	0.10	0.95	0.78				
CLAYEY SOIL 5-10%	0.10	0.60	0.76				

			DRIVEWAY CUI	LVERT DATA FOR BLK B LOT 3 1	ГО 9		
STREET STATION	CORRESPONDING LOT AREA	Q100	Q100 TOTAL	CONTRIBUTING LOTS/AREA	CULVERT SIZE*	UPSTREAM INV.	DOWNSTREAM INV.
10+47.78	0.97	4.22	4.22	LOT 9	18"	746.78	746.03
10+95.82	0.81	3.52	7.74	LOT 8 & 9	18"	745.29	744.55
12+49.77	0.55	2.39	10.14	LOT 7, 8 & 9	24"	740.53	739.79
13+88.82	0.55	2.39	12.53	LOT 6, 7, 8 & 9	24"	736.92	736.76
15+11.52	0.55	2.39	14.92	LOT 5, 6, 7, 8 & 9	27"	736.08	735.85
16+55.07	0.55	2.39	17.31	LOT 4, 5, 6, 7, 8 & 9	27"	734.59	734.28
17+61.27	0.14	0.61	17.92	LOT 3, 4, 5, 6, 7, 8 & 9	27"	733.38	733.07
* CHILVEDT LENGTH	-24' MATERIAL-ROD	•	1			•	

\* CULVERT LENGTH=24', MATERIAL=RCP

		DRIV	/EWAY CULVER	T DATA FOR BLK B LOT 1 & 2 C	ULVERTS		
STREET STATION	CORRESPONDING LOT AREA	Q100	Q100 TOTAL	CONTRIBUTING LOTS/AREA	CULVERT SIZE*	UPSTREAM INV.	DOWNSTREAM INV.
20+74.17	2.55	9.08	9.08	LOT 1, OA1a & OA1b	18"	734.11	734.01
19+65.12	1.74	6.19	15.27	LOT 1, 2 & OA1a, OA1b & A3	24"	733.58	733.46

\* CULVERT LENGTH=24', MATERIAL=RCP

		DRIV	EWAY CULVERT	DATA FOR BLK A LOT 3 TO 8 C	ULVERTS		
STREET STATION	CORRESPONDING LOT AREA	Q100	Q100 TOTAL	CONTRIBUTING LOTS/AREA	CULVERT SIZE*	UPSTREAM INV.	DOWNSTREAM INV.
10+80.03	0.21	1.18	1.18	LOT 9	18"	746.82	746.08
12+49.73	0.21	1.18	2.36	LOT 8 & 9	18"	741.58	740.84
13+88.82	0.21	1.18	3.54	LOT 7, 8 & 9	18"	737.83	737.60
15+11.46	0.21	1.18	4.72	LOT 6, 7, 8 & 9	18"	736.59	736.34
16+55.08	0.21	1.18	5.90	LOT 5, 6, 7, 8 & 9	18"	735.12	734.88
17+59.72	0.22	1.24	7.13	LOT 4, 5, 6, 7, 8 & 9	18"	734.05	733.82

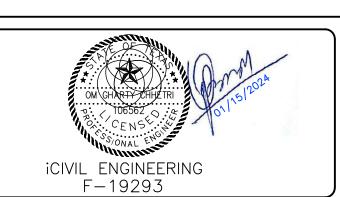
\* CULVERT LENGTH=24', MATERIAL=RCP

		DRIV	EWAY CULVER	T DATA FOR BLK A LOT 1 & 2 CU	JLVERTS		
STREET STATION	CORRESPONDING LOT AREA	Q100	Q100 TOTAL	CONTRIBUTING LOTS/AREA	CULVERT SIZE*	UPSTREAM INV.	DOWNSTREAM INV.
20+74.17	0.29	1.62	1.62	A4	18"	734.13	734.01
19+65.12	0.16	0.89	2.51	A4	18"	733.58	733.46
* CULVERT LENGTH	=24', MATERIAL=RCP						



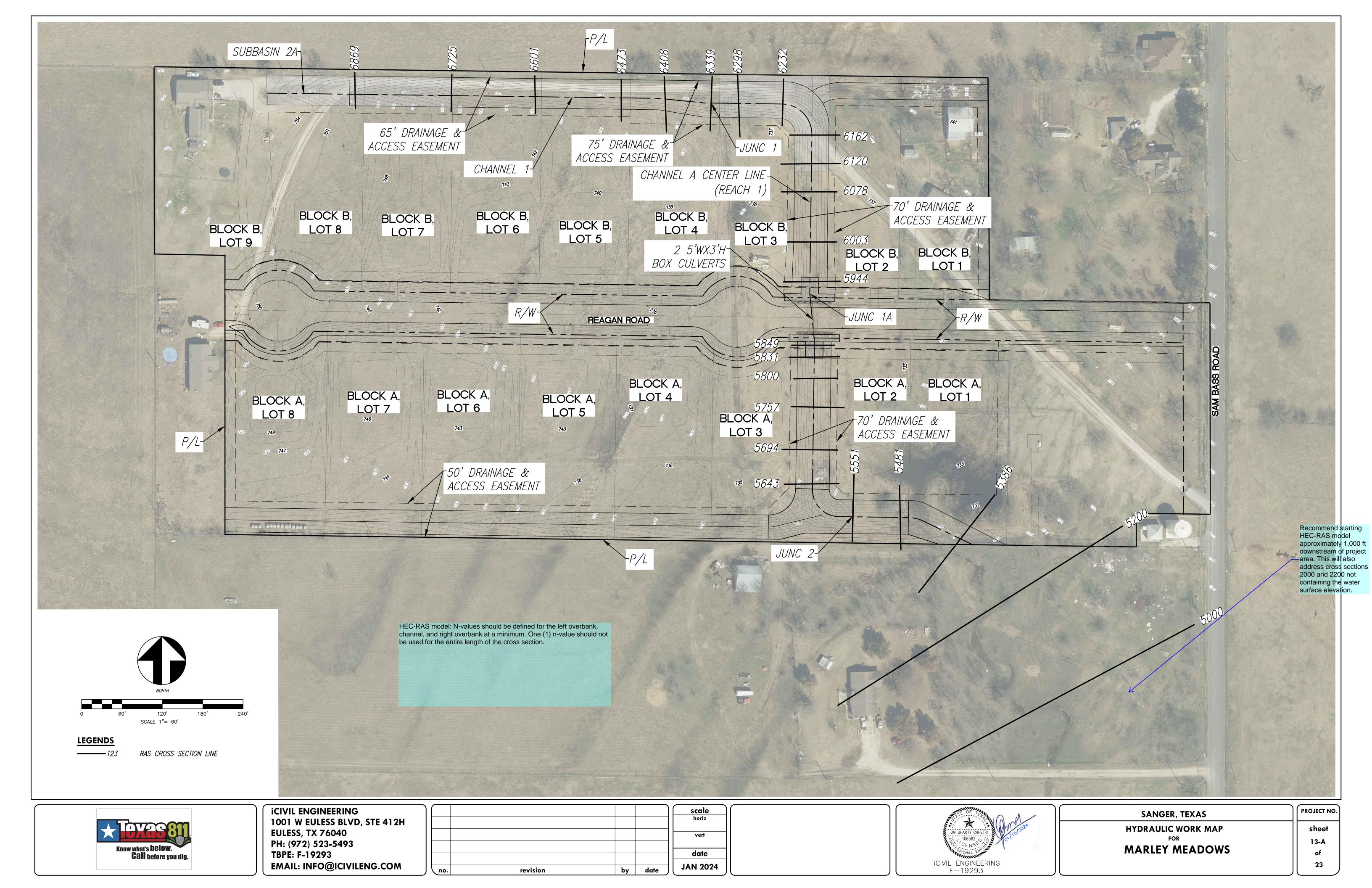
iCIVIL ENGINEERING
1001 W EULESS BLVD, STE 412H
EULESS, TX 76040
PH: (972) 523-5493
TBPE: F-19293
EMAIL: INFO@ICIVILENG.COM

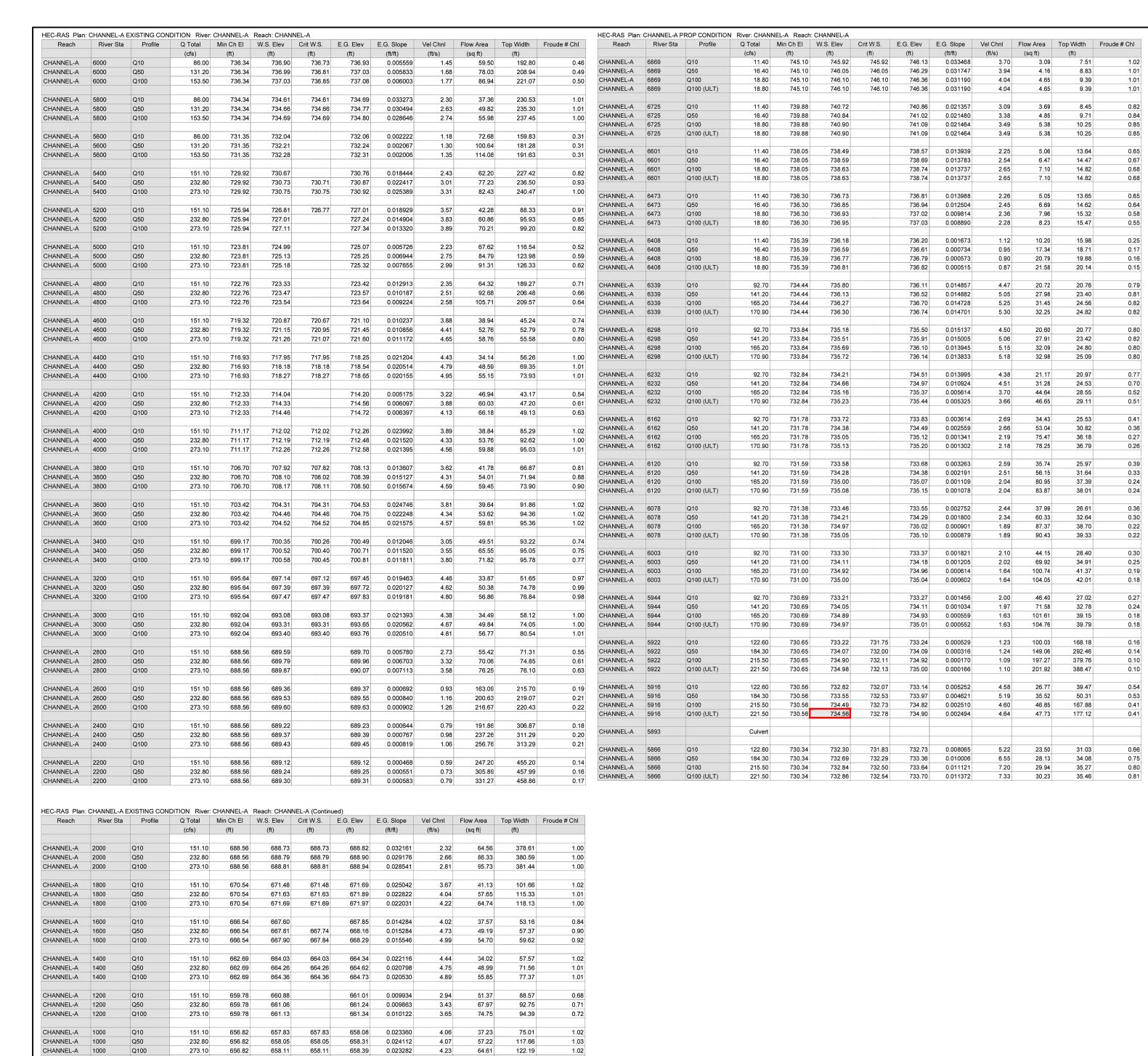
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revision	by	date	JAN 2024



