PLANNING & ZONING COMMISSION

MEETING AGENDA

MARCH 11, 2024, 7:00 PM



PLANNING & ZONING COMMISSION REGULAR MEETING HISTORIC CHURCH BUILDING - 403 N 7TH STREET, SANGER, TEXAS

CALL THE REGULAR MEETING TO ORDER AND ESTABLISH A QUORUM

INVOCATION AND PLEDGE

CITIZENS COMMENTS

This is an opportunity for citizens to address the Commission on any matter. Comments related to public hearings will be heard when the specific hearing begins. Citizens are allowed 3 minutes to speak. Each speaker must complete the Speaker's Form and include the topic(s) to be presented. Citizens who wish to address the Commission with regard to matters on the agenda will be received at the time the item is considered. The Commission is not allowed to converse, deliberate or take action on any matter presented during citizen input.

CONSENT AGENDA

All items on the Consent Agenda will be acted upon by one vote without being discussed separately unless requested by a Commissioner to remove the item(s) for additional discussion. Any items removed from the Consent Agenda will be taken up for individual consideration.

1. Consideration and possible action of the minutes from February 12, 2024, meeting.

ACTION ITEMS

2. Consideration and possible action on the Final Plat of Marley Meadows being 19.653 acres, located in the City of Sanger's ETJ, and generally located on the west side of Sam Bass Road and approximately 1307 feet north of the intersection of FM 455 and Sam Bass Road.

FUTURE AGENDA ITEMS

The purpose of this item is to allow the Chairman and Commissioners to bring forward items they wish to discuss at a future meeting, A Commissioner may inquire about a subject for which notice has not been given. A statement of specific factual information or the recitation of existing policy may be given. Any deliberation shall be limited to a proposal to place the subject on an agenda for a subsequent meeting. Items may be placed on a future meeting agenda with a consensus of the Commission or at the call of the Chairman.

ADJOURN

NOTE: The Commission reserves the right to adjourn into Executive Session as authorized by Texas Government Code, Section 551.001, et seq. (The Texas Open Meetings Act) on any item on its open meeting agenda in accordance with the Texas Open Meetings Act, including, without limitation Sections 551.071-551.087 of the Texas Open Meetings Act.

CERTIFICATION

I certify that a copy of this meeting notice was posted on the bulletin board at City Hall that is readily accessible to the general public at all times and was posted on the City of Sanger website on March 8, 2024, at 8:00 AM.

Stefani Dodson
Stefani Dodson, Secretary

The Historical Church is wheelchair accessible. Request for additional accommodations or sign interpretation or other special assistance for disabled attendees must be requested 48 hours prior to the meeting by contacting the City Secretary's Office at 940.458.7930.

DATE: March 11, 2024

FROM: Stefani Dodson, Planning Technician

AGENDA ITEM: Consideration and possible action of the minutes from February 12, 2024,

meeting.

SUMMARY:

N/A

FISCAL INFORMATION:

Budgeted: N/A Amount: N/A GL Account: N/A

RECOMMENDED MOTION OR ACTION:

N/A

ATTACHMENTS:

Minutes from February 12, 2024

PLANNING & ZONING COMMISSION

MEETING MINUTES

FEBRUARY 12, 2024, 7:00 PM



PLANNING & ZONING COMMISSION REGULAR MEETING HISTORIC CHURCH BUILDING - 403 N 7TH STREET, SANGER, TEXAS

CALL THE REGULAR MEETING TO ORDER AND ESTABLISH A QUORUM

There being a quorum Commissioner Miller called the Planning and Zoning meeting to order at 7:00 P.M

BOARD MEMBERS PRESENT:

Commissioner, Place 1	Shane Stone
Commissioner, Place 2	Sally Amendola
Commissioner, Place 3	Jackie Turner
Commissioner, Place 4	Allen McAlister
Commissioner, Place 6	Jason Miller
Commissioner, Place 7	Lisa Freeman

BOARD MEMBERS ABSENT:

Commissioner, Place 5 Jacob Gastelum

STAFF MEMBERS PRESENT:

Director of Development Services Ramie Hammonds, Planning Technician Stefani Dodson, and Secretary Shelley Warner

INVOCATION AND PLEDGE

CITIZENS COMMENTS

No citizens came forward.

CONSENT AGENDA

1. Consideration and possible action of the minutes from January 8, 2024, meeting.

Commissioner Miller makes a motion to approve the consent agenda. Commissioner Amendola seconded the motion. Voting Yea: Commissioner Stone, Commissioner Turner, Commissioner McAlister, Commissioner Freeman. The motion passes unanimously.

ACTION ITEMS

Consideration and possible action on the Final Plat of Marley Meadows being 19.653
acres, located in the City of Sanger's ETJ, and generally located on the west side of
Sam Bass Road and approximately 1307 feet north of the intersection of FM 455 and
Sam Bass Road.

Planning Technician Stefani Dodson presented the item.

Commissioner Miller makes a motion to deny since comments have not been met. Commissioner Amendola seconded the motion.

Voting Yea: Commissioner Stone, Commissioner Turner, Commissioner McAlister, Commissioner Freeman. The motion passes unanimously.

FUTURE AGENDA ITEMS

No items were discussed.

INFORMATIONAL ITEMS

3. Staff will be doing a presentation for the board.

Director Hammonds updates the board with a Development Services presentation and discussion held at the most recent City Council retreat.

ADJOURN

There being no further items Commissioner Miller adjourns the meeting at 7:44 P.M.



DATE: March 11, 2024

FROM: Ramie Hammonds, Development Services Director

AGENDA ITEM: Consideration and possible action on the Final Plat of Marley Meadows being

19.653 acres, located in the City of Sanger's ETJ, and generally located on the

west side of Sam Bass Road and approximately 1307 feet north of the

intersection of FM 455 and Sam Bass Road.

SUMMARY:

• The applicant is proposing to create 17 single-family lots from 1 unplatted tract.

- This site is located on the west side of Sam Bass Road.
- The lots have a minimum 1 acre.
- This development is located in the City of Sanger's ETJ
- The house will be served by onsite septic.

FISCAL INFORMATION:

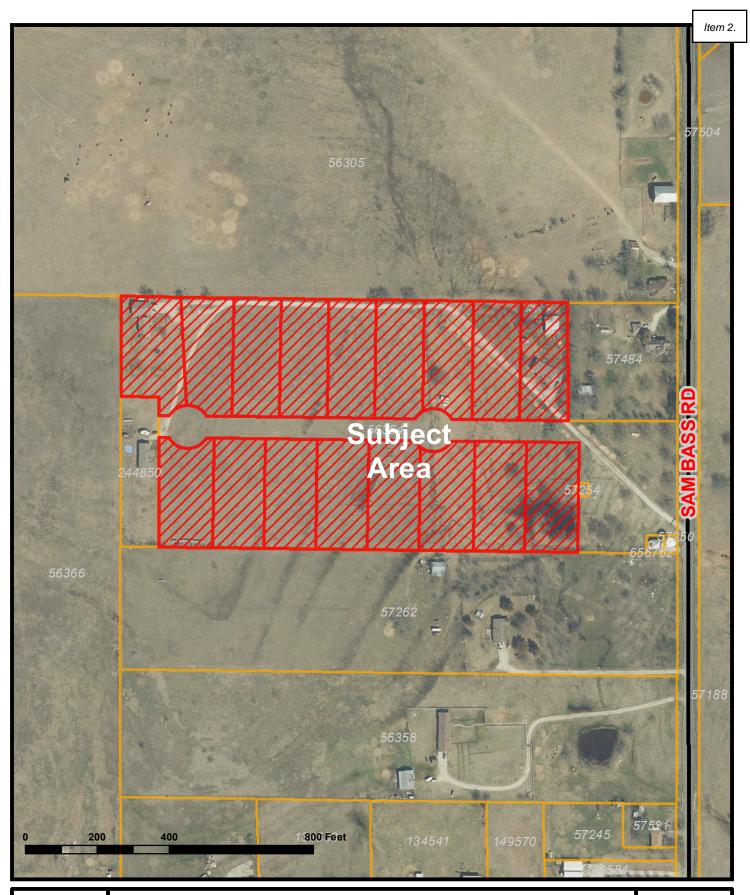
Budgeted: N/A Amount: N/A GL Account: N/A

RECOMMENDED MOTION OR ACTION:

Staff recommends APPROVAL with the condition all comments are met by City Council.

ATTACHMENTS:

Location Map
Final Plat
Application
Letter of Intent
Planning Comments
Engineering Comments



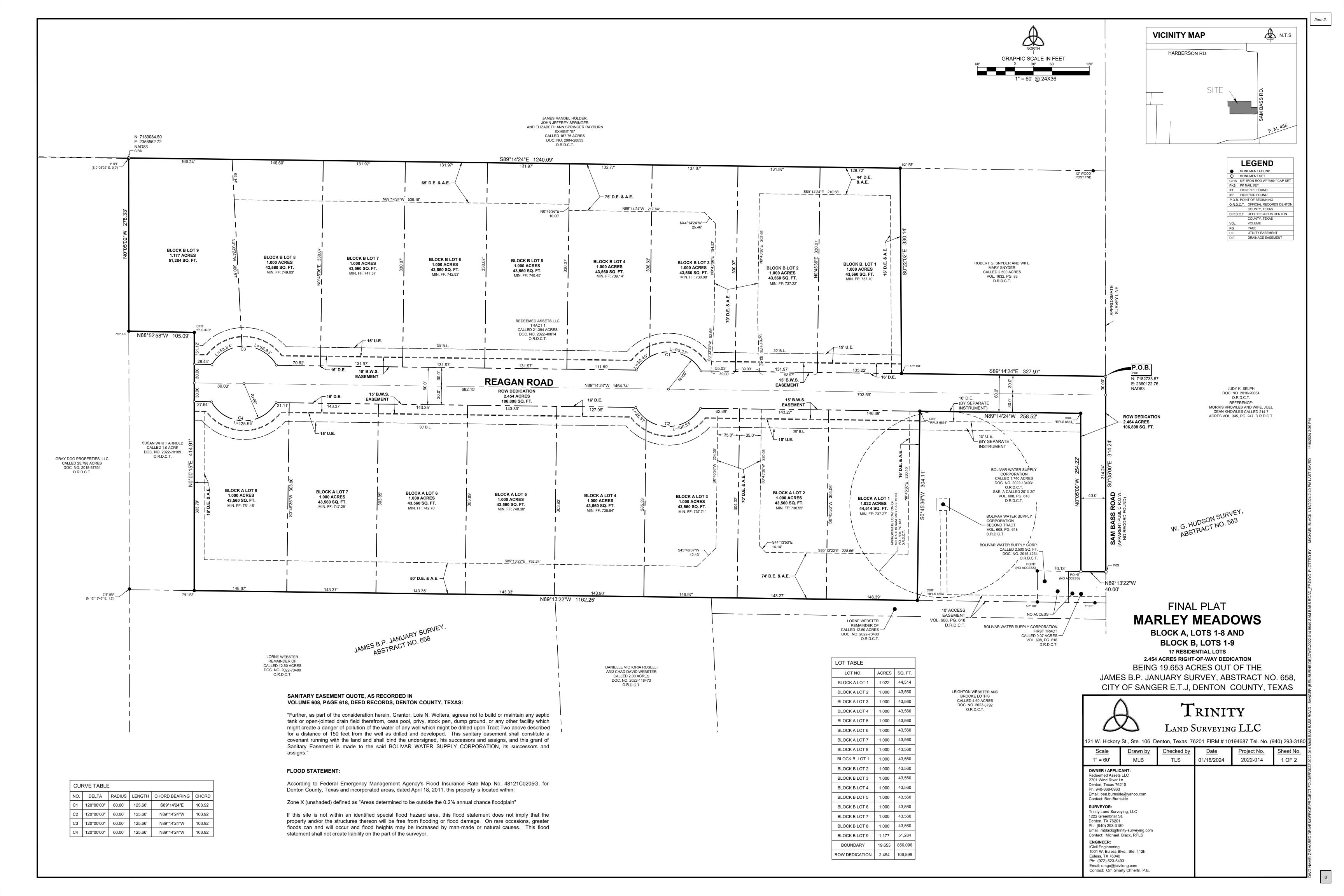




Project Name: Marley Meadows
Final Plat
Project: 24SANZON-0001
City Limits Exhibits







Item 2.

General Notes:

- The grid bearings and coordinates shown hereon are based on grid north of the Texas Coordinate System of 1983, North Central Zone (4202), North American Datum of 1983(2011).
- All corners are 5/8" iron rods set with a plastic cap stamped "RPLS 6854" unless otherwise noted.
- Minimum Finished Floor Elevations on lots were provided by iCivil Engineering, (972) 523-5493.
- The purpose of this plat is to create 17 residential lots from a previously unplatted tract of land.
- No 100-year floodplain exists on the site.
- This property lies within the ETJ of of the City of Sanger, Texas.
- All lots comply with the minimum size requirements of the zoning district.
- This property may be subject to charges related to impact fees and the applicant should contact the City regarding any applicable fees due.
- All common areas, drainage easements, and detention facilities will be owned and maintained by the HOA/POA. Any common area within the City's right-of-way will require a facilities agreement, to be reviewed and approved by the City.
- Notice selling a portion of this addition by metes and bounds is a violation of City ordinance and State Law and is subject to fines and withholding of utilities and building permits.
- This plat does not alter or remove existing deed restrictions, if any, on this property.
- Water service to be provided by:Bolivar Water Supply, 4161 FM 455 West, Sanger, Texas (940) 458-3931
- Sanitary sewer to be handled by facilities approved by the Denton County Public Health.
- Electric Service to be provided by: CoServ Energy, 7701 I-35E Frontage Road, Corinth, Texas 76210, (940)
- The maintenance of paving, grading and drainage improvements and/or easements shown on this plat are the responsibility of the individual property owner and DOES NOT constitute acceptance of same for maintenance purposes by Denton County.
- All surface drainage easements shall be kept clear of fences, buildings, foundation, plantings and other obstructions to the operation and maintenance of the drainage facility.
- Blocking the flow of water or constructing improvements in surface drainage easements, and filling or obstructing the floodway is prohibited.
- Denton County will not be responsible for any damage, personal injury or loss of life or property occasioned by flooding or flooding conditions.
- The existing creeks or drainage channels traversing along or across the addition will remain as open channels and will be maintained by the individual property owners of the lot or lots that are traversed by or adjacent to the drainage courses along or across the lots.
- Construction not complete within two years of the Commissioners Court approval shall be subject to current County Subdivision Rules and Regulations.
- A driveway culvert permit must be obtained from the Road and Bridge Department by the owner of each lot prior to the construction, installation or placement of any driveway access improvements within the dedicated right-of-way.
- No construction, without written approval from Denton County shall be allowed within an identified "FIRM" floodplain area, and then only after a detailed floodplain development permit including engineering plans and studies show that no rise in the Base Flood Elevation (BFE) will result, that no flooding will result, that no obstruction to the natural flow of water will result; and subject to all owners of the property affected by such construction becoming a party to the request. Where construction is permitted, all finished floor elevations shall be a minimum of two feet above the 100-year flood elevation.
- Denton County shall not be responsible for maintenance of private streets, drives, emergency access easements, recreation areas and open spaces; and the owners shall be responsible for the maintenance of private streets, drives, emergency access easements, recreation areas and open spaces, and said owners agree to indemnify and hold harmless Denton County from all claims, damages and losses arising out of or resulting from performance of the obligations of said owners set forth in this paragraph.

OWNER'S CERTIFICATE

STATE OF TEXAS

COUNTY OF DENTON §

WHEREAS Redeemed Assets LLC, is the owner of the land shown on this plat within the area described by metes and bounds as follows:

BEING a tract of land situated in the James B. P. January Survey, Abstract No. 658, City of Sanger E.T.J., Denton County, Texas and being part of a called 21.394 acre tract described in a Warranty Deed to Redeemed Assets LLC, as recorded in Document No. 2022-40814 of the Official Records of said county, and being more particularly described by metes and bounds as follows:

BEGINNING at a PK nail set in Sam Bass Road (an apparent public right-of-way, no record found), same being the most easterly northeast corner of said 21.394 acre tract and the southeast corner of a called 2.500 acre tract described in a Deed to Robert G. Snyder and wife, Mary Snyder, as recorded in Volume 1632, Page 83 of the Deed Records of said county; (NOTE: BEARINGS AND DISTANCES ARE BASED ON U. S. STATE PLANE NAD 1983 COORDINATES, TEXAS CENTRAL ZONE - 4203);

THENCE South 00°05'00" East, along said Sam Bass Road and the most easterly east line of said 21.394 acre tract, a distance of 314.24 feet to a pk nail set for the northeast corner of a called 0.07 acre tract described in a General Warranty Deed, Access Easement and Sanitary Easement to Bolivar Water Supply Corporation, as recorded in Volume 608, Page 618 of said Deed Records;

THENCE North 89°13'22" West, leaving said Sam Bass Road and along the north line of said 0.07 acre tract, a distance of 40.00 feet to a point for the most easterly southeast corner of a called 1.740 acre tract described in a General Warranty Deed to Bolivar Water Supply Corporation, as recorded in Document No. 2022-134931 of said Official Records;

THENCE North 00°05'00" West, along the east line of said 1.740 acre tract, being 40 feet from and parallel with the east line of said 21.394 acre tract, a distance of 254.22 feet to a 5/8 inch iron rod with a yellow cap, stamped "RPLS 6854", found for the northeast corner of said 1.740 acre tract;

THENCE North 89°14'24" West, along the north line of said 1.740 acre tract, a distance of 258.52 feet to a 5/8 inch iron rod with a yellow cap, stamped "RPLS 6854", found for the northwest corner of said 1.740 acre tract;

THENCE South 00°45'36" West, along the west line of said 1.740 acre tract, a distance of 304.11 feet to a 5/8 inch iron rod with a yellow cap, stamped "RPLS 6854", found on the north line of a called 12.50 acre tract described in a General Warranty Deed to Lorne Webster, as recorded in Document No. 2022-73400 of said Official Records and the south line of said 21.394 acre tract, for the southwest corner of said 1.740 acre tract;

THENCE North 89°13'22" West, along the south line of said 21.394 acre tract, a distance of 1,162.25 feet to a 7/8 inch iron rod found for the southeast corner of a called 1.0 acre tract described in a Quit Claim Deed to Susan Whitt Arnold, as recorded in Document No. 2022-78189 of said Official Records and the most southerly southwest corner of said 21.394 acre tract;

THENCE North 00°00'15" East, leaving the north line of said 12.50 acre tract and along the east line of said 1.0 acre tract and the most southerly west line of said 21.394 acre tract, a distance of 414.91 feet to a iron rod with a cap, stamped "PLS INC", found for the northeast corner of said 1.0 acre tract and an inner "L" corner of said 21.394 acre tract;

THENCE North 88°52'58" West, along the north line of said 1.0 acre tract and the most westerly south line of said 21.394 acre tract, a distance of 105.09 feet to a 7/8 inch iron rod found on the east line of a called 25.798 acre tract described in a General Warranty Deed to Gray Dog Properties, LLC, as recorded in Document No. 2018-87831 of said Official Records, for the northwest corner of said 1.0 acre tract and the most westerly southwest corner of said 21.394 acre tract;

THENCE North 00°05'02" West, along the east line of said 25.798 acre tract and the most northerly west line of said 21.394 acre tract, a distance of 278.33 feet to a 5/8 inch iron rod with a yellow cap, stamped "RPLS 6854", set on the south line of Exhibit "B", a called 167.75 acre tract, for the northeast corner of said 25.798 acre tract and the northwest corner of said 21.394 acre tract;

THENCE South 89°14'24" East, along the south line of said 167.75 acre tract and the most northerly north line of said 21.394 acre tract, a distance of 1,240.09 feet to a 1/2 inch iron rod found for the northwest corner of the aforementioned 2.500 acre tract and the most northerly northeast corner of said 21.394 acre tract;

THENCE South 00°22'02" East, along the west line of said 2.500 acre tract and the most northerly east line of said 21.394 acre tract, a distance of 330.14 feet to a 1/2 inch iron rod found for the southwest corner of said 2.500 acre tract and an inner "L" corner of said 21.394 acre tract;

THENCE South 89°14'24" East, along the south line of said 2.500 acre tract and the most easterly north line of said 21.394 acre tract, a distance of 327.97 feet to the POINT OF BEGINNING and containing 856,096 square feet or 19.653 acres of land, more or less.

OWNER'S DEDICATION

STATE OF TEXAS

COUNTY OF DENTON §

NOW THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

THAT, Redeemed Assets LLC, acting herein by and through its duly authorized officer, does hereby adopt this plat designating the herein above described property as MARLEY MEADOWS, an addition to the City of Sanger, Texas, and does hereby dedicate to the public use forever by fee simple title, free and clear of all liens and encumbrances, all streets, thoroughfares, alleys, fire lanes, drive aisles, parks, and watercourses, and to the public use forever easements for sidewalks, storm drainage facilities, utilities and any other property necessary to serve the plat and to implement the requirements of the subdivision regulations and other City codes and do hereby bind ourselves, our heirs, successors and assigns to warrant and to forever defend the title on the land so dedicated. Further, the undersigned covenants and agrees that he/she shall maintain all easements and facilities in a state of good repair and functional condition at all times in accordance with City codes and regulations. No buildings, fences, trees, shrubs, or other improvements or growths shall be constructed or placed upon, over, or across the easements as shown, except that landscape improvements may be installed, if approved by the City of Sanger. The City of Sanger and public utility entities shall have the right to access and maintain all respective easements without the necessity at any time of procuring permission from anyone.

WITNESS MY HAND, this	day of	, 2024.
BY: Ben Burnside		
Ву:		

STATE OF TEXAS

Printed Name

COUNTY OF DENTON §

Signature

BEFORE ME, the undersigned authority, on this day personally appeared Ben Burnside, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he/she executed the same for the purpose and consideration therein expressed, in the capacity therein stated.

Title: Owner

My Commission Expires

GIVEN UNDER MY HAND AND SEAL OF OFFICE on the _____ day of _____, 2024.

SURVEYOR'S CERTIFICATION

KNOW ALL MEN BY THESE PRESENTS:

That I, Michael L. Black, do hereby certify that I prepared this plat and the field notes made a part thereof from an actual and accurate survey of the land and that the corner monuments shown thereon were properly placed under my personal supervision, in accordance with the Subdivision regulations of the Extra Territorial Jurisdiction of the City of Sanger, Texas.

PREĹIMIŇARY Michael L. Black Registered Professional Land Surveyor No. 6854 THIS DOCUMENT SHALL NOT BE RECORDED FOR

ANY PURPOSE AND SHALL NOT BE USED OR VIEWED OR RELIED UPON AS A FINAL SURVEY DOCUMENT

STATE OF TEXAS § COUNTY OF DENTON §

BEFORE ME, the undersigned, a Notary Public in and for The State of Texas, on this day personally appeared Michael L. Black, known to me to be the person and officer whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and considerations therein expressed and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the _____ day of ______, 2024.

Notary Public, State of Texas

FINAL PLAT

MARLEY MEADOWS

BLOCK A, LOTS 1-8 AND BLOCK B, LOTS 1-9 17 RESIDENTIAL LOTS 2.454 ACRES RIGHT-OF-WAY DEDICATION BEING 19.653 ACRES OUT OF THE

JAMES B.P. JANUARY SURVEY, ABSTRACT NO. 658, CITY OF SANGER E.T.J. DENTON COUNTY, TEXAS



TRINITY

LAND SURVEYING LLC

121 W. Hickory St., Ste. 106 Denton, Texas 76201 FIRM # 10194687 Tel. No. (940) 293-3180

APPROVAL BLOCK		<u>Scale</u>	<u>Drawn by</u>	Checked by	<u>Date</u>	Project No.	Sheet No.
A manager of the			MLB	TLS	01/16/2024	2022-014	2 OF 2
Approved: Chairman, Planning & Zoning Commission City of Sanger, TX	Date	OWNER / APPLI Redeemed Asset 2701 Wind River Denton, Texas 76 Ph. 940-368-096; Email: ben.burnsi Contact: Ben Bur	s LLC Ln. 6210 3 Ide@yahoo.com				
Mayor City of Sanger, TX Attested by:	Date	Trinity Land Surv 1222 Greenbriar Denton, TX 7620 Ph: (940) 293-31	St. 1 80 rinity-surveying.com				
City Secretary, City of Sanger, TX	Date	ENGINEER: iCivil Engineering 1001 W. Euless I Euless, TX 7604 Ph: (972) 523-54 Email: omgc@ici Contact: Om Gh	Slvd., Ste. 412h 0 193				



201 Bolivar Street/PO Box 1729 * Sanger, TX 76266 940-458-2059(office) www.sangertexas.org

SUBDIVISION APPLICATION

Prelimina Plat Mino Plat	•	X	Final Plat/Replat Amended Plat			Vacating P Conveyand Plat	
Applicant			Owner (i	if different	from appli	cant)	
Name: Michael Black	(Name: Be	en Burns	ide		
Company: Trinity Lan	d Surveying	LLC	Company:	Redeem	ned Asse	ts LLC	
Address: 1222 Green			Address	Maria Maria Maria Maria	ind River		
City, State, Zip: Dento		201	City, State	, Zip: Der	nton, Tex	as 76210)
Phone 940-293-3180	Media Maria			40-368-0			
Fax:			Fax:	10 000 0	000		
Email: mblack@trinity	/-surveying.	.com	Email: be	en.burnsi	ide@yaho	oo.com	
Supporting Materials (List	One (1) P X Letter of X Non-Reft Sanger) X Applicati X Applicab X Additiona X One (1) P Emailed	ication Confer aper Copy of F Intent undable Applid on Form (Sign le Plat Checkli al Required Do DF Copy of all to developme	emittal Checklist ence (Date: 2 / 1 Plat (24"x36", folded cation Fee (Check F med by Owner) st (Completed) couments/Traffic & Documents Provid	Payable to 0 Drainage S led on a CD	City of		
R Number(s): 56354							
Benja Bun	_	S.				/8/23	
Owner's \$∫gnature					Date '		
Applicant's Signature			10 1 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3		Date		
Office Use: Reviewed by Di	rector of Deve	elopment Serv	rices//				The Water

City of Sanger 201 Bolivar / P.O Box 1729 Sanger, TX 76266

940-458-2059 (office)

www.sangertexas.org

Effective Date: 02/11/2020

February 7, 2024

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

Re: Final Plat Letter of Intent - Marley Meadows

Ms. Hammonds,

On behalf of our client, Redeemed Assets LLC, we respectfully submit this letter of Intent for the attached Final Plat for the Marley Meadows project.

Marley Meadows is a proposed 19.653 acre subdivision within the City of Sanger ETJ. The project is located north of FM 455 on Sam Bass Road, more specifically, 8949 Sam Bass Road.

Marley Meadows proposes to create 1 dedicated street and 17 residential lots.

We appreciate your review and consideration of our request. If you have any questions or require additional information, please contact me at (940) 293-3180 or by email at mblack@trinity-surveying.com.

Sincerely,

Michael L. Black, RPLS #6854 (Tx) PLS #1982 (Ok) Trinity Land Surveying LLC

Firm # 10194687 1222 Greenbriar St. Denton, Texas 76201 Ph. 940-293-3180

Email: mblack@trinity-surveying.com
Website: www.trinity-surveying.com



DATE: 02/07/2024

1st REVIEW COMMENTS – Final Plat (Marley Meadows)

The request is for a Final Plat of Marley Meadows containing 17 lots, being approximately 19.653 acres in the JAMES B.P. JANUARY SURVEY, ABSTRACT NO. 658, prepared by Trinity Land Surveying, submitted on 01/16/2024. Below are the comments that should be addressed before City Council approval. Resubmit the revised plat along with a response letter addressing all comments.

Planning

Provide the following

- 1. Show the centerline of existing streets. Dimensions from centerline to edges of existing and proposed right of way on both sides of the centerline.
- 2. Notation to be added; "Minimum finished floor elevations are at least 2 feet about the 100-year flood plain."
- 3. Notation to be added; "The subject property does not lie within a 100-year floodplain according to the Community Panel No._____, dated_____, of the National Flood Insurance Rate maps for Denton County, Texas."
- 4. A signed and notarized copy of private restriction (if any), that is filed for the record in the office of the County Clerk shall be provided with the Final Plat.

Informational Comments

- 1. The property is within the Sanger ETJ.
- 2. The Final Pat will be scheduled for the Planning and Zoning (P&Z) Commission meeting on Monday, February 12, 2024, and the City Council meeting on Monday, March 4, 2024.



September 22, 2023 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 Preliminary Plat

Fourth 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. The drainage study is acceptable for preliminary platting. Please address the comments below with the drainage study in support of the final plat/construction plans.

General:

- 1. <u>1st 4th Review Comment:</u> Plans and plat are reviewed separately. Please note an accepted drainage study is required prior to plat acceptance.
- 2. <u>1st 4th Review Comment:</u> Please address comments on attached markups and provide <u>annotated responses on markups</u>. All the comments have been addressed and response is provided
- 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.
 - 1st Review Response: No Response.
 - 2nd Review Comment: Address comments on preliminary plat.
 - 2nd Review Response: Noted
 - 3rd Review Comment: 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 Review Comment: Please update all relevant information based of any changes due to comments. All information has been updated based on changes.
- 4. <u>1st 3rd Review Comment:</u> Please note, additional comments may result once models and additional info is provided.
 - 4th Review Comment: Please note, additional comments may result once final drainage study/construction plans/ final plats are provided. Noted

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 September 22, 2023 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 2nd 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.
2nd Review Comment: 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.

2nd Review Response: HMS Reconciled, Calculation added 3rd 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

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

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

2nd 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

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

2nd 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 Addressed

Ms. Ramie Hammonds September 22, 2023 Page 3 of 4

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 2nd 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

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

2nd 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 2nd 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 2nd 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

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

2nd 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 All comments 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 2nd Review Comment: Addressed.

17. 4th Review Comment: Please review and revise HEC-RAS models for the following comments

DCSRR IV.3.4:

Channel bank station adjusted for all cross sections and all channels

- a. Channel bank stations should be adjusted for all cross sections and all channels.
- b. All cross sections must contain the computed water surface elevations. Verified
- 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.

 n-value for natural channel = 0.035 DCSRR TABLE IV.3-6
 n-value for engineered channel = 0.040 recommended on earlier review

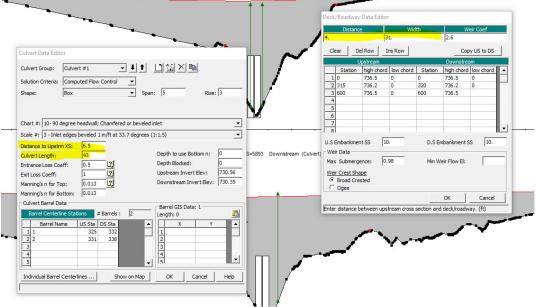
Ms. Ramie Hammonds September 22, 2023 Page 4 of 4

curved cross-sections are straightened e.

g.

Distance and width are now same on both Deck/Roadway editor and culvert editor

d. Ineffective flow areas should not be located within the conveyance area of the proposed culverts (Channel-A structure cross section 5893). Culvert Ineffective flow area station are adjusted e. Flow profiles should not cross (Channel-A 6473 – 6601)
 Additional cross-sections were added to resolve crossing profiles
 Cross sections should not curve (Channel-A 5866 and 5922). Please revise.
 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.



