TCEQ Interoffice Memorandum

To: Office of the Chief Clerk
Texas Commission on Environmental Quality

Thru: Chris Kozlowski, Team Leader
Water Rights Permitting Team

From: Lillian E. Beerman, Ph.D., Project Manager
Water Rights Permitting Team

Date: February 22, 2022

Subject: Big Sky MUD
WRPERM 13795
CN605342336, RN111325551
Application No. 13795 for a Water Use Permit
Texas Water Code §§ 11.121, 11.143, Requiring Published and Mailed Notice
Unnamed Tributary of Denton Creek, Trinity River Basin

The application and partial fees were received on August 27, 2021. Additional information and fees were received on November 15, 2021 and February 10, 2022. The application was declared administratively complete and filed with the Office of the Chief Clerk on February 22, 2022. Mailed and published notice to water right holders of record in the Trinity River Basin is required pursuant to Title 30 Texas Administrative Code (TAC) §§ 295.151 and 295.152(b), and mailed notice to the North Texas Groundwater Conservation District is required pursuant to Title 30 TAC § 295.153(c)(2).

All fees have been paid and the application is sufficient for filing.

Lillian E. Beerman, Ph.D

_____

Lillian E. Beerman, Ph.D., Project Manager
Water Rights Permitting Team
Water Rights Permitting and Availability Section

OCC Mailed Notice Required **X YES** □**NO**

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

February 22, 2022

Mr. Dustin Wentz **VIA E-MAIL**
Associate Vice President
Pape-Dawson Engineers
5810 Tennyson Pkwy, Ste. 425
Plano, TX 75024

RE: Big Sky MUD
WRPERM 13795
CN605342336, RN111325551
Application No. 13795 for a Water Use Permit
Texas Water Code §§ 11.121, 11.143, Requiring Published and Mailed Notice
Unnamed Tributary of Denton Creek, Trinity River Basin

Dear Mr. Wentz:

This acknowledges receipt of additional information on February 10, 2022.

The application was declared administratively complete and filed with the Office of the Chief Clerk on February 22, 2022. Staff will continue processing the application for consideration by the Executive Director.

Please be advised that additional information may be requested during the technical review phase of the application process.

If you have any questions concerning the application, please contact me at lillian.beerman@tceq.texas.gov or by phone at (512) 239-4019.

Sincerely,

Lillian E. Beerman, Ph.D

Lillian E. Beerman, Ph.D., Project Manager
Water Rights Permitting Team
Water Rights Permitting and Availability Section

RE: Big_Sky_MUD_13795_Second_Request_for_Information

Lance Stewart [redacted]
Thu 2/10/2022 4:29 PM

To: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>

Cc: Erin Stiggins [redacted] Dustin Wentz [redacted]

Lillian,

Please see attached for our response to this request for information.

Thanks,

Lance Stewart, P.E. | **Project Manager**
Pape-Dawson Engineers, Inc.
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10194390

5810 Tennyson Parkway, Suite 425, Plano, TX 75024
P: 214.420.8494 | **E:** [redacted]

Dallas | San Antonio | Austin | Houston | Fort Worth | New Braunfels

---

From: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>
Sent: Thursday, February 10, 2022 2:01 PM
To: Dustin Wentz [redacted]; Lance Stewart [redacted]
Cc: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>
Subject: Big_Sky_MUD_13795_Second_Request_for_Information

Greetings,
I want to follow up on TCEQ's Request for Information for Big Sky Municipal Utility District's Application No. 13795 sent January 11, 2022 and due today, February 10, 2022. See attached.

Please inform me of the status of your response and let me know if you have any questions or concerns.

Thank You,

Lillian E. Beerman, Ph.D.

Water Rights Permitting Team

Water Availability Division

512-239-4019

lillian.beerman@tceq.texas.gov

From: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>
Sent: Tuesday, January 11, 2022 1:22 PM
To: LStewart@Pape-[redacted] <[redacted]>
Cc: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>
Subject: Big_Sky_MUD_13795_Second_Request_for_Information

Mr. Stewart,
I understand that you are the contact for Big Sky MUD during the absence of Mr. Wentz.
Attached is the Second Request for Information for Big Sky MUD's Application for a Water Use Permit.
Please provide a response by February 10, 2022.
If you have any questions or concerns, do not hesitate to contact me.
Thank you,

Lillian E. Beerman, Ph.D.

Water Rights Permitting Team

Water Availability Division

512-239-4019

lillian.beerman@tceq.texas.gov

PAPE-DAWSON ENGINEERS

February 10, 2022

Ms. Lillian E. Beerman, Ph.D., Project Manager
Water Rights Permitting and Availability Section
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711

Re: Comments regarding Big Sky MUD WRPERM 13795 - CN605342336, RN111325551
Application No. 13795 for a Water Use Permit
Texas Water Code §§ 11.121, 11.143 Requiring Published and Mailed Notice Denton Creek, Trinity River Basin.

Dear Ms. Beerman:

Enclosed is our response to comments dated January 11, 2022, regarding the above referenced project.

1. Before the application can be declared administratively complete, provide evidence that an application for a groundwater well permit has been submitted to the North Texas Groundwater Conservation District or evidence that a permit is not required. Staff acknowledges that your letter dated November 10, 2021 indicates that a copy of the groundwater well permit will be submitted upon receipt. However, in order to declare the application administratively complete, the application must demonstrate that the applicant is in the process of obtaining any required groundwater well permits.

   Staff notes that additional information may be required prior to completion of technical review.

   PD response (02/10/2022): Please see enclosed attachments for the requested information.

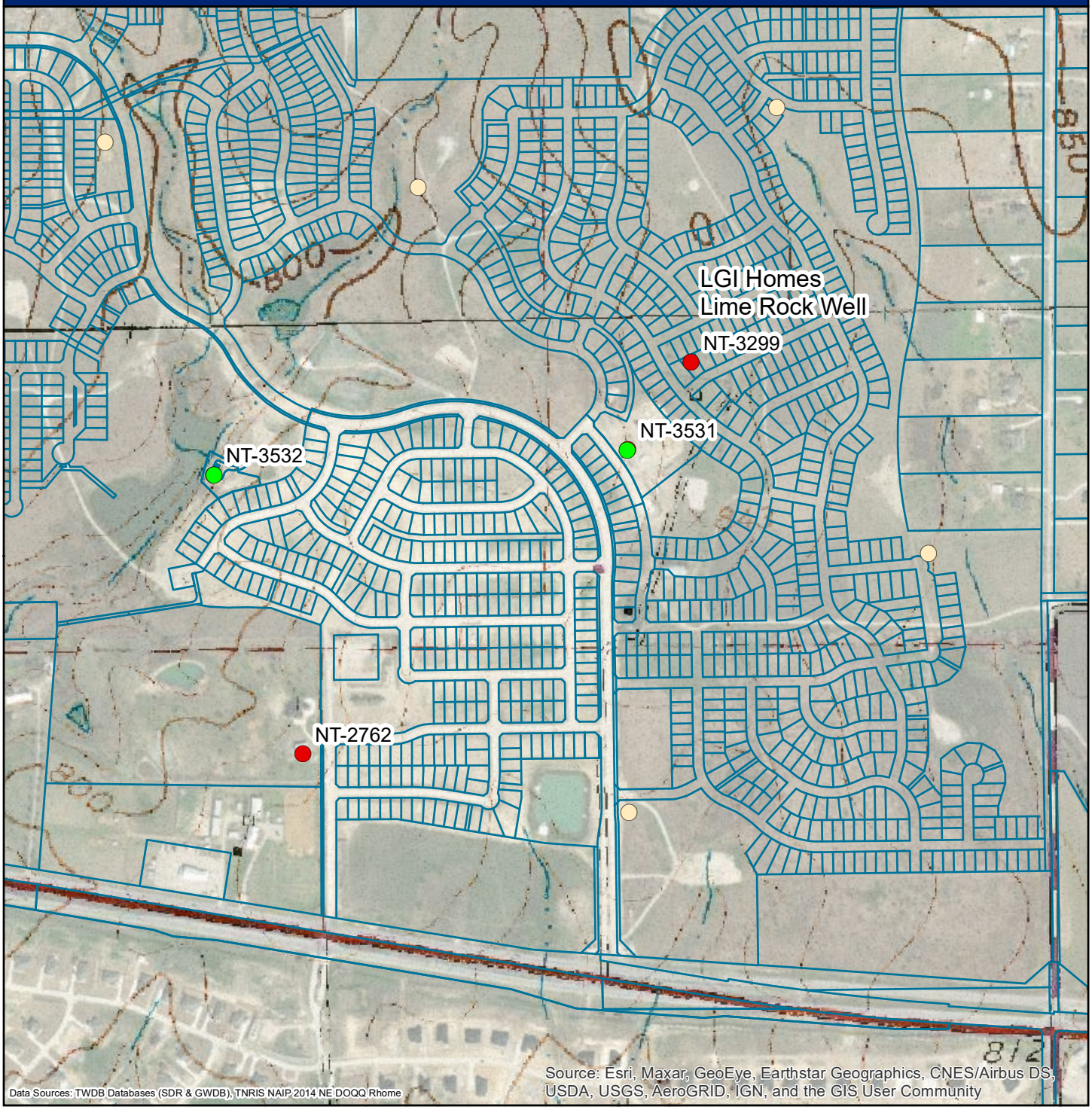
If you have any further questions or need additional information, please contact me at dwentz@pape-dawson.com or 214-420-8494.

Sincerely,
Pape-Dawson Engineers, Inc.

Lance Stewart, P.E.
Project Manager

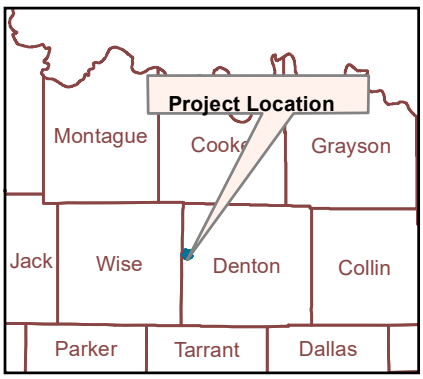
W:\projects\700\08\14\1.0 Admin\1.3 Correspondence\1.3.1 Letters\Response Letters\220210_WRApp-RFI.docx

BIG SKY SUBDIVISION - WELL LOCATIONS



EXPLANATION

- Big Sky PWS Wells
- Proposed - Big Sky PWS Wells
- Other Registered Wells



0 250 500 1,000 1,500 Feet

N

Coordinate System: GAM

Location Map

Figure 1. Well Location
Big Sky Subdivision

Denton County, Texas

DESIGN: BG	CHECKED: MV	DATE: 2/10/2022
DRAWN: NV	SCALE: 1 to 8,106	REVISION: 1

COLLIER CONSULTING
254-968-8741
www.collierconsulting.com

NORTH TEXAS GROUNDWATER CONSERVATION DISTRICT
P.O. Box 508, Gainesville, TX 76241
5100 Airport Drive, Denison, TX 75020
Office: (855) 426-4433 | Fax: (903) *786-8211*
n[redacted] | www.northtexasgcd.org

APPLICATION FOR PRODUCTION PERMIT FOR NEW WELL

Complete one application for each well - Refer to District Rules 3.9 - 3.10.

This application must be completed and submitted in conjunction with the District's Application for New Well Registration (Form NTGCD-100), which will be incorporated and considered as part of this application.

Applicant Information

Name: LGI Homes - Elain Torres E-mail: elaine.torres@lgihomes.com

Phone: 972-467-5214 *Ext.* Alt. Phone: *Ext.*

Mailing Address: PO Box 51273 Denton TX 76206
Address *City* *State* *Zip code*

Well Information

Owner Name: LGI Homes Well Name: NT-3299 -Lime Rock Well

Well Address: 33.24947; -97.36079
Address *City* *State* *Zip code*

Well Spacing

Does the proposed well location comply with the District's spacing requirements? ☐Yes ☐No

If No, please explain (Application for Exception to Spacing Requirements of the District may be required): Pre-Existing Well

Purpose and Amount of Water Use

For each proposed purpose of use of water from the well, provide the proposed amount of use:

Use: For TCEQ Surface Water Permit Amount (gallons/year): 16.4 acft/yr - 5343956 gal/yr

Use: Irrigation Amount (gallons/year): 32.07 acft/yr - 10450040 gal/yr

Use: Amount (gallons/year):

Total Amount of Water Requested (gallons/year): 15,793,996

Will the entire amount of water requested be put to beneficial use in the first full calendar year of production? ☐Yes ☐No *If No, please attach supplemental information describing in detail the projected timeframe for use.*

Aquifer or subdivision water is to be drawn from: Trinity-Antlers

Will the groundwater produced from the well be resold, leased, or otherwise transferred to others, whether inside or outside of the District? ☐Yes ■No

If yes, provide the following:

1. *Description of purpose of use and location to which the groundwater will be delivered:*
   Pond C and surrounding Park Land
2. *Attach a copy of the legal documents establishing the right for the groundwater to be sold, leased, or otherwise transferred (e.g. contract for the sale, lease, or transfer of groundwater).*

Will the groundwater produced from the well be transported out of the District? ☐Yes ■No

If yes, attach supplemental information describing the following issues and provide documents relevant to these issues:

1. *Availability of water in the District and in the proposed receiving area during the period for which the water supply is requested;*
2. *Projected effect of the proposed transport on aquifer conditions, depletion, subsidence, or effects on existing permit holders or other groundwater users within the District; and*
3. *How the proposed transport is consistent with the approved regional water plan and District Management Plan.*

Hydrogeological Report Requirement

Is the proposed production capacity of the well, or proposed aggregate production capacity if the well is part of a well system, 200 gpm or more? ☐Yes ■No

If Yes, attach a Hydrogeological Report that complies with all of the requirements of the District's Hydrogeological Report Requirements.

Attachments

Please check off/describe all items attached to this permit application (not all items listed may be required):

☐ Application for New Well Registration – Form NTGCD-100 (REQUIRED)
■ Location Map Showing Proposed Well Location (REQUIRED)
☐ Hydrogeological Report
☐ Water Conservation Plan (WCP)*
☐ Drought Contingency Plan (DCP)*
☐ Application for Exception to District Spacing Requirements

☐ Other (explain): _____

** In lieu of submitting the WCP and DCP, the applicant may declare via the *Certification* section below that he/she will abide by the District's Management Plan and Drought Contingency Plan, respectively, except in cases where the applicant is required by other law to prepare a drought contingency plan.

Certification – please read carefully

I hereby certify that the information given herewith is true and accurate to the best of my knowledge and belief. I further certify that all water produced from the well that is the subject of this permit will at all times be put to beneficial use. I further certify and declare that I will comply with the District's Rules and all groundwater use permits and plans promulgated pursuant to the District's Rules, the District's Management Plan, and the District's Drought Contingency Plan. My signature below represents my acknowledgement that other political subdivisions (such as the county or municipality, for example) may impose additional requirements related to the drilling and completion of water wells under certain conditions, and that I am solely responsible for obtaining any other necessary governmental approval.

By signing below, I hereby represent and warrant that I have the full right, power, and binding authority to execute this document on behalf of the owner/responsible party. My signature below further represents my declaration that I am responsible for reporting any closure of the well to the District and the appropriate state agencies and that I will strictly comply with all District well plugging and capping guidelines.

I further acknowledge that I am not authorized to drill the well that is the subject of this application until receipt of a Production Permit from the District, and that a District Production Permit is not complete until District receipt of a fully complete and accurate Well Report and Well Completion Form.

Elaine Torres		2-10-22
Print Name	*Signature*	*Date*

STATE OF TEXAS
COUNTY OF _____

SWORN TO AND SUBSCRIBED BEFORE ME on (date) _____, by (applicant) _____.

_____
Notary Public – State of Texas
My Commission Exp. _____

Please submit this application to the District by mail, fax or email:

North Texas Groundwater Conservation District
P.O. Box 508, Gainesville, TX 76241
Fax: (903) 786-8211 | ntgcd@northtexasgcd.org

If you have any questions, please call (855) 426-4433

FOR DISTRICT USE ONLY

Application Fee Received by District?	☐Yes ☐No	Amount Paid:
Is application administratively complete?	☐Yes ☐No	
Is Applicant currently in compliance with District Rules?	☐Yes ☐No	

Date of Hearing (if applicable):

Notes:

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

October 11, 2021

Dustin Wentz **VIA E-MAIL**
Associate Vice President
Pape-Dawson Engineers
5810 Tennyson Pkwy, Ste. 425
Plano, TX 75024

RE: Big Sky MUD
WRPERM 13795
CN605342336, RN111325551
Application No. 13795 for a Water Use Permit
Texas Water Code §§ 11.121, 11.143 Requiring Published and Mailed Notice
Denton Creek, Trinity River Basin

Dear Mr. Wentz:

This acknowledges receipt, on August 27, 2021, of the referenced application, and on October 1, 2021, fees in the amount of $610.11 (Receipt No. M200762, copy enclosed).

Additional information and fees are required before the application can be declared administratively complete.

1. Confirm the following amounts of water from each source:

Quantity (acre-feet)	Source
25.45	Trinity River Basin (pond capacities)
761.75	Groundwater-based Return Flows from the WWTP
68.3	Groundwater from Trinity-Antlers aquifer
855.5	TOTAL

2. Provide a copy of the groundwater well permit or evidence that a groundwater well permit is not required for the Limerock Well from the North Texas Groundwater Conservation District.

   Staff notes that additional information may be required prior to completion of technical review.

3. Provide the accounting plan described in "Attachment 1.5 – Accounting Plan" submitted September 1, 2021.

4. Before the application can be declared administratively complete, remit fees in the amount of $ 613.87, as described below. Please make the check payable to the TCEQ or Texas Commission on Environmental Quality.

Filing Fees	(< 100 A-F)	$	100.00
Recording Fee		$	25.00
Use Fees	($1.00 x 25.45 A-F)		25.45
Mailed Notice	(Trinity River Basin)	$	463.42
TOTAL FEES		$	613.87
FEES RECEIVED		$	610.11
TOTAL FEES DUE		**$**	**3.76**

Please submit the requested information and fees by November 10, 2021 or the application may be returned pursuant to Title 30 Texas Administrative Code § 281.18.

If you have any questions concerning this matter, please contact me via email at lillian.beerman@tceq.texas.gov or by telephone at (512) 239-4019.

Sincerely,

Lillian E. Beerman, Ph.D.

Lillian E. Beerman, Ph.D., Project Manager
Water Rights Permitting Team
Water Rights Permitting and Availability Section

TCEQ - A/R RECEIPT REPORT BY ACCOUNT NUMBER

29-SEP-21 08:23 AM

Fee Description	Fee Code / Account# / Account Name	Ref#1 / Ref#2 / Paid In By	Check Number / Card Auth. / User Data	CC Type / Tran Code / Rec Code	Slip Key / Document#	Tran Date	Tran Amount
WTR USE PERMITS	WUP WUP WATER USE PERMITS	M200762 13795 PAPE DAWSON ENGINEERS	8213 092821 JARIVERA	 N CK	BS00089024 D2800173	29-SEP-21	-$610.11
				Total (Fee Code):			-$610.11
				Grand Total:			-$1,825.11

RECEIVED
OCT 0 1 2021
Water Availability Division

Re: Big_Sky_MUD_13795_Second_Request_for_Information

Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>
Thu 2/10/2022 3:00 PM

To: Dustin Wentz [redacted]

Thank you. I will keep an eye out for it.

Lillian E. Beerman, Ph.D.
Water Rights Permitting Team
Water Availability Division
512-239-4019
lillian.beerman@tceq.texas.gov

From: Dustin Wentz [redacted]
Sent: Thursday, February 10, 2022 2:03 PM
To: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>; Lance Stewart [redacted]
Cc: Erin Stiggins [redacted]
[redacted]Information

Lillian – We are working to finalize our response and are tracking to send today.

Thank you,

Dustin Wentz, P.E. | **Associate Vice President**
Pape-Dawson Engineers, Inc.
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10194390
5810 Tennyson Parkway, Suite 425, Plano, TX 75024
P: 214.420.8494 | **E:** [redacted]
Dallas | San Antonio | Austin | Houston | Fort Worth | New Braunfels

---

From: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>
Sent: Thursday, February 10, 2022 2:01 PM
To: Dustin Wentz [redacted] Lance Stewart [redacted]
Cc: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>
Subject: Big_Sky_MUD_13795_Second_Request_for_Information

Greetings,
I want to follow up on TCEQ's Request for Information for Big Sky Municipal Utility District's Application No. 13795 sent January 11, 2022 and due today, February 10, 2022. See attached.

Please inform me of the status of your response and let me know if you have any questions or concerns.

Thank You,
Lillian E. Beerman, Ph.D.
Water Rights Permitting Team
Water Availability Division
512-239-4019
lillian.beerman@tceq.texas.gov

Big_Sky_MUD_13795_Second_Request_for_Information

Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>

Tue 1/11/2022 1:22 PM

To: LStewart [redacted] <[redacted]

Cc: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>

Mr. Stewart,
I understand that you are the contact for Big Sky MUD during the absence of Mr. Wentz.
Attached is the Second Request for Information for Big Sky MUD's Application for a Water Use Permit.
Please provide a response by February 10, 2022.
If you have any questions or concerns, do not hesitate to contact me.
Thank you,

Lillian E. Beerman, Ph.D.
Water Rights Permitting Team
Water Availability Division
512-239-4019
lillian.beerman@tceq.texas.gov

Big_Sky_MUD_13795_Second_Request_for_Information

Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>

Tue 1/11/2022 11:51 AM

To: DWENTZ [redacted]

Cc: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>

1 attachments (251 KB)

Big_Sky_MUD_13795_RFI_Sent_01.11.2022.pdf;

Mr. Wentz,
Attached is a Second Request for Information for Big Sky MUD's Application for a Water Use Permit.
Please provide a response by February 10, 2022.
If you have any questions or concerns, do not hesitate to contact me.
Thank you,

Lillian E. Beerman, Ph.D.
Water Rights Permitting Team
Water Availability Division
512-239-4019
lillian.beerman@tceq.texas.gov

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

January 11, 2022

Mr. Dustin Wentz **VIA E-MAIL**
Associate Vice President
Pape-Dawson Engineers
5810 Tennyson Pkwy, Ste. 425
Plano, TX 75024

RE: Big Sky MUD
WRPERM 13795
CN605342336, RN111325551
Application No. 13795 for a Water Use Permit
Texas Water Code §§ 11.121, 11.143, Requiring Published and Mailed Notice
Unnamed Tributary of Denton Creek, Trinity River Basin

Dear Mr. Wentz:

This acknowledges receipt, on November 15, 2021, of additional information and fees in the amount of $3.76 (Receipt No. M204126, copy attached).

Before the application can be declared administratively complete, provide evidence that an application for a groundwater well permit has been submitted to the North Texas Groundwater Conservation District or evidence that a permit is not required. Staff acknowledges that your letter dated November 10, 2021 indicates that a copy of the groundwater well permit will be submitted upon receipt. However, in order to declare the application administratively complete, the application must demonstrate that the applicant is in the process of obtaining any required groundwater well permits.

Staff notes that additional information may be required prior to completion of technical review.

Please submit the requested information by February 10, 2022 or the application may be returned pursuant to Title 30 Texas Administrative Code § 281.18.

If you have any questions concerning this matter, please contact me via email at lillian.beerman@tceq.texas.gov or by telephone at (512) 239-4019.

Sincerely,

Lillian E. Beerman, Ph.D.

Lillian E. Beerman, Ph.D., Project Manager
Water Rights Permitting Team
Water Rights Permitting and Availability Section

TCEQ 16-NOV-21 02:20 PM

TCEQ - A/R RECEIPT REPORT BY ACCOUNT NUMBER

Fee Description	Fee Code / Account# / Account Name	Ref#1 / Ref#2 / Paid In By	Check Number / Card Auth. / User Data	CC Type / Tran Code / Rec Code	Slip Key / Document#	Tran Date	Tran Amount
WTR USE PERMITS	WUP	M204126	8217		BS00090258	16-NOV-21	-$3.76
L. BEERMAN	WUP	13795	111621	N	D2800730		
	WATER USE PERMITS	PAPE DAWSON ENGINEERS	RHDAVIS	CK			
	WUP	M204127	2383		BS00090258	16-NOV-21	-$52.92
NATALIA P.	WUP	122822	111621	N	D2800730		
	WATER USE PERMITS	ARTESIAN CATTLE & FARMING LLC	RHDAVIS	CK			
				Total (Fee Code):			-$56.68
				Grand Total:			-$288.68

FW: Big_Sky_MUD_of Denton County_13795_Request_for_Information

Dustin Wentz [redacted]

Mon 11/15/2021 4:13 PM

To: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>
Cc: Erin Stiggins [redacted] Lance Stewart [redacted] AJ Roscoe [redacted]

1 attachments (925 KB)
211110_WRApp-RFI.pdf;

Lillian – I received your voicemail about this RFI. Did you get the response below from Erin?

Thank you,

Dustin Wentz, P.E. | **Associate Vice President**
Pape-Dawson Engineers, Inc.
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10194390

5810 Tennyson Parkway, Suite 425, Plano, TX 75024
P: 214.420.8494 | **E:** [redacted]

Dallas | San Antonio | Austin | Houston | Fort Worth | New Braunfels

---

From: Erin Stiggins [redacted]
Sent: Thursday, November 11, 2021 2:18 PM
To: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>
Cc: Lance Stewart [redacted] AJ Roscoe [redacted] .com>; Dustin Wentz [redacted]
Subject: RE: Big_Sky_MUD_of Denton County_13795_Request_for_Information

Ms. Beerman,

Please find the response to the RFI attached to this email.

Please let us know about any questions or concerns.

Thank you! Erin

Erin Stiggins, P.E., CFM, PMP | **Project Manager**
Pape-Dawson Engineers, Inc.
TEXAS ENGINEERING FIRM #470

One Ridgmar Centre, 6500 West Fwy., Suite 700, Fort Worth, TX 76116
P: 817.870.3668 | **E:** [redacted]

Fort Worth | San Antonio | Austin | Houston | Dallas | New Braunfels

---

From: Dustin Wentz @PD
Sent: Tuesday, October 12, 2021 1:36 PM
To: Erin Stiggins [redacted]
Cc: Lance Stewart [redacted] AJ Roscoe @PD [redacted]
Subject: Fwd: Big_Sky_MUD_of Denton County_13795_Request_for_Information

FYI

Dustin Wentz, P.E. | **Associate Vice President**
Pape-Dawson Engineers, Inc.
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10194390

5810 Tennyson Parkway, Suite 425, Plano, TX 75024
P: 214.420.8494 | **E:** [redacted]

Dallas | San Antonio | Austin | Houston | Fort Worth | New Braunfels

Begin forwarded message:

> **From:** Lillian Beerman <Lillian.Beerman@tceq.texas.gov>
> **Date:** October 11, 2021 at 12:28:12 PM PDT
> **To:** "Dustin Wentz [redacted]
> **Cc:** Lillian Beerman <Lillian.Beerman@tceq.texas.gov>
> **Subject: Big_Sky_MUD_of Denton County_13795_Request_for_Information**
>
> Mr. Wentz,
> Attached is the TCEQ Request for Information for Big Sky MUD's Application No. 13795. Please respond to this request by November 11, 2021.
> If you have any questions or concerns, do not hesitate to contact me.
> Thank You,

Lillian E. Beerman, Ph.D.
Water Rights Permitting Team
Water Availability Division
512-239-4019
lillian.beerman@tceq.texas.gov

PAPE-DAWSON ENGINEERS

November 10, 2021

Ms. Lillian E. Beerman, Ph.D., Project Manager
Water Rights Permitting and Availability Section
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711

Re: Comments regarding Big Sky MUD WRPERM 13795 - CN605342336, RN111325551
Application No. 13795 for a Water Use Permit
Texas Water Code §§ 11.121, 11.143 Requiring Published and Mailed Notice Denton Creek, Trinity River Basin.

Dear Ms. Beerman:

Enclosed is our response to the comments dated October 11, 2021, regarding Big Sky MUD WRPERM 13795 - CN605342336, RN111325551 Application No. 13795 for a Water Use Permit filed under Texas Water Code §§ 11.121, 11.143 Requiring Published and Mailed Notice Denton Creek, Trinity River Basin.

1. Confirm the following amounts of water from each source:

Quantity (acre-feet)	Source
25.45	Trinity River Basin (pond capacities)
761.75	Groundwater-based Return Flows from the WWTP
68.3	Groundwater from Trinity-Antlers aquifer
855.5	TOTAL

PD response (11/10/2021): The values in the table above are confirmed.

2. Provide a copy of the groundwater well permit or evidence that a groundwater well permit is not required for the Limerock Well from the North Texas Groundwater Conservation District.

   Staff notes that additional information may be required prior to completion of technical review.

   PD response (11/10/2021): Permitting for the Limerock Well is currently in progress. A copy of the permit will be sent to your attention once received.

3. Provide the accounting plan described in "Attachment 1.5 – Accounting Plan" submitted September 1, 2021.
   PD response (11/10/2021): The Accounting Plan is attached. Based on the nature of the project, the Accounting Plan is very simple. A spreadsheet is not applicable in this case. The entirety of the Accounting Plan is the narrative description provided in the attachment.

4. Before the application can be declared administratively complete, remit fees in the amount of $ 613.87, as described below. Please make the check payable to the TCEQ or Texas Commission on Environmental Quality.

Filing Fees	(< 100 A-F)	$	100.00
Recording Fee		$	25.00
Use Fees	($1.00 x 25.45 A-F)	$	25.45
Mailed Notice	(Trinity River Basin)	$	463.42
TOTAL FEES		$	613.87
FEES RECEIVED		$	610.11
TOTAL FEES DUE		$	3.76

   PD response (11/10/2021): Check will be sent by US Postal Service with a reference to the Permit #13795.

If you have any further questions or need additional information, please contact me at dwentz@pape-dawson.com or 214-420-8494.

Sincerely,
Pape-Dawson Engineers, Inc.

Dustin Wentz, P.E.
Associate Vice President

W:\projects\700\08\14\1.0 Admin\1.3 Correspondence\1.3.1 Letters\Response Letters\211110_WRApp-RFI.docx

Attachment 1.5 – Accounting Plan

With this application, the water rights will authorize Big Sky Municipal Utility District of Denton County to use groundwater-based return flows to maintain the maximum normal operating level of two (2) recreational reservoirs within a new residential subdivision. Losses are expected to be encountered from evaporation within the reservoirs, which will be replaced with groundwater-based return flows from three (3) potential discharge points:

1. Well 1A (DP #1) – permitted well to supply potable water to on-site water treatment facility
2. Limerock Well (DP #2) – on-site well
3. WWTP (DP #3) – new on-site wastewater treatment plant serving subdivision

All sources of water are derived from groundwater.

In accordance with Water Rights permit issued:

- Mechanical devices will be installed in each reservoir to monitor the water level.
- Primary source of replacement water will be DP #3.
- Wells (DP #1 and #2) will be activated when water level drops below the maximum normal operating level of either reservoir.
- Big Sky Municipal Utility District of Denton County will maintain records of pumping to replace water lost to evaporation.

By following the above practices, the water rights issued for this application are not anticipated to adversely impact surface water within the basin.

PHONE MEMO

To & From: Lillian E. Beerman	From: Dustin Wentz PAPE-DAWSON ENGINEERS
DATE: November 15, 2021	APPLICATION NO: 13795 BIG SKY MUNICIPAL UTILITY DISTRICT (MUD) OF DENTON COUNTY
PHONE NUMBER: (214)420-8494 ext. 361	RE: Need for RFI Extension

Left a voicemail with Mr. Wentz requesting that he call me regarding the status of the RFI for BIG SKY MUNICIPAL UTILITY DISTRICT (MUD) OF DENTON COUNTY which was due on November 10, 2021. I recommended that he send a request for an extension via email, if needed.

Shortly afterward, Mr. Wentz returned my call and said that he had sent the RFI response last week. I did not find it. However, he did send another copy on Monday, November 15th.

Lillian E. Beerman, November 15, 2021

Big_Sky_MUD_of Denton County_13795_Request_for_Information

Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>

Mon 10/11/2021 2:28 PM

To: DWENTZ@[redacted]
Cc: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>

2 attachments (776 KB)

Big_Sky_MUD_13795_RFI_Sent_10.11.2021.pdf; Big_Sky_MUD_13795_RFI_Sent_10.11.2021.pdf;

Mr. Wentz,
Attached is the TCEQ Request for Information for Big Sky MUD's Application No. 13795.
Please respond to this request by November 11, 2021.
If you have any questions or concerns, do not hesitate to contact me.
Thank You,

Lillian E. Beerman, Ph.D.
Water Rights Permitting Team
Water Availability Division
512-239-4019
lillian.beerman@tceq.texas.gov

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

October 11, 2021

Dustin Wentz **VIA E-MAIL**
Associate Vice President
Pape-Dawson Engineers
5810 Tennyson Pkwy, Ste. 425
Plano, TX 75024

RE: Big Sky MUD
WRPERM 13795
CN605342336, RN111325551
Application No. 13795 for a Water Use Permit
Texas Water Code §§ 11.121, 11.143 Requiring Published and Mailed Notice
Denton Creek, Trinity River Basin

Dear Mr. Wentz:

This acknowledges receipt, on August 27, 2021, of the referenced application, and on October 1, 2021, fees in the amount of $610.11 (Receipt No. M200762, copy enclosed).

Additional information and fees are required before the application can be declared administratively complete.

1. Confirm the following amounts of water from each source:

Quantity (acre-feet)	Source
25.45	Trinity River Basin (pond capacities)
761.75	Groundwater-based Return Flows from the WWTP
68.3	Groundwater from Trinity-Antlers aquifer
855.5	TOTAL

2. Provide a copy of the groundwater well permit or evidence that a groundwater well permit is not required for the Limerock Well from the North Texas Groundwater Conservation District.

   Staff notes that additional information may be required prior to completion of technical review.

3. Provide the accounting plan described in "Attachment 1.5 – Accounting Plan" submitted September 1, 2021.

4. Before the application can be declared administratively complete, remit fees in the amount of $ 613.87, as described below. Please make the check payable to the TCEQ or Texas Commission on Environmental Quality.

Filing Fees	(< 100 A-F)	$	100.00
Recording Fee		$	25.00
Use Fees	($1.00 x 25.45 A-F)		25.45
Mailed Notice	(Trinity River Basin)	$	463.42
TOTAL FEES		$	613.87
FEES RECEIVED		$	610.11
TOTAL FEES DUE		**$**	**3.76**

Please submit the requested information and fees by November 10, 2021 or the application may be returned pursuant to Title 30 Texas Administrative Code § 281.18.

If you have any questions concerning this matter, please contact me via email at lillian.beerman@tceq.texas.gov or by telephone at (512) 239-4019.

Sincerely,

Lillian E. Beerman, Ph.D.

Lillian E. Beerman, Ph.D., Project Manager
Water Rights Permitting Team
Water Rights Permitting and Availability Section

TCEQ - A/R RECEIPT REPORT BY ACCOUNT NUMBER

29-SEP-21 08:23 AM

Fee Description	Fee Code / Account# / Account Name	Ref#1 / Ref#2 / Paid In By	Check Number / Card Auth. / User Data	CC Type / Tran Code / Rec Code	Slip Key / Document#	Tran Date	Tran Amount
WTR USE PERMITS	WUP WUP WATER USE PERMITS	M200762 13795 PAPE DAWSON ENGINEERS	8213 092821 JARIVERA	 N CK	BS00089024 D2800173	29-SEP-21	-$610.11
				Total (Fee Code):			-$610.11
				Grand Total:			-$1,825.11

RECEIVED
OCT 0 1 2021
Water Availability Division

Re: Big Sky Municipal Utility District (MUD) of Denton County_13795_Electronic_Application_Received

Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>
Fri 9/24/2021 10:41 AM

To: Erin Stiggins [redacted]
Cc: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>

Erin,
You are welcome. You should be receiving a Request for Information needed for Administrative Completeness soon.
Please let me know if you have any questions or concerns.
Thank You,

Lillian E. Beerman, Ph.D.
Water Rights Permitting Team
Water Availability Division
512-239-4019
lillian.beerman@tceq.texas.gov

From: Erin Stiggins [redacted]
Sent: Friday, September 24, 2021 10:32 AM
To: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>
Subject: RE: Big Sky Municipal Utility District (MUD) of Denton County_13795_Electronic_Application_Received

Thanks for the update! Please let me know about any questions or concerns you may have.

We have sent the hard copy, so please let me know if you do not receive it by the middle of next week.

I look forward to working with you on this project.
Thanks, Erin

Erin Stiggins, P.E., CFM, PMP | **Project Manager**
Pape-Dawson Engineers, Inc.
TEXAS ENGINEERING FIRM #470
One Ridgmar Centre, 6500 West Fwy., Suite 700, Fort Worth, TX 76116
P: 817.870.3668 | **E:** [redacted]
Fort Worth | San Antonio | Austin | Houston | Dallas | New Braunfels

From: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>
Sent: Tuesday, September 21, 2021 5:06 PM
To: Erin Stiggins [redacted]
Cc: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>

Subject: Big Sky Municipal Utility District (MUD) of Denton County_13795_Electronic_Application_Received

Erin Stiggins, P.E., CFM, PMP

I, Lillian E. Beerman, am the project manager for Big Sky MUD, Application No. 13795 for a Water Use Permit.
I received the application in its entirety and am currently processing it.
The hard copy of the application does not require special binding.

If you have any questions or concerns, please do not hesitate to contact me.

Thank you,

Lillian E. Beerman, Ph.D.
Water Rights Permitting Team
Water Availability Division
512-239-4019
lillian.beerman@tceq.texas.gov

Good afternoon Sam,

I am writing to follow up on the application that was submitted by email on 08/27/2021. Can you confirm that the application was received? I sent it to WRPT@tceq.texas.gov per the instructions. I did not receive any bounce-back email about the attachments being too large to email.

Also, for the hard copy submittal, do we need to provide any special binding?

Thank you, Erin

Big Sky Municipal Utility District (MUD) of Denton County_13795_Electronic_Application_Received

Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>

Tue 9/21/2021 5:05 PM

To: [redacted]
Cc: Lillian Beerman <Lillian.Beerman@Tceq.Texas.Gov>

Erin Stiggins, P.E., CFM, PMP

I, Lillian E. Beerman, am the project manager for Big Sky MUD, Application No. 13795 for a Water Use Permit.
I received the application in its entirety and am currently processing it.
The hard copy of the application does not require special binding.

If you have any questions or concerns, please do not hesitate to contact me.

Thank you,

Lillian E. Beerman, Ph.D.
Water Rights Permitting Team
Water Availability Division
512-239-4019
lillian.beerman@tceq.texas.gov

Good afternoon Sam,

I am writing to follow up on the application that was submitted by email on 08/27/2021. Can you confirm that the application was received? I sent it to WRPT@tceq.texas.gov per the instructions. I did not receive any bounce-back email about the attachments being too large to email.

Also, for the hard copy submittal, do we need to provide any special binding?

Thank you, Erin

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

TCEQ WATER RIGHTS PERMITTING APPLICATION

ADMINISTRATIVE INFORMATION CHECKLIST

Complete and submit this checklist for each application. See Instructions Page. 5.

APPLICANT(S): Big Sky Municipal Utility District of Denton County

Indicate whether the following items are included in your application by writing either Y (for yes) or N (for no) next to each item (all items are not required for every application).

Y/N		Y/N	
Y	**Administrative Information Report**	Y	**Worksheet 3.0**
N	Additional Co-Applicant Information	N	Additional W.S 3.0 for each Point
N	Additional Co-Applicant Signature Pages	N	Recorded Deeds for Diversion Points
Y	Written Evidence of Signature Authority	N	Consent For Diversion Access
Y	**Technical Information Report**	Y	**Worksheet 4.0**
Y	USGS Map (or equivalent) Attachment 1.1	Y	TPDES Permit(s) Attachments 4.1 and 4.2
Y	Map Showing Project Details Attachment 1.2	N	WWTP Discharge Data
Y	Original Photographs Attachment 1.4	Y	24-hour Pump Test
N	Water Availability Analysis	Y	Groundwater Well Permit Attachment 3.1
Y	**Worksheet 1.0**	N	Signed Water Supply Contract
N	Recorded Deeds for Irrigated Land	Y	**Worksheet 4.1**
N	Consent For Irrigation Land	Y	**Worksheet 5.0**
N	**Worksheet 1.1**	N	Addendum to Worksheet 5.0
N	Addendum to Worksheet 1.1	Y	**Worksheet 6.0**
N	**Worksheet 1.2**	N	Water Conservation Plan(s)
N	Addendum to Worksheet 1.2	N	Drought Contingency Plan(s)
Y	**Worksheet 2.0**	N	Documentation of Adoption
Y	Additional W.S 2.0 for Each Reservoir	Y	**Worksheet 7.0**
Y	Dam Safety Documents	Y	Accounting Plan Attachment 1.5
N	Notice(s) to Governing Bodies	Y	**Worksheet 8.0**
Y	Recorded Deeds for Inundated Land Attachment 2.1	Y	Fees
N	Consent For Inundation Land		

For Commission Use Only:
Proposed/Current Water Right Number: _____
Basin: _____ Watermaster area Y/N: _____

Attachment 1.6 - Consent Documentation
Attachment 1.7 - Evidence of Signature Authority

ADMINISTRATIVE INFORMATION REPORT

The following information **is required** for **all** new applications and amendments.

****Applicants are strongly encouraged to schedule a pre-application meeting with TCEQ Staff to discuss Applicant's needs prior to submitting an application. Call the Water Rights Permitting Team to schedule a meeting at* (512) 239-4600.**

1. TYPE OF APPLICATION (Instructions, Page. 6)

Indicate, by marking X, next to the following authorizations you are seeking.

X New Appropriation of State Water

_____ Amendment to a Water Right *

X Bed and Banks

***If you are seeking an amendment to an existing water rights authorization, you must be the owner of record of the authorization. If the name of the Applicant in Section 2, does not match the name of the current owner(s) of record for the permit or certificate or if any of the co-owners is not included as an applicant in this amendment request, your application could be returned. If you or a co-applicant are a new owner, but ownership is not reflected in the records of the TCEQ, submit a change of ownership request (Form TCEQ-10204) prior to submitting the application for an amendment. See Instructions page. 6. Please note that an amendment application may be returned, and the Applicant may resubmit once the change of ownership is complete.**

Please summarize the authorizations or amendments you are seeking in the space below or attach a narrative description entitled "Summary of Request."

Big Sky Municipal Utility District of Denton County is proposing a multi-phase, single-family development within Denton County, TX. The project is located in west Denton County, north of U.S. Highway 380 West and west of South Branch Road. Multiple detention ponds will serve as regional detention with two of the ponds to also impound water for recreational purposes. This application is requesting authorization from TCEQ to impound water. Water lost to evaporation will be replaced with groundwater-based return flows (discharge from a wastewater treatment plant) and groundwater.

2. APPLICANT INFORMATION (Instructions, Page. 6)

a. Applicant

Indicate the number of Applicants/Co-Applicants 1
(Include a copy of this section for each Co-Applicant, if any)

What is the Full Legal Name of the individual or entity (applicant) applying for this permit?

Big Sky Municipal Utility District of Denton County

(If the Applicant is an entity, the legal name must be spelled exactly as filed with the Texas Secretary of State, County, or in the legal documents forming the entity.)

If the applicant is currently a customer with the TCEQ, what is the Customer Number (CN)? You may search for your CN on the TCEQ website at http://www15.tceq.texas.gov/crpub/index.cfm?fuseaction=cust.CustSearch

CN : 605342336 (leave blank if you do not yet have a CN).

What is the name and title of the person or persons signing the application? Unless an application is signed by an individual applicant, the person or persons must submit written evidence that they meet the signatory requirements in *30 TAC § 295.14.*

First/Last Name: Andrew Mizerek

Title: President

Have you provided written evidence meeting the signatory requirements in 30 TAC § 295.14, as an attachment to this application? Yes

What is the applicant's mailing address as recognized by the US Postal Service (USPS)? You may verify the address on the USPS website at https://tools.usps.com/go/ZipLookupAction!input.action.

Name: Big Sky Municipal Utility District of Denton County

Mailing Address: 1980 Post Oak Blvd. Suite 180

City: Houston State: TX ZIP Code: 77056

Indicate an X next to the type of Applicant:

___Individual	___Sole Proprietorship-D.B.A.
___Partnership	___Corporation
___Trust	___Estate
___Federal Government	___State Government
___County Government	___City Government
X Other Government	___Other_____

For Corporations or Limited Partnerships, provide:
State Franchise Tax ID Number: _____ SOS Charter (filing) Number: _____

3. APPLICATION CONTACT INFORMATION (Instructions, Page. 9)

If the TCEQ needs additional information during the review of the application, who should be contacted? Applicant may submit their own contact information if Applicant wishes to be the point of contact.

First and Last Name: Dustin Wentz

Title: Associate Vice President

Organization Name: Pape-Dawson Engineers

Mailing Address: 5810 Tennyson Pkwy #425

City: Plano State: TX ZIP Code: 75024

Phone No.: 214-420-8494 Extension: 361

Fax No.: E-mail Address: [redacted]

4. WATER RIGHT CONSOLIDATED CONTACT INFORMATION (Instructions, Page. 9)

This section applies only if there are multiple Owners of the same authorization. Unless otherwise requested, Co-Owners will each receive future correspondence from the Commission regarding this water right (after a permit has been issued), such as notices and water use reports. Multiple copies will be sent to the same address if Co-Owners share the same address. Complete this section if there will be multiple owners and **all** owners agree to let one owner receive correspondence from the Commission. Leave this section blank if you would like all future notices to be sent to the address of each of the applicants listed in section 2 above.

I/We authorize all future notices be received on my/our behalf at the following:

First and Last Name:

Title:

Organization Name:

Mailing Address:

City: State: ZIP Code:

Phone No.: Extension:

Fax No.: E-mail Address:

NOT APPLICABLE - SINGLE OWNER

5. MISCELLANEOUS INFORMATION (Instructions, Page. 9)

a. The application will not be processed unless all delinquent fees and/or penalties owed to the TCEQ or the Office of the Attorney General on behalf of the TCEQ are paid in accordance with the Delinquent Fee and Penalty Protocol by all applicants/co-applicants. If you need assistance determining whether you owe delinquent penalties or fees, please call the Water Rights Permitting Team at (512) 239-4600, prior to submitting your application.