SANGER, TEXAS
DITCH AND CULVERT CALCULATIONS
FOR
<b>MARLEY MEADOWS</b>

sheet
12-B
of
23





Q10 Q50 Q100 (ULT)	122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50	730.22 730.22 730.22 730.22 730.22 730.13 730.13 730.13 730.13 729.97 729.97 729.97 729.77 729.77 729.77 729.77 729.77 729.44 729.44 729.44 729.44 729.44 729.19 729.19 729.19 729.19 729.19 728.75 728.75 728.75 728.75 728.75	732.31 732.78 732.98 733.02 732.23 732.71 732.96 732.96 732.97 732.78 732.82 731.89 732.60 732.63 731.63 732.44 732.34 732.38 731.45 731.96 732.17 732.20		732.50 733.02 733.25 733.29 732.40 732.92 733.14 733.18 732.24 732.76 732.99 733.03 732.80 732.81 732.57 732.80 732.81 732.53 732.57 732.31 732.53 732.57	0.005435 0.005503 0.005503 0.005549 0.005571 0.005007 0.004860 0.004827 0.004835 0.004451 0.004390 0.004471 0.004274 0.004294 0.004274 0.003975 0.003819 0.003829 0.003857	3.51 3.95 4.13 4.17 3.29 3.63 3.77 3.80 3.16 3.49 3.63 3.66 3.14 3.46 3.60 3.63 3.31 3.46 3.49 3.63	34.94 46.69 52.15 53.12 37.27 50.77 57.09 58.22 38.76 52.78 59.30 60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45	23.47 26.48 27.75 27.97 26.10 29.95 31.59 31.88 26.82 30.72 32.37 32.65 26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.53 0.48 0.45 0.50 0.46 0.47 0.47 0.47 0.47 0.44 0.44 0.44
Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q50 Q100 (ULT)	184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50	730.22 730.22 730.22 730.22 730.13 730.13 730.13 730.13 729.97 729.97 729.97 729.77 729.77 729.77 729.77 729.77 729.44 729.44 729.44 729.44 729.44 729.49 729.19 729.19 729.19 729.19 729.19 728.75 728.75 728.75	732.78 732.98 733.02 732.23 732.71 732.96 732.96 732.97 732.78 732.78 732.82 731.89 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		733.02 733.25 733.29 732.40 732.92 733.14 733.18 732.24 732.76 732.99 733.03 732.05 732.57 732.80 732.53 732.53 732.57	0.005503 0.005549 0.005571 0.005077 0.004860 0.004827 0.004835 0.004450 0.004411 0.004390 0.004471 0.004294 0.004274 0.004291 0.003975 0.003819 0.003857 0.003431 0.003339	3.95 4.13 4.17 3.29 3.63 3.77 3.80 3.16 3.49 3.63 3.66 3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	46.69 52.15 53.12 37.27 50.77 57.09 58.22 38.76 52.78 59.30 60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	26.48 27.75 27.97 26.10 29.95 31.59 31.88 26.82 30.72 32.37 32.65 26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.52 0.53 0.53 0.44 0.45 0.50 0.46 0.47 0.47 0.47 0.47 0.44 0.44 0.44 0.44
Q100 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)	215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50	730.22 730.22 730.22 730.13 730.13 730.13 730.13 729.97 729.97 729.97 729.77 729.77 729.77 729.77 729.77 729.44 729.44 729.44 729.44 729.44 729.19 729.19 729.19 729.19 729.19 728.75 728.75 728.75	732.98 733.02 732.23 732.71 732.92 732.96 732.09 732.57 732.78 732.82 731.89 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		733.25 732.40 732.92 733.14 733.18 732.24 732.76 732.99 733.03 732.05 732.57 732.80 732.84 731.77 732.31 732.53 732.57	0.005549 0.005571 0.005007 0.004860 0.004827 0.004835 0.004550 0.004411 0.004390 0.004401 0.004294 0.004274 0.004291 0.003819 0.003857 0.003839	4.13 4.17 3.29 3.63 3.77 3.80 3.16 3.49 3.63 3.66 3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	52.15 53.12 37.27 50.77 57.09 58.22 38.76 52.78 59.30 60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45	27.75 27.97 26.10 29.95 31.59 31.88 26.82 30.72 32.37 32.65 26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.53 0.489 0.490 0.500 0.460 0.470 0.470 0.470 0.470 0.470 0.440 0.444 0.444 0.445
Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)	221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50	730.22  730.13  730.13  730.13  730.13  729.97  729.97  729.97  729.77  729.77  729.77  729.77  729.44  729.44  729.44  729.44  729.44  729.19  729.19  729.19  729.19  729.19  728.75  728.75  728.75	733.02 732.23 732.71 732.92 732.96 732.09 732.57 732.78 732.82 731.89 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20 730.93		733.29  732.40  732.92  733.14  733.18  732.24  732.76  732.99  733.03  732.05  732.57  732.80  732.31  732.53  732.57	0.005571  0.005007 0.004860 0.004827 0.004835  0.004550 0.004411 0.004390 0.004401  0.004294 0.004274 0.004291  0.003819 0.003857  0.003431 0.003339	3.29 3.63 3.77 3.80 3.16 3.49 3.63 3.66 3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 3.53	53.12 37.27 50.77 57.09 58.22 38.76 52.78 59.30 60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	27.97  26.10 29.95 31.59 31.88  26.82 30.72 32.37 32.65  26.92 30.87 32.53 32.81  27.39 31.45 33.12 33.38	0.53 0.49 0.49 0.50 0.50 0.46 0.47 0.47 0.47 0.47 0.44 0.44 0.44 0.44 0.45
Q10 Q50 Q100 (ULT)	122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 125.50 221.50	730.13 730.13 730.13 730.13 730.13 729.97 729.97 729.97 729.77 729.77 729.77 729.77 729.44 729.44 729.44 729.44 729.44 729.19 729.19 729.19 729.19 729.19	732.23 732.71 732.92 732.96 732.09 732.57 732.78 732.82 731.89 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.40 732.92 733.14 733.18 732.24 732.76 732.99 733.03 732.05 732.57 732.80 732.84 731.77 732.31 732.53 732.57 731.58 732.12 732.34	0.005007 0.004860 0.004827 0.004835 0.004550 0.004411 0.004401 0.004471 0.004294 0.004274 0.004291 0.003819 0.003829 0.003857	3.29 3.63 3.77 3.80 3.16 3.49 3.63 3.66 3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	37.27 50.77 57.09 58.22 38.76 52.78 59.30 60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	26.10 29.95 31.59 31.88 26.82 30.72 32.37 32.65 26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.499 0.500 0.500 0.400 0.477 0.477 0.477 0.470 0.444 0.444 0.444
Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)	184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 121.50 221.50 122.60 184.30 215.50 221.50 125.50 221.50	730.13 730.13 730.13 730.13 730.13 729.97 729.97 729.97 729.77 729.77 729.77 729.77 729.44 729.44 729.44 729.44 729.19 729.19 729.19 729.19 729.19 729.19 728.75 728.75 728.75	732.71 732.92 732.96 732.09 732.57 732.78 732.82 731.89 732.39 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.92 733.14 733.18 732.24 732.76 732.99 733.03 732.05 732.57 732.80 732.84 731.77 732.31 732.53 732.57	0.004860 0.004827 0.004835 0.004450 0.004411 0.004390 0.004401 0.004294 0.004274 0.004291 0.003875 0.003819 0.003829 0.003857	3.63 3.77 3.80 3.16 3.49 3.63 3.66 3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	50.77 57.09 58.22 38.76 52.78 59.30 60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	29.95 31.59 31.88 26.82 30.72 32.37 32.65 26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.49 0.50 0.50 0.40 0.47 0.47 0.46 0.46 0.47 0.44 0.44 0.44
Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)	184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 121.50 221.50 122.60 184.30 215.50 221.50 125.50 221.50	730.13 730.13 730.13 730.13 730.13 729.97 729.97 729.97 729.77 729.77 729.77 729.77 729.44 729.44 729.44 729.44 729.19 729.19 729.19 729.19 729.19 729.19 728.75 728.75 728.75	732.71 732.92 732.96 732.09 732.57 732.78 732.82 731.89 732.39 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.92 733.14 733.18 732.24 732.76 732.99 733.03 732.05 732.57 732.80 732.84 731.77 732.31 732.53 732.57	0.004860 0.004827 0.004835 0.004450 0.004411 0.004390 0.004401 0.004294 0.004274 0.004291 0.003875 0.003819 0.003829 0.003857	3.63 3.77 3.80 3.16 3.49 3.63 3.66 3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	50.77 57.09 58.22 38.76 52.78 59.30 60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	29.95 31.59 31.88 26.82 30.72 32.37 32.65 26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.49 0.50 0.50 0.46 0.47 0.47 0.47 0.46 0.46 0.47 0.47 0.44 0.44 0.44 0.45
Q100 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q50 Q100 (ULT)	215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 125.50 221.50 155.70 231.70 269.40 275.40	730.13 730.13 730.13 730.13 729.97 729.97 729.97 729.77 729.77 729.77 729.44 729.44 729.44 729.44 729.19 729.19 729.19 729.19 729.19 728.75 728.75 728.75	732.92 732.96 732.09 732.57 732.78 732.82 731.89 732.39 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		733.14 733.18 732.24 732.76 732.99 733.03 732.05 732.57 732.80 732.84 731.77 732.31 732.53 732.57	0.004827 0.004835 0.004450 0.004411 0.004390 0.004401 0.004294 0.004274 0.004291 0.003875 0.003819 0.003829 0.003857	3.77 3.80 3.16 3.49 3.63 3.66 3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	57.09 58.22 38.76 52.78 59.30 60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	31.59 31.88 26.82 30.72 32.37 32.65 26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.50 0.46 0.47 0.47 0.46 0.46 0.47 0.44 0.44 0.44 0.44
Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)	221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  1275.40	730.13  729.97  729.97  729.97  729.77  729.77  729.77  729.44  729.44  729.44  729.44  729.19  729.19  729.19  729.19  729.19  728.75  728.75  728.75	732.96 732.09 732.57 732.78 732.82 731.89 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20 730.93		733.18  732.24  732.76  732.99  733.03  732.05  732.80  732.84  731.77  732.31  732.53  732.57  731.58  732.12  732.34	0.004835 0.004550 0.004411 0.004390 0.004401 0.004294 0.004274 0.004291 0.003875 0.003819 0.003829 0.003857 0.003431 0.003339	3.80 3.16 3.49 3.63 3.66 3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	58.22 38.76 52.78 59.30 60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	31.88 26.82 30.72 32.37 32.65 26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.50 0.46 0.47 0.47 0.46 0.46 0.47 0.44 0.44 0.44
Q10 Q50 Q100 (ULT)	122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50	729.97 729.97 729.97 729.97 729.77 729.77 729.77 729.77 729.44 729.44 729.44 729.44 729.19 729.19 729.19 729.19 729.19 728.75 728.75	732.09 732.57 732.78 732.82 731.89 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.24 732.76 732.99 733.03 732.05 732.57 732.80 732.84 731.77 732.31 732.53 732.57	0.004550 0.004411 0.004390 0.004401 0.004471 0.004294 0.004274 0.004291 0.003857 0.003857 0.003431 0.003339	3.16 3.49 3.63 3.66 3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	38.76 52.78 59.30 60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45	26.82 30.72 32.37 32.65 26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.46 0.47 0.47 0.47 0.46 0.46 0.47 0.44 0.44
Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q100 (ULT)	184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50	729.97 729.97 729.97 729.77 729.77 729.77 729.77 729.44 729.44 729.44 729.44 729.19 729.19 729.19 729.19 729.19 728.75 728.75	732.57 732.78 732.82 731.89 732.39 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.76 732.99 733.03 732.05 732.57 732.80 732.84 731.77 732.31 732.53 732.57 731.58 732.12	0.004411 0.004390 0.004401 0.004471 0.004294 0.004274 0.004291 0.003975 0.003819 0.003829 0.003857	3.49 3.63 3.66 3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	52.78 59.30 60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	30.72 32.37 32.65 26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.47 0.47 0.47 0.46 0.46 0.47 0.47 0.44 0.44
Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q100 (ULT)	184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50	729.97 729.97 729.97 729.77 729.77 729.77 729.77 729.44 729.44 729.44 729.44 729.19 729.19 729.19 729.19 729.19 728.75 728.75	732.57 732.78 732.82 731.89 732.39 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.76 732.99 733.03 732.05 732.57 732.80 732.84 731.77 732.31 732.53 732.57 731.58 732.12	0.004411 0.004390 0.004401 0.004471 0.004294 0.004274 0.004291 0.003975 0.003819 0.003829 0.003857	3.49 3.63 3.66 3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	52.78 59.30 60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	30.72 32.37 32.65 26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.47 0.47 0.47 0.46 0.46 0.47 0.47 0.44 0.44
Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q100 (ULT)	184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50	729.97 729.97 729.97 729.77 729.77 729.77 729.77 729.44 729.44 729.44 729.44 729.19 729.19 729.19 729.19 729.19 728.75 728.75	732.57 732.78 732.82 731.89 732.39 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.76 732.99 733.03 732.05 732.57 732.80 732.84 731.77 732.31 732.53 732.57 731.58 732.12	0.004411 0.004390 0.004401 0.004471 0.004294 0.004274 0.004291 0.003975 0.003819 0.003829 0.003857	3.49 3.63 3.66 3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	52.78 59.30 60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	30.72 32.37 32.65 26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.47 0.47 0.47 0.46 0.46 0.47 0.47 0.44 0.44
Q100 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q50 Q100 (ULT)	215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50	729.97 729.97 729.77 729.77 729.77 729.77 729.44 729.44 729.44 729.19 729.19 729.19 729.19 729.19 728.75 728.75	732.78 732.82 731.89 732.39 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.99 733.03 732.05 732.57 732.80 732.84 731.77 732.31 732.53 732.57 731.58 732.12	0.004390 0.004401 0.004471 0.004294 0.004274 0.004291 0.003975 0.003819 0.003829 0.003857	3.63 3.66 3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	59.30 60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	32.37 32.65 26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.47 0.46 0.46 0.47 0.47 0.44 0.44
Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)	221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  125.50 221.50  155.70 231.70 269.40 275.40	729.97 729.77 729.77 729.77 729.77 729.44 729.44 729.44 729.19 729.19 729.19 729.19 729.19 728.75 728.75 728.75	732.82 731.89 732.39 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		733.03 732.05 732.57 732.80 732.84 731.77 732.31 732.53 732.57 731.58 732.12 732.34	0.004401 0.004471 0.004294 0.004274 0.004291 0.003975 0.003819 0.003829 0.003857 0.003431 0.003339	3.66 3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	60.45 39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	32.65 26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.47 0.46 0.46 0.47 0.47 0.44 0.44 0.45
Q10 Q50 Q100 (ULT)	122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 215.50 221.50 151.70 269.40 275.40	729.77 729.77 729.77 729.77 729.44 729.44 729.44 729.49 729.19 729.19 729.19 729.19 728.75 728.75	731.89 732.39 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.05 732.57 732.80 732.84 731.77 732.31 732.53 732.57 731.58 732.12 732.34	0.004471 0.004294 0.004274 0.004291 0.003975 0.003819 0.003829 0.003857 0.003431 0.003339	3.14 3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	39.02 53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	26.92 30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.46 0.46 0.47 0.47 0.44 0.44 0.45
Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)	184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 21.50 221.50 21.50 21.50	729.77 729.77 729.77 729.44 729.44 729.44 729.49 729.19 729.19 729.19 729.19 728.75 728.75 728.75	732.39 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.57 732.80 732.84 731.77 732.31 732.53 732.57 731.58 732.12 732.34	0.004294 0.004274 0.004291 0.003975 0.003819 0.003829 0.003857 0.003431 0.003339	3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.46 0.47 0.47 0.44 0.44 0.45
Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)	184.30 215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 21.50 221.50 21.50 21.50	729.77 729.77 729.77 729.44 729.44 729.44 729.49 729.19 729.19 729.19 729.19 728.75 728.75 728.75	732.39 732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.57 732.80 732.84 731.77 732.31 732.53 732.57 731.58 732.12 732.34	0.004294 0.004274 0.004291 0.003975 0.003819 0.003829 0.003857 0.003431 0.003339	3.46 3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	53.31 59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	30.87 32.53 32.81 27.39 31.45 33.12 33.38	0.46 0.47 0.47 0.44 0.44 0.45
Q100 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)	215.50 221.50 122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 151.70 269.40 275.40	729.77 729.77 729.44 729.44 729.44 729.49 729.19 729.19 729.19 729.19 728.75 728.75 728.75	732.60 732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.80 732.84 731.77 732.31 732.53 732.57 731.58 732.12 732.34	0.004274 0.004291 0.003975 0.003819 0.003829 0.003857 0.003431 0.003339	3.60 3.63 3.01 3.31 3.46 3.49 2.85 3.15	59.89 61.03 40.71 55.64 62.35 63.45 42.97 58.47	32.53 32.81 27.39 31.45 33.12 33.38	0.47 0.47 0.44 0.44 0.44
Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)	221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  215.50 221.50  251.70 269.40 275.40	729.77 729.44 729.44 729.44 729.19 729.19 729.19 729.19 729.75 728.75 728.75	732.63 731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20 730.93		732.84 731.77 732.31 732.53 732.57 731.58 732.12 732.34	0.004291 0.003975 0.003819 0.003829 0.003857 0.003431 0.003339	3.63 3.01 3.31 3.46 3.49 2.85 3.15	61.03 40.71 55.64 62.35 63.45 42.97 58.47	32.81 27.39 31.45 33.12 33.38	0.47 0.44 0.44 0.45
Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q100 (ULT)	221.50  122.60 184.30 215.50 221.50  122.60 184.30 215.50 221.50  215.50 221.50  251.70 269.40 275.40	729.77 729.44 729.44 729.44 729.19 729.19 729.19 729.19 729.75 728.75 728.75	731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.84 731.77 732.31 732.53 732.57 731.58 732.12 732.34	0.004291 0.003975 0.003819 0.003829 0.003857 0.003431 0.003339	3.01 3.31 3.46 3.49 2.85 3.15	40.71 55.64 62.35 63.45 42.97 58.47	27.39 31.45 33.12 33.38	0.47 0.44 0.44 0.45
Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q100 (ULT)	122.60 184.30 215.50 221.50 122.60 184.30 215.50 221.50 151.70 231.70 269.40 275.40	729.44 729.44 729.44 729.44 729.19 729.19 729.19 729.19 728.75 728.75 728.75	731.63 732.14 732.34 732.38 731.45 731.96 732.17 732.20		731.77 732.31 732.53 732.57 731.58 732.12 732.34	0.003975 0.003819 0.003829 0.003857 0.003431 0.003339	3.01 3.31 3.46 3.49 2.85 3.15	40.71 55.64 62.35 63.45 42.97 58.47	27.39 31.45 33.12 33.38	0.44 0.44 0.45
Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)	184.30 215.50 221.50 122.60 184.30 215.50 221.50 151.70 231.70 269.40 275.40	729.44 729.44 729.44 729.19 729.19 729.19 729.19 728.75 728.75 728.75	732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.31 732.53 732.57 731.58 732.12 732.34	0.003819 0.003829 0.003857 0.003431 0.003339	3.31 3.46 3.49 2.85 3.15	55.64 62.35 63.45 42.97 58.47	31.45 33.12 33.38	0.44 0.44 0.45
Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)	184.30 215.50 221.50 122.60 184.30 215.50 221.50 151.70 231.70 269.40 275.40	729.44 729.44 729.44 729.19 729.19 729.19 729.19 728.75 728.75 728.75	732.14 732.34 732.38 731.45 731.96 732.17 732.20		732.31 732.53 732.57 731.58 732.12 732.34	0.003819 0.003829 0.003857 0.003431 0.003339	3.31 3.46 3.49 2.85 3.15	55.64 62.35 63.45 42.97 58.47	31.45 33.12 33.38	0.44 0.44 0.45
Q100 Q100 (ULT)  Q10 Q50 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)	215.50 221.50 122.60 184.30 215.50 221.50 151.70 269.40 275.40	729.44 729.44 729.19 729.19 729.19 729.19 728.75 728.75 728.75	732.34 732.38 731.45 731.96 732.17 732.20		732.53 732.57 731.58 732.12 732.34	0.003829 0.003857 0.003431 0.003339	3.46 3.49 2.85 3.15	62.35 63.45 42.97 58.47	33.12 33.38	0.44 0.45
Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)  Q10 Q50 Q100 Q100 (ULT)	221.50 122.60 184.30 215.50 221.50 151.70 231.70 269.40 275.40	729.44 729.19 729.19 729.19 729.19 728.75 728.75 728.75	732.38 731.45 731.96 732.17 732.20 730.93		732.57 731.58 732.12 732.34	0.003857 0.003431 0.003339	3.49 2.85 3.15	63.45 42.97 58.47	33.38	0.45
Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100	122.60 184.30 215.50 221.50 151.70 231.70 269.40 275.40	729.19 729.19 729.19 729.19 729.19 728.75 728.75 728.75	731.45 731.96 732.17 732.20 730.93		731.58 732.12 732.34	0.003431 0.003339	2.85 3.15	42.97 58.47		
Q50 Q100 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100	184.30 215.50 221.50 151.70 231.70 269.40 275.40	729.19 729.19 729.19 728.75 728.75 728.75	731.96 732.17 732.20 730.93		732.12 732.34	0.003339	3.15	58.47	28.07	0.41
Q50 Q100 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100	184.30 215.50 221.50 151.70 231.70 269.40 275.40	729.19 729.19 729.19 728.75 728.75 728.75	731.96 732.17 732.20 730.93		732.12 732.34	0.003339	3.15	58.47	28.07	0.41
Q100 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100	215.50 221.50 151.70 231.70 269.40 275.40	729.19 729.19 728.75 728.75 728.75	732.17 732.20 730.93		732.34					
Q100 (ULT)  Q10  Q50  Q100  Q100 (ULT)  Q10  Q50  Q100	221.50 151.70 231.70 269.40 275.40	729.19 728.75 728.75 728.75	732.20 730.93			0.003380	2.20		32.19	0.41
Q100 (ULT)  Q10  Q50  Q100  Q100 (ULT)  Q10  Q50  Q100	221.50 151.70 231.70 269.40 275.40	729.19 728.75 728.75 728.75	732.20 730.93				3.30	65.30	33.84	0.42
Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100	151.70 231.70 269.40 275.40	728.75 728.75 728.75	730.93		102.01	0.003418	3.34	66.36	34.09	0.42
Q50 Q100 Q100 (ULT) Q10 Q50 Q100	231.70 269.40 275.40	728.75 728.75								
Q50 Q100 Q100 (ULT) Q10 Q50 Q100	231.70 269.40 275.40	728.75 728.75			731.15	0.006040	3.71	40.84	27.46	0.54
Q100 Q100 (ULT) Q10 Q50 Q100	269.40 275.40 151.70	728.75	724 20	-						
Q100 (ULT)  Q10  Q50  Q100	275.40 151.70		731.39		731.68	0.006428	4.26	54.39	31.16	0.57
Q10 Q50 Q100	151.70	728.75	731.58		731.89	0.006558	4.47	60.31	32.64	0.58
Q50 Q100			731.61		731.92	0.006582	4.50	61.21	32.86	0.58
Q50 Q100										
Q100	224.70	728.40	730.36	729.96	730.65	0.009203	4.32	35.10	25.80	0.65
	231.70	728.40	730.70	730.36	731.12	0.011329	5.23	44.27	28.51	0.74
	269.40	728.40	730.83	730.51	731.32	0.012203	5.60	48.09	32.76	0.77
Q100 (021)	275.40	728.40	730.85	730.56	731.35	0.012381	5.67	48.61	33.33	0.78
	210.40	120.40	700.00	700.00	701.00	0.012001	0.07	40.01	00.00	0.70
040	454.70	707.04	700.40	700.04	700.00	0.040500	2.24	45.40	00.40	0.00
Q10	151.70	727.91	729.46	729.24	729.63	0.012509	3.34	45.49	63.10	0.69
Q50	231.70	727.91	729.63	729.49	729.89	0.015912	4.06	57.13	70.80	0.80
Q100	269.40	727.91	729.69	729.59	729.99	0.017304	4.36	61.82	75.14	0.84
Q100 (ULT)	275.40	727.91	729.70	729.59	730.01	0.017610	4.41	62.47	77.41	0.84
Q10	151.70	725.93	726.73	726.68	726.91	0.017397	3.42	44.36	92.93	0.87
Q50	231.70	725.93	726.92		727.13	0.013737	3.69	62.83	98.42	0.81
										0.80
										0.80
Q100 (OL1)	273.40	720.00	727.01		121.24	0.012041	3.01	12.22	101.03	0.00
0.40	454 70	700.00	70400	70405	705.05	0.005004	2.22	22.22	100.00	0.54
				724.65						0.51
										0.58
Q100	269.40	723.80	725.16			0.007412	2.93	92.03	128.36	0.61
Q100 (ULT)	275.40	723.80	725.17		725.30	0.007497	2.96	93.03	128.66	0.61
Q10	151.70	722.76	723.33		723.42	0.012717	2.34	64.82	189.62	0.71
Q50	231.70	722.76	723.47		723.57	0.010022	2.49	92.88	206.53	0.66
										0.64
										0.64
Q TOO (OLT)	213.40	122.10	123.34		125.04	0.008107	2.50	100.70	203.19	0.04
040	454 70	740.00	700.07	700.07	704.40	0.040400	2.04	20.00	4E 47	
										0.74
										0.79
Q100	269.40	719.32	721.25	721.06	721.58	0.011294	4.65	57.94	55.22	0.80
Q100 (ULT)	275.40	719.32	721.26	721.08	721.60	0.011305	4.68	58.87	55.63	0.80
Q10	151.70	716.93	717.92	717.92	718.27	0.020450	4.71	32.24	54.02	1.00
Q50	231.70	716.93	718.17	718.17	718.58	0.018924	5.13	45.12	69.07	1.00
Q100	269.40	716.93	718.27		718.71	0.018638	5.33	50.50	73.91	1.00
										1.00
Q 100 (OL1)	210.40	1 10.00	, , 0.28	110.23	, ,0.70	5.515055	5.51	51.50	1-7.00	1.00
040	454.70	740.00	74404		744.00	0.005405	2.00	47.04	40.00	2.5.
										0.54
										0.60
Q100	269.40	712.33	714.45		714.71	0.006360	4.10	65.66	48.96	0.62
Q100 (ULT)	275.40	712.33	714.46		714.73	0.006415	4.14	66.51	49.23	0.63
Q10	151.70	711.17	712.02	712.02	712.26	0.023921	3.89	38.98	85.36	1.02
Q50	231.70	711.17	712.18	712.18	712.48	0.022115	4.36	53.11	92.36	1.01
										1.01
										1.01
Q TOO (OLT)	210.40	111.11	112.20	112.20	1 12.30	0.02 1300	7.37	00.24	99.17	1.01
	Q50 Q100 (ULT)  Q10 Q50 Q100 (ULT)	Q100 269.40 Q100 (ULT) 275.40  Q10 151.70 Q50 231.70 Q100 269.40 Q100 (ULT) 275.40  Q10 151.70 Q50 231.70 Q100 269.40 Q100 (ULT) 275.40  Q10 151.70 Q50 231.70 Q100 269.40 Q100 (ULT) 275.40  Q10 151.70 Q50 231.70 Q100 269.40 Q100 (ULT) 275.40  Q10 151.70 Q50 231.70 Q100 269.40 Q100 ULT) 275.40  Q10 151.70 Q50 231.70 Q100 269.40 Q100 ULT) 275.40  Q10 151.70 Q50 231.70 Q100 269.40 Q100 ULT) 275.40  Q10 151.70 Q50 231.70 Q100 269.40 Q100 151.70 Q50 231.70 Q100 269.40	Q100         269.40         725.93           Q100 (ULT)         275.40         725.93           Q10         151.70         723.80           Q50         231.70         723.80           Q100         269.40         723.80           Q100 (ULT)         275.40         723.80           Q10         151.70         722.76           Q50         231.70         722.76           Q100         269.40         722.76           Q100 (ULT)         275.40         722.76           Q10         151.70         719.32           Q50         231.70         719.32           Q50         231.70         719.32           Q50         231.70         719.32           Q100         269.40         719.32           Q100         151.70         716.93           Q50         231.70         716.93           Q10         151.70         716.93           Q100         269.40         716.93           Q100         269.40         716.93           Q10         151.70         712.33           Q50         231.70         712.33           Q50         231.70         712.33	Q100         269.40         725.93         727.00           Q100 (ULT)         275.40         725.93         727.01           Q10         151.70         723.80         724.98           Q50         231.70         723.80         725.11           Q100         269.40         723.80         725.16           Q100 (ULT)         275.40         723.80         725.17           Q10         151.70         722.76         723.33           Q50         231.70         722.76         723.47           Q100         269.40         722.76         723.53           Q100 (ULT)         275.40         722.76         723.53           Q100 (ULT)         275.40         722.76         723.54           Q10         151.70         719.32         720.87           Q50         231.70         719.32         721.26           Q100 (ULT)         275.40         719.32         721.26           Q100 (ULT)         275.40         719.32         721.26           Q100 (ULT)         275.40         716.93         718.27           Q100 (ULT)         275.40         716.93         718.27           Q100 (ULT)         275.40         716.93 </td <td>Q100         269.40         725.93         727.00           Q100 (ULT)         275.40         725.93         727.01           Q10         151.70         723.80         724.98         724.65           Q50         231.70         723.80         725.11         725.16           Q100         269.40         723.80         725.16         725.17           Q100 (ULT)         275.40         723.80         725.17           Q10         151.70         722.76         723.33           Q50         231.70         722.76         723.47           Q100         269.40         722.76         723.53           Q100 (ULT)         275.40         722.76         723.54           Q10         151.70         719.32         720.87         720.87           Q50         231.70         719.32         721.14         720.95           Q100         269.40         719.32         721.26         721.06           Q100 (ULT)         275.40         719.32         721.26         721.08           Q10         151.70         716.93         717.92         717.92           Q50         231.70         716.93         718.27         718.27</td> <td>Q100         269.40         725.93         727.00         727.23           Q100 (ULT)         275.40         725.93         727.01         727.24           Q10         151.70         723.80         724.98         724.65         725.05           Q50         231.70         723.80         725.11         725.22           Q100         269.40         723.80         725.16         725.29           Q100 (ULT)         275.40         723.80         725.17         725.30           Q10         151.70         722.76         723.33         723.42           Q50         231.70         722.76         723.47         723.57           Q100         269.40         722.76         723.53         723.63           Q100 (ULT)         275.40         722.76         723.53         723.64           Q100 (ULT)         275.40         722.76         723.54         723.64           Q100 (ULT)         275.40         719.32         721.14         720.95         721.10           Q50         231.70         719.32         721.25         721.06         721.58           Q100 (ULT)         275.40         719.32         721.26         721.08         721.60</td> <td>Q100         269.40         725.93         727.00         727.23         0.012776           Q100 (ULT)         275.40         725.93         727.01         727.24         0.012641           Q10         151.70         723.80         724.98         724.65         725.05         0.005664           Q50         231.70         723.80         725.16         725.22         0.006832           Q100         269.40         723.80         725.16         725.29         0.007412           Q100 (ULT)         275.40         723.80         725.17         725.30         0.007497           Q10         151.70         722.76         723.33         723.42         0.012717           Q50         231.70         722.76         723.53         723.63         0.009208           Q100         269.40         722.76         723.54         723.64         0.009107           Q10         151.70         719.32         720.87         720.67         721.10         0.010400           Q50         231.70         719.32         721.44         720.95         721.45         0.011400           Q50         231.70         719.32         721.25         721.06         721.58         0.011294<td>Q100         269.40         725.93         727.00         727.23         0.012776         3.80           Q100 (ULT)         275.40         725.93         727.01         727.24         0.012641         3.81           Q10         151.70         723.80         724.98         724.65         725.05         0.005664         2.20           Q50         231.70         723.80         725.11         725.22         0.006832         2.71           Q100         269.40         723.80         725.16         725.29         0.007497         2.96           Q100 (ULT)         275.40         723.80         725.17         725.30         0.007497         2.96           Q10         151.70         722.76         723.33         723.42         0.012717         2.34           Q50         231.70         722.76         723.53         723.63         0.009208         2.57           Q100 (ULT)         275.40         722.76         723.53         723.63         0.009208         2.57           Q100 (ULT)         275.40         722.76         723.54         723.63         0.009208         2.57           Q100 (ULT)         275.40         722.76         723.54         723.64         0.009</td><td>Q100         269.40         725.93         727.00         727.23         0.012776         3.80         70.94           Q100 (ULT)         275.40         725.93         727.01         727.24         0.012641         3.81         72.22           Q10         151.70         723.80         724.98         724.65         725.05         0.005664         2.20         68.96           Q50         231.70         723.80         725.16         725.29         0.007412         2.93         92.03           Q100         269.40         723.80         725.16         725.29         0.007412         2.93         92.03           Q100 (ULT)         275.40         723.80         725.17         725.30         0.007497         2.96         93.03           Q10         151.70         722.76         723.33         723.42         0.012717         2.34         64.82           Q50         231.70         722.76         723.53         723.63         0.009208         2.57         104.87           Q10 (ULT)         275.40         722.76         723.54         723.64         0.009107         2.58         106.70           Q10         151.70         719.32         720.87         720.67</td><td>  Q100   269.40   725.93   727.00   727.23   0.012776   3.80   70.94   100.71     Q100 (ULT)   275.40   725.93   727.01   727.24   0.012641   3.81   72.22   101.09     Q10</td></td>	Q100         269.40         725.93         727.00           Q100 (ULT)         275.40         725.93         727.01           Q10         151.70         723.80         724.98         724.65           Q50         231.70         723.80         725.11         725.16           Q100         269.40         723.80         725.16         725.17           Q100 (ULT)         275.40         723.80         725.17           Q10         151.70         722.76         723.33           Q50         231.70         722.76         723.47           Q100         269.40         722.76         723.53           Q100 (ULT)         275.40         722.76         723.54           Q10         151.70         719.32         720.87         720.87           Q50         231.70         719.32         721.14         720.95           Q100         269.40         719.32         721.26         721.06           Q100 (ULT)         275.40         719.32         721.26         721.08           Q10         151.70         716.93         717.92         717.92           Q50         231.70         716.93         718.27         718.27	Q100         269.40         725.93         727.00         727.23           Q100 (ULT)         275.40         725.93         727.01         727.24           Q10         151.70         723.80         724.98         724.65         725.05           Q50         231.70         723.80         725.11         725.22           Q100         269.40         723.80         725.16         725.29           Q100 (ULT)         275.40         723.80         725.17         725.30           Q10         151.70         722.76         723.33         723.42           Q50         231.70         722.76         723.47         723.57           Q100         269.40         722.76         723.53         723.63           Q100 (ULT)         275.40         722.76         723.53         723.64           Q100 (ULT)         275.40         722.76         723.54         723.64           Q100 (ULT)         275.40         719.32         721.14         720.95         721.10           Q50         231.70         719.32         721.25         721.06         721.58           Q100 (ULT)         275.40         719.32         721.26         721.08         721.60	Q100         269.40         725.93         727.00         727.23         0.012776           Q100 (ULT)         275.40         725.93         727.01         727.24         0.012641           Q10         151.70         723.80         724.98         724.65         725.05         0.005664           Q50         231.70         723.80         725.16         725.22         0.006832           Q100         269.40         723.80         725.16         725.29         0.007412           Q100 (ULT)         275.40         723.80         725.17         725.30         0.007497           Q10         151.70         722.76         723.33         723.42         0.012717           Q50         231.70         722.76         723.53         723.63         0.009208           Q100         269.40         722.76         723.54         723.64         0.009107           Q10         151.70         719.32         720.87         720.67         721.10         0.010400           Q50         231.70         719.32         721.44         720.95         721.45         0.011400           Q50         231.70         719.32         721.25         721.06         721.58         0.011294 <td>Q100         269.40         725.93         727.00         727.23         0.012776         3.80           Q100 (ULT)         275.40         725.93         727.01         727.24         0.012641         3.81           Q10         151.70         723.80         724.98         724.65         725.05         0.005664         2.20           Q50         231.70         723.80         725.11         725.22         0.006832         2.71           Q100         269.40         723.80         725.16         725.29         0.007497         2.96           Q100 (ULT)         275.40         723.80         725.17         725.30         0.007497         2.96           Q10         151.70         722.76         723.33         723.42         0.012717         2.34           Q50         231.70         722.76         723.53         723.63         0.009208         2.57           Q100 (ULT)         275.40         722.76         723.53         723.63         0.009208         2.57           Q100 (ULT)         275.40         722.76         723.54         723.63         0.009208         2.57           Q100 (ULT)         275.40         722.76         723.54         723.64         0.009</td> <td>Q100         269.40         725.93         727.00         727.23         0.012776         3.80         70.94           Q100 (ULT)         275.40         725.93         727.01         727.24         0.012641         3.81         72.22           Q10         151.70         723.80         724.98         724.65         725.05         0.005664         2.20         68.96           Q50         231.70         723.80         725.16         725.29         0.007412         2.93         92.03           Q100         269.40         723.80         725.16         725.29         0.007412         2.93         92.03           Q100 (ULT)         275.40         723.80         725.17         725.30         0.007497         2.96         93.03           Q10         151.70         722.76         723.33         723.42         0.012717         2.34         64.82           Q50         231.70         722.76         723.53         723.63         0.009208         2.57         104.87           Q10 (ULT)         275.40         722.76         723.54         723.64         0.009107         2.58         106.70           Q10         151.70         719.32         720.87         720.67</td> <td>  Q100   269.40   725.93   727.00   727.23   0.012776   3.80   70.94   100.71     Q100 (ULT)   275.40   725.93   727.01   727.24   0.012641   3.81   72.22   101.09     Q10</td>	Q100         269.40         725.93         727.00         727.23         0.012776         3.80           Q100 (ULT)         275.40         725.93         727.01         727.24         0.012641         3.81           Q10         151.70         723.80         724.98         724.65         725.05         0.005664         2.20           Q50         231.70         723.80         725.11         725.22         0.006832         2.71           Q100         269.40         723.80         725.16         725.29         0.007497         2.96           Q100 (ULT)         275.40         723.80         725.17         725.30         0.007497         2.96           Q10         151.70         722.76         723.33         723.42         0.012717         2.34           Q50         231.70         722.76         723.53         723.63         0.009208         2.57           Q100 (ULT)         275.40         722.76         723.53         723.63         0.009208         2.57           Q100 (ULT)         275.40         722.76         723.54         723.63         0.009208         2.57           Q100 (ULT)         275.40         722.76         723.54         723.64         0.009	Q100         269.40         725.93         727.00         727.23         0.012776         3.80         70.94           Q100 (ULT)         275.40         725.93         727.01         727.24         0.012641         3.81         72.22           Q10         151.70         723.80         724.98         724.65         725.05         0.005664         2.20         68.96           Q50         231.70         723.80         725.16         725.29         0.007412         2.93         92.03           Q100         269.40         723.80         725.16         725.29         0.007412         2.93         92.03           Q100 (ULT)         275.40         723.80         725.17         725.30         0.007497         2.96         93.03           Q10         151.70         722.76         723.33         723.42         0.012717         2.34         64.82           Q50         231.70         722.76         723.53         723.63         0.009208         2.57         104.87           Q10 (ULT)         275.40         722.76         723.54         723.64         0.009107         2.58         106.70           Q10         151.70         719.32         720.87         720.67	Q100   269.40   725.93   727.00   727.23   0.012776   3.80   70.94   100.71     Q100 (ULT)   275.40   725.93   727.01   727.24   0.012641   3.81   72.22   101.09     Q10