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

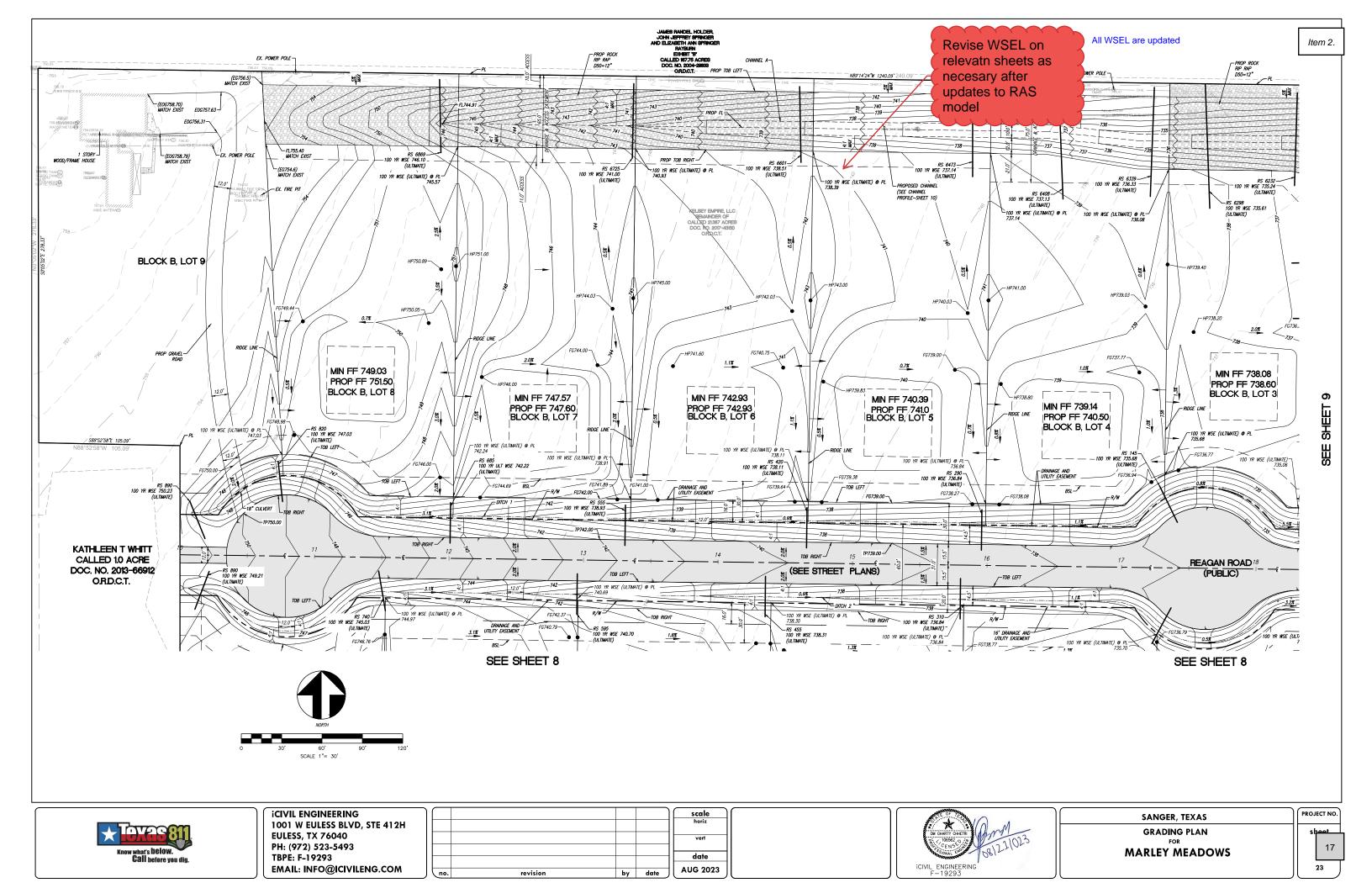
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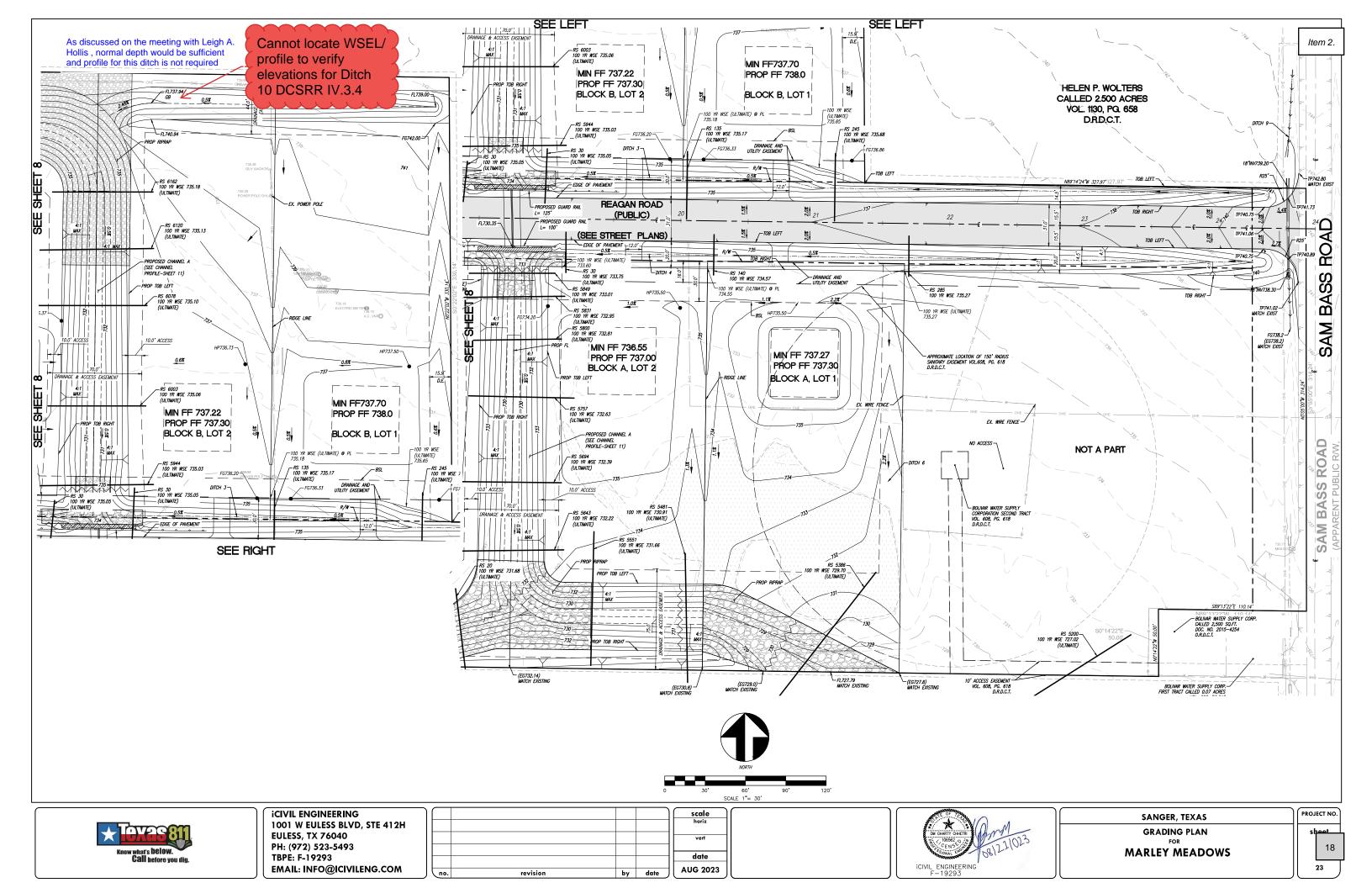
Parker C. Moore, P.E., CFM

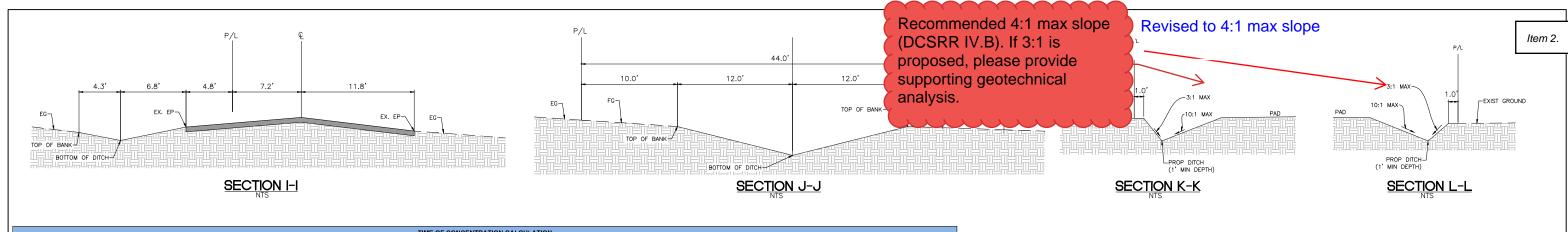
Project Manager

Attachment:

Plan Markups







	TIME OF CONCENTRATION CALCULATION																		
AREA CODE	SHEET FLOW SHALLOW CONCENTRATED FLOW CHANNEL FLOW												TOC (TOTAL)	TOC USED					
AREA CODE	LENGTH (ft)	MANNINGS'S N	P2 (in.)	SLOPE (ft/ft)	TIME(hr.)	TIME(Min.)	HIGH ELEV	HELEV LOWELEV LENGTH(ft) SLOPE(ft/ft) VEL.(fps) TOC(hr) TOC(Min.) VEL.(fps) LENGTH (ft) TOC(hr) TOC(Min.) (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:	DTE:																		

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

. 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	ME OF CONCENTRATION CALCULATION															
	SHEET 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:															

. 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

														Please double check
							RUI	NOFF CA	LCULATIO	ON /				intensity values vs
Area	DITOLLID	Area	С	CA	TC	11	I 5	I 10	I 100	Q1	Q5	Q10	Q100	
ID	DITCH ID	(acres)			(min.)	(in /hr.)	(in./hr.)	(in./hr.)	(in./hr.)	(cfs)	(cfs)	(cfs)	(cfs)	COM DCSRR Table IV 1-3
SIDE YARD DITCH	DITCH 0	0.75	0.45	0.34	15	3.34	4.65	5.42	7.87	1.13	1.57	1.83	2.66	DITCH BETWEEN ANY TWO LOTS (TYP.
A1a & A1b	DITCH 1	4.12	0.55	2.27	15	3.34	4.65	5.42	7.87	7.57	10.54	12.28	17.83	HALF OF THE LOT DRAINS TO CHANNEL 1
A2	DITCH 2	1.27	0.71	0.90	15	3.34	4.65	5.42	7.87	3.01	4.19	4.89	7.10	COMPOSITE C=0.71 (CALCULATION PROVIDED ON THIS SHEET
OA1a, OA1b & A3	DITCH 3	4.29	0.45	1.93	15	3.34	4.65	5.42	7.87	6.45	8.98	10.46	15.19	AREA A3+OA1a+OA1b DRAINS TO DITCH 3
A4	DITCH 4	0.45	0.75	0.34	15	3.34	4.65	5.42	7.87	1.13	1.57	1.83	2.66	COMPOSITE C=0.71 (CALCULATION PROVIDED ON THIS SHEET
OA1b	DITCH 5	1.12	0.45	0.50	15	3.34	4.65	5.42	7.87	1.68	2.34	2.73	3.97	DICTH FOR OFFSITE AREA DRAINAGE
OA2	DITCH 6	0.96	0.45	0.43	15	3.34	4.65	5.42	7.87	1.44	2.01	2.34	3.40	DICTH FOR OFFSITE AREA DRAINAGE
OA3	DITCH 7	0.50	0.55	0.28	15	3.34	4.65	5.42	7.87	0.92	1.28	1.49	2.16	DICTH FOR OFFSITE AREA DRAINAGE
OA3 & A5	DITCH 8	5.56	0.45	2.50	15	3.34	4.65	5.42	7.87	8.36	11.63	13.56	19.69	1 ACRE LOTS
OA2-a	DITCH 9	0.20	0.78	0.16	15	3.34	4.65	5.42	7.87	0.52	0.73	0.85	1.23	ROADSIDE DITCH
OA1c	DITCH 10	1.57	0.30	0.47	15	3.34	4.65	5.42	7.87	1.57	2.19	2.55	3.71	DICTH FOR OFFSITE AREA DRAINAGE

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 OF INTENSITY PER HOUR IS TAKEN FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 47-48-49, TABLE IV.1-3

Ditches shall maintain 30" minimum depth (DCSRR IV.B)

ASPHALT/CONCRETE

CLAYEY SOIL 5-10%

These are not ditch but rather swales. Ditch/Swale depth revised

WEIGHTED RUNOFFF

0.71

revised

13+88.82

16+55.08

0.21

		V-D	ITCH CAPACITY CALC	JLATION		
Q100 (cfs)	AVERAGE SLOPE (ft/ft)	MANNING'S N	WATER DEPTH (ft.)	VELOCITY (fps)	TOTAL DITCH DEPTH (ft)	SECTION DETAILS
17.83	0.020	0.040	0.91	3.47	3.5	SHEET 5 SECTION A-A
7.10	0.020	0.040	0.80	2.77	2.5	SHEET 5 SECTION A-A
15.19	0.020	0.040	1.07	3.32	2.5	SHEET 6 SECTION F-F
2.66	0.020	0.040	0.55	2.07	2.5	SHEET 6 SECTION F-F
3.97	0.005	0.040	0.70	1.25	1.0	SHEET 12-B SECTION L-L
3.40	0.005	0.040	0.66	1.20	1.0	SHEET 12-B SECTION L-L
2.16	0.005	0.040	0.56	1.06	1.0	SHEET 12-B SECTION K-K
19.69	0.015	0.040	1.24	3.20	4.5	SHEET 8 SECTION E-E
1.23	0.005	0.040	0.37	0.80	1.0	SHEET 12-B SECTION I-I

WEIGHTED RUNOFF COEFFICIENT (DITCH-4)											
TOTAL LAND WEIGHT LAND USE AREA RUNOFF COEF.											
ASPHALT/CONCRETE	0.19	0.95	0.75								
CLAYEY SOIL 5-10%	0.26	0.60	0.75								

0.86

ED RUNOFF COEFFICIENT (DITCH-2)

RUNOFF COEF.

0.60

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

	DRIVEWAY CULVERT DATA FOR BLK B LOT 3 TO 9												
STREET STATION	CORRESPONDING LOT AREA	Q100	Q100 TOTAL	CONTRIBUTING LOTS/AREA	CULVERT SIZE*	UPSTREAM INV.	DOWNSTREAM INV.						
10+47.78	0.97	4.20	4.20	LOT 9	18"	746.78	746.03						
10+95.82	0.81	3.51	7.71	LOT8&9	18"	745.29	744.55						
12+49.77	0.55	2.38	10.09	LOT 7, 8 & 9	24"	740.53	739.79						
13+88.82	0.55	2.38	12.47	LOT 6, 7, 8 & 9	24"	736.92	736.76						
15+11.52	0.55	2.38	14.85	LOT 5, 6, 7, 8 & 9	27"	736.08	735.85						
16+55.07	0.55	2.38	17.23	LOT 4, 5, 6, 7, 8 & 9	27"	734.59	734.28						
17+61.27	0.14	0.60	17.83	LOT 3, 4, 5, 6, 7, 8 & 9	27"	733.38	733.07						
			* CULVERT LEN	IGTH=24', MATERIAL=RCP									
		DRIVEWA	Y CULVERT DA	TA FOR BLK B LOT 1 & 2 CULV	ERTS								
STREET STATION	CORRESPONDING LOT AREA	Q100	Q100 TOTAL	CONTRIBUTING LOTS/AREA	CULVERT SIZE*	UPSTREAM INV.	DOWNSTREAM INV.						
20+74.17	2.55	9.00	9.00	LOT 1, OA1a & OA1b	18"	734.11	734.01						
19+65.12	1.74	6.16	15.16	LOT 1, 2 & OA1a, OA1b & A3	24"	733,58	733.46						
	* CULVERT LENGTH=24*, MATERIAL=RCP												
		RIVEWAY	CULVERT DAT	A FOR BLK A LOT 3 TO 8 CUL	/ERTS								

STREET STATION | CORRESPONDING LOT AREA | Q100 | Q100 TOTAL | CONTRIBUTING LOTS/AREA | CULVERT SIZE* | UPSTREAM INV. | DOWNSTREAM INV.

LOT 7, 8 & 9

LOT 5, 6, 7, 8 & 9

3.51

5.85

* CULVERT LENGTH	=24', MATERIAL=RCP						
		DRIVEWA	Y CULVERT DA	TA FOR BLK A LOT 1 & 2 CULV	ERTS		
STREET STATION	CORRESPONDING LOT AREA	Q100	Q100 TOTAL	CONTRIBUTING LOTS/AREA	CULVERT SIZE*	UPSTREAM INV.	DOWNSTREAM IN
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



DITCH ID C

DITCH 1 DITCH 2 DITCH 3 DITCH 5

DITCH 9

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



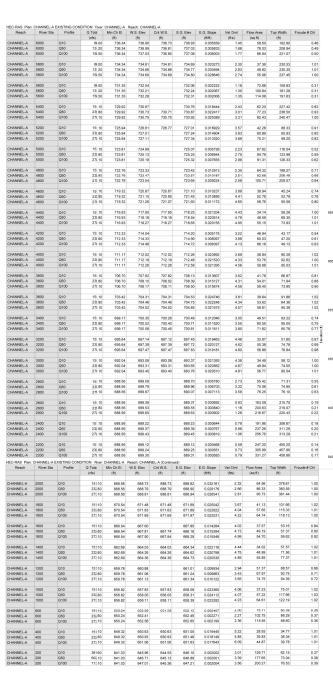
SANGER, TEXAS **DITCH AND CULVERT CALCULATIONS MARLEY MEADOWS**

737.83

737.60

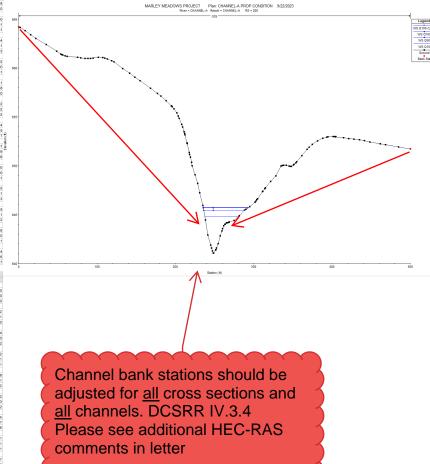
734.88

PROJECT NO. 19



Check to ensure no increases in water surface elevations for all storm events or crossing profiles for all channels/ditches

Verified



All Channel all bank stations are updated

CULVERT ANALYSIS

C-RAS Plan: CHANNEL-A PROP CONDITION River: CHANNEL-A Reach: CHANNEL-A

				000111 01 11 11 11 11								
Reach	River Sta	Profile	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
CHANNEL-A	5893 Culvert #1	Q10	733.43	732.82	733.14	733.43	736.21	122.60		0.35	6.54	5.77
CHANNEL-A	5893 Culvert #1	Q50	734.34	733.66	733.97	734.34	736.21	184.30		0.70	7.79	7.06
CHANNEL-A	5893 Culvert #1	Q100	734.77	734.05	734.46	734.77	736.21	215.50		0.89	8.36	7.66
CHANNEL-A	5893 Culvert #1	Q100 (ULT)	734.85	734.13	734.53	734.85	736.21	221.50		0.93	8.47	7.78

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

no.	revision	by	date
I [

7	scale
1	horiz
	vert
	date
J	AUG 2023

151.70 231.70 269.40 275.40

712.02 712.19 712.25 712.26

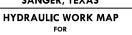
0.005181 0.006088 0.006353 0.006407

0.023902 0.021528 0.021525 0.021424 3.89 4.32 4.55 4.58

712.26 712.48 712.57 712.58

712.02 712.19 712.25 712.26





SANGER, TEXAS **MARLEY MEADOWS** PROJECT NO. 20

Item 2.

92.70 141.20 165.20 170.90 733.60 734.52 734.96 735.04 658.09 658.31 658.38 658.40 732.82 733.66 734.05 734.13 649.32 649.32 649.32 3(2.90 6(1.90 7:1.60 7(8.40 644.84 645.42 645.68 645.71 644.55 645.13 645.36 645.37 645.33 646.03 646.33 646.37 0.010006 0.009998 0.010001 0.010002 641.03 641.03 641.03 122.60 184.30 215.50 221.50

Critical depth still

688.56 688.56 688.56 688.56

exists

This section barely

have any flow. Rip-Rap is provided



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.

1st Review Response: No Response.

2nd Review Comment: Address comments on preliminary plat.

2nd Review Response: Noted

3rd Review Comment: 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. 1st - 3rd Review Comment: 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 2nd 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.

2nd Review Comment: 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.

2nd Review Response: HMS Reconciled, Calculation added

3rd 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

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

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

2nd 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

 $\underline{2^{\text{nd}}\,\text{Review Comment:}}\,\text{Please address comments on channel profile sheets and hydraulic workmap.}$

2nd 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

Ms. Ramie Hammonds January 24, 2024 Page 3 of 4

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 2nd 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

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

2nd Review Response:

3rd Review Comment: Addressed.

 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 2nd 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 2nd 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

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

2nd Review Response: Ultimate Condition Utilized.

<u>3rd Review Comment: (a)</u> 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

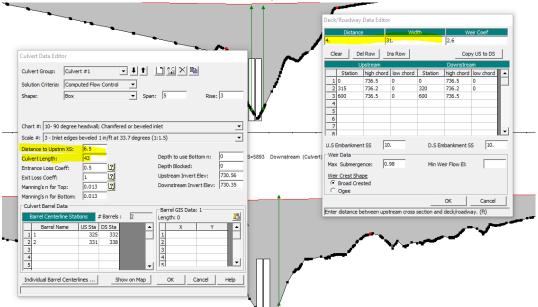
16. The proposed infrastructure (ie inlets, SD, swales, driveway culverts, channels, etc.) included in the drainage study to support the preliminary plat will be reviewed again once the construction plans are available. Update calculations as necessary to correspond to plans.

 $\frac{1^{st}\ Review\ Response:}{2^{nd}\ Review\ Comment:}\ All\ proposed\ infrastructure\ calculation\ are\ included\ in\ plan\ set$

- 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. <u>5th Review Comment</u> XS 2000 & 2200. Recommend cutting off HEC-RAS model approximately 1,000 ft downstream of project area.

Ms. Ramie Hammonds January 24, 2024 Page 4 of 4

- 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

Tall 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

PROJECT OWNER:

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

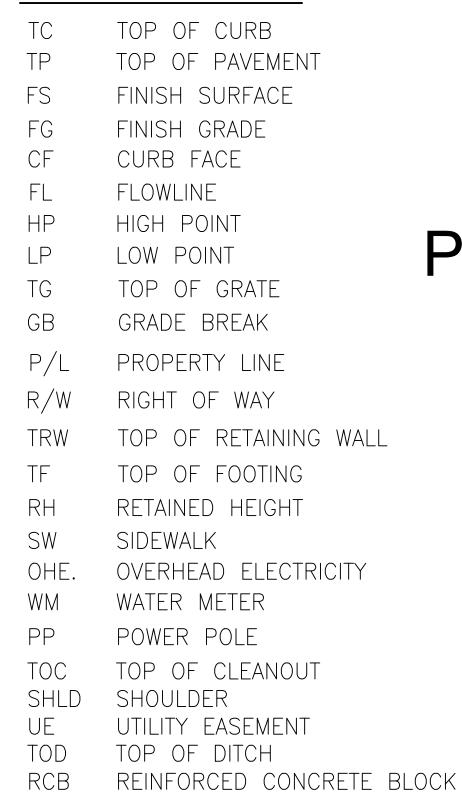
PROP 6" RIP-RAP

PROP PAVEMENT

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

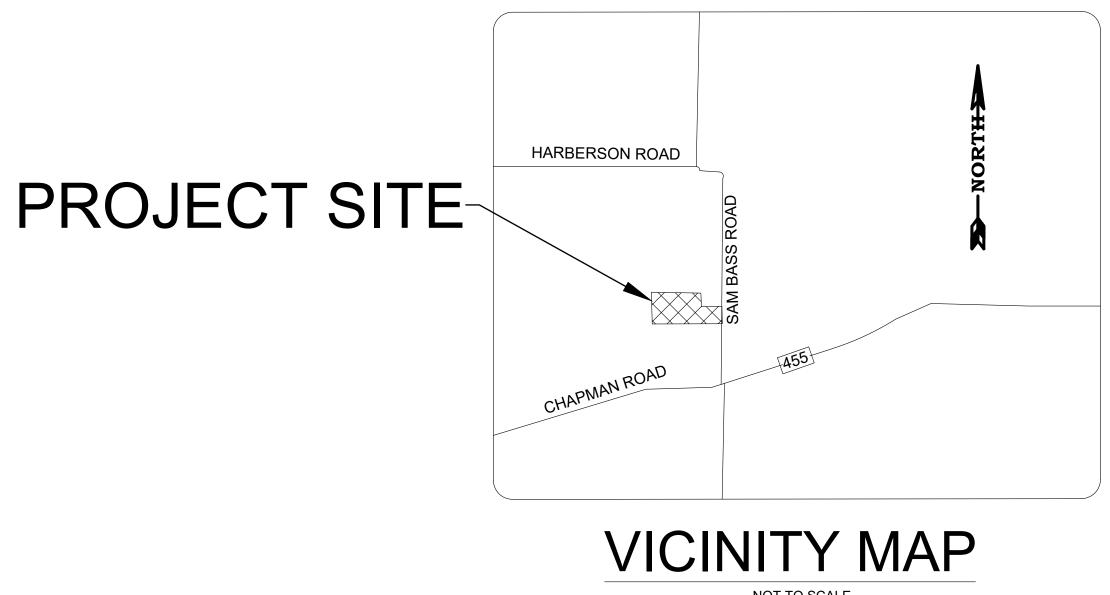


TOP OF BANK

DRAINAGE EASEMENT

B.W.S. BOLIVAR WATER SUPPLY

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



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

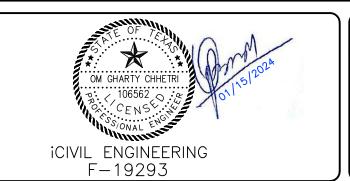
PREPARED BY:

EMAIL:INFO@ICIVILENG.COM



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SANGER, TEXAS	$\Big]\Big[$	
COVER SHEET FOR		
MARLEY MEADOWS		
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PROJECT NO sheet



- 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.
- 3. 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 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, EXCAVATE, RESURFACE, 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 $\frac{1}{3}$ 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.

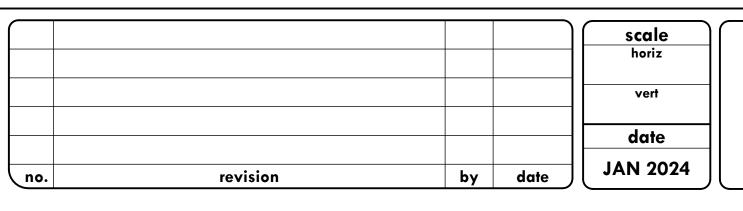
 29. TRAFFIC CONTROL PLANS SHALL BE SUBMITTED TO THE COUNTY. THE TRAFFIC CONTROL PLAN AND BARRICADES SHALL MAINTAIN TRAFFIC FLOW AND SHALL BE IN ACCORDANCE WITH THE LATEST
- EDITION OF THE TMUTCD AND PREPARED BY A WORK ZONE CERTIFIED TECHNICIAN. TRAFFIC CONTROL PLANS SHALL BE SUBMITTED A MINIMUM OF TWO WEEKS IN ADVANCE OF WORK COMMENCING. TEMPORARY STREET CLOSURE REQUESTS SHALL BE SUBMITTED IN WRITING.

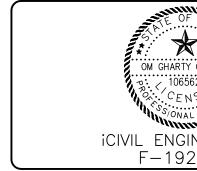
 30. ALL PAVEMENT MARKINGS, INCLUDING RAISED PAVEMENT MARKERS, LANE STRIPING, TRANSVERSE MARKINGS, SIGNS AND OTHER TRAFFIC CONTROL DEVICES, DISTURBED DURING CONSTRUCTION SHALL BE MAINTAINED, REPAIRED OR REPLACED AT
- 30. ALL PAVEMENT MARKINGS, INCLUDING RAISED PAVEMENT MARKERS, LANE STRIPING, TRANSVERSE 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.

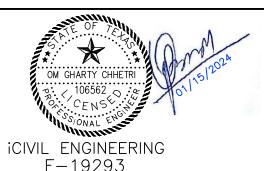
 34. THE CONTRACTOR SHALL NOT ALLOW SOIL AND DEBRIS TO ENTER EXISTING INLETS. ALL INLETS SHALL BE PROTECTED DURING CONSTRUCTION.
- 35. THE CONTRACTOR SHALL NOT DISPOSE OF WASTE OR ANY OTHER MATERIALS INTO STREAMS OR WATERWAYS. EXCESS MATERIAL SHALL BE HAULED OFF-SITE EACH DAY AND WILL NOT BE ALLOWED TO 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
FOR

MARLEY MEADOWS

sheet 2

of 23

PROJECT NO

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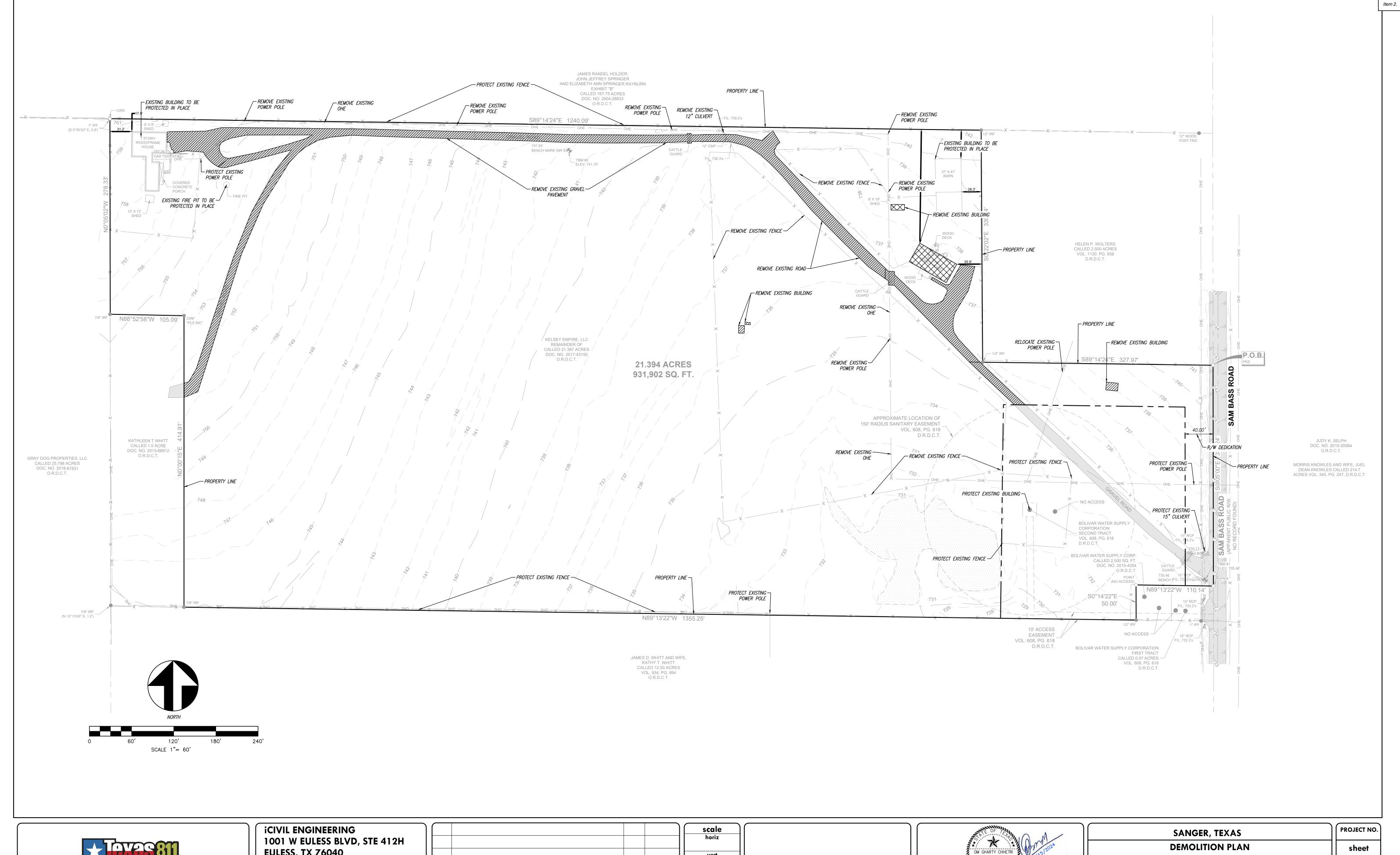
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SANGER, TEXAS	PROJECT NO.
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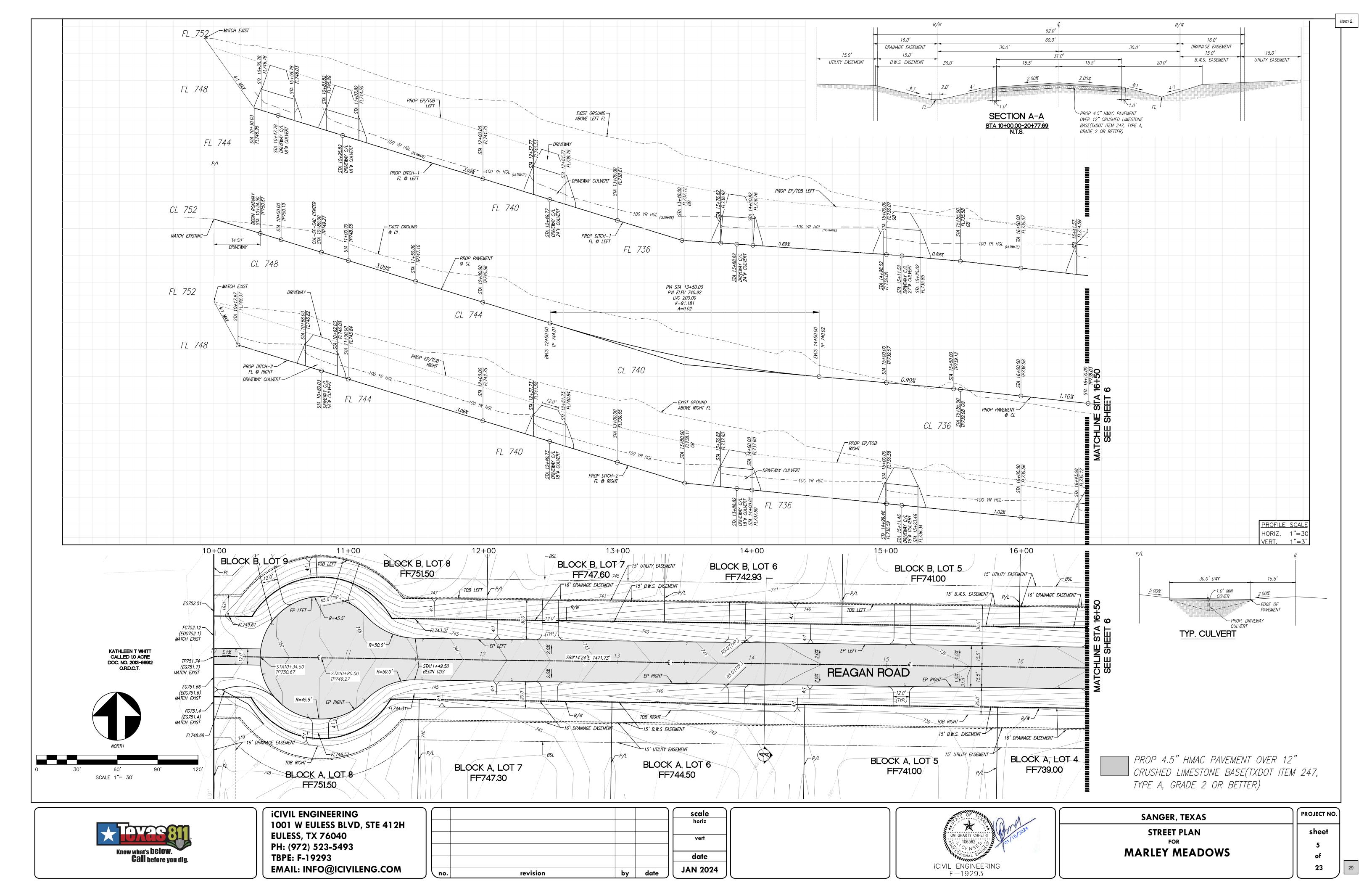
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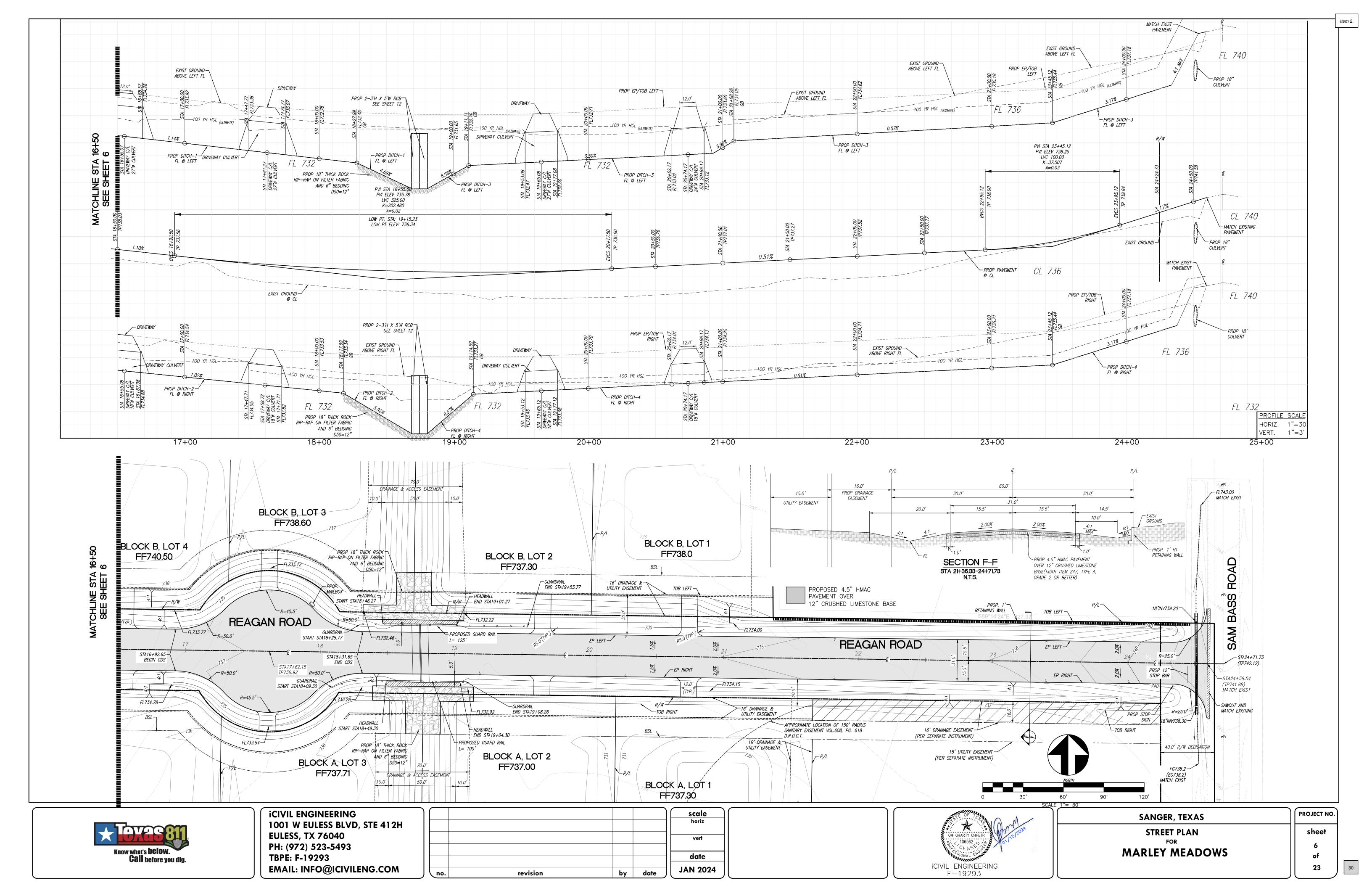