1. Does Applicant or Co-Applicant owe any fees to the TCEQ? **Yes** / (**No**)

   If **yes**, provide the following information:

   Account number: N/A Amount past due: N/A

2. Does Applicant or Co-Applicant owe any penalties to the TCEQ? **Yes** / (**No**)

   If **yes**, please provide the following information:

   Enforcement order number: N/A Amount past due: N/A

b. If the Applicant is a taxable entity (corporation or limited partnership), the Applicant must be in good standing with the Comptroller or the right of the entity to transact business in the State may be forfeited. See Texas Tax Code, Subchapter F. Applicant's may check their status with the Comptroller at https://mycpa.cpa.state.tx.us/coa/

   Is the Applicant or Co-Applicant in good standing with the Comptroller? (**Yes**) / **No**

c. The commission will not grant an application for a water right unless the applicant has submitted all Texas Water Development Board (TWDB) surveys of groundwater and surface water use – if required. See TWC §16.012(m) and 30 TAC § 297.41(a)(5).

Applicant has submitted all required TWDB surveys of groundwater and surface water? (**Yes**) / **No**

Big Sky MUD is a newly formed entity that has recently come on line and decertified the CCN from the previous entity, Bolivar Water Supply Corporation (WSC). Therefore, through evaluation of the TWDB Prior Water Use Surveys it has been confirmed that Bolivar WSC is current and has submitted all required surveys. Since Big Sky MUD has been recently formed it has not yet been subject to reporting requirements.

6. SIGNATURE PAGE (Instructions, Page. 11)

Applicant:

I, ANDREW MIZEREK PRESIDENT
(Typed or printed name) (Title)

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that I am authorized under Title 30 Texas Administrative Code §295.14 to sign and submit this document and I have submitted written evidence of my signature authority.

Signature: _____ Date: 8/11/2021
(Use blue ink)

Subscribed and Sworn to before me by the said

on this 11 day of August, 2021.

My commission expires on the 11 day of December, 2023.

Jessica Lee
Notary Public *[SEAL]*

Collin
County, Texas

JESSICA LEE
Notary Public, State of Texas
Comm. Expires 12-11-2023
Notary ID 124763924

If the Application includes Co-Applicants, each Applicant and Co-Applicant must submit an original, separate signature page

TECHNICAL INFORMATION REPORT
WATER RIGHTS PERMITTING

This Report is required for applications for new or amended water rights. Based on the Applicant's responses below, Applicant are directed to submit additional Worksheets (provided herein). A completed Administrative Information Report is also required for each application.

Applicants are strongly encouraged to schedule a pre-application meeting with TCEQ Permitting Staff to discuss Applicant's needs and to confirm information necessary for an application prior to submitting such application. Please call Water Availability Division at (512) 239-4600 to schedule a meeting. Applicant attended a pre-application meeting with TCEQ Staff for this Application? (Y) / N_____ (If yes, date : 03/12/2021 and 06/30/2021).

1. New or Additional Appropriations of State Water. Texas Water Code (TWC) § 11.121 (Instructions, Page. 12)

State Water is: *The water of the ordinary flow, underflow, and tides of every flowing river, natural stream, and lake, and of every bay or arm of the Gulf of Mexico, and the storm water, floodwater, and rainwater of every river, natural stream, canyon, ravine, depression, and watershed in the state. TWC § 11.021.*

a. Applicant requests a new appropriation (diversion or impoundment) of State Water? (Y) / N_____

b. Applicant requests an amendment to an existing water right requesting an increase in the appropriation of State Water or an increase of the overall or maximum combined diversion rate? Y / (N)_____(If yes, indicate the Certificate or Permit number:_____)

If Applicant answered yes to (a) or (b) above, does Applicant also wish to be considered for a term permit pursuant to TWC § 11.1381? Y / (N)___

c. Applicant requests to extend an existing Term authorization or to make the right permanent? Y / (N)_____(If yes, indicate the Term Certificate or Permit number:_____)

If Applicant answered yes to (a), (b) or (c), the following worksheets and documents are required:

- **Worksheet 1.0 – Quantity, Purpose, and Place of Use Information Worksheet**
- **Worksheet 2.0 - Impoundment/Dam Information Worksheet** (submit one worksheet for each impoundment or reservoir requested in the application)
- **Worksheet 3.0 - Diversion Point Information Worksheet** (submit one worksheet for each diversion point and/or one worksheet for the upstream limit and one worksheet for the downstream limit of each diversion reach requested in the application)
- **Worksheet 5.0 – Environmental Information Worksheet**
- **Worksheet 6.0 – Water Conservation Information Worksheet**
- **Worksheet 7.0 – Accounting Plan Information Worksheet**
- **Worksheet 8.0 – Calculation of Fees**
- **Fees calculated on Worksheet 8.0 –** see instructions **Page. 34.**
- **Maps –** See instructions **Page. 15.**
- **Photographs -** See instructions **Page. 30.**

Additionally, if Applicant wishes to submit an alternate source of water for the project/authorization, see Section 3, Page 3 for Bed and Banks Authorizations (Alternate sources may include groundwater, imported water, contract water or other sources).

Additional Documents and Worksheets may be required (see within).

2. Amendments to Water Rights. TWC § 11.122 (Instructions, Page. 12)

This section should be completed if Applicant owns an existing water right and Applicant requests to amend the water right. ***If Applicant is not currently the Owner of Record in the TCEQ Records, Applicant must submit a Change of Ownership Application (TCEQ-10204) prior to submitting the amendment Application or provide consent from the current owner to make the requested amendment. If the application does not contain consent from the current owner to make the requested amendment, TCEQ will not begin processing the amendment application until the Change of Ownership has been completed and will consider the Received Date for the application to be the date the Change of Ownership is completed.*** **See instructions page. 6.**

Water Right (Certificate or Permit) number you are requesting to amend: N/A

Applicant requests to sever and combine existing water rights from one or more Permits or Certificates into another Permit or Certificate? **Y / N** N/A (if yes, complete chart below):

List of water rights to sever	Combine into this ONE water right
N/A	

a. Applicant requests an amendment to an existing water right to increase the amount of the appropriation of State Water (diversion and/or impoundment)? **Y /** (**N**)

If yes, application is a new appropriation for the increased amount, complete ***Section 1 of this Report (PAGE. 1) regarding New or Additional Appropriations of State Water.***

b. Applicant requests to amend existing Term authorization to extend the term or make the water right permanent (remove conditions restricting water right to a term of years)? **Y /** (**N**)

If yes, application is a new appropriation for the entire amount, complete ***Section 1 of this Report (PAGE. 1) regarding New or Additional Appropriations of State Water.***

c. Applicant requests an amendment to change the purpose or place of use or to add an additional purpose or place of use to an existing Permit or Certificate? **Y /** (**N**)
If yes, submit:

- **Worksheet 1.0 – Quantity, Purpose, and Place of Use Information Worksheet**
- **Worksheet 1.2 - Notice: "Marshall Criteria"**

d. Applicant requests to change: diversion point(s); or reach(es); or diversion rate? **Y /** (**N**)
If yes, submit:

- **Worksheet 3.0 - Diversion Point Information Worksheet** (submit one worksheet for each diversion point or one worksheet for the upstream limit and one worksheet for the downstream limit of each diversion reach)
- **Worksheet 5.0 – Environmental Information** (Required for <u>any</u> new diversion points that are not already authorized in a water right)

e. Applicant requests amendment to add or modify an impoundment, reservoir, or dam? **Y /** (**N**)

If yes, submit: **Worksheet 2.0 - Impoundment/Dam Information Worksheet** (submit one worksheet for each impoundment or reservoir)

f. Other - Applicant requests to change any provision of an authorization not mentioned above? **Y** / (**N**)_____*If yes, call the Water Availability Division at (512) 239-4600 to discuss.*

Additionally, all amendments require:

- **Worksheet 8.0 – Calculation of Fees; and Fees calculated – see instructions Page. 34**
- **Maps – See instructions Page. 15.**
- **Additional Documents and Worksheets may be required (see within).**

3. Bed and Banks. TWC § 11.042 (Instructions, Page 13)

a. Pursuant to contract, Applicant requests authorization to convey, stored or conserved water to the place of use or diversion point of purchaser(s) using the bed and banks of a watercourse? TWC § 11.042(a). **Y**/(**N**)_____

If yes, submit a signed copy of the Water Supply Contract pursuant to 30 TAC §§ 295.101 and 297.101. Further, if the underlying Permit or Authorization upon which the Contract is based does not authorize Purchaser's requested Quantity, Purpose or Place of Use, or Purchaser's diversion point(s), then either:

1. *Purchaser must submit the worksheets required under Section 1 above with the Contract Water identified as an alternate source; or*
2. *Seller must amend its underlying water right under Section 2.*

b. Applicant requests to convey water imported into the state from a source located wholly outside the state using the bed and banks of a watercourse? TWC § 11.042(a-1). **Y** / (**N**)___

If yes, submit: worksheets 1.0, 2.0, 3.0, 4.0, 5.0, 7.0, 8.0, Maps and fees from the list below.

c. Applicant requests to convey Applicant's own return flows derived from privately owned groundwater using the bed and banks of a watercourse? TWC § 11.042(b). (**Y**) / **N**___

If yes, submit: worksheets 1.0, 2.0, 3.0, 4.0, 5.0, 7.0, 8.0, Maps, and fees from the list below.

d. Applicant requests to convey Applicant's own return flows derived from surface water using the bed and banks of a watercourse? TWC § 11.042(c). **Y** / (**N**)___

If yes, submit: worksheets 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, Maps, and fees from the list below.

Please note, if Applicant requests the reuse of return flows belonging to others, the Applicant will need to submit the worksheets and documents under Section 1 above, as the application will be treated as a new appropriation subject to termination upon direct or indirect reuse by the return flow discharger/owner.

e. Applicant requests to convey water from any other source, other than (a)-(d) above, using the bed and banks of a watercourse? TWC § 11.042(c). **Y** / (**N**)_____

If yes, submit: worksheets 1.0, 2.0, 3.0, 4.0, 5.0, 7.0, 8.0, Maps, and fees from the list below.

Worksheets and information:

- **Worksheet 1.0 – Quantity, Purpose, and Place of Use Information Worksheet**
- **Worksheet 2.0 - Impoundment/Dam Information Worksheet** (submit one worksheet for each impoundment or reservoir owned by the applicant through which water will be conveyed or diverted)
- **Worksheet 3.0 - Diversion Point Information Worksheet** (submit one worksheet for the downstream limit of each diversion reach for the proposed conveyances)
- **Worksheet 4.0 – Discharge Information Worksheet** (for each discharge point)

- **Worksheet 5.0 – Environmental Information Worksheet**
- **Worksheet 6.0 – Water Conservation Information Worksheet**
- **Worksheet 7.0 – Accounting Plan Information Worksheet**
- **Worksheet 8.0 – Calculation of Fees; and Fees calculated – see instructions Page. 34**
- **Maps –** See instructions **Page. 15.**
- **Additional Documents and Worksheets may be required (see within).**

4. General Information, Response Required for all Water Right Applications (Instructions, Page 15)

a. Provide information describing how this application addresses a water supply need in a manner that is consistent with the state water plan or the applicable approved regional water plan for any area in which the proposed appropriation is located or, in the alternative, describe conditions that warrant a waiver of this requirement (*not required for applications to use groundwater-based return flows*). Include citations or page numbers for the State and Regional Water Plans, if applicable. Provide the information in the space below or submit a supplemental sheet entitled "Addendum Regarding the State and Regional Water Plans":

Big Sky Municipal Utility District is located in Denton County which is part of Region C of the State's Water Plan. The state and regional water plans generally do not address every possible change in individual water rights. The application is consistent with the Region C 2021 Water Plan and the 2017 State Water Plan because there is nothing with the plans that conflict with the application.

b. Did the Applicant perform its own Water Availability Analysis? **Y** / (**N**)_____

If the Applicant performed its own Water Availability Analysis, provide electronic copies of any modeling files and reports. See Attachment 2.3 for Hydrogeological Report

C. Does the application include required Maps? (Instructions **Page. 15**) (**Y**) / **N**_____
See Attachments 1.1 and 1.2

Relevant site data is provided:
Attachment 2.2 - Boundary Survey
Attachment 2.4 - WOUS Delineation Report

WORKSHEET 1.0
Quantity, Purpose and Place of Use

1. New Authorizations (Instructions, Page. 16)

Submit the following information regarding quantity, purpose and place of use for requests for new or additional appropriations of State Water or Bed and Banks authorizations:

Quantity (acre-feet) (*Include losses for Bed and Banks*)	**State Water Source (River Basin) or Alternate Source** *each *alternate source* (*and new appropriation based on return flows of others*) *also requires completion of Worksheet 4.0*	**Purpose(s) of Use**	**Place(s) of Use** **requests to move state water out of basin also require completion of Worksheet 1.1 Interbasin Transfer*
25.45	Trinity River Basin	Recreation	Denton County
762.20	Groundwater-based return flows from WWTP.	Recreation	Denton County
68.3	Groundwater-based return flows from groundwater wells Well 1A and Limerock Well 2 to replace losses to evapotranspiration	Recreation	Denton County

855.95 Total amount of water (in acre-feet) to be used annually (*include losses for Bed and Banks applications*)

If the Purpose of Use is Agricultural/Irrigation for any amount of water, provide:

a. Location Information Regarding the Lands to be Irrigated

i) Applicant proposes to irrigate a total of N/A acres in any one year. This acreage is all of or part of a larger tract(s) which is described in a supplement attached to this application and contains a total of N/A acres in N/A County, TX.

ii) Location of land to be irrigated: In the N/A Original Survey No. N/A, Abstract No. N/A.

A copy of the deed(s) or other acceptable instrument describing the overall tract(s) with the recording information from the county records must be submitted. Applicant's name must match deeds.
If the Applicant is not currently the sole owner of the lands to be irrigated, Applicant must submit documentation evidencing consent or other documentation supporting Applicant's right to use the land described.

Water Rights for Irrigation may be appurtenant to the land irrigated and convey with the land unless reserved in the conveyance. 30 TAC § 297.81.

2. Amendments - Purpose or Place of Use (Instructions, Page. 12)

a. Complete this section for each requested amendment changing, adding, or removing Purpose(s) or Place(s) of Use, complete the following: N/A

Quantity (acre-feet)	Existing Purpose(s) of Use	Proposed Purpose(s) of Use*	Existing Place(s) of Use	Proposed Place(s) of Use**

**If the request is to add additional purpose(s) of use, include the existing and new purposes of use under "Proposed Purpose(s) of Use."*

***If the request is to add additional place(s) of use, include the existing and new places of use under "Proposed Place(s) of Use."*

Changes to the purpose of use in the Rio Grande Basin may require conversion. 30 TAC § 303.43.

b. For any request which adds Agricultural purpose of use or changes the place of use for Agricultural rights, provide the following location information regarding the lands to be irrigated: N/A

i. Applicant proposes to irrigate a total of_____acres in any one year. This acreage is all of or part of a larger tract(s) which is described in a supplement attached to this application and contains a total of_____acres in_____ County, TX.

ii. Location of land to be irrigated: In the_____Original Survey No. _____, Abstract No._____.

A copy of the deed(s) describing the overall tract(s) with the recording information from the county records must be submitted. Applicant's name must match deeds. If the Applicant is not currently the sole owner of the lands to be irrigated, Applicant must submit documentation evidencing consent or other legal right for Applicant to use the land described.

Water Rights for Irrigation may be appurtenant to the land irrigated and convey with the land unless reserved in the conveyance. 30 TAC § 297.81.

c. Submit Worksheet 1.1, Interbasin Transfers, for any request to change the place of use which moves State Water to another river basin. N/A

d. See Worksheet 1.2, Marshall Criteria, and submit if required. N/A

e. See Worksheet 6.0, Water Conservation/Drought Contingency, and submit if required. N/A

WORKSHEET 1.1
INTERBASIN TRANSFERS, TWC § 11.085

Submit this worksheet for an application for a new or amended water right which requests to transfer State Water from its river basin of origin to use in a different river basin. A river basin is defined and designated by the Texas Water Development Board by rule pursuant to TWC § 16.051.

N/A

Applicant requests to transfer State Water to another river basin within the State? **Y / N**_____

1. Interbasin Transfer Request (Instructions, Page. 20)

a. Provide the Basin of Origin._____

b. Provide the quantity of water to be transferred (acre-feet)._____

c. Provide the Basin(s) and count(y/ies) where use will occur in the space below:

_____

2. Exemptions (Instructions, Page. 20), TWC § 11.085(v)

Certain interbasin transfers are exempt from further requirements. Answer the following:

a. The proposed transfer, which in combination with any existing transfers, totals less than 3,000 acre-feet of water per annum from the same water right. **Y/N**_

b. The proposed transfer is from a basin to an adjoining coastal basin? **Y/N**___

c. The proposed transfer from the part of the geographic area of a county or municipality, or the part of the retail service area of a retail public utility as defined by Section 13.002, that is within the basin of origin for use in that part of the geographic area of the county or municipality, or that contiguous part of the retail service area of the utility, not within the basin of origin? **Y/N**__

d. The proposed transfer is for water that is imported from a source located wholly outside the boundaries of Texas, except water that is imported from a source located in the United Mexican States? **Y/N**__

3. Interbasin Transfer Requirements (Instructions, Page. 20)

For each Interbasin Transfer request that is not exempt under any of the exemptions listed above Section 2, provide the following information in a supplemental attachment titled "Addendum to Worksheet 1.1, Interbasin Transfer":

a. the contract price of the water to be transferred (if applicable) (also include a copy of the contract or adopted rate for contract water);

b. a statement of each general category of proposed use of the water to be transferred and a detailed description of the proposed uses and users under each category;

c. the cost of diverting, conveying, distributing, and supplying the water to, and treating the water for, the proposed users (example - expert plans and/or reports documents may be provided to show the cost);

d. describe the need for the water in the basin of origin and in the proposed receiving basin based on the period for which the water supply is requested, but not to exceed 50 years (the need can be identified in the most recently approved regional water plans. The state and regional water plans are available for download at this website: (http://www.twdb.texas.gov/waterplanning/swp/index.asp);

e. address the factors identified in the applicable most recently approved regional water plans which address the following:

(i) the availability of feasible and practicable alternative supplies in the receiving basin to the water proposed for transfer;
(ii) the amount and purposes of use in the receiving basin for which water is needed;

(iii) proposed methods and efforts by the receiving basin to avoid waste and implement water conservation and drought contingency measures;

(iv) proposed methods and efforts by the receiving basin to put the water proposed for transfer to beneficial use;

(v) the projected economic impact that is reasonably expected to occur in each basin as a result of the transfer; and

(vi) the projected impacts of the proposed transfer that are reasonably expected to occur on existing water rights, instream uses, water quality, aquatic and riparian habitat, and bays and estuaries that must be assessed under Sections 11.147, 11.150, and 11.152 in each basin *(if applicable)*. If the water sought to be transferred is currently authorized to be used under an existing permit, certified filing, or certificate of adjudication, such impacts shall only be considered in relation to that portion of the permit, certified filing, or certificate of adjudication proposed for transfer and shall be based on historical uses of the permit, certified filing, or certificate of adjudication for which amendment is sought;

f. proposed mitigation or compensation, if any, to the basin of origin by the applicant; and

g. the continued need to use the water for the purposes authorized under the existing Permit, Certified Filing, or Certificate of Adjudication, if an amendment to an existing water right is sought.

WORKSHEET 1.2
NOTICE. "THE MARSHALL CRITERIA"

This worksheet assists the Commission in determining notice required for certain **amendments** that do not already have a specific notice requirement in a rule for that type of amendment, and *that do not change the amount of water to be taken or the diversion rate*. The worksheet provides information that Applicant **is required** to submit for such amendments which include changes in use, changes in place of use, or other non-substantive changes in a water right (such as certain amendments to special conditions or changes to off-channel storage). These criteria address whether the proposed amendment will impact other water right holders or the on-stream environment beyond and irrespective of the fact that the water right can be used to its full authorized amount.

N/A

*This worksheet is **not required for Applications in the Rio Grande Basin** requesting changes in the purpose of use, rate of diversion, point of diversion, and place of use for water rights held in and transferred within and between the mainstems of the Lower Rio Grande, Middle Rio Grande, and Amistad Reservoir. See 30 TAC § 303.42.*

*This worksheet is **not required for amendments which are only changing or adding diversion points, or request only a bed and banks authorization or an IBT authorization**. However, Applicants may wish to submit the Marshall Criteria to ensure that the administrative record includes information supporting each of these criteria*

1. The "Marshall Criteria" (Instructions, Page. 21)

Submit responses on a supplemental attachment titled "Marshall Criteria" in a manner that conforms to the paragraphs (a) – (g) below:

a. Administrative Requirements and Fees. Confirm whether application meets the administrative requirements for an amendment to a water use permit pursuant to TWC Chapter 11 and Title 30 Texas Administrative Code (TAC) Chapters 281, 295, and 297. An amendment application should include, but is not limited to, a sworn application, maps, completed conservation plan, fees, etc.

b. Beneficial Use. Discuss how proposed amendment is a beneficial use of the water as defined in TWC § 11.002 and listed in TWC § 11.023. Identify the specific proposed use of the water (e.g., road construction, hydrostatic testing, etc.) for which the amendment is requested.

c. Public Welfare. Explain how proposed amendment is not detrimental to the public welfare. Consider any public welfare matters that might be relevant to a decision on the application. Examples could include concerns related to the well-being of humans and the environment.

d. Groundwater Effects. Discuss effects of proposed amendment on groundwater or groundwater recharge.

e. State Water Plan. Describe how proposed amendment addresses a water supply need in a manner that is consistent with the state water plan or the applicable approved regional water plan for any area in which the proposed appropriation is located or, in the alternative, describe conditions that warrant a waiver of this requirement. The state and regional water plans are available for download at: http://www.twdb.texas.gov/waterplanning/swp/index.asp.

f. Waste Avoidance. Provide evidence that reasonable diligence will be used to avoid waste and achieve water conservation as defined in TWC § 11.002. Examples of evidence could include, but are not limited to, a water conservation plan or, if required, a drought contingency plan, meeting the requirements of 30 TAC Chapter 288.

g. Impacts on Water Rights or On-stream Environment. Explain how proposed amendment will not impact other water right holders or the on-stream environment beyond and irrespective of the fact that the water right can be used to its full authorized amount.

WORKSHEET 2.0
Impoundment/Dam Information

This worksheet **is required** for any impoundment, reservoir and/or dam. Submit an additional Worksheet 2.0 for each impoundment or reservoir requested in this application.

If there is more than one structure, the numbering/naming of structures should be consistent throughout the application and on any supplemental documents (e.g. maps).

1. Storage Information (Instructions, Page. 21)

a. Official USGS name of reservoir, if applicable: POND B (unofficial name) - Res #1

b. Provide amount of water (in acre-feet) impounded by structure at normal maximum operating level: 14.13.

c. The impoundment is on-channel X or off-channel _____(mark one)

i. Applicant has verified on-channel or off-channel determination by contacting Surface Water Availability Team at (512) 239-4600? **Y** / (**N**)

ii. If on-channel, will the structure have the ability to pass all State Water inflows that Applicant does not have authorization to impound? (**Y**) / **N**

d. Is the impoundment structure already constructed? (**Y**) / **N**

i. For already constructed **on-channel** structures:

1. Date of Construction: 2001-2005 (determined based on historical aerials).

2. Was it constructed to be an exempt structure under TWC § 11.142? (**Y**) / **N**
   a. If Yes, is Applicant requesting to proceed under TWC § 11.143? (**Y**) / **N**
   b. If No, has the structure been issued a notice of violation by TCEQ? **Y** / **N** N/A

3. Is it a U.S. Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service (SCS)) floodwater-retarding structure? **Y** / (**N**)
   a. If yes, provide the Site No. N/A and watershed project name N/A;
   b. Authorization to close "ports" in the service spillway requested? **Y** / **N** N/A

ii. For **any** proposed new structures or modifications to structures:

Applicant is currently designing improvements to the dam structure to comply with TCEQ Dam Safety Section. Proposed design will be submitted to TCEQ Dam Safety Division for review and approval. Pre-Application meeting held 03/02/2021 with Johnny Cosgrove and Alexander Wallen.

1. Applicant **must** contact TCEQ Dam Safety Section at (512) 239-0326, *prior to submitting an Application.* Applicant has contacted the TCEQ Dam Safety Section regarding the submission requirements of 30 TAC, Ch. 299? (**Y**) / **N**
   Provide the date and the name of the Staff Person Warren Samuelson on 06/27/2016

2. As a result of Applicant's consultation with the TCEQ Dam Safety Section, TCEQ has confirmed that:
   a. No additional dam safety documents required with the Application. **Y** / (**N**)
   b. Plans (with engineer's seal) for the structure required. (**Y**) / **N**
   c. Engineer's signed and sealed hazard classification required. (**Y**) / **N**
   d. Engineer's statement that structure complies with 30 TAC, Ch. 299 Rules required. **Y** / (**N**)

Correspondence with TCEQ Dam Safety included as Attachments 5.1 and 5.2.

3. Applicants **shall** give notice by certified mail to each member of the governing body of each county and municipality in which the reservoir, or any part of the reservoir to be constructed, will be located. (30 TAC § 295.42). Applicant must submit a copy of all the notices and certified mailing cards with this Application. Notices and cards are included? **Y** / **N**

iii. Additional information required for **on-channel** storage:

1. Surface area (in acres) of on-channel reservoir at normal maximum operating level: 4.70.

2. Based on the Application information provided, Staff will calculate the drainage area above the on-channel dam or reservoir. If Applicant wishes to also calculate the drainage area they may do so at their option.
Applicant has calculated the drainage area. **Y**/**N**
If yes, the drainage area is 0.759 sq. miles.
(*If assistance is needed, call the Surface Water Availability Team prior to submitting the application, (512) 239-4600).*

2. Structure Location (Instructions, Page. 23)

a. On Watercourse (if on-channel) (USGS name): Unnamed Tributary to Denton Creek

b. Zip Code: 76249

c. In the Richard R. Jowell Original Survey No. _____, Abstract No. 660, Denton County, Texas.

* ***A copy of the deed(s) with the recording information from the county records must be submitted describing the tract(s) that include the structure and all lands to be inundated.***

*****If the Applicant is not currently the sole owner of the land on which the structure is or will be built and sole owner of all lands to be inundated, Applicant must submit documentation evidencing consent or other documentation supporting Applicant's right to use the land described.***

d. A point on the centerline of the dam (on-channel) or anywhere within the impoundment (off-channel) is:

Latitude 33.247111 °N, Longitude 97.369505 °W.

****Provide Latitude and Longitude coordinates in decimal degrees to at least six decimal places***

di. Indicate the method used to calculate the location (examples: Handheld GPS Device, GIS, Mapping Program): ArcGIS version 10.8

dii. Map submitted which clearly identifies the Impoundment, dam (where applicable), and the lands to be inundated. See instructions Page. 15. **Y** / **N**

WORKSHEET 2.0
Impoundment/Dam Information

This worksheet **is required** for any impoundment, reservoir and/or dam. Submit an additional Worksheet 2.0 for each impoundment or reservoir requested in this application.

If there is more than one structure, the numbering/naming of structures should be consistent throughout the application and on any supplemental documents (e.g. maps).

1. Storage Information (Instructions, Page. 21)

a. Official USGS name of reservoir, if applicable: POND C (unofficial name) - Res #2

b. Provide amount of water (in acre-feet) impounded by structure at normal maximum operating level: 11.32.

c. The impoundment is on-channel X or off-channel _____(mark one)

i. Applicant has verified on-channel or off-channel determination by contacting Surface Water Availability Team at (512) 239-4600? **Y** / (**N**)

ii. If on-channel, will the structure have the ability to pass all State Water inflows that Applicant does not have authorization to impound? (**Y**) / **N**

d. Is the impoundment structure already constructed? (**Y**) / **N**

i. For already constructed **on-channel** structures:

1. Date of Construction: Prior to 1995 (determined based on historical aerials).

2. Was it constructed to be an exempt structure under TWC § 11.142? (**Y**) / **N**
   a. If Yes, is Applicant requesting to proceed under TWC § 11.143? (**Y**) / **N**
   b. If No, has the structure been issued a notice of violation by TCEQ? **Y** / **N** N/A

3. Is it a U.S. Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service (SCS)) floodwater-retarding structure? **Y** / (**N**)
   a. If yes, provide the Site No. N/A and watershed project name N/A;
   b. Authorization to close "ports" in the service spillway requested? **Y** / **N** N/A

ii. For **any** proposed new structures or modifications to structures:

1. Applicant **must** contact TCEQ Dam Safety Section at (512) 239-0326, *prior to submitting an Application.* Applicant has contacted the TCEQ Dam Safety Section regarding the submission requirements of 30 TAC, Ch. 299? (**Y**) / **N**
   Provide the date and the name of the Staff Person Warren Samuelson on 06/27/2016

2. As a result of Applicant's consultation with the TCEQ Dam Safety Section, TCEQ has confirmed that:
   a. No additional dam safety documents required with the Application. (**Y**) / **N**
   b. Plans (with engineer's seal) for the structure required. **Y** / (**N**)
   c. Engineer's signed and sealed hazard classification required. **Y** / (**N**)
   d. Engineer's statement that structure complies with 30 TAC, Ch. 299 Rules required. **Y** / (**N**)

Volume of impoundment is less than 50 acre-feet therefore not subject to Dam Safety jurisdiction.

3. Applicants **shall** give notice by certified mail to each member of the governing body of each county and municipality in which the reservoir, or any part of the reservoir to be constructed, will be located. (30 TAC § 295.42). Applicant must submit a copy of all the notices and certified mailing cards with this Application. Notices and cards are included? **Y** / **N**

iii. Additional information required for **on-channel** storage:

1. Surface area (in acres) of on-channel reservoir at normal maximum operating level: 1.49.

2. Based on the Application information provided, Staff will calculate the drainage area above the on-channel dam or reservoir. If Applicant wishes to also calculate the drainage area they may do so at their option.
Applicant has calculated the drainage area. **Y**/**N**
If yes, the drainage area is 0.195 sq. miles.
(*If assistance is needed, call the Surface Water Availability Team prior to submitting the application, (512) 239-4600).*

2. Structure Location (Instructions, Page. 23)

a. On Watercourse (if on-channel) (USGS name): Unnamed Tributary to Denton Creek

b. Zip Code: 76249

c. In the Richard R. Jowell Original Survey No. _____, Abstract No. 660, Denton County, Texas.

* ***A copy of the deed(s) with the recording information from the county records must be submitted describing the tract(s) that include the structure and all lands to be inundated.***

*****If the Applicant is not currently the sole owner of the land on which the structure is or will be built and sole owner of all lands to be inundated, Applicant must submit documentation evidencing consent or other documentation supporting Applicant's right to use the land described.***

d. A point on the centerline of the dam (on-channel) or anywhere within the impoundment (off-channel) is:

Latitude 33.249819 °N, Longitude 97.366979 °W.

****Provide Latitude and Longitude coordinates in decimal degrees to at least six decimal places***

di. Indicate the method used to calculate the location (examples: Handheld GPS Device, GIS, Mapping Program): ArcGIS version 10.8

dii. Map submitted which clearly identifies the Impoundment, dam (where applicable), and the lands to be inundated. See instructions Page. 15. **Y** / **N**

WORKSHEET 3.0
DIVERSION POINT (OR DIVERSION REACH) INFORMATION

This worksheet **is required** for each diversion point or diversion reach. Submit one Worksheet 3.0 for **each** diversion point and two Worksheets for **each** diversion reach (one for the upstream limit and one for the downstream limit of each diversion reach).

The numbering of any points or reach limits should be consistent throughout the application and on supplemental documents (e.g. maps). N/A No diversions are proposed.

1. Diversion Information (Instructions, Page. 24)

a. This Worksheet is to add new (select 1 of 3 below):

1. ____Diversion Point No.
2. ____Upstream Limit of Diversion Reach No.
3. ____Downstream Limit of Diversion Reach No.

b. Maximum Rate of Diversion for **this new point**_____cfs (cubic feet per second) or_____gpm (gallons per minute)

c. Does this point share a diversion rate with other points? **Y / N**_____
*If yes, submit Maximum **Combined** Rate of Diversion for all points/reaches*_____cfs or_____gpm

d. For amendments, is Applicant seeking to increase combined diversion rate? **Y / N**_____

*** An increase in diversion rate is considered a new appropriation and would require completion of Section 1, New or Additional Appropriation of State Water.*

e. Check (√) the appropriate box to indicate diversion location and indicate whether the diversion location is existing or proposed):

Check one		Write: Existing or Proposed
	Directly from stream	
	From an on-channel reservoir	
	From a stream to an on-channel reservoir	
	Other method (explain fully, use additional sheets if necessary)	

f. Based on the Application information provided, Staff will calculate the drainage area above the diversion point (or reach limit). If Applicant wishes to also calculate the drainage area, you may do so at their option.

Applicant has calculated the drainage area. **Y / N**_____

If yes, the drainage area is_____sq. miles.
(*If assistance is needed, call the Surface Water Availability Team at (512) 239-4600, prior to submitting application*)

2. Diversion Location (Instructions, Page 25)

a. On watercourse (USGS name): _____

b. Zip Code: _____

c. Location of point: In the_____Original Survey No._____, Abstract No._____,_____County, Texas.

A copy of the deed(s) with the recording information from the county records must be submitted describing tract(s) that include the diversion structure.

For diversion reaches, the Commission cannot grant an Applicant access to property that the Applicant does not own or have consent or a legal right to access, the Applicant will be required to provide deeds, or consent, or other documents supporting a legal right to use the specific points when specific diversion points within the reach are utilized. Other documents may include, but are not limited to: a recorded easement, a land lease, a contract, or a citation to the Applicant's right to exercise eminent domain to acquire access.

d. Point is at:
Latitude_____°N, Longitude_____°W.
Provide Latitude and Longitude coordinates in decimal degrees to at least six decimal places

e. Indicate the method used to calculate the location (examples: Handheld GPS Device, GIS, Mapping Program):_____

f. Map submitted must clearly identify each diversion point and/or reach. See instructions Page. 38.

g. If the Plan of Diversion is complicated and not readily discernable from looking at the map, attach additional sheets that fully explain the plan of diversion.

WORKSHEET 4.0
DISCHARGE INFORMATION

Well 1A, DP #1

This worksheet required for any requested authorization to discharge water into a State Watercourse for conveyance and later withdrawal or in-place use. Worksheet 4.1 is also required for each Discharge point location requested. **Instructions Page. 26.** ***Applicant is responsible for obtaining any separate water quality authorizations which may be required and for insuring compliance with TWC, Chapter 26 or any other applicable law.***

a. The purpose of use for the water being discharged will be to replace water lost to evaporation.

b. Provide the amount of water that will be lost to transportation, evaporation, seepage, channel or other associated carriage losses 43.0 gpm ~~%~~ and explain the method of calculation: Calculations in Attachment 1.3. Water budget using max annual evaporation values total for entire project area for the location on the TWDB 410.

Is the source of the discharged water return flows? **Y** / (**N**) If yes, provide the following information:

1. The TPDES Permit Number(s). N/A (attach a copy of the **current** TPDES permit(s))

2. Applicant is the owner/holder of each TPDES permit listed above? **Y** / **N** N/A

PLEASE NOTE: If Applicant is not the discharger of the return flows, the application should be submitted under Section 1, New or Additional Appropriation of State Water, as a request for a new appropriation of state water. If Applicant is the discharger, then the application should be submitted under Section 3, Bed and Banks.

3. Monthly WWTP discharge data for the past 5 years in electronic format. (Attach and label as "Supplement to Worksheet 4.0"). N/A

4. The percentage of return flows from groundwater 100%, surface water 0%?

5. If any percentage is surface water, provide the base water right number(s) N/A.

c. Is the source of the water being discharged groundwater? (**Y**) / **N** If yes, provide the following information:

1. Source aquifer(s) from which water will be pumped: Trinity - Antler's Aquifer

2. Any 24 hour pump test for the well if one has been conducted. If the well has not been constructed, provide production information for wells in the same aquifer in the area of the application. See http://www.twdb.texas.gov/groundwater/data/gwdbrpt.asp. Additionally, provide well numbers or identifiers Well 1A, DP#1.

3. Indicate how the groundwater will be conveyed to the stream or reservoir.
Groundwater will be conveyed in pipe from well to reservoir.

4. A copy of the groundwater well permit if it is located in a Groundwater Conservation District (GCD) or evidence that a groundwater well permit is not required.

ci. Is the source of the water being discharged a surface water supply contract? **Y** / (**N**)
If yes, provide the signed contract(s).

cii. Identify any other source of the water N/A

WORKSHEET 4.0
DISCHARGE INFORMATION

Limerock Well, DP #2

This worksheet required for any requested authorization to discharge water into a State Watercourse for conveyance and later withdrawal or in-place use. Worksheet 4.1 is also required for each Discharge point location requested. **Instructions Page. 26.** ***Applicant is responsible for obtaining any separate water quality authorizations which may be required and for insuring compliance with TWC, Chapter 26 or any other applicable law.***

a. The purpose of use for the water being discharged will be to replace water lost to evaporation.

b. Provide the amount of water that will be lost to transportation, evaporation, seepage, channel or other associated carriage losses 43.0 gpm ~~%~~ and explain the method of calculation: Calculations in Attachment 1.3. Water budget using max annual evaporation values total for entire project area for the location on the TWDB 410.

Is the source of the discharged water return flows? (Y) / N_____ If yes, provide the following information:

1. The TPDES Permit Number(s). N/A (attach a copy of the **current** TPDES permit(s))

2. Applicant is the owner/holder of each TPDES permit listed above? (Y) / N_____

PLEASE NOTE: If Applicant is not the discharger of the return flows, the application should be submitted under Section 1, New or Additional Appropriation of State Water, as a request for a new appropriation of state water. If Applicant is the discharger, then the application should be submitted under Section 3, Bed and Banks.

3. Monthly WWTP discharge data for the past 5 years in electronic format. (Attach and label as "Supplement to Worksheet 4.0"). N/A

4. The percentage of return flows from groundwater 100%, surface water 0%?

5. If any percentage is surface water, provide the base water right number(s) N/A.

c. Is the source of the water being discharged groundwater? (Y) / N_____ If yes, provide the following information:

1. Source aquifer(s) from which water will be pumped: Trinity - Antler's Aquifer

2. Any 24 hour pump test for the well if one has been conducted. If the well has not been constructed, provide production information for wells in the same aquifer in the area of the application. See http://www.twdb.texas.gov/groundwater/data/gwdbrpt.asp. Additionally, provide well numbers or identifiers Limerock Well, DP #2.

3. Indicate how the groundwater will be conveyed to the stream or reservoir.
Groundwater will be conveyed in pipe from well to reservoir.

4. A copy of the groundwater well permit if it is located in a Groundwater Conservation District (GCD) or evidence that a groundwater well permit is not required.

ci. Is the source of the water being discharged a surface water supply contract? Y / (N)
If yes, provide the signed contract(s).

cii. Identify any other source of the water N/A

WORKSHEET 4.0
DISCHARGE INFORMATION

WWTP, DP #3

This worksheet required for any requested authorization to discharge water into a State Watercourse for conveyance and later withdrawal or in-place use. Worksheet 4.1 is also required for each Discharge point location requested. **Instructions Page. 26.** ***Applicant is responsible for obtaining any separate water quality authorizations which may be required and for insuring compliance with TWC, Chapter 26 or any other applicable law.***

a. The purpose of use for the water being discharged will be to replace water lost to evaporation.

b. Provide the amount of water that will be lost to transportation, evaporation, seepage, channel or other associated carriage losses 43.0 gpm ~~%~~ and explain the method of calculation: Calculations in Attachment 1.3. Water budget using max annual evaporation values total for entire project area for the location on the TWDB 410. Minimal losses of 1% anticipated in watercourse from discharge of WWTP (DP#3) to Pond B (Res #1).

Is the source of the discharged water return flows? (Y) / N_____ If yes, provide the following information:

1. The TPDES Permit Number(s). WQ0015479001 (attach a copy of the **current** TPDES permit(s))

2. Applicant is the owner/holder of each TPDES permit listed above? (Y) / N_____

PLEASE NOTE: If Applicant is not the discharger of the return flows, the application should be submitted under Section 1, New or Additional Appropriation of State Water, as a request for a new appropriation of state water. If Applicant is the discharger, then the application should be submitted under Section 3, Bed and Banks.

3. Monthly WWTP discharge data for the past 5 years in electronic format. (Attach and label as "Supplement to Worksheet 4.0"). N/A (newly constructed WWTP)

4. The percentage of return flows from groundwater 100%, surface water 0%?

5. If any percentage is surface water, provide the base water right number(s) N/A.

c. Is the source of the water being discharged groundwater? (Y) / N_____ If yes, provide the following information:

1. Source aquifer(s) from which water will be pumped: Trinity - Antler's Aquifer

2. Any 24 hour pump test for the well if one has been conducted. If the well has not been constructed, provide production information for wells in the same aquifer in the area of the application. See http://www.twdb.texas.gov/groundwater/data/gwdbrpt.asp. Additionally, provide well numbers or identifiers_____.

3. Indicate how the groundwater will be conveyed to the stream or reservoir.
Groundwater-based return flows will be conveyed in pipe from WWTP to watercourse.

4. A copy of the groundwater well permit if it is located in a Groundwater Conservation District (GCD) or evidence that a groundwater well permit is not required.

ci. Is the source of the water being discharged a surface water supply contract? Y / (N)
If yes, provide the signed contract(s).

cii. Identify any other source of the water N/A

WORKSHEET 4.1
DISCHARGE POINT INFORMATION

Well 1A, DP#1

This worksheet is required for **each** discharge point. Submit one Worksheet 4.1 for each discharge point. If there is more than one discharge point, the numbering of the points should be consistent throughout the application and on any supplemental documents (e.g. maps). **Instructions, Page 27.**

For water discharged at this location provide:

a. The amount of water that will be discharged at this point is 180.6 acre-feet per year. The discharged amount should include the amount needed for use and to compensate for any losses.

b. Water will be discharged at this point at a maximum rate of N/A cfs or 112 gpm.

c. Name of Watercourse as shown on Official USGS maps: Unnamed Tributary to Denton Creek

d. Zip Code 76249

f. Location of point: In the Richard R. Jowell Original Survey No. _____, Abstract No. 660, Denton County, Texas.

g. Point is at:

Latitude 33.248346 °N, Longitude 97.368395 °W.

Provide Latitude and Longitude coordinates in decimal degrees to at least six decimal places

h. Indicate the method used to calculate the discharge point location (examples: Handheld GPS Device, GIS, Mapping Program): ArcGIS version 10.8

Map submitted must clearly identify each discharge point. See instructions Page. 15.

See Well Permit in Attachment 3.1

WORKSHEET 4.1
DISCHARGE POINT INFORMATION

Limerock Well, DP #2

This worksheet is required for **each** discharge point. Submit one Worksheet 4.1 for each discharge point. If there is more than one discharge point, the numbering of the points should be consistent throughout the application and on any supplemental documents (e.g. maps). **Instructions, Page 27.**

For water discharged at this location provide:

a. The amount of water that will be discharged at this point is 48.39 acre-feet per year. The discharged amount should include the amount needed for use and to compensate for any losses.

b. Water will be discharged at this point at a maximum rate of N/A cfs or 30 gpm.

c. Name of Watercourse as shown on Official USGS maps: Unnamed Tributary to Denton Creek

d. Zip Code 76249

f. Location of point: In the Richard R. Jowell Original Survey No. _____, Abstract No. 660, Denton County, Texas.

g. Point is at:

Latitude 33.250504 °N, Longitude 97.366747 °W.

Provide Latitude and Longitude coordinates in decimal degrees to at least six decimal places

h. Indicate the method used to calculate the discharge point location (examples: Handheld GPS Device, GIS, Mapping Program): ArcGIS version 10.8

Map submitted must clearly identify each discharge point. See instructions Page. 15.

See Well Permit in Attachment 3.4

WORKSHEET 4.1
DISCHARGE POINT INFORMATION

WWTP, DP #3

This worksheet is required for **each** discharge point. Submit one Worksheet 4.1 for each discharge point. If there is more than one discharge point, the numbering of the points should be consistent throughout the application and on any supplemental documents (e.g. maps). **Instructions, Page 27.**

For water discharged at this location provide:

a. The amount of water that will be discharged at this point is 761.75 acre-feet per year. The discharged amount should include the amount needed for use and to compensate for any losses.

b. Water will be discharged at this point at a maximum rate of N/A cfs or 472 gpm.

c. Name of Watercourse as shown on Official USGS maps: Unnamed Tributary to Denton Creek

d. Zip Code 76249

f. Location of point: In the Richard R. Jowell Original Survey No. _____, Abstract No. 660, Denton County, Texas.

g. Point is at:

Latitude 33.253303 °N, Longitude 97.369198 °W.

Provide Latitude and Longitude coordinates in decimal degrees to at least six decimal places

h. Indicate the method used to calculate the discharge point location (examples: Handheld GPS Device, GIS, Mapping Program): ArcGIS version 10.8

Map submitted must clearly identify each discharge point. See instructions Page. 15.

See TPDES Permit documentation in Attachment 4.1 and 4.2

WORKSHEET 5.0
ENVIRONMENTAL INFORMATION

1. Impingement and Entrainment

This section is required for any new diversion point that is not already authorized. Indicate the measures the applicant will take to avoid impingement and entrainment of aquatic organisms (ex. Screens on any new diversion structure that is not already authorized in a water right). **Instructions, Page 29.**

N/A. Not diverting water.

2. New Appropriations of Water (Canadian, Red, Sulphur, and Cypress Creek Basins only) and Changes in Diversion Point(s)

This section is required for new appropriations of water in the Canadian, Red, Sulphur, and Cypress Creek Basins and in all basins for requests to change a diversion point. **Instructions, Page 30.**

Description of the Water Body at each Diversion Point or Dam Location. (Provide an Environmental Information Sheet for each location),

a. Identify the appropriate description of the water body.

Part 2 of this worksheet is not required since the new appropriation is not within one of the three basins listed.

☐ Stream

☐ Reservoir

Average depth of the entire water body, in feet: _____

☐ Other, specify: _____

b. Flow characteristics

If a stream, was checked above, provide the following. For new diversion locations, check one of the following that best characterize the area downstream of the diversion (check one).

☐ Intermittent – dry for at least one week during most years

☐ Intermittent with Perennial Pools – enduring pools

☐ Perennial – normally flowing

Check the method used to characterize the area downstream of the new diversion location.

☐ USGS flow records

☐ Historical observation by adjacent landowners

☐ Personal observation

☐ Other, specify: _____

c. Waterbody aesthetics

Check one of the following that best describes the aesthetics of the stream segments affected by the application and the area surrounding those stream segments.