Reach River Sta Profile Q Total Min Ch El W.S. Elev Crit W.S. E.G. Elev E.G. Slope Vel Chnl Flow Area Top Width Froude # Chl

(cfs) (ft) (ft) (ft) (ft) (ft/ft) (ft/s) (sq ft) (ft)

HEC-RAS Plan: CHANNEL-A PROP CONDITION River: CHANNEL-A Reach: CHANNEL-A (Continued)

OLIANINE A	0000	0.10	454.70	700.70	707.00	707.00	700.40	0.040500	0.00	44.00	00.04	0.01
CHANNEL-A	3800	Q10	151.70	706.70	707.92		708.13	0.013569	3.62	41.93	66.94	0.81
CHANNEL-A	3800	Q50	231.70	706.70	708.10	708.02	708.38	0.015082	4.30	53.89	71.90	0.88
CHANNEL-A	3800	Q100	269.40	706.70	708.17	708.10	708.49	0.015598	4.57	59.00	73.74	0.90
CHANNEL-A	3800	Q100 (ULT)	275.40	706.70	708.18	708.11	708.51	0.015755	4.61	59.68	73.99	0.91
OT IN WITH LE 71	0000	Q100 (OL1)	270.40	700.70	700.10	700.11	700.01	0.010700	4.01	00.00	70.00	0.01
CHANNEL-A	3600	Q10	151.70	703.42	704.31	704.31	704.53	0.024750	3.82	39.73	91.87	1.02
CHANNEL-A	3600	Q50	231.70	703.42	704.46	704.46	704.75	0.022344	4.34	53.39	94.32	1.02
CHANNEL-A	3600	Q100	269.40	703.42	704.52	704.52	704.84	0.021669	4.55	59.22	95.27	1.02
CHANNEL-A	3600	Q100 (ULT)	275.40	703.42	704.53	704.53	704.85	0.021494	4.58	60.19	95.42	1.02
CHANNELA	3000	Q100 (OL1)	273.40	703.42	704.55	704.55	704.00	0.021434	4.50	00.13	33.42	1.02
CHANNEL-A	3400	Q10	151.70	699.17	700.35	700.26	700.49	0.012292	3.08	49.32	93.20	0.75
CHANNEL-A	3400	Q50	231.70	699.17	700.51	700.38	700.71	0.011785	3.57	64.90	94.98	0.76
CHANNEL-A	3400	Q100	269.40	699.17	700.59	700.45	700.80	0.011397	3.74	72.01	95.81	0.76
					-							
CHANNEL-A	3400	Q100 (ULT)	275.40	699.17	700.60	700.46	700.82	0.011392	3.77	73.02	95.93	0.76
CHANNEL-A	3200	Q10	151.70	695.64	697.15	697.12	697.45	0.018970	4.43	34.27	51.89	0.96
CHANNEL-A	3200	Q50	231.70	695.64	697.39	697.39	697.72	0.019531	4.57	50.72	74.90	0.98
CHANNEL-A	3200	Q100	269.40	695.64	697.46	697.45	697.82	0.020151	4.86	55.45	76.44	1.01
CHANNEL-A	3200	Q100 (ULT)	275.40	695.64	697.47	697.46	697.84	0.020117	4.89	56.29	76.68	1.01
CHANNEL-A	3000	Q10	151.70	692.04	693.07	693.07	693.38	0.021926	4.42	34.29	58.01	1.01
CHANNEL-A	3000	Q50	231.70	692.04	693.31	693.31	693.65	0.020793	4.69	49.42	73.62	1.01
CHANNEL-A	3000	Q100	269.40	692.04	693.40	693.40	693.75	0.020543	4.80	56.12	79.96	1.01
CHANNEL-A	3000	Q100 (ULT)	275.40	692.04	693.41	693.41	693.77	0.020543	4.82	57.11	80.84	1.01
CHANNEL-A	2800	Q10	151.70	688.56	689.59		689.71	0.005789	2.73	55.54	71.35	0.55
CHANNEL-A	2800	Q50	231.70	688.56	689.79		689.96	0.006692	3.32	69.88	74.82	0.60
CHANNEL-A	2800	Q100	269.40	688.56	689.86		690.06	0.007074	3.56	75.70	75.99	0.63
CHANNEL-A	2800	Q100 (ULT)	275.40	688.56	689.88		690.08	0.007135	3.60	76.59	76.17	0.63
CHANNEL-A	2600	Q10	151.70	688.56	689.36		689.37	0.000692	0.93	163.43	215.73	0.19
					-							
CHANNEL-A	2600	Q50	231.70	688.56	689.53		689.55	0.000838	1.16	200.19	219.04	0.21
CHANNEL-A	2600	Q100	269.40	688.56	689.59		689.62	0.000897	1.25	215.26	220.31	0.22
CHANNEL-A	2600	Q100 (ULT)	275.40	688.56	689.61		689.63	0.000906	1.27	217.57	220.51	0.22
		, , , ,										
CHANNEL A	2400	Q10	151.70	600 E6	689.23		690.33	0.000644	0.79	192.34	306.92	0.18
CHANNEL-A	2400			688.56	-		689.23					
CHANNEL-A	2400	Q50	231.70	688.56	689.37		689.38	0.000765	0.98	236.75	311.24	0.20
CHANNEL-A	2400	Q100	269.40	688.56	689.43		689.45	0.000814	1.06	255.08	313.12	0.21
CHANNEL-A	2400	Q100 (ULT)	275.40	688.56	689.44		689.45	0.000821	1.07	257.91	313.41	0.21
		, ,										
CHANNELA	2200	Q10	454.70	600 56	689.12		690.40	0.000468	0.64	247.02	455.04	0.45
CHANNEL-A	2200		151.70	688.56	-		689.12		0.61	247.92	455.24	0.15
CHANNEL-A	2200	Q50	231.70	688.56	689.24		689.25	0.000550	0.76	305.25	457.96	0.16
CHANNEL-A	2200	Q100	269.40	688.56	689.29		689.31	0.000581	0.82	329.00	458.79	0.17
CHANNEL-A	2200	Q100 (ULT)	275.40	688.56	689.30		689.31	0.000585	0.83	332.78	458.92	0.17
		4.00 (02.)						0.00000				• • • • • • • • • • • • • • • • • • • •
OLIANDIEL A	2000	0.40	454.70	000 50	200 70	200 70	200.00	0.000577	0.05	04.40	070.00	4.04
CHANNEL-A	2000	Q10	151.70	688.56	688.73	688.73	688.82	0.032577	2.35	64.46	378.60	1.01
CHANNEL-A	2000	Q50	231.70	688.56	688.79	688.79	688.90	0.029245	2.69	86.03	380.56	1.00
CHANNEL-A	2000	Q100	269.40	688.56	688.81	688.81	688.94	0.028255	2.83	95.24	381.40	1.00
CHANNEL-A	2000	Q100 (ULT)	275.40	688.56	688.82	688.82	688.94	0.028525	2.86	96.24	381.49	1.00
								0.020020				
CHANNEL-A	1800	Q10	151.70	670.54	671.49	671.49	671.69	0.024080	3.63	41.83	102.34	1.00
CHANNEL-A	1800	Q50	231.70	670.54	671.63	671.63	671.88	0.022768	4.03	57.52	115.27	1.01
CHANNEL-A	1800	Q100	269.40	670.54	671.69	671.68	671.96	0.022210	4.21	64.00	117.86	1.01
CHANNEL-A	1800	Q100 (ULT)	275.40	670.54	671.70	671.69	671.97	0.022099	4.24	65.03	118.23	1.01
OT IV WATER TO	1000	Q100 (OL1)	270.40	070.04	071.70	07 1.00	07 1.07	0.022000	7.2-1	00.00	110.20	1.01
	1000	0.10										
CHANNEL-A	1600	Q10	151.70	666.54	667.60		667.85	0.014368	4.04	37.59	53.17	0.85
CHANNEL-A	1600	Q50	231.70	666.54	667.80	667.74	668.15	0.015502	4.75	48.79	57.23	0.91
CHANNEL-A	1600	Q100	269.40	666.54	667.89	667.83	668.28	0.015484	4.97	54.25	59.43	0.92
CHANNEL-A	1600	Q100 (ULT)	275.40	666.54	667.91	667.84	668.30	0.015507	5.00	55.07	59.78	0.92
OT IV MAINELY	1000	Q.30 (OL1)	275.40	550.54	551.31	557.04	550.50	0.010007	5.00	33.07	39.10	0.32
CHANNEL-A	1400	Q10	151.70	662.69	664.03	664.03	664.34	0.021970	4.43	34.21	57.74	1.02
CHANNEL-A	1400	Q50	231.70	662.69	664.27	664.27	664.61	0.020406	4.71	49.20	71.78	1.00
CHANNEL-A	1400	Q100	269.40	662.69	664.35	664.35	664.72	0.020624	4.88	55.16	76.85	1.02
CHANNEL-A	1400	Q100 (ULT)	275.40	662.69	664.36	664.36	664.73	0.020623	4.91	56.11	77.58	1.02
OT IV MAINEL-PA	1700	Q 100 (OL1)	213.40	002.09	004.30	004.00	004.73	0.020023	4.31	30.11	11.50	1.02
										_		
CHANNEL-A	1200	Q10	151.70	659.78	660.93		661.04	0.007746	2.72	55.76	89.69	0.61
CHANNEL-A	1200	Q50	231.70	659.78	661.12		661.28	0.007541	3.13	73.92	94.20	0.62
CHANNEL-A	1200	Q100	269.40	659.78	661.21		661.38	0.007463	3.29	81.79	96.01	0.63
CHANNEL-A	1200	Q100 (ULT)	275.40	659.78	661.22		661.39	0.007509	3.33	82.81	96.24	0.63
3, a titLL-71	1200	Q 100 (OL1)	213.40	000.10	001.22		301.38	5.007508	3.33	02.01	30.24	0.03
	105-	0.15										
CHANNEL-A	1000	Q10	151.70	657.16	658.31	658.31	658.66	0.020052	4.78	31.76	138.49	1.00
CHANNEL-A	1000	Q50	231.70	657.16	658.56	658.56	658.98	0.019023	5.20	44.57	170.93	1.00
CHANNEL-A	1000	Q100	269.40	657.16	658.65	658.65	659.11	0.018608	5.45	49.41	175.61	1.00
CHANNEL-A	1000	Q100 (ULT)	275.40	657.16	658.67	658.67	659.13	0.018301	5.47	50.38	176.41	1.00
OTT/ WAINEL-/A	1000	Q 100 (OL1)	273.40	037.10	030.07	030.07	038.13	0.010301	5.47	30.36	170.41	1.00
01144	205	0.15										
CHANNEL-A	600	Q10	151.70	650.24	652.09		652.15	0.002436	2.01	75.61	80.36	0.36
CHANNEL-A	600	Q50	231.70	650.24	652.41		652.49	0.002257	2.26	102.64	86.27	0.36
CHANNEL-A	600	Q100	269.40	650.24	652.54		652.63	0.002207	2.36	114.21	88.36	0.37
CHANNEL-A	600	Q100 (ULT)	275.40	650.24	652.57		652.65	0.002197	2.37	116.06	88.68	0.37
	000	Q 100 (UL1)	213.40	050.24	002.07		002.00	0.00218/	2.31	110.00	00.00	0.37
5.00											_	
			151.70	649.32	650.63	650.63	651.06	0.019467	5.23	29.00	34.80	1.01
CHANNEL-A	400	Q10										
	400	Q10										
	400	Q10										
CHANNEL-A			I Di C	NEL A E		(OF						
CHANNEL-A HEC-RAS Plan:	CHANNEL-A	A PROP CONDITION				<u> </u>						
CHANNEL-A		A PROP CONDITION	N River: CHAN Q Total	NEL-A Reach Min Ch El	: CHANNEL-A W.S. Elev	(Continued) Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
CHANNEL-A HEC-RAS Plan:	CHANNEL-A	A PROP CONDITION				<u> </u>	E.G. Elev	E.G. Slope	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width	Froude # Chl
CHANNEL-A HEC-RAS Plan:	CHANNEL-A	A PROP CONDITION	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S.	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
CHANNEL-A  HEC-RAS Plan: ( Reach	CHANNEL-A	A PROP CONDITION  Profile  Q50	Q Total (cfs) 231.70	Min Ch El (ft) 649.32	W.S. Elev (ft) 650.92	Crit W.S. (ft) 650.92	(ft) 651.45	(ft/ft) 0.018142	(ft/s) 5.84	(sq ft) 39.70	(ft) 38.30	1.01
CHANNEL-A  HEC-RAS Plan: ( Reach  CHANNEL-A  CHANNEL-A	CHANNEL-A River Sta 400 400	A PROP CONDITION Profile Q50 Q100	Q Total (cfs) 231.70 269.40	Min Ch El (ft) 649.32 649.32	W.S. Elev (ft) 650.92 651.05	Crit W.S. (ft) 650.92 651.05	(ft) 651.45 651.62	(ft/ft) 0.018142 0.017683	(ft/s) 5.84 6.07	(sq ft) 39.70 44.42	(ft) 38.30 39.66	1.01 1.01
CHANNEL-A  HEC-RAS Plan: ( Reach	CHANNEL-A	A PROP CONDITION  Profile  Q50	Q Total (cfs) 231.70	Min Ch El (ft) 649.32	W.S. Elev (ft) 650.92	Crit W.S. (ft) 650.92	(ft) 651.45	(ft/ft) 0.018142	(ft/s) 5.84	(sq ft) 39.70	(ft) 38.30	1.01
CHANNEL-A  HEC-RAS Plan: ( Reach  CHANNEL-A  CHANNEL-A	CHANNEL-A River Sta 400 400	A PROP CONDITION Profile Q50 Q100	Q Total (cfs) 231.70 269.40	Min Ch El (ft) 649.32 649.32	W.S. Elev (ft) 650.92 651.05	Crit W.S. (ft) 650.92 651.05	(ft) 651.45 651.62	(ft/ft) 0.018142 0.017683	(ft/s) 5.84 6.07	(sq ft) 39.70 44.42	(ft) 38.30 39.66	1.01 1.01

 601.90
 641.03
 645.42
 645.10
 646.03
 0.009998

 711.60
 641.03
 645.68
 645.36
 646.33
 0.010001

CHANNEL-A 200 Q100 (ULT) 726.40 641.03 645.71 645.37

6.29 95.62 6.48 109.82 6.51 111.64

Reach River Sta Profile Q Total Min Ch El W.S. Elev Crit W.S. E.G. Elev E.G. Slope Vel Chnl Flow Area Top Width Froude # Chl

 151.70
 706.70
 707.92
 707.82
 708.13
 0.013569
 3.62
 41.93

 231.70
 706.70
 708.10
 708.02
 708.38
 0.015082
 4.30
 53.89

(ft) (ft) (ft) (ft/ft) (ft/s) (sq ft) (ft)