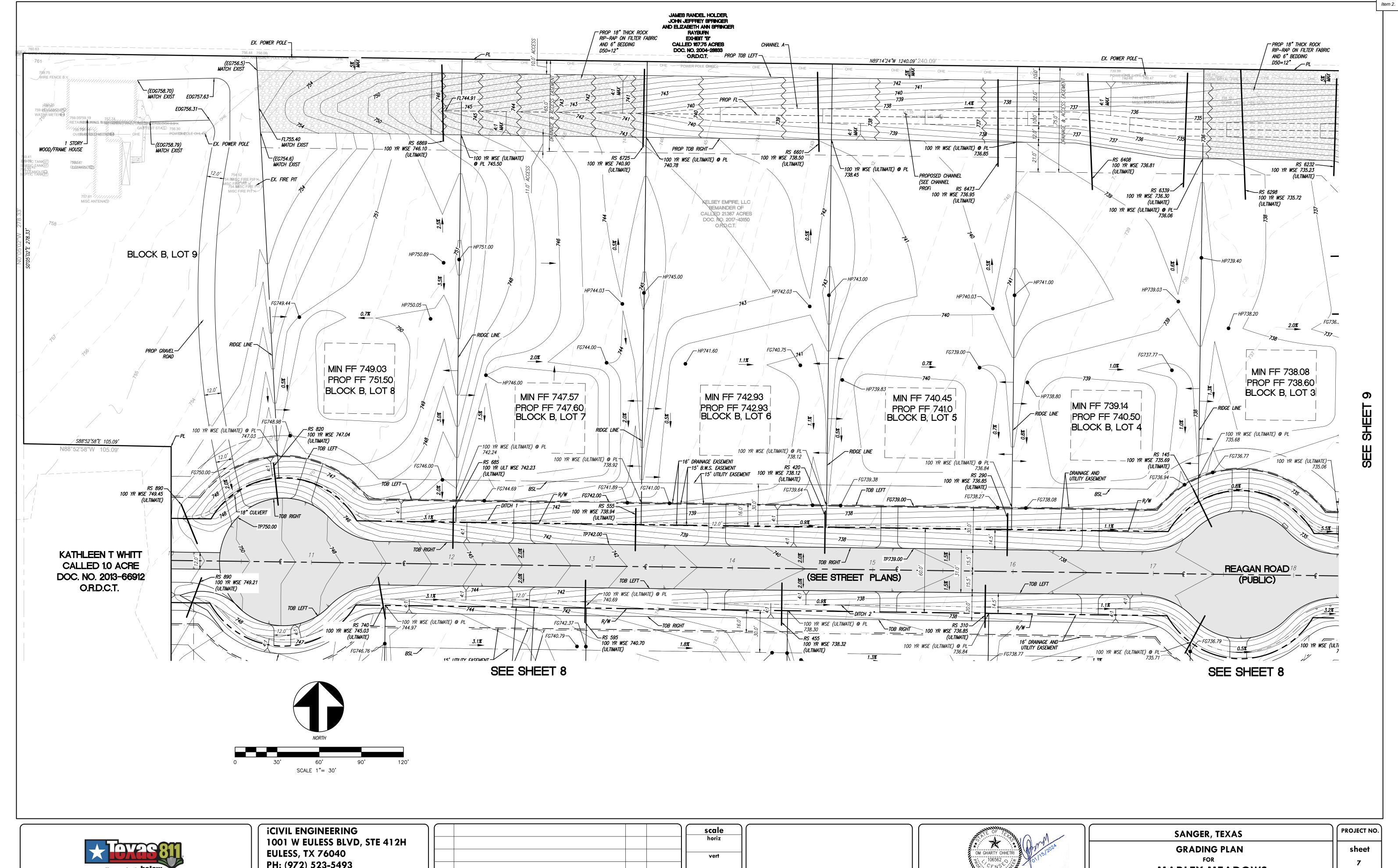
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SANGER, TEXAS	
DEMOLITION PLAN	
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MARLEY MEADOWS	

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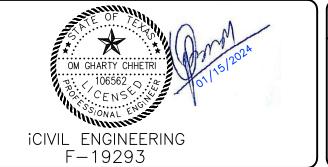






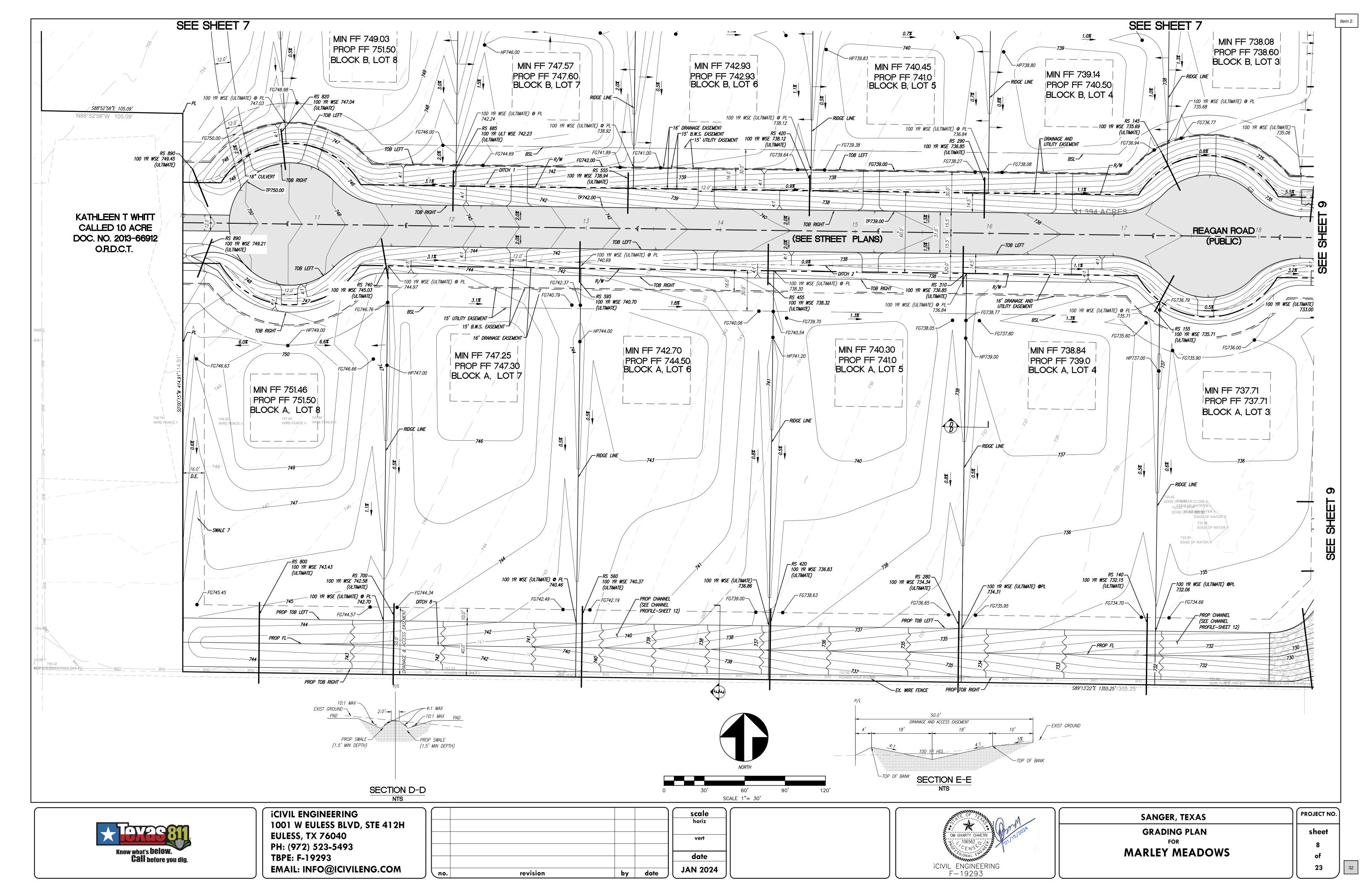
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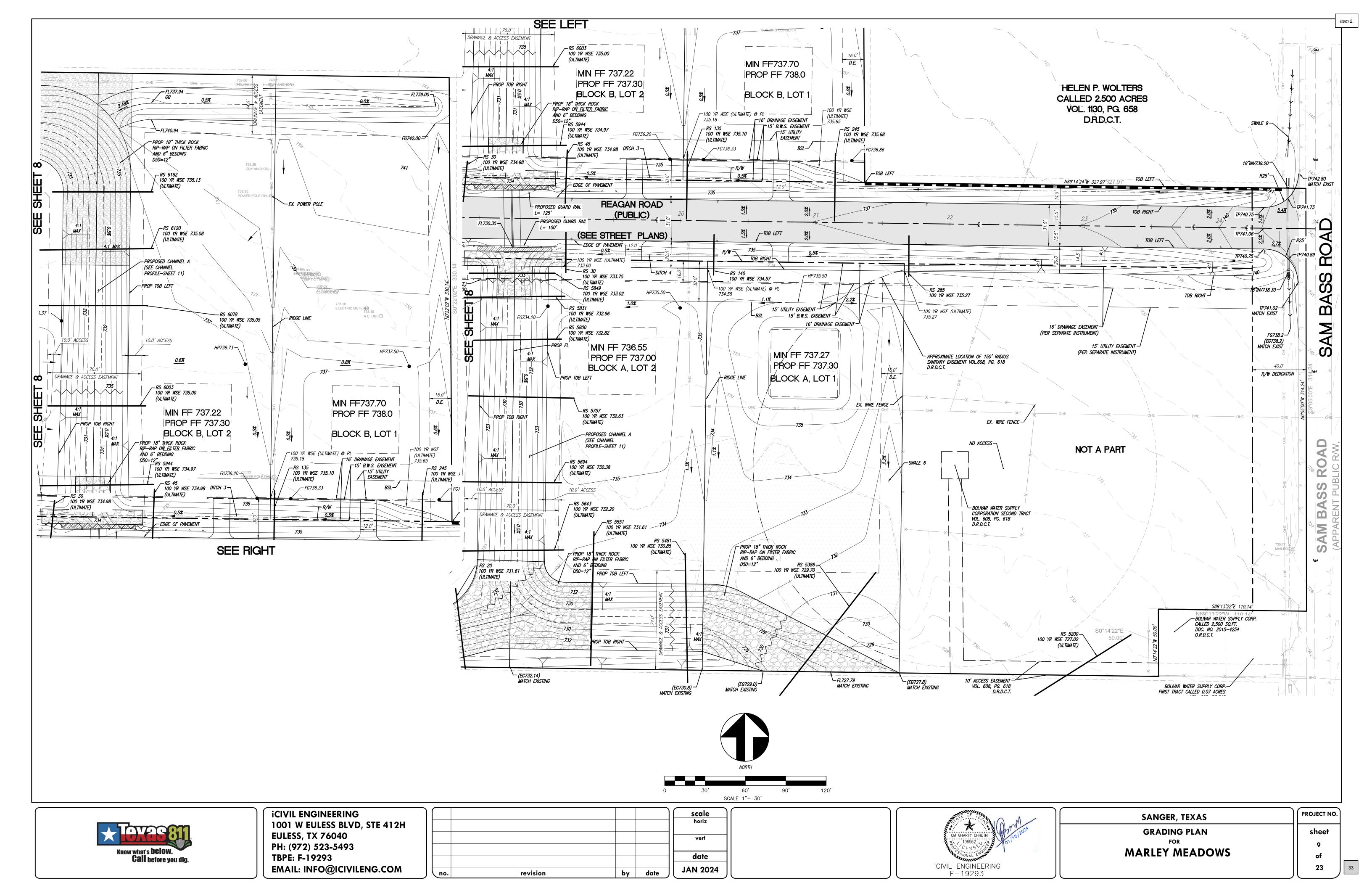
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MARLEY MEADOWS

23





	TIME OF CONCENTRATION CALCULATION (PRE-PROJECT)																		
AREA CODE			SHEET FL	_OW			SHALLOW CONCENTRATED FLOW							CHANNEL FLOW				TOC (TOTAL)	LAC TIME (min.)
	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 COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 49, TABLE IV.1-3

	TIME OF CONCENTRATION CALCULATION (PRE-PROJECT)															
AREA CODE		SHEET FLOW							SHALLOW CONCENTRATED FLOW							
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 (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	

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)																		
AREA CODE	SHEET FLOW						SHALLOW CONCENTRATED FLOW CHANNEL FLOW TOC (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

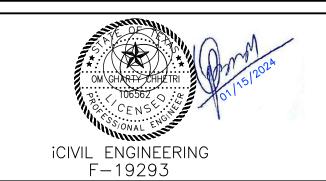
3. P2=3.36 FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 49, TABLE IV.1-3

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SANGER, TEXAS	PR
PRE-PROJECT TIME OF CONCENTRATION CALCULATION	
FOR	
MARLEY MEADOWS	

PROJECT NO. sheet

23



<u>Legends</u>

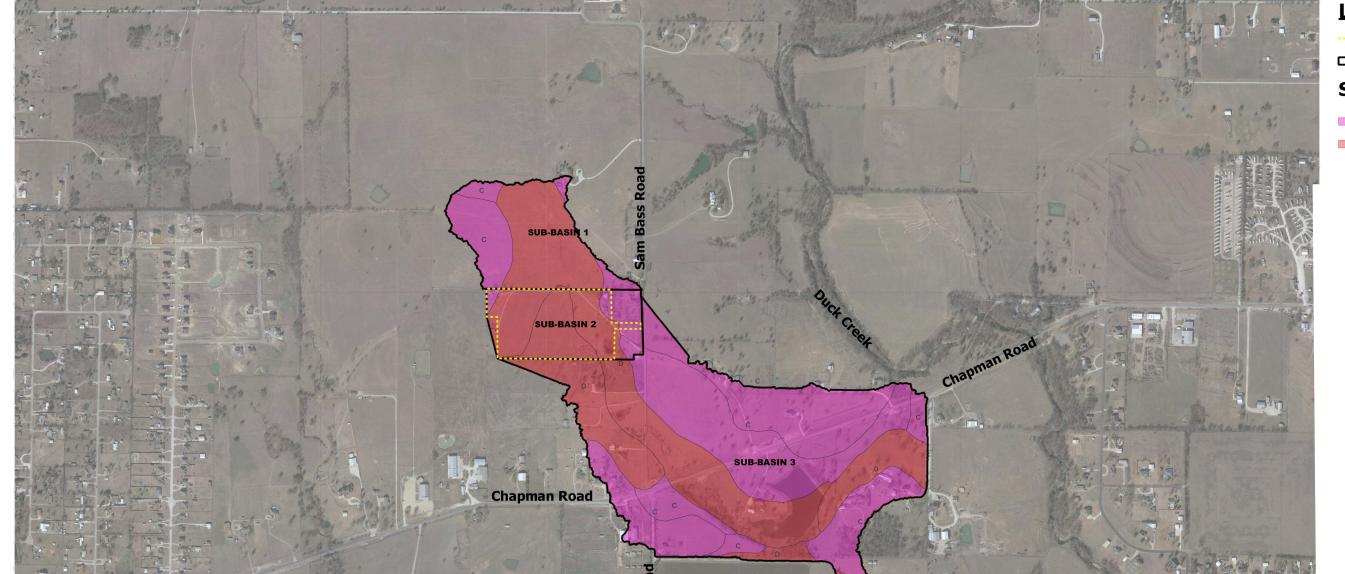
- Project Boundary

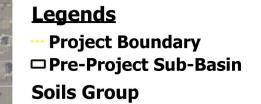
Pervious Area

Roof/ConcreteWater Body

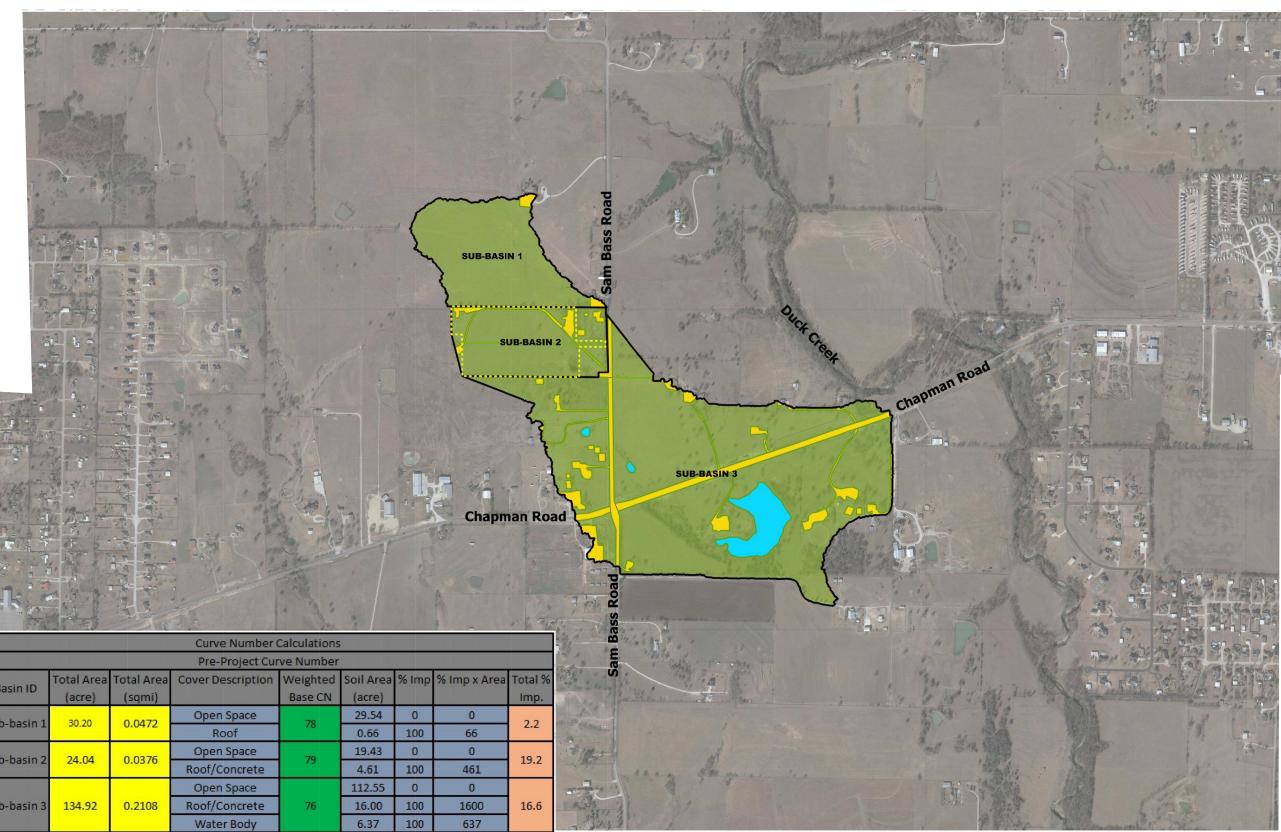
□ Pre-Project Sub-Basin

Pre-Project Land Use





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Ann ID Area (es) Area (es)

<u>Legends</u>

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

Contours

- 10-Ft Interval2-Ft Interval
- TC Flowpath
- Sheet Flow
- -Shallow Conc. Flow
- -Channel Flow

1000' 2000' 3000' 4000' SCALE 1"= 1000'



Weighted Base Curve Number

5.05 373.70

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SANGER, TEXAS

PRE DAM

FOR

MARLEY MEADOWS

PROJECT NO.

sheet 10-B of 23

	TIME OF CONCENTRATION CALCULATION (POST-PROJECT & ULTIMATE DEVELOPMENT)																		
AREA CODE	SHEET FLOW							SHALLOW CONCENTRATED FLOW							CHANNI	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(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 COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 49, TABLE IV.1-3

	TIME OF CONCENTRATION CALCULATION (POST-PROJECT & ULTIMATE DEVELOPMENT)													
AREA 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		

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 O	F CONCENTRA	ATION CALCUL	ATION (POST-I	PROJECT & ULT	TIMATE DEVE	ELOPMENT))						
AREA CODE			SHEET F	LOW					SHALLOW CO	ONCENTRATED	FLOW				CHANNE	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 (MIN.)
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

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

				T	IME OF CONC	ENTRATION C	ALCULATION	I (POST-PRO	JECT & ULTIM	ATE DEVELOP	MENT)					
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 (IIIII.)
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

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 (POST-PROJECT & ULTIMATE DEVELOPMENT)																			
AREA CODE			SHEET F	LOW					SHALLOW CO	ONCENTRATED	FLOW				CHANNE	L FLOW		TOC (TOTAL)		
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	

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

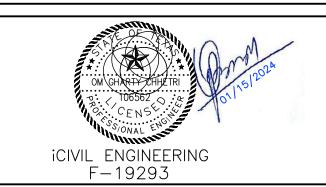
3. P2=3.36 FROM DENTON COUNTY SUBDIVISION RULES & REGULATIONS, PAGE 49, TABLE IV.1-3



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SANGER, TEXAS
POST-PROJECT & ULT. DEV. TIME OF CONCENTRATION
FOR
MARLEY MEADOWS

sheet 11-A of 23

PROJECT NO.



<u>Legends</u>

Post-Project Junction Point

Project Boundary

□ Post-Project Sub-Basin

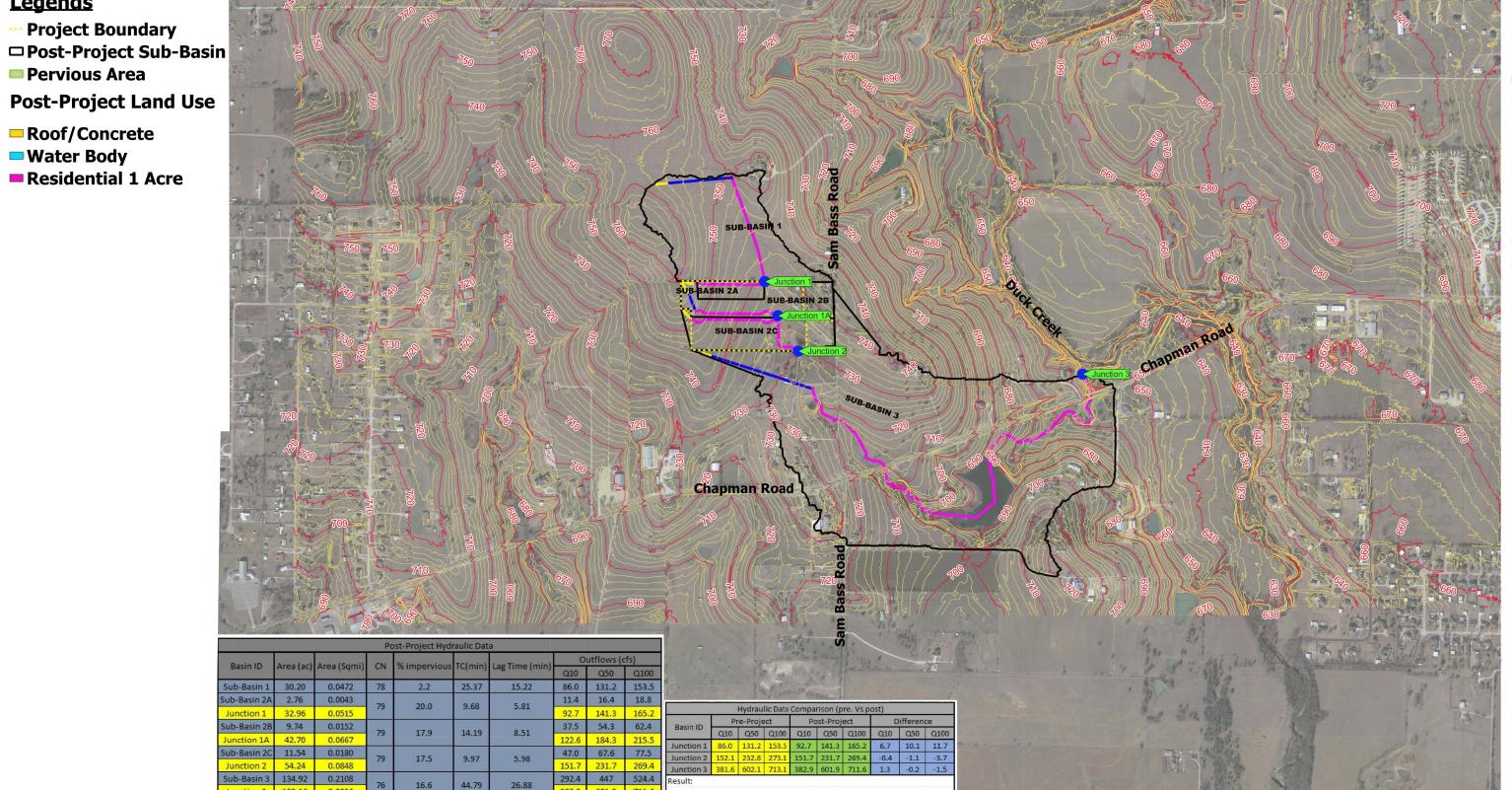
Contours

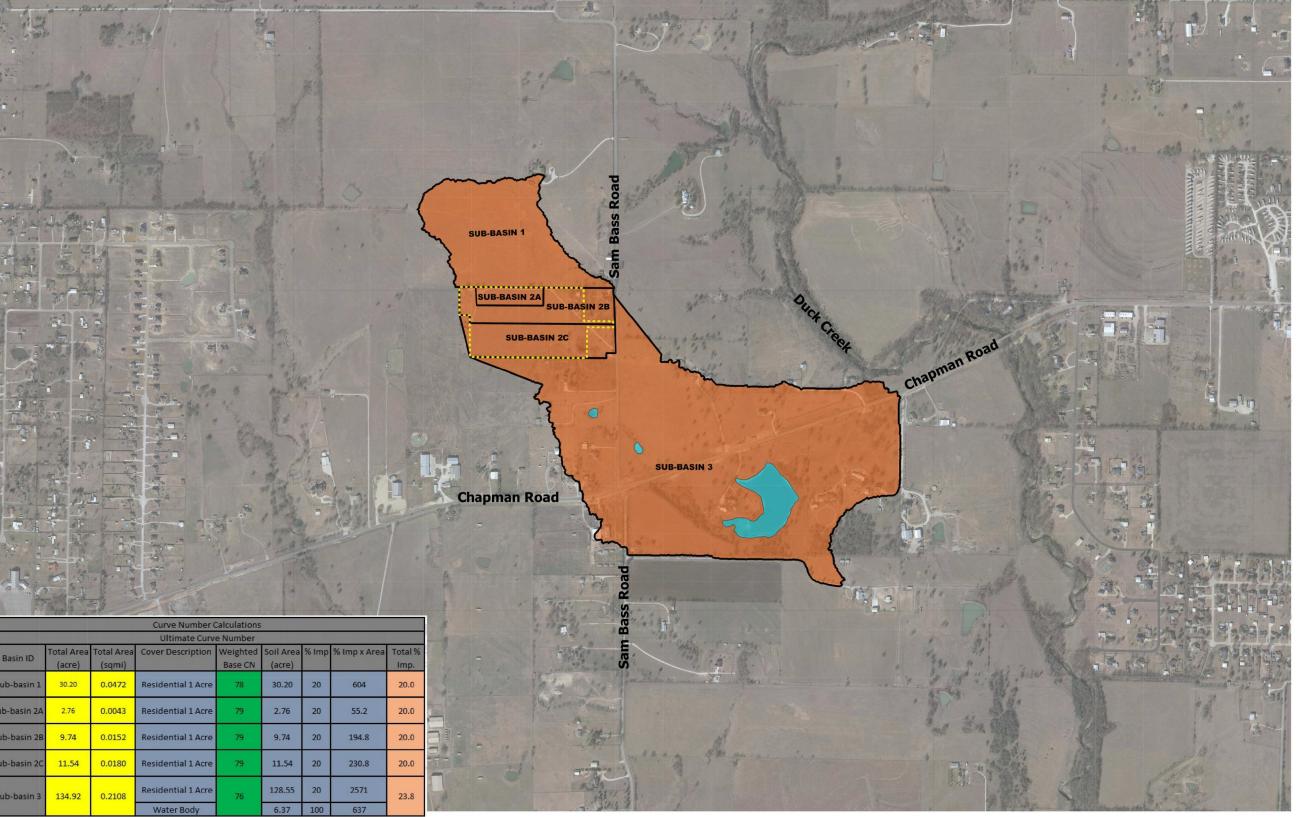
10-Ft Interval

2-Ft Interval



-Shallow Conc. Flow -Channel Flow





<u>Legends</u>

<u>Legends</u>

Project Boundary

Pervious Area

Roof/Concrete

Residential 1 Acre

Water Body

 Project Boundary □ Ultimate Sub-Basin **Ultimate Land Use** Residential 1 Acre ■ Water Body

<u>Legends</u>

Post-Project Junction Point

Project Boundary □ Ultimate Sub-Basin

Contours

10-Ft Interval 2-Ft Interval

Post Project TC Flowpath

Sheet Flow

-Shallow Conc. Flow

—Channel Flow



2000' SCALE 1"= 1000'

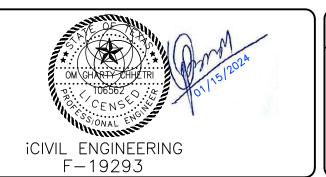
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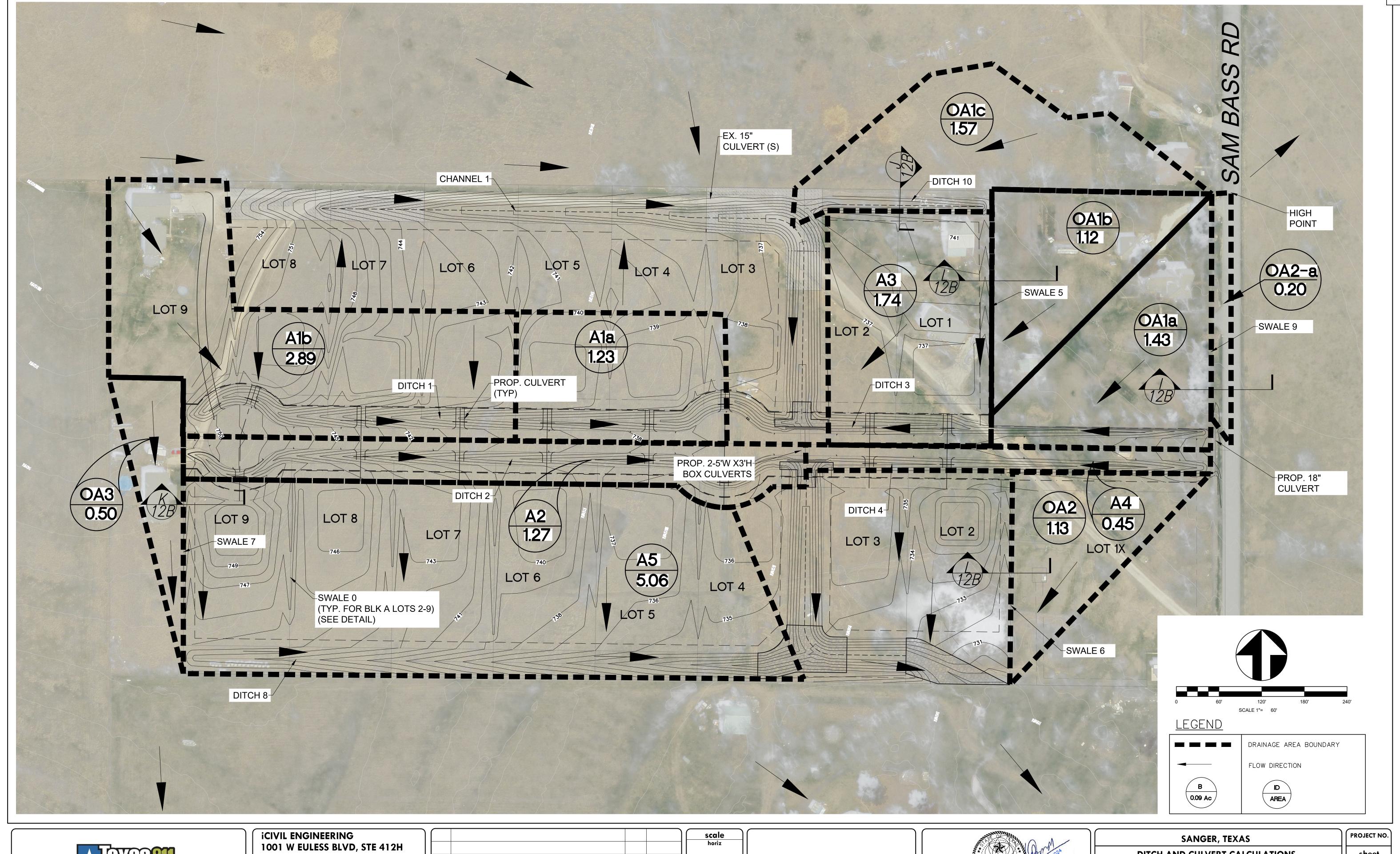
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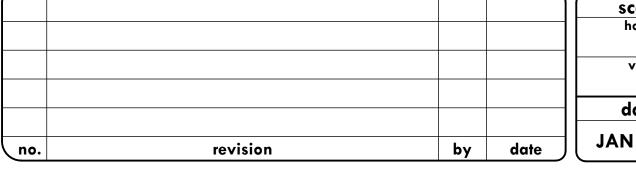
SANGER, TEXAS POST AND ULTIMATE DAM **MARLEY MEADOWS** PROJECT NO.