☐ Wilderness: outstanding natural beauty; usually wooded or unpastured area; water clarity exceptional

☐ Natural Area: trees and/or native vegetation common; some development evident (from fields, pastures, dwellings); water clarity discolored

☐ Common Setting: not offensive; developed but uncluttered; water may be colored or turbid

☐ Offensive: stream does not enhance aesthetics; cluttered; highly developed; dumping areas; water discolored

d. Waterbody Recreational Uses

Are there any known recreational uses of the stream segments affected by the application?

☐ Primary contact recreation (swimming or direct contact with water)

☐ Secondary contact recreation (fishing, canoeing, or limited contact with water)

☐ Non-contact recreation

Submit the following information in a Supplemental Attachment, labeled Addendum to Worksheet 5.0:

1. Photographs of the stream at the diversion point or dam location. Photographs should be in color and show the proposed point or reservoir and upstream and downstream views of the stream, including riparian vegetation along the banks. Include a description of each photograph and reference the photograph to the map submitted with the application indicating the location of the photograph and the direction of the shot.

2. If the application includes a proposed reservoir, also include:

    i. A brief description of the area that will be inundated by the reservoir.

    ii. If a United States Army Corps of Engineers (USACE) 404 permit is required, provide the project number and USACE project manager.

    iii. A description of how any impacts to wetland habitat, if any, will be mitigated if the reservoir is greater than 5,000 acre-feet.

3. Alternate Sources of Water and/or Bed and Banks Applications

This section is required for applications using an alternate source of water and bed and banks applications in any basins. **Instructions, page 31.**

a. For all bed and banks applications: All groundwater-based return flows discharged by Big Sky MUD are generated from groundwater within the Big Sky MUD and therefore have no adverse impacts to instream uses.

i. Submit an assessment of the adequacy of the quantity and quality of flows remaining after the proposed diversion to meet instream uses and bay and estuary freshwater inflow requirements.

b. For all alternate source applications:

i. If the alternate source is treated return flows, provide the TPDES permit number WQ0015479001

ii. If groundwater is the alternate source, or groundwater or other surface water will be discharged into a watercourse provide:
Reasonably current water chemistry information including but not limited to the following parameters in the table below. Additional parameters may be requested if there is a specific water quality concern associated with the aquifer from which water is withdrawn. If data for onsite wells are unavailable; historical data collected from similar sized wells drawing water from the same aquifer may be provided. However, onsite data may still be required when it becomes available. Provide the well number or well identifier. Complete the information below for each well and provide the Well Number or identifier.

Parameter	Average Conc.	Max Conc.	No. of Samples	Sample Type	Sample Date/Time
Sulfate, mg/L	41.9	46.6	4	Well Records	see well reports
Chloride, mg/L	9.2	14	4	Well Records	see well reports
Total Dissolved Solids, mg/L	411	448	4	Well Records	see well reports
pH, standard units	8.5	8.9	4	Well Records	see well reports
Temperature*, degrees Celsius	23.8	25	2	Well Records	see well reports

* Temperature must be measured onsite at the time the groundwater sample is collected.

iii. If groundwater will be used, provide the depth of the well 800 - 1,000 ft. and the name of the aquifer from which water is withdrawn Trinity - Antlers.

See Water Quality Reports in Attachments 3.2, 3.3, 3.5, 3.6, 3.7 and 3.8

WORKSHEET 6.0
Water Conservation/Drought Contingency Plans

This form is intended to assist applicants in determining whether a Water Conservation Plan and/or Drought Contingency Plans is required and to specify the requirements for plans. **Instructions, Page 31.**

N/A. Use is for recreation, not municipal, industrial/mining, agricultural, or water supply.

The TCEQ has developed guidance and model plans to help applicants prepare plans. Applicants may use the model plan with pertinent information filled in. For assistance submitting a plan call the Resource Protection Team (Water Conservation staff) at 512-239-4600, or e-mail wras@tceq.texas.gov. The model plans can also be downloaded from the TCEQ webpage. ***Please use the most up-to-date plan documents available on the webpage.***

1. Water Conservation Plans

a. The following applications must include a completed Water Conservation Plan (30 TAC § 295.9) for each use specified in 30 TAC, Chapter 288 (municipal, industrial or mining, agriculture – including irrigation, wholesale):

1. Request for a new appropriation or use of State Water.

2. Request to amend water right to increase appropriation of State Water.

3. Request to amend water right to extend a term.

4. Request to amend water right to change a place of use.
   **does not apply to a request to expand irrigation acreage to adjacent tracts.*

5. Request to amend water right to change the purpose of use.
   **applicant need only address new uses.*

6. Request for bed and banks under TWC § 11.042(c), when the source water is State Water
   **including return flows, contract water, or other State Water.*

b. If Applicant is requesting any authorization in section (1)(a) above, indicate each use for which Applicant is submitting a Water Conservation Plan as an attachment:

1. _____Municipal Use. See 30 TAC § 288.2. **

2. _____Industrial or Mining Use. See 30 TAC § 288.3.

3. _____Agricultural Use, including irrigation. See 30 TAC § 288.4.

4. _____Wholesale Water Suppliers. See 30 TAC § 288.5. **

If Applicant is a water supplier, Applicant must also submit documentation of adoption of the plan. Documentation may include an ordinance, resolution, or tariff, etc. See 30 TAC §§ 288.2(a)(1)(J)(i) and 288.5(1)(H). Applicant has submitted such documentation with each water conservation plan? **Y / N____

c. Water conservation plans submitted with an application must also include data and information which: supports applicant's proposed use with consideration of the plan's water conservation goals; evaluates conservation as an alternative to the proposed

appropriation; and evaluates any other feasible alternative to new water development. See 30 TAC § 288.7.
Applicant has included this information in each applicable plan? **Y / N**____

2. Drought Contingency Plans

a. A drought contingency plan is also required for the following entities if Applicant is requesting any of the authorizations in section (1) (a) above – indicate each that applies:

1. _____Municipal Uses by public water suppliers. See 30 TAC § 288.20.

2. _____Irrigation Use/ Irrigation water suppliers. See 30 TAC § 288.21.

3. _____Wholesale Water Suppliers. See 30 TAC § 288.22.

b. If Applicant must submit a plan under section 2(a) above, Applicant has also submitted documentation of adoption of drought contingency plan (*ordinance, resolution, or tariff, etc. See 30 TAC § 288.30*) **Y / N**___

WORKSHEET 7.0
ACCOUNTING PLAN INFORMATION WORKSHEET

The following information provides guidance on when an Accounting Plan may be required for certain applications and if so, what information should be provided. An accounting plan can either be very simple such as keeping records of gage flows, discharges, and diversions; or, more complex depending on the requests in the application. Contact the Surface Water Availability Team at 512-239-4600 for information about accounting plan requirements, if any, for your application. **Instructions, Page 34.** An accounting plan demonstrating how the reservoirs are not adversely impacting surface water, is included as Attachment 1.5.

1. Is Accounting Plan Required

Accounting Plans are generally required:

- For applications that request authorization to divert large amounts of water from a single point where multiple diversion rates, priority dates, and water rights can also divert from that point;
- For applications for new major water supply reservoirs;
- For applications that amend a water right where an accounting plan is already required, if the amendment would require changes to the accounting plan;
- For applications with complex environmental flow requirements;
- For applications with an alternate source of water where the water is conveyed and diverted; and
- For reuse applications.

2. Accounting Plan Requirements

a. A **text file** that includes:

1. an introduction explaining the water rights and what they authorize;
2. an explanation of the fields in the accounting plan spreadsheet including how they are calculated and the source of the data;
3. for accounting plans that include multiple priority dates and authorizations, a section that discusses how water is accounted for by priority date and which water is subject to a priority call by whom; and
4. Should provide a summary of all sources of water.

b. A **spreadsheet** that includes:

1. Basic daily data such as diversions, deliveries, compliance with any instream flow requirements, return flows discharged and diverted and reservoir content;
2. Method for accounting for inflows if needed;
3. Reporting of all water use from all authorizations, both existing and proposed;
4. An accounting for all sources of water;
5. An accounting of water by priority date;
6. For bed and banks applications, the accounting plan must track the discharged water from the point of delivery to the final point of diversion;
7. Accounting for conveyance losses;
8. Evaporation losses if the water will be stored in or transported through a reservoir. Include changes in evaporation losses and a method for measuring reservoir content resulting from the discharge of additional water into the reservoir;
9. An accounting for spills of other water added to thereservoir; and
10. Calculation of the amount of drawdown resulting from diversion by junior rights or diversions of other water discharged into and then stored in the reservoir.

WORKSHEET 8.0
CALCULATION OF FEES

This worksheet is for calculating required application fees. Applications are not Administratively Complete until all required fees are received. **Instructions, Page. 34**

1. NEW APPROPRIATION

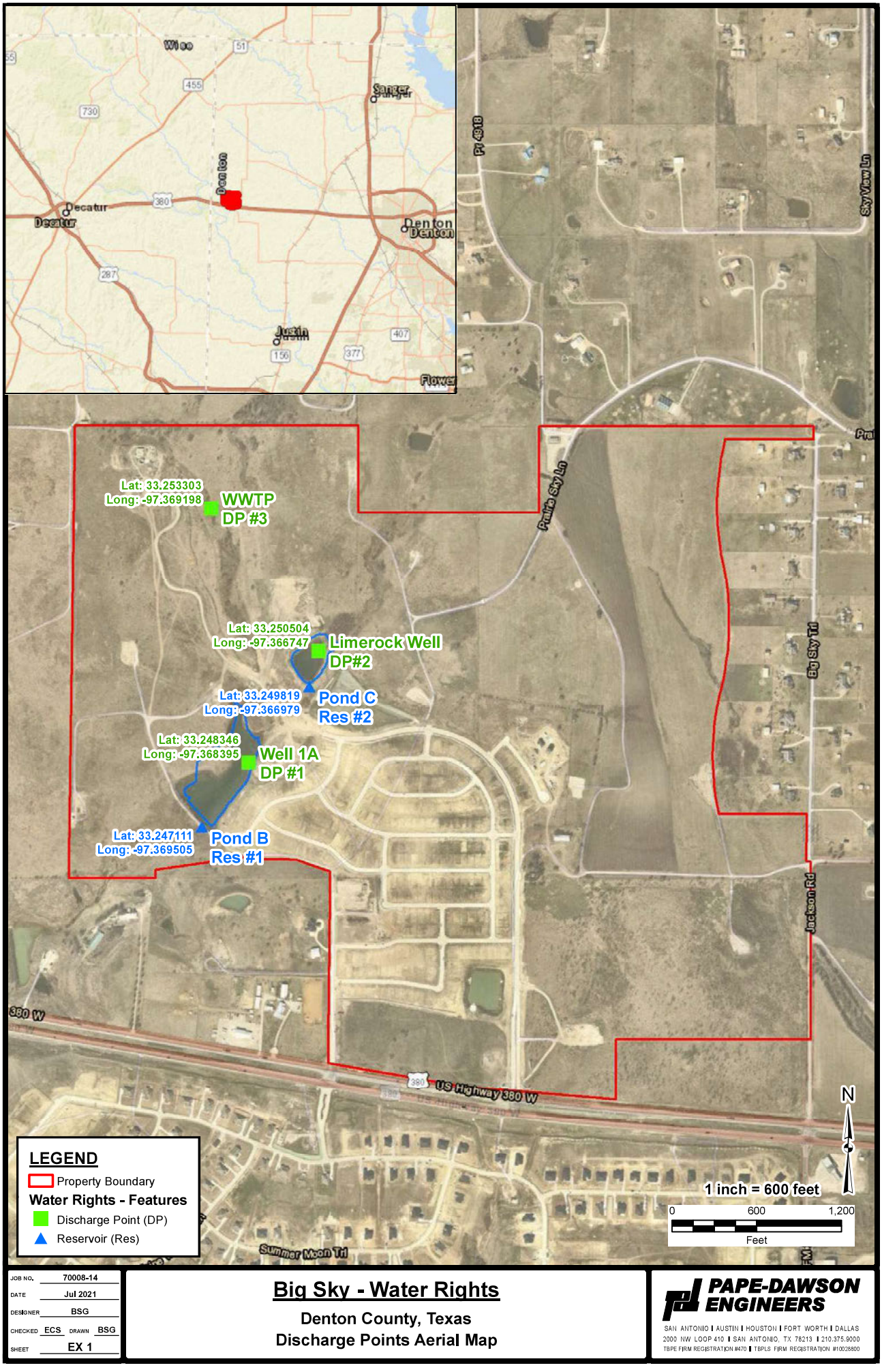
	Description	Amount ($)
Filing Fee	Circle fee correlating to the total amount of water* requested for any new appropriation and/or impoundment. Amount should match total on Worksheet 1, Section 1. Enter corresponding fee under **Amount ($).** In Acre-Feet a. Less than 100 $100.00 b. 100 - 5,000 $250.00 c. 5,001 - 10,000 $500.00 d. 10,001 - 250,000 $1,000.00 e. More than 250,000 $2,000.00	100.00
Recording Fee		$25.00
Agriculture Use Fee	*Only for those with an Irrigation Use.* Multiply 50¢ x_____Number of acres that will be irrigated with State Water. **	N/A
Use Fee	*Required for all Use Types,* ***excluding Irrigation Use.*** Multiply $1.00 x_____Maximum annual diversion of State Water in acre-feet. **	N/A
Recreational Storage Fee	*Only for those with Recreational Storage.* Multiply $1.00 x25.45 acre-feet of in-place Recreational Use State Water to be stored at normal max operating level.	25.45
Storage Fee	*Only for those with Storage,* ***excluding Recreational Storage.*** Multiply 50¢ x_____acre-feet of State Water to be stored at normal max operating level.	N/A
Mailed Notice	Cost of mailed notice to all water rights in the basin. Contact Staff to determine the amount (512) 239-4600.	459.66
	TOTAL	$ 610.11

2. AMENDMENT *OR* SEVER AND COMBINE

	Description	Amount ($)
Filing Fee	Amendment: $100	N/A
	OR Sever and Combine: $100 x___of water rights to combine	N/A
Recording Fee		$12.50
Mailed Notice	Additional notice fee to be determined once application is submitted.	
	TOTAL INCLUDED	$ N/A

3. BED AND BANKS

	Description	Amount ($)
Filing Fee		$100.00
Recording Fee		$12.50
Mailed Notice	Additional notice fee to be determined once application is submitted.	
	TOTAL INCLUDED	$

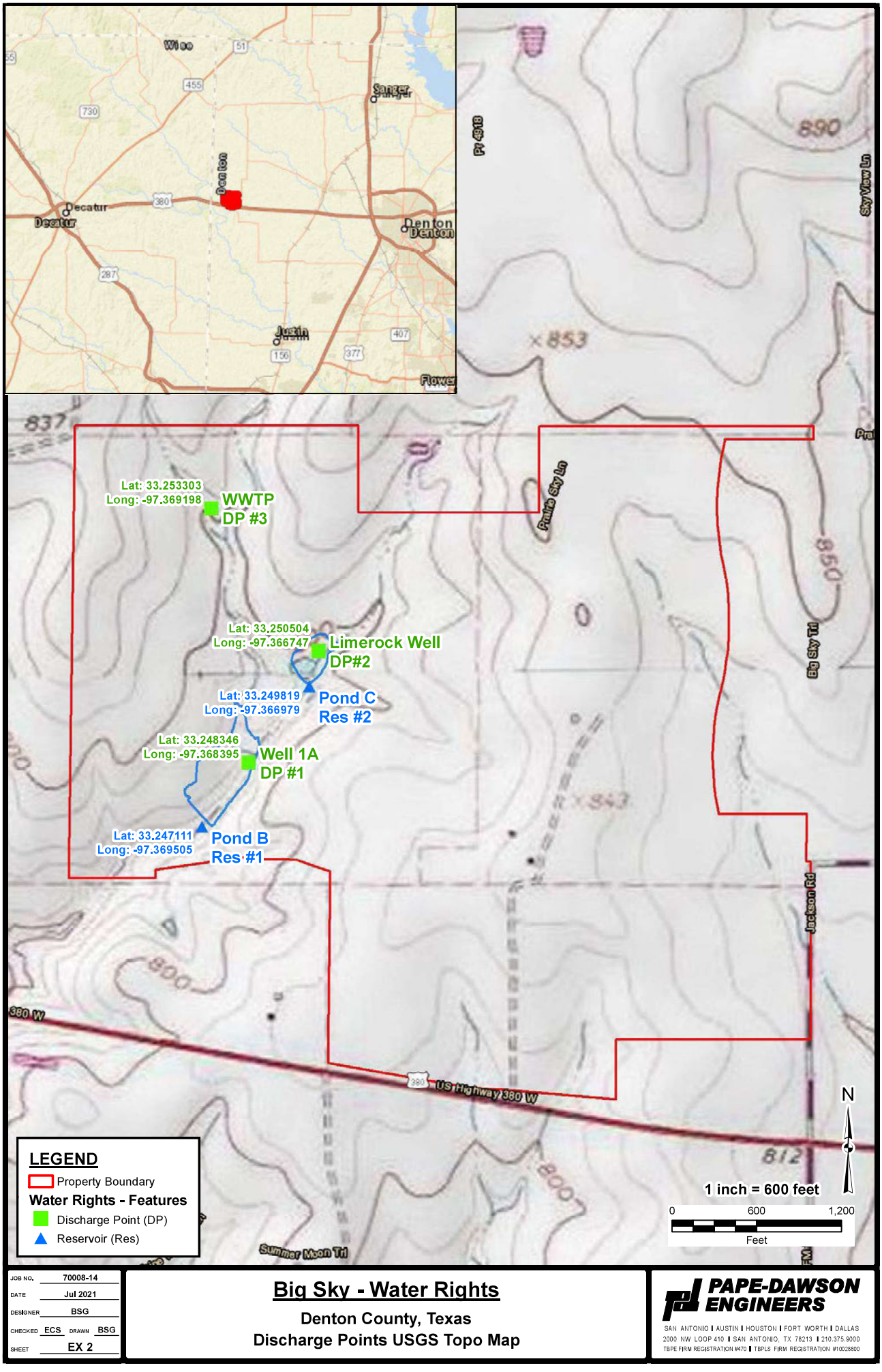


JOB NO.	70008-14
DATE	Jul 2021
DESIGNER	BSG
CHECKED	ECS
DRAWN	BSG
SHEET	EX 1

Big Sky - Water Rights

Denton County, Texas
Discharge Points Aerial Map

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800



JOB NO.	70008-14
DATE	Jul 2021
DESIGNER	BSG
CHECKED	ECS
DRAWN	BSG
SHEET	EX 2

Big Sky - Water Rights

Denton County, Texas

Discharge Points USGS Topo Map

PAPE-DAWSON ENGINEERS
SAN ANTONIO | AUSTIN | HOUSTON | FORT WORTH | DALLAS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TBPE FIRM REGISTRATION #470 | TBPLS FIRM REGISTRATION #10028800

Table 1

Big Sky - Water Rights

Pond B Evapotranspiration (ET)

Max Monthly Evaporation [1, 2]	11.04	inches	Max Monthly Volume/ acre	40,075	ft^3/ acre
Max Annual Evaporation [1, 2]	69.28	inches	Total Wet Pond Area	4.70	acres
Max Annual Evaporation	5.77	feet	Monthly Evaporation Volume	188,353	ft^3/ month
Peak Average Evaporation Rate:				32.6	gpm
Annual Volume:				51.9	ac-ft./ yr

Table 2

Big Sky - Water Rights

Pond C Evapotranspiration (ET)

Max Monthly Evaporation [1]	11.04	inches	Max Monthly Volume/ acre	40,075	ft^3/ acre
Max Annual Evaporation [2]	69.28	inches	Total Wet Pond Area	1.49	acres
Max Annual Evaporation	5.77	feet	Monthly Evaporation Volume	59,712	ft^3/ month
Peak Average Evaporation Rate:				10.3	gpm
Annual Volume:				16.4	ac-ft./ yr

Table 3

Big Sky - Water Rights

Total Evapotranspiration (ET) for Ponds B and C

Max Monthly Evaporation [1]	11.04	inches	Max Monthly Volume/ acre	40,075	ft^3/ acre
Max Annual Evaporation [2]	69.28	inches	Total Wet Pond Area	6.19	acres
Max Annual Evaporation	5.77	feet	Monthly Evaporation Volume	248,065	ft^3/ month
Peak Average Evaporation Rate:				43.0	gpm
Annual Volume:				68.3	ac-ft./ yr

Notes:

[1] Values for maximum monthly evaporation depths were available from 1954 to 2019 and obtained from TWDB evaporation and rainfall data located in Quadrangle 410.

[2] Values for maximum annual evaporation depths were available from 1954 to 2019 and obtained from TWDB evaporation and rainfall data located in Quadrangle 410.

Data Source: https://www.waterdatafortexas.org/lake-evaporation-rainfall [Texas Water Development Board (TWDB)].

Pond B (Res #1), looking South from DP #1

Pond C (Res #2), looking southwest from DP #2

Attachment 1.5 – Accounting Plan

With this application, the water rights will authorize Big Sky Municipal Utility District of Denton County to use groundwater-based return flows to maintain the maximum normal operating level of two (2) recreational reservoirs within a new residential subdivision. Losses are expected to be encountered from evaporation within the reservoirs, which will be replaced with groundwater-based return flows from three (3) potential discharge points:

1. Well 1A (DP #1) – permitted well to supply potable water to on-site water treatment facility
2. Limerock Well (DP #2) – on-site well
3. WWTP (DP #3) – new on-site wastewater treatment plant serving subdivision

All sources of water are derived from groundwater.

In accordance with Water Rights permit issued:

- Mechanical devices will be installed in each reservoir to monitor the water level.
- Primary source of replacement water will be DP #3.
- Wells (DP #1 and #2) will be activated when water level drops below the maximum normal operating level of either reservoir.
- Big Sky Municipal Utility District of Denton County will maintain records of pumping to replace water lost to evaporation.

By following the above practices, the water rights issued for this application are not anticipated to adversely impact surface water within the basin.

THE STATE OF TEXAS §

COUNTY OF DENTON §

BIG SKY MUNICIPAL UTILITY §
DISTRICT OF DENTON COUNTY §

I, the undersigned Secretary of the Board of Directors of Big Sky Municipal Utility District of Denton County (the "District"), hereby certify that the attached and foregoing is a true and correct copy of the MINUTES OF MEETING OF THE BOARD OF DIRECTORS OF BIG SKY MUNICIPAL UTILITY DISTRICT OF DENTON COUNTY, dated October 23, 2020, documenting that Director Andrew Mizerek was appointed to the Board of Directors as President; and the original of said Minutes is on file in the District's office.

WITNESS MY HAND AND THE OFFICIAL SEAL OF THE DISTRICT this 4th day of August, 2021.

Kenny Bourds
Secretary, Board of Directors

BIG SKY MUNICIPAL UTILITY DISTRICT OF DENTON COUNTY
TEXAS

MINUTES OF MEETING
OF THE
BOARD OF DIRECTORS

October 23, 2020

THE STATE OF TEXAS §

COUNTY OF DENTON §

BIG SKY MUNICIPAL UTILITY DISTRICT OF DENTON COUNTY §

The Board of Directors (the "Board") of Big Sky Municipal Utility District of Denton County (the "District"), noticed a special session, open to the public, via audio/video conference meeting on Friday, October 23, 2020, at 10:00 a.m. The Zoom conference meeting was authorized pursuant to the March 16, 2020, Declaration by the Governor of the State of Texas, which suspended certain provisions of Chapter 551, Texas Government Code, in response to the Coronavirus (COVID-19) disaster. The Governor's Proclamation permitted governmental bodies to conduct meetings via telephone or videoconferences to advance the public health goal of limiting face-to-face meetings (also called "social distancing") to slow the spread of the Coronavirus (COVID-19). The roll was called of the members of the Board, to-wit:

Ron Davis	-	President
Naveen Khammanpati	-	Vice President
Ronnie Nichols	-	Secretary
Greg Edwards	-	Assistant Secretary
Kenny Bounds	-	Assistant Secretary

All members of the Board were present, except Director Davis and Director Nichols, thus constituting a quorum.

Also present at the meeting were Lance Stewart of Pape-Dawson Engineers Inc. ("Pape-Dawson"), Engineers for the District; Nolan Spradlin, Landon Hopper, and Pat Vedra of LGI-Homes Texas, LLC ("LGI"), a Developer within the District; Laura C. Davis and Judy Marcantel (paralegal) of Sanford Kuhl Hagan Kugle Parker Kahn LLP ("SK Law"); and Andrew Mizerek and Preston Crow.

WHEREUPON, the meeting was called to order at 10:08 a.m. Copies of the notice of the meeting are attached hereto.

HEAR FROM PUBLIC

The Board noted that no public was present who wished to address the Board.

APPROVE MINUTES OF MEETING HELD MAY 12, 2020

The Board reviewed the proposed minutes of the meeting of the Board held May 12, 2020, copies of which were previously distributed to the Board.

Upon motion by Director Khammanpati, seconded by Director Bounds, and after full discussion the board voted unanimously to approve the minutes as submitted.

APPOINMENT OF DIRECTOR

This item was taken out of order. The Board recognized Ms. Davis, who advised that Director Nichols submitted his resignation from the Board, and that Andrew Mizerek, who is qualified to be a directo, has agreed to be appointed to the Board.

Upon motion by Director Edwards, seconded by Director Bounds, and after full discussion, the Board voted unanimously to accept the resignation of Director Nichols and appoint Andrew Mizerek to the Board. Ms. Davis noted that Mr. Mizerek had taken the Oath of Office and executed the Statement of Appointed Officer.

RESIGNATION OF DIRECTOR

Ms. Davis advised the Board that Director Khammanpati submitted his notice of resignation, effective immediately.

Upon motion by Director Bounds, seconded by Director Edwards, and after full discussion, the Board voted unanimously to accept the resignation of Director Khammanpati.

APPOINTMENT OF DIRECTOR

Ms. Davis introduced Preston Crow to the Board, who has qualified and desires to be a director.

Upon motion by Director Edwards, seconded by Director Bounds, and after full discussion, the Board voted unanimously to appoint Preston Crow to the Board. Ms. Davis noted that Mr. Crow had taken the Oath of Office and executed the Statement of Appointed Officer.

Mr. Khammanpati left the meeting at 10:13 a.m.

RECONSTITUTE BOARD

The Board next considered reconstituting the Board.

Upon motion by Director Bounds, seconded by Director Edwards, and after full discussion the Board voted unanimously to reconstitute the Board, as follows: President – Ron Davis; Vice President – Andrew Mizerek; Secretary – Greg Edwards; Assistant Secretary – Kenny Bounds; and Assistant Secretary – Preston Crow.

APPROVE DISTRICT REGISTRATION FORM

The Board next considered authorizing preparation of a District Registration Form and filing of same with the Texas Commission on Environmental Quality ("TCEQ"). Ms. Davis explained that the Texas Water Code provides that this Form be completed with updated Director and officer information. She noted that information on the District's consultants is also listed on the Form.

Upon motion by Director Edwards, seconded by Director Mizerek, and after full discussion, the Board voted unanimously to authorize preparation of the District Registration Form and filing of said Form with the TCEQ.

FINANCIAL ADVISOR'S REPORT

The Board recognized Mr. Howell, who submitted to and reviewed with the Board a tax rate recommendation based upon certified values from Denton County of $2,630,027, a copy of which is attached hereto. He then discussed with the Board the tax rate recommendation, which proposes a tax rate of $1.165 per $100 assessed valuation for maintenance and operations.

Ms. Davis reviewed with the Board the process for setting the tax rate, noting that the District must hold a public hearing for discussion of the proposed rate to be set and would then

adopt the tax rate for 2020. The Board then discussed setting a meeting date for conducting the public hearing and setting the tax rate. The Board determined to schedule such meeting on Friday, November 13, 2020, at 10:00 a.m., at which meeting the District would consider setting the tax rate for 2020.

Ms. Davis discussed with the Board Senate Bill 2, also known as the Texas Property Tax Reform and Transparency Act of 2019, which was passed by the Texas Legislature in 2019. She also discussed the provisions of Section 49.23601 through Section 49.23603 of the Texas Water Code. After discussion, the Board determined that the District should be classified as a "Developing" District.

Upon motion by Director Edwards seconded by Director Mizerek, and after full discussion, the Board voted unanimously to authorize the Tax Assessor/Collector to publish Notice of Public Hearing on Tax Rate, scheduled for November 13, 2020 at 10:00 a.m., and to publish a proposed total tax rate for 2020 of $1.165 per $100 of assessed value, along with a tax rate and levy analysis as required by Chapter 49 of the Texas Water Code.

BOOKKEEPER'S REPORT

Ms. Davis reviewed with the Board the Bookkeeper's Report, including payment of certain bills and the budget for the fiscal year ending April 30, 2021, copies of which are attached hereto. She stated that a developer advance has been requested.

Upon motion by Director Mizerek, seconded by Director Bounds, and after full discussion, the Board voted unanimously to (1) approve the Bookkeeper's Report as submitted, and to authorize payment of the checks listed therein upon receipt of developers advance, and (2) approve the proposed budget for the fiscal year ending April 30, 2021.

DEVELOPER'S REPORT

The Board recognized Mr. Spradlin who updated the Board on development of the property within the District.

The Board noted that no action was necessary in connection with the Developer's Report.

ENGINEER'S REPORT

The Board recognized Mr. Stewart who updated the Board on ongoing engineering matters within the District. Mr. Stewart requested the District's approval of (1) Big Sky Estates, Phase 1, Wastewater Treatment Facilities contract with Rey-Mar Construction in the amount of $1,803,028.50; (2) Big Sky Estates Phase 1 Water Well contract with Davis Water Well, LLC in the amount of $611,300.00; (3) Big Sky Estates Phase 1 Ground Storage Tank, Water Treatment, and Pump Station Contract with MELA Contracting in the amount of $3,430,000.00; (4) Change Order Nos. 6, 7, 8, and Progress Payment Nos. 5, 6, and 7, in the amounts of ($9,600.00), $0.00, $16,715.00, $24,849.42, $11,059.20, and $9,387.00 respectively, made payable to RPMx Construction; (5) Progress Payment Nos. 6 and 7 in the amounts of $653,816.71 and $21,069.47, respectively, made payable to K Construction LLC; (6) Change Order Nos. 1, 2, and Progress Payment Nos. 1, 2, 3, 4, 5, in the amounts of $80,219.40, $45,428.00, $36,540.00, $241,074.00, $1,944.851.89; $121,147.20, and $83,505.60, respectively, made payable to Gilco Contracting Inc.; (7) Change Order Nos. 1, 2, and Progress Payment Nos. 1, 2, in the amounts of $16,000.00, $3,200.00, $58,500.00, and $49,635.00, respectively, made payable to Davis Water Well, LLC; (8) Progress Payments Nos. 1, 2, and 3, in the amounts of $335,700.00, $71,550,00, $94,363.20, respectively, made payable to MELA Contracting, Inc.; and (9) Progress Payment Nos. 1, 2, and 3, in the amounts of $20,502.00, $76,500.00, and $27,000.00, respectively, made payable to Rey-Mar Construction.

Upon motion by Director Edwards, seconded by Director Mizerek, and after full discussion, the Board voted unanimously to approve and authorize the above stated items.

ATTORNEY'S REPORT

Renew District Insurance

The Board recognized Ms. Davis, who presented to and reviewed with the Board a renewal policy from the District's current insurance provider, SIG/McDonald & Wessendorff Insurance.

Upon motion by Director Crow, seconded by Director Edwards and after full discussion, the Board voted unanimously to renew the District's insurance policy with SIG/McDonald & Wessendorff Insurance.

Investment Policy and Strategies

The Board recognized Ms. Davis, who reminded the Board that the Public Funds Investment Act requires the Board to review the District's Investment Policy annually and consider making any changes thereto. Ms. Davis recommended that no changes be made to the Investment Policy at this time other than to update the list of authorized brokers for the District, which updated list had been provided by the District's bookkeeper.

Upon motion by Director Edwards, seconded by Director Mizerek, the Board voted unanimously not to make any changes to the District's Investment Policy, other than to update the list of authorized brokers for the District, and to adopt the Resolution Evidencing Review of Investment Policy and Investment Strategies.

Order Adopting Code of Ethics

Ms. Davis next submitted to and reviewed with the Board a proposed Order Adopting a Code of Ethics and Establishing Policies Relating to Travel Expenditure, Fees of Office, Professional Services, Financial Accounting, Annual Operating Budget, Audit Committee, and Meeting Conduct. She stated that the proposed Order sets forth the various policies prescribed by the Texas Local Government Code and the Texas Water Code that are applicable to the District. Ms. Davis then reviewed the policies with the Board.

Upon motion duly made by Director Bounds, and seconded by Director Mizerek, the Board voted unanimously to approve the Order Adopting a Code of Ethics and Establishing Policies Relating to Travel Expenditure, Fees of Office, Professional Services, Financial Accounting, Annual Operating Budget, Audit Committee, and Meeting Conduct.

There being no further business to come before the Board, upon a motion duly made, seconded and approved unanimously, the meeting was adjourned.

PASSED, APPROVED, AND ADOPTED this 13th day of November, 2020.

Kenny Bounds
Secretary, Board of Directors

Denton County
Juli Luke
County Clerk

Instrument Number: 159921

ERecordings-RP

DEED

Recorded On: December 17, 2019 10:38 AM

Number of Pages: 17

" Examined and Charged as Follows: "

Total Recording: $90.00

********** **THIS PAGE IS PART OF THE INSTRUMENT** **********
Any provision herein which restricts the Sale, Rental or use of the described REAL PROPERTY because of color or race is invalid and unenforceable under federal law.

File Information:

Document Number:	159921
Receipt Number:	20191217000203
Recorded Date/Time:	December 17, 2019 10:38 AM
User:	Kraig T
Station:	Station 25

Record and Return To:

Simplifile

STATE OF TEXAS
COUNTY OF DENTON

I hereby certify that this Instrument was FILED In the File Number sequence on the date/time printed hereon, and was duly RECORDED in the Official Records of Denton County, Texas.

Juli Luke
County Clerk
Denton County, TX

Empower Title, L.L.C.
GF# 19-56475

NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE.

SPECIAL WARRANTY DEED

THE STATE OF TEXAS §
§ KNOW ALL MEN BY THESE PRESENTS:
COUNTY OF DENTON §

THAT, BIG SKY, LLC, a Texas limited liability company (hereinafter referred to as "**Grantor**"), for the sum of Ten and No/100 Dollars ($10.00) and other good and valuable consideration to the undersigned in hand paid by **LGI HOMES -TEXAS, LLC**, a Texas limited liability company (hereinafter referred to as "**Grantee**"), whose address is l450 Lake Robbins Drive – S. 430, The Woodlands, Texas 77380, the receipt and sufficiency of which are hereby acknowledged, has GRANTED, SOLD and CONVEYED and by these presents docs GRANT, SELL and CONVEY to Grantee all that certain land (the "**Land**") situated in Denton County, Texas, and described on **Exhibit A** attached hereto and incorporated herein by reference, together with all improvements located thereon and together with all rights and appurtenances pertaining thereto, including all rights, title, and interest of Grantor in and to adjacent streets, alleys, and rights-of-way, and one hundred percent (100%) of any and all development rights, licenses, permits, approval, powers, privileges, options or other benefits associated with the Land, including (without limitation) all of the rights, title and interests in and to the municipal utility district associated with the Land (the "**MUD**") and one hundred percent (100%) of any and all reimbursements available from such MUD or from any governmental or quasi-governmental agency (the Land and all of the foregoing set forth in the above being hereinafter collectively referred to as the "**Property**").

The Property does not include, and Grantor specifically retains, for Grantor and Grantor's heirs, successors and assigns forever, any and all outstanding rights related to any oil, gas or other minerals in and under, and that may be produced from the Property (the "**Mineral Interests**"); provided, however, that Grantor hereby waives all rights of access, ingress and egress over the surface of any of the Property for the purpose of mining, drilling, exploring, exploiting, producing, processing, transporting, marketing or developing the Mineral Interests or for any other reason, including, without limitation, any right to construct houses, pits, tanks, pipelines, compressors or similar structures on the Property; provided further, however, nothing herein shall prevent Grantor or its successors and assigns from exploring for, developing, and/or producing the Mineral Interests in and under the Property by pooling or by directional drilling, which enters or bottoms at least 500 feet under the surface of the Property, from well sites located on other property so long as such production activities for the Mineral Interests do not impair the lateral or subjacent support of the surface of the Property or any improvements thereon. The Mineral Interests hereby excepted and reserved from the Property is subject to any valid, recorded oil and gas and other mineral lease or leases which cover the Mineral Interests, but covers and includes all delay rentals

and royalties, and any other rights and payments due or to become due or which have been or may hereafter be payable or paid under the terms of said lease or leases to the lessor therein, its successors and assigns, insofar as said lease or leases cover all or any part of the Property to be conveyed pursuant to this instrument. Upon termination of any and/or all of such leases as to any of the Property described herein, the interest of said lessee, its successors and assigns, shall revert to the applicable party comprising Grantor, its successors and assigns and be subject to the surface waiver set forth herein.

This conveyance is made and accepted subject to those certain title exceptions more particularly described on **Exhibit B** attached hereto and made a part hereof for all purposes (the "**Permitted Exceptions**"), but only to the extent that such Permitted Exceptions are valid, subsisting and, in fact, affect the Property.

TO HAVE AND TO HOLD, the Property unto Grantee and Grantee's heirs, executors, administrators, legal representatives, successors and assigns forever, and Grantor does hereby bind Grantor and Grantor's heirs, executors, administrators, legal representatives, successors and assigns to WARRANT AND FOREVER DEFEND, all and singular, the Property unto Grantee and Grantee's heirs, executors, administrators, legal representatives, successors and assigns. against every person whomsoever lawfully claiming or to claim the Property or any part thereof, by, through or under Grantor, but not otherwise.

When the context requires, singular nouns and pronouns include the plural.

[THE BALANCE OF THIS PAGE IS INTENTIONALLY LEFT BLANK]

EXECUTED AND DELIVERED on this the 12 day of December, 2019.

GRANTOR:

BIG SKY, LLC,
a Texas limited liability company

By: _____
Leonard S. Zak, President and Manager

THE STATE OF TEXAS §
§
COUNTY OF DENTON §

BEFORE ME, the undersigned authority, on this day personally appeared Leonard S. Zak, President and Manager of Big Sky, LLC, a Texas limited liability company, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purpose and consideration and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 12th day of December, 2019.

_____
Notary Public, State of Texas

Nancy S John
Notary Public, State of Texas
My Comm. Exp. 10/31/22
Notary ID 538877-9

After Recording send to:

LGI HOMES – TEXAS, LLC
1450 Lake Robbins Drive – S. 430
The Woodlands, Texas 77380
Attn: Land Division

EXHIBIT A TO SPECIAL WARRANTY DEED

LEGAL DESCRIPTION OF THE LAND

[see attached]

EXHIBIT A

LEGAL DESCRIPTION OF THE LAND

TRACT 1

BEING a tract of land, situated in Richard R. Jowell Survey, Abstract No. 660 Survey, Abstract No. 660, Denton County, Texas, and being a portion of Tract 1 as described in a Special Warranty Deed to Big Sky, LLC and recorded in Instrument Number 2018-120750 of the Official Public Records of Denton, Texas (O.P.R.D.C.T.), and being all of Lot 11R, Block B of Lots 1R thru 20R, Block A, and Lot 1R thru 11R, Block B, Big Sky Trails, an addition to Denton County, Texas as recorded in Cabinet S, Page 18 of the Plat Records of Denton County, Texas (P.R.D.C.T.), corrected by Certificate of Correction recorded in Instrument Number 2004-147706 of the Deed Records of Denton County, Texas (D.R.D.C.T.) and being more particularly described by metes and bounds as follows;

COMMENCING at a 5/8-inch iron rod (controlling monument) for the southeast corner of a tract of land described in a Warranty Deed to Choctaw Properties, L.L.C. as recorded in Instrument Number 1996-082284 (O.P.R.D.C.T.) and being the northwest corner of a 280.000-acre tract of land described in a Special Warranty Deed to LGI Homes - Texas, LLC as recorded in Instrument Number 2018-141332 (O.P.R.D.C.T.), said point also being the northeast corner of Tract One and the southwest corner of Tract Two, both tracts described in a Warranty Deed to Joe Edwin Barnett as recorded in Instrument Number 2004-116615 (O.P.R.D.C.T.);

THENCE, South 89 degrees 57 minutes 58 seconds East, along the southerly line of said Tract Two (Barnett) and the northerly line of said 280.000-acre tract, a distance of 682.10 feet to the north most northeast corner of said 280.000-acre tract and the west most northwest corner of said Tract 1 (Big Sky, LLC) for the **POINT OF BEGINNING**, from which a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" bears North 09 degrees 10 minutes 03 seconds East - 0.46 feet;

THENCE, South 89 degrees 57 minutes 58 seconds East, along the southerly line of said Tract Two (Barnett) and the northerly line of said Tract 1, a distance of 1324.99 feet to a found 1/2-inch iron rod (controlling monument) at the southeast corner of said Tract Two (Barnett), said point also being the common west corner of Lots 20 and 21, Block A of Burns Branch Estates Phase 2, an addition to Denton County, Texas as recorded in Cabinet T, Page 293 (P.R.D.C.T.);

THENCE, South 00 degrees 07 minutes 40 seconds East, along the west line of said Lot 21, a distance of 612.84 feet to a found 1/2-inch iron rod with red cap stamped "Alliance" (controlling monument) at the south most southwest corner of said Lot 21;

THENCE, South 89 degrees 56 minutes 25 seconds East, along the southerly line of said Lot 21 and the northerly line of said Tract 1, a distance of 1280.25 feet to a found 1/2-inch iron rod (controlling monument) at the south most southeast corner of said Lot 21;

THENCE, North 00 degrees 08 minutes 13 seconds West, along the easterly line of said Lot 21, a distance of 612.31 feet to a found 1/2-inch iron rod (controlling monument) on an angle point on the easterly line of said Lot 21;

THENCE, South 89 degrees 58 minutes 24 seconds East, along the northerly line of said Tract 1 and the easterly line of said Lot 21 and the southerly line of Prairie Sky Estates, an addition to the County of Denton, Texas as recorded in Cabinet X, Page 299 (P.R.D.C.T.), a distance of 1944.92 feet to a found 1/2-inch iron rod with yellow cap stamped "H&N 1849" (controlling monument) at the east most northeast corner of said Tract 1;

THENCE, South 00 degrees 03 minutes 20 seconds West, along the easterly line of said Tract 1, a distance of 90.18 feet to a found 1/2-inch iron rod (controlling monument) at the northeast corner of Lot 10R, Block A of said Big Sky Trails;

THENCE, North 89 degrees 56 minutes 40 seconds West, along the northerly line of said Lot 10R, a distance of 625.19 feet to a found 1/2-inch iron rod (controlling monument) at the common north corner of said Lot 10R and Lot 11R of said Big Sky Trails, said point also being the beginning of a non-tangent curve to the left having a radius of 1984.57 feet, a central angle of 25 degrees 46 minutes 00 seconds, subtended by an 884.99-foot chord which bears South 01 degree 00 minutes 41 seconds West;

THENCE, Along said curve to the left and along the easterly line of said Lot 11R, passing at an arc distance of 269.82 feet to the common west corner of said Lot 10R and Lot 9R of said Big Sky Trails, from which a found 1/2-inch iron rod bears North 85 degrees 20 minutes 12 seconds East for a distance of 0.25 feet, passing at an arc distance of 535.72 feet to a found 1/2-inch iron rod with yellow cap stamped "H&N" 1849 (controlling monument) at the common west corner of said Lot 9R and Lot 8R of said Big Sky Trails, passing at an arc distance of 802.70 feet to a found 1/2-inch iron rod with yellow cap stamped "H&N" 1849 (controlling monument) at the common west corner of said Lot 8R and Lot 7R of said Big Sky Trails, in all, a total arc distance of 892.49 feet to a set 1/2-inch iron rod with yellow plastic cap stamped "PAPE DAWSON" and being the beginning of a reverse curve to the right, having a radius of 1984.57 feet, a central angle of 25 degrees 46 minutes 43 seconds, subtended by an 885.39-foot chord which bears South 01 degree 01 minute 03 seconds West;

THENCE, Along said curve to the right and the easterly line of said Lot 11R, passing at an arc distance of 179.75 feet to a found 1/2-inch iron rod with yellow cap (controlling monument) at the common west corner of said Lot 7R and Lot 6R of said Big Sky Trails, passing at an arc distance of 445.85 feet to a found 1/2-inch iron rod with yellow cap stamped "H&N" 1849 (controlling monument) at the common west corner of said Lot 6R and Lot 5R of said Big Sky Trails, passing at an arc distance of 712.54 feet to the common west corner of said Lot 5R and Lot 4R of said Big Sky Trails, from which a found 1/2-inch iron rod with yellow cap stamped "H&N 1849" bears South 71 degrees 18 minutes 02 seconds East for a distance of 0.28 feet, in all, a total arc distance of 892.90 feet to a set 1/2-inch iron rod with yellow plastic cap stamped "PAPE DAWSON" and being the beginning of a reverse curve to the left having a radius of 1984.57 feet, a central angle

of 25 degrees 47 minutes 11 seconds, subtended by an 885.65-foot chord which bears South 00 degrees 59 minutes 17 seconds West;

THENCE, Along said curve to the left and along the easterly line of said Lot 11R, passing at an arc distance 358.86 feet to the common west corner of said Lot 3R and Lot 2R of said Big Sky Trails, from which a found 1/2-inch iron rod with yellow cap stamped "Metroplex 10023300" bears North 61 degrees 38 minutes 01 second East for a distance of 0.41 feet, in all, a total arc distance of 893.17 feet to a found 1/2-inch iron rod with yellow cap "METROPLEX 10023300" (controlling monument) at the southwest corner of Lot 1R of said Big Sky Trails;

THENCE, South 89 degrees 56 minutes 53 seconds East, along the southerly line of Lot 1R, a distance of 625.20 feet to a set 1/2-inch iron rod with yellow plastic cap stamped "PAPE DAWSON" at the southeast corner of said Lot 1R, same being the west line of Big Sky Trail (a 60-foot access easement) as shown on said Big Sky Trails;

THENCE, South 01 degrees 00 minutes 22 seconds West, along the easterly line of said Tract 1, a distance of 200.48 feet to a found 1/2-inch iron rod (bent) with yellow cap stamped "METROPLEX 10023300" (controlling monument) at the east most southeast corner of said Tract 1 and the east most northeast corner of said 280.000-acre LGI tract;

THENCE, along the northerly lines of said 280.000-acre LGI tract, the following courses and distances;

South 89 degrees 48 minutes 11 seconds West, a distance of 829.18 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument) for an angle point on the southerly line of said Tract 1 and the northerly line of said 280.000-acre tract;

South 77 degrees 46 minutes 05 seconds West, a distance of 479.93 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument);

North 89 degrees 32 minutes 40 seconds West, a distance of 622.51 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument) at the south most southwest corner of said Tract 1;

THENCE, along the northeasterly lines of said 280.000-acre LGI tract, the following courses and distances;

North 00 degrees 55 minutes 41 seconds West, a distance of 352.22 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument);

North 55 degrees 26 minutes 59 seconds East, a distance of 539.98 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument);

North 38 degrees 19 minutes 26 seconds West a distance of 477.21 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument);

South 60 degrees 39 minutes 41 seconds West a distance of 101.83 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument);

North 55 degrees 05 minutes 45 seconds West a distance of 400.49 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument);

North 21 degrees 03 minutes 12 seconds West a distance of 195.67 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument);

North 45 degrees 55 minutes 11 seconds West a distance of 884.35 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument);

South 54 degrees 00 minutes 05 seconds West a distance of 908.53 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument) and being the beginning of a non-tangent curve to the left having a radius of 616.94 feet, a central angle of 27 degrees 14 minutes 57 seconds, subtended by a 290.65-foot chord which bears North 59 degrees 49 minutes 59 seconds West;

Along said curve to the left, an arc distance of 293.41 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument);

North 10 degrees 52 minutes 39 seconds West a distance of 495.98 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument);

North 26 degrees 31 minutes 58 seconds West a distance of 619.06 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument);

North 50 degrees 06 minutes 30 seconds West a distance of 210.46 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument);

North 17 degrees 57 minutes 48 seconds West a distance of 264.39 feet to the **POINT OF BEGINNING**, and **CONTAINING** 146.4 Acres or 6,376,515 Square Feet of land more or less, and being described in accordance with a survey made on ground and accompanied by an exhibit or survey map prepared under job number ***70008-07*** by Pape Dawson Engineers, Inc.