HEC-RAS Plan: CHANNEL-A PROP CONDITION River: CHANNEL-A Reach: CHANNEL-A (Continued)

(cfs) (ft)

### **CULVERT ANALYSIS**

CHANNEL-A 1000

CHANNEL-A 400

CHANNEL-A 1000 Q100

CHANNEL-A 200 Q50 CHANNEL-A 200 Q100

 Reach
 River Sta
 Profile
 E.G. US.
 W.S. US.
 E.G. IC
 E.G. IC
 E.G. OC
 Min El Weir Flow
 Q Culv Group
 Q Weir
 Delta WS
 Culv Vel US
 Culv Vel DS

 CHANNEL-A
 5893
 Culvert #1
 Q10
 733.14
 732.82
 733.14
 733.49
 736.22
 122.60
 0.51
 7.33
 6.28

 CHANNEL-A
 5893
 Culvert #1
 Q50
 733.97
 733.55
 733.97
 734.40
 736.22
 184.30
 0.86
 8.40
 7.88

 CHANNEL-A
 5893
 Culvert #1
 Q100
 734.82
 734.49
 734.46
 734.82
 736.22
 215.50
 1.65
 8.85
 9.10

 CHANNEL-A
 5893
 Culvert #1
 Q100 (ULT)
 734.90
 734.56
 734.53
 734.90
 736.22
 221.50
 1.70
 8.93
 9.17

232.80 656.82 658.05 658.05 658.31 0.024112

602.10 641.03 646.71 645.13 646.89 0.002001

713.10 641.03 647.01 645.36 647.21 0.002004

650.93

652.49 0.002271

651.46 0.018149

652.65 0.002190

5.22 5.85 6.09

39.83

73.04 76.53

 3.01
 126.71

 3.39
 177.65

 3.56
 200.27

273.10 656.82 658.11 658.39 0.023282

650.93



232.80 650.24

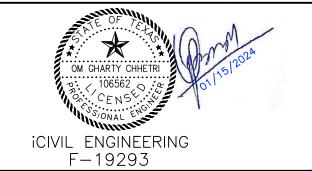
232.80

273.10 650.24 652.56

649.32

**ICIVIL ENGINEERING** 1001 W EULESS BLVD, STE 412H **EULESS, TX 76040** PH: (972) 523-5493 TBPE: F-19293 **EMAIL: INFO@ICIVILENG.COM** 

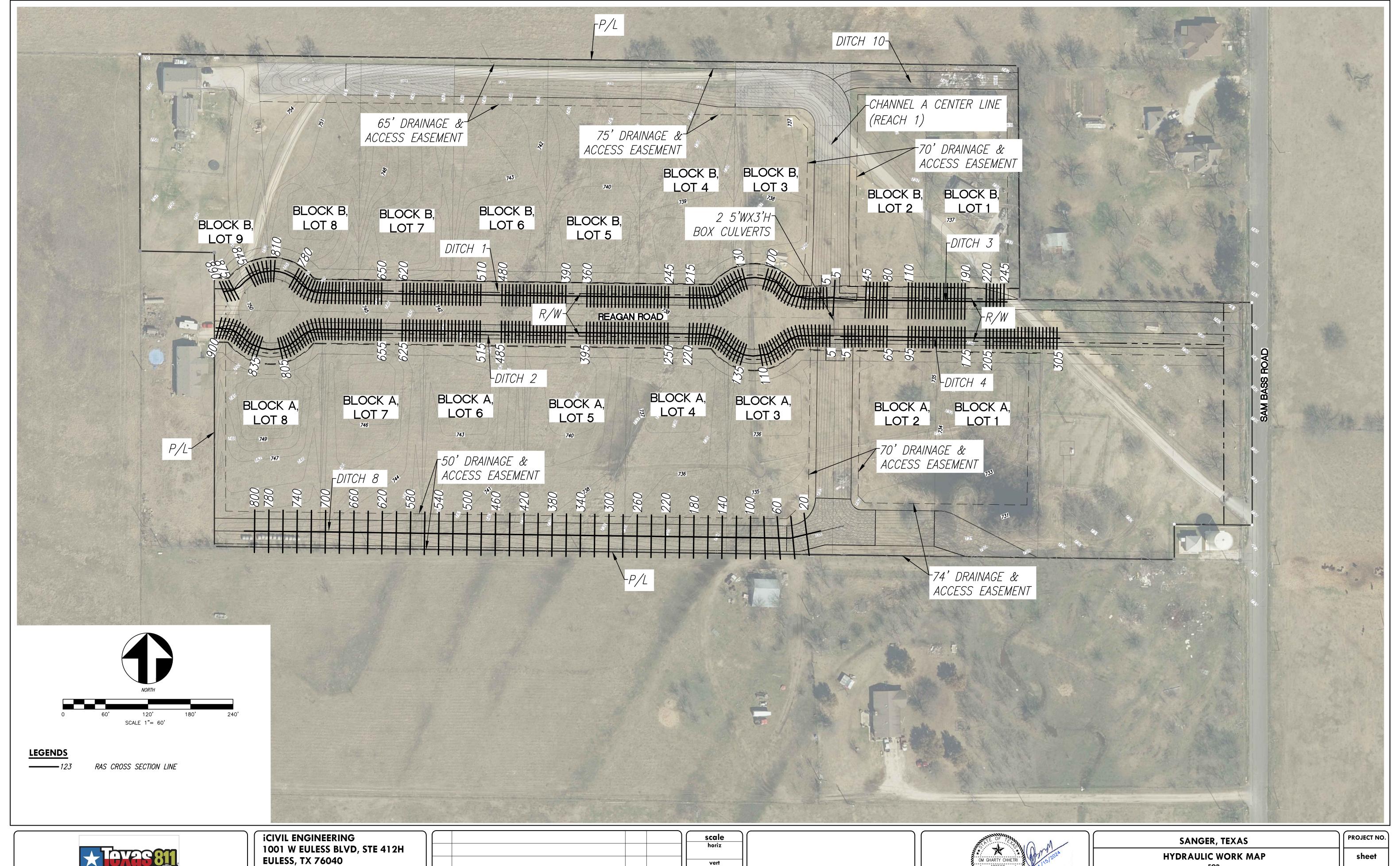
scale



**HYDRAULIC WORK MAP MARLEY MEADOWS** 

SANGER, TEXAS

PROJECT NO sheet





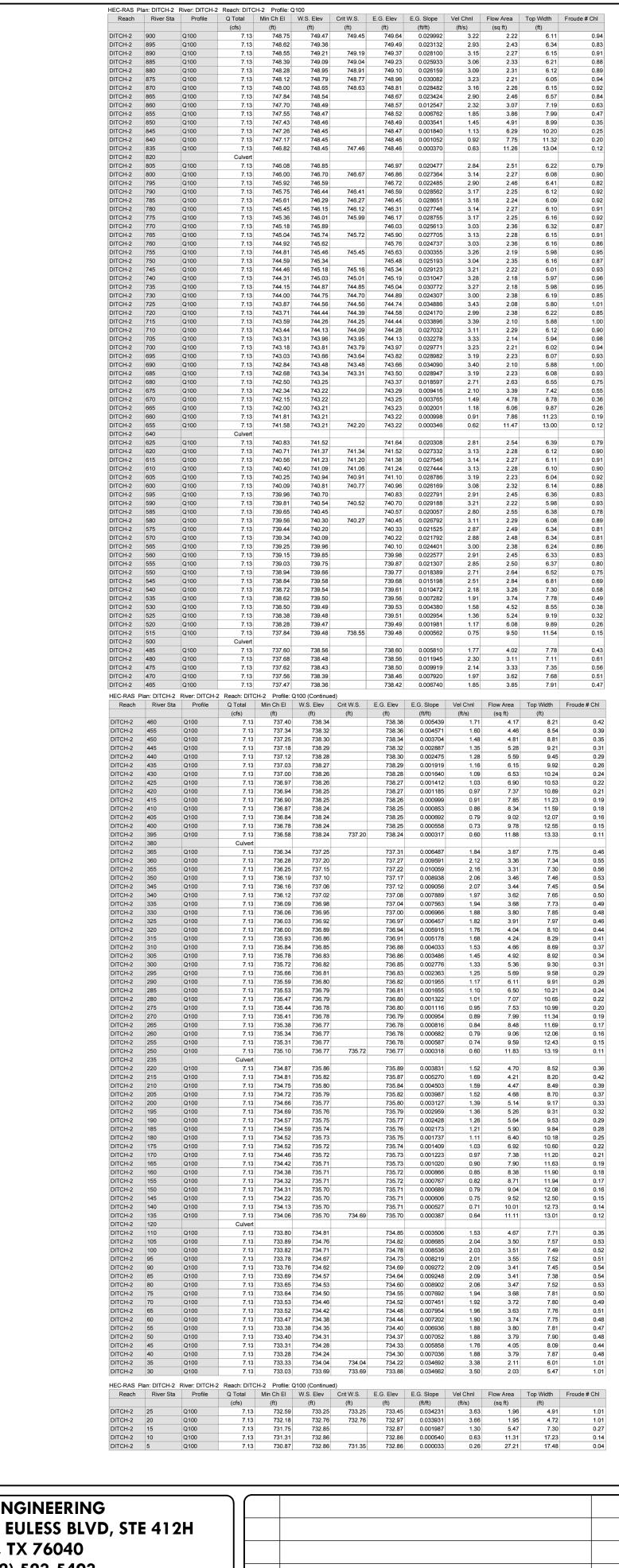
PH: (972) 523-5493 TBPE: F-19293 EMAIL: INFO@ICIVILENG.COM

			L scale
			horiz
			vert
			date
revision	by	date	JAN 2024



**MARLEY MEADOWS** 

875 860 845 840 835 830 825 820 815 810 795 777 765 760 755	Q100 Q100 Q100 Q100 Q100 Q100 Q100 Q100	4.22 Culvert 4.22 4.22 4.22 4.22 4.22 4.22 4.22 7.74 Culvert 7.74	746.78 746.04 746.03 745.94 745.82 745.72 745.60 745.29 744.55	747.94 747.04 747.04 747.04 747.04 747.04 747.04 747.03	747.22	747.94 747.05 747.05 747.04 747.04 747.04 747.04 747.04	0.000503 0.001062 0.000751 0.000469 0.000319 0.000213 0.000149	0.62 0.81 0.71 0.59 0.51 0.44 0.39	5.22 5.97 7.11 8.22 9.51 10.87	9.33 10.09 10.95 11.80 12.54	0.13 0.19 0.16 0.13 0.11
840 835 830 825 820 815 810 795 775 770 765 760 755	Q100 Q100 Q100 Q100 Q100 Q100 Q100 Q100	4.22 4.22 4.22 4.22 4.22 4.22 7.74 Culvert 7.74	746.03 745.94 745.82 745.72 745.62 745.50 745.29	747.04 747.04 747.04 747.04 747.04 747.04	745.00	747.05 747.04 747.04 747.04 747.04	0.000751 0.000469 0.000319 0.000213 0.000149	0.71 0.59 0.51 0.44	5.97 7.11 8.22 9.51	10.09 10.95 11.80 12.54	0.16 0.13 0.11 0.09
825 820 815 810 795 775 770 765 760 755	Q100 Q100 Q100 Q100 Q100 Q100	4.22 4.22 4.22 7.74 Culvert 7.74	745.72 745.62 745.50 745.29	747.04 747.04 747.04	745.00	747.04 747.04	0.000213 0.000149	0.44	9.51	12.54	0.09
810 795 775 770 765 760 755	Q100 Q100 Q100	7.74 Culvert 7.74	745.29		745.00	747.04				13.41	0.08
775 770 765 760 755	Q100	7.74	744.55		743.80	747.04	0.000101 0.000235	0.34	12.55 14.40	14.32 15.30	0.06 0.10
760 755	Q100		744.53	745.23 745.14		745.34 745.25	0.017960 0.019089	2.68 2.70	2.89 2.86	7.19 7.36	0.74 0.76
	Q100 Q100	7.74 7.74 7.74	744.41 744.21 744.00	744.95 744.73 744.55	744.95 744.75 744.56	745.12 744.93 744.74	0.034602 0.039466 0.036870	3.32 3.55 3.50	2.33 2.18 2.21	6.88 6.43 6.33	1.01 1.07 1.04
750 745	Q100 Q100	7.74 7.74	743.82 743.63	744.37 744.14	744.38 744.17	744.56 744.36	0.035718 0.044995	3.45 3.76	2.24 2.06	6.40 6.14	1.03 1.14
740 735 730	Q100 Q100 Q100	7.74 7.74 7.74	743.42 743.24 743.09	743.98 743.76 743.59	743.98 743.79 743.64	744.16 743.97 743.83	0.034168 0.044720 0.051253	3.40 3.73 3.94	2.28 2.07 1.96	6.40 6.20 6.00	1.01 1.14 1.21
725 720	Q100 Q100	7.74 7.74	742.94 742.79	743.42 743.26	743.49 743.35	743.69 743.56	0.060863 0.069432	4.20	1.84 1.76	5.83 5.70	1.32
715 710	Q100 Q100	7.74 7.74	742.64 742.49	743.11 742.96	743.20 743.05	743.42 743.27	0.072897	4.49 4.44	1.72 1.74	5.63 5.69	1.43
700 695	Q100 Q100 Q100	7.74 7.74 7.74	742.21 742.06	742.82 742.67 742.52	742.76 742.61	742.98 742.82	0.078308	4.42 4.36	1.75 1.77	5.77 5.84	1.48 1.42 1.39
690 685	Q100 Q100	7.74 7.74	741.90 741.75	742.37 742.22	742.45 742.30	742.66 742.52	0.066859 0.069188	4.32 4.38	1.79 1.77	5.84 5.77	1.38 1.40
675	Q100	7.74	741.44	742.23	742.14	742.29	0.006982	1.90	4.08	8.38	0.68 0.48 0.32
665 660	Q100 Q100	7.74 7.74	741.12 740.97	742.23 742.23		742.25 742.24	0.001611 0.000866	1.10 0.87	7.03 8.85	10.80 12.05	0.24 0.18
650	Q100 Q100	10.14	740.81	742.22 742.22	741.18	742.23 742.23	0.000505	0.72	10.82	13.30 14.72	0.14 0.13
620 615	Q100 Q100	10.14 10.14	739.75 739.59	740.39 740.26	740.39 740.23	740.59 740.43	0.032125 0.026654	3.57 3.34	2.84 3.04	7.10 7.30	0.99 0.91
605	Q100	10.14	739.31	739.98	739.96	740.16	0.027319	3.37	3.01	7.24	0.91 0.92 0.93
595 590	Q100 Q100	10.14	739.06 738.91	739.70 739.59	739.68	739.88 739.75	0.028951 0.023230	3.43 3.17	2.95 3.20	7.23 7.47	0.95 0.85
585 580	Q100 Q100	10.14 10.14	738.78 738.66	739.46 739.34	739.42 739.29	739.62 739.50	0.024885	3.26 3.25	3.11 3.12	7.31 7.33	0.88
575 570 565	Q100 Q100 Q100	10.14 10.14 10.14	738.41 738.31	739.21 739.11 739.03	739.17	739.26 739.15	0.024666 0.020306 0.017638	3.25 3.03 2.86	3.12 3.34 3.54	7.54 7.85	0.88 0.80 0.75
560 555	Q100 Q100	10.14 10.14	738.19 738.06	738.97 738.94		739.07 739.01	0.013232 0.008502	2.58 2.19	3.94 4.63	8.23 8.85	0.66 0.53
550 545 540	Q100 Q100 Q100	10.14 10.14 10.14	737.97 737.84 737.75	738.92 738.91 738.90		738.97 738.94 738.93	0.005602 0.003498 0.002362	1.87 1.57 1.36	5.41 6.44 7.46	9.57 10.36 11.14	0.44 0.35 0.29
535 530	Q100 Q100	10.14 10.14	737.66 737.56	738.89 738.89		738.91 738.91	0.001645 0.001165	1.19 1.04	8.53 9.72	11.90 12.72	0.25 0.21
525 520 515	Q100 Q100 Q100	10.14 10.14 10.14	737.47 737.37 737.28	738.89 738.89 738.88		738.90 738.90 738.89	0.000869 0.000618 0.000476	0.94 0.82 0.75	10.83 12.30 13.54	13.35 14.20 14.86	0.18 0.16 0.14
510 495	Q100	12.53 Culvert	736.93	738.88	737.74	738.89	0.000438	0.78	16.15	15.69	0.13
480 475 470	Q100 Q100 Q100	12.53 12.53 12.53	736.72 736.66 736.59	738.14 738.13 738.13		738.16 738.15 738.15	0.001381 0.001091 0.000908	1.18 1.08 1.00	10.66 11.65 12.47	13.23 13.84 14.31	0.23 0.21 0.19
465 460	Q100 Q100	12.53 12.53	736.53 736.47	738.13 738.13		738.14 738.14	0.000766 0.000632	0.94 0.88	13.29 14.28	14.75 15.27	0.18
455 450 445	Q100 Q100	12.53 12.53	736.41 736.34	738.12 738.12		738.13 738.13	0.000535 0.000470	0.82 0.79	15.19 15.93	15.75 16.10	0.15 0.14 0.13
440 435	Q100 Q100	12.53 12.53	736.25 736.22	738.12 738.12		738.13 738.13	0.000357 0.000319	0.71 0.68	17.67 18.42	16.93 17.31	0.12 0.12
lan: DITCH	I-1 River: DITCH-1	Reach: DITCI	I-1 Profile: 0	Q100 (Continued)					'	'	0.11 Froude # Chl
425	Q100	(cfs) 12.53	(ft) 736.12	(ft) 738.12	(ft)	(ft) 738.12	(ft/ft) 0.000254	(ft/s) 0.62	(sq ft) 20.08	(ft) 18.05	0.10
420 415 410	Q100 Q100 Q100	12.53 12.53 12.53	736.06 736.03 735.97	738.12 738.11 738.11		738.12 738.12 738.12	0.000226 0.000206 0.000190	0.50 0.58 0.56	20.96 21.70 22.36	18.42 18.78 19.03	0.10
405 400	Q100 Q100	12.53 12.53	735.94 735.91	738.11 738.11		738.12 738.12	0.000172 0.000158	0.54 0.52	23.24	19.40 19.76	0.00
395 390 375	Q100 Q100	12.53 14.92 Culvert	735.84	738.11	736.58	738.12	0.000145	0.51	25.59	20.36	0.08
360 355	Q100 Q100	14.92 14.92	735.53 735.50	736.90 736.90		736.94 736.93	0.002158 0.001994	1.45 1.41	10.28 10.59	13.00 13.18	0.2
345	Q100	14.92	735.41	736.88		736.91	0.001555	1.28	11.62	13.79	0.2 0.2 0.2
335 330	Q100 Q100	14.92 14.92	735.31 735.25	736.87 736.87		736.89 736.89	0.001210 0.001053	1.17 1.11	12.76 13.44	14.46 14.81	0.2
325 320	Q100	14.92 14.92	735.22 735.16	736.86 736.86		736.88 736.88	0.000941 0.000793	1.06	14.03 14.94	15.16 15.62	0.1
310 305	Q100 Q100 Q100	14.92 14.92	735.09 735.03 735.00	736.85 736.85		736.87 736.86	0.000574 0.000596 0.000513	0.94	16.62 17.59	16.44 16.92	0.10 0.10 0.11
300 295	Q100 Q100	14.92 14.92	734.94 734.88	736.85 736.85		736.86 736.86	0.000451 0.000388	0.81 0.76	18.44 19.54	17.31 17.86	0.14 0.13
285	Q100	14.92	734.78	736.85		736.86	0.000301	0.70	21.47	18.66	0.12 0.11 0.11
275 270	Q100 Q100	14.92 14.92	734.66 734.59	736.85 736.85		736.85 736.85	0.000237 0.000206	0.64 0.60	23.48 24.73	19.49 20.00	0.10 0.10
260	Q100	14.92	734.50	736.84		736.85	0.000169	0.56	26.61	20.75	0.09
250 245	Q100 Q100	17.31 17.31	734.38 734.34	736.84 736.84	735.15	736.85 736.85	0.000133 0.000179 0.000163	0.59 0.57	29.16 30.15	21.70 22.09	0.00
230 215	Q100	17.31	734.00	735.71		735.73	0.001033	1.14	15.14	15.74	0.2
205 200	Q100 Q100 Q100	17.31 17.31 17.31	733.96 733.90 733.84	735.71 735.71		735.72 735.72	0.000902 0.000789 0.000657	1.09 1.03 0.96	16.78 16.78	16.20 16.63 17.18	0.19 0.18 0.17
195 190	Q100 Q100	17.31 17.31	733.78 733.75	735.70 735.70		735.72 735.71	0.000577 0.000519	0.92 0.88	18.86 19.57	17.63 17.86	0.16 0.15
185 180 175	Q100 Q100 Q100	17.31 17.31 17.31	733.70 733.66 733.62	735.70 735.70 735.70		735.71 735.71 735.71	0.000516 0.000452 0.000395	0.89 0.84 0.79	19.49 20.51 21.81	17.56 18.08 19.06	0.15 0.14 0.13
170 165	Q100 Q100	17.31 17.31	733.59 733.53	735.69 735.69		735.70 735.70	0.000350 0.000287	0.76 0.70	22.80 24.77	19.49 20.66	0.12 0.1
160 155 150	Q100 Q100 Q100	17.31 17.31	733.50 733.44 733.41	735.69 735.69 735.69		735.70 735.70 735.70	0.000243 0.000239 0.000229	0.65 0.65 0.64	26.61 26.69 26.88	21.84 21.76 21.38	0.10 0.10 0.10
145 140	Q100 Q100	17.31 17.31	733.36 733.32	735.69 735.69		735.70 735.70	0.000219 0.000211	0.64 0.63	27.24 27.56	21.38 21.37 21.42	0.10 0.10 0.10
135 130	Q100 Q100	17.31 17.92	733.28 733.24	735.69 735.69	734.06	735.69 735.69	0.000199 0.000193	0.62 0.62	28.10 29.04	21.45 21.63	0.09
115 100 95	Q100 Q100	17.92 17.92	732.97 732.94	735.00 735.00		735.01 735.01	0.000503 0.000448	0.88 0.84	20.32 21.23	18.15 18.61	0.19 0.14
90 85	Q100 Q100	17.92 17.92	732.89 732.84	734.99 734.99		735.00 735.00	0.000405 0.000357	0.81 0.77	22.13 23.19	19.14 19.58	0.13 0.13
75 70	Q100 Q100 Q100	17.92 17.92 17.92	732.81 732.78 732.72	734.99 734.99 734.99		735.00 735.00 735.00	0.000317 0.000278 0.000239	0.74 0.70 0.65	24.34 25.75 27.37	20.19 21.13 21.97	0.12 0.1 0.10
65 60	Q100 Q100	17.92 17.92	732.69 732.65	734.99 734.99		735.00 734.99	0.000224 0.000230	0.64 0.65	27.85 27.41	21.80 21.37	0.10 0.10
55 50 45	Q100 Q100 Q100	17.92 17.92 17.92	732.59 732.56 732.51	734.99 734.99 734.99		734.99 734.99 734.99	0.000220 0.000213 0.000199	0.64 0.64 0.63	27.79 27.87 28.55	21.36 20.98 21.14	0.10 0.10 0.10
40 35	Q100 Q100	17.92 17.92	732.47 732.32	734.98 734.98		734.99 734.99	0.000172 0.000315	0.60 0.75	30.01 24.05	21.50 19.21	0.09 0.12
30 25 20	Q100 Q100 Q100	17.92 17.92	732.07 731.83 731.56	734.98 734.98 734.98		734.99 734.98 734.98	0.000403 0.000408 0.000073	0.85 0.70 0.39	21.16 25.77 47.68	16.31 27.03 34.24	0.13 0.13 0.06
15 10	Q100 Q100	17.92 17.92	731.32 731.07	734.98 734.98		734.98 734.98	0.000022 0.000007	0.26 0.19	68.66 94.13	32.90 31.00	0.03
5 an: DITCH-1	Q100 River: DITCH-1 Re	17.92 each: DITCH-1	730.62 Profile: Q100	734.98	730.98	734.98	0.000003	0.15	120.29	31.31	0.0
Rive 860 Culv	vert #1 Q100	e E.G. US. (ft) 747.9	W.S. US. (ft) 4 747.94	(ft) 1 747.91	(ft) 747.94	(ft) 750.4	(cfs)	(cfs)	(ft) 0.90		Culv Vel DS (ft/s) 7.66
635 Culv 495 Culv	vert #1 Q100 vert #1 Q100	742.2 738.8	4 747.03 3 742.22 9 738.88	3 747.04 2 742.21 3 738.89	746.97 742.23 738.85	748.8 744.0 740.6	31 7 7 10 31 12	0.14 2.53	1.83 0.74	5.48 5.94	8.7 8.8 6.3
	vert #1 Q100 vert #1 Q100	738.1 736.8 735.6	5 736.84	736.85	738.10 736.80 735.64	739.1 737.7 736.5	1 1	7.31 7.92	1.20 1.13 0.69	6.37	7.1! 7.9! 4.9
	vert #1 Q100			7 00.00	1 0010 1	70010	.,		0,00	0.10	
	720 715 710 710 710 710 710 700 695 690 6880 675 670 665 660 6655 660 6655 660 635 650 635 650 635 650 655 550 5565 550 5550 5	710	720	170	170	720   0.100		200	1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906   1906	1968	Cont