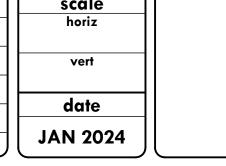
sheet 23





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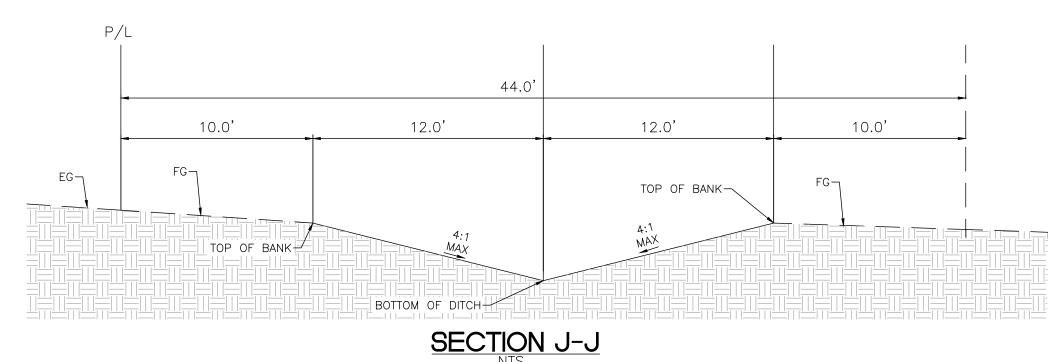


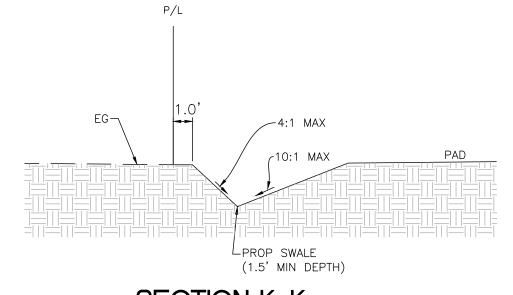


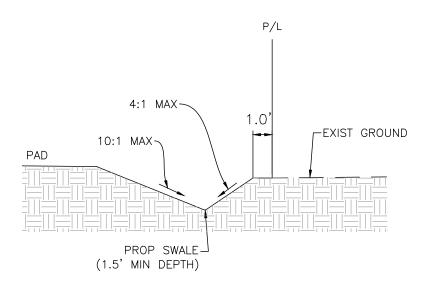


DITCH AND CULVERT CALCULATIONS
FOR
MARLEY MEADOWS

sheet
12-A
of
23







SECTION K-K

SECTION L-L

	TIME OF CONCENTRATION CALCULATION																		
AREA CODE	SHEET FLOW SHALLOW CONCENTRATED FLOW CHANNEL FLOW									TOC (TOTAL)	TOC USED								
AREA CODE	LENGTH (ft)	MANNINGS'S N	P2 (in.)	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 (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:																			

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	TIME OF CONCENTRATION CALCULATION															
			CHANNE	L FLOW 1			CHANNEL FLOW 2				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

	RUNOFF CALCULATION														
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

	V-DITCH & SWALE CAPACITY CALCULATION													
DITCH ID	Q100 (cfs)	AVERAGE SLOPE (ft/ft)	MANNING'S N	WATER DEPTH (ft.)	VELOCITY (fps)	TOTAL DITCH/SWALE DEPTH (ft)	SECTION DETAILS							
DITCH 1	17.92	0.020	0.040	0.91	3.47	3.5	SHEET 5 SECTION A-A							
DITCH 2	7.13	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							

V	VEIGHTED RUNOFF	COEFFICIENT (DIT	CH-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	VEIGHTED 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	0.70									
CLAYEY SOIL 5-10%	0.10	0.60	0.78									

DRIVEWAY CULVERT DATA FOR BLK B LOT 3 TO 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						

* CULVERT LENGTH=24', MATERIAL=RCP

	DRIVEWAY CULVERT DATA FOR BLK B LOT 1 & 2 CULVERTS												
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

	DRIVEWAY CULVERT DATA FOR BLK A LOT 3 TO 8 CULVERTS												
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

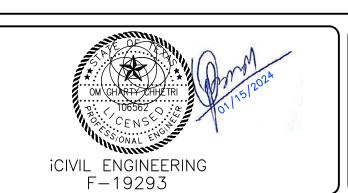
	DRIVEWAY CULVERT DATA FOR BLK A LOT 1 & 2 CULVERTS								
STREET STATION	CORRESPONDING LOT AREA	Q100	Q100 TOTAL	CONTRIBUTING LOTS/AREA	CULVERT SIZE*	UPSTREAM INV.	DOWNSTREAM INV.		
20+74.17	0.29	1.62	1.62	A4	18"	734.13	734.01		
19+65.12	0.16	0.89	2.51	A4	18"	733.58	733.46		
CULVERT LENGTH=24', MATERIAL=RCP									

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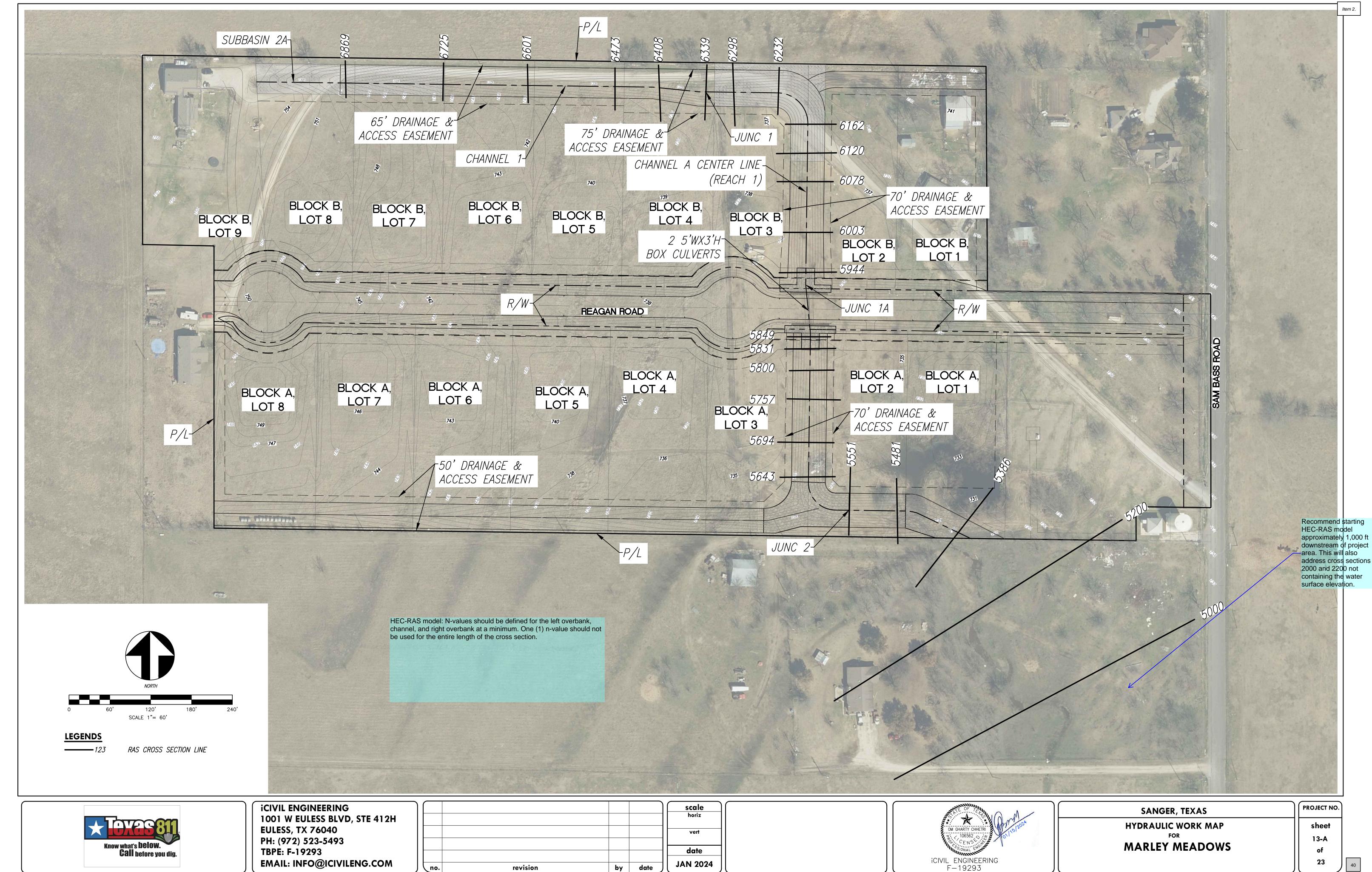
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SANGER, TEXAS	
DITCH AND CULVERT CALCULATIONS	
FOR	
MARLEY MEADOWS	

sheet 12-B of 23

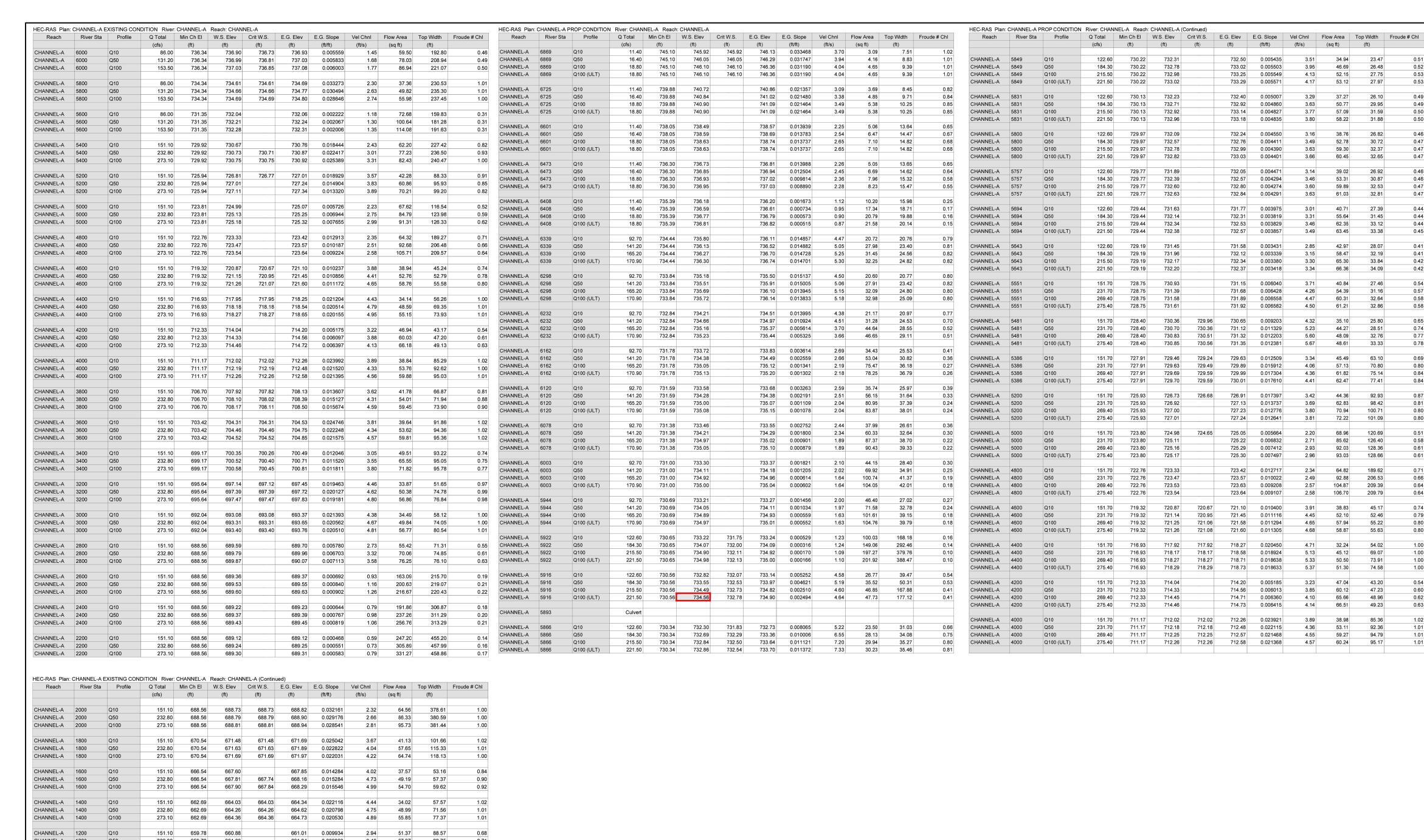
PROJECT NO.



revision

by date

23



CHANNEL-A	5849	Q10	122.60	730.22	732.31		732.50	0.005435	3.51	34.94	23.47	0.51	CHANNEL-A	3800	Q10	151.70	706.70	707.92	707.82	708.13	0.013569	3.62	41.93	
													CHANNEL-A	3800	Q50	231.70	706.70	708.10	708.02	708.38	0.015082	4.30	53.89	
CHANNEL-A	5849	Q50	184.30	730.22	732.78		733.02	0.005503	3.95	46.69	26.48	0.52	CHANNEL-A	3800	Q100	269.40	706.70	708.17	708.10	708.49	0.015598	4.57	59.00	
CHANNEL-A	5849	Q100	215.50	730.22	732.98		733.25	0.005549	4.13	52.15	27.75	0.53												
CHANNEL-A	5849	Q100 (ULT)	221.50	730.22	733.02		733.29	0.005571	4.17	53.12	27.97	0.53	CHANNEL-A	3800	Q100 (ULT)	275.40	706.70	708.18	708.11	708.51	0.015755	4.61	59.68	
		20 7				-																		
													CHANNEL-A	3600	Q10	151.70	703.42	704.31	704.31	704.53	0.024750	3.82	39.73	
CHANNEL-A	5831	Q10	122.60	730.13	732.23		732.40	0.005007	3.29	37.27	26.10	0.49	CHANNEL-A	3600	Q50	231.70	703.42	704.46	704.46	704.75	0.022344	4.34	53.39	
CHANNEL-A	5831	Q50	184.30	730.13	732.71		732.92	0.004860	3.63	50.77	29.95	0.49												
CHANNEL-A	5831	Q100	215.50	730.13	732.92		733.14	0.004827	3.77	57.09	31.59	0.50	CHANNEL-A	3600	Q100	269.40	703.42	704.52	704.52	704.84	0.021669	4.55	59.22	
CHANNEL-A	5831	Q100 (ULT)	221.50	730.13	732.96		733.18	0.004835	3.80	58.22	31.88	0.50	CHANNEL-A	3600	Q100 (ULT)	275.40	703.42	704.53	704.53	704.85	0.021494	4.58	60.19	
CHANNELA	3031	Q 100 (OL1)	221.00	730.13	732.30		733.10	0.004033	3.00	30.22	31.00	0.30												
													CHANNEL-A	3400	Q10	151.70	699.17	700.35	700.26	700.49	0.012292	3.08	49.32	
CHANNEL-A	5800	Q10	122.60	729.97	732.09		732.24	0.004550	3.16	38.76	26.82	0.46												
CHANNEL-A	5800	Q50	184.30	729.97	732.57		732.76	0.004411	3.49	52.78	30.72	0.47	CHANNEL-A	3400	Q50	231.70	699.17	700.51	700.38	700.71	0.011785	3.57	64.90	
CHANNEL-A	5800	Q100	215.50	729.97	732.78		732.99	0.004390	3.63	59.30	32.37	0.47	CHANNEL-A	3400	Q100	269.40	699.17	700.59	700.45	700.80	0.011397	3.74	72.01	
													CHANNEL-A	3400	Q100 (ULT)	275.40	699.17	700.60	700.46	700.82	0.011392	3.77	73.02	
CHANNEL-A	5800	Q100 (ULT)	221.50	729.97	732.82		733.03	0.004401	3.66	60.45	32.65	0.47												
													OLIANINIEL A	2000	040	454.70	005.04	207.45	207.40	207.45	0.040070	4.40	04.07	
CHANNEL-A	5757	Q10	122.60	729.77	731.89		732.05	0.004471	3.14	39.02	26.92	0.46	CHANNEL-A	3200	Q10	151.70	695.64	697.15	697.12	697.45	0.018970	4.43	34.27	
CHANNEL-A	5757	Q50	184.30	729.77	732.39		732.57	0.004294	3.46	53.31	30.87	0.46	CHANNEL-A	3200	Q50	231.70	695.64	697.39	697.39	697.72	0.019531	4.57	50.72	
						-							CHANNEL-A	3200	Q100	269.40	695.64	697.46	697.45	697.82	0.020151	4.86	55.45	
CHANNEL-A	5757	Q100	215.50	729.77	732.60		732.80	0.004274	3.60	59.89	32.53	0.47	CHANNEL-A	3200	Q100 (ULT)	275.40	695.64	697.47	697.46	697.84	0.020117	4.89	56.29	
CHANNEL-A	5757	Q100 (ULT)	221.50	729.77	732.63		732.84	0.004291	3.63	61.03	32.81	0.47	0.0.0		4.00 (01.)	2,0,10	000.01			557.151	0.020		00.20	
													0114515151		0.40	454.50	200.04	200.07	200.07		0.004000		04.00	
CHANNEL-A	5694	Q10	122.60	729.44	731.63		731.77	0.003975	3.01	40.71	27.39	0.44	CHANNEL-A	3000	Q10	151.70	692.04	693.07	693.07	693.38	0.021926	4.42	34.29	
	5694	Q50	184.30		732.14		732.31					0.44	CHANNEL-A	3000	Q50	231.70	692.04	693.31	693.31	693.65	0.020793	4.69	49.42	
CHANNEL-A				729.44				0.003819	3.31	55.64	31.45		CHANNEL-A	3000	Q100	269.40	692.04	693.40	693.40	693.75	0.020543	4.80	56.12	
CHANNEL-A	5694	Q100	215.50	729.44	732.34		732.53	0.003829	3.46	62.35	33.12	0.44	CHANNEL-A	3000	Q100 (ULT)	275.40	692.04	693.41	693.41	693.77	0.020543	4.82	57.11	
CHANNEL-A	5694	Q100 (ULT)	221.50	729.44	732.38		732.57	0.003857	3.49	63.45	33.38	0.45	CHAININEL-A	3000	Q100 (OL1)	213.40	092.04	093.41	053.41	093.11	0.020343	4.02	37.11	
CHANNE! A	5642	010	122.60	720 40	731.45		731.58	0.003431	2 05	42.07	28.07	0.41	CHANNEL-A	2800	Q10	151.70	688.56	689.59		689.71	0.005789	2.73	55.54	
CHANNEL-A	5643	Q10		729.19					2.85	42.97			CHANNEL-A	2800	Q50	231.70	688.56	689.79		689.96	0.006692	3.32	69.88	
CHANNEL-A	5643	Q50	184.30	729.19	731.96		732.12	0.003339	3.15	58.47	32.19	0.41	CHANNEL-A	2800	Q100	269.40	688.56	689.86		690.06	0.007074	3.56	75.70	
CHANNEL-A	5643	Q100	215.50	729.19	732.17		732.34	0.003380	3.30	65.30	33.84	0.42												
CHANNEL-A	5643	Q100 (ULT)	221.50	729.19	732.20		732.37	0.003418	3.34	66.36	34.09	0.42	CHANNEL-A	2800	Q100 (ULT)	275.40	688.56	689.88		690.08	0.007135	3.60	76.59	
		(,/				-																		
OLIANIST: :	5554	040	1=1==	700				0.0000:-				2	CHANNEL-A	2600	Q10	151.70	688.56	689.36		689.37	0.000692	0.93	163.43	
CHANNEL-A	5551	Q10	151.70	728.75	730.93		731.15	0.006040	3.71	40.84	27.46	0.54	CHANNEL-A	2600	Q50	231.70	688.56	689.53		689.55	0.000838	1.16	200.19	
CHANNEL-A	5551	Q50	231.70	728.75	731.39		731.68	0.006428	4.26	54.39	31.16	0.57												
CHANNEL-A	5551	Q100	269.40	728.75	731.58		731.89	0.006558	4.47	60.31	32.64	0.58	CHANNEL-A	2600	Q100	269.40	688.56	689.59		689.62	0.000897	1.25	215.26	
CHANNEL-A	5551	Q100 (ULT)	275.40	728.75	731.61		731.92	0.006582	4.50	61.21	32.86	0.58	CHANNEL-A	2600	Q100 (ULT)	275.40	688.56	689.61		689.63	0.000906	1.27	217.57	
OT DATABLE 71	0001	Q100 (OL1)	210.40	720.70	701.01		701.02	0.000002	4.00	01.21	02.00	0.00												
													CHANNEL-A	2400	Q10	151.70	688.56	689.23		689.23	0.000644	0.79	192.34	
CHANNEL-A	5481	Q10	151.70	728.40	730.36	729.96	730.65	0.009203	4.32	35.10	25.80	0.65	CHANNEL-A	2400	Q50	231.70	688.56	689.37		689.38	0.000765	0.98	236.75	
CHANNEL-A	5481	Q50	231.70	728.40	730.70	730.36	731.12	0.011329	5.23	44.27	28.51	0.74												
CHANNEL-A	5481	Q100	269.40	728.40	730.83	730.51	731.32	0.012203	5.60	48.09	32.76	0.77	CHANNEL-A	2400	Q100	269.40	688.56	689.43		689.45	0.000814	1.06	255.08	
CHANNEL-A	5481	Q100 (ULT)	275.40	728.40	730.85	730.56	731.35	0.012381	5.67	48.61	33.33	0.78	CHANNEL-A	2400	Q100 (ULT)	275.40	688.56	689.44		689.45	0.000821	1.07	257.91	
CHANNEL-A	3401	Q100 (OL1)	273.40	720.40	730.00	730.30	751.55	0.012301	5.67	40.01	33.33	0.78												
													CHANNEL-A	2200	Q10	151.70	688.56	689.12		689.12	0.000468	0.61	247.92	
CHANNEL-A	5386	Q10	151.70	727.91	729.46	729.24	729.63	0.012509	3.34	45.49	63.10	0.69												
CHANNEL-A	5386	Q50	231.70	727.91	729.63	729.49	729.89	0.015912	4.06	57.13	70.80	0.80	CHANNEL-A	2200	Q50	231.70	688.56	689.24		689.25	0.000550	0.76	305.25	
CHANNEL-A	5386	Q100	269.40	727.91	729.69	729.59	729.99	0.017304	4.36	61.82	75.14	0.84	CHANNEL-A	2200	Q100	269.40	688.56	689.29		689.31	0.000581	0.82	329.00	
													CHANNEL-A	2200	Q100 (ULT)	275.40	688.56	689.30		689.31	0.000585	0.83	332.78	
CHANNEL-A	5386	Q100 (ULT)	275.40	727.91	729.70	729.59	730.01	0.017610	4.41	62.47	77.41	0.84			` ,									
													CHANINELA	2000	040	454.70	000.50	000.70	000.70	000.00	0.000577	0.05	04.40	
CHANNEL-A	5200	Q10	151.70	725.93	726.73	726.68	726.91	0.017397	3.42	44.36	92.93	0.87	CHANNEL-A	2000	Q10	151.70	688.56	688.73	688.73	688.82	0.032577	2.35	64.46	
CHANNEL-A	5200	Q50	231.70	725.93	726.92		727.13	0.013737	3.69	62.83	98.42	0.81	CHANNEL-A	2000	Q50	231.70	688.56	688.79	688.79	688.90	0.029245	2.69	86.03	
													CHANNEL-A	2000	Q100	269.40	688.56	688.81	688.81	688.94	0.028255	2.83	95.24	
CHANNEL-A	5200	Q100	269.40	725.93	727.00		727.23	0.012776	3.80	70.94	100.71	0.80	CHANNEL-A	2000	Q100 (ULT)	275.40	688.56	688.82	688.82	688.94	0.028525	2.86	96.24	
CHANNEL-A	5200	Q100 (ULT)	275.40	725.93	727.01		727.24	0.012641	3.81	72.22	101.09	0.80	011711111111111111111111111111111111111	2000	Q.00 (02.1)	210.10	555.55	000.02	000.02	000.01	0.020020	2.00	00.21	
CHANNEL-A	5000	Q10	151.70	723.80	724.98	724.65	725.05	0.005664	2.20	68.96	120.69	0.51	CHANNEL-A	1800	Q10	151.70	670.54	671.49	671.49	671.69	0.024080	3.63	41.83	
						124.00							CHANNEL-A	1800	Q50	231.70	670.54	671.63	671.63	671.88	0.022768	4.03	57.52	
CHANNEL-A	5000	Q50	231.70	723.80	725.11		725.22	0.006832	2.71	85.62	126.40	0.58	CHANNEL-A	1800	Q100	269.40	670.54	671.69	671.68	671.96	0.022210	4.21	64.00	
CHANNEL-A	5000	Q100	269.40	723.80	725.16		725.29	0.007412	2.93	92.03	128.36	0.61	CHANNEL-A	1800	Q100 (ULT)		670.54	671.70	671.69	671.97	0.022099	4.24	65.03	
CHANNEL-A	5000	Q100 (ULT)	275.40	723.80	725.17		725.30	0.007497	2.96	93.03	128.66	0.61	CHAININEL-A	1000	Q100 (OL1)	275.40	670.54	6/1./0	671.69	671.97	0.022099	4.24	65.03	
		, ,																						
CHANNEL-A	4800	010	151.70	700.76	723.33		723.42	0.012717	2.34	64.82	400.00	0.71	CHANNEL-A	1600	Q10	151.70	666.54	667.60		667.85	0.014368	4.04	37.59	
		Q10		722.76						64.82	189.62		CHANNEL-A	1600	Q50	231.70	666.54	667.80	667.74	668.15	0.015502	4.75	48.79	
CHANNEL-A	4800	Q50	231.70	722.76	723.47		723.57	0.010022	2.49	92.88	206.53	0.66	CHANNEL-A	1600	Q100	269.40	666.54	667.89	667.83	668.28	0.015484	4.97	54.25	
CHANNEL-A	4800	Q100	269.40	722.76	723.53		723.63	0.009208	2.57	104.87	209.39	0.64												
CHANNEL-A	4800	Q100 (ULT)	275.40	722.76	723.54		723.64	0.009107	2.58	106.70	209.79	0.64	CHANNEL-A	1600	Q100 (ULT)	275.40	666.54	667.91	667.84	668.30	0.015507	5.00	55.07	
					5.0 1		5.0 /																	
OLIANISTE: .	4000	040	4=4==	710.55	700 00	=05 5=	70: :-	0.010155		00.55	45 :-		CHANNEL-A	1400	Q10	151.70	662.69	664.03	664.03	664.34	0.021970	4.43	34.21	
CHANNEL-A	4600	Q10	151.70	719.32	720.87	720.67	721.10	0.010400	3.91	38.83	45.17	0.74	CHANNEL-A	1400	Q50	231.70	662.69	664.27	664.27	664.61	0.020406	4.71	49.20	
CHANNEL-A	4600	Q50	231.70	719.32	721.14	720.95	721.45	0.011116	4.45	52.10	52.46	0.79	CHANNEL-A	1400	Q100	269.40	662.69	664.35	664.35	664.72	0.020624	4.88	55.16	
CHANNEL-A	4600	Q100	269.40	719.32	721.25	721.06	721.58	0.011294	4.65	57.94	55.22	0.80												
CHANNEL-A	4600	Q100 (ULT)	275.40	719.32	721.26	721.08	721.60	0.011305	4.68	58.87	55.63	0.80	CHANNEL-A	1400	Q100 (ULT)	275.40	662.69	664.36	664.36	664.73	0.020623	4.91	56.11	
		,,																						
CHANNE	4400	010	454 70	740.00	747.00	747.00	740.00	0.000450	4 74	20.01	54.00	4.00	CHANNEL-A	1200	Q10	151.70	659.78	660.93		661.04	0.007746	2.72	55.76	
CHANNEL-A	4400	Q10	151.70	716.93	717.92	717.92	718.27	0.020450	4.71	32.24	54.02	1.00	CHANNEL-A	1200	Q50	231.70	659.78	661.12		661.28	0.007541	3.13	73.92	
CHANNEL-A	4400	Q50	231.70	716.93	718.17	718.17	718.58	0.018924	5.13	45.12	69.07	1.00	CHANNEL-A	1200	Q100	269.40	659.78	661.21		661.38	0.007463	3.29	81.79	
CHANNEL-A	4400	Q100	269.40	716.93	718.27	718.27	718.71	0.018638	5.33	50.50	73.91	1.00						-						
CHANNEL-A	4400	Q100 (ULT)	275.40	716.93	718.29	718.29	718.73	0.018633	5.37	51.30	74.58	1.00	CHANNEL-A	1200	Q100 (ULT)	275.40	659.78	661.22		661.39	0.007509	3.33	82.81	
		(JE1)	2.0.10			5.20	5.75	2.0,000	0.01	000														
01141	40.55	0.45						0.0001					CHANNEL-A	1000	Q10	151.70	657.16	658.31	658.31	658.66	0.020052	4.78	31.76	
CHANNEL-A	4200	Q10	151.70	712.33	714.04		714.20	0.005185	3.23	47.04	43.20	0.54	CHANNEL-A	1000	Q50	231.70	657.16	658.56	658.56	658.98	0.019023	5.20	44.57	
CHANNEL-A	4200	Q50	231.70	712.33	714.33		714.56	0.006013	3.85	60.12	47.23	0.60												
CHANNEL-A	4200	Q100	269.40	712.33	714.45		714.71	0.006360	4.10	65.66	48.96	0.62	CHANNEL-A	1000	Q100	269.40	657.16	658.65	658.65	659.11	0.018608	5.45	49.41	
CHANNEL-A	4200		275.40	712.33	714.46	-	714.73	0.006415	4.14	66.51	49.23	0.63	CHANNEL-A	1000	Q100 (ULT)	275.40	657.16	658.67	658.67	659.13	0.018301	5.47	50.38	
	4200			112.33	114.40		114.13	0.000415	4.14	00.01	45.23	0.03												
OT INTITULE 71		Q100 (ULT)	275.40										CHANNEL-A	600	Q10	151.70	650.24	652.09		652.15	0.002436	2.01	75.61	
	4200 4200							0.023921	3.89	38.98	85.36	1.02									0.002436			
CHANNEL-A	4200		151.70	711.17	712.02	712.02	712.26	0.020021		50.44	00.00	1.01	CHANNEL-A	600	Q50	231.70	650.24	652.41		652.49	0.00.7267			
	4200 4200	Q100 (ULT)		711.17 711.17	712.02 712.18	712.02 712.18	712.26 712.48	0.023321	4.36	53.11	92.36		CHANNEL-A	600	0100	000 10						2.26	102.64	
CHANNEL-A CHANNEL-A	4200 4200 4000 4000	Q100 (ULT) Q10 Q50	151.70 231.70	711.17	712.18	712.18	712.48	0.022115							Q100	269.40	650.24	652.54		652.63	0.002207	2.26	114.21	
CHANNEL-A CHANNEL-A CHANNEL-A	4200 4200 4000 4000 4000	Q100 (ULT) Q10 Q50 Q100	151.70 231.70 269.40	711.17 711.17	712.18 712.25	712.18 712.25	712.48 712.57	0.022115 0.021468	4.55	59.27	94.79	1.01	CHANNEL-A	600	Q100 (ULT)	269.40	650.24 650.24	652.54 652.57						
CHANNEL-A CHANNEL-A	4200 4200 4000 4000	Q100 (ULT) Q10 Q50	151.70 231.70	711.17	712.18	712.18	712.48	0.022115												652.63	0.002207	2.36	114.21	
CHANNEL-A CHANNEL-A CHANNEL-A	4200 4200 4000 4000 4000	Q100 (ULT) Q10 Q50 Q100	151.70 231.70 269.40	711.17 711.17	712.18 712.25	712.18 712.25	712.48 712.57	0.022115 0.021468	4.55	59.27	94.79	1.01	CHANNEL-A	600	Q100 (ULT)	275.40	650.24	652.57	650.63	652.63 652.65	0.002207 0.002197	2.36 2.37	114.21 116.06	
CHANNEL-A CHANNEL-A CHANNEL-A	4200 4200 4000 4000 4000	Q100 (ULT) Q10 Q50 Q100	151.70 231.70 269.40	711.17 711.17	712.18 712.25	712.18 712.25	712.48 712.57	0.022115 0.021468	4.55	59.27	94.79	1.01							650.63	652.63	0.002207	2.36	114.21	
CHANNEL-A CHANNEL-A CHANNEL-A	4200 4200 4000 4000 4000	Q100 (ULT) Q10 Q50 Q100	151.70 231.70 269.40	711.17 711.17	712.18 712.25	712.18 712.25	712.48 712.57	0.022115 0.021468	4.55	59.27	94.79	1.01	CHANNEL-A	600	Q100 (ULT)	275.40	650.24	652.57	650.63	652.63 652.65	0.002207 0.002197	2.36 2.37	114.21 116.06	
CHANNEL-A CHANNEL-A CHANNEL-A	4200 4200 4000 4000 4000	Q100 (ULT) Q10 Q50 Q100	151.70 231.70 269.40	711.17 711.17	712.18 712.25	712.18 712.25	712.48 712.57	0.022115 0.021468	4.55	59.27	94.79	1.01	CHANNEL-A	600	Q100 (ULT)	275.40	650.24	652.57	650.63	652.63 652.65	0.002207 0.002197	2.36 2.37	114.21 116.06	
CHANNEL-A CHANNEL-A CHANNEL-A	4200 4200 4000 4000 4000	Q100 (ULT) Q10 Q50 Q100	151.70 231.70 269.40	711.17 711.17	712.18 712.25	712.18 712.25	712.48 712.57	0.022115 0.021468	4.55	59.27	94.79	1.01	CHANNEL-A	400	Q100 (ULT)	275.40 151.70	650.24 649.32	652.57 650.63		652.63 652.65	0.002207 0.002197	2.36 2.37	114.21 116.06	
CHANNEL-A CHANNEL-A CHANNEL-A	4200 4200 4000 4000 4000	Q100 (ULT) Q10 Q50 Q100	151.70 231.70 269.40	711.17 711.17	712.18 712.25	712.18 712.25	712.48 712.57	0.022115 0.021468	4.55	59.27	94.79	1.01	CHANNEL-A CHANNEL-A HEC-RAS Plan	400 400 : CHANNEL	Q100 (ULT) Q10 Q10 -A PROP CONDITION	275.40 151.70 I River: CHANN	650.24 649.32 EL-A Reach: C	652.57 650.63 HANNEL-A (Continued)	652.63 652.65 651.06	0.002207 0.002197 0.019467	2.36 2.37 5.23	114.21 116.06 29.00	
CHANNEL-A CHANNEL-A CHANNEL-A	4200 4200 4000 4000 4000	Q100 (ULT) Q10 Q50 Q100	151.70 231.70 269.40	711.17 711.17	712.18 712.25	712.18 712.25	712.48 712.57	0.022115 0.021468	4.55	59.27	94.79	1.01	CHANNEL-A	400	Q100 (ULT) Q10 Q10 -A PROP CONDITION	275.40 151.70 I River: CHANN	650.24 649.32 EL-A Reach: C	652.57 650.63		652.63 652.65	0.002207 0.002197	2.36 2.37 5.23	114.21 116.06 29.00	Top \
CHANNEL-A CHANNEL-A CHANNEL-A	4200 4200 4000 4000 4000	Q100 (ULT) Q10 Q50 Q100	151.70 231.70 269.40	711.17 711.17	712.18 712.25	712.18 712.25	712.48 712.57	0.022115 0.021468	4.55	59.27	94.79	1.01	CHANNEL-A CHANNEL-A HEC-RAS Plan	400 400 : CHANNEL	Q100 (ULT) Q10 Q10 -A PROP CONDITION	275.40 151.70 I River: CHANN	650.24 649.32 EL-A Reach: C	652.57 650.63 HANNEL-A (Continued)	652.63 652.65 651.06	0.002207 0.002197 0.019467	2.36 2.37 5.23	114.21 116.06 29.00	Top \
CHANNEL-A CHANNEL-A CHANNEL-A	4200 4200 4000 4000 4000	Q100 (ULT) Q10 Q50 Q100	151.70 231.70 269.40	711.17 711.17	712.18 712.25	712.18 712.25	712.48 712.57	0.022115 0.021468	4.55	59.27	94.79	1.01	CHANNEL-A CHANNEL-A HEC-RAS Plan Reach	600 400 : CHANNEL River S	Q100 (ULT) Q10 -A PROP CONDITION Sta Profile	275.40 151.70 I River: CHANNI Q Total (cfs)	650.24 649.32 EL-A Reach: C Min Ch El V	652.57 650.63 HANNEL-A (0 V.S. Elev (ft)	Continued) Crit W.S. (ft)	652.63 652.65 651.06	0.002207 0.002197 0.019467 E.G. Slope (ft/ft)	2.36 2.37 5.23 Vel Chnl (ft/s)	114.21 116.06 29.00 Flow Area (sq ft)	Top \
CHANNEL-A CHANNEL-A CHANNEL-A	4200 4200 4000 4000 4000	Q100 (ULT) Q10 Q50 Q100	151.70 231.70 269.40	711.17 711.17	712.18 712.25	712.18 712.25	712.48 712.57	0.022115 0.021468	4.55	59.27	94.79	1.01	CHANNEL-A CHANNEL-A HEC-RAS Plan	400 400 : CHANNEL	Q100 (ULT) Q10 Q10 -A PROP CONDITION	275.40 151.70 I River: CHANNI Q Total	650.24 649.32 EL-A Reach: C Min Ch El V	652.57 650.63 HANNEL-A (0	Continued) Crit W.S.	652.63 652.65 651.06	0.002207 0.002197 0.019467	2.36 2.37 5.23	114.21 116.06 29.00	Top \((f)