TRACT 2

BEING a tract of land, situated in William O. Matthews Survey, Abstract No. 891, Denton County, Texas, and being all of Tract 2 as described in a Special Warranty Deed to Big Sky, LLC and recorded in Instrument Number 2018-120750 of the Official Public Records of Denton, Texas (O.P.R.D.C.T.), and being more particularly described by metes and bounds as follows;

COMMENCING at a found PK nail (controlling monument) at an angle point in a 280.000-acre tract of land described in a Special Warranty Deed to LGI Homes - Texas, LLC as recorded in Instrument Number 2018-141332 (O.P.R.D.C.T.) and being the northwest corner of a 30.102-acre tract of land described in a Special Warranty Deed with Vendor's Lien to Jagoe-Public Co. as recorded in Instrument Number 2012-77572 (O.P.R.D.C.T.), said point also being on the south right-of-way line of Jackson Road (a 35-foot width right-of-way) as shown on Lots 1R thru 20R,

Block A, and Lot 1R thru 11R, Block B, Big Sky Trails, an addition to Denton County, Texas as recorded in Cabinet S, Page 18 of the Plat Records of Denton County, Texas (P.R.D.C.T.), corrected by Certificate of Correction recorded in Instrument Number 2004-147706 of the Deed Records of Denton County, Texas (D.R.D.C.T.), same being a point along the center of North Jackson Road (deed of record not found);

THENCE, departing the south right-of-way line of said Jackson Road, South 00 degrees 09 minutes 56 seconds East, along the center of North Jackson Road and the east line of said 280.000-acre LGI tract and the west line of said 30.102-acre Jagoe tract, a distance of 793.05 feet to a found PK nail for the west most southwest corner of said 30.102-acre Jagoe tract and the north most northwest corner of said Tract 2 for the **POINT OF BEGINNING**;

THENCE, along the southerly line of said 30.102-acre tract and the northerly line of said Tract 2, the following courses and distances;

South 87 degrees 10 minutes 02 seconds East, departing the center of said North Jackson Road and the east line of said 280.00-acre LGI tract, a distance of 63.42 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument);

South 29 degrees 37 minutes 39 seconds East, a distance of 437.34 feet to a found 1/2-inch iron rod with yellow cap stamped "METROPLEX 10023300" (controlling monument);

South 48 degrees 56 minutes 24 seconds East, a distance of 331.33 feet to a found 1/2-inch iron rod (controlling monument);

South 85 degrees 19 minutes 44 seconds East, a distance of 477.48 feet to a set 1/2-inch iron rod with yellow plastic cap stamped "PAPE DAWSON" at the southeast corner of said 30.102-acre Jagoe tract and the northeast corner of said Tract 2, said point also being on the west line of a 10.01-acre tract of land described in a Warranty Deed with Vendor's Lien to Hilario Hernandez & wife, Sanjuana Hernandez and Manuel Hernandez & wife, Nidia Hernandez as recorded in Volume 4657, Page 1266 of the Deed Records of Denton County, Texas (D.R.D.C.T.);

THENCE, along the easterly line of said Tract 2 and the westerly line of said 10.01-acre Hernandez tract, the following courses and distances;

South 06 degrees 43 minutes 13 seconds West, a distance of 93.36 feet to a found 1/2-inch iron rod (controlling monument);

South 01 degree 30 minutes 06 seconds East, a distance of 343.09 feet to a found 1/2-inch iron rod (controlling monument) at the southeast corner of said Tract 2 and on the northerly right-of-way line of U.S. 380 (W. University Drive - a variable width right-of-way), said point also being the northwest corner of a tract of land described in a Deed to the State of Texas as recorded in Instrument Number 2008-19979 (O.P.R.D.C.T.) and the northeast corner of a tract of land described in a Judgment of Court in Absence of Objection

Document (Cause Number PR-2009-00418) to the State of Texas as recorded in Instrument Number 2009-127041 (O.P.R.D.C.T.);

THENCE, along the southerly line of said Tract 2 and the northerly right-of-way line of said U.S. 380, the following courses and distances;

North 85 degrees 20 minutes 52 seconds West, a distance of 849.64 feet to a found TXDOT monument with aluminum disk (controlling monument);

North 49 degrees 38 minutes 34 seconds West, along said a distance of 174.39 feet to a found TXDOT monument with aluminum disk (controlling monument) to the northwest corner of said State of Texas tract (Instrument Number 2009-127041), said point also being an angle point on the right-of-way line of said U.S. 380 and the southerly line of said Tract 2;

THENCE, North 88 degrees 50 minutes 46 seconds West, along the northerly right-of-way line of said U.S. 380 and the southerly line of said Tract 2, a distance of 21.00 feet to a found mag nail (controlling monument) in the center of said North Jackson Road, said point also being the west most southwest corner of said Tract 2 and the east most southeast corner of a 15.000-acre tract of land described in a General Warranty Deed to Everclear Investments, Inc. as recorded in 2013-143203 (O.P.R.D.C.T.);

THENCE, along the center of said North Jackson Road and the westerly line of said Tract 2, the following courses and distances;

North 00 degrees 10 minutes 26 seconds West, along the easterly line of said 15.000-acre Everclear tract, a distance of 426.77 feet to a found PK nail (controlling monument) at the northeast corner of said 15.000-acre Everclear tract and southeast corner of said 280.000-acre LGI tract;

North 00 degrees 09 minutes 42 seconds West, along the easterly line of said 280.000-acre LGI tract, a distance of 466.48 feet to the **POINT OF BEGINNING**, and **CONTAINING** 13.0 Acres or 567,130 Square Feet of land more or less, and being described in accordance with a survey made on ground and accompanied by an exhibit or survey map prepared under job number ***70008-07*** by Pape Dawson Engineers, Inc.

Bearings are based on the Texas State Plane Coordinate System, North Central Zone (4202) North American Datum 1983 (NA2011) epoch 2010.00.

EXHIBIT B

PERMITTED EXCEPTIONS

1. Restrictive Covenants recorded in Volume 4291, Page 1265 and County Clerk's File Numbers 97-R0013693; 97-R0030546; 2013-140643; 2018-120592; 2019-113418 and 2019129351, Real Property Records, Denton County, Texas.

2. The following, as set out in the plat recorded in Cabinet S, Page 18, Plat Records, Denton County, Texas:

   Twenty foot (20') mutual access easement along easterly property line (Lot 11R, Block B)

3. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

   Granted to: Denton County Electric Cooperative, Inc.
   Recording Date: December 4, 1953
   Recording No: Volume 401, Page 131

4. Easement(s) for Right-of-Way purpose(s) shown below and rights incidental thereto, as granted in a document:

   Granted to: Denton County Electric Cooperative, Inc.
   Recording Date: February 24, 1954
   Recording No: Volume 403, Page 245

5. Easement(s) for Right-of-Way purpose(s) shown below and rights incidental thereto, as granted in a document:

   Granted to: Denton County Electric Cooperative, Inc.
   Recording Date: April 9, 1954
   Recording No: Volume 404, Page 7; affected by Agreement recorded in Volume 4206, Page 90

6. A Thirty (30) foot ingress and egress easement contained in Warranty Deed dated June 23, 2000, recorded in Volume 4646, Page 2780; corrected in Volume 4864, Page 1621, and being more particularly defined and located as set out therein.

7. Terms, conditions and stipulation contained in that certain Right-of-Way and Easement Agreement to construct, lay, install, operate, inspect, maintain, replace and repair a single pipeline, as granted in a document:

   Granted to: Dynegy Midstream Services, Limited Partnership
   Recording Date: August 29, 2001
   Recording No: Volume 4911, Page 3081; corrected in County Clerk's File No. 2004-67134, and being more particularly defined and located as set out therein.

8. Terms, conditions and stipulation contained in that certain Right-of-Way Grant (Roadway), Twenty-five (25) feet in width being Twelve and a half (12.5) feet to each side of the centerline, as granted in a document:

Granted to: Devon Energy Operating Company, L.P.
Recording Date: March 3, 2004
Recording No: County Clerk's File No. 2004-27006

9. Easement(s) for the purpose(s) shown below and rights incidental thereto, as granted in a document:

Granted to: Big Sky Trails, Ltd. and Jagoe-Public Company
Purpose: temporary access easement agreement
Recording Date: July 18, 2012
Recording No: County Clerk's File No. 2012-77571

10. Interest in and to oil, gas and other minerals and/or royalties, bonuses, rentals and all other rights relating thereto as set forth in the document

Recording No.: Volume 186, Page 113
Said mineral interest not traced subsequent to the date of the above-cited instrument.

11. Interest in and to oil, gas and other minerals and/or royalties, bonuses, rentals and all other rights relating thereto as set forth in the document

Recording No.: Volume 266, Page 49
Said mineral interest not traced subsequent to the date of the above-cited instrument.

12. Interest in and to oil, gas and other minerals and/or royalties, bonuses, rentals and all other rights relating thereto as set forth in the document

Recording No.: Volume 275, Page 84
Said mineral interest not traced subsequent to the date of the above-cited instrument.

13. Interest in and to oil, gas and other minerals and/or royalties, bonuses, rentals and all other rights relating thereto as set forth in the document

Recording No.: Volume 481, Page 4
Said mineral interest not traced subsequent to the date of the above-cited instrument.

14. Interest in and to oil, gas and other minerals and/or royalties, bonuses, rentals and all other rights relating thereto as set forth in the document

Recording No.: Volume 553, Page 375
Said mineral interest not traced subsequent to the date of the above-cited instrument.

15. Interest in and to oil, gas and other minerals and/or royalties, bonuses, rentals and all other rights relating thereto as set forth in the document

Recording No.: County Clerk's File No. 96-R0027538
Said mineral interest not traced subsequent to the date of the above-cited instrument.

16. Interest in and to oil, gas and other minerals and/or royalties, bonuses, rentals and all other rights relating thereto as set forth in the document

Recording No.: Volume 4122, Page 28
Said mineral interest not traced subsequent to the date of the above-cited instrument.

17. Interest in and to oil, gas and other minerals and/or royalties, bonuses, rentals and all other rights relating thereto as set forth in the document

Recording No.: Volume 4291, Page 1265
Said mineral interest not traced subsequent to the date of the above-cited instrument.

18. Interest in and to oil, gas and other minerals and/or royalties, bonuses, rentals and all other rights relating thereto as set forth in the document

Recording No.: Volume 5431, Page 4070
Said mineral interest not traced subsequent to the date of the above-cited instrument.

19. Interest in and to oil, gas and other minerals and/or royalties, bonuses, rentals and all other rights relating thereto as set forth in the document

Recording No.: County Clerk's File No. 2004-113341
Said mineral interest not traced subsequent to the date of the above-cited instrument.

20. Interest in and to oil, gas and other minerals and/or royalties, bonuses, rentals and all other rights relating thereto as set forth in the document

Recording No.: County Clerk's File No. 2005-48029
Said mineral interest not traced subsequent to the date of the above-cited instrument.

21. Interest in and to oil, gas and other minerals and/or royalties, bonuses, rentals and all other rights relating thereto as set forth in the document

Recording No.: County Clerk's File No. 2005-48030
Said mineral interest not traced subsequent to the date of the above-cited instrument.

22. Oil, Gas and Mineral Lease, together with all rights incident thereto.

Lessor: Gladys Simpson
Lessee: J.E. Allen et al,
Dated: February 15, 1955
Recording No.: Volume 405, Page 221

Said mineral interest not traced subsequent to the date of the above-cited instrument.

23. Oil, Gas and Mineral Lease, together will all rights incident thereto.

Lessor: Gladys Simpson et al,
Lessee: Coke L. Gage
Dated: March 17, 1964
Recording No.: Volume 509, Page 638; affected by Affidavit of Non-Production recorded in Volume 5194, Page 2309

Said mineral interest not traced subsequent to the date of the above-cited instrument.

24. Oil, Gas and Mineral Lease, together with all rights incident thereto.

Lessor: Clifford W. Balthrop et ux, Myrtle Balthrop
Lessee: Natural Gas Finders, Inc.
Dated: October 11, 1971
Recording No.: Volume 635, Page 304

Said mineral interest not traced subsequent to the date of the above-cited instrument.

25. Oil, Gas and Mineral Lease, together with all rights incident thereto.

Lessor: Mercantile National Bank at Dallas et al
Lessee: Panther Drilling Company
Dated: October 10, 1972
Recording No.: Volume 660, Page 117; affected by Affidavit of Non-Production recorded in Volume 5194, Page 2309

Said mineral interest not traced subsequent to the date of the above-cited instrument.

26. Oil, Gas and Mineral Lease, together with all rights incident thereto.

Lessor: Big Sky Trails, Ltd.
Lessee: L. Frank Pitts d/b/a Pitts Oil Company and Fagadau Energy Corporation
Dated: July 17, 2000
Recording No.: Volume 4671, Page 674

Said mineral interest not traced subsequent to the date of the above-cited instrument.

27. Oil, Gas and Mineral Lease, together with all rights incident thereto.

Lessor: Kay Williams and Tressa Williams
Lessee: MultiBrands, Ltd. Co.
Dated: November 1, 2000
Recording No.: Volume 4709, Page 1621

Said mineral interest not traced subsequent to the date of the above-cited instrument.

28. Oil, Gas and Mineral Lease, together with all rights incident thereto.

Lessor: Jamie Lou Harrington Appleton, Ind. Executrix of the Estate of Myrtle Kathryn Harrington, deceased
Lessee: L. Frank Pitts d/b/a Pitts Oil Company and Fagadau Energy Corporation
Dated: December 1, 2000
Recording No.: Volume 4747, Page 2642, corrected in Volume 4771, Page 1179

Said mineral interest not traced subsequent to the date of the above-cited instrument.

29. Oil, Gas and Mineral Lease, together with all rights incident thereto.

Lessor: Big Sky Trails, Ltd.
Lessee: L. Frank Pitts d/b/a Pitts Oil Company and Fagadau Energy Corporation
Dated: June 23, 2001
Recording No.: Volume 4874, Page 2366

As affected by Surface Use and Easement Agreement executed by Burlington Resources Oil & Gas Company, LP and Big Sky Trails, Ltd., recorded March 27, 2017 under County Clerk's File No. 2017-34841 of the Real Records of Denton County, Texas.

Said mineral interest not traced subsequent to the date of the above-cited instrument.

30. Oil, Gas and Mineral Lease, together with all rights incident thereto.

Lessor: Big Sky Trails, Ltd.
Lessee: Fagadau Energy Corporation
Dated: October 11, 2001
Recording No.: Volume 4943, Page 261

Said mineral interest not traced subsequent to the date of the above-cited instrument.

31. Oil, Gas and Mineral Lease, together with all rights incident thereto.

Lessor: Jamie Lou Harrington Appleton, Ind. Executrix of the Estate of Myrtle Kathryn Harrington, deceased
Lessee: L. Frank Pitts d/b/a Pitts Oil Company and Fagadau Energy Corporation
Dated: October 19, 2001
Recording No.: Volume 4960, Page 448

Said mineral interest not traced subsequent to the date of the above-cited instrument.

32. Surface Use Agreement

Executed by: Hess Operating Company and Kay and Tressa Williams Recording Date: November 5, 2004 Recording No.: County Clerk's File No. 2004-144061 ao. Surface Use Agreement
Executed by: Burns Branch, LP and MAP2003-NET
Recording Date: April 26, 2005
Recording No.: County Clerk's File No. 2005-48027 ap. Surface Use Agreement

Executed by: Big Sky Trails, Ltd. and MAP2003-NET
Recording Date: April 26, 2005
Recording No.: County Clerk's File No. 2005-48028 aq. Surface Use and Easement Agreement
Executed by: Burlington Resources Oil & Gas Company, LP and Big Sky Trails, Ltd.
Recording Date: March 27, 2017
Recording No.: County Clerk's File No. 2017-34841

33. Subject property lies within the Big Sky Municipal Utility District of Denton County.

34. Memorandum of Settlement Agreement

Executed by: Big Sky Trails, Ltd.; Big Sky Municipal Utility District of Denton County; Debra Drayovitch; John Adami; David Adami and Serax Ranch, Ltd.
Recording Date: October 11, 2018
Recording No.: County Clerk's File No. 2018-120591

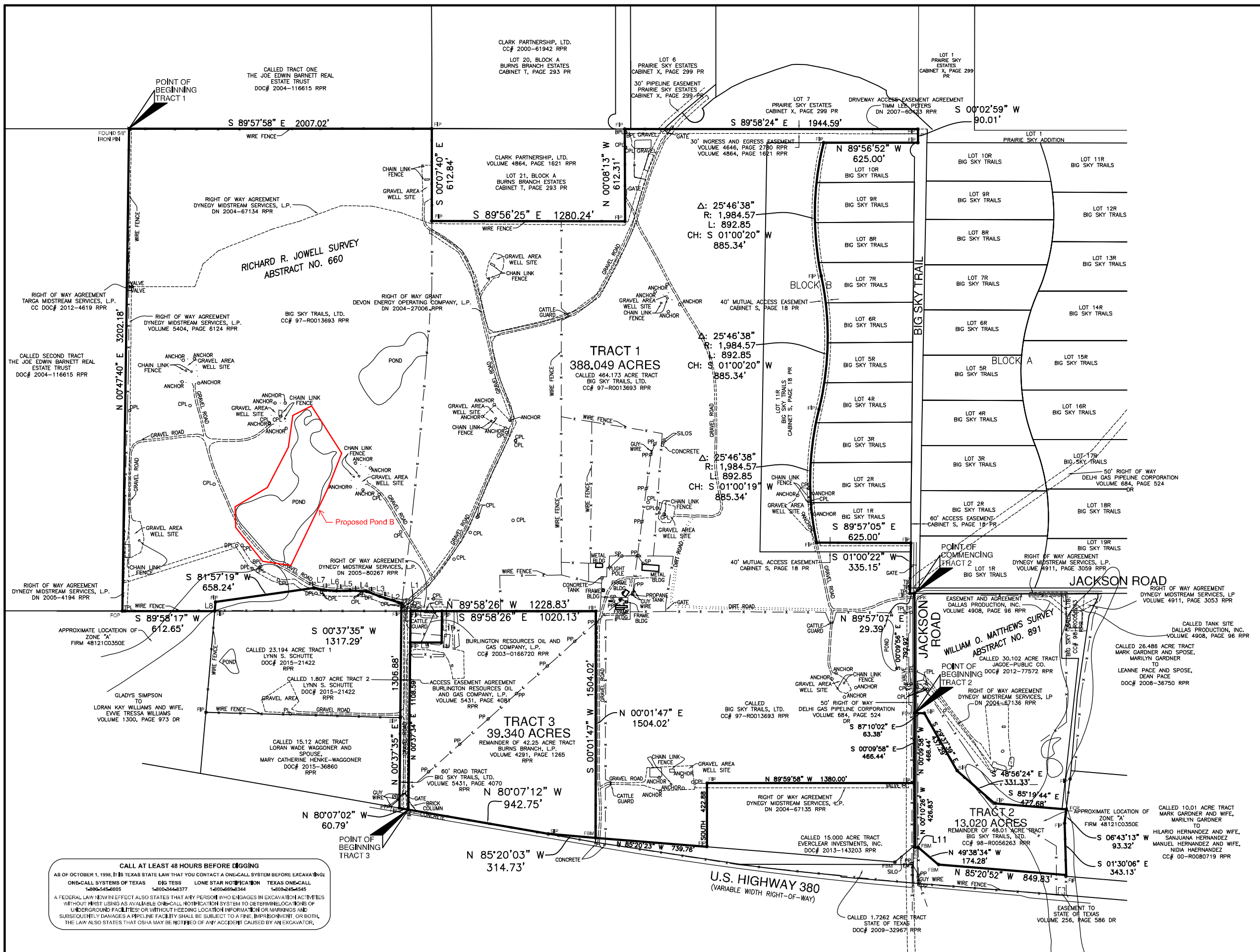
35. Interest in and to oil, gas and other minerals and/or royalties, bonuses, rentals and all other rights relating thereto as set forth in the document

Recording No.: County Clerk's File No. 2018-141332

Said mineral interest not traced subsequent to the date of the above-cited instrument.

36. Terms, conditions, easements, assessments and liens securing assessments for Big Sky Estates, as set out in covenants and restrictions recorded in County Clerk's File No. 2019-113418, Official Public Records, Denton County, Texas, together with any and all amendments thereto.

Said instrument also provides for the levy of assessments, the lien of which is stated to be subordinate to first lien mortgage, deed of trust or lien of any taxing authority.



LINE TABLE				
L1	N	00°37'28"	E	49.00'
L2	N	71°03'14"	W	152.83'
L3	N	69°44'59"	W	93.31'
L4	N	87°02'15"	W	110.53'
L5	S	88°53'36"	W	88.65'
L6	N	86°23'22"	W	84.54'
L7	N	79°36'36"	W	67.72'
L8	S	05°01'32"	W	60.00'
L9	S	89°58'30"	E	208.70'
L10	N	00°37'39"	E	208.70'
L11	N	88°50'46"	W	21.00'

CALL AT LEAST 48 HOURS BEFORE DIGGING

AS OF OCTOBER 1, 1998, IT IS TEXAS STATE LAW THAT YOU CONTACT A ONE-CALL SYSTEM BEFORE EXCAVATING.

ONE-CALL SYSTEMS OF TEXAS	DIG TESS	LONE STAR NOTIFICATION	TEXAS ONE-CALL
1-800-545-6005	1-800-344-8377	1-800-669-8344	1-800-245-4545

A FEDERAL LAW NOW IN EFFECT ALSO STATES THAT ANY PERSON WHO ENGAGES IN EXCAVATION ACTIVITIES WITHOUT FIRST USING AS AVALIABLE ONE-CALL NOTIFICATION SYSTEM TO DETERMINELOCATIONS OF UNDERGROUND FACILITIES, OR WITHOUT HEEDING LOCATION INFORMATION OR MARKINGS AND SUBSEQUENTLY DAMAGES A PIPELINE FACILITY SHALL BE SUBJECT TO A FINE, IMPRISONMENT, OR BOTH. THE LAW ALSO STATES THAT OSHA MAY BE NOTIFIED OF ANY ACCIDENT CAUSED BY AN EXCAVATOR.

SURVEYOR'S CERTIFICATE

I, BRAD G. SHELTON, DO HEREBY CERTIFY THAT A SURVEY WAS MADE ON THE GROUND THIS 22ND DAY OF FEBRUARY, 2016 OF THE PROPERTY DESCRIBED HEREON AND THERE ARE NO (VISIBLE) ENCROACHMENTS, PROTRUSIONS, OR OVERLAPPING OF IMPROVEMENTS, EXCEPT AS SHOWN HEREON.

BRAD G. SHELTON
REGISTERED PROFESSIONAL LAND SURVEYOR
STATE OF TEXAS NO. 5452

STATE OF TEXAS REGISTERED B.G. SHELTON 5452 PROFESSIONAL LAND SURVEYOR

DATE	REVISIONS	BY:	DWN. JRH	SCALE 1"= 300'
			CKD. BGS	DATE 02/22/16

Metroplex Surveying, Inc.
940-387-0506 223 W. HICKORY, DENTON, TEXAS 76201 info@metroplexsurveying.com

BOUNDARY SURVEY OF 3 TRACTSS IN THE RICHARD R. JOWELL SURVEY, ABSTRACT NO. 660 AND THE WILLIAM O. MATTHEWS SURVEY, ABSTRACT NO. 891 DENTON COUNTY, TEXAS

SHEET 1 OF 2
JOB No. 36327

36327
02/22/16
TRACT 1

ALL THAT CERTAIN TRACT OR PARCEL OF LAND LYING AND BEING SITUATED IN THE R. JOWELL SURVEY, ABSTRACT NUMBER 660, BEING PART OF A CALLED 464.173 ACRE TRACT OF LAND DESCRIBED IN THE DEED TO BIG SKY TRAIL, LTD RECORDED UNDER CLERKS FILE NUMBER 97-R0013693, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS, BEING ALL OF A CALLED 60' ROAD TRACT DESCRIBED IN THE DEED TO BIG SKY TRAILS, LTD., RECORDED IN VOLUME 5431, PAGE 4070, REAL PROPERTY RECORDS, DENTON COUNTY, AND BEING A PART OF LOT 11R, BLOCK B OF BIG SKY TRAILS, RECORDED IN AMENDING PLAT CABINET S, PAGE 18 CERTIFICATE OF CORRECTION RECORDED IN COUNTY CLERK DOCUMENT NUMBER 2004-147706, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS, AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A 5/8 INCH IRON PIN FOUND AT THE NORTHWEST CORNER OF SAID 464.173 ACRE TRACT, BEING ON THE SOUTH LINE OF A CALLED TRACT ONE DESCRIBED IN A DEED TO THE JOE EDWIN BARNETT REAL ESTATE TRUST RECORDED UNDER CLERKS FILE NUMBER 2004-116615, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS;

THENCE SOUTH 89 DEGREES 57 MINUTES 58 SECONDS EAST WITH A NORTH LINE OF SAID 464.173 ACRE TRACT AND THE SOUTH LINE OF SAID TRACT ONE, A DISTANCE OF 2007.02 FEET TO A 1/2 INCH IRON PIN FOUND AT THE NORTHWEST CORNER OF LOT 21, BLOCK A, BURNS BRANCH ESTATES, RECORDED IN CABINET T, PAGE 293, PLAT RECORDS, DENTON COUNTY, TEXAS;

THENCE SOUTH 00 DEGREES 07 MINUTES 40 SECONDS EAST WITH THE WEST LINE OF SAID LOT 21, A DISTANCE OF 612.84 FEET TO A 1/2 INCH IRON PIN FOUND AT THE SOUTHWEST CORNER OF SAID LOT 21;

THENCE SOUTH 89 DEGREES 56 MINUTES 25 SECONDS EAST WITH THE SOUTH LINE OF SAID LOT 21, A DISTANCE OF 1280.24 FEET, TO A 1/2 INCH IRON PIN FOUND AT THE SOUTHEAST OF SAID LOT 21;

THENCE NORTH 00 DEGREES 08 MINUTES 13 SECONDS WEST WITH THE EAST LINE OF SAID CLARK PARTNERSHIP, LTD. TRACT, A DISTANCE OF 612.31 FEET, TO A 1/2 INCH IRON PIN FOUND AT THE NORTH EAST CORNER OF SAID LOT 21, SAID PIN BEING ON A NORTH LINE OF SAID 464.173 ACRE TRACT;

THENCE SOUTH 89 DEGREES 58 MINUTES 24 SECONDS EAST WITH A NORTH LINE OF SAID 464.137 ACRE TRACT, A DISTANCE OF 1944.59 FEET, TO 1/2 INCH IRON PIN FOUND FOR CORNER ON THE WEST LINE OF A 60' PRIVATE ROAD EASEMENT (BIG SKY TRAIL), IN BIG SKY TRAILS, AN ADDITION TO DENTON COUNTY, AS SHOWN BY THE AMENDING PLAT THEREOF RECORDED IN CABINET S, PAGE 18, PLAT RECORDS, DENTON COUNTY, TEXAS;

THENCE SOUTH 00 DEGREES 02 MINUTES 59 SECONDS WEST WITH THE WEST LINE OF SAID 60' PRIVATE ROAD EASEMENT (BIG SKY TRAIL), A DISTANCE OF 90.01 FEET, TO A 1/2 INCH IRON PIN FOUND AT THE NORTHEAST CORNER OF LOT 10R OF SAID BIG SKY TRAILS;

THENCE NORTH 89 DEGREES 56 MINUTES 52 SECONDS WEST, WITH THE NORTH LINE OF SAID LOT 10R, A DISTANCE OF 625.00 FEET, TO A 1/2 INCH IRON PIN FOUND FOR CORNER, AT THE BEGINNING OF A CURVE TO THE LEFT, SAID PIN BEING THE NORTHWEST CORNER OF SAID LOT 10R, AND BEING AN INNER ELL CORNER OF LOT 11R OF SAID BIG SKY TRAILS;

THENCE WITH SAID CURVE TO THE LEFT, HAVING A CENTRAL ANGLE OF 25 DEGREES 46 MINUTES 38 SECONDS, A RADIUS OF 1984.57 FEET, AN ARC LENGTH OF 892.85 FEET, AND A CHORD BEARING SOUTH 01 DEGREES 00 MINUTES 20 SECONDS WEST, A DISTANCE OF 885.34 FEET TO A 1/2 INCH IRON PIN FOUND FOR CORNER AND BEING THE BEGINNING OF A CURVE TO THE RIGHT;

THENCE WITH SAID CURVE TO THE RIGHT, HAVING A CENTRAL ANGLE OF 25 DEGREES 46 MINUTES 38 SECONDS, A RADIUS OF 1984.57 FEET, AN ARC LENGTH OF 892.85 FEET, AND A CHORD BEARING SOUTH 01 DEGREES 00 MINUTES 20 SECONDS WEST, A DISTANCE OF 885.34 FEET TO A 1/2 INCH IRON PIN FOUND FOR CORNER AND BEING THE BEGINNING OF A CURVE TO THE LEFT;

THENCE WITH SAID CURVE TO THE LEFT, HAVING A CENTRAL ANGLE OF 25 DEGREES 46 MINUTES 38 SECONDS, A RADIUS OF 1984.57 FEET, AN ARC LENGTH OF 892.85 FEET, AND A CHORD BEARING SOUTH 01 DEGREES 00 MINUTES 19 SECONDS WEST, A DISTANCE OF 885.34 FEET TO A 1/2 INCH IRON PIN FOUND AT THE SOUTHWEST CORNER OF LOT 1R OF SAID BIG SKY TRAILS;

THENCE SOUTH 89 DEGREES 57 MINUTES 05 SECONDS EAST WITH THE SOUTH LINE OF SAID LOT 1R, A DISTANCE OF 625.00 FEET TO A 1/2 INCH IRON PIN FOUND AT THE SOUTHEAST CORNER OF SAID LOT 1R, SAID PIN BEING ON THE WEST LINE OF SAID 60' PRIVATE ROAD EASEMENT (BIG SKY TRAIL);

THENCE SOUTH 01 DEGREES 00 MINUTES 22 SECONDS WEST, WITH THE WEST LINE OF SAID 60' PRIVATE ROAD EASEMENT (BIG SKY TRAIL), A DISTANCE OF 335.15 FEET, TO 1/2 INCH IRON PIN FOUND FOR CORNER;

THENCE NORTH 89 DEGREES 57 MINUTES 07 SECONDS EAST, A DISTANCE OF 29.39 FEET TO PK NAIL SET FOR CORNER, SAID PIN BEING IN JACKSON ROAD AN EAST LINE OF SAID 464.173 ACRE TRACT AND AT THE NORTHWEST CORNER OF A CALLED 30.102 ACRE TRACT DESCRIBED IN A DEED TO JAGOE-PUBLIC CO., RECORDED UNDER COUNTY CLERK'S DOCUMENT NUMBER 2012-77572, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS;

THENCE SOUTH 00 DEGREES 09 MINUTES 56 SECONDS EAST, WITH AN EAST LINE OF SAID 464.173 ACRE TRACT AND THE WEST LINE OF SAID 30.102 ACRE TRACT IN JACKSON ROAD, A DISTANCE OF 792.92 FEET, TO A P.K. NAIL FOUND ON AN EAST LINE OF SAID 464.173 ACRE TRACT AND A SOUTHWEST CORNER OF SAID 30.102 ACRE TRACT, SAID PIN ALSO BEING ON THE WEST LINE OF A CALLED 48.01 ACRE TRACT DESCRIBED IN A DEED TO BIG SKY TRAILS, LTD. RECORDED UNDER COUNTY CLERK FILE NUMBER 98-R0056263 REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS;

THENCE SOUTH 00 DEGREES 09 MINUTES 58 SECONDS EAST WITH AN EAST LINE OF SAID 464.173 ACRE TRACT AND THE WEST LINE OF SAID 48.01 ACRE TRACT IN JACKSON ROAD, A DISTANCE OF 466.44 FEET TO A 1/2 INCH IRON PIN FOUND ON AN EAST LINE OF SAID 464.173 ACRE TRACT AND THE WEST LINE OF SAID 48.01 ACRE TRACT IN JACKSON ROAD, SAID PIN ALSO BEING AT THE NORTHEAST CORNER OF A CALLED 15.000 ACRE TRACT DESCRIBED IN A DEED TO EVERCLEAR INVESTMENTS, INC., RECORDED UNDER COUNTY CLERK'S DOCUMENT NUMBER 2013-143203, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS;

THENCE NORTH 89 DEGREES 59 MINUTES 58 SECONDS WEST WITH THE NORTH LINE OF SAID 15.000 ACRE TRACT, A DISTANCE OF 1380.00 FEET TO A 1/2 INCH IRON PIN FOUND AT THE NORTHWEST CORNER OF SAID 15.000 ACRE TRACT;

THENCE SOUTH WITH THE WEST LINE OF SAID 15.000 ACRE TRACT, A DISTANCE OF 422.88 FEET TO A 1/2 INCH IRON PIN FOUND AT THE SOUTHWEST CORNER OF SAID 15.000 ACRE TRACT AND ON THE NORTH LINE OF U.S.HIGHWAY 380;

THENCE NORTH 85 DEGREES 20 MINUTES 23 SECONDS WEST WITH THE NORTH LINE OF U.S. HIGHWAY 380, A DISTANCE OF 739.76 FEET TO A BRASS TXDOT MONUMENT FOUND ON A WEST LINE OF SAID 464.173 ACRE TRACT AND ON AN EAST LINE OF A CALLED 42.25 ACRE TRACT DESCRIBED IN A DEED TO BURNS BRANCH, L.P., RECORDED IN VOLUME 4291, PAGE 1265, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS, SAID PIN ALSO BEING ON THE NORTH LINE OF U.S. HIGHWAY 380;

THENCE NORTH 00 DEGREES 01 MINUTES 47 SECONDS EAST WITH A WEST LINE OF SAID 464.173 ACRE TRACT AND THE EAST LINE OF SAID 42.25 ACRE TRACT, A DISTANCE OF 1504.02 FEET TO A 1/2 INCH IRON PIN FOUND AT AN INNER ELL CORNER OF SAID 464.173 ACRE TRACT, BEING THE NORTHEAST CORNER OF SAID 42.25 ACRE TRACT;

THENCE NORTH 89 DEGREES 58 MINUTES 26 SECONDS WEST WITH A SOUTH LINE OF SAID 464.173 ACRE TRACT AND THE NORTH LINE OF SAID 42.25 ACRE TRACT, A DISTANCE OF 1228.83 FEET TO A 1/2 INCH IRON PIN FOUND AT THE NORTHEAST CORNER OF A CALLED 60' ROAD TRACT DESCRIBED IN A DEED TO BIG SKY TRAILS, LTD. RECORDED IN VOLUME 5431, PAGE 4070, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS, SAID PIN ALSO BEING THE NORTHWEST CORNER OF A TRACT DESCRIBED IN A DEED TO BURLINGTON RESOURCES OIL AND GAS COMPANY, L.P., RECORDED UNDER COUNTY CLERK'S FILE NUMBER 2003-0166720, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS;

THENCE SOUTH 00 DEGREES 37 MINUTES 35 SECONDS WEST WITH THE EAST LINE OF SAID 60' ROAD TRACT, A DISTANCE OF 1317.29 FEET TO A 1/2 INCH IRON PIN FOUND AT THE SOUTHEAST CORNER OF SAID 60' ROAD TRACT AND THE NORTH RIGHT-OF-WAY OF U.S. HIGHWAY 380;

THENCE NORTH 80 DEGREES 07 MINUTES 02 SECONDS WEST WITH THE SOUTH LINE OF SAID 60' ROAD TRACT AND THE NORTH RIGHT-OF-WAY LINE OF U.S. HIGHWAY 380, A DISTANCE OF 60.79 FEET TO A FOUND IRON PIN AT THE SOUTHWEST CORNER OF SAID 60' ROAD TRACT BEING THE SOUTHEAST CORNER OF A CALLED 15.12 ACRE TRACT, DESCRIBED IN A DEED LORAN WADE WAGGONER AND SPOUSE, MARY CATHERINE HENKE-WAGGONER., RECORDED UNDER COUNTY CLKER FILE NUMBER 2015-36860, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS,

THENCE NORTH 00 DEGREES 37 MINUTES 35 SECONDS EAST WITH THE WEST LINE OF SAID 60' ROAD TRACT, THE EAST LINE OF SAID WAGGONER TRACT, PASSING AT 599.09 FEET A 1/2 INCH IRON PIN FOUND AT THE SOUTHEAST CORNER OF A CALLED 23.194 ACRE TRACT 1, DESCRIBED IN A DEED TO LYNN S. SCHUTTE, RECORDED UNDER COUNTY CLERK'S DOCUMENT NUMBER 2015-21422 AND CONTINUING ALONG THE EAST LINE OF SAID SCHUTTE TRACT, A TOTAL DISTANCE OF 1306.88 FEET TO A 1/2 INCH IRON PIN FOUND AT THE NORTHEAST CORNER OF SAID SCHUTTE TRACT AND ON A SOUTH LINE OF SAID 464.173 ACRE TRACT;

THENCE NORTH 00 DEGREES 37 MINUTES 28 SECONDS EAST, A DISTANCE OF 49.00 FEET TO A FOUND 1/2 IRON PIN;

THENCE NORTH 71 DEGREES 03 MINUTES 14 SECONDS WEST, A DISTANCE OF 152.83 FEET TO A FOUND IRON PIN;

THENCE NORTH 69 DEGREES 44 MINUTES 59 SECONDS WEST, A DISTANCE OF 93.31 FEET TO A FOUND IRON PIN;

THENCE NORTH 87 DEGREES 02 MINUTES 15 SECONDS WEST, A DISTANCE OF 110.53 FEET TO A FOUND IRON PIN;

THENCE SOUTH 88 DEGREES 53 MINUTES 36 SECONDS WEST, A DISTANCE OF 88.65 FEET TO A FOUND IRON PIN;

THENCE NORTH 86 DEGREES 23 MINUTES 22 SECONDS WEST, A DISTANCE OF 84.54 FEET TO A FOUND IRON PIN;

THENCE NORTH 79 DEGREES 36 MINUTES 36 SECONDS WEST, A DISTANCE OF 67.72 FEET TO A FOUND IRON PIN;

THENCE SOUTH 81 DEGREES 57 MINUTES 19 SECONDS WEST, A DISTANCE OF 658.24 FEET TO A FOUND IRON PIN;

THENCE SOUTH 05 DEGREES 01 MINUTES 32 SECONDS WEST, A DISTANCE OF 60.00 FEET TO A 1/2 INCH IRON PIN FOUND ON A SOUTH LINE OF SAID 464.173 ACRE TRACT AND THE NORTH LINE OF A TRACT DESCRIBED IN A DEED TO LORAN KAY WILLIAMS AND WIFE, EVVIE TRESSA WILLIAMS, RECORDED IN VOLUME 1300, PAGE 973, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS;

THENCE SOUTH 89 DEGREES 58 MINUTES 17 SECONDS WEST WITH A SOUTH LINE OF SAID 464.173 ACRE TRACT AND THE NORTH LINE OF SAID WILLIAMS TRACT, A DISTANCE OF 612.65 FEET TO A FENCE POST FOUND AT THE WESTERN MOST SOUTHWEST CORNER OF SAID 464.173 ACRE TRACT AND THE SOUTHEAST CORNER CALLED SECOND TRACT DESCRIBED IN A DEED TO THE JOE EDWIN BARNETT REAL ESTATE TRUST, RECORDED UNDER COUNTY CLERK'S DOCUMENT NUMBER 2004-116615, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS;

THENCE NORTH 00 DEGREES 47 MINUTES 40 SECONDS EAST WITH THE WESTERN MOST WEST LINE OF SAID 464.173 ACRE TRACT AND THE EAST LINE OF SAID SECOND TRACT, A DISTANCE OF 3202.18 FEET TO THE POINT OF BEGINNING AND CONTAINING IN ALL 388.049 ACRES OF LAND.

TRACT 2

ALL THAT CERTAIN TRACT OR PARCEL OF LAND LYING AND BEING SITUATED IN THE WILLIAM O. MATTHEWS SURVEY ABSTRACT NUMBER 891, DENTON COUNTY, TEXAS AND BEING THE REMAINER OF A 48.01 ACRE TRACT AS DESCRIBED IN A DEED TO BIG SKY TRAILS, LTD., RECORDED UNDER COUNTY CLERK'S FILE NUMBER 98-R0056263, REAL PROPERTY RECORDS OF DENTON COUNTY, TEXAS, AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS;

COMMENCING AT A PK NAIL SET IN JACKSON ROAD AT THE NORTHWEST CORNER OF SAID 48.01 ACRE TRACT, THE NORTHWEST CORNER OF A CALLED 30.102 ACRE TRACT DESCRIBED IN A DEED TO JAGOE-PUBLIC COMPANY, RECORDED UNDER COUNTY CLERK'S DOCUMENT NUMBER 2012-77572, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS, AND BEING ON AN EAST LINE OF A CALLED 464.173 ACRE TRACT DESCRIBED IN THE DEED TO BIG SKY TRAIL, LTD., RECORDED UNDER CLERKS FILE NUMBER 97-R0013693, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS;

THENCE SOUTH 00 DEGREES 09 MINUTES 56 SECONDS EAST WITH THE EAST LINE OF SAID 30.1021 ACRE TRACTANDAN EAST LINE OF SAID 464.173 ACRE TRACT IN JACKSON ROAD, A DISTANCE OF 792.92 FEET TO A PK NAIL FOUND ON THE WEST LINE OF SAID 48.01 ACRE TRACT AND THE WESTERN MOST SOUTHWEST CORNER OF SAID 30.102 ACRE TRACT, SAID NAIL ALSO BEING ON AN EAST LINE OF SAID 464.173 ACRE TRACT;

THENCE SOUTH 87 DEGREES 10 MINUTES 02 SECONDS EAST WITH A SOUTH LINE OF SAID 30.102 ACRE TRACT, A DISTANCE OF 63.38 FEET TO A 1/2 INCH IRON PIN WITH A YELLOW PLASTIC CAP STAMPED "10023300" SET AT AN INNER ELL CORNER OF SAID 30.102 ACRE TRACT;

THENCE SOUTH 29 DEGREES 37 MINUTES 39 SECONDS EAST WITH A SOUTH LINE OF SAID 30.102 ACRE TRACT, A DISTANCE OF 437.29 FEET TO A 1/2 INCH IRON PIN WITH A YELLOW PLASTIC CAP STAMPED "10023300" SET AT AN ANGLE POINT ON A SOUTH LINE OF SAID 30.102 ACRE TRACT;

THENCE SOUTH 48 DEGREES 56 MINUTES 24 SECONDS EAST WITH A SOUTH LINE OF SAID 30.102 ACRE TRACT, A DISTANCE OF 331.33 FEET TO A 1/2 INCH IRON PIN FOUND AT AN ANGLE POINT ON A SOUTH LINE OF SAID 30.102 ACRE TRACT;

THENCE SOUTH 85 DEGREES 19 MINUTES 44 SECONDS EAST, A DISTANCE OF 477.68 FEET TO A METAL FENCE POST FOUND ON THE EAST LINE OF SAID 48.01 ACRE TRACT AND ON THE WEST LINE OF A CALLED 10.01 ACRE TRACT DESCRIBED IN A DEED TO HILARIO HERNANDEZ AND WIFE, SANJUANA HERNANDEZ AND MANUEL HERNANDEZ AND WIFE, NIDIA HERNANDEZ, RECORDED UNDER COUNTY CLERK'S FILE NUMBER 00-R0080719, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS;

THENCE SOUTH 06 DEGREES 43 MINUTES 13 SECONDS WEST WITH THE EAST LINE OF SAID 48.01 ACRE TRACT AND THE WEST LINE OF SAID 10.01 ACRE TRACT, A DISTANCE OF 93.32 FEET TO A 1/2 INCH IRON PIN FOUND ON THE EAST LINE OF SAID 48.01 ACRE TRACT AND THE WEST LINE OF SAID 10.01 ACRE TRACT;

THENCE SOUTH 01 DEGREES 30 MINUTES 06 SECONDS EAST WITH THE EAST LINE OF SAID 48.01 ACRE TRACT AND THE WEST LINE OF SAID 10.01 ACRE TRACT, A DISTANCE OF 343.13 FEET TO A 1/2 INCH IRON PIN FOUND ON THE EAST LINE OF SAID 48.01 ACRE TRACT AND THE NORTH RIGHT-OF-WAY LINE OF U.S. HIGHWAY 380;
THENCE NORTH 85 DEGREES 20 MINUTES 52 SECONDS WEST WITH THE NORTH RIGHT-OF-WAY LINE OF U.S. HIGHWAY 380, A DISTANCE OF 849.69 FEET TO A BRASS TxDOT MONUMENT FOUND FOR CORNER;

THENCE NORTH 49 DEGREES 38 MINUTES 34 SECONDS WEST WITH THE WITH THE NORTH RIGHT-OF-WAY LINE OF U.S. HIGHWAY 380, A DISTANCE OF 174.18 FEET TO A BRASS TxDOT MONUMENT FOUND FOR CORNER;

THENCE NORTH 88 DEGREES 50 MINUTES 46 SECONDS WEST WITH THE NORTH RIGHT-OF-WAY LINE OF U.S. HIGHWAY 380, A DISTANCE OF 21.00 FEET TO A PK NAIL FOUND IN JACKSON ROAD ON THE WEST LINE OF SAID 48.01 ACRE TRACT AND THE EAST LINE OF A CALLED 15.00 ACRE TRACT DESCRIBED IN A DEED TO EVERCLEAR INVESTMENTS, INC. RECORDED UNDER COUNTY CLERK'S DOCUMENT NUMBER 2013-143203, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS;

THENCE NORTH 00 DEGREES 10 MINUTES 26 SECONDS WEST WITH THE WEST LINE OF SAID 48.01 ACRE TRACT AND THE EAST LINE OF SAID 15.00 ACRE TRACT IN JACKSON ROAD, DISTANCE OF 426.83 FEET TO A 1/2 INCH IRON PIN FOUND ON THE WEST LINE OF SAID 48.01 ACRE TRACT AND AT THE NORTHEAST CORNER OF SAID 15.00 ACRE TRACT, SAID PIN ALSO BEING ON AN EAST LINE OF SAID 464.173 ACRE TRACT;

THENCE NORTH 00 DEGREES 09 MINUTES 58 SECONDS EAST WITH THE WEST LINE OF SAID 48.01 ACRE TRACT AND AN EAST LINE OF SAID 464.173 ACRE TRACT, DISTANCE OF 466.44 FEET TO THE POINT OF BEGINNING AND CONTAINING IN ALL 13.020 ACRES OF LAND.