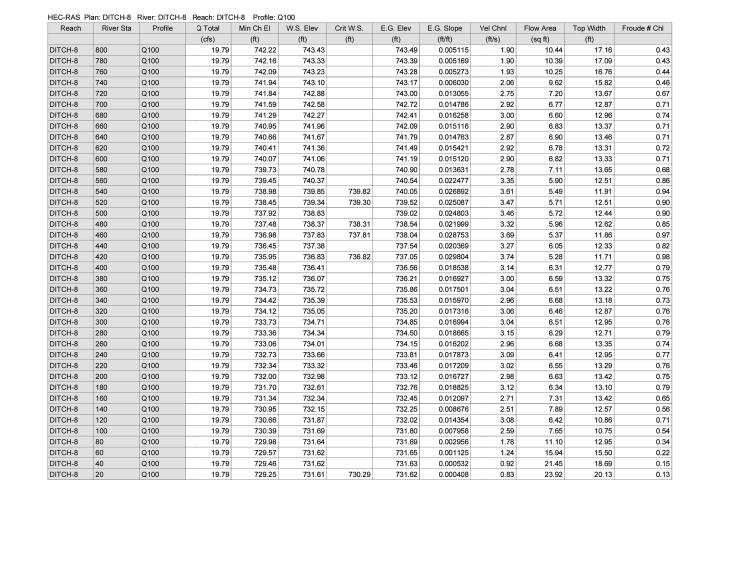
HEC-RAS Plan: DITCH-2 River: DITCH-2 Reach: DITCH-2 Profile: Q100

748.28 748.12	748.95 748.79	748.91 748.77	749.10 748.96	0.026159 0.030082	3.09 3.23	2.31 2.21	6.12 6.05	0.89 0.94		DITCH-2	120 Culvert #		735.70	735.70	735.70	735.65	736.4		7.13	0.88	5.49	6.27
748.00 747.84 747.70	748.65 748.54 748.49	748.63	748.81 748.67 748.57	0.028482 0.023424 0.012547	3.16 2.90 2.32	2.26 2.46 3.07	6.15 6.57 7.19	0.92 0.84 0.63		HEC-RAS F	Plan: DITCH-3 F	River: DITCH-3 Profile	Q Total		V.S. Elev			E.G. Slope			Top Width Fre	roude # Chl
747.55 747.43 747.26	748.47 748.46 748.45		748.52 748.49 748.47	0.006762 0.003541 0.001840	1.85 1.45 1.13	3.86 4.91 6.29	7.99 8.99 10.20	0.47 0.35 0.25		DITCH-3		Q100 Q100	(cfs) 15.27 15.27	(ft) 734.34 734.34	(ft) 735.68 735.66	(ft)	(ft) 735.73 735.71	(ft/ft) 0.003889 0.004052	(ft/s) 1.81 1.84	(sq ft) 8.42 8.30	(ft) 11.86 11.77	0.38
747.26 747.17 746.82	748.45 748.45 748.45	747.46	748.47 748.46 748.46	0.001840 0.001052 0.000370	0.92 0.63	7.75 11.26	11.32 13.04	0.25 0.20 0.12		DITCH-3 DITCH-3	235 230	Q100 Q100	15.27 15.27	734.32 734.06	735.64 735.64		735.69 735.67	0.004011 0.002032	1.83 1.42	8.33 10.78	11.81 13.48	0.38 0.28
746.08 746.00	746.85 746.70	746.67	746.97 746.86	0.020477 0.027364	2.84 3.14	2.51 2.27	6.22 6.08	0.79		DITCH-3 DITCH-3		Q100 Q100	15.27 15.27 Culvert	733.86 733.15	735.64 735.65	734.17	735.66 735.66	0.000933 0.000312	1.05 0.71	14.58 21.42	16.04 18.11	0.19
745.92 745.75	746.59 746.44	746.41	746.72 746.59	0.022485 0.028562	2.90 3.17	2.46 2.25	6.41 6.12	0.82 0.92		DITCH-3	190 185	Q100 Q100	15.27 15.27	733.00 732.97	735.11 735.11		735.11 735.11	0.000296 0.000282	0.70 0.68	21.96 22.38	18.85 19.02	0.11 0.11
745.61 745.45 745.36	746.29 746.15 746.01	746.27 746.12 745.99	746.45 746.31 746.17	0.028651 0.027746 0.028755	3.18 3.14 3.17	2.24 2.27 2.25	6.09 6.10 6.16	0.92 0.91 0.92		DITCH-3 DITCH-3	175	Q100 Q100 Q100	15.27 15.27 15.27	732.94 732.92 732.91	735.10 735.10 735.10		735.11 735.11 735.11	0.000261 0.000251 0.000241	0.66 0.65 0.64	23.04 23.36 23.73	19.31 19.44 19.62	0.11 0.11 0.10
745.18 745.04	745.89 745.74	745.72	746.03 745.90	0.025613 0.027705	3.03 3.13	2.36 2.28	6.32 6.15	0.87		DITCH-3	165	Q100 Q100	15.27 15.27	732.88 732.84	735.10 735.10		735.11 735.11	0.000241 0.000228 0.000214	0.63 0.62	24.23 24.80	19.81 20.04	0.10 0.10
744.92 744.81 744.59	745.62 745.46 745.34	745.45	745.76 745.63 745.48	0.024737 0.030355 0.025193	3.03 3.26 3.04	2.36 2.19 2.35	6.16 5.98 6.16	0.86 0.95 0.87		DITCH-3 DITCH-3	150	Q100 Q100 Q100	15.27 15.27 15.27	732.81 732.78 732.78	735.10 735.10 735.10		735.10 735.10 735.10	0.000204 0.000195 0.000184	0.60 0.59 0.58	25.26 25.70 26.27	20.21 20.39 20.65	0.10 0.09 0.09
744.46 744.31	745.18 745.03	745.16 745.01	745.34 745.19	0.029123 0.031047	3.21 3.28	2.22	6.01 5.97	0.93 0.96		DITCH-3	140	Q100 Q100	15.27 15.27	732.75 732.72	735.10 735.10		735.10 735.10	0.000164 0.000175 0.000166	0.57 0.56	26.76 27.29	20.81	0.09
744.15 744.00 743.87	744.87 744.75 744.56	744.85 744.70 744.56	745.04 744.89 744.74	0.030772 0.024307 0.034886	3.27 3.00 3.43	2.18 2.38 2.08	5.98 6.19 5.80	0.95 0.85 1.01		DITCH-3 DITCH-3	125	Q100 Q100 Q100	9.08 9.08 9.08	732.69 732.66 732.64	735.10 735.10 735.10		735.10 735.10 735.10	0.000056 0.000052 0.000050	0.33 0.32 0.31	27.68 28.50 29.01	21.14 21.45 21.67	0.05 0.05 0.05
743.71 743.59	744.44 744.26	744.39 744.25	744.58 744.44	0.024170 0.033896	2.99 3.39	2.38	6.22 5.88	0.85 1.00		DITCH-3	115	Q100 Q100	9.08 9.08	732.62 732.59	735.10 735.10	733.19	735.10 735.10	0.000048 0.000045	0.31 0.30	29.50 30.21	21.82 22.15	0.05 0.05
743.44 743.31 743.18	744.13 743.96 743.81	744.09 743.95 743.79	744.28 744.13 743.97	0.027032 0.032278 0.029771	3.11 3.33 3.23	2.29 2.14 2.21	6.12 5.94 6.02	0.90 0.98 0.94		DITCH-3 DITCH-3		Q100 Q100	9.08 9.08	732.44 732.42	734.98 734.98		734.98 734.98	0.000043 0.000041	0.30	30.70 31.28	22.25 22.48	0.04 0.04
743.03 742.84	743.66 743.48	743.64 743.48	743.82 743.66	0.028982 0.034090	3.19 3.40	2.23	6.07 5.88	0.93 1.00		DITCH-3	70	Q100 Q100	9.08 9.08	732.41 732.38	734.98 734.98		734.98 734.98	0.000041 0.000040 0.000038	0.29 0.28	31.61 31.98	22.60 22.72	0.04 0.04
742.68 742.50 742.34	743.34 743.25 743.22	743.31	743.50 743.37 743.29	0.028947 0.018597 0.009416	3.19 2.71 2.10	2.23 2.63 3.39	6.08 6.55 7.42	0.93 0.75 0.55		DITCH-3 DITCH-3	55	Q100 Q100 Q100	9.08 9.08 9.08	732.38 732.34 732.34	734.98 734.98 734.98		734.98 734.98 734.98	0.000037 0.000036 0.000035	0.28 0.28 0.27	32.29 32.69 33.07	22.84 22.96 23.12	0.04 0.04 0.04
742.15 742.00	743.22 743.21		743.25 743.23	0.003765 0.002001	1.49 1.18	4.78 6.06	8.78 9.87	0.36 0.26		DITCH-3	45	Q100 Q100	9.08 9.08	732.34 730.62	734.98 734.98	730.85	734.98 734.98	0.000034 0.000001	0.27 0.07	33.45 128.24	23.23 31.73	0.04 0.01
741.81 741.58	743.21 743.21	742.20	743.22 743.22	0.000998 0.000346	0.91	7.86 11.47	11.23 13.00	0.19 0.12														
740.83 740.71	741.52 741.37	741.34	741.64 741.52	0.020308 0.027332	2.81 3.13	2.54 2.28	6.39 6.12	0.79 0.90														
740.56 740.40 740.25	741.23 741.09 740.94	741.20 741.06 740.91	741.38 741.24 741.10	0.027546 0.027444 0.028786	3.14 3.13 3.19	2.27 2.28 2.23	6.11 6.10 6.04	0.91 0.90 0.92														
740.25 740.09 739.96	740.81 740.70	740.91	740.96 740.83	0.026169 0.022791	3.08 2.91	2.32 2.45	6.14 6.36	0.88 0.83		HEC-RAS PI	an: DITCH-3 River Sta			rofile: Q100 W.S. US.	E.G. IC	E.G. OC M	lin El Weir Flow	Q Culv Gro	up Q Weir	Delta WS	Culv Vel US	Culv Vel DS
739.81 739.65	740.54 740.45	740.52	740.70 740.57	0.029188 0.020057	3.21 2.80	2.22	5.98 6.38	0.93 0.78			205 Culvert # 95 Culvert #1		(ft) 735.66 735.10		(ft) 735.39 734.06	(ft) 735.66 735.10	(ft) 736.7 736.0		(cfs) 5.27 9.08	(ft) 0.54 0.12	(ft/s) 4.86 2.28	(ft/s) 4.86 2.28
739.56 739.44 739.34	740.30 740.20 740.09	740.27	740.45 740.33 740.22	0.026792 0.021525 0.021792	3.11 2.87 2.88	2.29 2.49 2.48	6.08 6.34 6.34	0.89 0.81 0.81			Plan: DITCH-4		'				, 50.0					
739.25 739.15 739.03	739.96 739.85 739.75		740.10 739.98 739.87	0.024401 0.022577 0.021307	3.00 2.91 2.85	2.38 2.45 2.50	6.24 6.33 6.37	0.86 0.83 0.80		Reach	River Sta	Profile	Q Total (cfs)	Min Ch El V	V.S. Elev (ft)	Crit W.S.	(ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	(sq ft)	(ft)	roude # Chl
738.94 738.84	739.66 739.58		739.77 739.68	0.018389 0.015198	2.71 2.51	2.64 2.84	6.52 6.81	0.75 0.69		DITCH-4 DITCH-4	300	Q100 Q100 Q100	2.51 2.51 2.51	734.72 734.72 734.72	735.37 735.35 735.32		735.40 735.37 735.35	0.004762 0.004796 0.005037	1.25 1.25 1.28	2.01 2.00 1.97	5.73 5.74 5.70	0.37 0.37 0.38
738.72 738.62	739.54 739.50 739.49		739.61 739.56 739.53	0.010472 0.007282 0.004380	2.18 1.91	3.26 3.74 4.52	7.30 7.78 8.55	0.58 0.49 0.38		DITCH-4 DITCH-4	290 285	Q100 Q100	2.51 2.51	734.69 734.67	735.30 735.27		735.32 735.30	0.004808 0.004768	1.25 1.25	2.00 2.01	5.75 5.75	0.37 0.37
738.50 738.38 738.28	739.49 739.48 739.47		739.53 739.51 739.49	0.004380 0.002954 0.001981	1.58 1.36 1.17	4.52 5.24 6.08	9.19 9.89	0.32 0.26		DITCH-4 DITCH-4	275	Q100 Q100 Q100	2.51 2.51 2.51	734.62 734.59 734.54	735.25 735.22 735.20		735.27 735.25 735.23	0.004719 0.005089 0.004400	1.25 1.28 1.21	2.01 1.96 2.07	5.75 5.67 5.82	0.37 0.38 0.36
737.84	739.48 738.56	738.55	739.48 738.60	0.000562	0.75	9.50	11.54 7.78	0.15		DITCH-4 DITCH-4	265 260	Q100 Q100	2.51 2.51	734.50 734.47	735.18 735.16		735.20 735.18	0.004404 0.004637	1.22 1.24	2.06 2.02	5.80 5.73	0.36 0.37
737.68 737.62	738.48 738.43		738.56 738.50	0.003810 0.011945 0.009919	2.30	3.11 3.33	7.78 7.11 7.35	0.61		DITCH-4	250	Q100 Q100	2.51 2.51	734.42 734.38	735.14 735.12		735.16 735.14	0.003786 0.003797	1.15 1.15	2.18	5.94 5.90	0.33
737.56 737.47	738.39 738.36		738.46 738.42	0.007920 0.006740	1.97 1.85	3.62 3.85	7.68 7.91	0.51 0.47		DITCH-4 DITCH-4	240 235	Q100 Q100 Q100	2.51 2.51 2.51	734.38 734.38 734.34	735.10 735.08 735.06		735.12 735.10 735.08	0.003863 0.003835 0.003206	1.16 1.15 1.08	2.17 2.18 2.32	5.92 5.96 6.15	0.34 0.34 0.31
	00 (Continued) W.S. Elev (ft)	Crit W.S.	E.G. Elev (ft)	E.G. Slope (ft/ft)		low Area	Top Width	Froude # Chl		DITCH-4 DITCH-4	225	Q100 Q100 Q100	2.51 2.51	734.34 734.34 734.32	735.05 735.03 735.02		735.07 735.05 735.03	0.003279 0.002991	1.09 1.05 1.02	2.31	6.13 6.26	0.31 0.30
737.40 737.34	738.34 738.32	(it)	738.38 738.36	0.005439 0.004571	1.71 1.60	4.17 4.46	8.21 8.54			DITCH-4 DITCH-4	215	Q100 Q100 Q100	2.51 2.51 2.51	734.31 734.28	735.02 735.01 734.99		735.02 735.01	0.002764 0.002554 0.002248	0.99 0.94	2.46 2.53 2.66	6.36 6.44 6.60	0.29 0.28 0.26
737.25 737.18 737.12	738.30 738.29 738.28		738.34 738.32 738.30	0.003704 0.002887 0.002475	1.48 1.35 1.28	4.81 5.28 5.59	9.21 9.45	0.31		DITCH-4	190	Q100	2.51 Culvert	734.13	734.99	734.51	735.00	0.000926	0.69	3.65	7.47	0.17
737.03 737.00	738.27 738.26		738.29 738.28	0.001919 0.001640	1.16 1.09	6.15 6.53		0.26		DITCH-4 DITCH-4	170	Q100 Q100 Q100	2.51 2.51 2.51	733.98 734.00 733.97	734.71 734.69 734.67		734.74 734.71 734.69	0.003934 0.004601 0.004159	1.17 1.24 1.19	2.14 2.03 2.11	5.83 5.73 5.84	0.34 0.37 0.35
736.97 736.94 736.90	738.26 738.25 738.25		738.27 738.27 738.26	0.001412 0.001185 0.000999	1.03 0.97 0.91	6.90 7.37 7.85	10.53 10.89 11.23	0.21		DITCH-4	155	Q100 Q100	2.51 2.51	733.97 733.97	734.65 734.63		734.67 734.65	0.004309 0.004272	1.21	2.08	5.82 5.85	0.36 0.35
736.87 736.84	738.24 738.24		738.25 738.25	0.000853 0.000692	0.86 0.79	8.34 9.02	11.59 12.07	0.18		DITCH-4 DITCH-4	145	Q100 Q100 Q100	2.51 2.51 2.51	733.97 733.94 733.94	734.61 734.59 734.57		734.63 734.61 734.59	0.004366 0.004060 0.003894	1.21 1.18 1.16	2.07 2.13 2.16	5.84 5.92 5.96	0.36 0.35 0.34
736.78 736.58	738.24 738.24	737.20	738.25 738.24	0.000558 0.000317	0.73	9.78 11.88	12.55 13.33			DITCH-4	130	Q100 Q100	2.51 2.51	733.91 733.88	734.55 734.53		734.57 734.55	0.003912 0.003702	1.16 1.14	2.16	5.96 6.04	0.34 0.33
736.34 736.28	737.25 737.20		737.31 737.27	0.006487 0.009591	1.84 2.12	3.87 3.36	7.75 7.34			DITCH-4 DITCH-4 DITCH-4	120	Q100 Q100 Q100	2.51 2.51 2.51	733.82 733.78 733.75	734.51 734.50 734.48		734.53 734.51 734.50	0.003228 0.003079 0.003053	1.08 1.06 1.06	2.32 2.36 2.37	6.16 6.21 6.20	0.31 0.30 0.30
736.25 736.19 736.16	737.15 737.10 737.06		737.22 737.17 737.12	0.010059 0.008938 0.009056	2.16 2.06 2.07	3.31 3.46 3.44	7.30 7.46 7.45	0.53		DITCH-4 DITCH-4	110 105	Q100 Q100	2.51 2.51	733.70 733.66	734.47 734.46		734.48 734.47	0.002494 0.002314	0.98	2.55 2.62	6.44 6.50	0.28 0.27
736.12 736.09	737.02 736.98		737.08 737.04	0.007889 0.007563	1.97 1.94	3.62 3.68	7.65 7.73	0.50		DITCH-4 DITCH-4		Q100 Q100	2.51 2.51 Culvert	733.62 733.58	734.45 734.44	734.06	734.46 734.45	0.002071 0.001690	0.92 0.85	2.73 2.94	6.61 6.82	0.25 0.23
736.06 736.03 736.00	736.95 736.92 736.89		737.00 736.97 736.94	0.006966 0.006457 0.005915	1.88 1.82 1.76	3.80 3.91 4.04	7.85 7.97 8.10	0.46		DITCH-4	60	Q100 Q100	2.51 2.51	733.47 733.53	734.14 734.11		734.16 734.14	0.002850 0.006065	1.04	2.41 1.84	6.18 5.51	0.29
735.93 735.84	736.86 736.85		736.94 736.91 736.88	0.005915 0.005178 0.004033	1.68 1.53	4.04 4.24 4.66	8.29	0.41		DITCH-4 DITCH-4	50	Q100 Q100 Q100	2.51 2.51 2.51	733.50 733.45 733.41	734.08 734.05 734.01		734.11 734.08 734.04	0.006094 0.006445 0.007373	1.37 1.40 1.47	1.83 1.79 1.70	5.50 5.44 5.30	0.42 0.43 0.46
735.78 735.72 735.66	736.83 736.82 736.81		736.86 736.85 736.83	0.003486 0.002776 0.002363	1.45 1.33 1.25	4.92 5.36 5.69	9.30 9.58	0.31		DITCH-4	35	Q100 Q100	2.51 2.51	733.38 733.32	733.96 733.91	700 75	734.00 733.96	0.008613 0.009434	1.56 1.62	1.61 1.55	5.15 5.02	0.49 0.51
735.59 735.53	736.80 736.79		736.82 736.81	0.002363 0.001955 0.001655	1.17 1.10	6.11 6.50	9.91	0.26		DITCH-4 DITCH-4	25	Q100 Q100 Q100	2.51 2.51 2.51	733.28 732.90 732.41	733.75 733.40 732.82	733.75 733.40 732.82	733.86 733.54 732.94	0.038776 0.040175 0.038340	2.75 2.91 2.82	0.91 0.86 0.89	3.85 3.36 3.57	1.00 1.01 1.00
735.47 735.44 735.41	736.79 736.78		736.80 736.80 736.79	0.001322 0.001116 0.000954	1.01 0.95 0.89	7.07 7.53 7.99	10.65 10.99	0.20		DITCH-4 DITCH-4	15 10	Q100 Q100	2.51 2.51	731.96 731.46	732.86 732.86		732.86 732.86	0.000493 0.000052	0.56 0.24	4.47 10.26	7.59 11.07	0.13 0.04
735.38 735.34	736.78 736.77 736.77		736.78 736.78	0.000934 0.000816 0.000682	0.84 0.79	8.48 9.06	11.69	0.17			an: DITCH-4 Rive				732.86	731.33	732.86	0.000011	0.13	19.65	17.55	0.02
735.31 735.10	736.77 736.77	735.72	736.78 736.77	0.000587 0.000318	0.74 0.60	9.59 11.83				Reach DITCH-4	River Sta		E.G. US. (ft) 735.00	W.S. US. (ft) 734.99	E.G. IC (ft) 734.97	E.G. OC M (ft) 735.00	lin El Weir Flow (ft) 736.4	(cfs)	up Q Weir (cfs) 2.51	Delta WS (ft) 0.28	Culv Vel US (ft/s) 3.80	Culv Vel DS (ft/s) 3.08
734.87 734.81	735.86 735.82		735.89 735.87	0.003831 0.005270	1.52 1.69	4.70 4.21	8.52 8.20			DITCH-4	80 Culvert #1	Q100	734.45	734.44	734.42	734.45	735.9	2	2.51	0.30	3.80	3.21
734.75 734.72 734.66	735.80 735.79 735.77		735.84 735.82 735.80	0.004503 0.003987 0.003127	1.59 1.52 1.39	4.47 4.68 5.14		0.37														
734.66 734.69 734.57	735.77 735.76 735.75		735.80 735.79 735.77	0.003127 0.002959 0.002428	1.39 1.36 1.26	5.14 5.26 5.64	9.31	0.32														
734.59 734.52	735.74 735.73		735.76 735.75	0.002173 0.001737	1.21 1.11	5.90 6.40	9.84 10.18	0.28 0.25			Plan: DITCH-9 F					0.33.33	F 2 = -	F.O. 5:	14.5		T \	
734.52 734.46 734.42	735.72 735.72 735.71		735.74 735.73 735.73	0.001409 0.001223 0.001020	1.03 0.97 0.90	6.92 7.38 7.90	11.20	0.21		Reach DITCH-9	River Sta	Profile 100 YR	Q Total (cfs) 1.23	Min Ch El V (ft) 742.81	V.S. Elev (ft) 743.10	Crit W.S. (ft) 743.07	E.G. Elev (ft) 743.15	E.G. Slope (ft/ft) 0.027656	Vel Chnl (ft/s) 1.79	Flow Area (sq ft) 0.69	Top Width Fro	roude # Chl 0.79
734.38 734.32	735.71 735.71		735.72 735.72	0.000866 0.000767	0.85 0.82	8.38 8.71	11.90 11.94	0.18 0.17		DITCH-9 DITCH-9	200 180	100 YR 100 YR	1.23 1.23	742.41 741.92	742.73 742.20	742.20	742.76 742.27	0.014104 0.053583	1.32 2.15	0.93 0.57	5.67 4.54	0.57 1.07
734.31 734.22 734.13	735.70 735.70 735.70		735.71 735.71 735.71	0.000689 0.000606 0.000527	0.79 0.75 0.71	9.04 9.52 10.01		0.15		DITCH-9 DITCH-9		100 YR 100 YR	1.23 1.23 Culvert	740.70 739.72	741.00 740.04	741.02 740.06	741.11 740.17	0.061812 0.062592	2.75	0.45	2.69	1.19 1.20
734.06	735.70	734.69	735.70	0.000387	0.64	11.11	13.01	0.12		DITCH-9 DITCH-9	75 60	100 YR 100 YR	1.23 1.23	738.34 738.25	738.80 738.70		738.84 738.72	0.011143 0.005215	1.54	0.80	3.10 4.45	0.54
733.80 733.89 733.82	734.81 734.76 734.71		734.85 734.82 734.78	0.003506 0.008685 0.008536	1.53 2.04 2.03	4.67 3.50 3.51	7.71 7.57 7.49	0.53		DITCH-9		100 YR 100 YR	1.23 1.23	738.16 737.88	738.49 738.27	738.16	738.54 738.29	0.020917 0.008005	1.73 1.13	0.71 1.09	3.80 5.43	0.71 0.44
733.78 733.76	734.67 734.62		734.73 734.69	0.008219 0.009272	2.01 2.09	3.55 3.41	7.52 7.45	0.51 0.54														
733.69 733.65 733.64	734.57 734.53 734.50		734.64 734.60 734.55	0.009248 0.008902 0.007692	2.09 2.06 1.94	3.41 3.47 3.68	7.52	0.53														
733.53 733.52	734.46 734.42		734.52 734.48	0.007451 0.007954	1.92 1.96	3.72 3.63	7.80 7.76	0.49 0.51														
733.47 733.38 733.40	734.38 734.35 734.31		734.44 734.40 734.37	0.007202 0.006936 0.007052	1.90 1.88 1.88	3.74 3.80 3.79	7.81	0.47		HEC-RAS PI	an: DITCH-9 River	er: DITCH-9 Re		rofile: 100 YR W.S. US.	E.G. IC	E.G. OC M	lin El Weir Flow	Q Culv Gro	up Q Weir	Delta WS	Culv Vel US	Culv Vel DS
733.31 733.28	734.28 734.24	764	734.33 734.30	0.005858 0.007036	1.76 1.88	4.05 3.79	8.09 7.87	0.44 0.48			110 Culvert #		(ft) 740.17	(ft)	(ft)	(ft)	(ft) 741.5	(cfs)	(cfs)	(ft) 1.24	(ft/s)	(ft/s) 4.54
733.33 733.03	734.04 733.69	734.04 733.69		0.034692 0.034662	3.38	2.11																
	00 (Continued) W.S. Elev (ft)	Crit W.S.	E.G. Elev (ft)	E.G. Slope (ft/ft)		low Area	Top Width	Froude # Chl														
732.59 732.18	733.25 732.76	733.25 732.76	733.45 732.97	0.034231 0.033931	3.63 3.66	1.96 1.95	4.91 4.72	1.01														
731.75 731.31 730.87	732.85 732.86 732.86	731.35	732.87 732.86 732.86	0.001987 0.000540 0.000033	1.30 0.63 0.26	5.47 11.31 27.21	7.30 17.23 17.48	0.14														
. 5.001	. 32.30	. 51.00	,	,	5.20	_,.21																
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(ft)
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744.14
740.56
739.06
737.50
736.41