CHANNEL-A 3 CHANNEL-A 2 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1	3600 3600 3600 3600 3600 3600 3400 3400	Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT)	151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	703.42 703.42 703.42 703.42 703.42 699.17 699.17 699.17 695.64 695.64 695.64 695.64 692.04 692.04 692.04 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	697.46 697.47 693.07 693.31 693.40 693.41 689.59 689.79 689.86 689.88 689.53 689.53	704.31 704.46 704.52 704.53 700.26 700.38 700.45 700.46 697.12 697.39 697.45 693.07 693.31 693.40 693.41	704.53 704.75 704.84 704.85 700.49 700.71 700.80 700.82 697.45 697.72 697.82 697.84 693.65 693.75 693.77 689.71 689.96 690.08 689.37 689.65 689.65 689.63 689.65 689.63 689.65 689.63 689.65 689.65 689.65 689.65 689.65 689.65	0.024750 0.022344 0.021669 0.021494 0.01292 0.011785 0.011397 0.011392 0.018970 0.019531 0.020151 0.020117 0.021926 0.020793 0.020543 0.020543 0.005789 0.006692 0.007074 0.007135 0.000897 0.000897 0.0008987 0.000897 0.000897 0.000881 0.000821 0.000881	3.82 4.34 4.55 4.58 3.08 3.57 3.74 4.43 4.57 4.86 4.89 4.42 4.69 4.80 4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	39.73 53.39 59.22 60.19 49.32 64.90 72.01 73.02 34.27 50.72 55.45 56.29 49.42 56.12 57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	91.87 94.32 95.27 95.42 93.20 94.98 95.81 95.93 51.89 74.90 76.44 76.68 58.01 73.62 79.96 80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	1.C 0.7 0.7 0.7 0.7 0.7 0.9 0.9 1.C 1.C 1.C 1.C 1.C 2.C 2.C 2.C 2.C 2.C 2.C 2.C 2.C 2.C 2
CHANNEL-A	3600 3600 3600 3400 3400 3400 3400 3200 3200 3200 32	Q100 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT)	269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	703.42 703.42 703.42 699.17 699.17 699.17 695.64 695.64 692.04 692.04 692.04 692.04 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	704.52 704.53 700.35 700.51 700.59 700.60 697.15 697.39 697.46 697.47 693.07 693.31 693.40 693.41 689.59 689.79 689.86 689.88 689.86 689.86 689.36 689.37 689.41 689.23 689.41 689.44 689.44 689.44	704.52 704.53 700.26 700.38 700.45 700.46 697.12 697.39 697.45 697.46	704.84 704.85 700.49 700.71 700.80 700.82 697.45 697.72 697.82 697.84 693.38 693.65 693.75 693.77 689.71 689.96 690.06 690.08 689.37 689.55 689.62 689.63 689.84 689.45 689.45	0.021669 0.021494 0.012292 0.011785 0.011397 0.011392 0.018970 0.019531 0.020151 0.020117 0.021926 0.020793 0.020543 0.020543 0.020543 0.005789 0.006692 0.007074 0.007135 0.000897 0.000897 0.000926 0.000844 0.000765 0.000814 0.000821	4.55 4.58 3.08 3.57 3.74 3.77 4.43 4.57 4.86 4.89 4.80 4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	59.22 60.19 49.32 64.90 72.01 73.02 34.27 50.72 55.45 56.29 34.29 49.42 56.12 57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	95.27 95.42 93.20 94.98 95.81 95.93 51.89 74.90 76.44 76.68 58.01 73.62 79.96 80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	1.0 1.0 1.0 0.7 0.7 0.7 0.7 0.7 0.9 0.9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
CHANNEL-A	3600 3400 3400 3400 3400 3400 3200 3200 32	Q100 (ULT) Q10 Q50 Q100 Q100 (ULT)	275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	703.42 699.17 699.17 699.17 699.17 695.64 695.64 695.64 692.04 692.04 692.04 692.04 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	704.53 700.35 700.51 700.59 700.60 697.15 697.39 697.46 697.47 693.07 693.31 693.40 693.41 689.59 689.79 689.86 689.88 689.36 689.53 689.59 689.61 689.23 689.37 689.44 689.24 689.29	704.53 700.26 700.38 700.45 700.46 697.12 697.39 697.45 697.46 693.07 693.31 693.40	704.85 700.49 700.71 700.80 700.82 697.45 697.72 697.82 697.84 693.38 693.65 693.75 693.77 689.71 689.96 690.06 690.08 689.37 689.55 689.62 689.63 689.23 689.84 689.45 689.45	0.021494 0.012292 0.011785 0.011397 0.011392 0.018970 0.019531 0.020151 0.020117 0.021926 0.020793 0.020543 0.020543 0.005789 0.006692 0.007074 0.007135 0.000692 0.000838 0.000897 0.000926 0.000644 0.000765 0.000814 0.000821	4.58 3.08 3.57 3.74 3.77 4.43 4.57 4.86 4.89 4.42 4.69 4.80 4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	60.19 49.32 64.90 72.01 73.02 34.27 50.72 55.45 56.29 34.29 49.42 56.12 57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	95.42 93.20 94.98 95.81 95.93 51.89 74.90 76.44 76.68 58.01 73.62 79.96 80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	0.7 0.7 0.7 0.7 0.7 0.9 0.9 1.0 1.0 1.0 1.0 1.0 0.6 0.6 0.6 0.1 0.2 0.2 0.2 0.2 0.1 0.1 0.2 0.2 0.2 0.2 0.1 0.1 0.2
CHANNEL-A	3400 3400 3400 3400 3400 3400 3200 3200	Q10 Q50 Q100 (ULT)	151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	699.17 699.17 699.17 699.17 695.64 695.64 695.64 692.04 692.04 692.04 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	700.35 700.51 700.59 700.60 697.15 697.39 697.46 697.47 693.07 693.31 693.40 693.41 689.59 689.88 689.88 689.88 689.53 689.53 689.59 689.61 689.23 689.44 689.44	700.26 700.38 700.45 700.46 697.12 697.39 697.45 697.46 693.07 693.31 693.40	700.49 700.71 700.80 700.82 697.45 697.72 697.84 693.38 693.65 693.75 693.77 689.71 689.96 690.08 689.37 689.55 689.62 689.63 689.63 689.63 689.45 689.45	0.012292 0.011785 0.011397 0.011392 0.018970 0.019531 0.020151 0.020151 0.020177 0.021926 0.020793 0.020543 0.020543 0.005789 0.006692 0.007074 0.007135 0.000897 0.000897 0.000644 0.000765 0.000814 0.000821	3.08 3.57 3.74 3.77 4.43 4.57 4.86 4.89 4.42 4.69 4.80 4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	49.32 64.90 72.01 73.02 34.27 50.72 55.45 56.29 49.42 56.12 57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	93.20 94.98 95.81 95.93 51.89 74.90 76.44 76.68 58.01 73.62 79.96 80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	1.0 0.7 0.7 0.7 0.7 0.7 0.9 0.9 1.0 1.0 1.0 1.0 1.0 1.0 0.5 0.6 0.6 0.6 0.6 0.1 0.2 0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.1
CHANNEL-A CHANNE	3400 3400 3400 3400 3400 3200 3200 3200	Q50 Q100 Q100 (ULT) Q10 Q50 Q100 (ULT)	231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	699.17 699.17 699.17 695.64 695.64 695.64 692.04 692.04 692.04 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	700.51 700.59 700.60 697.15 697.39 697.46 697.47 693.07 693.31 693.40 693.41 689.59 689.79 689.88 689.86 689.86 689.86 689.61 689.23 689.44 689.44 689.29	700.38 700.45 700.46 697.12 697.39 697.45 697.46 693.07 693.31 693.40	700.71 700.80 700.82 697.45 697.72 697.82 697.84 693.38 693.65 693.75 693.77 689.71 689.96 690.08 689.37 689.55 689.62 689.63 689.45 689.45 689.45	0.011785 0.011397 0.011392 0.018970 0.019531 0.020151 0.020117 0.021926 0.020793 0.020543 0.020543 0.005789 0.006692 0.007074 0.007135 0.000892 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	3.57 3.74 3.77 4.43 4.57 4.86 4.89 4.42 4.69 4.80 4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	64.90 72.01 73.02 34.27 50.72 55.45 56.29 34.29 49.42 56.12 57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	94.98 95.81 95.93 51.89 74.90 76.44 76.68 58.01 73.62 79.96 80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	0.7 0.7 0.7 0.9 0.9 1.0 1.0 1.0 1.0 1.0 0.5 0.6 0.6 0.6 0.1 0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.1
CHANNEL-A CHANNE	3400 3400 3400 3200 3200 3200 3200 3000 30	Q100 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT)	269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	699.17 699.17 695.64 695.64 695.64 692.04 692.04 692.04 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	700.59 700.60 697.15 697.39 697.47 693.07 693.31 693.40 693.41 689.59 689.79 689.86 689.88 689.86 689.86 689.37 689.41 689.23 689.37 689.43 689.44	700.45 700.46 697.12 697.39 697.45 697.46 693.07 693.31 693.40	700.80 700.82 697.45 697.72 697.82 697.84 693.38 693.65 693.75 693.77 689.71 689.96 690.08 689.37 689.55 689.62 689.63 689.45 689.45 689.45	0.011397 0.011392 0.018970 0.019531 0.020151 0.020117 0.021926 0.020793 0.020543 0.020543 0.006692 0.007074 0.007135 0.000892 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	3.74 3.77 4.43 4.57 4.89 4.42 4.69 4.80 4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	72.01 73.02 34.27 50.72 55.45 56.29 34.29 49.42 56.12 57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	95.81 95.93 51.89 74.90 76.44 76.68 58.01 73.62 79.96 80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	0.7 0.7 0.9 0.9 1.0 1.0 1.0 1.0 1.0 0.5 0.6 0.6 0.6 0.1 0.2 0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.1
CHANNEL-A	3400 3200 3200 3200 3200 3200 3000 3000	Q100 (ULT) Q10 Q50 Q100 Q100 (ULT)	275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	699.17 695.64 695.64 695.64 695.64 692.04 692.04 692.04 692.04 692.05 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	700.60 697.15 697.39 697.46 697.47 693.07 693.31 693.40 693.41 689.59 689.79 689.88 689.36 689.36 689.53 689.53 689.59 689.61 689.23 689.44 689.44 689.42 689.44	700.46 697.12 697.39 697.45 697.46 693.07 693.31 693.40	700.82 697.45 697.72 697.82 697.84 693.38 693.65 693.75 693.77 689.71 689.96 690.08 689.37 689.55 689.62 689.63 689.45 689.45 689.45	0.011392 0.018970 0.018970 0.019531 0.020151 0.020117 0.021926 0.020793 0.020543 0.020543 0.005789 0.006692 0.007074 0.007135 0.000692 0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	3.77 4.43 4.57 4.86 4.89 4.42 4.69 4.80 4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	73.02 34.27 50.72 55.45 56.29 34.29 49.42 56.12 57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	95.93 51.89 74.90 76.44 76.68 58.01 73.62 79.96 80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	0.7 0.9 0.9 1.0 1.0 1.0 1.0 1.0 1.0 0.5 0.6 0.6 0.6 0.1 0.2 0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.1
CHANNEL-A	3200 3200 3200 3200 3200 3200 3000 3000	Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT)	151.70 231.70 269.40 275.40 151.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	695.64 695.64 695.64 695.64 692.04 692.04 692.04 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	697.15 697.39 697.46 697.47 693.07 693.31 693.40 693.41 689.59 689.79 689.86 689.86 689.61 689.53 689.53 689.57 689.43 689.44	697.12 697.39 697.45 697.46 693.07 693.31 693.40	697.45 697.72 697.82 697.84 693.38 693.65 693.75 693.77 689.71 689.96 690.08 689.37 689.55 689.62 689.63 689.45 689.45	0.018970 0.019531 0.020151 0.020117 0.021926 0.020793 0.020543 0.020543 0.005789 0.00692 0.007074 0.007135 0.000692 0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	4.43 4.57 4.86 4.89 4.42 4.69 4.80 4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	34.27 50.72 55.45 56.29 34.29 49.42 56.12 57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	51.89 74.90 76.44 76.68 58.01 73.62 79.96 80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	0.9 0.9 1.0 1.0 1.0 1.0 1.0 1.0 0.5 0.6 0.6 0.1 0.2 0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.1
CHANNEL-A	3200 3200 3200 3200 3200 3000 3000 3000	Q50 Q100 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT)	231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	695.64 695.64 692.04 692.04 692.04 692.04 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	697.39 697.46 697.47 693.07 693.31 693.40 693.41 689.59 689.79 689.86 689.83 689.53 689.53 689.59 689.61 689.23 689.44 689.44 689.44	697.39 697.45 697.46 693.07 693.31 693.40	697.72 697.82 697.84 693.38 693.65 693.75 693.77 689.71 689.06 690.08 689.37 689.55 689.62 689.83 689.45 689.45	0.019531 0.020151 0.020117 0.021926 0.020793 0.020543 0.020543 0.005789 0.006692 0.007074 0.007135 0.000692 0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	4.57 4.86 4.89 4.42 4.69 4.80 4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	50.72 55.45 56.29 34.29 49.42 56.12 57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	74.90 76.44 76.68 58.01 73.62 79.96 80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	0.9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0
CHANNEL-A	3200 3200 3200 3000 3000 3000 3000 2800 28	Q100 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT)	269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	695.64 695.64 692.04 692.04 692.04 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	697.46 697.47 693.07 693.31 693.40 693.41 689.59 689.79 689.86 689.83 689.53 689.53 689.53 689.53 689.54 689.23 689.44	697.45 697.46 693.07 693.31 693.40	697.82 697.84 693.38 693.65 693.75 693.77 689.71 689.06 690.08 689.37 689.55 689.62 689.83 689.45 689.45	0.020151 0.020117 0.021926 0.020793 0.020543 0.020543 0.005789 0.006692 0.007074 0.007135 0.000692 0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	4.86 4.89 4.42 4.69 4.80 4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	55.45 56.29 34.29 49.42 56.12 57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	76.44 76.68 58.01 73.62 79.96 80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	1.0 1.0 1.0 1.0 1.0 1.0 0.5 0.6 0.6 0.6 0.1 0.2 0.2 0.2 0.2
CHANNEL-A	3200 3000 3000 3000 3000 3000 2800 2800	Q100 (ULT) Q10 Q50 Q100 Q100 (ULT)	275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	695.64 692.04 692.04 692.04 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	697.47 693.07 693.31 693.40 693.41 689.59 689.79 689.86 689.88 689.53 689.53 689.59 689.61 689.23 689.37 689.44 689.44 689.44	693.07 693.31 693.40	697.84 693.38 693.65 693.75 693.77 689.71 689.96 690.08 689.37 689.55 689.62 689.23 689.38 689.45 689.45 689.45	0.020117 0.021926 0.020793 0.020543 0.020543 0.005789 0.006692 0.007074 0.007135 0.000692 0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	4.89 4.42 4.69 4.80 4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	56.29 34.29 49.42 56.12 57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	76.68 58.01 73.62 79.96 80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	1.0 1.0 1.0 1.0 1.0 1.0 1.0 0.5 0.6 0.6 0.6 0.1 0.2 0.2 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1
CHANNEL-A	3000 3000 3000 3000 3000 2800 2800 2800	Q10 Q50 Q100 (ULT)	151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	692.04 692.04 692.04 692.04 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	693.07 693.31 693.40 693.41 689.59 689.79 689.86 689.88 689.36 689.53 689.53 689.53 689.59 689.61 689.23 689.44	693.07 693.31 693.40	693.38 693.65 693.75 693.77 689.71 689.96 690.08 689.37 689.55 689.62 689.63 689.23 689.38 689.45 689.45	0.021926 0.020793 0.020543 0.020543 0.005789 0.006692 0.007074 0.007135 0.000692 0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	4.42 4.69 4.80 4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	34.29 49.42 56.12 57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	58.01 73.62 79.96 80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	1.0 1.0 1.0 1.0 0.5 0.6 0.6 0.6 0.1 0.2 0.2 0.2 0.2
CHANNEL-A	3000 3000 3000 2800 2800 2800 2800 2800	Q50 Q100 Q100 (ULT) Q10 Q50 Q100 (ULT)	231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	692.04 692.04 692.04 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	693.31 693.40 693.41 689.59 689.79 689.86 689.88 689.36 689.53 689.59 689.61 689.23 689.37 689.44	693.31 693.40	693.65 693.75 693.77 689.71 689.96 690.08 689.37 689.55 689.62 689.63 689.23 689.45 689.45	0.020793 0.020543 0.020543 0.005789 0.006692 0.007074 0.007135 0.000692 0.000897 0.000906 0.000644 0.000765 0.000821 0.000821	4.69 4.80 4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	49.42 56.12 57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	73.62 79.96 80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	1.0 1.0 1.0 0.5 0.6 0.6 0.1 0.2 0.2 0.2 0.2 0.2
CHANNEL-A	3000 3000 2800 2800 2800 2800 2600 2600 2400 2400 2400 2200 2200 22	Q100 Q100 (ULT) Q10 Q50 Q100 (ULT)	269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	692.04 692.04 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	693.40 693.41 689.59 689.79 689.86 689.88 689.36 689.53 689.53 689.59 689.41 689.23 689.37 689.44	693.40	693.75 693.77 689.71 689.96 690.06 690.08 689.37 689.55 689.62 689.63 689.23 689.38 689.45 689.45	0.020543 0.020543 0.020543 0.006789 0.00692 0.007074 0.007135 0.000692 0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	4.80 4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	56.12 57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	79.96 80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	1.0 1.0 1.0 0.5 0.6 0.6 0.1 0.2 0.2 0.2 0.2 0.2 0.2
CHANNEL-A	3000 2800 2800 2800 2800 2800 2600 2600 2	Q100 (ULT) Q10 Q50 Q100 Q100 (ULT)	275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40	692.04 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	693.41 689.59 689.79 689.86 689.88 689.36 689.53 689.59 689.61 689.23 689.37 689.43 689.44 689.12 689.24 689.29		693.77 689.71 689.96 690.06 690.08 689.55 689.62 689.63 689.23 689.38 689.45 689.45	0.020543 0.005789 0.006692 0.007074 0.007135 0.000692 0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	4.82 2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	57.11 55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	80.84 71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.41 455.24 457.96	1.0 0.5 0.6 0.6 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.2
CHANNEL-A	2800	Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT)	151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 269.40 275.40 151.70 231.70 269.40 275.40	688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	689.59 689.79 689.86 689.88 689.36 689.53 689.59 689.61 689.23 689.37 689.43 689.44	693.41	689.71 689.96 690.06 690.08 689.37 689.55 689.62 689.23 689.38 689.45 689.45	0.005789 0.006692 0.007074 0.007135 0.000692 0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	2.73 3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	55.54 69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	71.35 74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.12 313.41 455.24 457.96	0.5 0.6 0.6 0.6 0.1 0.2 0.2 0.2 0.2 0.2 0.2
CHANNEL-A	2800 2800 2800 2600 2600 2600 2400 2400 2400 2200 22	Q50 Q100 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT)	231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 269.40 275.40 151.70 269.40 275.40	688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	689.79 689.86 689.88 689.36 689.53 689.59 689.61 689.23 689.44 689.44 689.44		689.96 690.06 690.08 689.37 689.55 689.62 689.23 689.38 689.45 689.45 689.12 689.25	0.006692 0.007074 0.007135 0.000692 0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	3.32 3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	69.88 75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	74.82 75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.12 313.41 455.24 457.96	0.6 0.6 0.6 0.1 0.2 0.2 0.2 0.1 0.2 0.2
CHANNEL-A	2800 2800 2800 2600 2600 2600 2400 2400 2400 2200 22	Q100 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT)	269.40 275.40 151.70 231.70 269.40 275.40 151.70 269.40 275.40 151.70 269.40 275.40	688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	689.86 689.88 689.36 689.53 689.59 689.61 689.23 689.43 689.44 689.12 689.24 689.29		690.06 690.08 689.37 689.55 689.62 689.23 689.38 689.45 689.45	0.007074 0.007135 0.000692 0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	3.56 3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	75.70 76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	75.99 76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.12 313.41 455.24 457.96	0.6 0.6 0.1 0.2 0.2 0.2 0.1 0.1 0.1
CHANNEL-A	2800 2600 2600 2600 2400 2400 2400 2200 22	Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q50 Q100 Q100 (ULT)	275.40 151.70 231.70 269.40 275.40 151.70 269.40 275.40 151.70 231.70 269.40 275.40	688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	689.88 689.36 689.53 689.59 689.61 689.23 689.43 689.44 689.12 689.24 689.29		690.08 689.37 689.55 689.62 689.63 689.23 689.38 689.45 689.45	0.007135 0.000692 0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	3.60 0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	76.17 215.73 219.04 220.31 220.51 306.92 311.24 313.12 313.41 455.24 457.96	0.6 0.1 0.2 0.2 0.2 0.1 0.1 0.2 0.2 0.1 0.1 0.2
CHANNEL-A	2600 2600 2600 2600 2400 2400 2400 2400	Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q100 (ULT) Q10 Q100 (ULT) Q10 Q100 (ULT)	151.70 231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 269.40 275.40	688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	689.36 689.53 689.59 689.61 689.23 689.37 689.43 689.44 689.12 689.24 689.29		689.37 689.55 689.62 689.63 689.23 689.38 689.45 689.45	0.007135 0.000692 0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	0.93 1.16 1.25 1.27 0.79 0.98 1.06 1.07	76.59 163.43 200.19 215.26 217.57 192.34 236.75 255.08 257.91	215.73 219.04 220.31 220.51 306.92 311.24 313.12 313.41 455.24 457.96	0.6 0.1 0.2 0.2 0.2 0.1 0.1 0.2 0.2 0.1 0.1 0.2
CHANNEL-A CHANNE	2600 2600 2400 2400 2400 2400 2400 2200 22	Q50 Q100 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT)	231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 269.40 275.40	688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	689.53 689.59 689.61 689.23 689.37 689.43 689.44 689.12 689.24 689.29		689.55 689.62 689.63 689.23 689.38 689.45 689.45 689.12	0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	1.16 1.25 1.27 0.79 0.98 1.06 1.07	200.19 215.26 217.57 192.34 236.75 255.08 257.91	219.04 220.31 220.51 306.92 311.24 313.12 313.41 455.24 457.96	0.2 0.2 0.2 0.1 0.1 0.2 0.2 0.2
CHANNEL-A CHANNE	2600 2600 2400 2400 2400 2400 2400 2200 22	Q50 Q100 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT)	231.70 269.40 275.40 151.70 231.70 269.40 275.40 151.70 269.40 275.40	688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	689.53 689.59 689.61 689.23 689.37 689.43 689.44 689.12 689.24 689.29		689.55 689.62 689.63 689.23 689.38 689.45 689.45 689.12	0.000838 0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	1.16 1.25 1.27 0.79 0.98 1.06 1.07	200.19 215.26 217.57 192.34 236.75 255.08 257.91	219.04 220.31 220.51 306.92 311.24 313.12 313.41 455.24 457.96	0.2 0.2 0.2 0.1 0.1 0.2 0.2 0.2
CHANNEL-A CHANNE	2600 2600 2400 2400 2400 2400 2200 2200 2200 2200 2000 2000 2000 2000 2000	Q100 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q50 Q100 (ULT)	269.40 275.40 151.70 231.70 269.40 275.40 151.70 269.40 275.40	688.56 688.56 688.56 688.56 688.56 688.56 688.56 688.56	689.59 689.61 689.23 689.37 689.43 689.44 689.12 689.24 689.29		689.62 689.63 689.23 689.38 689.45 689.45 689.12	0.000897 0.000906 0.000644 0.000765 0.000814 0.000821	1.25 1.27 0.79 0.98 1.06 1.07	215.26 217.57 192.34 236.75 255.08 257.91	220.31 220.51 306.92 311.24 313.12 313.41 455.24 457.96	0.2 0.2 0.1 0.2 0.2 0.2 0.2
CHANNEL-A	2600 2400 2400 2400 2400 2400 2200 2200	Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT)	275.40 151.70 231.70 269.40 275.40 151.70 269.40 275.40	688.56 688.56 688.56 688.56 688.56 688.56 688.56	689.61 689.23 689.37 689.43 689.44 689.12 689.24 689.29		689.63 689.23 689.38 689.45 689.45 689.12 689.25	0.000906 0.000644 0.000765 0.000814 0.000821	0.79 0.98 1.06 1.07	217.57 192.34 236.75 255.08 257.91 247.92	220.51 306.92 311.24 313.12 313.41 455.24 457.96	0.2 0.1 0.2 0.2 0.2 0.2
CHANNEL-A 2 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1	2400 2400 2400 2400 2200 2200 2200 2200	Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100 (ULT) Q10 Q100 (ULT)	151.70 231.70 269.40 275.40 151.70 269.40 275.40	688.56 688.56 688.56 688.56 688.56 688.56 688.56	689.23 689.37 689.43 689.44 689.12 689.24 689.29		689.23 689.38 689.45 689.45 689.12	0.000644 0.000765 0.000814 0.000821	0.79 0.98 1.06 1.07	192.34 236.75 255.08 257.91 247.92	306.92 311.24 313.12 313.41 455.24 457.96	0.1 0.2 0.2 0.2 0.2
CHANNEL-A	2400 2400 2400 2200 2200 2200 2200 2000 2000 2000 2000	Q50 Q100 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100	231.70 269.40 275.40 151.70 231.70 269.40 275.40	688.56 688.56 688.56 688.56 688.56 688.56 688.56	689.43 689.44 689.12 689.24 689.29		689.38 689.45 689.45 689.12 689.25	0.000765 0.000814 0.000821 0.000468	0.98 1.06 1.07	236.75 255.08 257.91 247.92	311.24 313.12 313.41 455.24 457.96	0.2 0.2 0.2 0.1 0.1
CHANNEL-A	2400 2400 2200 2200 2200 2200 2200 2000 2000 2000 2000	Q100 Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100	269.40 275.40 151.70 231.70 269.40 275.40	688.56 688.56 688.56 688.56 688.56 688.56	689.43 689.44 689.12 689.24 689.29		689.45 689.45 689.12 689.25	0.000814 0.000821 0.000468	1.06 1.07 0.61	255.08 257.91 247.92	313.12 313.41 455.24 457.96	0.2 0.2 0.1 0.1
CHANNEL-A	2400 2200 2200 2200 2200 2000 2000 2000 2000 2000	Q100 (ULT) Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100	275.40 151.70 231.70 269.40 275.40	688.56 688.56 688.56 688.56	689.44 689.12 689.24 689.29		689.45 689.12 689.25	0.000821	0.61	257.91 247.92	313.41 455.24 457.96	0.2 0.1 0.1
CHANNEL-A 2 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1	2200 2200 2200 2200 2200 2000 2000 200	Q10 Q50 Q100 Q100 (ULT) Q10 Q50 Q100	151.70 231.70 269.40 275.40	688.56 688.56 688.56 688.56	689.12 689.24 689.29		689.12 689.25	0.000468	0.61	247.92	455.24 457.96	0.1 0.1
CHANNEL-A 2 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1	2200 2200 2200 2000 2000 2000 2000 200	Q50 Q100 Q100 (ULT) Q10 Q50 Q100	231.70 269.40 275.40	688.56 688.56 688.56	689.24 689.29		689.25				457.96	0.1
CHANNEL-A 2 CHANNEL-A 2 CHANNEL-A 2 CHANNEL-A 2 CHANNEL-A 2 CHANNEL-A 2 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1	2200 2200 2000 2000 2000 2000 2000	Q100 Q100 (ULT) Q10 Q50 Q100	269.40 275.40 151.70	688.56 688.56	689.29			0.000550	0.70	305.25		
CHANNEL-A 2 CHANNEL-A 2 CHANNEL-A 2 CHANNEL-A 2 CHANNEL-A 2 CHANNEL-A 2 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1	2200 2000 2000 2000 2000	Q100 (ULT) Q10 Q50 Q100	269.40 275.40 151.70	688.56 688.56	689.29		000.04		0.76			
CHANNEL-A 2 CHANNEL-A 2 CHANNEL-A 2 CHANNEL-A 2 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1	2000 2000 2000 2000	Q10 Q50 Q100	151.70		689.30		689.31	0.000581	0.82	329.00	458.79	0.1
CHANNEL-A 2 CHANNEL-A 2 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1	2000 2000 2000	Q50 Q100		200 =-			689.31	0.000585	0.83	332.78	458.92	0.1
CHANNEL-A 2 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1	2000 2000	Q100	231 70	688.56	688.73	688.73	688.82	0.032577	2.35	64.46	378.60	1.0
CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1	2000			688.56	688.79	688.79	688.90	0.029245	2.69	86.03	380.56	1.0
CHANNEL-A 1 CHANNEL-A 1 CHANNEL-A 1		Q100 (LILT)	269.40	688.56	688.81	688.81	688.94	0.028255	2.83	95.24	381.40	1.0
CHANNEL-A 1 CHANNEL-A 1	1800	Q 100 (OL1)	275.40	688.56	688.82	688.82	688.94	0.028525	2.86	96.24	381.49	1.0
CHANNEL-A 1 CHANNEL-A 1	1800											
CHANNEL-A 1		Q10	151.70	670.54	671.49	671.49	671.69	0.024080	3.63	41.83	102.34	1.0
	1800	Q50	231.70	670.54	671.63	671.63	671.88	0.022768	4.03	57.52	115.27	1.0
	1800	Q100 Q100 (ULT)	269.40 275.40	670.54 670.54		671.68 671.69	671.96 671.97	0.022210	4.21	64.00 65.03	117.86 118.23	1.0 1.0
	1600	Q10	151.70	666.54			667.85	0.014368	4.04	37.59	53.17	0.8
	1600	Q50	231.70	666.54	667.80	667.74	668.15	0.015502	4.75	48.79	57.23	0.9
	1600	Q100	269.40	666.54		667.83	668.28	0.015484	4.97	54.25	59.43	0.9
CHANNEL-A 1	1600	Q100 (ULT)	275.40	666.54	667.91	667.84	668.30	0.015507	5.00	55.07	59.78	0.9
CHANNEL-A 1	1400	Q10	151.70	662.69	664.03	664.03	664.34	0.021970	4.43	34.21	57.74	1.0
CHANNEL-A 1	1400	Q50	231.70	662.69	664.27	664.27	664.61	0.020406	4.71	49.20	71.78	1.0
	1400	Q100	269.40	662.69		664.35	664.72	0.020624	4.88	55.16	76.85	1.0
CHANNEL-A 1	1400	Q100 (ULT)	275.40	662.69	664.36	664.36	664.73	0.020623	4.91	56.11	77.58	1.0
CHANNEL-A 1	1200	Q10	151.70	659.78	660.93		661.04	0.007746	2.72	55.76	89.69	0.6
	1200	Q50	231.70	659.78	661.12		661.28	0.007740	3.13	73.92	94.20	0.6
	1200	Q100	269.40	659.78			661.38	0.007341	3.19	81.79	96.01	0.6
	1200	Q100 (ULT)	275.40	659.78	661.22		661.39	0.007509	3.33	82.81	96.24	0.6
CHANNEL-A 1	1000	Q10	151.70	657.16	658.31	658.31	658.66	0.020052	4.78	31.76	138.49	1.0
	1000	Q50	231.70	657.16		658.56	658.98	0.020052	5.20	44.57	170.93	1.0
	1000	Q100	269.40	657.16		658.65	659.11	0.018608	5.45	49.41	175.61	1.0
	1000	Q100 (ULT)	275.40	657.16		658.67	659.13	0.018301	5.47	50.38	176.41	1.0
CHANNEL-A 6	600	Q10	151.70	650.24	652.09		652.15	0.002436	2.01	75.61	80.36	0.3
	600	Q50	231.70	650.24			652.49	0.002455	2.26	102.64	86.27	0.3
	600	Q100	269.40	650.24			652.63	0.002207	2.36	114.21	88.36	0.3
	600	Q100 (ULT)	275.40	650.24	652.57		652.65	0.002197	2.37	116.06	88.68	0.3
CHANNEL-A 4	400	Q10	151.70	649.32	650.63	650.63	651.06	0.019467	5.23	29.00	34.80	1.0
IEC-RAS Plan: Ch Reach	CHANNEL-A PR	ROP CONDITION Profile	River: CHAN Q Total	NEL-A Reach Min Ch El	n: CHANNEL-A (W.S. Elev	Continued) 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)	
	400	Q50	231.70	649.32	650.92	650.92	651.45	0.018142	5.84	39.70	38.30	1.0
	400	Q100	269.40	649.32	651.05	651.05	651.62	0.017683	6.07	44.42	39.66	1.0
CHANNEL-A 4	400	Q100 (ULT)	275.40	649.32	651.06	651.06	651.64	0.017632	6.10	45.14	39.86	1.0
	200	Q10	382.90	641.03	644.84	644.55	645.33	0.010006	5.63	68.06	43.59	0.7
	200 200	Q50	601.90	641.03	645.42	645.10	646.03	0.009998	6.29	95.62	51.76	0.8
CHANNEL-A 2 CHANNEL-A 2		Q100	711.60 726.40	641.03 641.03		645.36 645.37	646.33 646.37	0.010001 0.010002	6.48 6.51	109.82 111.64	57.00 57.59	0.8