TRACT 3

ALL THAT CERTAIN TRACT OR PARCEL OF LAND LYING AND BEING SITUATED IN THE R. JOWELL SURVEY, ABSTRACT NUMBER 660, BEING PART OF A CALLED 42.25 ACRE TRACT OF LAND DESCRIBED IN THE DEED TO BURNS BRANCH, L.P., RECORDED IN VOLUME 4291, PAGE 1265, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS, AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A 1/2 INCH IRON PIN FOUND ON THE SOUTH LINE OF SAID 42.25 ACRE TRACT AND THE NORTH RIGHT OF WAY LINE OF U.S. HIGHWAY 380, SAID PIN ALSO BEING AT THE SOUTHEAST CORNER OF A CALLED 60 FOOT ROAD TRACT DESCRIBED IN A DEED TO BIG SKY TRAILS, LTD., RECORDED IN VOLUME 5431, PAGE 4070, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS;

THENCE NORTH 00 DEGREES 37 MINUTES 34 SECONDS EAST WITH THE EAST LINE OF SAID 60 FOOT ROAD TRACT, A DISTANCE OF 1108.59 FEET TO A 1/2 INCH IRON PIN FOUND ON THE EAST LINE OF SAID 60 FOOT ROAD TRACT AND THE SOUTHWEST CORNER OF A TRACT DESCRIBED IN A DEED TO BURLINGTON RESOURCES OIL AND GAS COMPANY, L.P., RECORDED UNDER COUNTY CLERK'S INSTRUMENT FILE NUMBER 2003-0166720, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS;

THENCE SOUTH 89 DEGREES 58 MINUTES 30 SECONDS EAST WITH THE SOUTH LINE OF SAID BURLINGTON TRACT, A DISTANCE OF 208.70 FEET TO A 1/2 INCH IRON PIN FOUND AT THE SOUTHEAST CORNER OF SAID BURLINGTON TRACT;

THENCE NORTH 00 DEGREES 37 MINUTES 39 SECONDS EAST WITH THE EAST LINE OF SAID BURLINGTON TRACT, A DISTANCE OF 208.70 FEET TO A 1/2 INCH IRON PIN FOUND AT THE NORTHEAST CORNER OF SAID BURLINGTON TRACT AND ON THE NORTH LINE OF SAID 42.25 ACRE TRACT, SAID PIN ALSO BEING ON A SOUTH LINE OF A CALLED 464.173 ACRE TRACT OF LAND DESCRIBED IN THE DEED TO BIG SKY TRAIL, LTD RECORDED UNDER CLERKS FILE NUMBER 97-R0013693, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS;

THENCE SOUTH 89 DEGREES 58 MINUTES 26 SECONDS EAST WITH THE NORTH LINE OF SAID 42.25 ACRE TRACT AND A SOUTH LINE OF SAID 464.173 ACRE TRACT, A DISTANCE OF 1020.13 FEET TO A 1/2 INCH IRON PIN FOUND AT THE NORTHEAST CORNER OF SAID 42.25 ACRE TRACT AND AN INNER ELL CORNER OF SAID 464.173 ACRE TRACT;

THENCE SOUTH 00 DEGREES 01 MINUTES 47 SECONDS WEST WITH THE EAST LINE OF SAID 42.25 ACRE TRACT AND A WEST LINE OF SAID 464.173 ACRE TRACT, A DISTANCE OF 1504.02 FEET TO A BRASS TXDOT MONUMENT FOUND ON THE EAST LINE OF SAID 42.25 ACRE TRACT AND A WEST LINE OF SAID 464.173 ACRE TRACT, SAID MONUMENT ALSO BEING ON THE NORTH RIGHT OF WAY LINE OF U.S. HIGWAY 380;

THENCE NORTH 85 DEGREES 20 MINUTES 03 SECONDS WESTWITH THE NORTH RIGHT OF WAY LINE OF U.S. HIGHWAY 380, A DISTANCE OF 314.73 FEET TO A 1/2 INCH IRON PIN WITH A YELLOW PLASTIC CAP STAMPED "10023300" SET ON THE SOUTH LINE OF SAID 42.25 ACRE TRACT AND ON THE NORTH RIGHT OF WAY OF U.S. HIGHWAY 380;

THENCE NORTH 80 DEGREES 07 MINUTES 12 SECONDS WEST WITH THE SOUTH LINE OF SAID 42.25 ACRE TRACT AND THE NORTH RIGHT OF WAY LINE OF U.S. HIGHWAY 380, A DISTANCE OF 942.75 FEET TO THE POINT OF BEGINNING AND CONTAINING IN ALL 39.340 ACRES OF LAND.

NOTES:

EASEMENTS SHOWN HEREON ARE AS LISTED IN TITLE RESOURCE'S GF NO. 165180, EFFECTIVE DATE FEBRUARY 2, 2016:

10.F. 20' MUTUAL ACCESS EASEMENT ALONG THE EAST BOUNDARY LINE AND 40' MUTUAL ACCESS EASEMENT ALONG THE SOUTHERN NORTH BOUNDARY LINE; 16' DRAINAGE AND UTILITY EASEMENT ALONG THE FRONT OF THE SOUTHERN EAST BOUNDARY LINE; AS SHOWN ON PLAT RECORDED IN CABINET S, PAGE 18, PLAT RECORDS, DENTON COUNTY, TEXAS. DOES AFFECT AS SHOWN

10.R. SURFACE USE AGREEMENT EXECUTED BY AND BETWEEN BURNS BRANCH, LP AND MAP2003-NET FILED APRIL 26, 2005, RECORDED UNDER CC# 2005-48027, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS. BLANKET IN NATURE AND DOES AFFECT.

10.S. SURFACE USE AGREEMENT EXECUTED BY AND BETWEEN BIG SKY TRAILS, LTD. AND MAP 2003-NET, FILED APRIL 26, 2005, RECORDED UNDER CC# 2005-48028, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS. BLANKET IN NATURE AND DOES AFFECT

10.EE. EASEMENT EXECUTED BY G.R. FOSTER TO STATE OF TEXAS HIGHWAY COMMISSION FILED JUNE 6, 1936, RECORDED IN VOLUME 256, PAGE 586, DEED RECORDS OF DENTON COUNTY, TEXAS. DOES NOT AFFECT

10.FF. EASEMENT EXECUTED BY E.H. BATES TO DENTON COUNTY ELECTRIC COOPERATIVE, INC. FILED SEPTEMBER 8, 1953, RECORDED IN VOLUME 401, PAGE 26, DEED RECORDS OF DENTON COUNTY, TEXAS. BLANKET IN NATURE AND DOES AFFECT.

10.GG. EASEMENT EXECUTED BY G.R. FOSTER TO DENTON COUNTY ELECTRIC COOPERATIVE, INC. FILED NOVEMBER 3, 1953, RECORDED IN VOLUME 401, PAGE 131, DEED RECORDS OF DENTON COUNTY, TEXAS. BLANKET IN NATURE AND DOES AFFECT

10.HH. EASEMENT EXECUTED BY COLEMAN Y. MANKIN AND WIFE, MYLA C. MANKIN TO DENTON COUNTY ELECTRIC COOPERATIVE, INC. FILED JANUARY 16, 1954, RECORDED IN VOLUME 403, PAGE 245, DEED RECORDS OF DENTON COUNTY, TEXAS. BLANKET IN NATURE AND DOES AFFECT

10.II. EASEMENT EXECUTED BY B.D. SIMPSON AND WIFE, NANNIE SIMPSON TO DENTON COUNTY ELECTRIC COOPERATIVE, INC. FILED MARCH 25, 1954, RECORDED IN VOLUME 404, PAGE 7, DEED RECORDS OF DENTON COUNTY, TEXAS. BLANKET IN NATURE AND DOES AFFECT.

10.JJ. EASEMENT EXECUTED BY MYRTLE KATHRYN HARRINGTON ET AL TO DELHI GAS PIPELINE CORPORATION FILED SEPTEMBER 5, 1973, RECORDED IN VOLUME 684, PAGE 524, DEED RECORDS OF DENTON COUNTY, TEXAS. DOES AFFECT AS SHOWN.

10.KK. INGRESS AND EGRESS EASEMENT AS GRANTED IN WARRANTY DEED EXECUTED BY BIG SKY TRAILS, LTD. TO CLARK PARTNERSHIP, LTD., FILED AUGUST 4, 2000, RECORDED IN VOLUME 4646, PAGE 2780, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS AND BEING CORRECTED BY INSTRUMENT FILED JUNE 22, 2001, RECORDED IN VOLUME 4864, PAGE 1621, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS. DOES AFFECT AS SHOWN

10.LL. EASEMENT EXECUTED BY BURNS BRANCH, L.P. TO DYNEGY MIDSTREAM SERVICES, LIMITED PARTNERSHIP FILED AUGUST 29, 2001, RECORDED IN VOLUME 4911, PAGE 3067, REAL PROPERTY RECORDS OF DENTON COUNTY, TEXAS. DOES NOT AFFECT

10.MM. EASEMENT EXECUTED BY BIG SKY TRAILS, LTD. TO DYNEGY MIDSTREAM SERVICES, LIMITED PARTNERSHIP FILED AUGUST 29, 2001, RECORDED IN VOLUME 4911, PAGE 3081, REAL PROPERTY RECORDS OF DENTON COUNTY, TEXAS AND CORRECTED BY INSTRUMENT FILED MAY 24, 2004, RECORDED UNDER CC# 2004-67134, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS. DOES AFFECT AS SHOWN

10.NN. EASEMENT EXECUTED BY BIG SKY TRAILS, LTD. TO DYNEGY MIDSTREAM SERVICES, LIMITED PARTNERSHIP FILED AUGUST 26, 2003, RECORDED IN VOLUME 5404, PAGE 6124, REAL PROPERTY RECORDS OF DENTON COUNTY, TEXAS. DOES AFFECT AS SHOWN

10.OO. TERMS, PROVISIONS AND CONDITIONS OF ACCESS EASEMENT AGREEMENT GRANTED BY BIG SKY TRAILS, LTD. TO BURLINGTON RESOURCES OIL AND GAS COMPANY, L.P., FILED OCTOBER 23, 2003, RECORDED IN VOLUME 5431, PAGE 4081, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS. DOEAS AFFECT AS SHOWN

10.PP. EASEMENT EXECUTED BY BURNS BRANCH AND BIG SKY TRAILS, LTD. TO DEVON ENERGY OPERATING COMPANY, L.P. FILED MARCH 3, 2004, RECORDED UNDER CC# 2004-27006, REAL PROPERTY RECORDS OF DENTON COUNTY, TEXAS.DOES AFFECT AS SHOWN

10.QQ. EASEMENT EXECUTED BY BIG SKY TRAILS, LTD. TO DYNEGY MIDSTREAM SERVICES, LIMITED PARTNERSHIP FILED MAY 24, 2004, RECORDED UNDER CC# 2004-67135, REAL PROPERTY RECORDS OF DENTON COUNTY, TEXAS. DOES AFFECT AS SHOWN

10.RR.EASEMENT EXECUTED BY BIG SKY TRAILS, LTD. TO DYNEGY MIDSTREAM SERVICES, LIMITED PARTNERSHIP FILED MAY 24, 2004, RECORDED UNDER CC# 2004-67136, REAL PROPERTY RECORDS OF DENTON COUNTY, TEXAS. DOES NOT AFFECT

10.SS. TERMS AND PROVISIONS AND CONDITIONS OF SURFACE USE AGREEMENT EXECUTED BY AND BETWEEN HESS OPERATING COMPANY, KAY WILLIAMS AND TRESSA WILLIAMS, FILED NOVEMBER 5, 2004, RECORDED UNDER CC# 2004-144061, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS. BLANKET IN NATURE AND DOES AFFECT

10.TT. EASEMENT EXECUTED BY BIG SKY TRAILS, LTD. TO DYNEGY MIDSTREAM SERVICES, LIMITED PARTNERSHIP FILED JANUARY 11, 2005, RECORDED UNDER CC# 2005-4194, REAL PROPERTY RECORDS OF DENTON COUNTY, TEXAS. DOES AFFECT AS SHOWN

10.UU. EASEMENT EXECUTED BY BURNS BRANCH, L.P. AND BIG SKY TRAILS, LTD. TO DYNEGY MIDSTREAM SERVICES, LIMITED PARTNERSHIP FILED JULY 5, 2005, RECORDED UNDER CC# 2005-80267, REAL PROPERTY RECORDS OF DENTON COUNTY, TEXAS. DOES AFFECT AS SHOWN

10.VV. TERMS, PROVISIONS AND CONDITIONS OF ROAD ACCESS EASEMENT AGREEMENT EXECUTED BY AND BETWEEN BURNS BRANCH, L.P. AND BIG SKY TRAILS, LTD., FILED AUGUST 3, 2005, RECORDED UNDER CC# 2005-95454, REAL PROPERTY RECORDS, DENOTN COUNTY, TEXAS. BLANKET IN NATURE AND DOES AFFECT

10.WW. EASEMENT EXECUTED BY BIG SKY TRAILS, LTD. TO TARGA MIDSTREAM SERVICES LLC FILED JANUARY 17, 2012, RECORDED UNDER CC# 2012-4619, REAL PROPERTY RECORDS OF DENTON COUNTY, TEXAS. DOES AFFECT AS SHOWN

10.XX. TERMS, PROVISIONS AND CONDITIONS OF TEMPORARY ACCESS EASEMENT AGREEMENT EXECUTED BY AND BETWEEN BIG SKY TRAILS, LTD. AND JAGOE-PUBLIC COMPANY, FILED JULY 18, 2012, RECORDED UNDER CC# 2012-77571, REAL PROPERTY RECORDS, DENTON COUNTY, TEXAS. BLANKET IN NATURE AND DOES AFFECT

BEARINGS BASED ON GPS OBSERVATIONS DATES 12/01/09.

BY GRAPHIC PLOTTING ONLY, A PORTION OF THIS PROPERTY IS WITHIN ZONE "A", AREAS DETERMINED TO BE INSIDE OF A DESIGNATED 100 YEAR FLOODPLAIN AND A PORTION OF THIS PROPERTY IS WITHIN ZONE "X", AREAS DETERMINED TO BE OUTSIDE OF A DESIGNATED 100 YEAR OR 500 YEAR FLOODPLAIN AS SHOWN BY FIRM MAP COMMUNITY-PANEL NUMBER 48121C0190G AND 48121C0330G , DATED APRIL 18TH, 2011. NO SURVEYING WAS PERFORMED TO DETERMINE THIS FLOOD ZONE.

SURVEYOR'S CERTIFICATE

I, BRAD G. SHELTON, DO HEREBY CERTIFY THAT A SURVEY WAS MADE ON THE GROUND THIS 22ND DAY OF FEBRUARY, 2016 OF THE PROPERTY DESCRIBED HEREON AND THERE ARE NO (VISIBLE) ENCROACHMENTS, PROTRUSIONS, OR OVERLAPPING OF IMPROVEMENTS, EXCEPT AS SHOWN HEREON.

BRAD G. SHELTON
REGISTERED PROFESSIONAL LAND SURVEYOR
STATE OF TEXAS NO. 5452

DATE	REVISIONS	BY:	DWN. JRH / CKD. BGS	SCALE NA / DATE 02/22/16	Metroplex Surveying, Inc. 940-387-0506 223 W. HICKORY, DENTON, TEXAS 76201 info@metroplexsurveying.com

BOUNDARY SURVEY OF 3 TRACTS IN THE RICHARD R. JOWELL SURVEY, ABSTRACT NO. 660 AND THE WILLIAM O. MATTHEWS SURVEY, ABSTRACT NO. 891 DENTON COUNTY, TEXAS

SHEET 2 OF 2
JOB No. 36327

Big Sky Municipal Utility District (MUD) Hydrogeological Report

Prepared for:

PAPE-DAWSON ENGINEERS

In support of the Big Sky MUD groundwater produciton permit application to the

NTGCD NORTH TEXAS GROUNDWATER CONSERVATION DISTRICT

Prepared by:

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

INTERA Incorporated
9600 Great Hills Trail,
Suite 300W
Austin, Texas 78759

17 December 2019

This page is intentionally left blank.

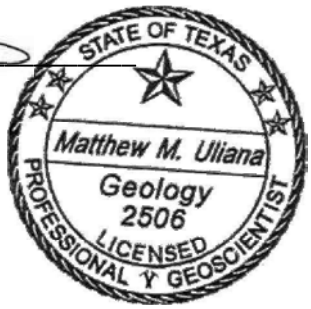
GEOSCIENTIST AND/OR PROFESSIONAL ENGINEER CERTIFICATION(S)

All technical work presented in this document is certified by the following Licensed Professional Geoscientist(s) and/or Professional Engineer(s):

Daniel M. Lupton, PG# 11354_____

Daniel Lupton was the Project Manager for this report

17 December 2019



Matthew M. Uliana, PG# 2506_____

Matthew Uliana was responsible for the groundwater modeling aspects of the report

17 December 2019

INTERA, Incorporated Firm Registration:

Texas PE Registration No. F-4722

Texas PG Registration No. 50189

This page is intentionally left blank.

TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 WELL CONSTRUCTION 3
3.0 HYDROGEOLOGICAL SETTING 9
4.0 WATER QUALITY ANALYSIS 19
5.0 INTERFERENCE ANALYSIS 23
5.1 Methodology 23
5.2 Model Input Justification 23
5.3 Model Results 24
5.3.1 Results for the Maximum Instantaneous Rate (180 gpm per well) 24
5.3.2 Results for the Requested Annual Production Rate (56 gpm per well) 25
6.0 DESIRED FUTURE CONDITIONS (DFC) AND MANAGED AVAILABLE GROUNDWATER (MAG) ANALYSIS 40
6.1 Evaluation of Total Requested Pumping Rate Relative to the MAG 40
6.2 Potential Impact of the Proposed Pumping on the DFC 42
6.2.1 Results for the Maximum Instantaneous Rate (180 gpm per well) 42
6.2.2 Results for the Requested Annual Production Rate (56 gpm per well) 42
7.0 REFERENCES 57

Appendix A: Data for wells within a two-mile radius of the center of the property

LIST OF FIGURES

Figure 1-1 Study area location map 2
Figure 2-1 Map showing planned Big Sky well locations 5
Figure 2-2 Schematic well diagram 6
Figure 2-3 Geophysical log for well 4212130016 (see figure 2-1 for well location) 7
Figure 3-1 Study area surface geology map 12
Figure 3-2 Relevant portion of stratigraphic column taken from Kelley and others 2014 13
Figure 3-3 Water use histogram for wells within 10 miles of the project site 13
Figure 3-4 Well yield histogram for wells within 10 miles of the project site 14
Figure 3-5 Well depth histogram for wells within 10 miles of the project site 14
Figure 3-6 Base of Hensell / top of Pearsall from Kelley and others (2014) 15
Figure 3-7 Base of Hosston from Kelley and others (2014) 16
Figure 3-8a Figure 4.1.45 from Kelley and others (2004) showing location of cross sections through NTGCD 17
Figure 3-8b Figure 4.1.46 from Kelley and others (2004) showing cross section #1 through NTGCD. 18
Figure 4-1 Location of water wells from the TWDB GWDB with reported water quality 21
Figure 5-1 Map showing the site relative to the North Trinity-Woodbine GAM grid. The yellow shaded area indicates the model cells used in determining input parameters for the interference analysis model. 34
Figure 5-2 Map of modeled drawdown from pumping two wells at 180 gpm each for 1, 30 and 365 days from the start of pumping Phase 1 35
Figure 5-3 Map of modeled drawdowns from pumping six wells at 180 gpm each at 1, 30, and 365 days after the start of pumping Phase 5 36
Figure 5-4 Map of modeled drawdown from pumping two wells at 56 gpm each for 1, 30 and 365 days from the start of pumping Phase 1 37
Figure 5-5 Map of modeled drawdowns from pumping six wells at 56 gpm each at 1, 30, and 365 days after the start of pumping Phase 5 38
Figure 6-1 GAM-calculated drawdowns for model layer 4 (Paluxy Aquifer) assuming 180 gpm per well 47
Figure 6-2 GAM-calculated drawdowns for model layer 5 (Glen Rose Aquifer) assuming 180 gpm per well 48
Figure 6-3 GAM-calculated drawdowns for model layer 6 (Hensell Aquifer) assuming 180 gpm per well 49
Figure 6-4 GAM-calculated drawdowns for model layer 7 (Pearsall Aquifer) assuming 180 gpm per well 50
Figure 6-5 GAM-calculated drawdowns for model layer 8 (Hosston Aquifer) assuming 180 gpm per well 51
Figure 6-6 GAM-calculated drawdowns for model layer 4 (Paluxy Aquifer) assuming 56 gpm per well 52
Figure 6-7 GAM-calculated drawdowns for model layer 5 (Glen Rose Aquifer) assuming 56 gpm per well 53
Figure 6-8 GAM-calculated drawdowns for model layer 6 (Hensell Aquifer) assuming 56 gpm per well 54

Figure 6-9 GAM-calculated drawdowns for model layer 7 (Pearsall Aquifer) assuming 56 gpm per well 55
Figure 6-10 GAM-calculated drawdowns for model layer 8 (Hosston Aquifer) assuming 56 gpm per well 56

LIST OF TABLES

Table 2-1 Well depths, completion intervals, and corresponding GAM layer intervals. 3
Table 3-1 Lower Trinity well completions within 2 miles of site. 11
Table 3-2 Final input parameters used in the TTIM interference model. 11
Table 4-1 Water quality data from the TWDB GWDB (2019a) 20
Table 5-1 Summary statistics for parameters extracted from the North Trinity-Woodbine GAM 26
Table 5-2 Final input parameters used in the TTIM interference model 26
Table 5-3 Well depths, completion intervals, and corresponding GAM layer intervals. 27
Table 5-4 Pumping schedule for the proposed well field 27
Table 5-5 Summary of calculated drawdown (in feet) in the combined Pearsall and Hosston aquifers assuming the requested max instantaneous rate 28
Table 5-6 Summary of calculated drawdown (in feet) in the combined Paluxy and Glen Rose aquifers assuming the max instantaneous rate (180 gpm/well) 29
Table 5-7 Summary of calculated drawdown (in feet) in the combined Pearsall and Hosston aquifers assuming the requested average annual production rate 31
Table 5-8 Summary of calculated drawdown (in feet) in the combined Paluxy and Glen Rose aquifers assuming the requested average annual production rate 32
Table 6-1 Desired Future Conditions for the relevant aquifers within the North Texas GCD (modified from Shi, 2017) 40
Table 6-2 Hydrostratigraphic units developed for the DFC/MAG analysis for GMA8 (from Appendix A in Shi, 2017). The proposed wells in this report are located in Region 1 41
Table 6-3 (a) GAM-calculated average county-wide drawdowns associated with the requested maximum instantaneous pumping rate (180 gpm); (b) relevant DFCs for the North Texas GCD; (c) incremental drawdowns associated with the proposed pumping; (d) percentage of the total DFC represented by the incremental drawdown (calculated as [incremental drawdown]/[DFC]) 44
Table 6-4 (a) GAM-calculated average county-wide drawdowns associated with the requested annual average pumping rate (56 gpm per weill; (b) relevant DFCs for the North Texas GCD; (c) incremental drawdowns associated with the proposed pumping; (d) percentage of the total DFC represented by the incremental drawdown (calculated as [incremental drawdown]/[DFC]) 45
Table 6-4 GAM-Modeled ranges of drawdowns in Denton County for the various GAM model layers/aquifer 46

ACROYNMS AND ABBREVIATIONS

acft/yr	acre-feet per year
amsl	above mean seal level
bgs	below ground surface
DFC	Desired Future Condition
District	North Texas Groundwater Conservation District
EDUs	Equivalent Dwelling Units
ELU	Equivalent Living Unit
ft	feet
GAM	Groundwater Availability Model
GMA	Groundwater Management Area
gpm	gallons per minute
Kh	horizontal hydraulic conductivity
Kv	vertical hydraulic conductivity
lps	liters per second
MAG	Managed Available Groundwater
mg/L	milligrams per liter
NTGAM	Northern Trinity Groundwater Availability Model
NTGCD	North Texas Groundwater Conservation District
PWS	Public Water Supply
S	storativity
SDR	Submitted Drillers Report
Ss	specific storage
T	transmissivity
TCEQ	Texas Commission on Environmental Quality
TDS	total dissolved solids
TWDB	Texas Water Development Board

1.0 INTRODUCTION

The Big Sky Water Production Facility will be constructed to provide potable water to a new master planned community, Big Sky Development, in northern Denton County (**Figure 1-1**). The new facility will support a mixed-use community, incorporating single and multi-family residential areas, and local retail and commercial land uses. The Big Sky Development, upon full buildout over fifteen years, will have an estimated 1,800 Equivalent Living Units (ELUs). The development will be constructed by LGI Homes – Texas, LLC, the owner of the facilities. The Public Water Supply (PWS) permit will be acquired from the Texas Commission on Environmental Quality (TCEQ) by Pape-Dawson Engineers, Inc (engineer of record for the project). Pape-Dawson has contracted INTERA Incorporated (INTERA) to fulfill the "Hydrogeological Report Requirements" set forth by the North Texas Groundwater Conservation District (the District) and adopted pursuant to District Rules 3.10(a)(13), 3.10(b) and 3.15(b)). The purpose of the Hydrogeological Report is to "provide the District with hydrogeological information addressing the impacts of the proposed well on existing wells and in relation to the Desired Future Condition (DFC) for the applicable aquifer, as required by Sections 36.113(d) and 36.1132 of the Texas Water Code."

The report requirements, as detailed on the District's website (http://nebula.wsimg.com/d2483b5534c870c64c2c4f6ac4b5af81?AccessKeyId=888A1880E4023ABFC5AE&disposition=0&alloworigin=1) can generally be separated into five parts:

1. Details on Well Construction
2. Hydrogeological Setting
3. Water Quality Analysis
4. Interference Analysis
5. Desired Future Condition (DFC) and Managed Available Groundwater (MAG) Analysis

As follows is a detailed assessment of the five parts of the Hydrogeological Report.

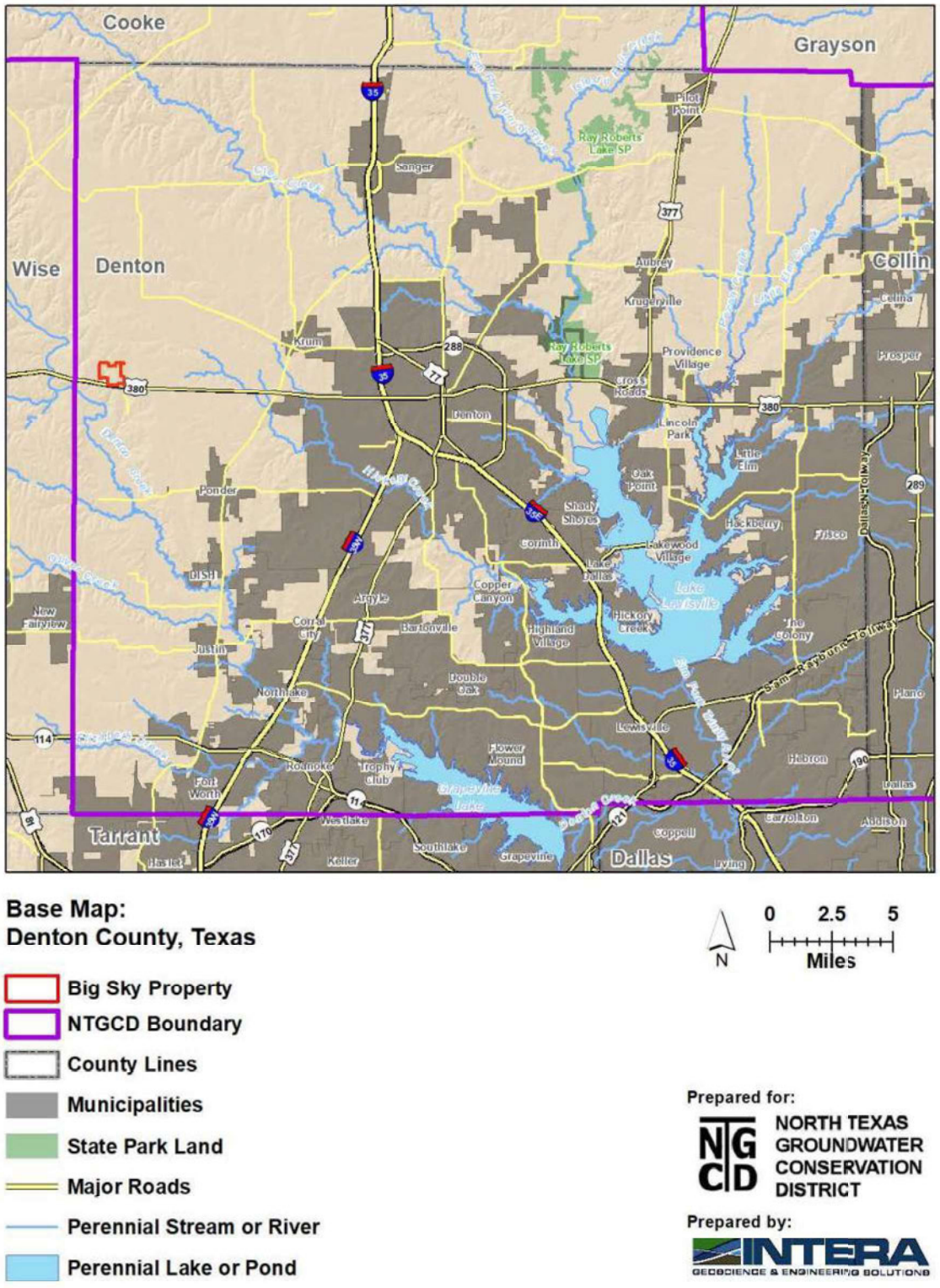


Figure 1-1 Study area location map

2.0 WELL CONSTRUCTION

Up to six groundwater wells will be drilled on the Big Sky property in support of an eventual 1800 Equivalent Living Unit (ELU) development (**Figure 2-1**). Factoring in a TCEQ minimum of 0.6 gallons per minute (gpm) per connection for peak demand, the property would require a total of 1,080 gpm, or 180 gpm per well (**Figure 2-1**). The first two wells have been submitted to the TCEQ PWS division in support of Phase I. Well productivity was assumed based on area wells completed in the Lower Trinity Aquifer. Well construction was determined using existing groundwater wells in the area along with geophysical logs (electric) run on nearby oil and gas wells. The specific completion depths should be treated as an estimate until the pilot holes have been drilled and geophysically logged.

Figure 2-2 is a generalized schematic well diagram created by Pape-Dawson Engineers, Inc as part of their PWS application to the TCEQ. **Table 2-1** is a well construction summary table for the planned wells. Values for the top and base of the aquifer units were extracted from the Northern Trinity Groundwater Availability Model (GAM) (Kelley and others 2014) and represent the best approximation of aquifer structure for the area.

Table 2-1 Well depths, completion intervals, and corresponding GAM layer intervals.

WELL ID	GS ELEV	Casing Depth	Total Depth	Top Open Interval	Base Open Interval	Row	Col	Top Pearsall	Top Hosston	Base Hosston
	ft msl	ft	ft	ft msl	ft msl			ft msl	ft msl	ft msl
1	841	750	1000	91	-159	387	789	137.6	22.5	-87.9
1A	797	709	956	88	-159	386	789	146.9	31.8	-78.3
2	812	723	971	89	-159	389	790	117.8	-0.7	-109.5
3	846	757	1005	89	-159	387	790	136.0	18.4	-90.1
4	822	733	981	89	-159	388	788	128.1	16.2	-96.6
5	826	737	985	89	-159	388	789	128.6	13.5	-97.6

Initially, a 6-inch pilot hole will be drilled to an approximate depth of 1,000 feet (ft) below ground surface (bgs) for well 1 and 956 ft bgs for well 1A. At that point, the driller will air-lift water from the hole in an attempt to quantify the production rate from the well. If the pilot hole is deemed successful, a reaming bit will be used to widen the borehole to 17 inches, and a 12-inch Schedule 40 steel casing will be pressure cemented in place from 750/709 ft bgs to ground surface. The well will then be under-reamed to a width of 24 inches from 750/709 to 1,000/956 ft bgs and a 10-inch steel screen (wire wrap or louvered) will be installed from 750/709 to 1,000/956 ft bgs. At that point, the well will be developed and subsequently tested.

Geology anticipated while drilling the wells was assessed using a combination of Kelley and others (2014) along with the geophysical log for well 421213001600 (**Figure 2-3**). Kelley and others (2014) separated the Trinity aquifer into five regions based on lithologic changes in the horizontal direction. At the Big Sky property, the Trinity Group is in region 1 and is conceptualized as being mainly composed of sandstones and shales of various depositional origins and all of the units are lumped together as the Antlers aquifer. Geology encountered down to approximately 100-150 ft will be limestones of the

Washita-Fredericksburg unit. After that, it is anticipated that the majority of the geology encountered will be sands and shales with possible interspersed limestones.

Well 4212130016 (Figure 2-3) is the closest accessible geophysical log to the site and was compared to lithologic picks made by Kelley and others (2014) on other geophysical logs in the vicinity. Assuming a predominantly clastic lithology, drilling from 350 to 570 ft bgs will be through a sandy interval followed by an alternating thin bedded sand/shale sequence from 570 to 700 ft bgs. Another large sand occurs from 700 to 790 ft bgs, followed by an alternating shale, sand shale sequence from 790 to 910 ft bgs. From 910 to 980 ft bgs, two sands are separated by a roughly 10-foot-thick clay layer.

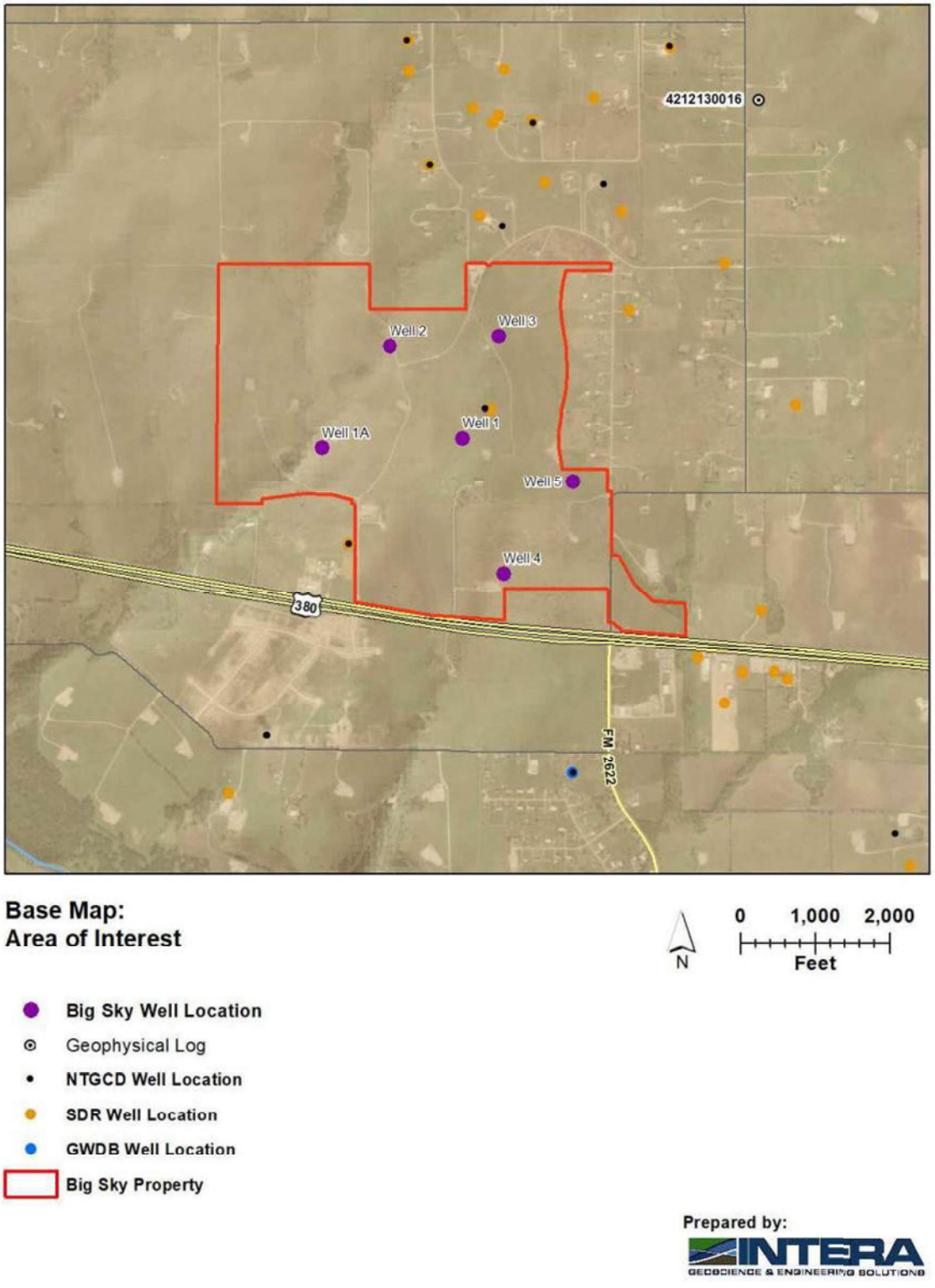


Figure 2-1 Map showing planned Big Sky well locations

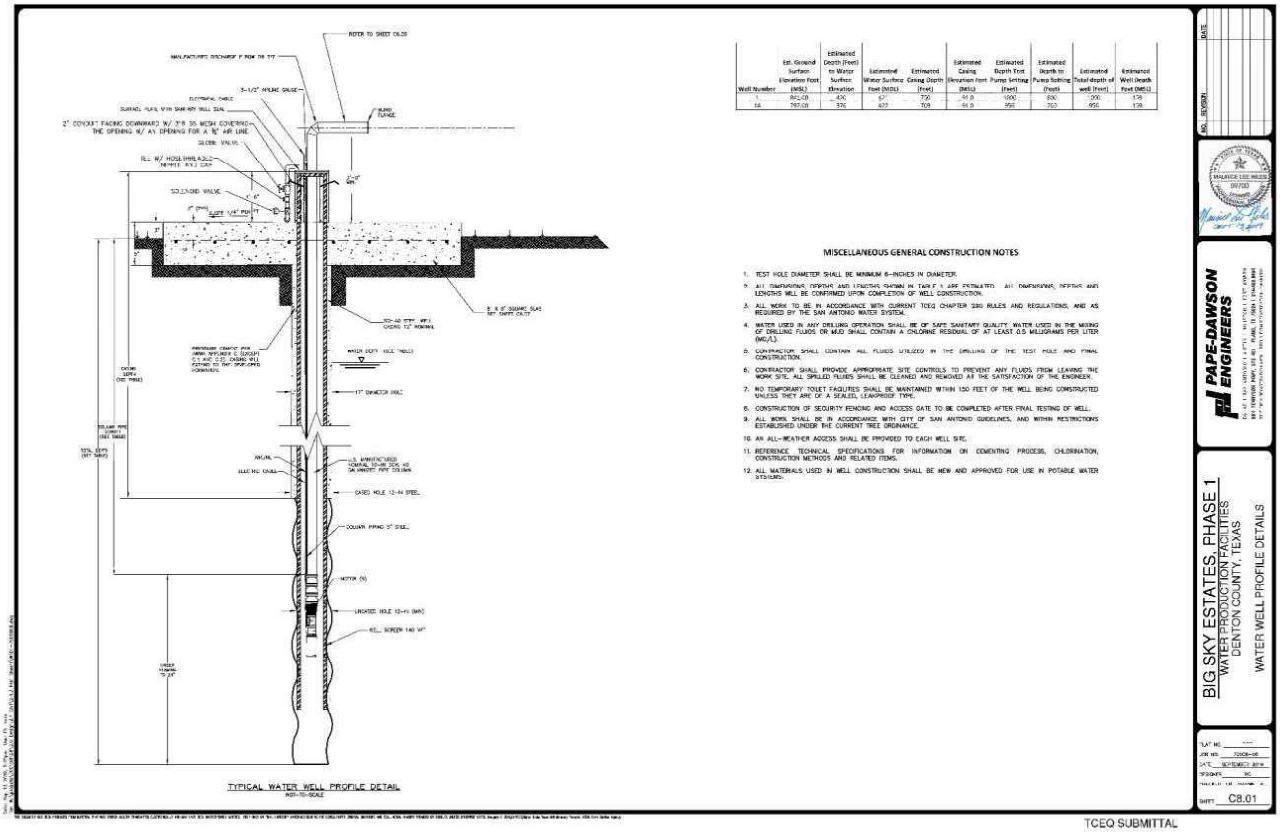


Figure 2-2 Schematic well diagram

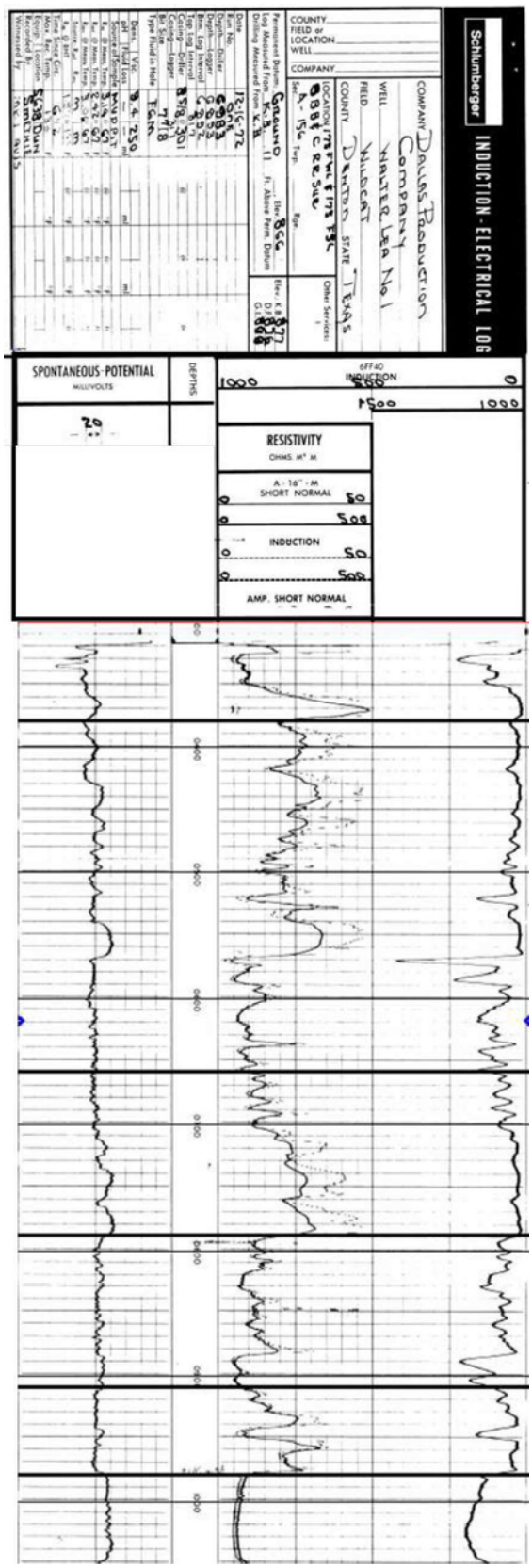


Figure 2-3 Geophysical log for well 4212130016 (see figure 2-1 for well location)

This page is intentionally left blank.

3.0 HYDROGEOLOGICAL SETTING

The surface geology at the Big Sky site is dominated by Cretaceous limestones, primarily the Fort Worth and Duck Creek Units, and Quaternary alluvial and terrace deposits (**Figure 3-1**). The site is located directly to the east of the convergence of Sweetwater and Denton Creeks which have sufficiently incised into the Fort Worth\Duck Creek units to expose the Kiamich and Goodland/Walnut units. According to the National Hydrography Dataset (USGS, 2019), two unnamed ephemeral streams exist on the site, both of which flow west into Denton Creek downstream of the convergency of Fort Worth and Denton Creek (Figure 3-1). Pape-Dawson commissioned a Phase I Environmental Site Assessment on the property, which states that: “there are a few stock ponds and dry creek beds, but no evidence of other notable site features were observed. No surface impoundments, concrete swales or dry wells were observed”. To the best of their knowledge, no known recharge features have been identified on the property.