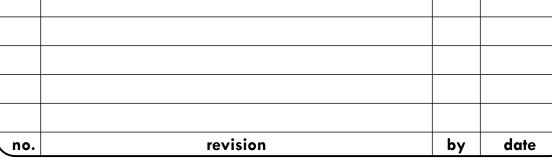
(ft) 748.42 743.18 739.43 738.19 736.72 735.65

(ft) (ft) (ft) (ft) (ft) (748.46 (748.45 748.46 743.22 743.21 743.22 739.48 739.48 739.48 739.24 738.24 736.77 736.77 736.77 735.70 735.70 735.70

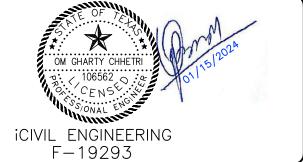




**EULESS BLVD, STE 412H** TX 76040 PH: (972) 523-5493 TBPE: F-19293 **EMAIL: INFO@ICIVILENG.COM** 



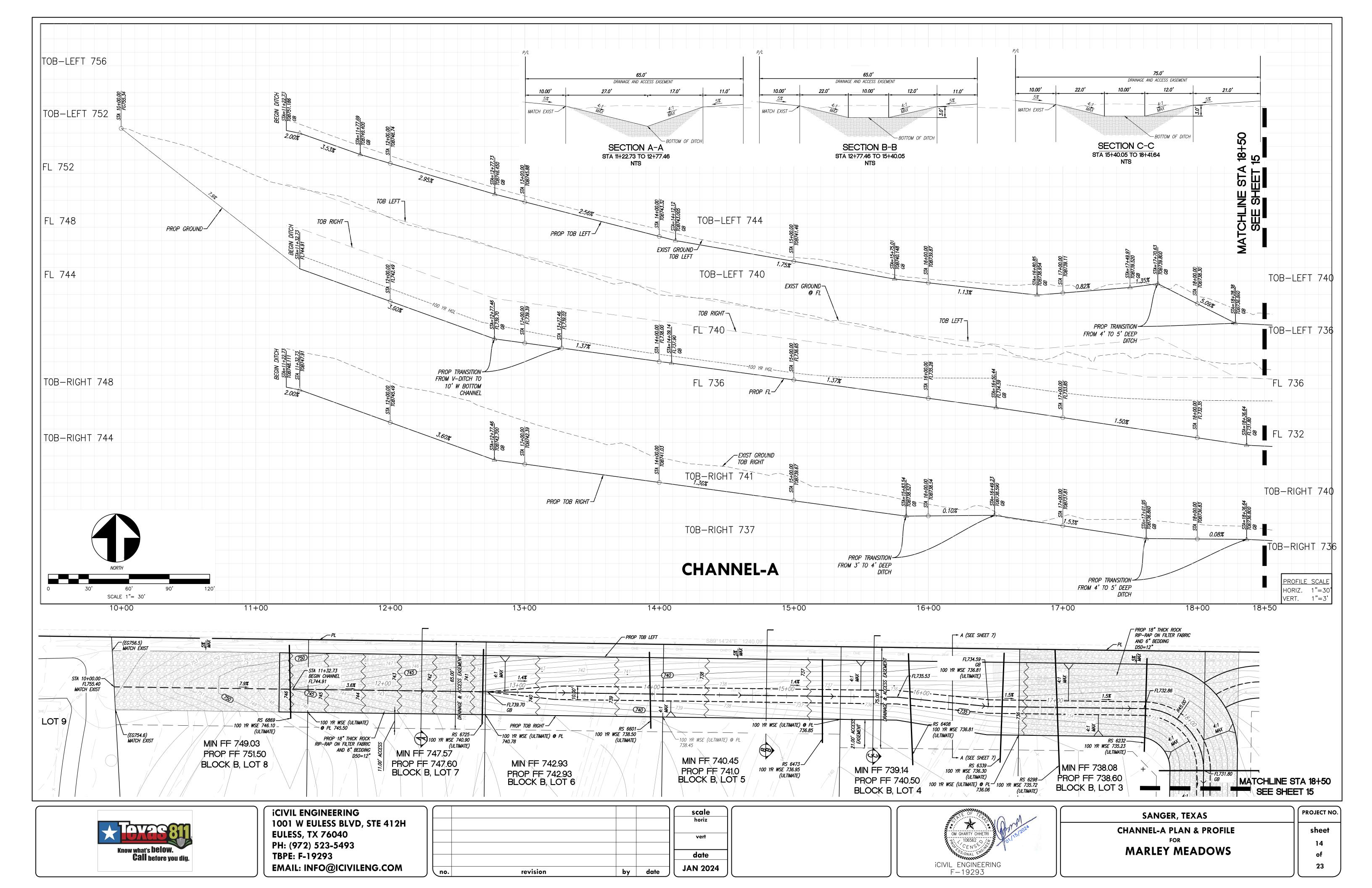
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JAN 2024