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)

708.13 0.013569 3.62 41.93 708.38 0.015082 4.30 53.89

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

CHANNEL-A	1800	Q10	151.10	670.54	671.48	671.48	671.69	0.025042	3.67	41.13	101.66	1.0
CHANNEL-A	1800	Q50	232.80	670.54	671.63	671.63	671.89	0.022822	4.04	57.65	115.33	1.0
CHANNEL-A	1800	Q100	273.10	670.54	671.69	671.69	671.97	0.022031	4.22	64.74	118.13	1.0
CHANNEL-A	1600	Q10	151.10	666.54	667.60		667.85	0.014284	4.02	37.57	53.16	3.0
CHANNEL-A	1600	Q50	232.80	666.54	667.81	667.74	668.16	0.015284	4.73	49.19	57.37	0.9
CHANNEL-A	1600	Q100	273.10	666.54	667.90	667.84	668.29	0.015546	4.99	54.70	59.62	0.9
CHANNEL-A	1400	Q10	151.10	662.69	664.03	664.03	664.34	0.022116	4.44	34.02	57.57	1.0
CHANNEL-A	1400	Q50	232.80	662.69	664.26	664.26	664.62	0.020798	4.75	48.99	71.56	1.0
CHANNEL-A	1400	Q100	273.10	662.69	664.36	664.36	664.73	0.020530	4.89	55.85	77.37	1.0
CHANNEL-A	1200	Q10	151.10	659.78	660.88		661.01	0.009934	2.94	51.37	88.57	0.6
CHANNEL-A	1200	Q50	232.80	659.78	661.06		661.24	0.009863	3.43	67.97	92.75	0.7
CHANNEL-A	1200	Q100	273.10	659.78	661.13		661.34	0.010122	3.65	74.75	94.39	0.7
CHANNEL-A	1000	Q10	151.10	656.82	657.83	657.83	658.08	0.023360	4.06	37.23	75.01	1.0
CHANNEL-A	1000	Q50	232.80	656.82	658.05	658.05	658.31	0.024112	4.07	57.22	117.66	1.0
CHANNEL-A	1000	Q100	273.10	656.82	658.11	658.11	658.39	0.023282	4.23	64.61	122.19	1.0
CHANNEL-A	600	Q10	151.10	650.24	652.09	651.59	652.15	0.002407	2.00	75.71	80.39	0.3
CHANNEL-A	600	Q50	232.80	650.24	652.41		652.49	0.002271	2.27	102.75	86.29	0.3
CHANNEL-A	600	Q100	273.10	650.24	652.56		652.65	0.002190	2.36	115.55	88.60	0.3

HEC-RAS Plan: (C-RAS Plan: CHANNEL-A PROP CONDITION River: CHANNEL-A Reach: CHANNEL-A												
Reach		River Sta	Profile	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
				(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
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

650.93 651.06

 602.10
 641.03
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 645.13
 646.89
 0.002001

 713.10
 641.03
 647.01
 645.36
 647.21
 0.002004

650.93

651.46 0.018149



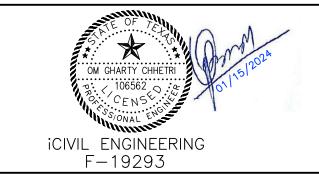
649.32

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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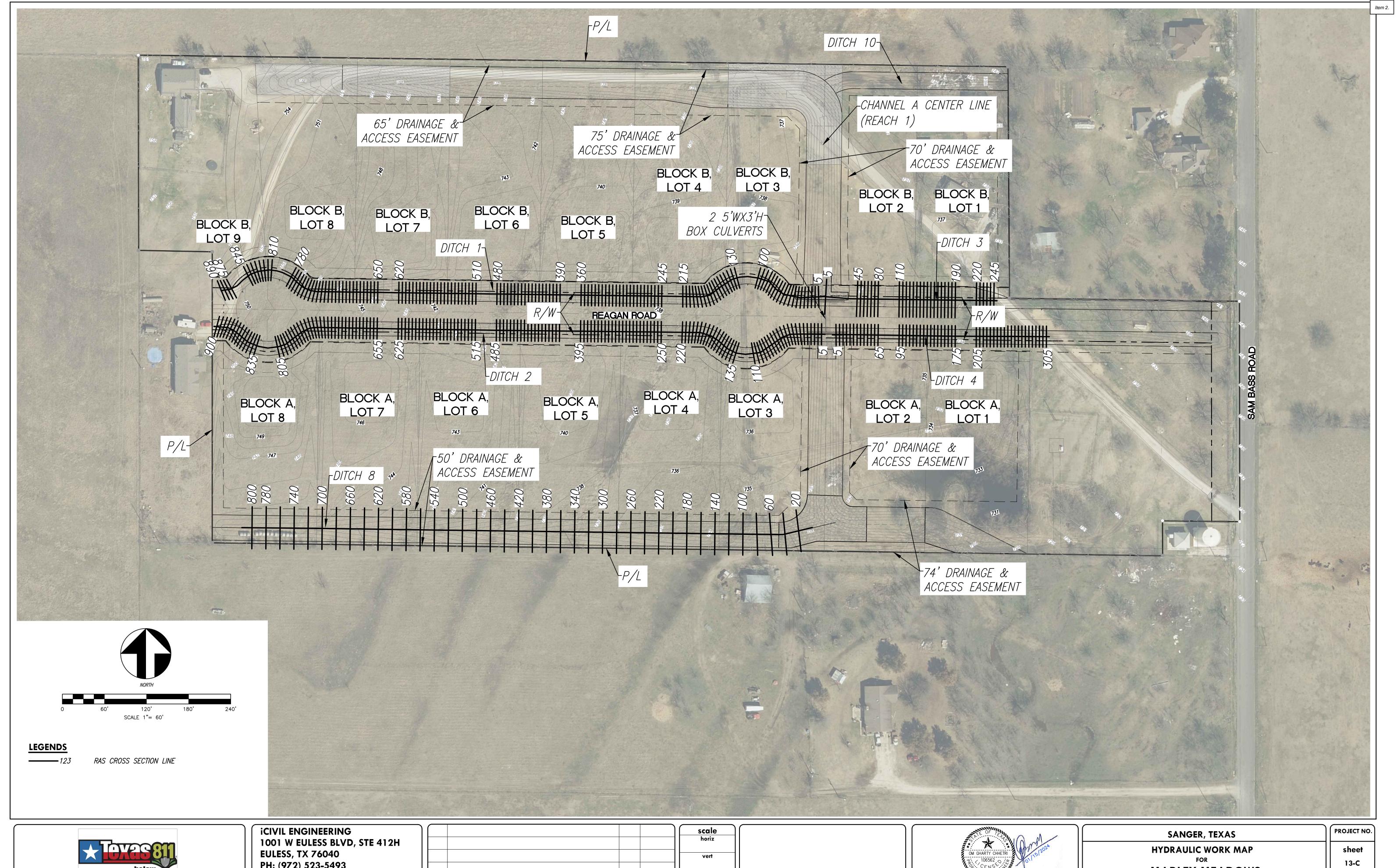
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SANGER, TEXAS **HYDRAULIC WORK MAP MARLEY MEADOWS** PROJECT NO

23

Item 2.





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

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MARLEY MEADOWS

23

735.03 735.00 16.62 17.59 18.44 19.54 20.36 0.000513 736.85 736.85 14.92 14.92 DITCH-1 295 Q100 734.88 734.81 736.85 736.86 0.000388 736.86 736.85 0.000347 14.92
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 Q Culv Group (cfs)
 Q Weir (cfs)
 Delta W/S (ft)
 Culv Vel US (ft)s
 (f) 750.41 748.81 744.07 740.61 739.16 737.71 736.51 747.94 746.97 742.23 738.85 738.10 736.80 735.64 Call before you dig

C-RAS Plan: DITCH-1 River: DITCH-1 Reach: DITCH-1 Profile: Q10

Q100

Q100 Q100

Q100 Q100

Q100

Q100

Q100

Q100

Q100 Q100 Q100

Q100

Q100 Q100 Q100

Q100 Q100

Q100

DITCH-1 875
DITCH-1 860

DITCH-1 830

DITCH-1 820 DITCH-1 815

DITCH-1 775 DITCH-1 770

DITCH-1 740 DITCH-1 735

DITCH-1 725 DITCH-1 720

DITCH-1 705

DITCH-1 670 DITCH-1 665

DITCH-1 650 DITCH-1 635

DITCH-1 590

DITCH-1 575

DITCH-1 560

DITCH-1 535

DITCH-1 525 DITCH-1 520

DITCH-1 495 DITCH-1 480

DITCH-1 450 DITCH-1 445

DITCH-1 430

DITCH-1 420 DITCH-1 415

DITCH-1 405 DITCH-1 400

DITCH-1

DITCH-1

DITCH-1 360

DITCH-1 330 DITCH-1 325

DITCH-1 310

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

 750.33
 0.041483
 2.47
 1.71
 9.13

 749.86
 0.281809
 5.12
 0.82
 6.22

 749.16
 0.070877
 3.31
 1.27
 6.53

 747.94
 0.000503
 0.62
 6.79
 10.22

0.81 0.71 0.59 0.51 0.44 0.39 0.34 0.54

2.68 2.70 3.32 3.55 3.50 3.45 3.76 3.40 3.73 3.94 4.20

4.41 4.49 4.44 4.57 4.42 4.36

4.32 4.38

3.38 3.43 3.17 3.26 3.25 3.03 2.86 2.58 2.19 1.87 1.57 1.36 1.19 1.04 0.94 0.82 0.75 0.78

1.18 1.08 1.00 0.94 0.88 0.82 0.79 0.74 0.71 0.68 0.65

0.62 0.60 0.58 0.56 0.54 0.52 0.51

5.97 7.11 8.22 9.51 10.87 12.55 14.40

2.89 2.86 2.33 2.18 2.21 2.24 2.06 2.28 2.07 1.96 1.84 1.76 1.72

1.79 1.77 3.09

4.08 5.57 7.03 8.85 10.82 13.88

2.84 3.04 3.05 3.01 3.00 2.95

3.20 3.11 3.12

3.12 3.34 3.54 3.94 4.63 5.41 6.44 7.46 8.53 9.72 10.83 12.30 13.54

10.66 11.65 12.47 13.29 14.28

15.19 15.93 16.90 17.67 18.42 19.24

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

20.08 20.96 21.70 22.36 23.24 23.99 24.76 25.59

10.28

10.59 11.11 11.62 12.22 12.76

10.09 10.95 11.80

12.54 13.41 14.32 15.30

7.19 7.36 6.88 6.43 6.33 6.40

8.38 9.70 10.80 12.05 13.30 14.72

10.36 11.14 11.90

12.72 13.35 14.20 14.86 15.69

15.75 16.10 16.59 16.93 17.31 17.66

18.78

19.03 19.40 19.76 20.01 20.36

13.48 13.79 14.12

16.92

17.86 18.17

18.66 19.06 19.49 20.00 20.37 20.75 21.12 21.70 22.09

15.74 16.20 16.63 17.18 17.63 17.86 17.56 18.08 19.06 19.49 20.66 21.84 21.76 21.38 21.37 21.42 21.45 21.63

18.61 19.14 19.58 20.19 21.13 21.97 21.80 21.37 21.36 20.98 21.14 21.50 19.21 16.31 27.03 34.24 32.90 31.30 31.31

Flow Area Top Width Froude # Chl

747.05 0.000751
747.04 0.000469
747.04 0.000319
747.04 0.000213
747.04 0.000149
747.04 0.000101
747.04 0.000235

745.34 745.25 745.12 744.93 744.74 744.56 744.36 744.16 743.97 743.83 743.69 743.56 743.42 743.27 743.14 742.98 742.82 742.66 742.52 742.35 742.29 742.29 742.25

0.017960 0.019089 0.034602 0.039466 0.036870

0.035718 0.044995 0.034168 0.044720

0.051253

0.060863 0.069432 0.072897

0.070766 0.078308 0.071199

0.068899 0.066859 0.069188

0.014931 0.006982 0.003015 0.001611 0.000866 0.000505

742.24 0.000866 742.23 0.000505 742.23 0.000435

740.59 0.032125
740.43 0.026654
740.30 0.026410
740.16 0.027319
740.02 0.027777
739.88 0.028951
739.75 0.023230
739.62 0.024885
739.50 0.024692
739.37 0.024666
739.26 0.020306
739.15 0.017638
739.07 0.013232
739.01 0.008502
738.97 0.005602
738.94 0.003498

738.97 0.005602 738.94 0.003498 738.93 0.002362 738.91 0.001645 738.91 0.00165 738.90 0.000618 738.90 0.000476 738.89 0.000478

738.15 738.14

738.13 738.13 738.13

738.13 738.13

738.12 738.12 738.12

738.12 738.12 738.12 738.12 738.11

736.92

736.91

736.58

738.12 0.000284

0.001381

0.000908 0.000766

0.000632

0.000535

0.000470 0.000402 0.000357

(ft/ft)

0.000254 0.000226

0.000206

0.000190

0.000172 0.000158 0.000145

0.000188

0.002158

0.001753

0.001555

0.001357

0.000674

0.000596

736.89 0.001210

736.89 0.001053 736.88 0.000941

0.000319

750.23 749.56 749.03 747.22

745.90

744.95 744.75 744.56 744.38 744.17 743.98 743.79 743.64 743.49 743.35 743.20 743.05 742.91 742.61 742.61 742.45

740.39 740.23 740.10

748.99

747.94

747.04 747.04

747.04 747.04 747.04 747.04 747.03

744.55 745.23
744.53 745.14
744.41 744.95
744.21 744.73
744.02 744.55
743.62 744.37
743.63 744.14
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743.09 743.59
742.94 743.42
742.79 743.26
742.64 743.11
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741.91 742.23
741.28 742.23
741.12 742.23
740.81 742.22
740.81 742.22

748.66 746.78

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Culvert 12.53 12.53 12.53 12.53 12.53

12.53 12.53 12.53 12.53 12.53 12.53

HEC-RAS Plan: DITCH-1 River: DITCH-1 Reach: DITCH-1 Profile: Q100 (Continued)

Reach River Sta Profile Q Total Min Ch El W.S. Elev Crit W.S.

12.53 12.53 12.53 12.53 12.53 12.53 12.53 12.53

Culvert 14.92 14.92

14.92 14.92 14.92

739.75 739.59 739.47

739.19 739.06

738.91 738.78 738.66

738.53 738.41 738.31

738.19 738.06 737.97

737.84 737.75 737.66 737.56 737.47 737.37 737.28 736.93

736.72 736.66

736.59 736.53 736.47

736.41 736.34 736.31 736.25 736.22

736.16

736.12 736.06

736.03 735.97 735.94 735.91

735.84 735.81

735.53

735.44 735.41

735.31

735.25

735.09

740.39

740.26 740.13

739.84 739.70 739.59 739.46

739.34

739.21 739.11

739.03

738.97 738.94

738.91 738.90

738.89

738.89 738.89 738.89 738.88 738.88

738.14

738.13 738.13

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738.12 738.12 738.12

738.12

738.12

738.12 738.12 738.11

738.11 738.11 738.11 738.11 738.11

736.90

736.89

736.88

736.87

736.87

736.86

746.04 746.03 745.94 745.82 745.72 745.62 745.50 745.29

 HEC-RAS Plan: DITCH-2
 River Sta
 Profile
 Q Total (cfs)
 Min Ch El (ft)
 W.S. Elev (ft)
 Crit W.S.

 DITCH-2
 25
 Q100
 7.13
 732.59
 733.25
 733.25

 DITCH-2
 20
 Q100
 7.13
 732.18
 732.76
 732.76

 DITCH-2
 15
 Q100
 7.13
 731.75
 732.85

 DITCH-2
 10
 Q100
 7.13
 731.31
 732.86

 DITCH-2
 5
 Q100
 7.13
 730.87
 732.86
 731.35
 iCIVIL ENGINEERING 1001 W EULESS BLVD, STE 412H **EULESS, TX 76040** PH: (972) 523-5493 TBPE: F-19293 **EMAIL: INFO@ICIVILENG.COM**

HEC-RAS Plan: DITCH-2 River: DITCH-2 Reach: DITCH-2 Profile: Q10

Q100 Q100 Q100

Q100 Q100 Q100 Q100 Q100 Q100 Q100

Q100 Q100 Q100 Q100

Q100 Q100

Q100

Q100 Q100

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Q100 Q100 Q100

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Q100 Q100 Q100 Q100

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Q100 Q100 Q100

Q100 Q100

Q100

Q100 Q100

Q100 Q100

Q100

Q100 Q100

Q100

Q100 Q100

Q100 Q100 Q100 Q100 Q100

DITCH-2 465 Q100

DITCH-2 455
DITCH-2 455
DITCH-2 450
DITCH-2 445
DITCH-2 440
DITCH-2 435
DITCH-2 430
DITCH-2 425

DITCH-2 415 DITCH-2 410

DITCH-2 405

DITCH-2 400 DITCH-2 395 DITCH-2 380

DITCH-2 365
DITCH-2 360
DITCH-2 355
DITCH-2 350

DITCH-2 345 DITCH-2 340 DITCH-2 335

DITCH-2 330

DITCH-2 315
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DITCH-2 885 DITCH-2 880

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DITCH-2 485
DITCH-2 485
DITCH-2 475

Reach River Sta Profile Q Total Min Ch El W.S. Elev

749.64 749.49 749.37

749.23 749.10 748.96 748.81 748.67 748.57

746.97 746.86

749.19 749.04 748.91 748.77

748.63

747.46

746.67

746.41 746.27 746.12 745.99

745.72

745.45

745.16 745.01 744.85 744.70 744.56 744.39 744.25 744.09 743.95 743.79 743.64 743.48

742.20

741.34 741.20 741.06 740.91 740.77

740.52

740.27

749.47 749.36 749.21 749.09 748.95 748.79 748.65 748.54 748.49 748.47 748.46 748.45 748.45

746.85 746.70 746.59 746.44 746.29 746.15 746.01 745.89 745.74 745.62 745.46 745.18 745.03 744.87 744.75 744.56 744.44 744.26 744.13 743.96 743.81 743.66 743.81 743.22 743.22 743.22 743.21 743.21

748.55 748.39 748.28

748.12
748.00
747.84
747.70
747.55
747.43
747.26
747.17
746.82
746.08
746.00
745.92
745.75
745.61
745.45
745.36
745.18
745.04
744.92
744.81
744.49
744.31
744.15
744.00
743.87
743.71
743.59
743.44
743.31
742.68
742.60
742.84
742.68
742.50
742.34
742.00
741.81
741.58

Culvert
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7.13 737.34 738
7.13 737.25 72
7.13 737.18 7
7.13 737.12
7.13 737.03
7.13 737.00
7.13 736.97
7.13 736.97
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736.25 736.19

736.16

736.12

736.09

736.03

736.06

735.93 735.84 735.78 735.72 735.66 735.59 735.53 735.47 735.44 735.38 735.34 735.34 735.31

734.87 734.81 734.75 734.72 734.69 734.59 734.52 734.52 734.42 734.38 734.32 734.31 734.06 733.80 733.82 733.78 733.78 733.69 733.69 733.69 733.64 733.53 733.64 733.53 733.47 733.38

HEC-RAS Plan: DITCH-2 River: DITCH-2 Reach: DITCH-2 Profile: Q100 (Continued)

Reach River Sta Profile Q Total Min Ch El W.S. Elev Crit W.S.

740.83 740.71 740.56 740.40 740.25 740.09 739.96 739.81 739.56 739.44 739.34 739.25 739.15 739.03 738.94 738.72 738.62 738.72 738.62 738.72

737.60 737.68 737.62 737.56 737.47

741.52 741.37 741.23 741.09 740.91 740.81 740.70 740.54 740.45 740.20 740.09 739.96 739.85 739.75 739.75 739.54 739.54 739.48

738.56 738.48 738.43 738.39

738.34 738.32 738.30

738.29 738.28 738.27 738.26 738.26

738.25 738.25 738.24

738.24 738.24 738.24

737.25 737.20 737.15

737.06

737.02 736.98 736.95

736.92

736.86 736.85 736.83 736.82 736.81 736.80 736.79 736.79 736.78 736.78 736.77 736.77 736.77

735.86 735.82 735.80 735.79 735.77 735.76 735.74 735.73 735.72 735.71 735.71 735.71 735.71 735.70 735.70

734.81 734.76 734.71 734.62 734.57 734.53 734.50 734.42 734.38 734.35 734.31 734.24 734.24 734.24

734.04 733.69

(ft) 733.25 732.76

737.20

0.029992 0.023132

0.028100 0.025933 0.026159

0.030082 0.028482 0.023424 0.012547 0.006762

0.020477

0.02477 0.027364 0.022485 0.028562 0.028651 0.027746 0.028755 0.025613 0.027705

746.86 0.027364
746.72 0.022485
746.59 0.028562
746.45 0.028651
746.31 0.027746
746.17 0.028755
746.03 0.025613
745.90 0.027705
745.76 0.024737
745.63 0.030355
745.48 0.025193
745.34 0.029123
745.19 0.031047

745.48 0.025193 745.34 0.029123 745.19 0.031047 745.04 0.030772 744.89 0.024307 744.74 0.034886 744.58 0.024170 744.44 0.033896 744.28 0.027032

743.82 0.028982 743.66 0.034090 743.50 0.028947 743.37 0.018597

743.29 0.009416 743.25 0.003765 743.23 0.002001 743.22 0.000998 743.22 0.000346

741.64 0.020308 741.52 0.027332 741.38 0.027546

741.24 0.027444 741.10 0.028786 740.96 0.026169 740.83 0.022791 740.70 0.029188

740.70 0.029188
740.57 0.020057
740.45 0.026792
740.33 0.021525
740.22 0.021792
740.10 0.024401
739.98 0.022577
739.87 0.021307

739.87 0.021307 739.77 0.018389 739.68 0.015198 739.61 0.010472 739.56 0.007282 739.53 0.004380 739.51 0.002954 739.49 0.001981 739.48 0.000562

738.60 0.005810 738.56 0.011945 738.50 0.009919

738.46 0.007920

738.42 0.006740

738.34 0.003704

738.32 0.002887 738.30 0.002475

738.29 0.001919

738.28 0.001640 738.27 0.001412

738.26 0.000999 738.25 0.000853

738.25 0.000692 738.25 0.000558 738.24 0.000317

737.31 0.006487 737.27 0.009591 737.22 0.010059

737.12 0.009056

737.08 0.007889

737.04 0.007563

737.00 0.006966

736.97 0.006457

736.86 736.85 736.83

736.82 736.81 736.80 736.80 736.79 736.78 736.78 736.78

735.89 735.87 735.84 735.80 735.79 735.77 735.76 735.75 735.73 735.73 735.72 735.72 735.72 735.71 735.71 735.71

734.85 734.82 734.78 734.73 734.69 734.64 734.60 734.55 734.52 734.42 734.44 734.40 734.33 734.33 734.38

(ft) 733.45 732.97 732.87 732.86 732.86

0.008938

0.005178 0.004033 0.003486 0.002776 0.002363 0.001955 0.001655 0.001322 0.001116 0.000954 0.000816 0.000682 0.000587 0.000318

0.003831 0.005270 0.004503 0.003987 0.003127 0.002959 0.002428 0.002173 0.001737 0.001409 0.001223 0.001020 0.000866 0.000767 0.000689 0.000666 0.000527 0.000387

0.003506 0.008685 0.008536 0.008219 0.009272 0.009248 0.008902 0.007692 0.007954 0.007954 0.007202 0.006936 0.007052 0.005858 0.007036 0.034692 0.034692

(ft/ft)
0.034231
0.033931
0.001987
0.000540
0.000033

1.53 2.04 2.03 2.01 2.09 2.09 2.06 1.94 1.92 1.96 1.90 1.88 1.76 1.88 3.38 3.50

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

 738.38
 0.005439
 1.71

 738.36
 0.004571
 1.60

0.027444 0.028786

0.032278 0.029771

744.74 744.58 744.44 744.28 744.13 743.97

748.52 0.006762 748.49 0.003541 748.47 0.001840 748.46 0.001052 748.46 0.000370

2.22 2.43 2.27 2.33 2.31 2.21 2.26 2.46 3.07 3.86 4.91 6.29 7.75

2.51 2.27 2.46 2.25 2.24 2.27 2.25 2.36 2.28 2.36 2.19 2.35 2.22 2.18 2.18 2.38

2.08 2.38 2.10 2.29 2.11 2.21 2.23 2.10 2.23 2.63 3.39 4.78 6.06 7.86

2.54 2.28 2.27 2.28 2.23 2.32 2.45 2.22 2.55 2.29 2.49 2.48 2.38 2.45 2.50 2.64 2.84 3.26 3.74 4.52 5.24 6.08

4.02 3.11 3.33 3.62 3.85

(sq ft)

4.17 4.46 4.81 5.28 5.59 6.15

6.53 6.90 7.37

7.85 8.34 9.02 9.78 11.88

3.62 3.68 3.80 3.91

4.24 4.66 4.92 5.36 6.11 6.50 7.07 7.53 7.99 8.48 9.06 9.59

4.70 4.21 4.47 4.68 5.14 5.26 5.64 5.90 6.40 6.92 7.38 7.90 8.38 8.71 9.04 9.52

4.67 3.50 3.51 3.55 3.41 3.41 3.47 3.68 3.72 3.63 3.74 3.80 3.79 4.05 3.79 2.11 2.03

 Vel Chnl
 Flow Area (ft/s)
 Top Width (ft)

 3.63
 1.96
 4.9

 3.66
 1.95
 4.7

 1.30
 5.47
 7.3

 0.63
 11.31
 17.2

 0.26
 27.21
 17.44

10.20 11.32 13.04

6.22

6.01 5.97 5.98 6.19

5.88 6.12 5.94 6.02 6.07 5.88 6.08 6.55 7.42 8.78 9.87 11.23

6.10 6.04 6.14 6.36 5.98 6.38 6.08 6.34 6.34 6.24 6.33 6.37 6.52

9.19 9.89 11.54

10.24 10.53

10.89 11.23 11.59 12.07 12.55 13.33

8.29 8.69 8.92 9.30 9.58 9.91 10.21 10.65 10.99 11.34 11.69 12.06 12.43 13.19

8.20 8.49 8.70 9.17 9.31 9.53 9.84 10.18 10.60 11.20 11.63 11.90 11.94 12.08 12.50 12.73

7.71 7.57 7.49 7.52 7.45 7.38 7.52 7.81 7.80 7.76 7.75 7.81 7.90 8.09 7.87 6.01

4.91 4.72 7.30 17.23 17.48

0.19 0.18

0.36 0.42 0.39 0.37 0.33 0.29 0.28 0.25 0.22 0.19 0.18 0.17 0.16 0.15 0.14

0.35 0.53 0.52 0.51 0.54 0.53 0.50 0.49 0.51 0.48 0.47 0.48 0.44

3.22 2.93 3.15 3.06 3.09 3.23 3.16 2.90 2.32 1.85 1.45 1.13 0.92 0.63

2.84 3.14 2.90 3.17 3.18 3.18 3.14 3.17 3.03 3.26 3.04 3.21 3.27 3.00 3.43 2.99 3.39 3.31 3.11 3.33 3.23 3.19 2.71 2.10 1.49 1.149 1