Springs of Texas (Brune, 1981) along with the Texas Water Development Board (TWDB) Groundwater Database (TWDB, 2019a) were accessed for any evidence of springs in and around the Big Sky property. In general, most of the springs that did exist in the area occurred in the eastern half of Denton County, flowing chiefly from the Woodbine sand and river terrace sand and gravel. No documented/recorded springs occur on or within 1 mile of the Big Sky site. The closest spring to the site (circa 1981) is Mud Springs, which is located approximately 11 miles to the northeast of the Big Sky site and issues from the Fort Worth limestone conglomerate. Mud Springs is characterized as “very small,” with an average flowrate of 0.028 to 0.28 cubic feet per second (cfs). The discharge was 0.20 liters per second (lps) on July 2, 1976 and barely a seep on December 23, 1977 (Brune, 1981). Given the distance from the Big Sky site and that the wells at the Big Sky site will be completed into the lower Trinity Aquifer, it is assumed that Mud Springs is not relevant to the permit application.

The Big Sky property is underlain by the Northern Trinity Aquifer which, is locally referred to as the Antlers aquifer. The rocks and sediments that comprise the Northern Trinity Aquifer are contained in the Trinity group deposited during the Cretaceous Period, which lasted from about 145 to 65 million years ago (Kelley and others, 2014). The Cretaceous units were unconformably deposited atop Paleozoic -age strata and dip/thicken from west to east where the Cretaceous-age strata are the oldest Gulf of Mexico Basin fill units exposed at the surface.

Units that make up the Northern Trinity Aquifer have a wide variation in lithology ranging from sand and gravel dominated systems to shale and off shore limestone units (Kelley and others, 2014). **Figure 3-2** from Kelley and others (2014) reflects the large degree of variability and the associated geologic nomenclature. As a consequence of the significant geologic variation, the northern Trinity Group was divided by Kelley and others (2014) into five regions based on stratigraphic and lithologic similarities. The project site is located entirely in Region 1 where the Antlers Formation wholly comprises the Trinity Aquifer. However, for consistency purposes, Kelley and others (2014) defined hydrostratigraphic units that extend across the entire Northern Trinity Aquifer. At the site from youngest to oldest, these units are the Washita-Fredericksburg Group, the Paluxy member, the Glen Rose Formation, the Hensell member, the Pearsall member and the Hosston member. The target units for all six wells on the property are the Hosston and Pearsall members which comprise the lower portion of the Antlers aquifer.

Data used to evaluate groundwater well variability within 10 miles of the site was accessed from the TWDB Groundwater Database (TWDB, 2019a), the Submitted Drillers Reports Database (TWDB, 2019b) and the North Texas Groundwater Conservation District (NTGCD) Database (NTGCD, 2019). Primary groundwater use in the area is predominantly Domestic (75%) followed by Public Supply (7%), Rig Supply (6%) and Stock (4%) (**Figure 3-3**). There are 962 wells within 10 miles of the site with a reported production rate. The majority, if not all, of the production rates come from the capacity test performed by the well driller upon completion of the well. The test is typically performed by either jetting or bailing the well and on occasion, using an actual pump. The majority of the yield values (61%) came from the Submitted Drillers Report (SDR) database and the NTGCD database (38%). Of the recorded values within 10 miles of the study area, 78% produce between 1 and 25 gpm, 9% produce between 25 and 50 gpm, 5% produce between 50 and 100 gpm, 6% produce between 100 and 200 gpm, 3% produce between 200 and 500 gpm, and less than 1% produce between 500 and 1,000 gpm (**Figure 3-4**). Of the 1,123 wells within 10 miles of the study area that had a reported well depth, 12% were between 100 and 200 ft bgs, 67% were between 200 and 500 ft bgs, 18% were between 500 and 1,000 ft bgs and less than 4% were between 1.000 and 2.000 ft bgs (**Figure 3-5**).

A hydrostratigraphic assignment of the well data within 2 miles of the project site was performed using the groundwater well data from the three aforementioned datasets along with the structural surfaces from the Northern Trinity Groundwater Availability Model (NTGAM) (Kelley and others, 2014) (Appendix A). Of the 54 wells that we could assign to a specific hydrostratigraphic unit, five had a reported production rate greater than 100 gpm (**Table 3-1**). Of the five, two are equally completed into the Pearsall and Hosston, one is almost entirely completed into the Hosston, one is 63% Pearsall and 32% Hosston, and one is roughly half Hensell and half Pearsall. Based on that information, it was determined that a well completed into the Pearsall and Hosston units would provide the best opportunity to reach the desired production rate.

The top of the Pearsall (base of Hensell) occurs between 200 and 100 ft above mean seal level (amsl) at the Big Sky property (**Figure 3-6**). The base of Hosston occurs between -50 and -150 ft amsl (**Figure 3-7**). Thickness of the water bearing zone in this area, which is the combination of the Pearsall and Hosston hydrostratigraphic units, is approximately 225 ft. This part of the Northern Trinity aquifer includes thick sandstone sequences deposited by multiple superimposed sandstone-dominated, fluvial and shoreline depositional systems (Kelley and others 2014). A review of Figure 4.1.46 from Kelley and others (2014) clearly shows that both the Hosston and Pearsall are sand dominated and any shales/limestones that do occur are thought to be thin and laterally discontinuous (**Figure 3-8a and b**).

Depth interval of proposed water bearing zone, anticipated thickness and aquifer parameters are summarized in **Tables 3-2** and **2-1**. Data for these values were acquired from the GAM for the Northern Trinity aquifer (Kelley and others, 2014). Due to the heterogenous distribution of sands and clays within the aquifer, it is anticipated that the aquifer response will be confined to semi-confined locally but will act more like a fully unconfined aquifer regionally.

Table 3-1 Lower Trinity well completions within 2 miles of site.

Well ID	Source	County	Well Depth (ft bgs)	Yield (gpm)	Top of Screen (ft bgs)	Base of Screen (ft bgs)	Primary Aquifer	Percent of Screen in Unit	Secondary Aquifer	Percent of Screen in Unit	Distance from Study Area (miles)
25984	SDR	Denton	910	190	610	910	HEN	42%	PEA	41%	0.83
27516	SDR	Denton	925	150	690	920	PEA	63%	HOS	32%	1.70
96573	SDR	Denton	940	120	860	940	HOS	94%	BELOW HOS	6%	1.45
202920	SDR	Denton	930	180	707	930	HOS	55%	PEA	43%	1.91
235032	SDR	Denton	880	190	710	870	HOS	54%	PEA	46%	1.63

Table 3-2 Final input parameters used in the TTIM interference model.

TTIM Layer	GAM Layer	Formation	Thickness	T	S	Kv	Kx	Ss	kz/kx
			ft	ft^2/d		ft/d	ft/d	1/ft	
1	3	Washita-Fredericksburg	97	80.2	1.55E-04	8.87E-01	8.31E-01	1.60E-06	1.07E+00
2	4	Paluxy	142	188.5	1.32E-03	9.30E-06	1.33E+00	9.28E-06	6.99E-06
3	5	Glen Rose	260	274.3	1.05E-02	4.05E-05	1.06E+00	4.05E-05	3.84E-05
4	6	Hensell	106	391.5	1.16E-04	2.26E-05	3.70E+00	1.10E-06	6.09E-06
5	7	Pearsall	116	218.5	1.01E-04	4.13E-06	1.88E+00	8.69E-07	2.20E-06
6	8	Hosston	108	465.9	9.14E-05	1.98E-04	4.30E+00	8.43E-07	4.61E-05

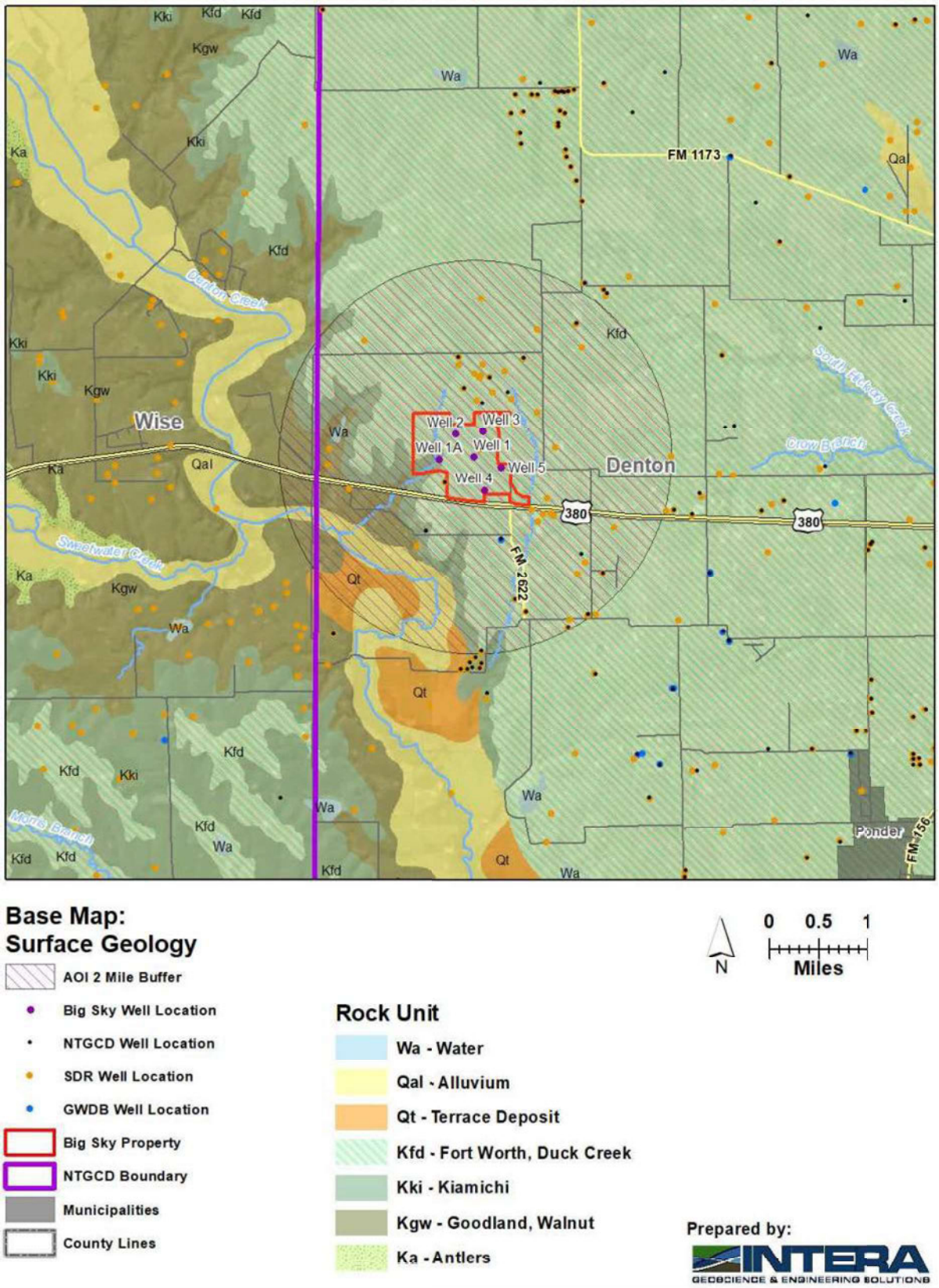


Figure 3-1 Study area surface geology map

Period	Group	North and West	Central		South		Terminology for Generalized Surface Geology in Figures 2.2.1 and 2.2.2
		Formation	Formation	Member	Formation	Member	
Cretaceous (continued)	Trinity	Antlers	Paluxy		Paluxy		Antlers Formation (north and west) or Paluxy Formation (central and south)
			Glen Rose		Glen Rose		Antler Formation (north and west) or Glen Rose Formation (central and south)
			Twin Mountains	Hensell	Travis Peak	Hensell	Antlers Formation (north and west) or Hensell Member (south)
				Pearsall		Pearsall/ Hammett/ Cow Creek	Antlers Formation (north and west), Twin Mountains Formation (central), Travis Peak Formation (south), or Cow Creek Member (south)
				Hosston		Sycamore /Hosston/ Sligo	Antlers Formation (north and west), Twin Mountains Formation (central), Travis Peak Formation (south), or Sycamore Member (south)
Permian	Wichita	differentiation not necessary for this study					na
	Bowie	differentiation not necessary for this study					
Pennsylvanian	Cisco	differentiation not necessary for this study					
	Canyon	differentiation not necessary for this study					
	Strawn	differentiation not necessary for this study					

na - Permian- and Pennsylvanian-age groups do not outcrop in the study area

Figure 3-2 Relevant portion of stratigraphic column taken from Kelley and others 2014

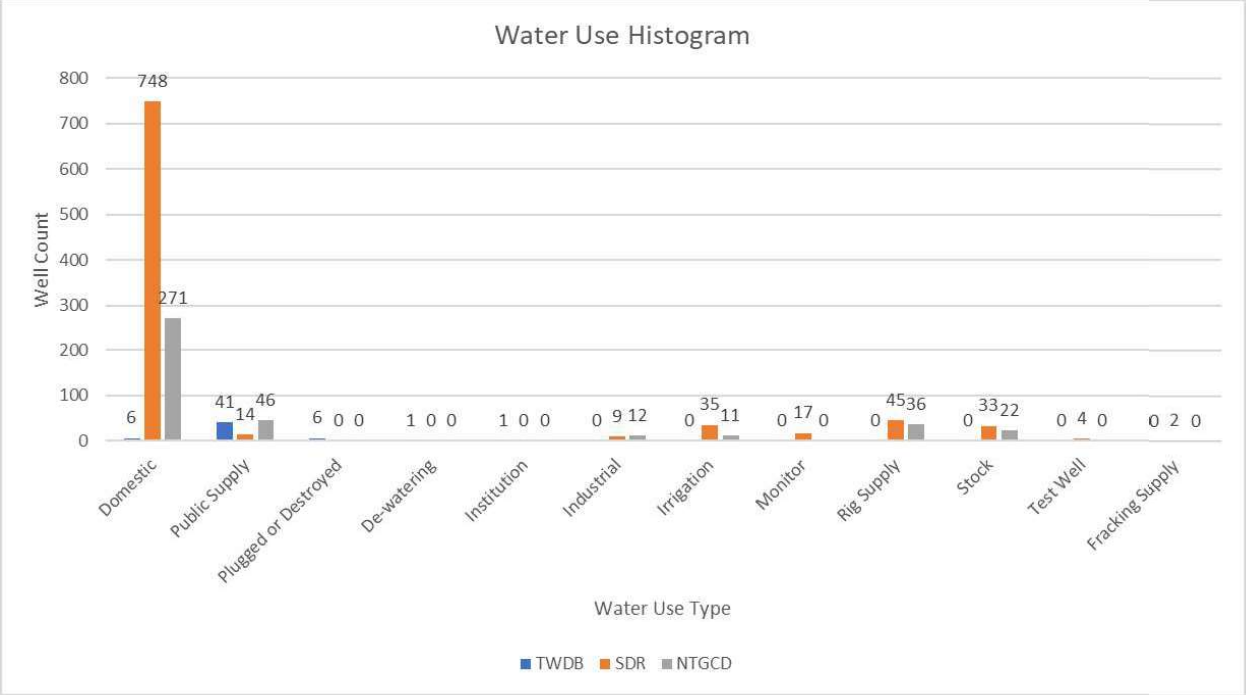


Figure 3-3 Water use histogram for wells within 10 miles of the project site

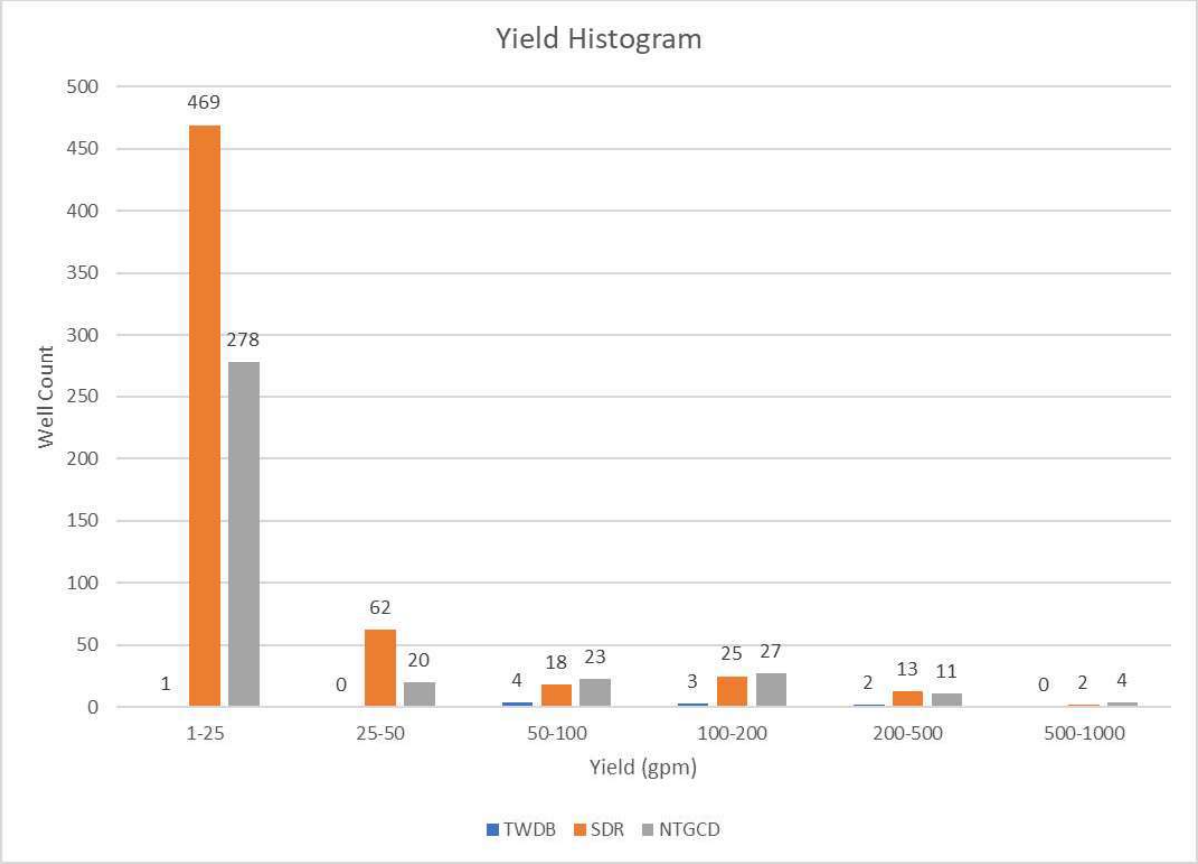


Figure 3-4 Well yield histogram for wells within 10 miles of the project site

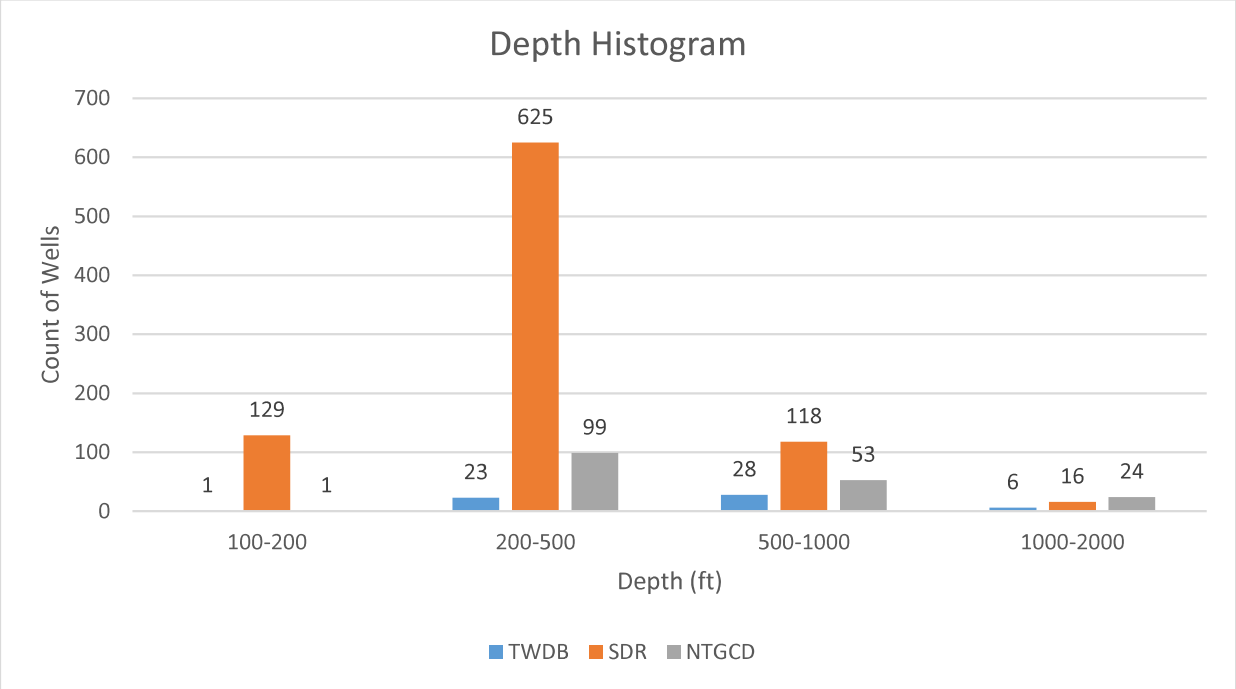


Figure 3-5 Well depth histogram for wells within 10 miles of the project site

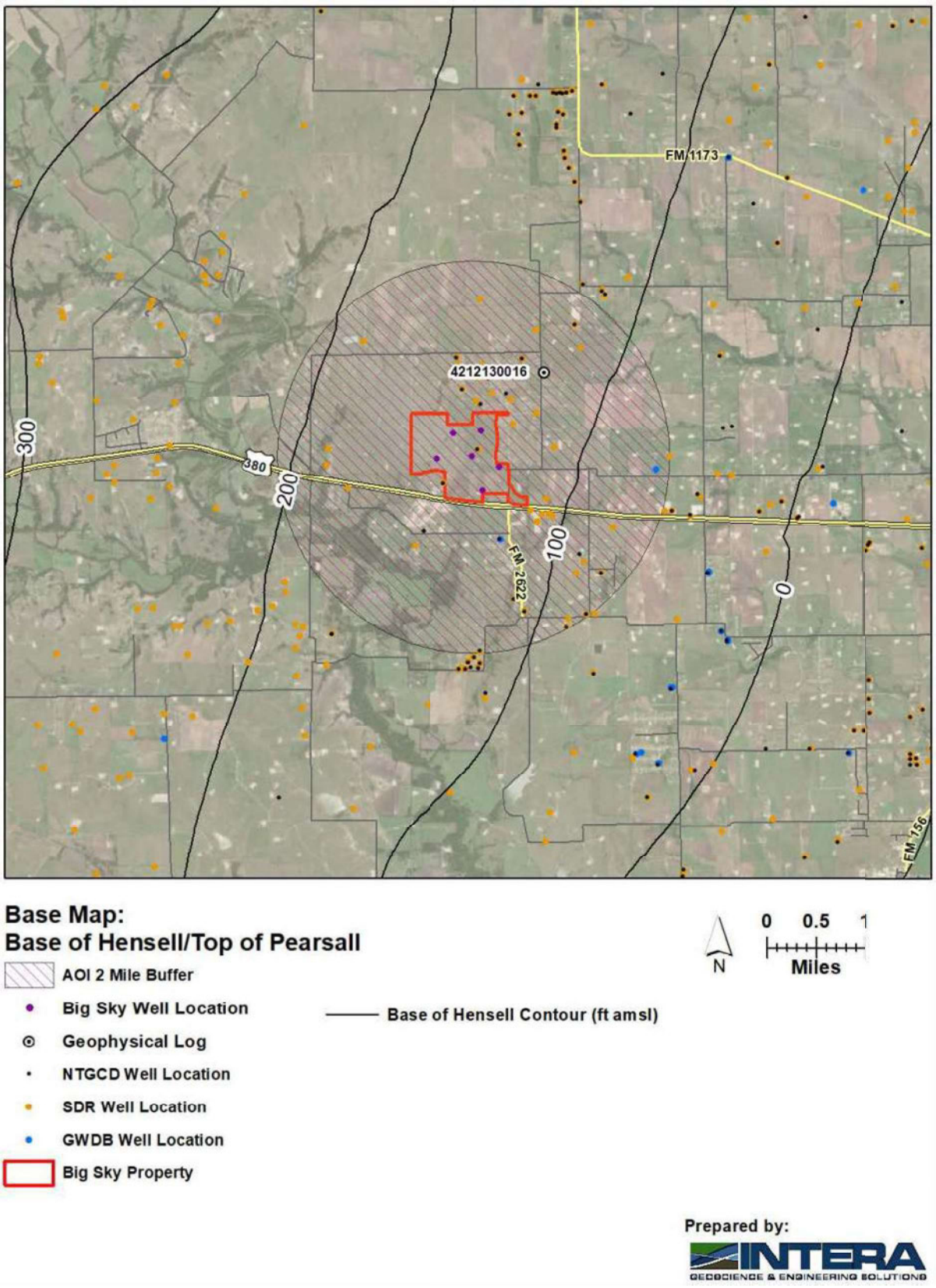


Figure 3-6 Base of Hensell / top of Pearsall from Kelley and others (2014)

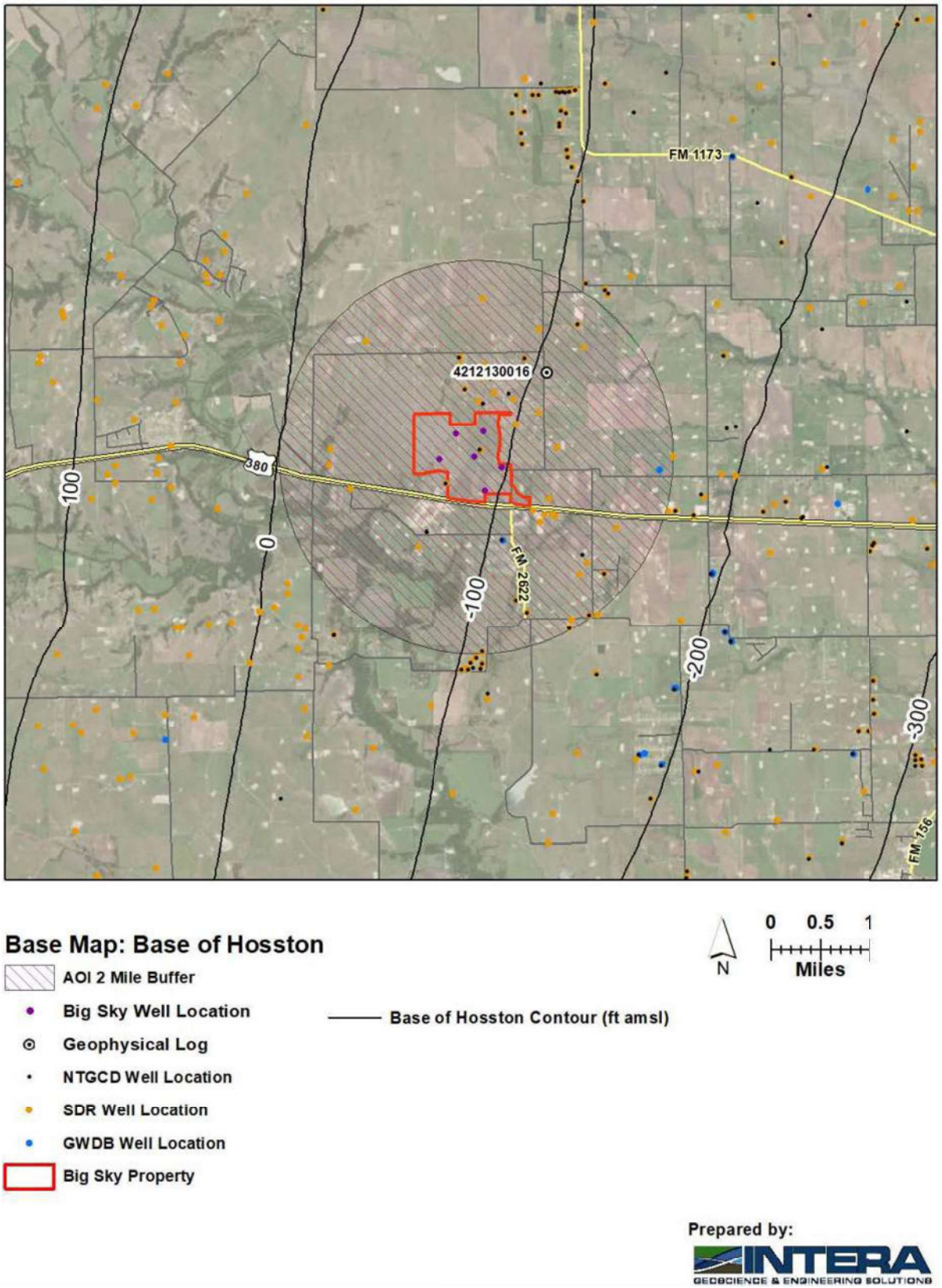


Figure 3-7 Base of Hosston from Kelley and others (2014)

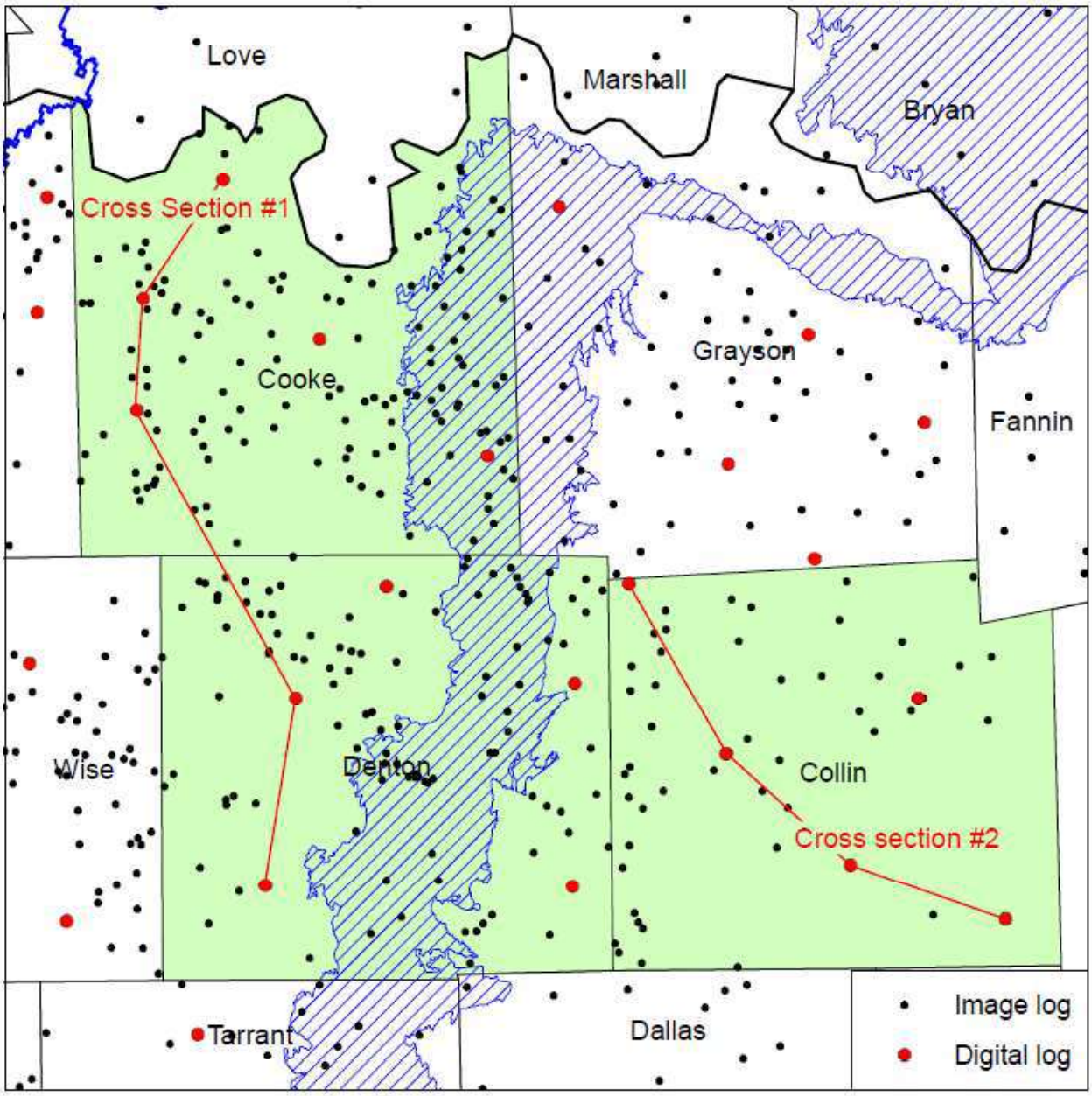


Figure 3-8a Figure 4.1.45 from Kelley and others (2004) showing location of cross sections through NTGCD

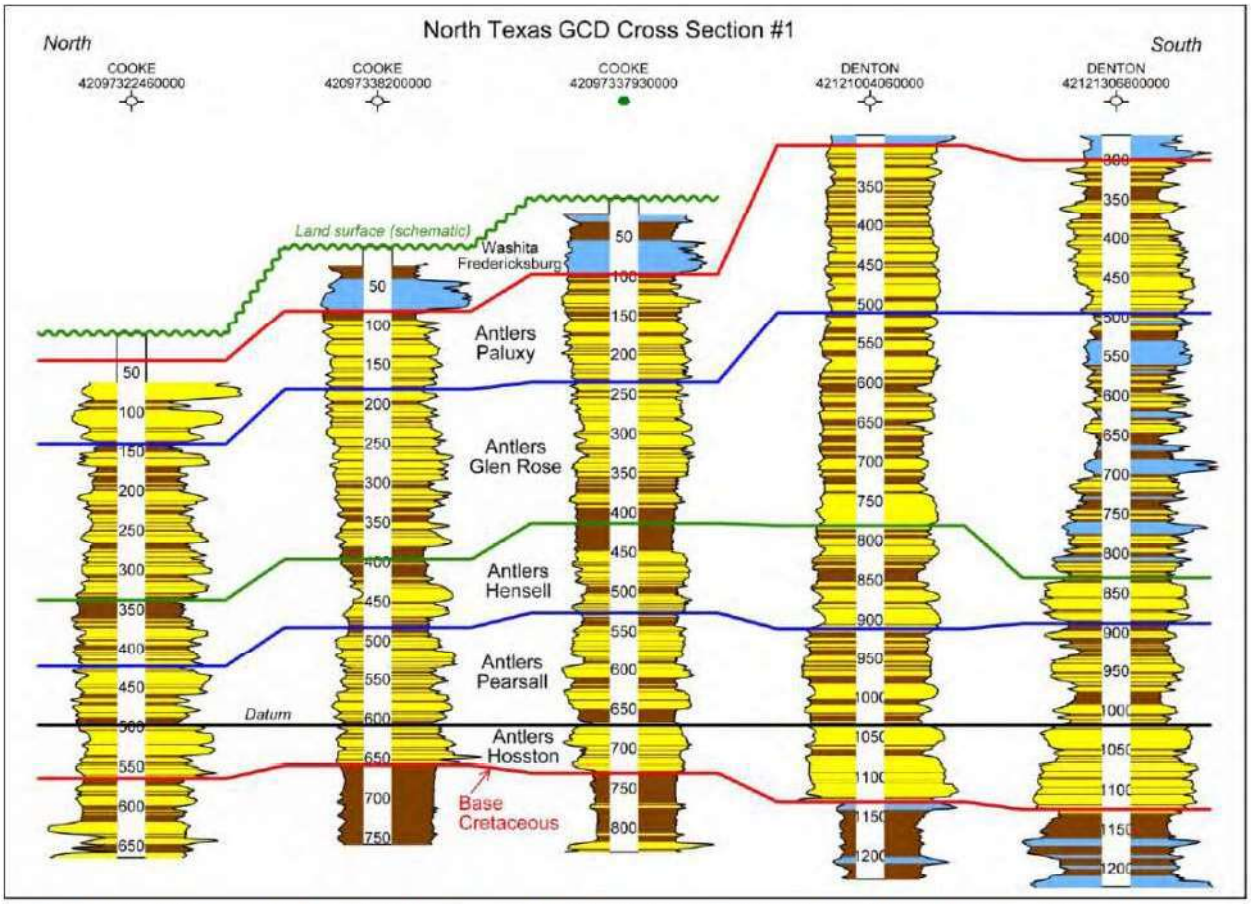


Figure 3-8b Figure 4.1.46 from Kelley and others (2004) showing cross section #1 through NTGCD

4.0 WATER QUALITY ANALYSIS

A review of the TWDB GWD (TWDB, 2019a) dataset was completed in support of determining water quality in the study area, specifically for the lower Trinity/base of Antlers aquifer. **Figure 4-1** is a location map showing four wells that are within a reasonable distance to the property and have at least one sampled water quality data accompanied by discernable depth and/or screen information. Three of the four wells had reported screen intervals, and completion intervals for those wells were therefore determined relative to the screened interval. Well 1953501 only had total depth reported. Structural surfaces for the individual units within the Trinity aquifer were sampled at the well locations and subsequently compared to the top and base of the screened intervals (Appendix A). A calculation was then made to determine the formation that accounted for the largest and, if more than one interval was screened, the second largest percent of the screen.

The total depth of well 1953501 extends 122 ft below the base of the Hosston. It is possible that the base of Hosston was interpolated high by Kelley and others (2014) in this area or the Paleozoic aquifer below the Hosston is productive or, some combination of the two. Given the similar water quality, it is assumed that this well is screened to some combination of the Hensell, Pearsall, Hosston and Paleozoics. Well 1946803 appears to be indiscriminately screened from the Glen Rose through the Hosston. Wells 1946501 and 1946502 are both screened into the Pearsall.

Sampled water quality for the four wells in Figure 4-1 is summarized in **Table 4-1**. Each well has one sampled water quality (total dissolved solids [TDS] in milligrams per liter [mg/L]) with the exception of well 1946501 which has three. The average TDS of the samples is 412 mg/L. Given the variability in the four well completions and the uniformity of the sampled TDS, it is surmised that the lower Trinity/base of Antlers (Hensell, Pearsall and Hosston) is acting as one system and formation water quality is relatively uniform amongst the units.

Table 4-1 Water quality data from the TWDB GWDB (2019a)

State Well Number	Aquifer	Latitude (Decimal Degree)	Longitude (Decimal Degree)	Well Depth (ft bgs)	Date	Time	Sample #	Entity ID	Lab ID	Reliability ID	Collection Remarks	Parameter Code	Parameter Description	Flag	Value	Unit	Plus/ Minus
1946803	Trinity	33.28861	-97.30500	1000	9/8/2005		1	9	32	14		70301	total dissolved solids, sum of constituents (mg/l)		448	mg/L	
1946502	Trinity	33.29167	-97.31528	864	9/25/2003	1000	1	1	23	7	Analysis Balanced	70301	total dissolved solids, sum of constituents (mg/l)		408	mg/L	
1946501	Trinity	33.29167	-97.31528	880	11/1/1974	0000	1	12	6	14	Analysis Balanced	70301	total dissolved solids, sum of constituents (mg/l)		420	mg/L	
1946501	Trinity	33.29167	-97.31528	880	4/21/1983	0000	1	1	1	3	Analysis Balanced	70301	total dissolved solids, sum of constituents (mg/l)		419	mg/L	
1946501	Trinity	33.29167	-97.31528	880	3/23/1995	1400	1	1	1	7	Analysis Balanced	70301	total dissolved solids, sum of constituents (mg/l)		410	mg/L	
1953501	Trinity	33.20778	-97.41722	925	9/11/2003	1130	1	1	23	7	Analysis Balanced	70301	total dissolved solids, sum of constituents (mg/l)		368	mg/L	

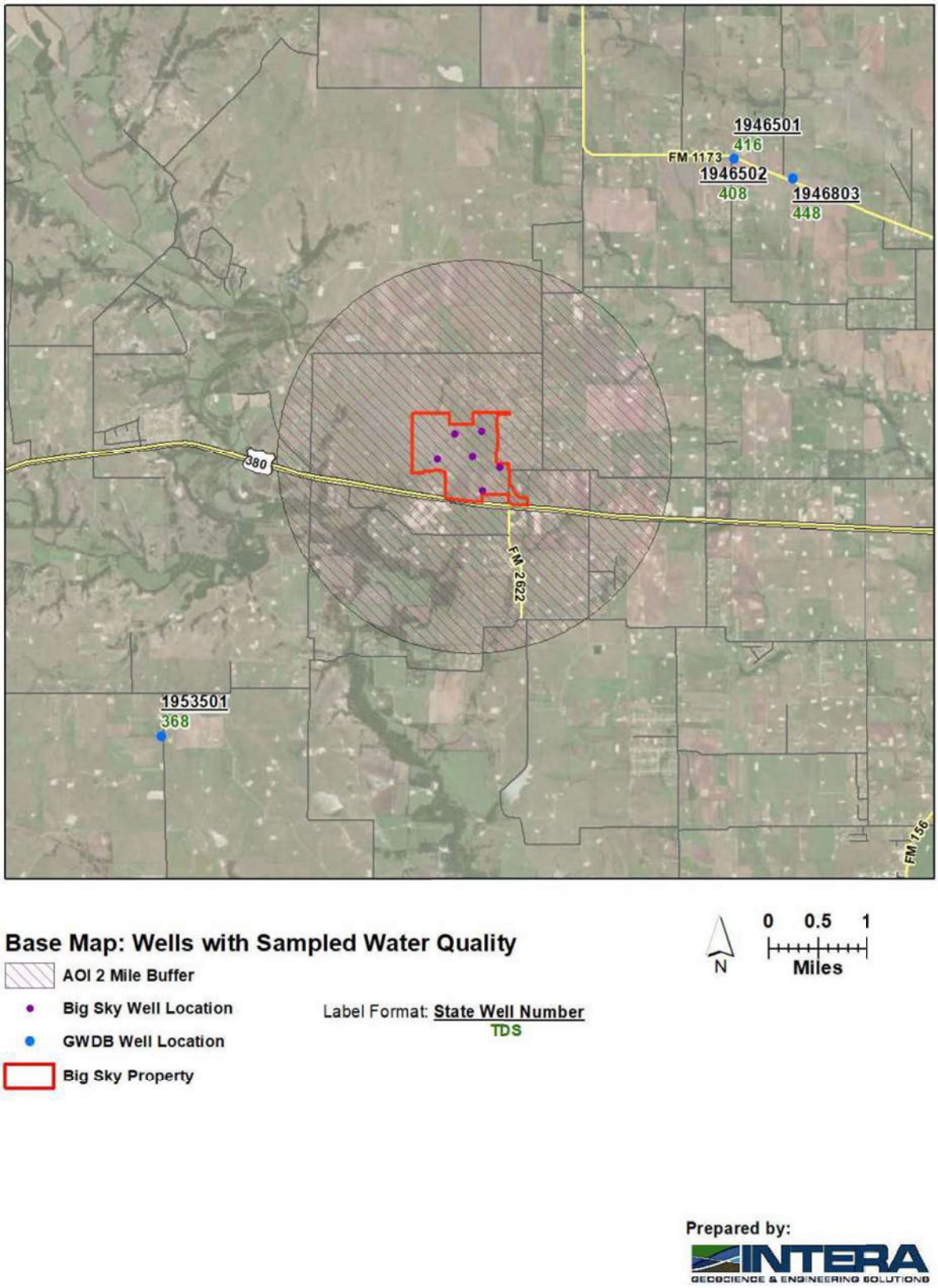


Figure 4-1 Location of water wells from the TWDB GWDB with reported water quality

This page intentionally left blank.

5.0 INTERFERENCE ANALYSIS

5.1 Methodology

INTERA used a groundwater model called TTIM (Bakker, 2015) to develop the required interference analysis. TTIM is a modeling code that uses an analytical element solution to the transient three-dimensional groundwater flow equations to solve for hydraulic heads in an aquifer.

The model used comprised six individual layers representing the Washita-Fredericksburg Groups, the Paluxy Aquifer, the Glen Rose Formation, the Hensell Sand, the Pearsall Formation, and the Hosston Aquifer. The proposed pumping was applied to and distributed among the model layers based on the expected completion depths for the Big Sky wells and the estimated completion based on the reported total depth of the NTGCD registered wells within a 2-mile radius of Big Sky Well 1. Required model input parameters, including layer thickness, transmissivity, storativity, vertical hydraulic conductivity, and producing formations for the proposed wells, were derived from the Northern Portion of the Trinity and Woodbine Aquifers (North Trinity-Woodbine) GAM. Two sets of models were prepared; one assuming the requested maximum instantaneous pumping rate (0.6 gpm per connection, or 180 gpm per well) and one with the requested annual production rate based on an assumed realistic average pumping rate of 270 gpd per connection (0.1875 gpm per connection, or 56 gpm per well). An overview of the input parameters used in the model is provided in the following section.

5.2 Model Input Justification

Input parameters for each layer in the TTIM model were extracted from a 1.5 x 1.5-mile zone in the North Trinity-Woodbine GAM roughly centered around the producing wells. The model cell addresses (as row, column) range from 384, 787 to 389, 792. **Figure 5-1** shows the locations of the model grid cells that contain the input parameters used in the interference model.

The specific values extracted from each model grid cell include the elevations of the individual layer contacts, the horizontal hydraulic conductivity (Kh), the vertical hydraulic conductivity (Kv), and the specific storage (Ss) for each of the 36 grid cells depicted in Figure 5-1. The model layer elevations were used to determine layer thicknesses, which were then used to calculate transmissivity (T) and storativity (S) for each formation within each grid cell. **Table 5-1** contains summary statistics for each parameter, including geometric and arithmetic mean values for T, S, and Kv. In layers 4 through 8, the arithmetic and geometric mean values are nearly identical for all parameters and the overall ranges of values are fairly small, which indicates that the model inputs within the 1.5 square mile area sampled from the GAM are consistent and normally distributed and that the mean values are a good representation of the overall aquifer in that area. The final values used in the TTIM model are presented in **Table 5-2**.

The proposed well construction information for all Big Sky and NTGCD registered wells is included in **Table 5-3** and **Appendix A**. Based on the well location, proposed depth of the open interval, and GAM model layer elevations in the North Trinity-Woodbine GAM, it is assumed that the Big Sky wells will produce from the Pearsall and Hosston aquifers. Additionally, one NTGCD registered well has a reported well depth in the Pearsall and Hosston. Given the combined thickness of the Washita, Paluxy and Glen

Rose is 489 feet, and the shallowest well depth was 300 ft-bgs (below the Washita), any registered well with a reported depth less than 500 feet (Appendix A) was assigned to the combined Paluxy and Glen Rose. Thirteen NTGCD registered wells fit this criterion. If a NTGCD registered well did not have a completion depth, drawdown in both the Paluxy/Glen Rose and Pearsall/Hosston was evaluated in order to address the uncertainty associated with the unknown completion interval and show the potential range of drawdown values that could be expected for completion in either the Pearsall/Hosston or Paluxy/Glen Rose producing zones. All model simulations therefore assume that the Big Sky production wells will be screened across the Hosston and Pearsall formations and that the total pumping from each well will be distributed among each of the two aquifer layers based on the relative transmissivity of each formation. District registered wells will be treated as observation wells (i.e., no pumping).