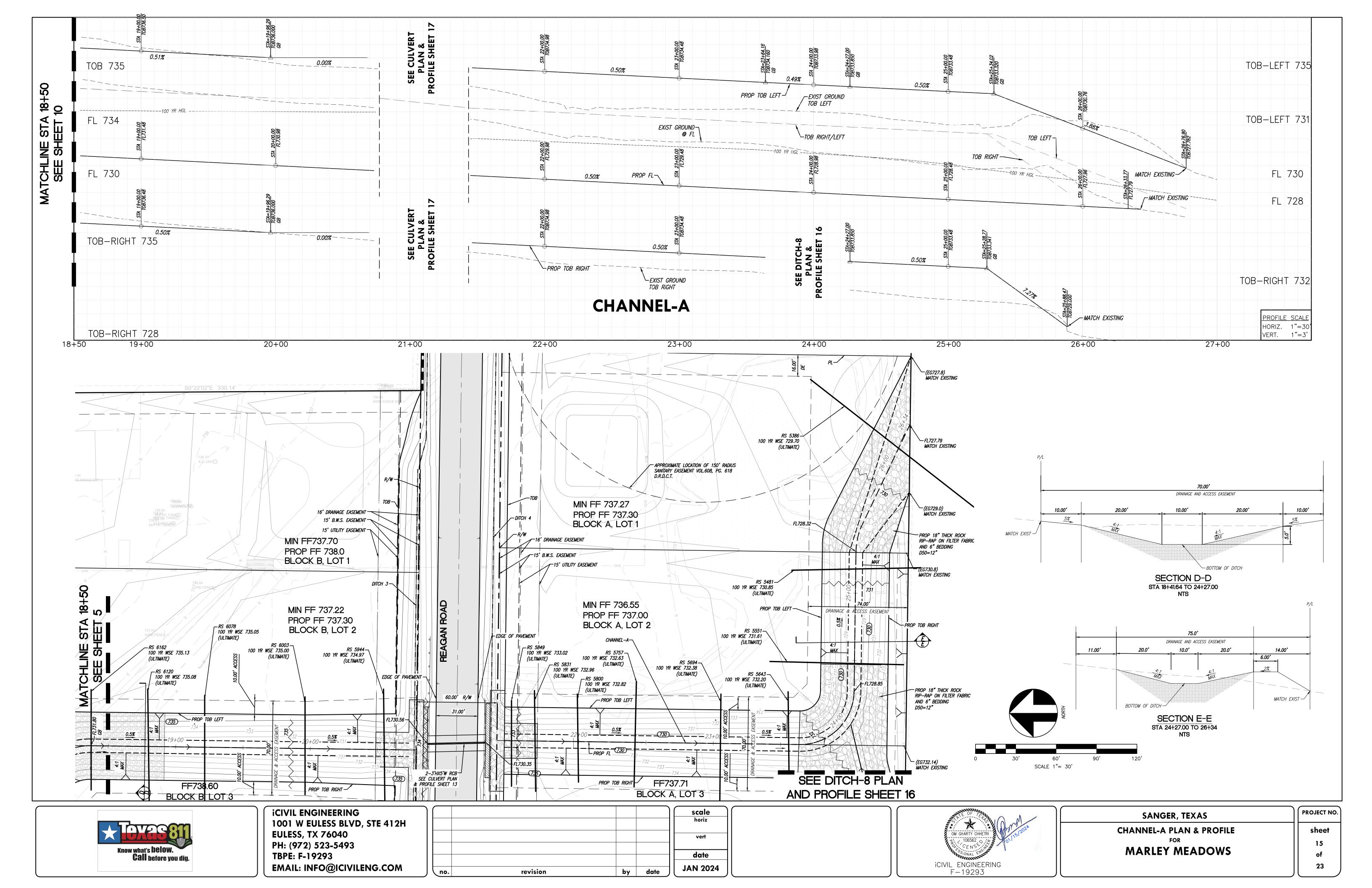


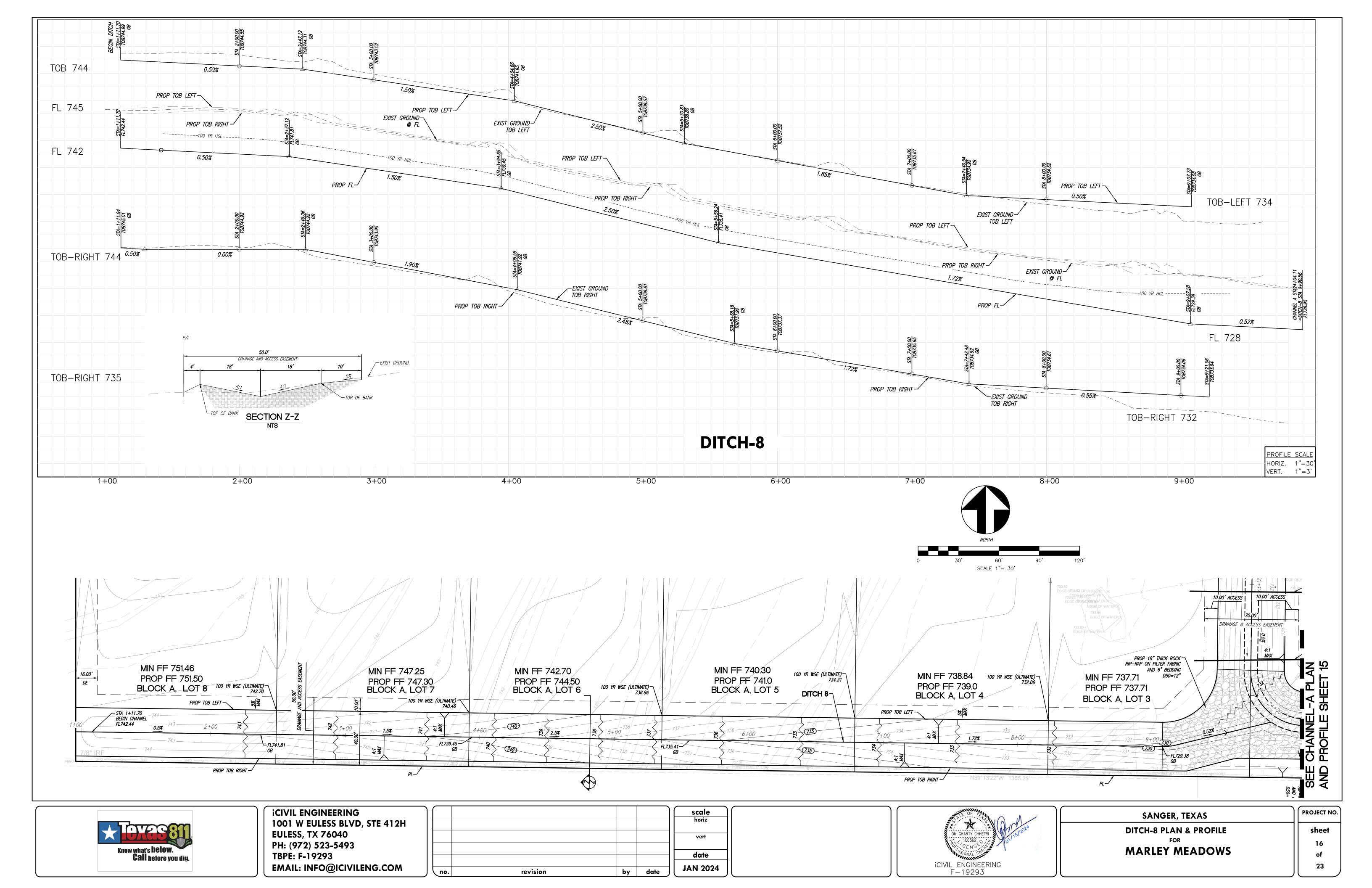
**HYDRAULIC WORK MAP MARLEY MEADOWS** 

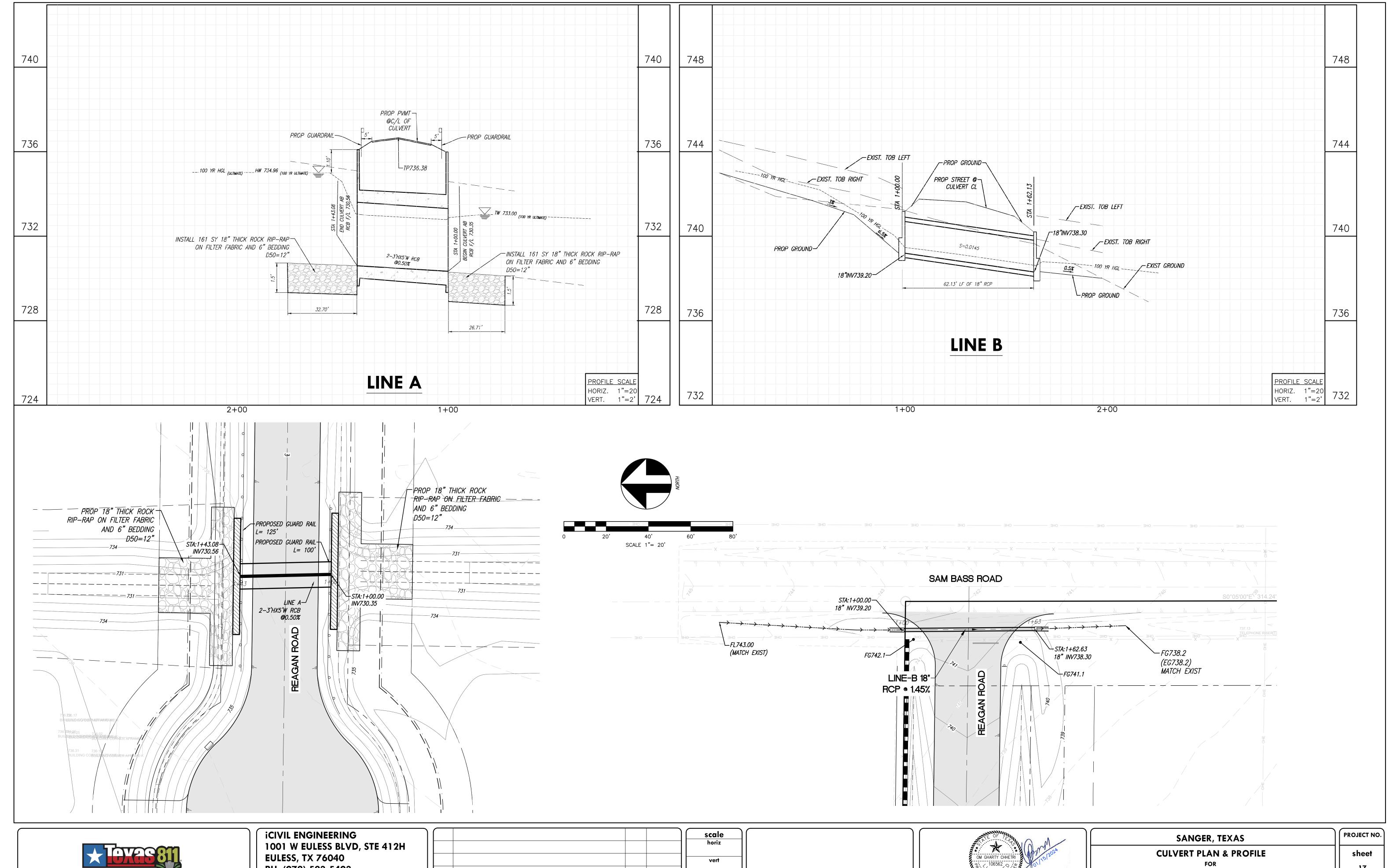
SANGER, TEXAS

PROJECT NO











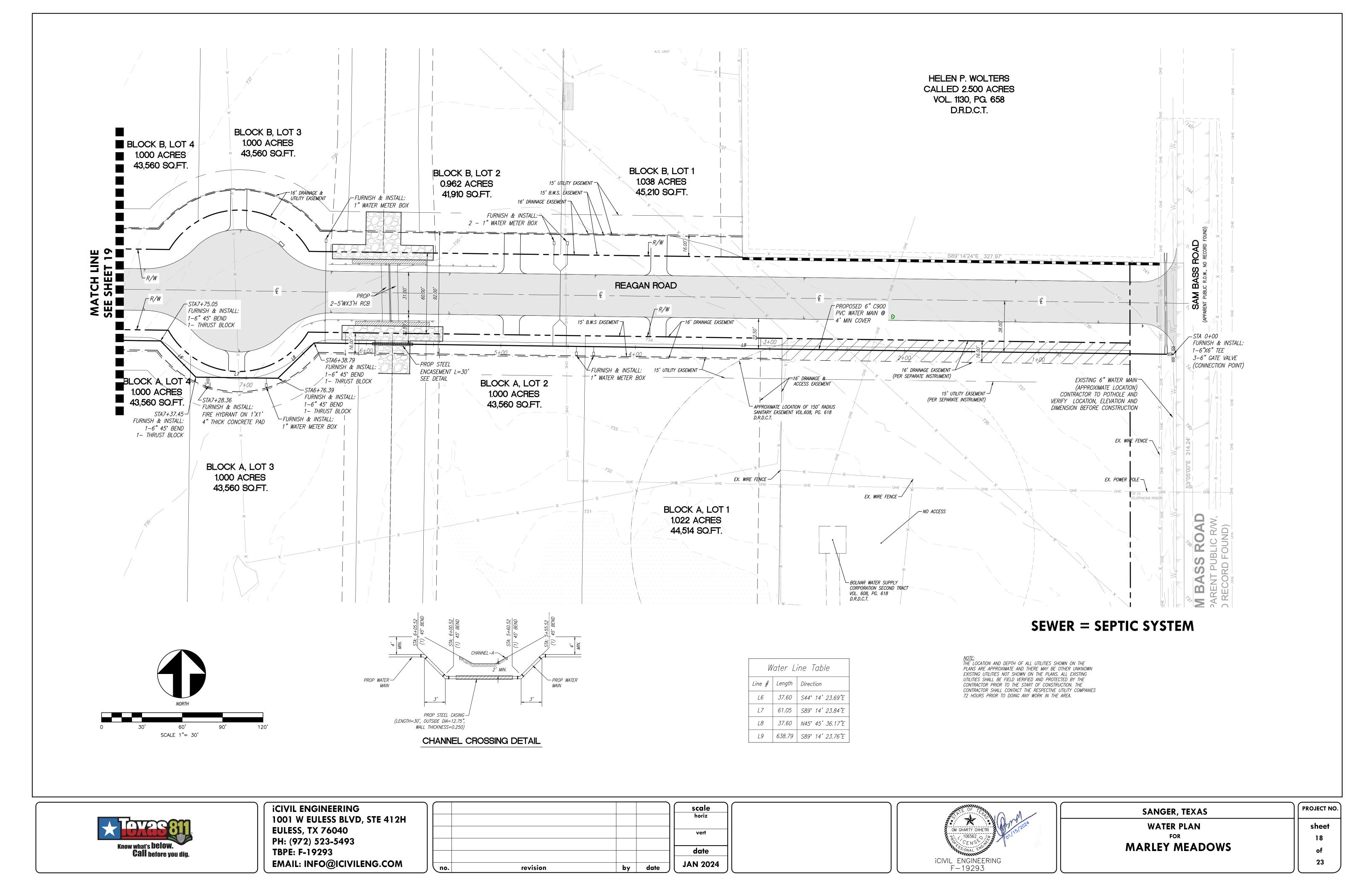
PH: (972) 523-5493 TBPE: F-19293 EMAIL: INFO@ICIVILENG.COM

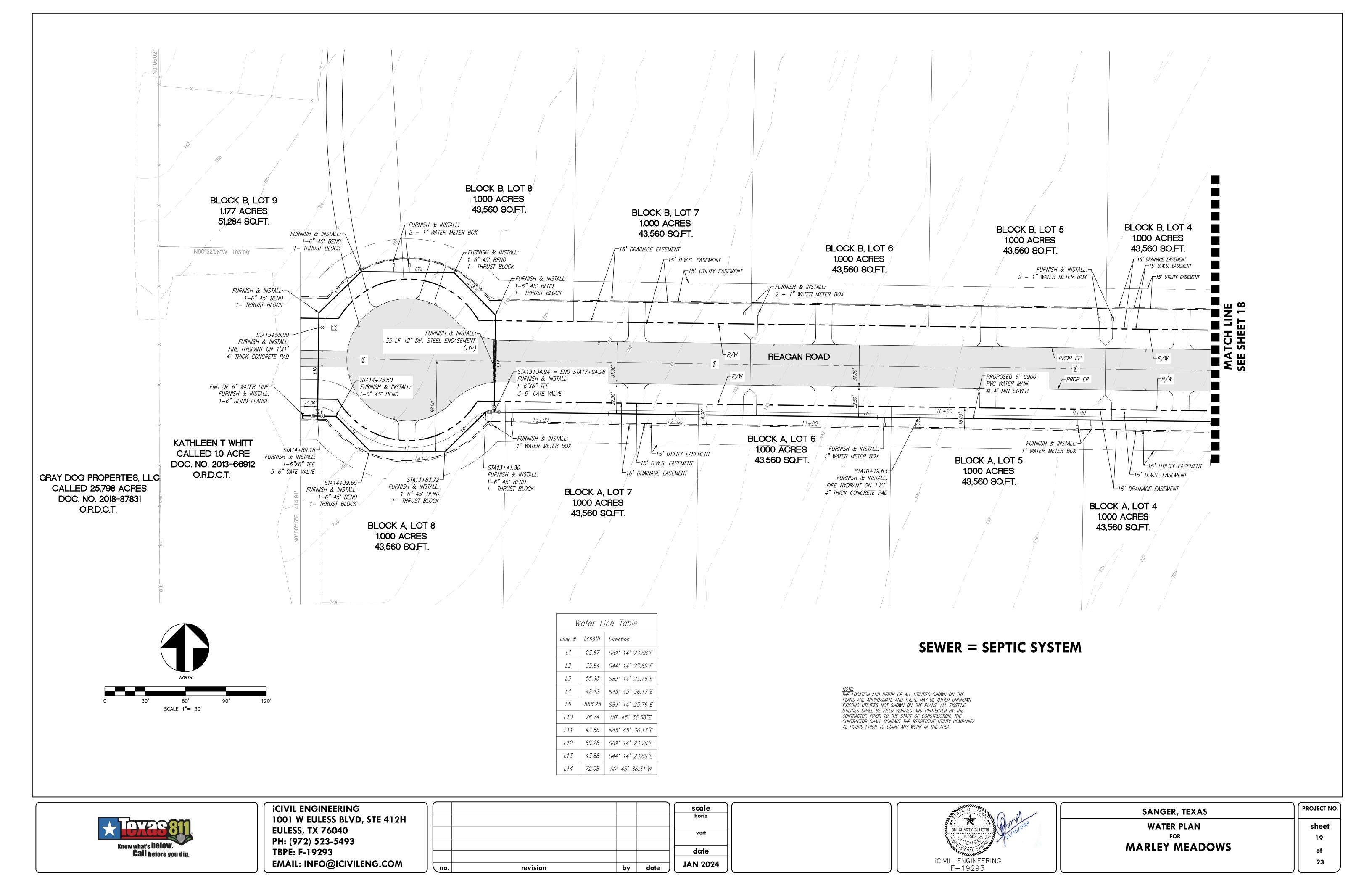
no.	revision	by	date	ı

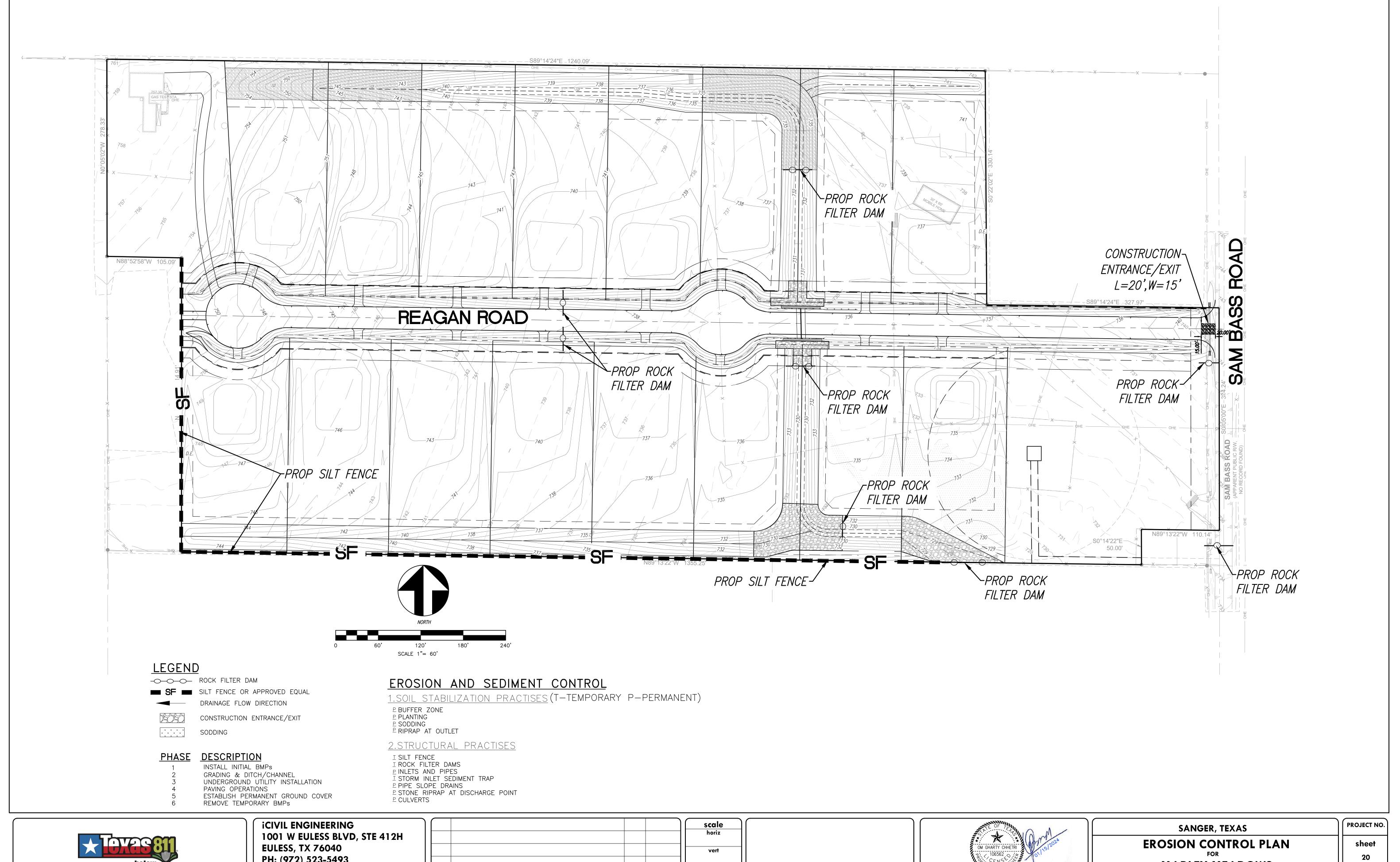
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SANGER, TEXAS
<b>CULVERT PLAN &amp; PROFILE</b>
FOR
MARLEY MEADOWS

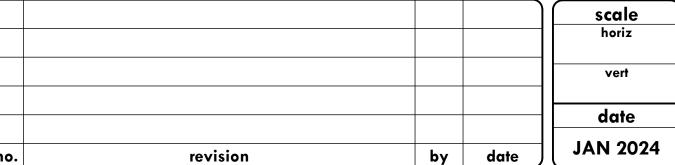






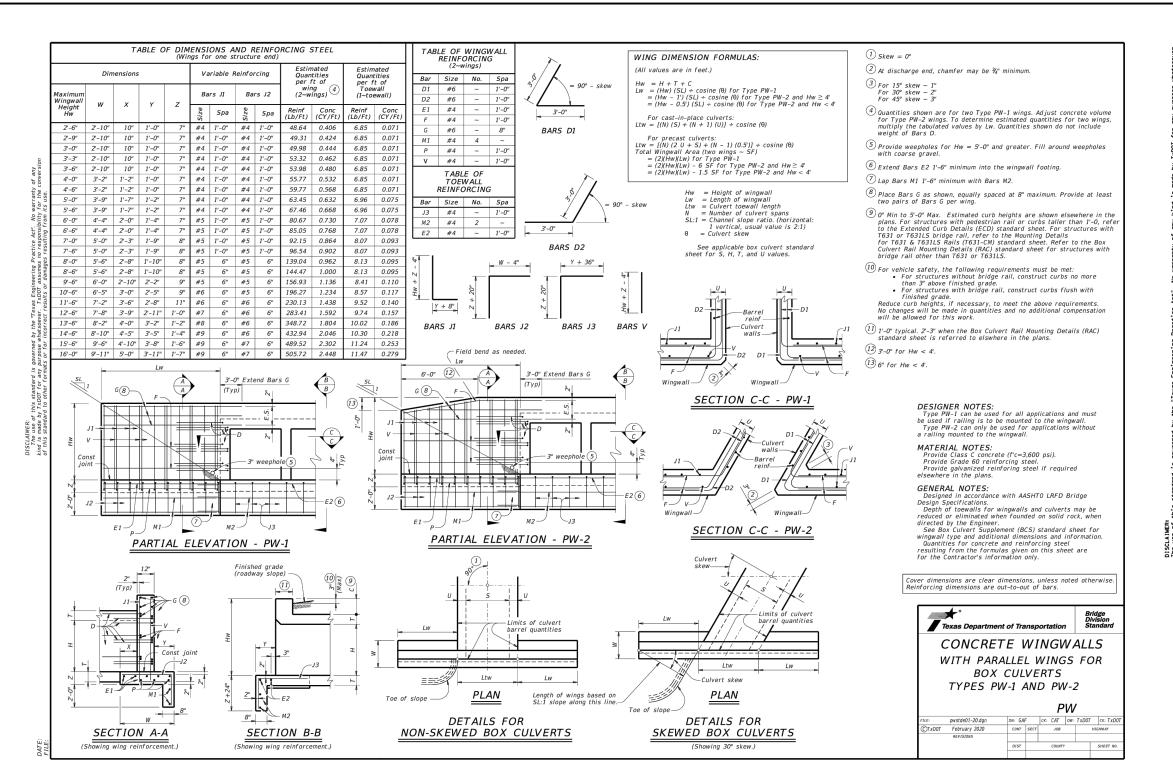


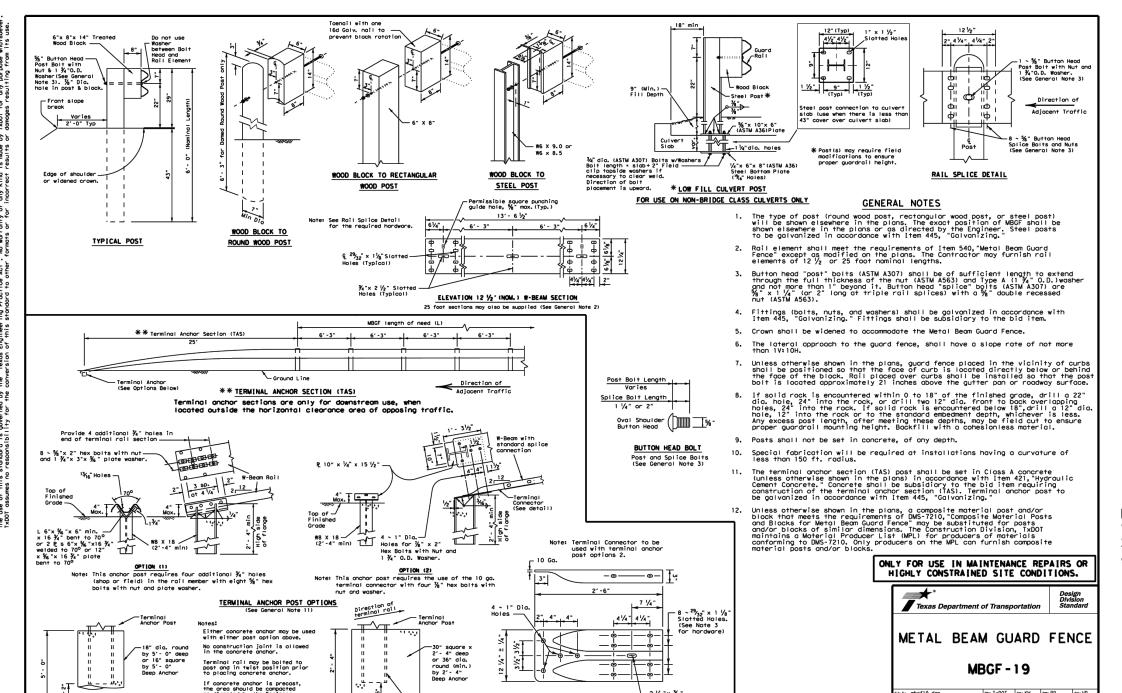
PH: (972) 523-5493 TBPE: F-19293 EMAIL: INFO@ICIVILENG.COM





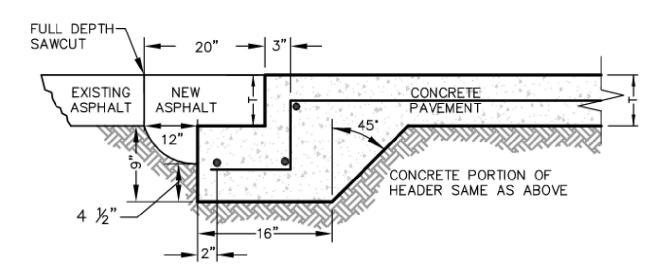
**MARLEY MEADOWS** 





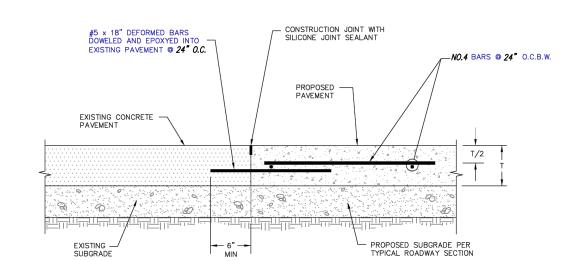
TERMINAL CONNECTOR

For connection hardware to concrete rails, see the MBGF transition standards.