2.81 3.13 3.14

3.13 3.19 3.08 2.91 3.21 2.80 3.11 2.87 2.88 3.00 2.91 2.85 2.71 2.51 2.18 1.91 1.56 1.36 1.17

1.77 2.30 2.14 1.97 1.85

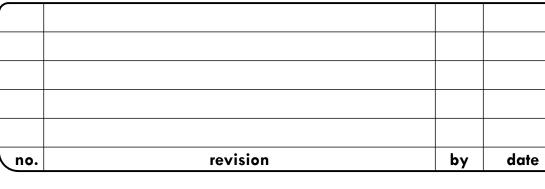
1.84 2.12 2.16 2.06 2.07 1.97 1.94 1.88 1.82

1.68 1.53 1.45 1.33 1.25 1.17 1.10 1.01 0.95 0.89 0.84 0.79 0.74 0.60

0.94 0.83 0.91 0.88 0.89 0.94 0.92 0.84 0.63 0.47 0.35 0.25

0.79
0.90
0.82
0.92
0.91
0.92
0.87
0.93
0.86
0.95
0.87
0.93
0.96
0.85
1.01
0.85
1.00
0.90
0.98
0.94
0.93
1.00
0.93
0.75
0.55
0.36
0.26
0.19
0.12

0.79
0.90
0.91
0.90
0.92
0.88
0.83
0.93
0.78
0.89
0.81
0.81
0.86
0.83
0.90
0.75
0.69
0.58
0.49
0.38
0.32
0.26
0.15



	scale
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HIDRAULIC WORK MAP **MARLEY MEADOWS**

sneer 13-D

23

748.83 744.14 740.66 739.06 737.50 736.41 (ft) (ft) (ft) (ft) (748.46 (743.22 (743.21 (739.48 (739.42 (738.24 (738.24 (736.77 (735.70 (7 748.42 743.18 739.43 738.19 736.72 735.65 DITCH-2 820 Culvert #1 Q100

DITCH-2 640 Culvert #1 Q100

DITCH-2 500 Culvert #1 Q100

DITCH-2 380 Culvert #1 Q100

DITCH-2 235 Culvert #1 Q100

DITCH-2 120 Culvert #1 Q100 8.55 8.55 6.27 6.33 6.24 6.27 HEC-RAS Plan: DITCH-3 River: DITCH-3 Reach: DITCH-3 Profile: Q100 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
 (ft)
 (ft)
 (ft/ft)
 (ft/s)
 (sq ft)
 (ft)

 735.73
 0.003889
 1.81
 8.42
 11.86

 735.71
 0.004052
 1.84
 8.30
 11.77
 Q100 Q100 Q100 Q100 Q100 Q100 734.34 735.68 734.34 735.66 734.32 735.64 734.06 735.64 733.86 735.64 733.15 735.65 DITCH-3 245 DITCH-3 240 DITCH-3 235 8.42 8.30 8.33 10.78 14.58 21.42 15.27 9.08 9.08 735.69 0.004011 735.67 0.002032 735.66 0.00933 735.66 0.000312 11.81 13.48 16.04 18.11 DITCH-3 230 DITCH-3 225 DITCH-3 220 DITCH-3 205 DITCH-3 190 DITCH-3 185 0.19 0.12 733.00 735.11 732.97 735.11 732.94 735.10 732.91 735.10 732.91 735.10 732.88 735.10 732.84 735.10 732.81 735.10 732.78 735.10 732.78 735.10 732.75 735.10 732.72 735.10 732.64 735.10 732.69 735.10 732.64 735.10 732.64 735.10 732.64 735.10 Q100 Q100 Q100 Q100 735.11 735.11 735.11 735.11 735.11 0.70 0.68 0.66 0.65 21.96 22.38 23.04 23.36 23.73 24.23 18.85 19.02 19.31 19.44 19.62 19.81 20.04 0.000296 0.000282 DITCH-3 180 DITCH-3 175 0.000261 0.000251 0.10 DITCH-3 170 Q100 0.000241 DITCH-3 165
DITCH-3 160
DITCH-3 155 0.000228 Q100 Q100 735.11 735.10 0.000214 0.000204 25.26 25.70 26.27 20.21 20.39 20.65 DITCH-3 150 DITCH-3 145 DITCH-3 140 DITCH-3 135 DITCH-3 130 735.10 735.10 735.10 Q100 Q100 Q100 0.000195 0.000184 26.76 27.29 27.68 0.000175 735.10 735.10 Q100 Q100 Q100 0.000166 0.000056 21.45 21.67 21.82 22.15 DITCH-3 125 0.000052 735.10 735.10 0.000050 0.000048 0.31 29.01 29.50 30.21 DITCH-3 120 DITCH-3 115 DITCH-3 110 Q100 Q100 735.10 0.000045 9.08 9.08 9.08 9.08 9.08 9.08 9.08 9.08 9.08 9.08 732.44 732.42 732.41 732.38 734.98 734.98 734.98 734.98 30.70 31.28 31.61 31.98 22.25 22.48 22.60 22.72 734.98 0.30 0.04 DITCH-3 80 DITCH-3 75 0.000043 0.000041 0.29 734.98 0.000040 DITCH-3 65 32.29 32.69 33.07 33.45 DITCH-3 60 DITCH-3 55 734.98 734.98 732.38 732.34 732.34 22.84 22.96 23.12 734.98 0.000037 0.000036 734.98 734.98 DITCH-3 50 0.000035 732.34 730.62 734.98 734.98 0.000034 0.000001 730.85

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

735.35

734.72 735.32 734.69 735.30 734.67 735.27 734.62 735.25 734.59 735.22 734.54 735.20 734.50 735.18 734.47 735.16 734.42 735.14 734.38 735.12 734.38 735.00 734.39 735.06 734.34 735.05 734.34 735.05 734.34 735.05 734.34 735.05 734.34 735.05 734.34 735.05 734.34 735.05 734.34 735.05 734.34 735.05 734.34 735.05 734.34 735.05 734.34 735.05 734.34 735.00 734.32 735.02 734.31 735.01 734.99

734.71

733.98 734.00 733.97 733.97 733.97 733.94 733.94 733.94 733.88 733.82 733.78 733.76 733.66 733.66

733.47 733.53 733.50 733.45 733.41 733.38 733.32 732.28 732.90 732.41 731.96 731.46 730.99

733.98 734.71
734.00 734.69
733.97 734.65
733.97 734.65
733.97 734.63
733.97 734.61
733.94 734.59
733.94 734.57
733.91 734.55
733.82 734.51
733.78 734.50
733.76 734.48
733.70 734.47
733.66 734.48
733.62 734.45
733.58 734.45
733.58 734.45

734.14 734.11 734.08 734.05 734.01 733.96 733.91 733.75 733.40 732.82 732.86 732.86

743.10 742.73 742.20 741.00 740.04

738.80 738.70 738.49 738.27

742.81 742.41 741.92 740.70 739.72

738.34 738.25 738.16 737.88

(ft) (ft) (ft/ft) 735.40 0.004762 735.37 0.004796

735.27

735.23 735.20

735.16 735.14 735.12

735.12 735.10 735.08 735.07 735.05 735.03 735.02 735.01

735.00

734.74

734.71 734.69 734.67 734.65

734.63 734.61 734.59 734.57 734.55

734.53 734.51 734.50

734.48 734.47 734.46

734.16 734.14 734.11 734.08 734.04 734.00 733.96 733.86 732.94 732.86 732.86 732.86

734.06

733.75 733.40 732.82

| Reach | River | Dit CH-4 | River | Dit CH-4 | River | Dit CH-4 | Profile | E.G. US. | W.S. US. | E.G. IC | E.G. OC | Min El Weir Flow | Q Culv Group | Q Weir | Delta WS | Culv Vel US | Culv Vel US

(ft) 743.07

742.20 741.02 740.06

HEC-RAS Plan: DITCH-9 River: DITCH-9 Reach: DITCH-9 Profile: 100 YR

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

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

DITCH-9 110 Culvert #1 100 YR 740.17 740.04 741.51 1.23 1.24 5.68 4.54

735.32 0.004808 735.30 0.004768

0.004719

0.004400 0.004404

0.003786

0.003797

0.003863

0.003835

0.003206

0.003279 0.002991

0.002764

0.002554 0.002248

0.000926

0.003934

0.004601

0.004159 0.004309 0.004272

0.004366

0.004060 0.003894 0.003912

0.003228 0.003079

0.003053

0.002494

0.002314 0.002071

0.002850

0.006065

0.007373 0.008613 0.009434 0.038776 0.040175 0.038340 0.000493 0.000052 0.000011

(ft/ft)
0.027656
0.014104
0.053583
0.061812
0.062592

0.011143 0.005215 0.020917 0.008005

(ft)
743.15
742.76
742.27
741.11
740.17

738.84 738.72 738.54 738.29

734.45 0.001690

1.09 1.05 1.02 0.99 0.94 0.69

0.98 0.96 0.92 0.85

1.47 1.56 1.62 2.75 2.91 2.82 0.56 0.24 0.13

2.01 2.00 1.97 2.00 2.01 2.01 1.96 2.07 2.06 2.02 2.18 2.18 2.17 2.18 2.32

2.31 2.39 2.46 2.53 2.66 3.65

2.14 2.03 2.11 2.08 2.09 2.07 2.13

5.75 5.75 5.67 5.82 5.80 5.73 5.94 5.90 5.92 5.96 6.15

6.13 6.26 6.36

6.44 6.60 7.47

5.83 5.73 5.84 5.82 5.85 5.84 5.92

5.44 5.30 5.15 5.02 3.85 3.36 3.57 7.59 11.07

4.39 5.67 4.54 2.69 2.39

3.10 4.45 3.80 5.43

1.79 1.70 1.61 1.55 0.91 0.86 0.89 4.47 10.26 19.65

(sq ft) 0.69 0.93 0.57 0.45 0.43

0.80 1.15 0.71 1.09

1.79 1.32 2.15 2.75 2.88

1.54 1.07 1.73 1.13

0.34

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

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

HEC-RAS Plan: DITCH-4 River: DITCH-4 Reach: DITCH-4 Profile: Q100

Q100 Q100 Q100

Q100 Q100 Q100 Q100 Q100 Q100

Q100 Q100 Q100 Q100 Q100 Q100 Q100

Q100 Q100

Q100 Q100

HEC-RAS Plan: DITCH-9 River: DITCH-9 Reach: DITCH-9 Profile: 100 YR

100 YR 100 YR 100 YR 100 YR

100 YR 100 YR 100 YR 100 YR

DITCH-4 300 DITCH-4 300 DITCH-4 295 DITCH-4 285 DITCH-4 285 DITCH-4 275 DITCH-4 270 DITCH-4 270

DITCH-4 260
DITCH-4 255
DITCH-4 250
DITCH-4 245
DITCH-4 240
DITCH-4 235

DITCH-4 230 DITCH-4 225

DITCH-4 220 DITCH-4 215 DITCH-4 210 DITCH-4 205 DITCH-4 190 DITCH-4 175

DITCH-4 170 DITCH-4 165 DITCH-4 160 DITCH-4 155

DITCH-4 145

DITCH-4 140

DITCH-4 135

DITCH-4 125

DITCH-4 115

DITCH-4 110

DITCH-4 100

DITCH-4 105

DITCH-4 80

DITCH-4 65

DITCH-4 60

DITCH-4 60
DITCH-4 55
DITCH-4 50
DITCH-4 45
DITCH-4 35
DITCH-4 35
DITCH-4 25
DITCH-4 20
DITCH-4 15
DITCH-4 10
DITCH-4 5

DITCH-9 220
DITCH-9 200
DITCH-9 180
DITCH-9 160
DITCH-9 145
DITCH-9 175
DITCH-9 60
DITCH-9 40

DITCH-4 120

(cfs) (ft)
2.51 734.72
2.51 734.72
2.51 734.72

1.23 1.23 1.23 1.23 1.23 1.23 1.23 Culvert 1.23 1.23 1.23

HEC-RAS PI	an: DITCH-8	River: DITCH-8	Reach: DITC	H-8 Profile:	Q100		
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	I
			(cfs)	(ft)	(ft)	(ft)	I
DITCH-8	800	Q100	19.79	742.22	743.43		Ī
DITCH-8	780	Q100	19.79	742.16	743.33		Ī
DITCH-8	760	O100	19 79	742 09	743 23		Τ

(ft)
742.22
742.16
742.09
741.94
741.84
741.59
740.95
740.66
740.41
740.07
739.73
739.45
738.98
738.45
737.92
737.48
736.45
735.95
735.48
735.12
734.42
734.12
733.73
733.36
732.73

743.43 743.33 743.23 743.10

742.88 742.58 742.27 741.96 741.67 741.36

741.06 740.78 740.37 739.85 739.34 738.83 738.37 737.38 736.83 736.83 736.41 736.07

735.72 735.39 735.05 734.71 734.34 734.01 733.66

19.79 19.79 19.79 19.79 19.79

19.79 19.79 19.79 19.79 19.79

19.79 19.79 19.79 19.79 19.79 19.79 19.79 19.79 19.79 19.79 19.79 19.79 19.79 19.79 19.79 19.79

DITCH-8 640

DITCH-8 560 DITCH-8 540

DITCH-8 500 DITCH-8 480

DITCH-8 440 DITCH-8 420

DITCH-8 280 DITCH-8 260

DITCH-8

Item 2.

10.44 10.39 10.25 9.62 7.20 6.77 6.60 6.83 6.90 6.78

17.16 17.09 16.76 15.82 13.67 12.87 12.96 13.37 13.46 13.31 13.33 13.65 12.51 11.91 12.62 11.86 12.33 11.71 12.77 13.32 13.22 13.18

0.005115 0.005169 0.005273 0.006030

0.013055

0.014786

0.016258

0.015116

0.014763 0.015421

0.015120

0.013631 0.022477

0.026892 0.025087

0.024803 0.021999

0.028753 0.020369

0.029804 0.018538

0.017501

0.015970 0.017316

0.016994

0.018665 0.016202

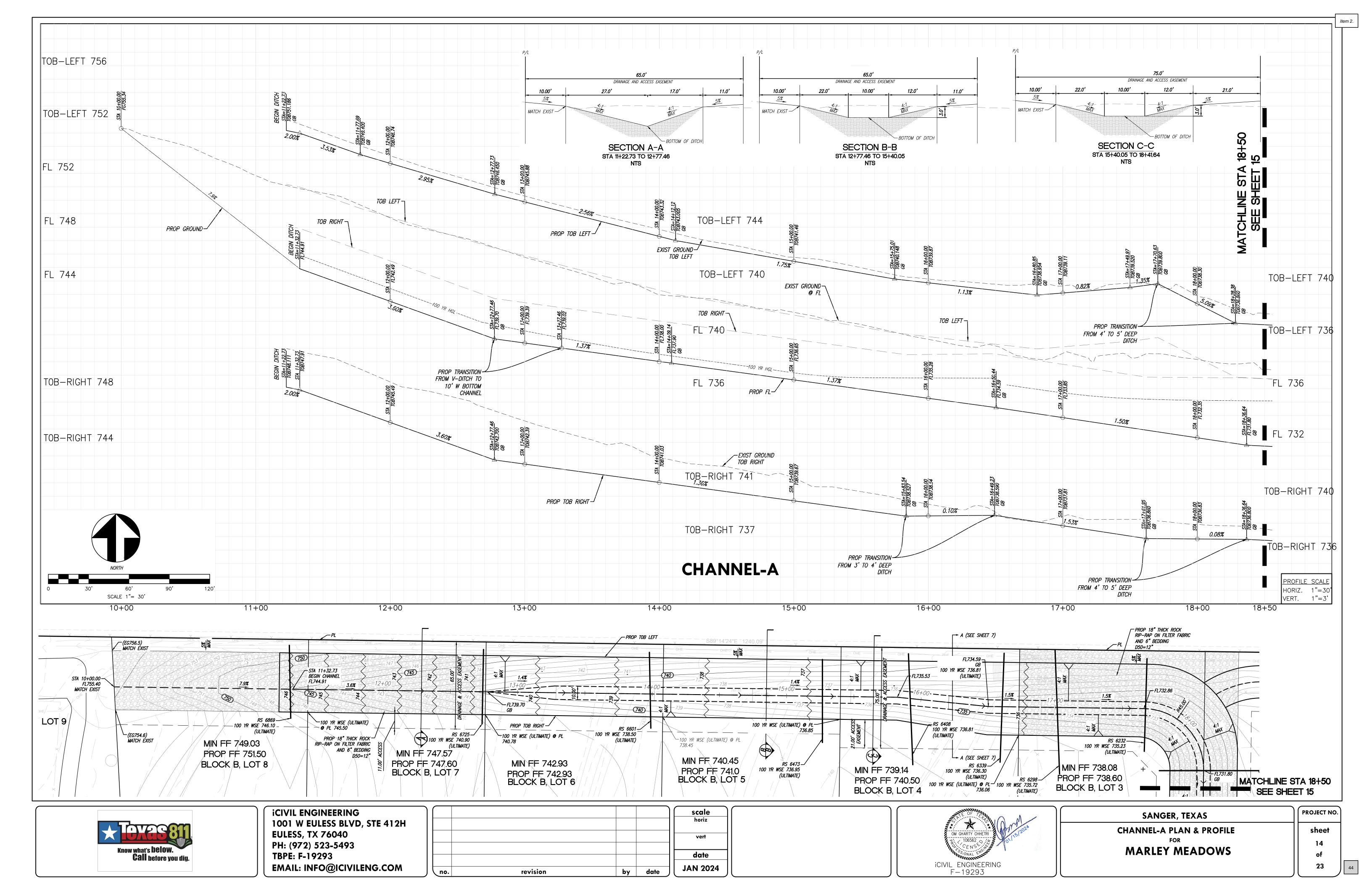
743.49 743.39 743.28 743.17 743.00 742.72 742.41 742.09 741.79 741.49

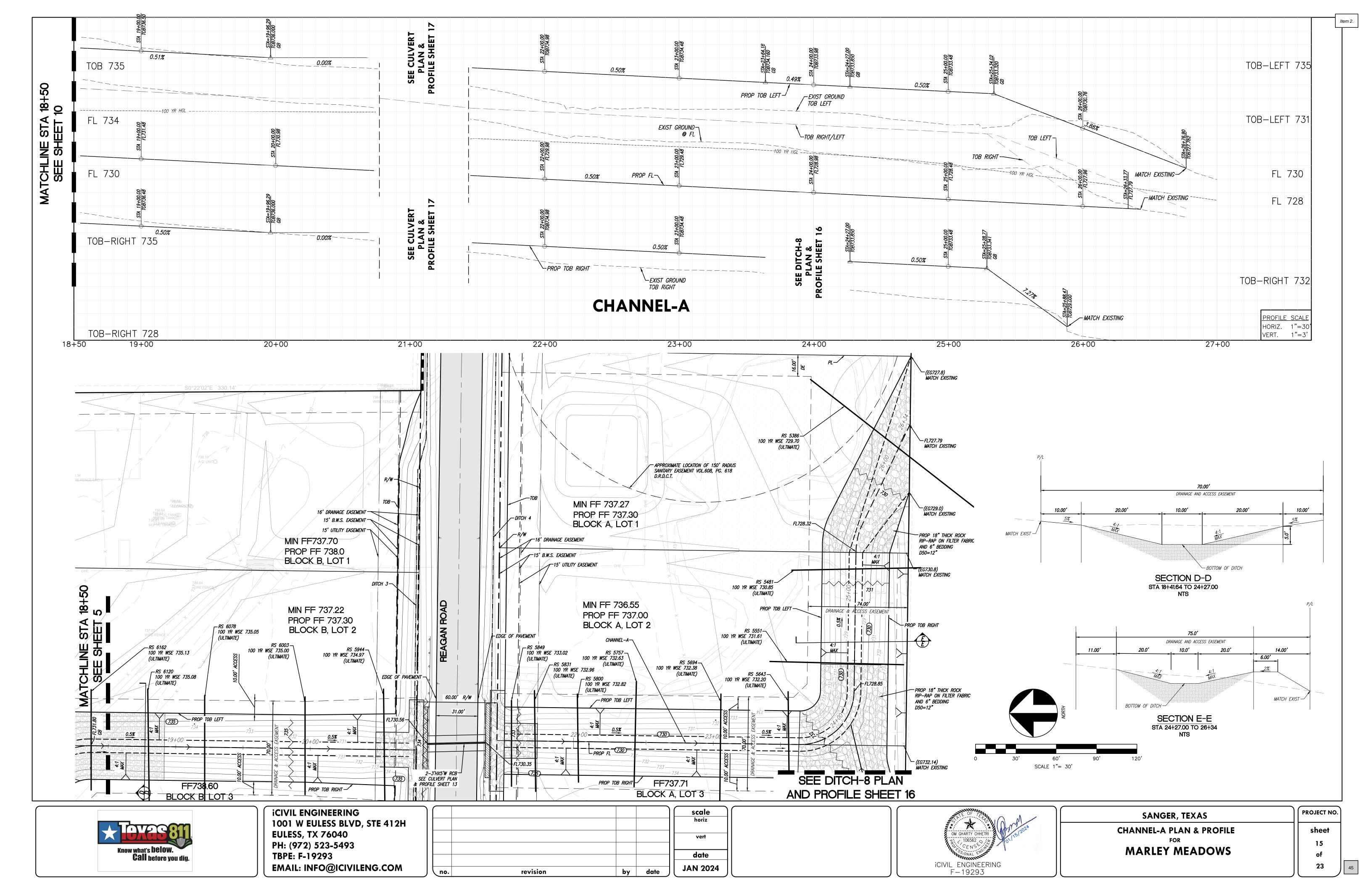
741.19 740.90 740.54 740.05 739.52 739.02 738.54 737.05 736.56 736.21

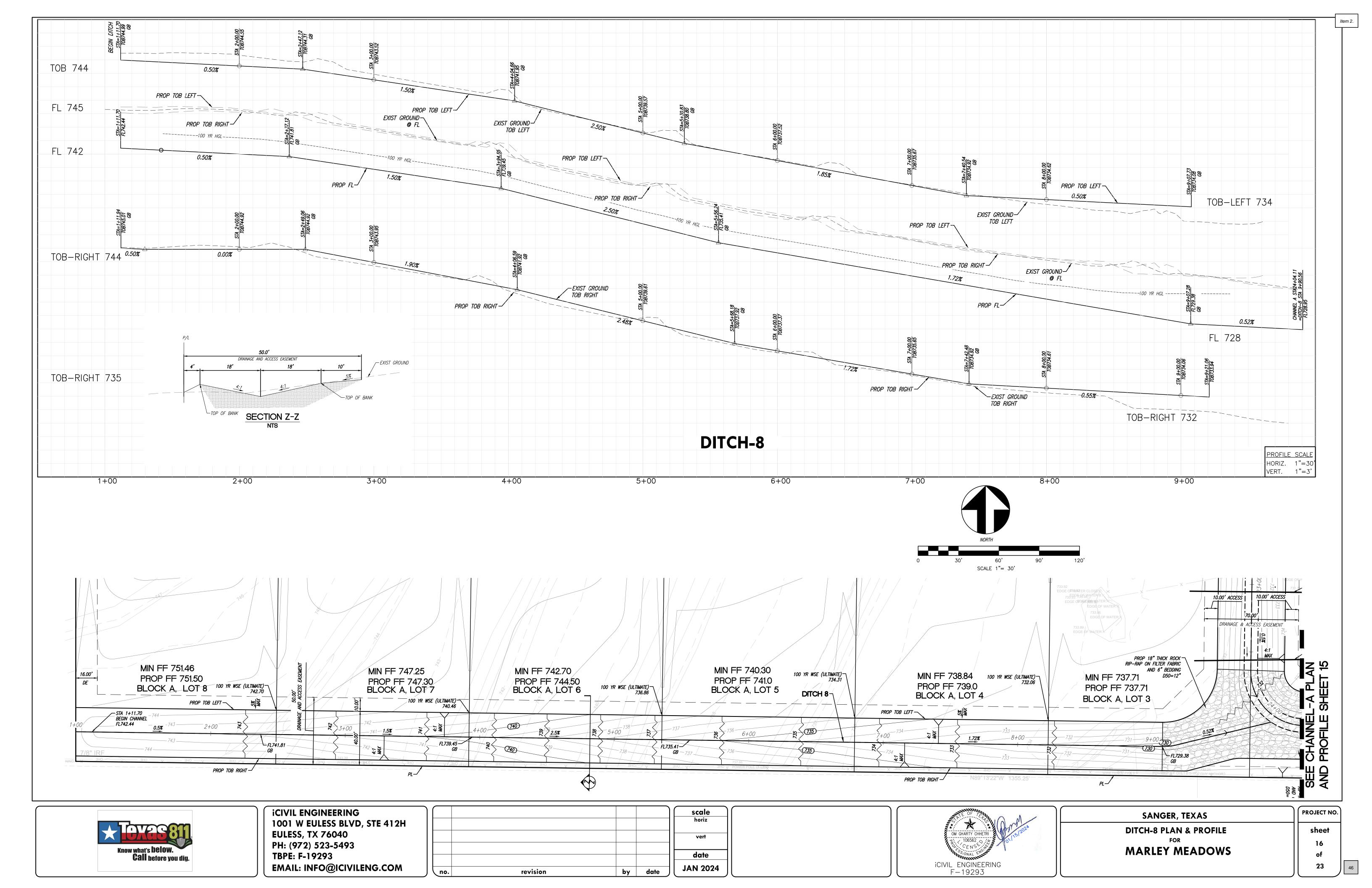
735.86 735.53 735.20

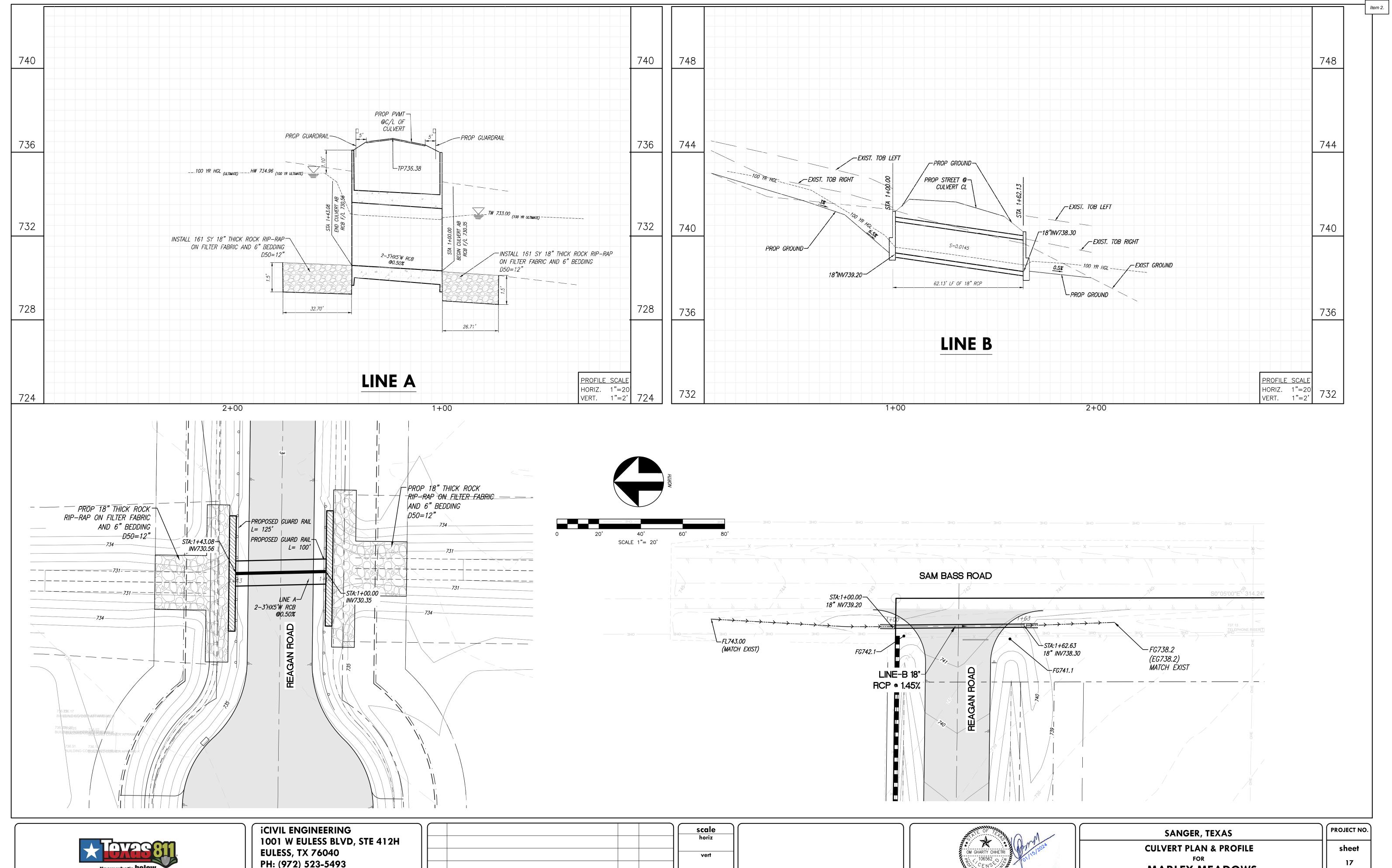
734.85 734.50 734.15

739.30



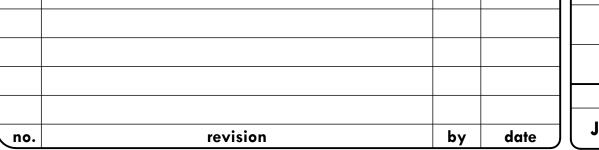








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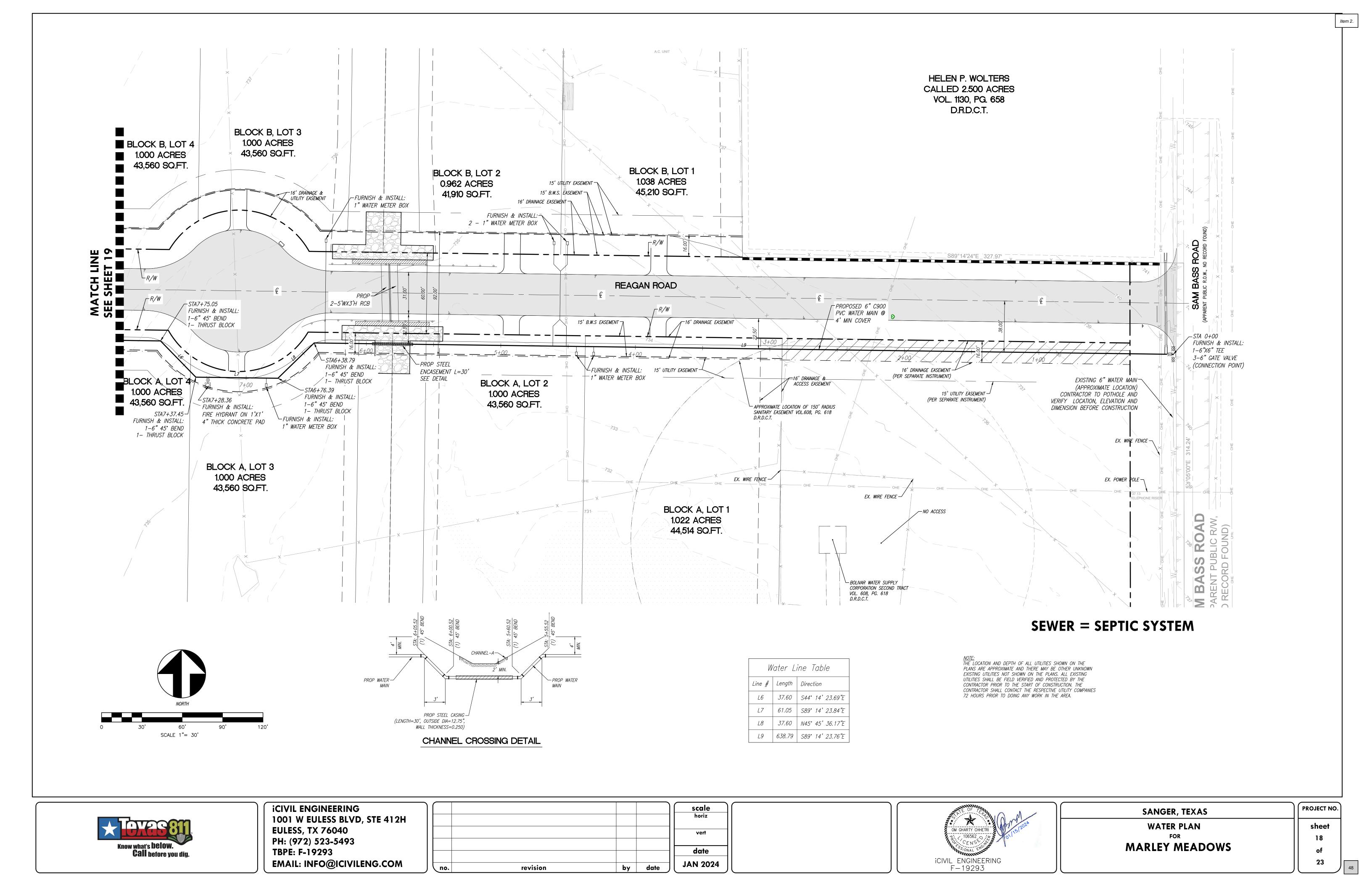