A five-phase pumping and well construction schedule for the system was provided by Pape-Dawson. The assumed well construction schedule is based on the predicted buildout of the subdivision, which is primarily a function of market forces. The first two wells will be in service by the end of 2020 (pumping start date of December 1, 2020). Assuming 12 homes per month can be constructed and each well is added at 252 connections, an additional well would be need every 21 months. Therefore, if wells 1 and 1A will be turned on December 1, 2020, then well 2 will be turned on September 1, 2022, well 3 will be turned on June 1, 2024, well 4 will be turned on March 1, 2026 and well 5 will be turned on December 1, 2026. **Table 5-4** contains a summary of the assumed pumping schedule for the proposed wells. A scenario was setup in TTIM where all 6 wells were pumping from the combined Pearsall and Hosston aquifers with pumping from each well assigned to the model using the pumping schedule presented in Table 5-4. Two sets of model simulations were performed; one with the requested maximum instantaneous rate (180 gpm per well) applied to each well and one with the assumed average annual production (56 gpm per well) applied to each well. All pumping was held constant from the start of each pumping phase through the end of the predictive model period, such that all six wells were producing after the start of pumping Phase 5.

5.3 Model Results

The North Texas GCD requires that potential impacts from the proposed pumping on existing wells within a two-mile radius be evaluated at 1 day, 30 days, and 365 days after the start of pumping. Drawdowns from pumping the combined Pearsall and Hosston model layers throughout a two-mile radius from Well 1 were therefore calculated after 1, 30, and 365 days after the start of pumping from the two initial wells (Wells 1 and 1A). Drawdowns throughout the 2-mile radius were also calculated at the start of each subsequent pumping phase, as well as at 1, 30, and 365 days after the start of each pumping phase. Model scenarios were performed with the requested maximum instantaneous pumping rate (180 gpm per well) and the requested annual production rate (56 gpm per well).

5.3.1 Results for the Maximum Instantaneous Rate (180 gpm per well)

Table 5-5 is a summary of calculated drawdowns in the combined Pearsall and Hosston aquifers, assuming pumping from the proposed wells at 180 gpm per well, in all of the Big Sky wells; one registered well which is assumed, based on the reported total depth, to be completed in the combined Pearsall and Hosston formations; and in district registered wells without a reported total depth. Table 5-

5 includes drawdowns calculated at 1, 30, and 365 days after the start of pumping Phase 1, as well as at the start of and at 1, 30, and 365 days after the start of each subsequent pumping phase.

Table 5-6 is a summary of calculated drawdowns, assuming pumping from the proposed wells at 180 gpm per well, in the combined Paluxy and Glen Rose aquifers from pumping the Pearsall and Hosston. Drawdowns were calculated at the six Big Sky wells along with 13 registered wells thought to be completed in the combined Paluxy and Glen Rose aquifers and district registered wells without a reported total depth. Table 5-6 includes drawdowns calculated at 1, 30, and 365 days after the start of pumping Phase 1, as well as at the start of and at 1, 30, and 365 days after the start of each subsequent pumping phase.

Figure 5-2 is a series of three maps showing drawdown at 1, 30 and 365 days from pumping the combined Pearsall and Hosston aquifers at 180 gpm each in two locations (Well 1 and Well 1A).

Figure 5-3 is a series of three maps showing drawdown at 1, 30 and 365 days after the activation of the sixth well with all wells pumping at 180 gpm. Please note that drawdown maps were only generated for 1, 30, and 365 days after the start of pumping Phase 1 and for the same times after the start of pumping Phase 5 in order to maintain a reasonable number of figures in this report. Drawdowns at intermediate times are presented in Table 5-5. Given the lack of any discernable drawdowns in the combined Paluxy and Glen Rose, maps showing modeled drawdowns in those formations were deemed unnecessary (Table 5-6).

5.3.2 Results for the Requested Annual Production Rate (56 gpm per well)

Table 5-7 is a summary of calculated drawdowns in the combined Pearsall and Hosston aquifers, assuming pumping from the proposed wells at 56 gpm per well, in all of the Big Sky wells; one registered well which is assumed, based on the reported total depth, to be completed in the combined Pearsall and Hosston formations; and in district registered wells without a reported total depth. Table 5-7 includes drawdowns calculated at 1, 30, and 365 days after the start of pumping Phase 1, as well as at the start of and at 1, 30, and 365 days after the start of each subsequent pumping phase.

Table 5-8 is a summary of calculated drawdowns, assuming pumping from the proposed wells at 56 gpm per well, in the combined Paluxy and Glen Rose aquifers from pumping the Pearsall and Hosston. Drawdowns were calculated at the six Big Sky wells along with 13 registered wells thought to be completed in the combined Paluxy and Glen Rose aquifers and district registered wells without a reported total depth. Table 5-8 includes drawdowns calculated at 1, 30, and 365 days after the start of pumping Phase 1, as well as at the start of and at 1, 30, and 365 days after the start of each subsequent pumping phase.

Figure 5-4 is a series of three maps showing drawdown at 1, 30 and 365 days from pumping the combined Pearsall and Hosston aquifers at 56 gpm each in two locations (Well 1 and Well 1A).

Figure 5-5 is a series of three maps showing drawdown at 1, 30 and 365 days after the activation of the sixth well with all wells pumping at 56 gpm. Please note that drawdown maps were only generated for 1, 30, and 365 days after the start of pumping Phase 1 and for the same times after the start of pumping Phase 5 in order to maintain a reasonable number of figures in this report. Drawdowns at intermediate times are presented in Table 5-7. Given the lack of any discernable drawdowns in the combined Paluxy

and Glen Rose, maps showing modeled drawdowns in those formations were deemed unnecessary (Table 5-8).

Table 5-1 Summary statistics for parameters extracted from the North Trinity-Woodbine GAM

GAM Model Layer-->	Layer 3	Layer 4	Layer 5	Layer 6	Layer 7	Layer 8	Units
Layer Thickness							
Maximum:	145.2	159.8	267.7	110.5	126.2	117.1	ft
Arithmetic Mean:	96.5	141.7	259.9	105.7	116.3	108.4	ft
Minimum:	30.0	124.2	256.3	98.4	105.7	100.8	ft
Transmissivity							
Maximum:	128.9	219.1	292.2	432.1	231.6	519.0	ft^2/d
Geometric Mean:	80.2	188.5	274.3	391.5	218.5	465.9	ft^2/d
Arithmetic Mean:	85.7	189.1	274.4	391.8	218.6	467.0	ft^2/d
Minimum:	26.5	158.8	263.2	367.7	204.5	411.7	ft^2/d
Storativity							
Maximum:	2.38E-04	1.44E-03	1.33E-02	1.25E-04	1.09E-04	9.77E-05	-
Geometric Mean:	1.55E-04	1.32E-03	1.05E-02	1.16E-04	1.01E-04	9.14E-05	-
Arithmetic Mean:	1.65E-04	1.32E-03	1.06E-02	1.16E-04	1.01E-04	9.15E-05	-
Minimum:	5.46E-05	1.17E-03	9.06E-03	1.04E-04	9.30E-05	8.42E-05	-
Vertical K							
Maximum:	9.00E-01	1.05E-05	5.13E-05	3.08E-05	4.82E-06	2.30E-04	ft/d
Geometric Mean:	8.87E-01	9.30E-06	4.05E-05	2.26E-05	4.13E-06	1.98E-04	ft/d
Arithmetic Mean:	8.87E-01	9.32E-06	4.07E-05	2.27E-05	4.14E-06	1.99E-04	ft/d
Minimum:	8.81E-01	8.36E-06	3.48E-05	1.87E-05	3.73E-06	1.81E-04	ft/d

Table 5-2 Final input parameters used in the TTIM interference model

GAM LAYER	TTIM LAYER	FORMATION	THICKNESS ft	T ft^2/d	S	Kv ft/d
3	1	Washita-Fredericksburg	97	80.2	1.55E-04	8.87E-01
4	2	Paluxy	142	188.5	1.32E-03	9.30E-06
5	3	Glen Rose	260	274.3	1.05E-02	4.05E-05
6	4	Hensell	106	391.5	1.16E-04	2.26E-05
7	5	Pearsall	116	218.5	1.01E-04	4.13E-06
8	6	Hosston	108	465.9	9.14E-05	1.98E-04

Table 5-3 Well depths, completion intervals, and corresponding GAM layer intervals.

Well ID	Ground Surface Elevation ft msl	Casing Depth ft	Total Depth ft	Top Open Interval ft msl	Base Open Interval ft msl	GAM Row	GAM Column	Elevation of Top of Pearsall ft msl	Elevation of Top of Hosston ft msl	Elevation of Base of Hosston ft msl
1	841	750	1000	91	-159	387	789	137.6	22.5	-87.9
1A	797	709	956	88	-159	386	789	146.9	31.8	-78.3
2	812	723	971	89	-159	389	790	117.8	-0.7	-109.5
3	846	757	1005	89	-159	387	790	136.0	18.4	-90.1
4	822	733	981	89	-159	388	788	128.1	16.2	-96.6
5	826	737	985	89	-159	388	789	128.6	13.5	-97.6

Table 5-4 Pumping schedule for the proposed well field

Pumping Phase	Wells	Start Date
Phase 1	Start pumping from Wells 1 and 1A	12/1/2020
Phase 2	Start pumping from Well 2	9/1/2022
Phase 3	Start pumping from Well 3	6/1/2024
Phase 4	Start pumping from Well 4	3/1/2026
Phase 5	Start pumping from Well 5	12/1/2027

Table 5-5 Summary of calculated drawdown (in feet) in the combined Pearsall and Hosston aquifers assuming the requested max instantaneous rate

Well ID	Distance (mi)	Phase 1: Wells 1 and 1A			Phase 2: Wells 1-2				Phase 3: Wells 1-3				Phase 4: Wells 1-4				Phase 5: Wells 1-5			
Date ===>		12/2/20	1/1/21	12/1/21	9/1/22	9/2/22	10/1/22	9/1/23	6/1/24	6/2/24	7/1/24	6/1/25	3/1/26	3/2/26	4/1/26	3/1/27	12/1/27	12/2/27	1/1/28	12/1/28
Time from start of pumping phase (days) ===>		1	31	365	-	1	30	365	-	1	30	365	-	1	31	365	-	1	31	366
Total Elapsed Time ===>		1	31	365	639	640	669	1004	1278	1279	1308	1643	1916	1917	1947	2281	2556	2557	2587	2922
Well 1	0.00	74	100	120	124	129	142	155	158	164	178	190	194	198	211	224	227	233	246	259
Well 1a	0.36	74	101	120	124	129	142	155	158	160	172	185	188	190	202	214	218	220	231	243
Well 2	0.30	11	37	56	60	130	144	156	159	166	179	191	195	196	208	220	224	226	237	250
Well 3	0.28	8	33	52	56	63	76	88	92	161	175	188	191	193	205	217	221	224	237	249
Well 4	0.36	6	31	50	54	55	67	79	82	84	96	108	112	181	195	208	211	217	230	243
Well 5	0.30	7	31	50	54	56	68	80	84	87	100	112	116	122	135	147	151	221	235	247
1653	1.52	0	12	30	34	34	39	51	54	54	60	71	75	75	83	95	99	99	106	118
*2872**	*0.09*	*18*	*44*	*63*	*67*	*73*	*86*	*98*	*102*	*111*	*124*	*137*	*140*	*144*	*157*	*169*	*173*	*178*	*192*	*204*
*2708**	*0.90*	*1*	*22*	*40*	*44*	*45*	*54*	*66*	*69*	*69*	*77*	*89*	*93*	*94*	*105*	*117*	*121*	*121*	*130*	*143*
*2707**	*0.90*	*1*	*22*	*40*	*44*	*45*	*54*	*66*	*69*	*69*	*77*	*89*	*93*	*94*	*105*	*117*	*121*	*121*	*130*	*143*
*407**	*1.48*	*0*	*11*	*30*	*33*	*33*	*39*	*50*	*54*	*54*	*60*	*72*	*75*	*75*	*83*	*95*	*99*	*99*	*107*	*119*
*803**	*1.72*	*0*	*10*	*27*	*31*	*31*	*37*	*49*	*52*	*52*	*59*	*71*	*74*	*74*	*79*	*91*	*94*	*94*	*100*	*112*

*Denotes well without a reported total depth

Table 5-6 Summary of calculated drawdown (in feet) in the combined Paluxy and Glen Rose aquifers assuming the max instantaneous rate (180 gpm/well)

Well ID	Distance (mi)	Phase 1: Wells 1 and 1A			Phase 2: Wells 1-2				Phase 3: Wells 1-3				Phase 4: Wells 1-4				Phase 5: Wells 1-5			
Date ===>		12/2/20	1/1/21	12/1/21	9/1/22	9/2/22	10/1/22	9/1/23	6/1/24	6/2/24	7/1/24	6/1/25	3/1/26	3/2/26	4/1/26	3/1/27	12/1/27	12/2/27	1/1/28	12/1/28
Time from start of pumping phase (days) ===>		1	31	365	-	1	30	365	-	1	30	365	-	1	31	365	-	1	31	366
Total Elapsed Time ===>		1	31	365	639	640	669	1004	1278	1279	1308	1643	1916	1917	1947	2281	2556	2557	2587	2922
Well 1	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.06	0.06	0.06	0.08	0.10	0.10	0.11	0.14
Well 1a	0.36	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.06	0.06	0.06	0.08	0.10	0.10	0.11	0.14
Well 2	0.30	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.06	0.06	0.06	0.08	0.10	0.10	0.11	0.14
Well 3	0.28	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.06	0.06	0.06	0.08	0.10	0.10	0.11	0.14
Well 4	0.36	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.06	0.06	0.06	0.08	0.10	0.10	0.11	0.14
Well 5	0.30	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.06	0.06	0.06	0.08	0.10	0.10	0.11	0.14
2272	0.40	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.06	0.06	0.06	0.08	0.10	0.10	0.11	0.14
2347	0.55	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.06	0.06	0.06	0.08	0.10	0.10	0.11	0.14
2180	0.70	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.06	0.06	0.06	0.08	0.10	0.10	0.11	0.14
976	0.74	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.06	0.06	0.06	0.08	0.10	0.10	0.11	0.14
2857	0.82	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.06	0.06	0.06	0.08	0.10	0.10	0.11	0.14
1598	1.02	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.06	0.06	0.06	0.08	0.10	0.10	0.10	0.13
2261	1.12	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.06	0.06	0.06	0.08	0.10	0.10	0.10	0.13
2640	1.67	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.04	0.05	0.05	0.06	0.08	0.10	0.10	0.10	0.13
1082	1.78	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.04	0.05	0.05	0.06	0.08	0.10	0.10	0.10	0.13
2394	1.98	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.04	0.05	0.05	0.05	0.08	0.09	0.09	0.10	0.13
2290	1.99	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.04	0.05	0.05	0.05	0.07	0.09	0.09	0.10	0.12
2179	1.99	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.04	0.05	0.05	0.05	0.07	0.09	0.09	0.10	0.12
368	0.89	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.06	0.06	0.06	0.08	0.10	0.10	0.10	0.13

Well ID	Distance (mi)	Phase 1: Wells 1 and 1A			Phase 2: Wells 1-2				Phase 3: Wells 1-3				Phase 4: Wells 1-4				Phase 5: Wells 1-5			
Date ===>		12/2/20	1/1/21	12/1/21	9/1/22	9/2/22	10/1/22	9/1/23	6/1/24	6/2/24	7/1/24	6/1/25	3/1/26	3/2/26	4/1/26	3/1/27	12/1/27	12/2/27	1/1/28	12/1/28
Time from start of pumping phase (days) ===>		1	31	365	-	1	30	365	-	1	30	365	-	1	31	365	-	1	31	366
Total Elapsed Time ===>		1	31	365	639	640	669	1004	1278	1279	1308	1643	1916	1917	1947	2281	2556	2557	2587	2922
*2872**	*0.09*	*0.00*	*0.00*	*0.00*	*0.01*	*0.01*	*0.01*	*0.02*	*0.03*	*0.03*	*0.03*	*0.04*	*0.06*	*0.06*	*0.06*	*0.08*	*0.10*	*0.10*	*0.11*	*0.14*
*2708**	*0.90*	*0.00*	*0.00*	*0.00*	*0.01*	*0.01*	*0.01*	*0.02*	*0.03*	*0.03*	*0.03*	*0.04*	*0.06*	*0.06*	*0.06*	*0.08*	*0.10*	*0.10*	*0.10*	*0.13*
*2707**	*0.90*	*0.00*	*0.00*	*0.00*	*0.01*	*0.01*	*0.01*	*0.02*	*0.03*	*0.03*	*0.03*	*0.04*	*0.06*	*0.06*	*0.06*	*0.08*	*0.10*	*0.10*	*0.10*	*0.13*
*407**	*1.48*	*0.00*	*0.00*	*0.00*	*0.01*	*0.01*	*0.01*	*0.01*	*0.02*	*0.02*	*0.03*	*0.04*	*0.05*	*0.05*	*0.06*	*0.08*	*0.10*	*0.10*	*0.10*	*0.13*
*803**	*1.72*	*0.00*	*0.00*	*0.00*	*0.01*	*0.01*	*0.01*	*0.01*	*0.02*	*0.02*	*0.02*	*0.04*	*0.05*	*0.05*	*0.05*	*0.07*	*0.09*	*0.09*	*0.10*	*0.12*

*Denotes well without a reported total depth

Table 5-7 Summary of calculated drawdown (in feet) in the combined Pearsall and Hosston aquifers assuming the requested average annual production rate

Well ID	Distance (mi)	Phase 1: Wells 1 and 1A			Phase 2: Wells 1-2				Phase 3: Wells 1-3				Phase 4: Wells 1-4				Phase 5: Wells 1-5			
Date ===>		12/2/20	1/1/21	12/1/21	9/1/22	9/2/22	10/1/22	9/1/23	6/1/24	6/2/24	7/1/24	6/1/25	3/1/26	3/2/26	4/1/26	3/1/27	12/1/27	12/2/27	1/1/28	12/1/28
Time from start of pumping phase (days) ===>		1	31	365	-	1	30	365	-	1	30	365	-	1	31	365	-	1	31	366
Total Elapsed Time ===>		1	31	365	639	640	669	1004	1278	1279	1308	1643	1916	1917	1947	2281	2556	2557	2587	2922
Well 1	0.00	23	31	37	38	40	44	48	49	51	55	59	60	62	66	70	71	72	77	81
Well 1a	0.36	23	31	37	38	40	44	48	49	50	54	57	59	59	63	67	68	68	72	76
Well 2	0.30	3	12	17	19	40	45	49	50	52	56	60	61	61	65	68	70	70	74	78
Well 3	0.28	3	10	16	18	19	24	27	29	50	55	58	59	60	64	67	69	70	74	78
Well 4	0.36	2	10	16	17	17	21	25	26	26	30	34	35	56	61	65	66	68	72	76
Well 5	0.30	2	10	16	17	17	21	25	26	27	31	35	36	38	42	46	47	69	73	77
1653	1.52	0	4	9	11	11	12	16	17	17	19	22	23	23	26	30	31	31	33	37
*2872**	*0.09*	5	14	20	21	23	27	31	32	34	39	43	44	45	49	53	54	56	60	64
*2708**	*0.90*	0	7	13	14	14	17	20	22	22	24	28	29	29	33	36	38	38	41	44
*2707**	*0.90*	0	7	13	14	14	17	20	22	22	24	28	29	29	33	36	38	38	41	44
*407**	*1.48*	0	4	9	10	10	12	16	17	17	19	22	23	23	26	30	31	31	33	37
*803**	*1.72*	0	3	9	10	10	12	15	16	16	18	22	23	23	25	28	29	29	31	35

*Denotes well without a reported total depth

Table 5-8 Summary of calculated drawdown (in feet) in the combined Paluxy and Glen Rose aquifers assuming the requested average annual production rate

Well ID	Distance (mi)	Phase 1: Wells 1 and 1A			Phase 2: Wells 1-2				Phase 3: Wells 1-3				Phase 4: Wells 1-4				Phase 5: Wells 1-5			
Date ===>		12/2/20	1/1/21	12/1/21	9/1/22	9/2/22	10/1/22	9/1/23	6/1/24	6/2/24	7/1/24	6/1/25	3/1/26	3/2/26	4/1/26	3/1/27	12/1/27	12/2/27	1/1/28	12/1/28
Time from start of pumping phase (days) ===>		1	31	365	-	1	30	365	-	1	30	365	-	1	31	365	-	1	31	366
Total Elapsed Time ===>		1	31	365	639	640	669	1004	1278	1279	1308	1643	1916	1917	1947	2281	2556	2557	2587	2922
Well 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
Well 1a	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
Well 2	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
Well 3	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
Well 4	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
Well 5	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
2272	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
2347	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
2180	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
976	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
2857	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
1598	1.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
2261	1.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04
2640	1.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04
1082	1.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04
2394	1.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04
2290	1.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04
2179	1.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04
368	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04

Well ID	Distance (mi)	Phase 1: Wells 1 and 1A			Phase 2: Wells 1-2				Phase 3: Wells 1-3				Phase 4: Wells 1-4				Phase 5: Wells 1-5			
Date ===>		12/2/20	1/1/21	12/1/21	9/1/22	9/2/22	10/1/22	9/1/23	6/1/24	6/2/24	7/1/24	6/1/25	3/1/26	3/2/26	4/1/26	3/1/27	12/1/27	12/2/27	1/1/28	12/1/28
Time from start of pumping phase (days) ===>		1	31	365	-	1	30	365	-	1	30	365	-	1	31	365	-	1	31	366
Total Elapsed Time ===>		1	31	365	639	640	669	1004	1278	1279	1308	1643	1916	1917	1947	2281	2556	2557	2587	2922
*2872**	*0.09*	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
*2708**	*0.90*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
*2707**	*0.90*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.04
*407**	*1.48*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04
*803**	*1.72*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.04

*Denotes well without a reported total depth

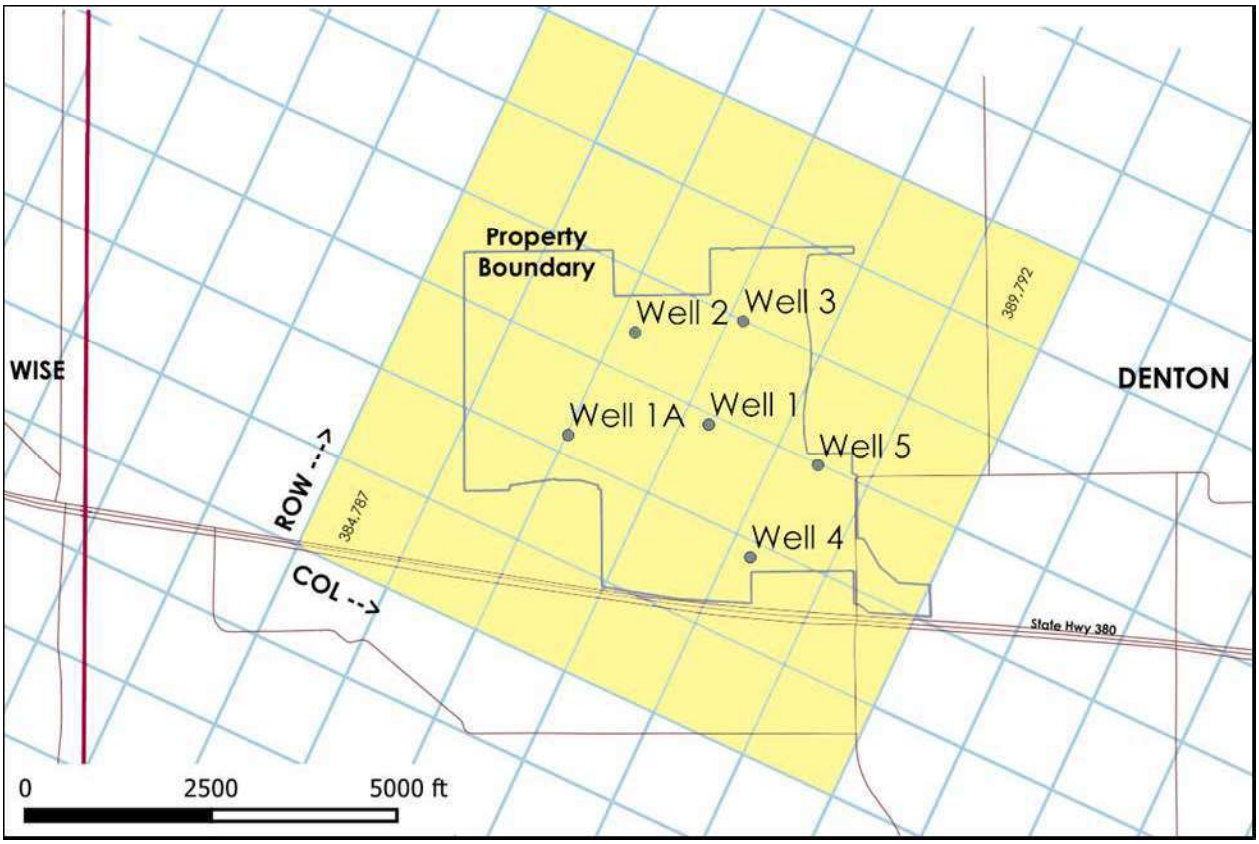


Figure 5-1 Map showing the site relative to the North Trinity-Woodbine GAM grid. The yellow shaded area indicates the model cells used in determining input parameters for the interference analysis model.

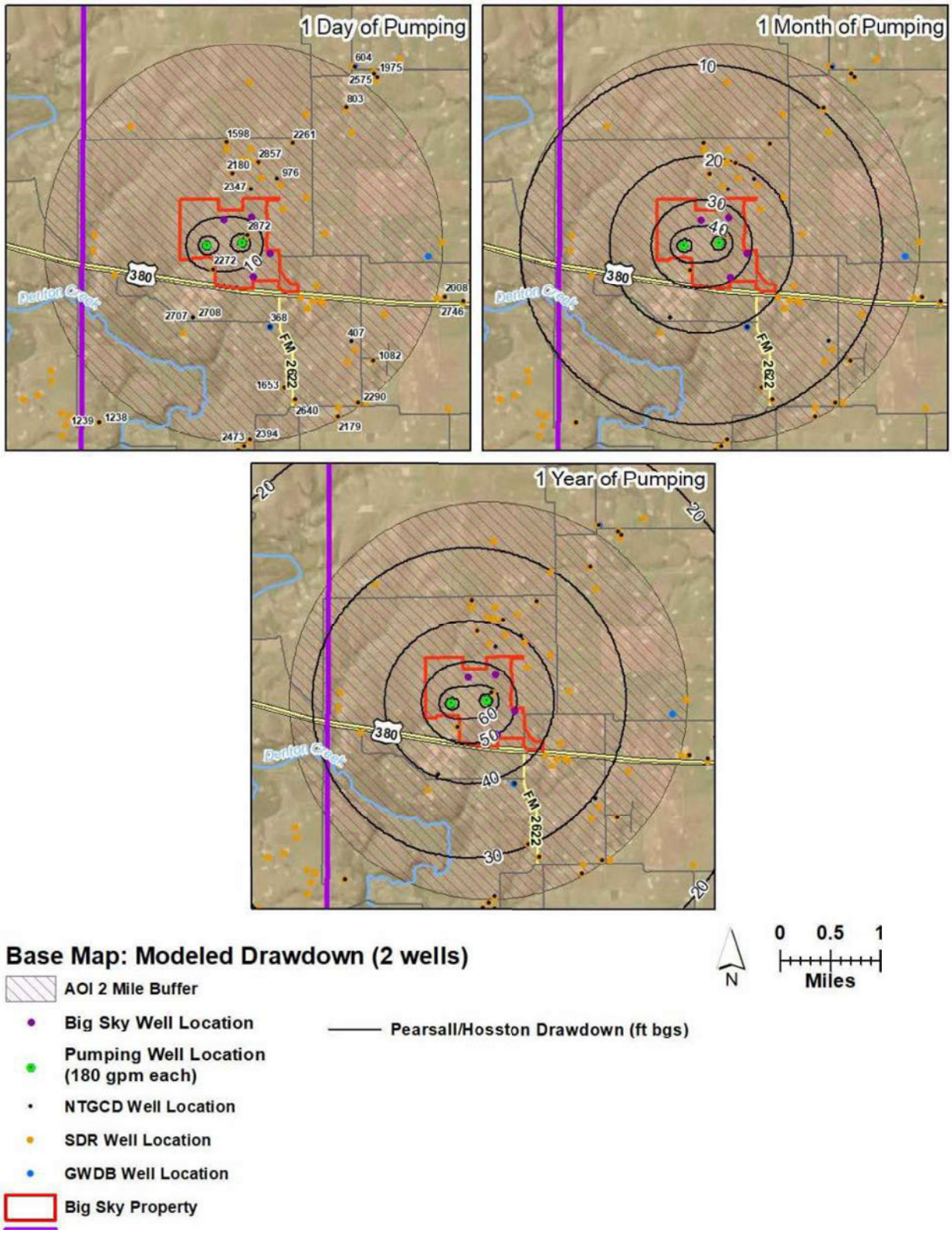


Figure 5-2 Map of modeled drawdown from pumping two wells at 180 gpm each for 1, 30 and 365 days from the start of pumping Phase 1

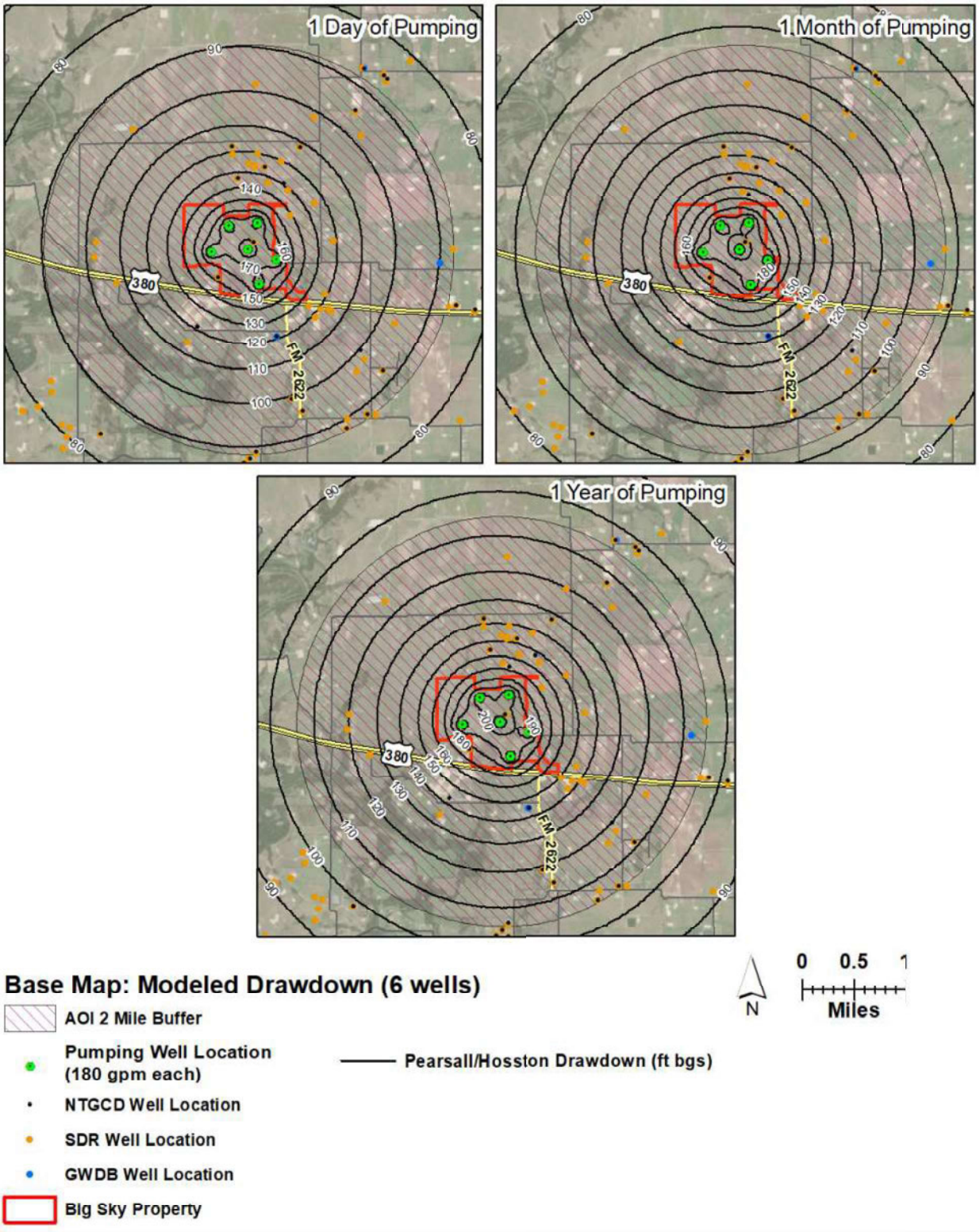


Figure 5-3 Map of modeled drawdowns from pumping six wells at 180 gpm each at 1, 30, and 365 days after the start of pumping Phase 5

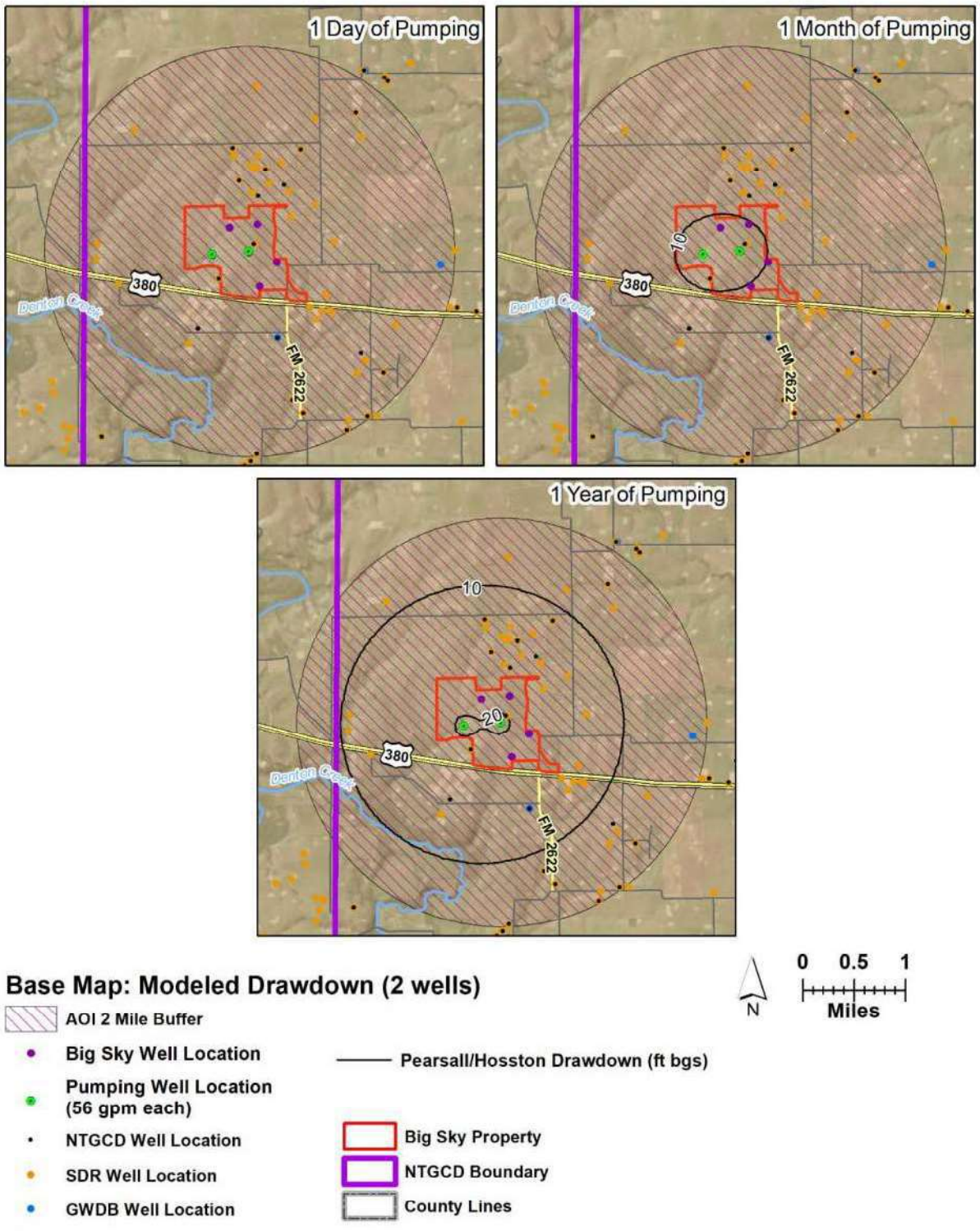


Figure 5-4 Map of modeled drawdown from pumping two wells at 56 gpm each for 1, 30 and 365 days from the start of pumping Phase 1

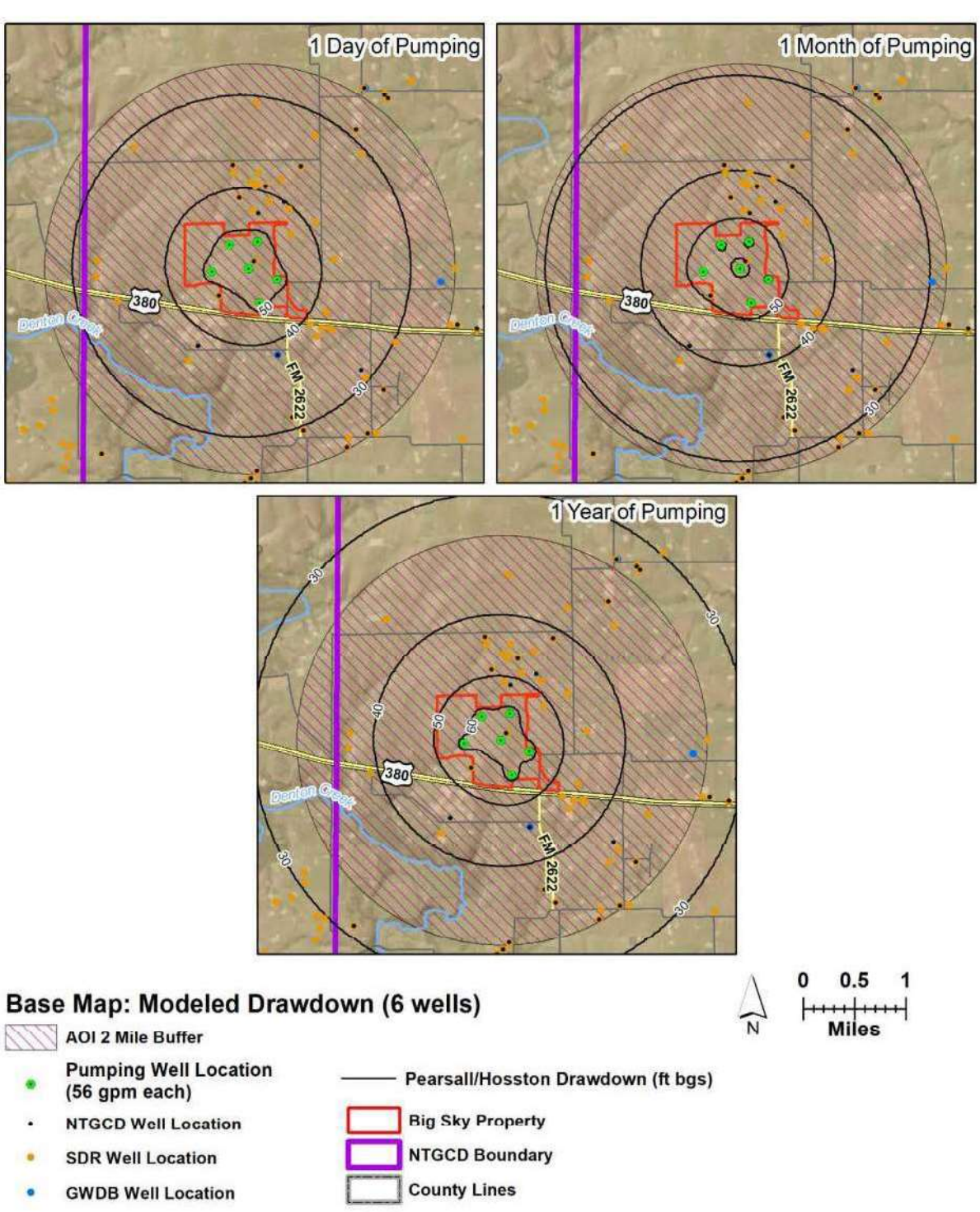


Figure 5-5 Map of modeled drawdowns from pumping six wells at 56 gpm each at 1, 30, and 365 days after the start of pumping Phase 5

This page is intentionally left blank.

6.0 DESIRED FUTURE CONDITIONS (DFC) AND MANAGED AVAILABLE GROUNDWATER (MAG) ANALYSIS

Item II.E in the "Hydrogeological Report Requirements" document provided by the NTGCD states that the applicant is required to discuss the relation of the proposed pumping to the current relevant modeled available groundwater (MAG) for the district, and prepare an analysis of the impact of the proposed pumping to the current adopted relevant desired future condition(s) (DFC) for the District. Current MAG and DFC values for the district were taken from the North Texas Groundwater Conservation District Management Plan (adopted 14 March 2017) and from GAM Run 17-029 MAG by Shi (2018). Estimates of current pumping in the district were provided by district staff and are based on reported production in non-exempt wells and estimates of exempt pumping within the district. The DFC evaluation was performed using the Northern Portion of the Trinity and Woodbine Aquifers ("North Trinity-Woodbine") Groundwater Availability Model (Kelley, et al., 2014) using the final DFC well file provided by the groundwater modeling division at the TWDB.

6.1 Evaluation of Total Requested Pumping Rate Relative to the MAG

The current application is requesting authorization to produce at an annual average rate of 56 gpm with a maximum instantaneous rate of 180 gpm per well from two wells located within the jurisdiction of the North Texas GCD. Proposed construction information for the initial two wells (see Table 5-3) indicates that the wells will be producing from the GAM layers corresponding to the Hosston and Pearsall aquifers. The applicant anticipates eventually permitting and developing a total of six wells at the site that will each be authorized to produce at an average annual rate of 56 gpm per well with a maximum instantaneous rate of 180 gpm and that will be phased in over a 6 to 7-year period. The total expected production from the site, assuming the annual average pumping rate, will therefore be 336 gpm, or just over **542.3 acre-feet/year (acft/yr)**.

Desired future conditions for GMA 8 are expressed as county-wide average drawdowns over the planning period of 2010 to 2070 (Table 6-1). Within Denton County, the producing formations for the proposed wells are grouped together with the other Trinity formations as the Antlers Aquifer (**Table 6-2**), and the relevant DFC for this analysis is therefore an average drawdown of 395 ft from 2010 to 2070 in the Antlers Aquifer in Denton County.

Table 6-1 Desired Future Conditions for the relevant aquifers within the North Texas GCD (modified from Shi, 2017)

County	Adopted Desired Future Condition (feet of drawdown below 2009 levels)							
	Woodbine	Paluxy	Glen Rose	Twin Mountains	Travis Peak	Hensell	Hosston	Antlers
Collin	459	705	339	526	—	—	—	570
Cooke	2		—	—	—		—	176
Denton	22	552	349	716	—	—	—	395

Table 6-2 Hydrostratigraphic units developed for the DFC/MAG analysis for GMA8 (from Appendix A in Shi, 2017). The proposed wells in this report are located in Region 1

<table>
<tr><th>Model Layer</th><th>Region 1</th><th>Region 2</th><th>Region 3</th><th>Region 4</th><th>Region 5</th></tr>
<tr><td>2</td><td colspan="3">Woodbine</td><td colspan="2">Woodbine (no sand)</td></tr>
<tr><td>3</td><td colspan="5">Washita/Fredericksburg</td></tr>
<tr><td>4</td><td rowspan="3">Antlers</td><td colspan="3">Paluxy</td><td>Paluxy (no sand)</td></tr>
<tr><td>5</td><td colspan="4">Glen Rose</td></tr>
<tr><td>6</td><td rowspan="3">Twin Mountains</td><td rowspan="3">Travis Peak</td><td>Hensell</td><td rowspan="3">Travis Peak</td><td>Hensell</td></tr>
<tr><td>7</td><td>Pearsall/Sligo</td><td>Pearsall/Sligo</td></tr>
<tr><td>8</td><td>Hosston</td><td>Hosston</td></tr>
</table>

The resulting MAG associated with the DFC for the Antlers Aquifer is **16,568 acft/yr** for Denton County and **29,061 acft/yr** for the entire North Texas GCD. The proposed total pumping from the site, assuming the annual average pumping requested (542.3 acft/yr) is therefore **3.3%** of the total MAG for the Antlers formation in Denton County and **1.9%** of the total MAG for the Antlers formation in the entire district.

Estimates of total district-wide and county-wide pumping within the North Texas GCD were provided by the district. A summary of the estimates of current pumping in the Antlers Formation with comparison to the MAG and to the requested total production, are as follows:

***For Denton County**:*

1. The average of reported non-exempt pumping from 2012 to 2018 is **8,830 acft/yr**.
2. Estimated exempt use for 2016 is **954 acft/yr**. Exempt use in the District is assumed to be relatively constant throughout 2012 to 2018.
3. The total estimated current pumping as the sum of the average non-exempt and the representative exempt pumping presented in item 2 above is **9,753 acft/yr**.
4. The total estimated remaining available groundwater in the Antlers Aquifer in Denton County, calculated as the Denton County MAG minus the total estimated current pumping, is **6,815 acft/yr**. The resulting fractions of allocated and remaining groundwater within the district are **59%** of the Denton County MAG currently in use and **41%** of the Denton County MAG still available.
5. The total requested annual production (542.3 acft/yr) is about **8%** of the estimated remaining available groundwater in the Antlers Aquifer within Denton County (6,815 acft/yr). This demonstrates that there is sufficient available groundwater within the district to support the maximum requested pumping from the proposed wells.