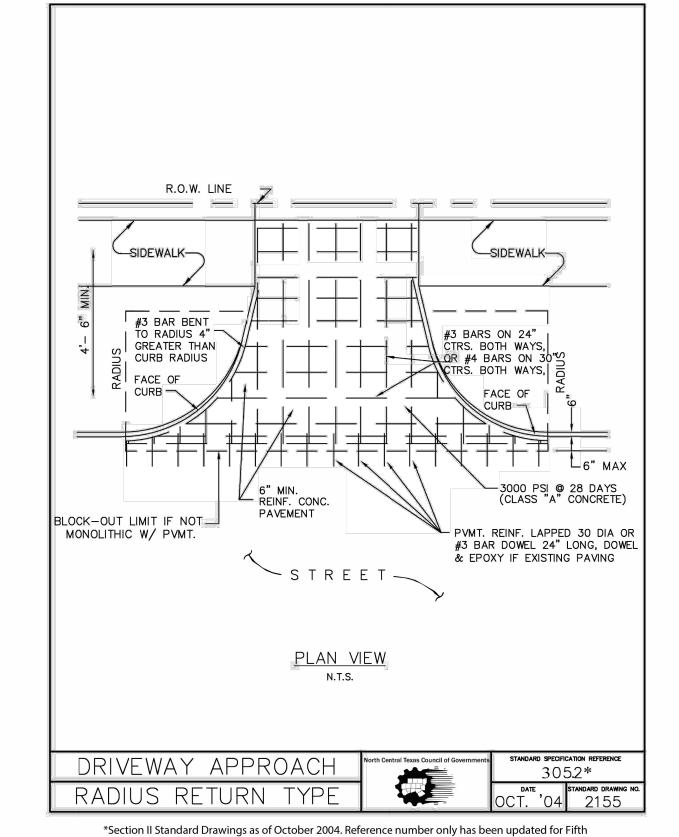


STREET HEADER AT ASPHALT PAVEMENT

 PAVEMENT BARS TO BE BENT DOWN INTO HEADER.
 HEADER AND PAVEMENT TO BE MONOLITHIC.
 NEW ASPHALT SHALL MATCH PROPOSED PAVEMENT THICKNESS WITH TOP 2" TYPE D AND THE REMAINING ASPHALT SHALL BE TYPE B PER TXDOT SPECIFICATIONS.



CONSTRUCTION JOINT (BETWEEN EXISTING & PROPOSED PAVEMENT)



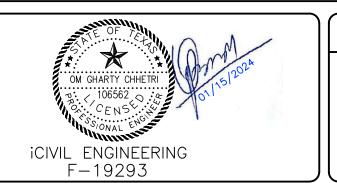
TERMINAL CONCRETE ANCHOR OPTIONS
(See General Note 11)

\*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition*.



iCIVIL ENGINEERING
1001 W EULESS BLVD, STE 412H
EULESS, TX 76040
PH: (972) 523-5493
TBPE: F-19293
EMAIL: INFO@ICIVILENG.COM

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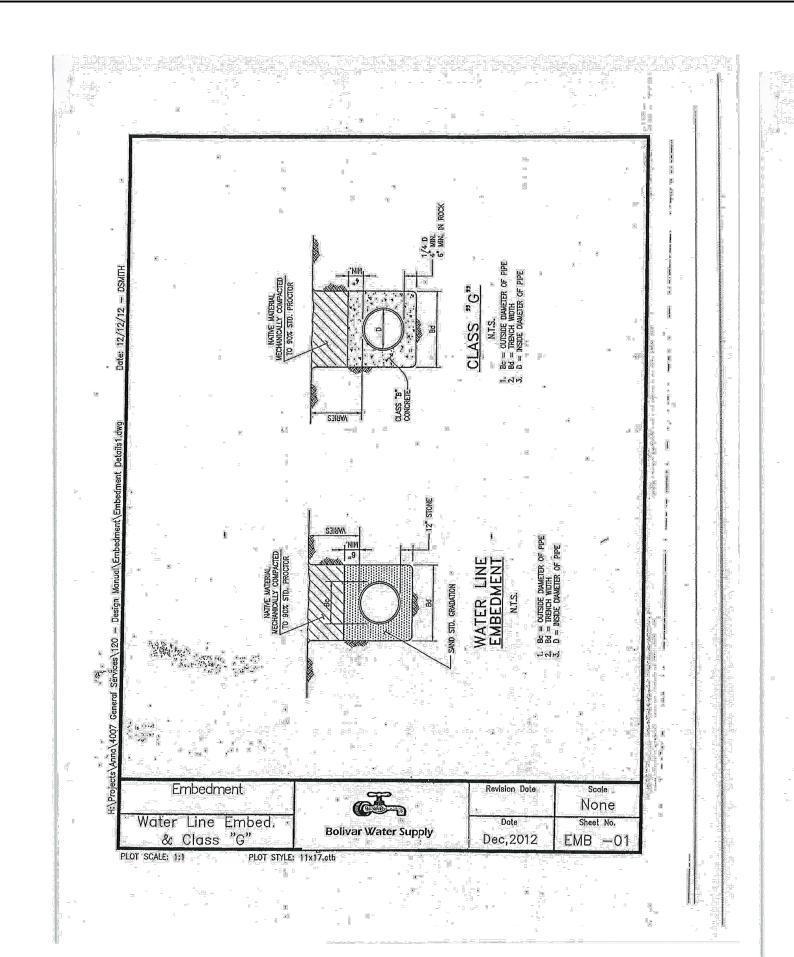


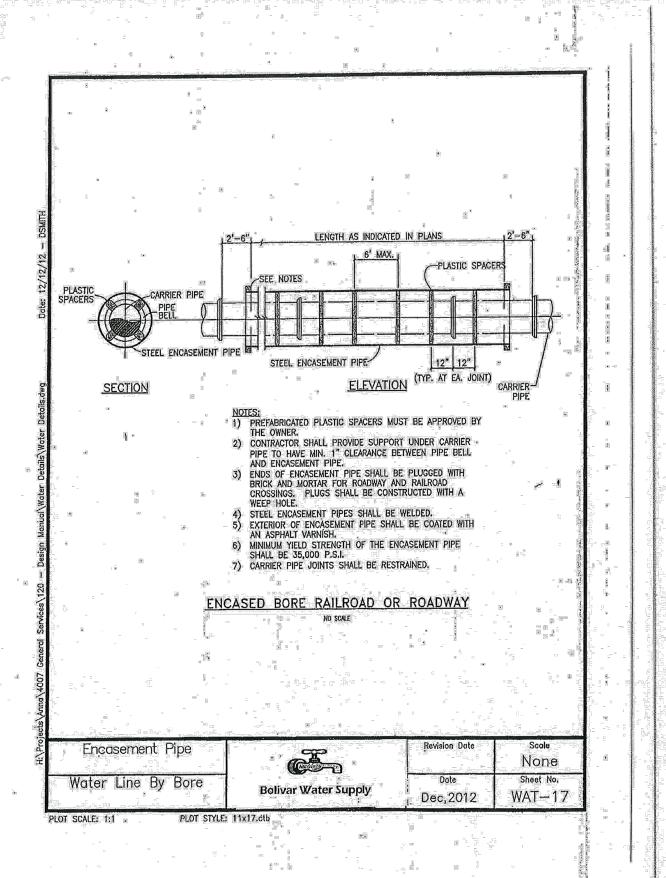
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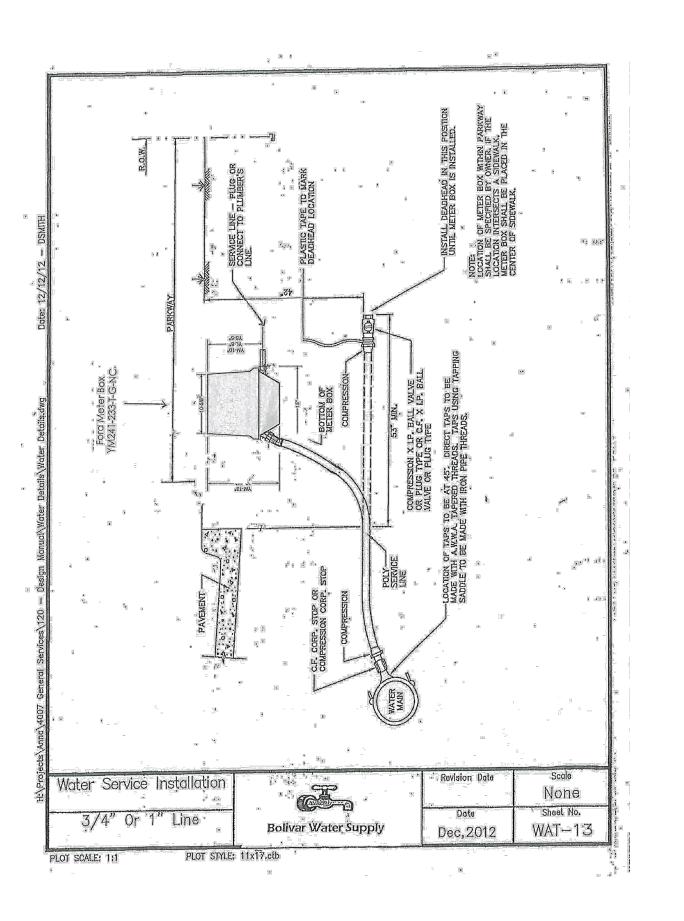
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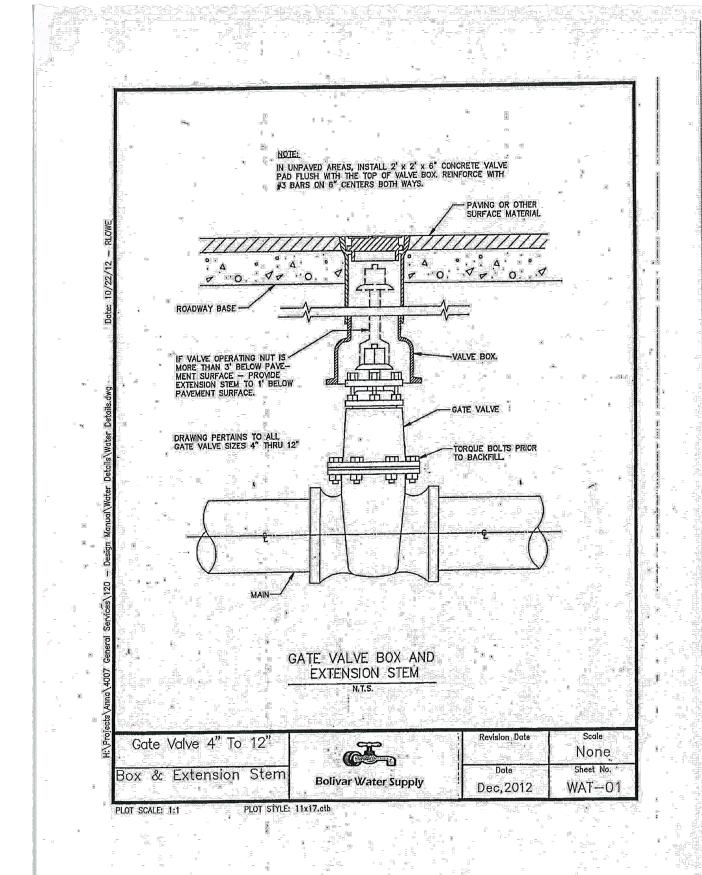
MARLEY MEADOWS

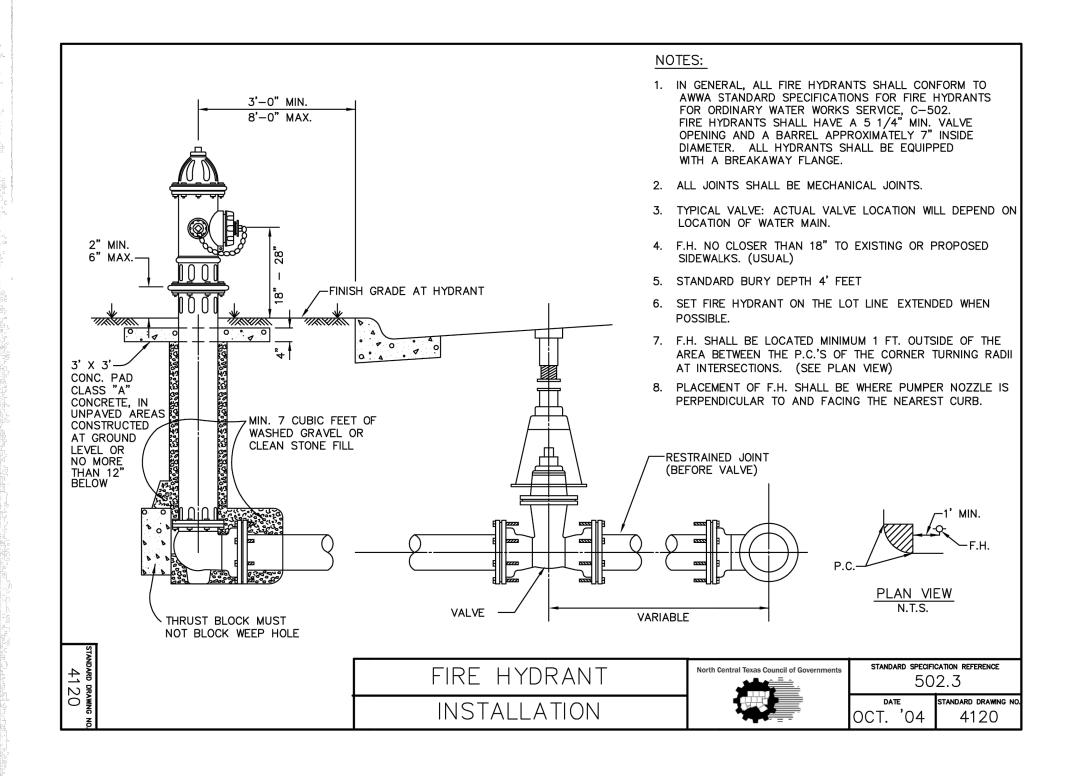
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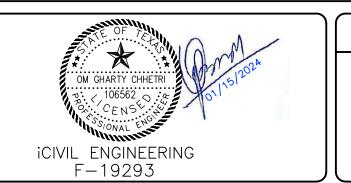




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1001 W EULESS BLVD, STE 412H
EULESS, TX 76040
PH: (972) 523-5493
TBPE: F-19293
EMAIL: INFO@ICIVILENG.COM

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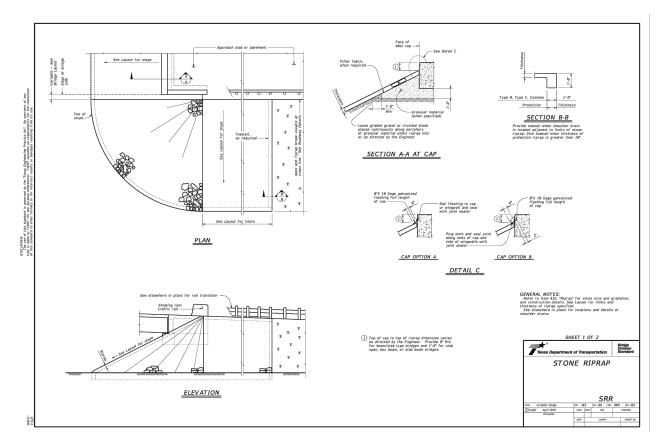
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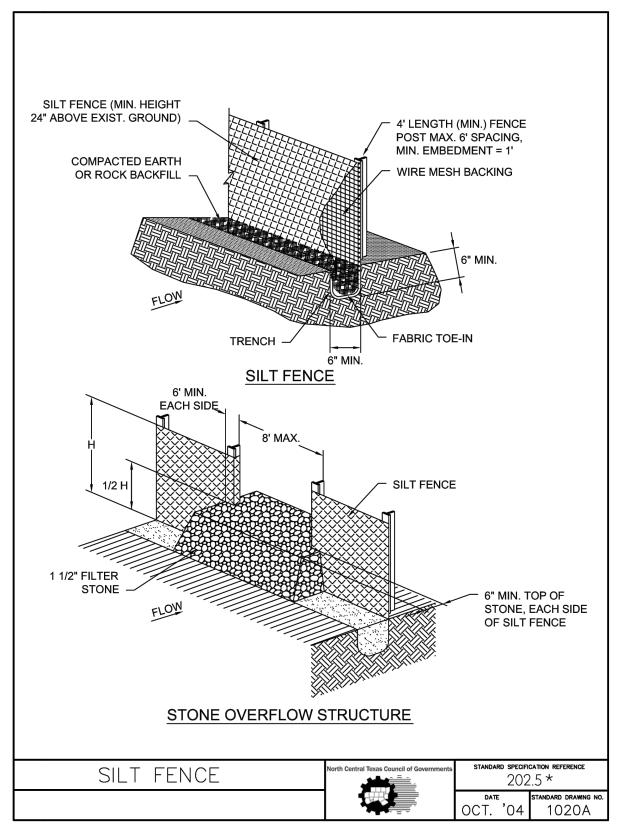


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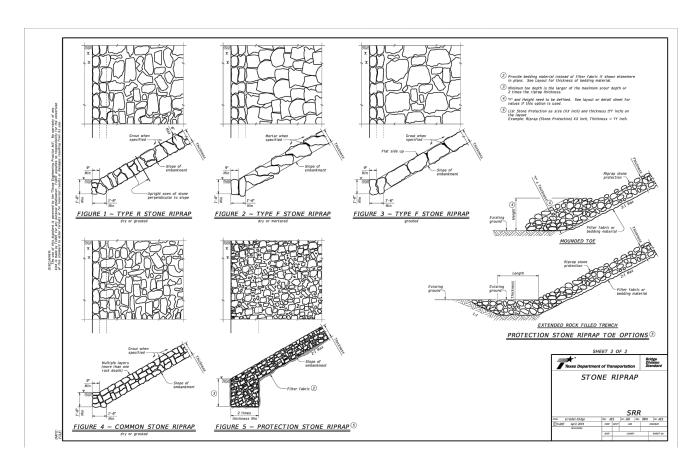
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\*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. Public Works Construction Standards North Central Texas, Fifth Edition.



#### SILT FENCE GENERAL NOTES:

1. POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF

2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (e.g. PAVEMENT), WEIGHT FABRIC FLAP WITH ROCK ON UPHILL SIDE TO PREVENT FLOW FROM SEEPING UNDER

3. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.

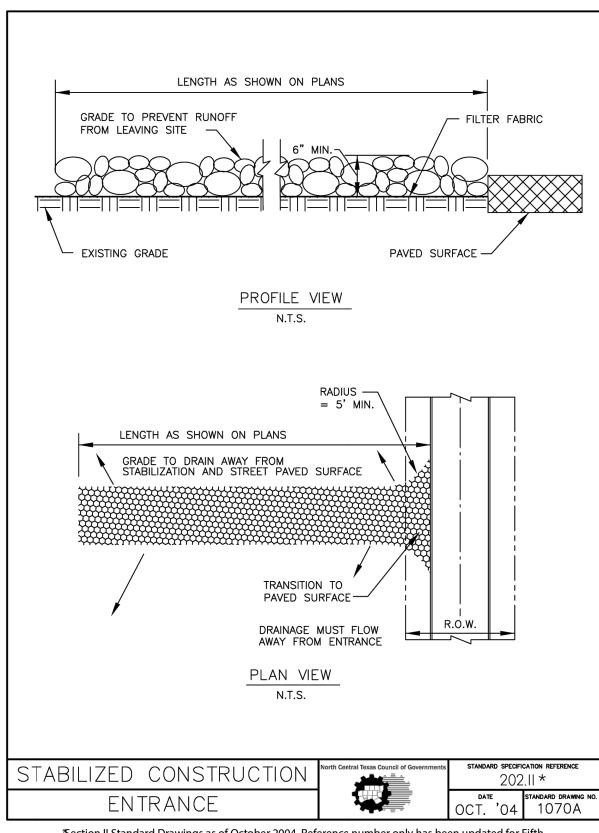
4. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH SUPPORT POST OR TO WIRE BACKING, WHICH IN TURN IS ATTACHED TO THE FENCE POST. THERE SHALL BE A 3 FOOT OVERLAP, SECURELY FASTENED WHERE ENDS OF FABRIC MEET.

5. INSPECTION SHALL BE AS SPECIFIED IN THE SWPPP. REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS

6. SILT FENCE SHALL BE REMOVED WHEN FINAL STABILIZATION

IS ACHIEVED OR ANOTHER EROSI DEVICE IS EMPLOYED.	ON OR SEDIMENT	CONTROL	
7. ACCUMULATED SILT SHALL BI A DEPTH OF HALF THE HEIGHT O SHALL BE DISPOSED OF AT AN A A MANNER AS TO NOT CONTRIBU	OF THE FENCE. TH APPROVED SITE AN	HE SILT ID IN SUCI	н
SILT FENCE	North Central Texas Council of Governments	standard specific 202	CATION REFERENCE
		OCT. '04	standard drawing no. 1020B
*Section II Standard Drawings as of October 2004. Re	ference number only has be	en updated for	Fifth

Edition Specifications. Public Works Construction Standards North Central Texas, Fifth Edition.



\*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. Public Works Construction Standards North Central Texas, Fifth Edition.

STABILIZED CONSTRUCTION ENTRANCE GENERAL NOTES:

1. STONE SHALL BE 3 TO 5 INCH DIAMETER COARSE AGGREGATE.

2. LENGTH SHALL BE AS SPECIFIED IN THE SWPPP.

3. THE THICKNESS SHALL NOT BE LESS THAN 12 INCHES.

4. THE WIDTH SHALL BE NO LESS THAN THE FULL WIDTH OF ALL

5. WHEN NECESSARY, VEHICLES SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO A PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WITH DRAINAGE FLOWING AWAY FROM BOTH THE STREET AND THE STABILIZED ENTRANCE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.

6. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PAVED SURFACES. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PAVED SURFACES MUST BE REMOVED IMMEDIATELY.

7. THE ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE

8. PREVENT SHORTCUTTING OF THE FULL LENGTH OF THE CONSTRUCTION ENTRANCE BY INSTALLING BARRIERS AS NECESSARY.

9. INSPECTION SHALL BE AS SPECIFIED IN THE SWPPP.

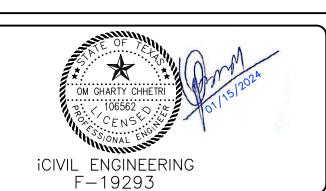
STABILIZED CONSTRUCTION	North Central Texas Council of Governments	standard specification reference 202.11 *
ENTRANCE		DATE STANDARD DRAWING NO.

\*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. Public Works Construction Standards North Central Texas, Fifth Edition.



**iCIVIL ENGINEERING** 1001 W EULESS BLVD, STE 412H **EULESS, TX 76040** PH: (972) 523-5493 TBPE: F-19293 EMAIL: INFO@ICIVILENG.COM

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SANGER, TEXAS **DETAILS MARLEY MEADOWS**  PROJECT NO. sheet