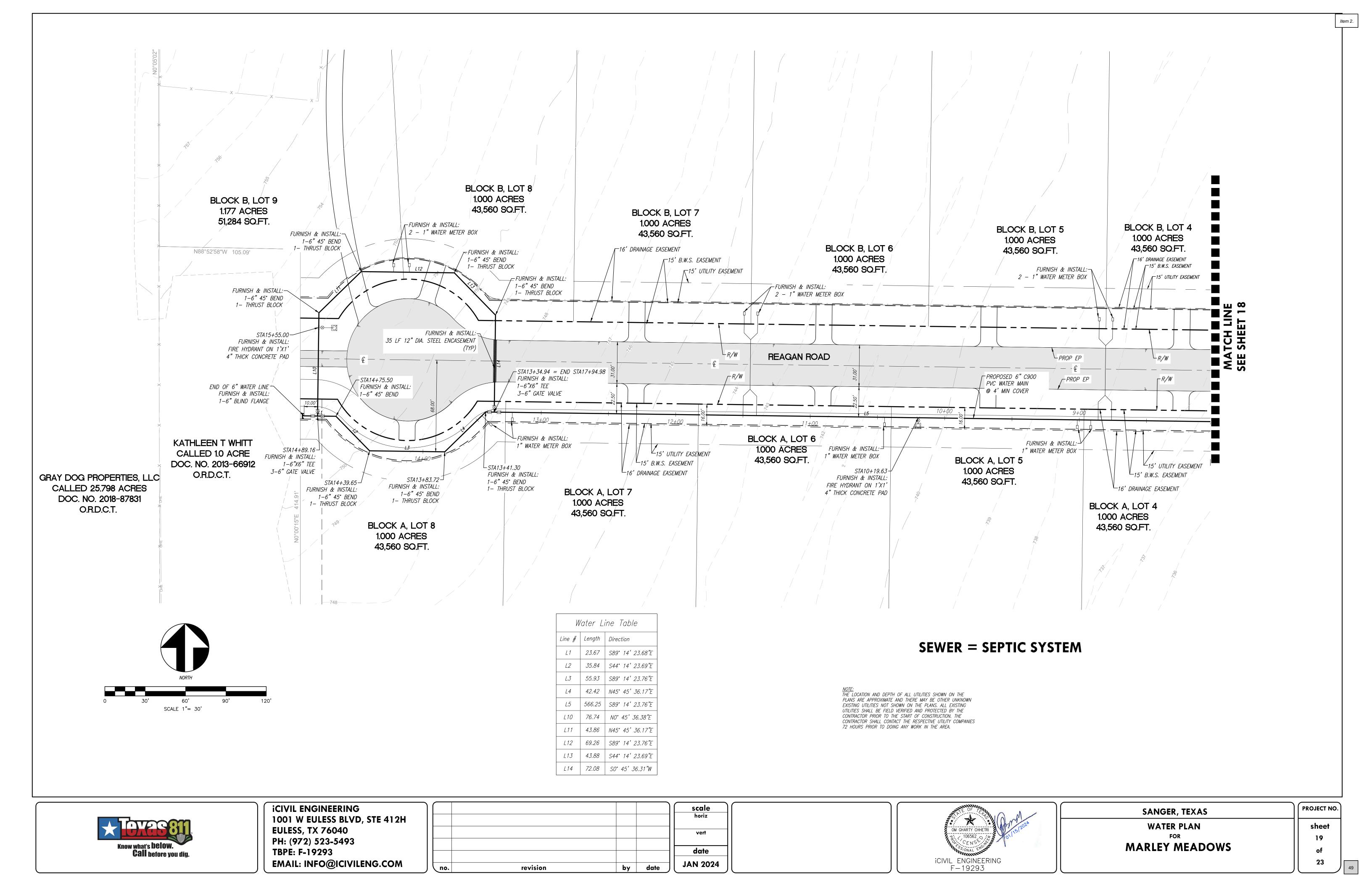
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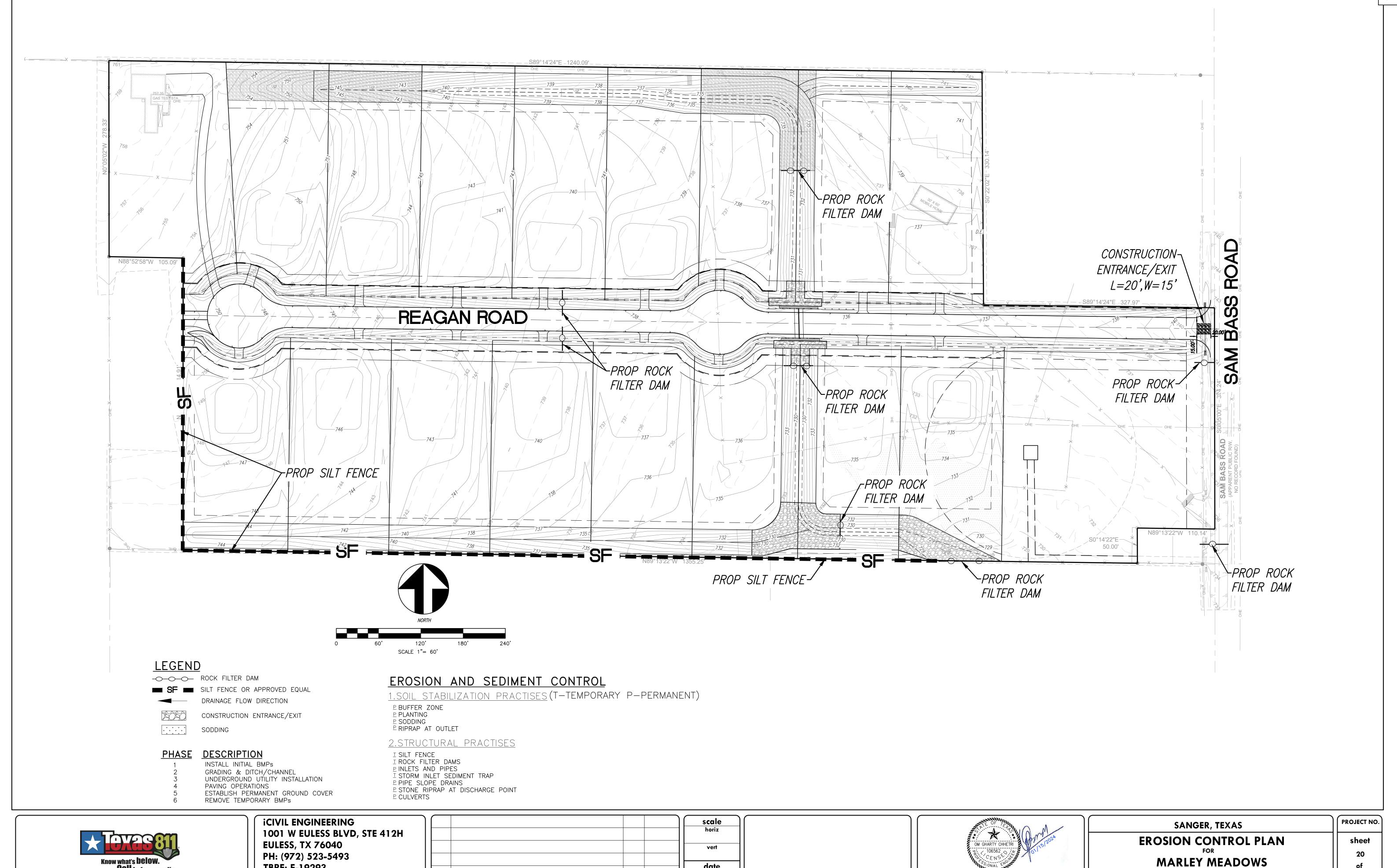


MARLEY MEADOWS

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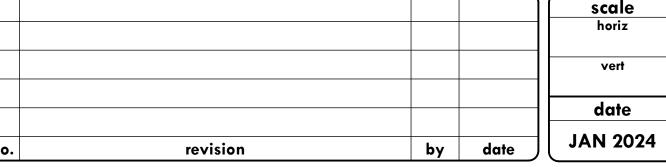




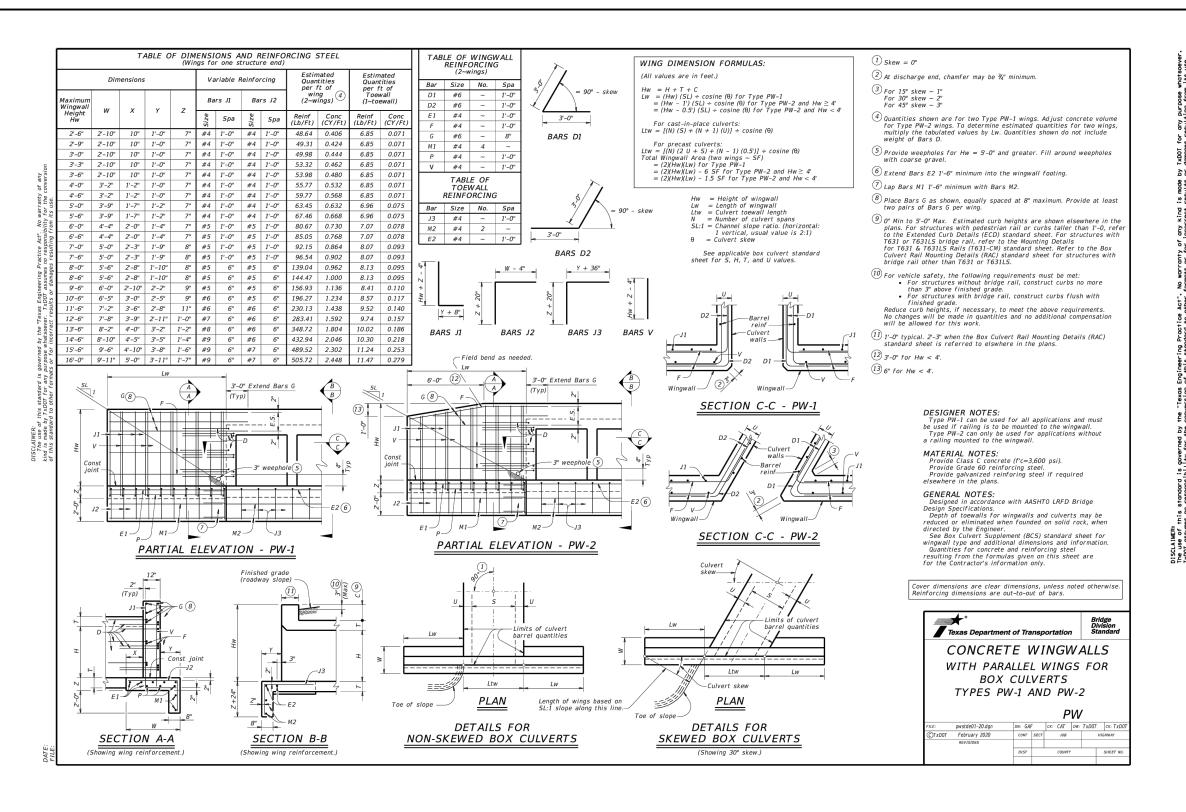


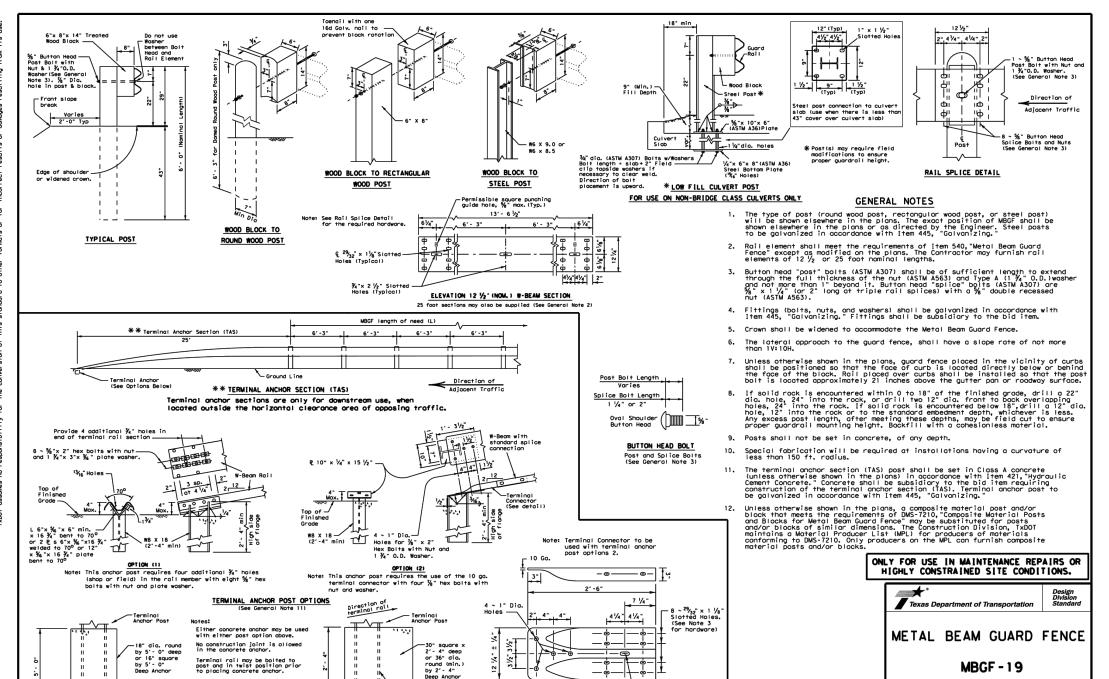


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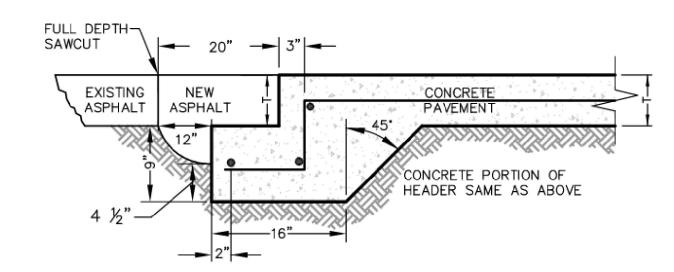






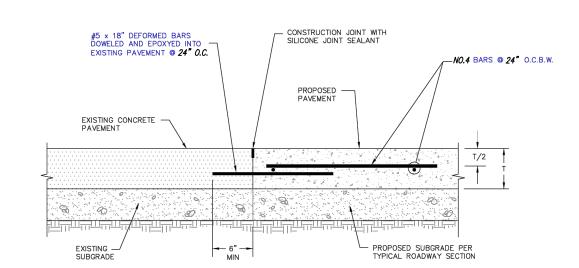
TERMINAL CONNECTOR

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

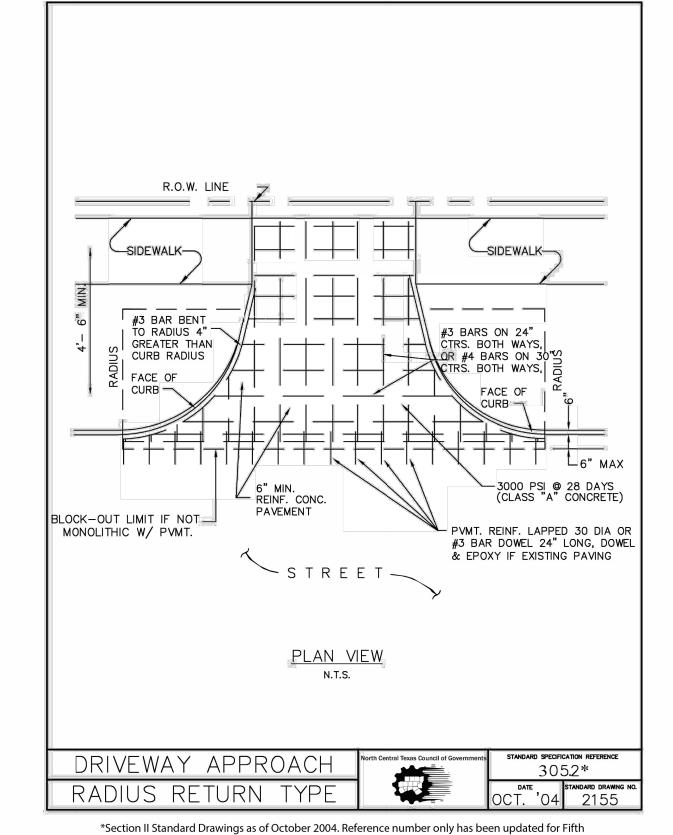


STREET HEADER AT ASPHALT PAVEMENT

1. PAVEMENT BARS TO BE BENT DOWN INTO HEADER.
2. HEADER AND PAVEMENT TO BE MONOLITHIC.
3. 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)



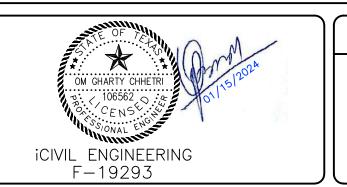
TERMINAL CONCRETE ANCHOR OPTIONS
(See General Note 11)

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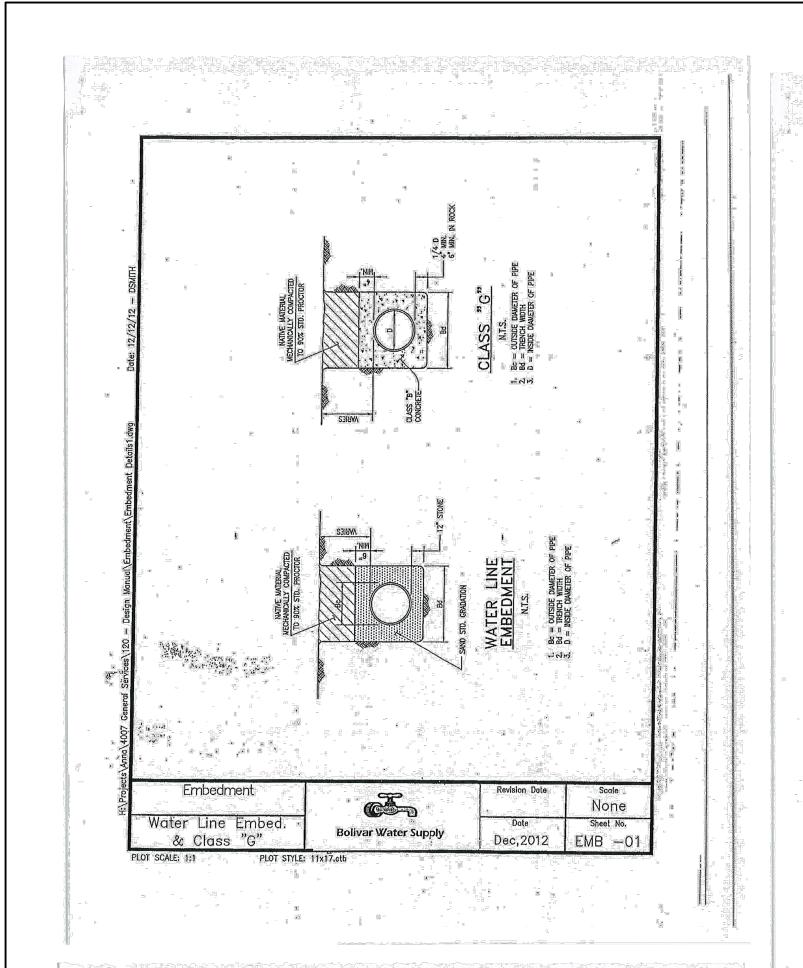


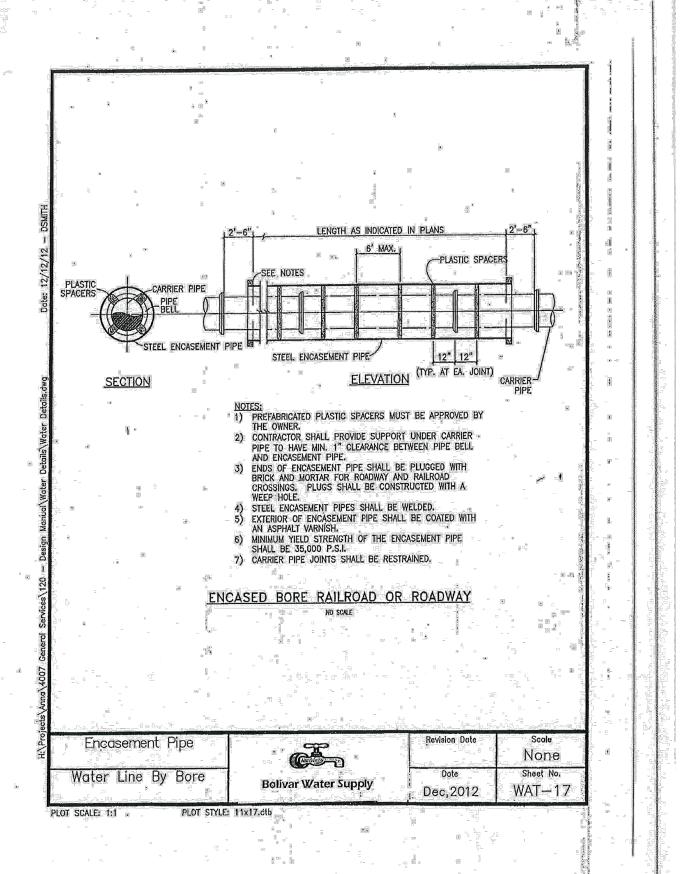
SANGER, TEXAS
DETAILS
FOR
MARLEY MEADOWS

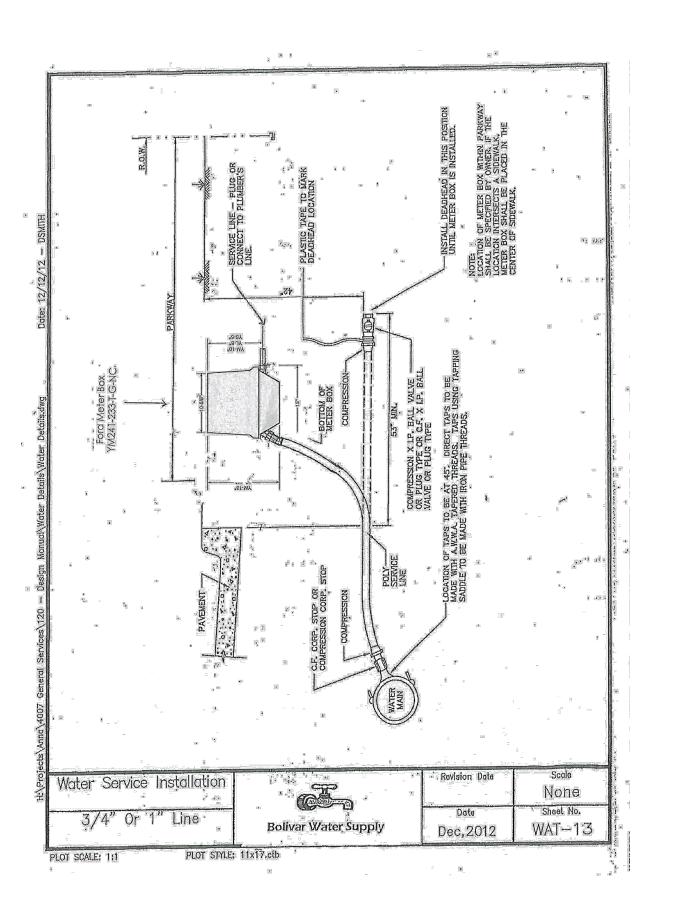
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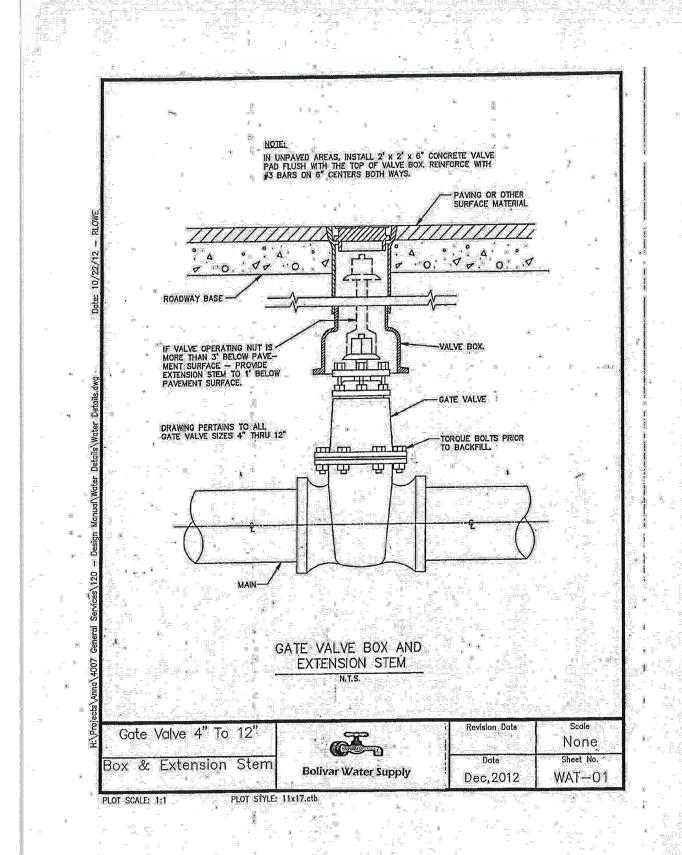
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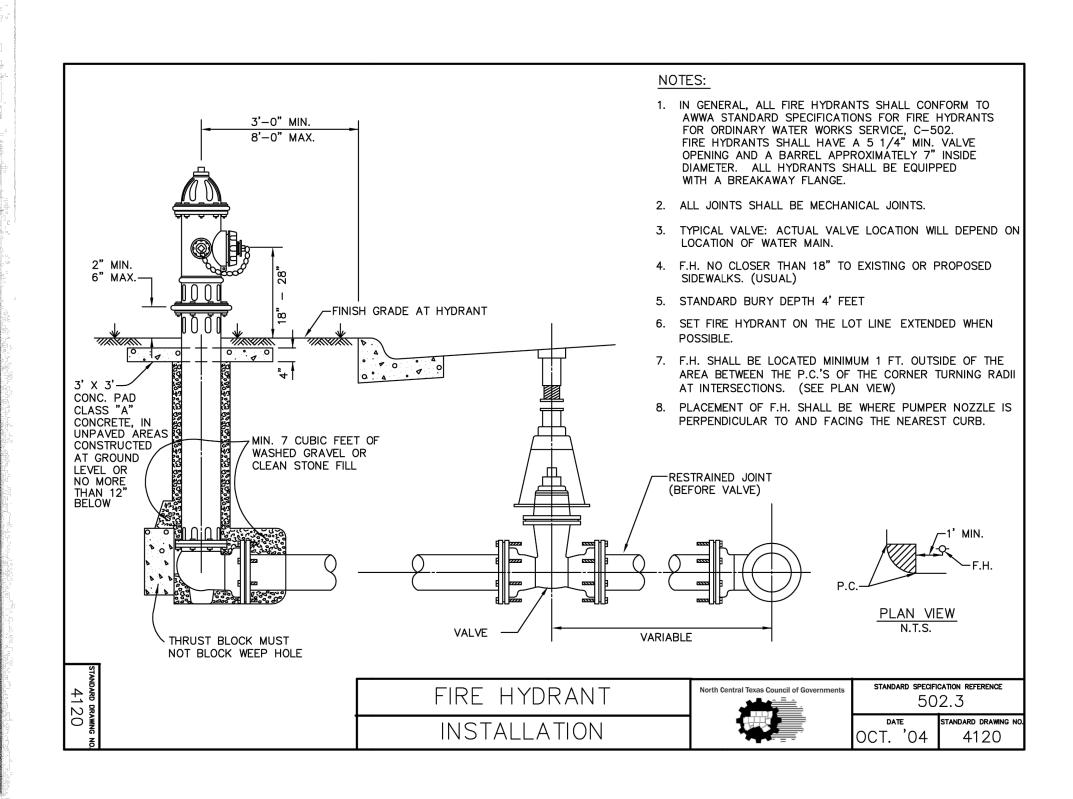










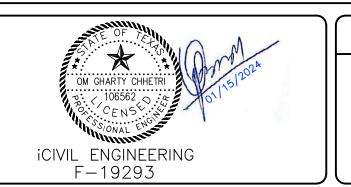




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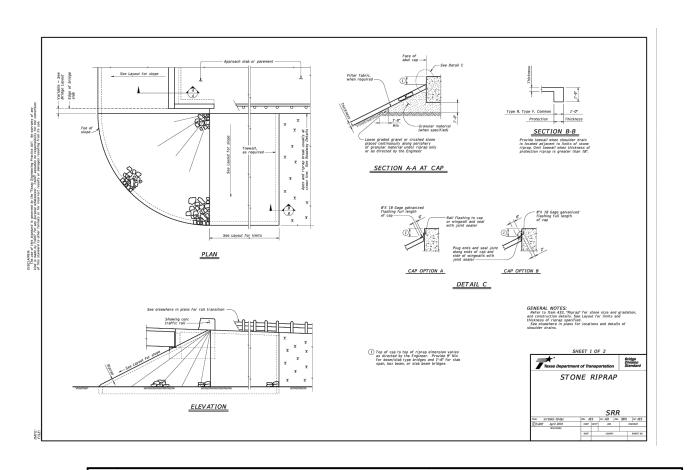
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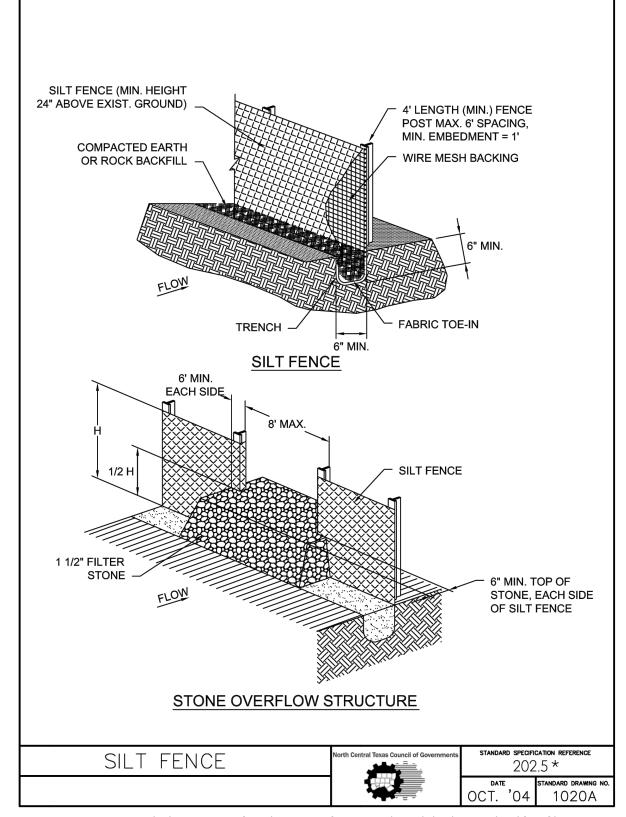
MARLEY MEADOWS

sheet 22

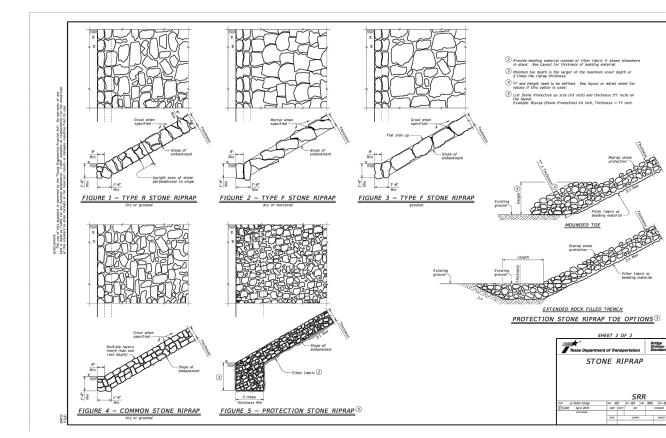
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22 of 23





*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.

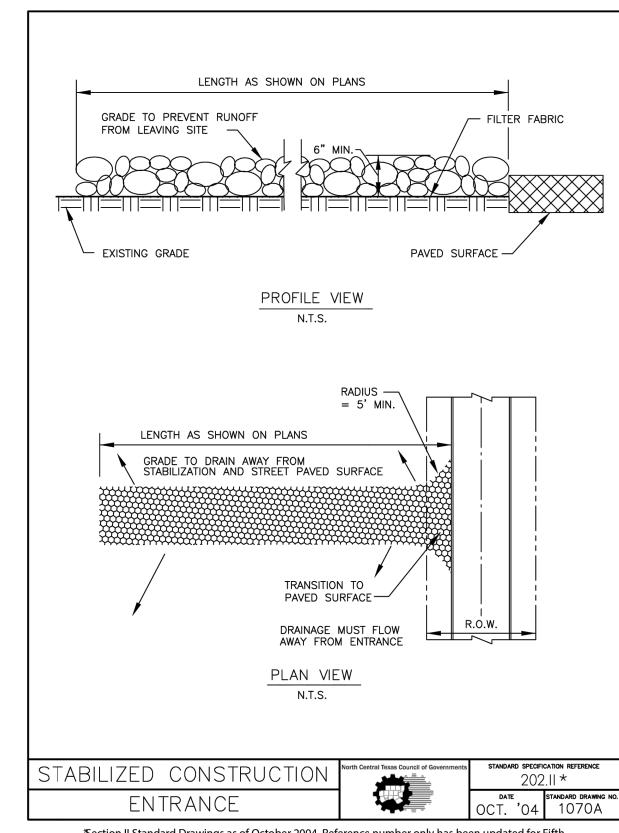
5. INSPECTION SHALL BE AS SPECIFIED IN THE SWPPP. REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.

6. SILT FENCE SHALL BE REMOVED WHEN FINAL STABILIZATION IS ACHIEVED OR ANOTHER EROSION OR SEDIMENT CONTROL DEVICE IS EMPLOYED.

7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF HALF THE HEIGHT OF THE FENCE. THE SILT SHALL BE DISPOSED OF AT AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SILTATION.

SILT FENCE 202.5 * *Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth

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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.

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.

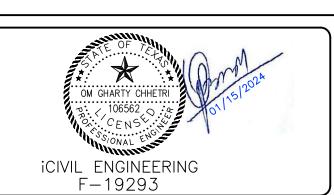
STABILIZED CONSTRUCTION 202.II * DATE STANDARD DRAWING NO. ENTRANCE OCT. '04 1070B

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

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