***For the Entire District**:*

1. The average of reported non-exempt pumping from 2012 to 2018 is **14,305 acft/yr**.
2. Estimated exempt use for 2016 is **2,134 acft/yr**. Exempt use in the district is assumed to be relatively constant throughout 2012 to 2018.
3. The total estimated current pumping as the sum of the average non-exempt and the representative exempt pumping presented in item 2 above is **16,439 acft/yr**.
4. The total estimated remaining available groundwater in the Antlers Aquifer in the entire district, calculated as the North Texas GCD MAG minus the total estimated current pumping, is **12,622 acft/yr**. The resulting fractions of allocated and remaining groundwater within the district are **57%** of the GCD MAG currently in use and **43%** of the GCD MAG still available.
5. The total requested pumping (542.3 acft/yr) is about **4%** of the estimated remaining available groundwater in the Antlers Aquifer within the entire GCD (12,622 acft/yr). This demonstrates

that there is sufficient available groundwater within the district to support the maximum requested pumping from the proposed wells.

6.2 Potential Impact of the Proposed Pumping on the DFC

The latest model files for the North Trinity-Woodbine GAM, including the final DFC model run, were obtained and used to develop an estimate of the potential impact of the proposed pumping on the DFCs for the District. The model simulation assumed that all six wells would start pumping from the Pearsall/Sligo and Hosston aquifers at the start of 2020 and pump continuously through the end of the predictive period for the most conservative impact estimate. Pumping was applied to model layers 7 (Pearsall) and 8 (Hosston) in the model cells presented in Table 5-3, with pumping distributed based on the relative transmissivity of each model layer; specifically, with 32% of the requested pumping (57.5 gpm per well) applied to layer 7 and 68% (122.5 gpm per well) applied to layer 8. Two sets of simulations were run; one with the requested maximum instantaneous production rate (180 gpm per well) and one with the requested annual production rate (542.3 acft/yr, or 56 gpm per well). The resulting drawdowns were calculated using the same methods used to evaluate the DFCs as described in Appendix A of Shi (2017), and the final average drawdowns determined for the final DFC simulation were subtracted from those calculated with the project to determine the incremental drawdown associated with the project alone.

6.2.1 Results for the Maximum Instantaneous Rate (180 gpm per well)

Table 6-3 shows the modeled average drawdowns per county associated with pumping at 180 gpm per well from the proposed wells expressed as the total average drawdowns within each county, the incremental drawdowns associated with the proposed pumping alone, and the percentage of the DFC associated with the project in each of the relevant aquifers. As indicated by Table 6-3, the incremental drawdowns associated with the most conservative modeled scenario (i.e., all six wells pumping continuously at the maximum requested rate of 180 gpm per well from 2020 through 2070) results in average county-wide incremental drawdowns in the Antlers Aquifer of 20 feet in Denton County; which represents about 5% of the total DFC drawdowns for that aquifer in Denton County. As described in Section 6.1; the actual current pumping in Denton County is less than 60% of the MAG, which suggests that there is sufficient available groundwater to satisfy the requested pumping without exceeding the DFCs for the Antlers Aquifer in Denton County.

Figures 6-1 through **6-5** are maps showing modeled incremental drawdowns associated with pumping from the proposed Big Sky PWS wells with six wells pumping at 180 gpm/well from 2020 through 2070. Model results indicate the ranges of drawdowns in Denton County presented in **Table 6-4**. As expected, drawdowns primarily occur in model layers 7 and 8, with minimal drawdowns in the overlying formations.

6.2.2 Results for the Requested Annual Production Rate (56 gpm per well)

Table 6-4 shows the modeled average drawdowns per county associated with pumping at 56 gpm per well from the proposed wells expressed as the total average drawdowns within each county, the incremental drawdowns associated with the proposed pumping alone, and the percentage of the DFC associated with the project in each of the relevant aquifers. As indicated by Table 6-4, the incremental

drawdowns associated with all six wells pumping continuously at the requested annual average rate of 56 gpm per well from 2020 through 2070 results in average county-wide incremental drawdowns in the Antlers Aquifer of 6 feet in Denton County; which represents less than 2% of the total DFC drawdowns for that aquifer in Denton County. As described in Section 6.1; the actual current pumping in Denton County is less than 60% of the MAG, which suggests that there is sufficient available groundwater to satisfy the requested pumping without exceeding the DFCs for the Antlers Aquifer in Denton County.

Figures 6-6 through **6-10** are maps showing modeled incremental drawdowns associated with pumping from the proposed Big Sky PWS wells with six wells pumping at 56 gpm/well from 2020 through 2070. Model results indicate the ranges of drawdowns in Denton County presented in **Table 6-4**. As expected, drawdowns primarily occur in model layers 7 and 8, with minimal drawdowns in the overlying formations.

Table 6-3 (a) GAM-calculated average county-wide drawdowns associated with the requested maximum instantaneous pumping rate (180 gpm); (b) relevant DFCs for the North Texas GCD; (c) incremental drawdowns associated with the proposed pumping; (d) percentage of the total DFC represented by the incremental drawdown (calculated as [incremental drawdown]/[DFC])

County	Paluxy	Glen Rose	Twin Mountain	Antlers
(a) Modeled Average County-Wide Drawdowns with the Big Sky PWS Pumping				
Collin	708	344	535	580
Cooke				182
Denton	553	355	739	415
(b) Desired Future Conditions for the Relevant Aquifers in the North Texas GCD				
Collin	705	339	526	570
Cooke				176
Denton	552	349	716	395
(c) Incremental Additional Average County-Wide Drawdowns with the Big Sky PWS Pumping				
Collin	3	5	9	10
Cooke				6
Denton	1	6	23	20
(d) Percent of Total DFC Represented BY Incremental Average County-Wide Drawdowns				
Collin	0.4%	1.5%	1.7%	1.8%
Cooke				3.2%
Denton	0.2%	1.6%	3.3%	5.1%

Table 6-4 (a) GAM-calculated average county-wide drawdowns associated with the requested annual average pumping rate (56 gpm per weill; (b) relevant DFCs for the North Texas GCD; (c) incremental drawdowns associated with the proposed pumping; (d) percentage of the total DFC represented by the incremental drawdown (calculated as [incremental drawdown]/[DFC])

County	Paluxy	Glen Rose	Twin Mountain	Antlers
(a) Modeled Average County-Wide Drawdowns with the Big Sky PWS Pumping				
Collin	706	341	526	572
Cooke				177
Denton	552	351	722	401
(b) Desired Future Conditions for the Relevant Aquifers in the North Texas GCD				
Collin	705	339	526	570
Cooke				176
Denton	552	349	716	395
(c) Incremental Additional Average County-Wide Drawdowns with the Big Sky PWS Pumping				
Collin	1	2	0	2
Cooke				1
Denton	0	2	6	6
(d) Percent of Total DFC Represented BY Incremental Average County-Wide Drawdowns				
Collin	0.2%	0.7%	0.1%	0.4%
Cooke				0.6%
Denton	0.1%	0.6%	0.9%	1.6%

Table 6-4 GAM-Modeled ranges of drawdowns in Denton County for the various GAM model layers/aquifer

Model Layer - Aquifer	180 gpm per well		56 gpm per well	
	Minimum Incremental Drawdown (ft)	Maximum Incremental Drawdown (ft)	Minimum Incremental Drawdown (ft)	Maximum Incremental Drawdown (ft)
4 – Paluxy	0.0	1.7	0.0	0.5
5 – Glen Rose	2.5	7.0	0.8	2.2
6 – Hensell	5.8	16.0	1.8	5.0
7 – Pearsall	18.1	213.3	5.7	67.0
8 – Hosston	20.1	246.4	6.3	77.5

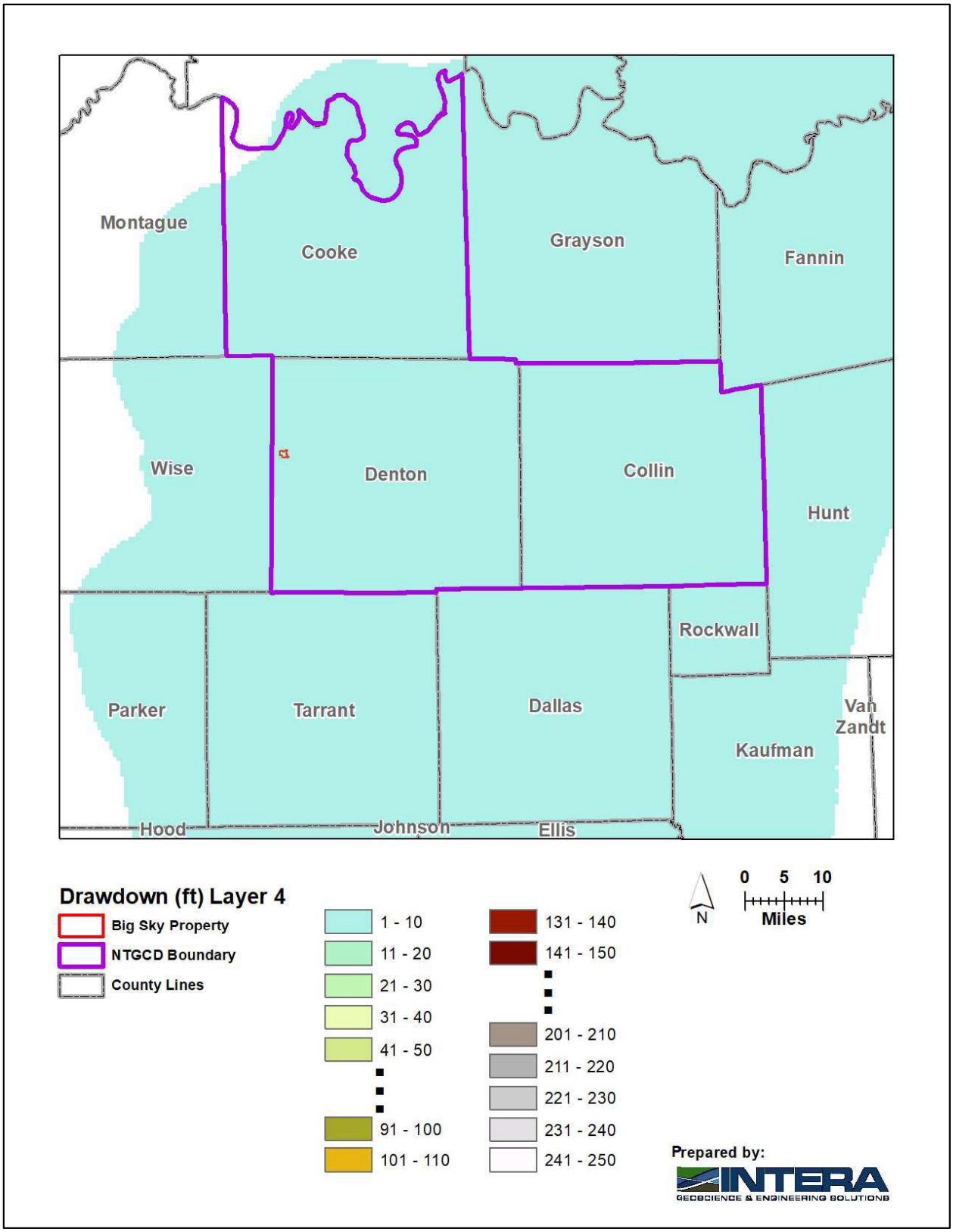


Figure 6-1 GAM-calculated drawdowns for model layer 4 (Paluxy Aquifer) assuming 180 gpm per well

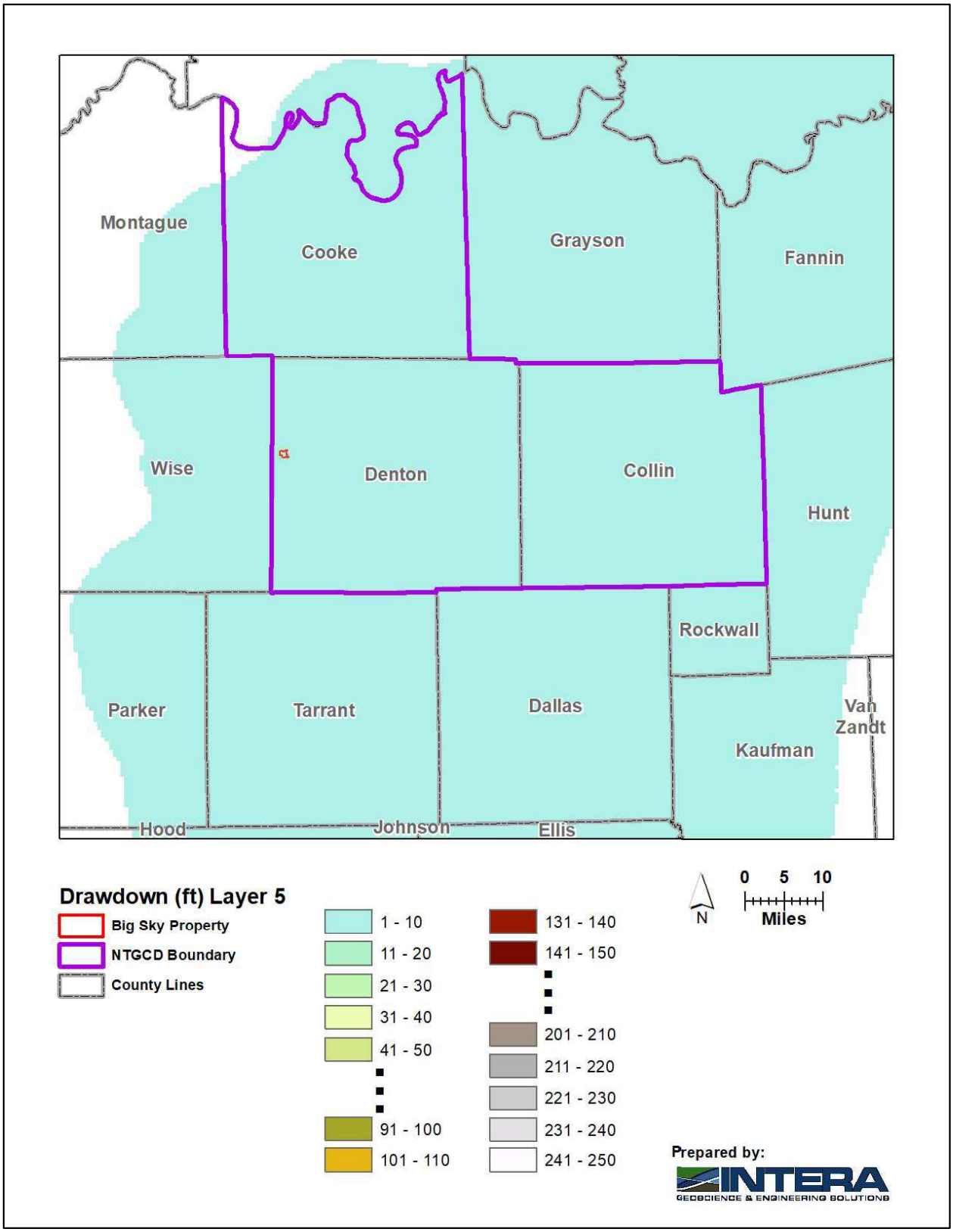


Figure 6-2 GAM-calculated drawdowns for model layer 5 (Glen Rose Aquifer) assuming 180 gpm per well

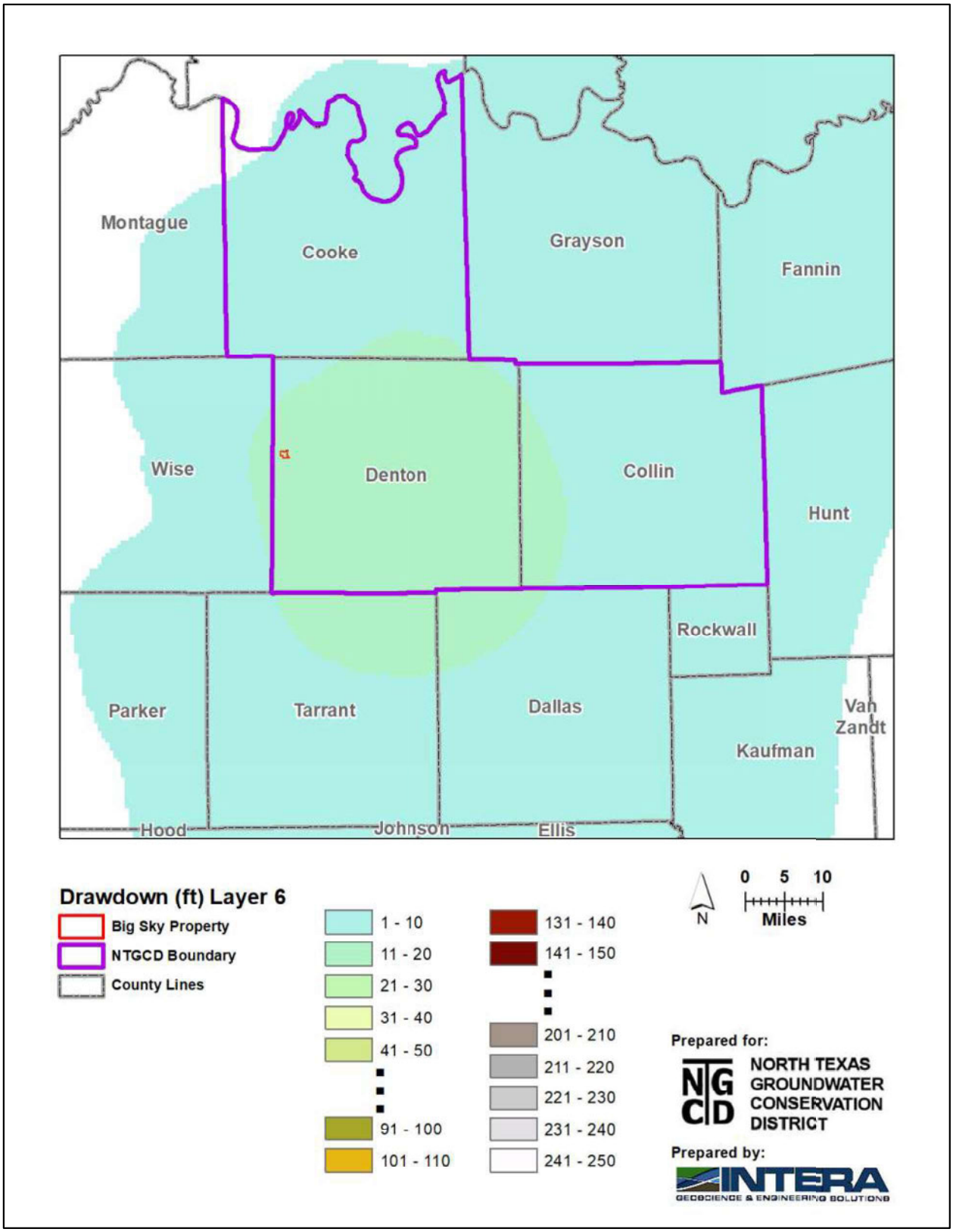


Figure 6-3 GAM-calculated drawdowns for model layer 6 (Hensell Aquifer) assuming 180 gpm per well

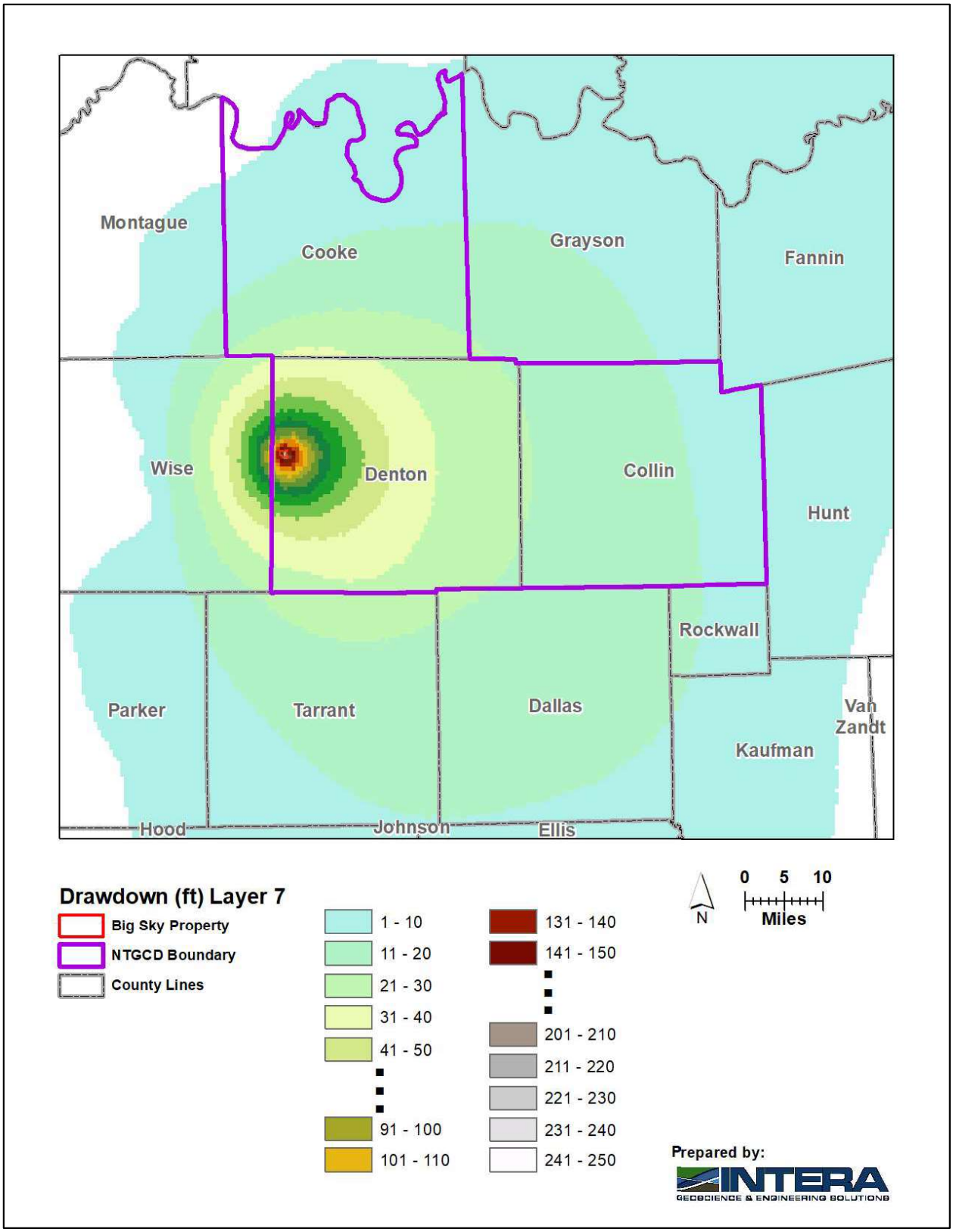


Figure 6-4 GAM-calculated drawdowns for model layer 7 (Pearsall Aquifer) assuming 180 gpm per well

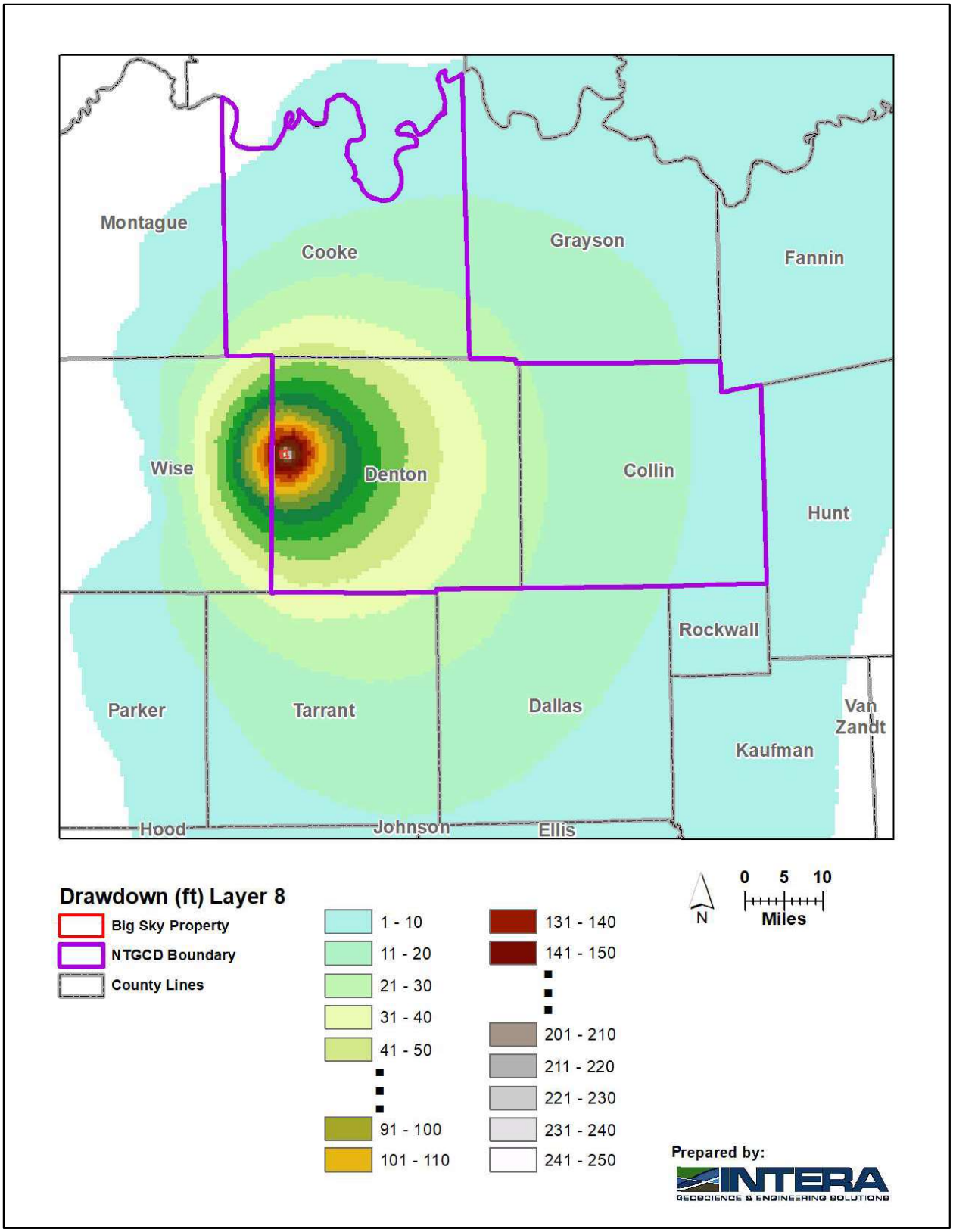


Figure 6-5 GAM-calculated drawdowns for model layer 8 (Hosston Aquifer) assuming 180 gpm per well

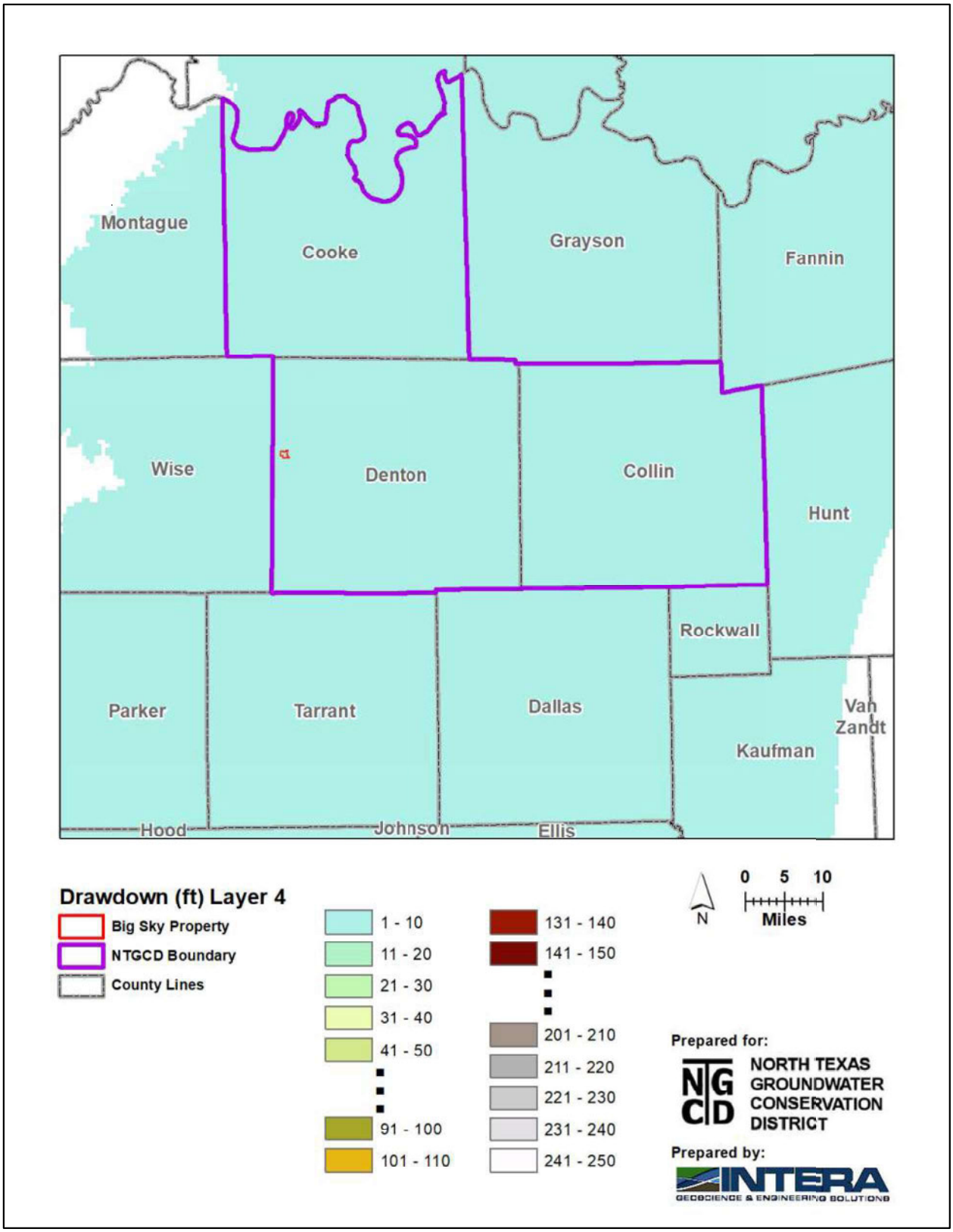


Figure 6-6 GAM-calculated drawdowns for model layer 4 (Paluxy Aquifer) assuming 56 gpm per well

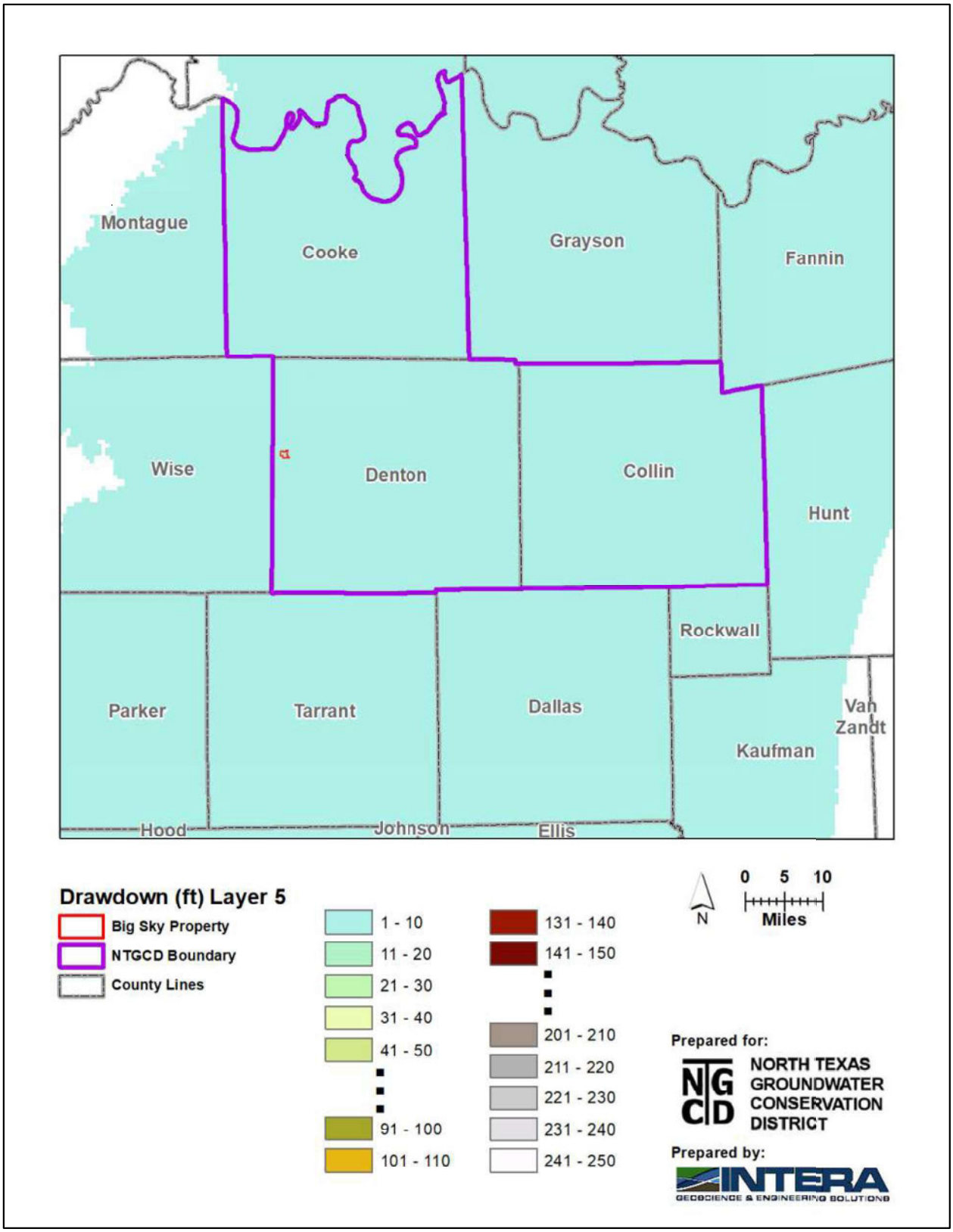


Figure 6-7 GAM-calculated drawdowns for model layer 5 (Glen Rose Aquifer) assuming 56 gpm per well

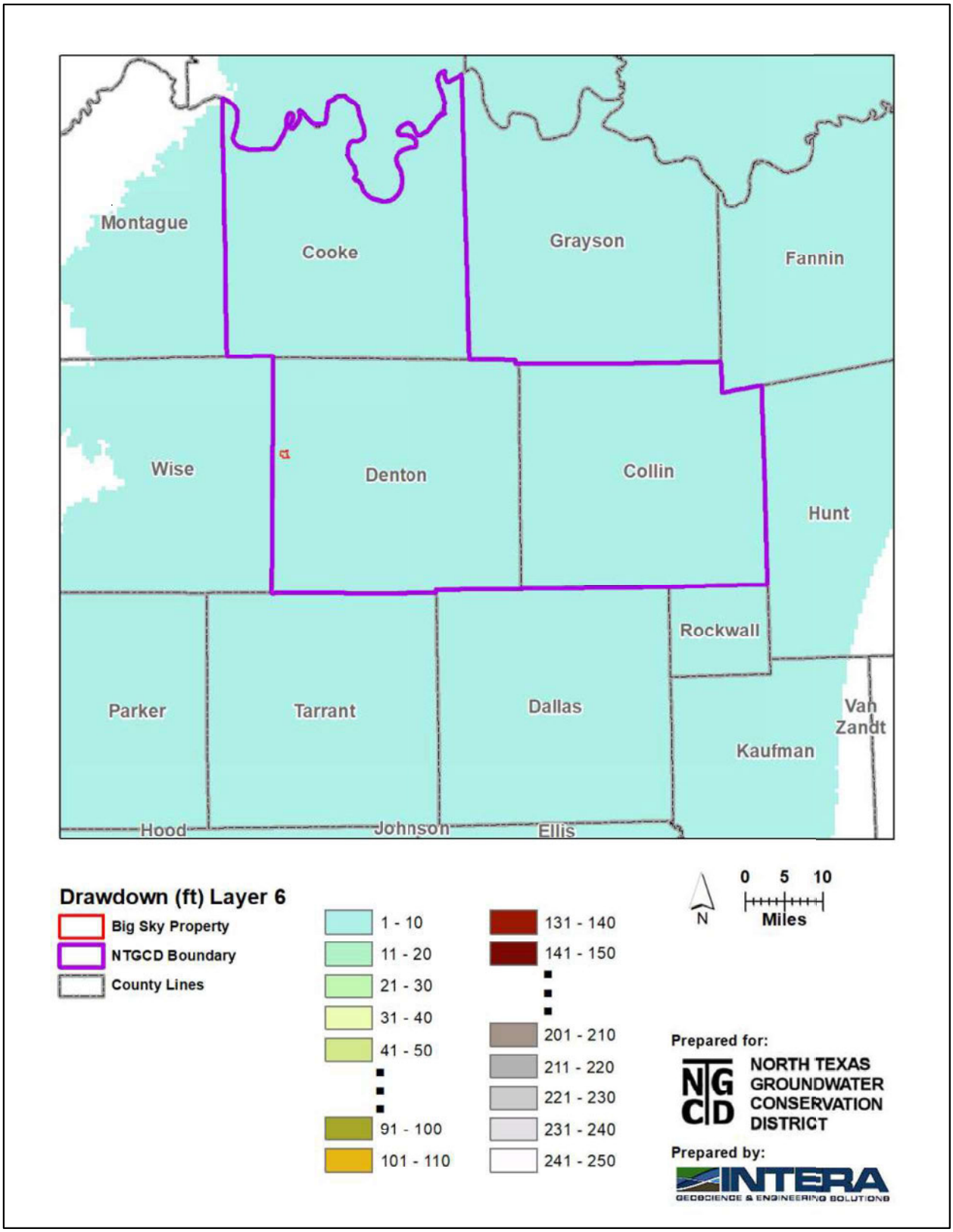


Figure 6-8 GAM-calculated drawdowns for model layer 6 (Hensell Aquifer) assuming 56 gpm per well

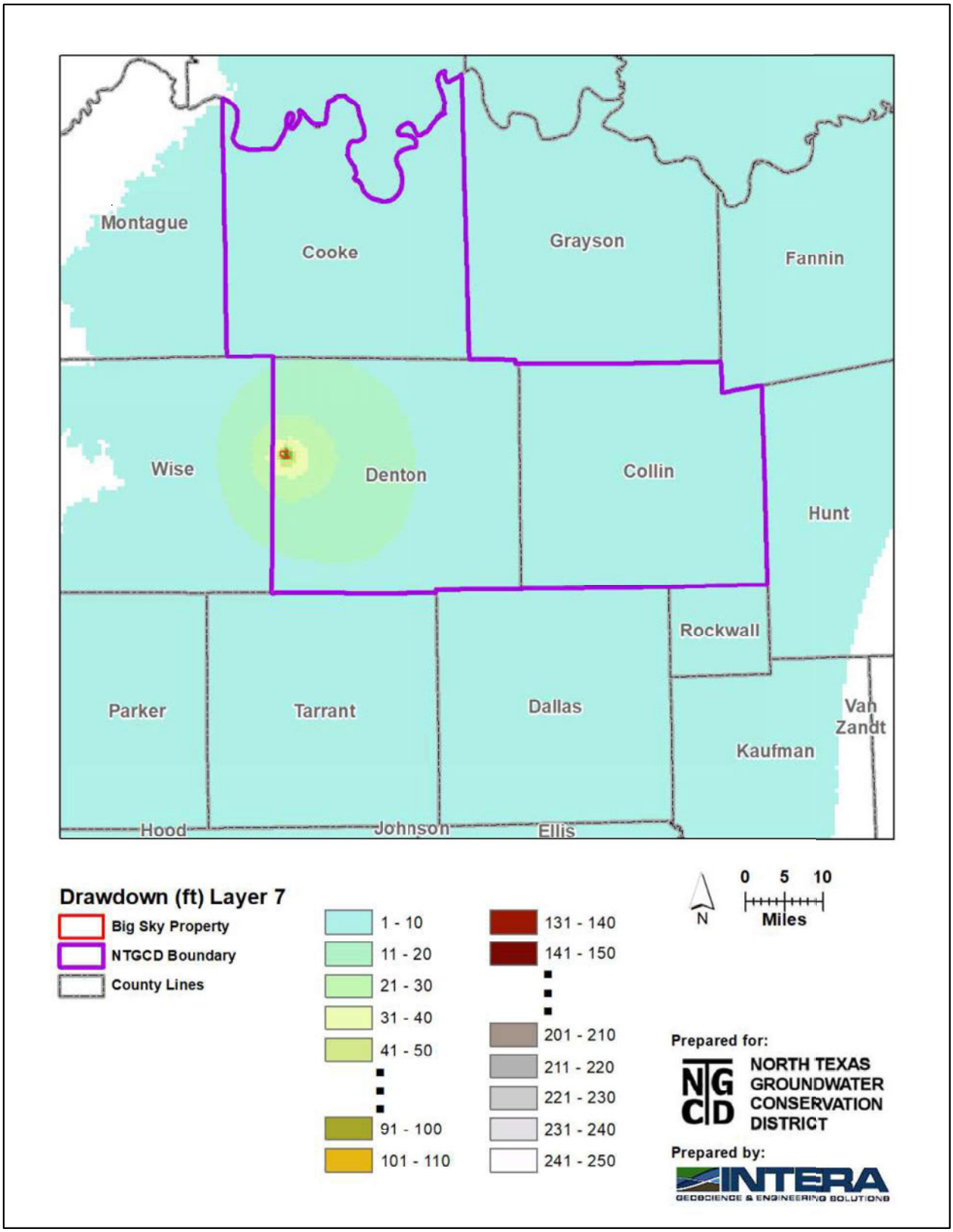


Figure 6-9 GAM-calculated drawdowns for model layer 7 (Pearsall Aquifer) assuming 56 gpm per well

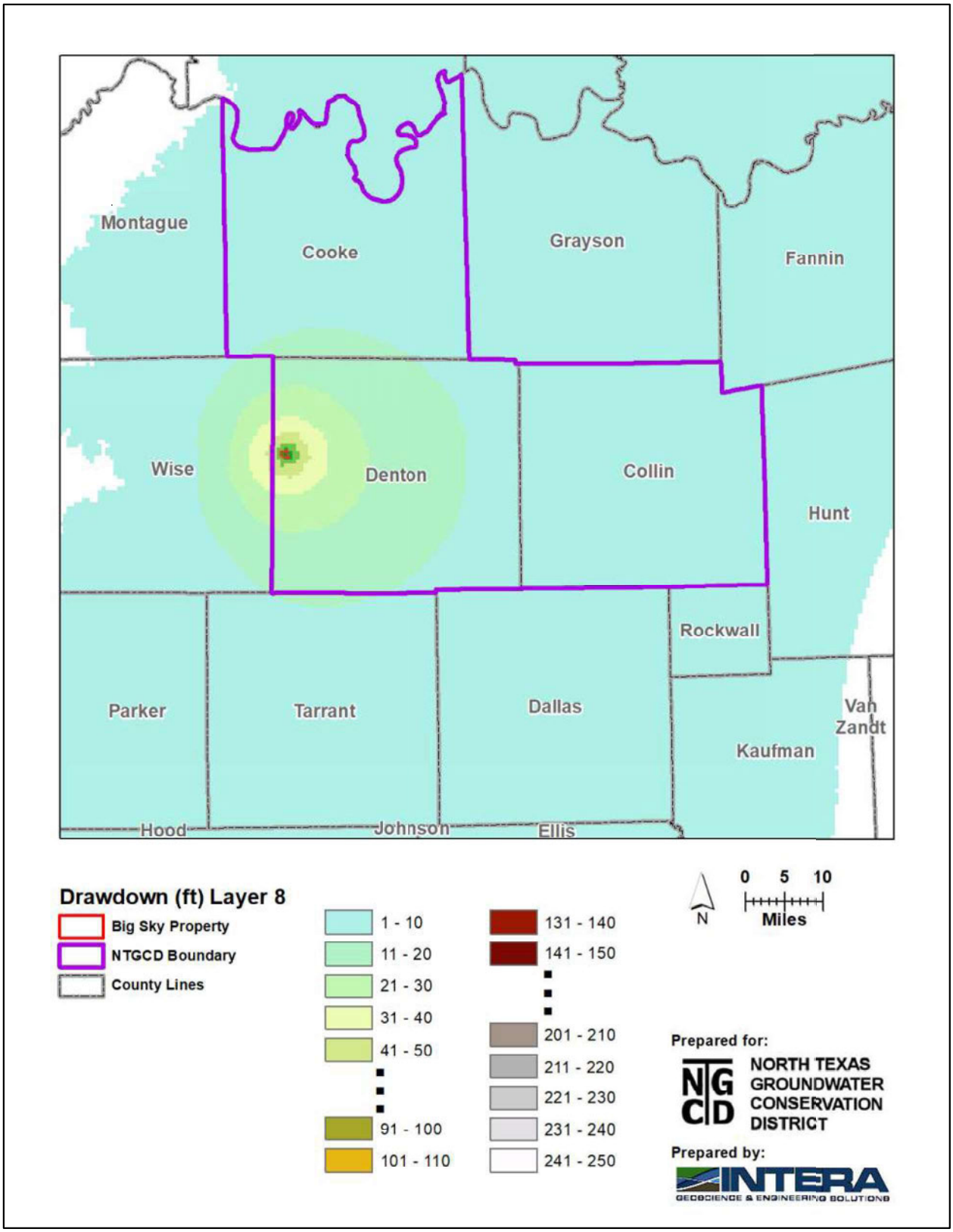


Figure 6-10 GAM-calculated drawdowns for model layer 8 (Hosston Aquifer) assuming 56 gpm per well

7.0 REFERENCES

Bakker, M., 2015, TTIM: A multi-aquifer transient analytic element model, version 1.0, Draft manual, 17 p.

Brune, G., 1981, Springs of Texas, Volume 1, 2nd edition: Branch-Smith, Inc, Fort, Worth, Texas.

Kelley, V.A., Ewing, J., Jones, T.L., Young, S.C., Deeds, N., Hamlin, S., Jigmond, M., Harding, J., Pinkard, J. Yan, T.T., Scanlon, B., Beach, J., Davidson, T., Laughlin, K., 2014, FINAL REPORT: Updated groundwater availability model of the Northern Trinity and Woodbine aquifers; prepared by INTERA Incorporated for the North Texas GCD, Northern Trinity GCD, Prairielands GCD, and Upper Trinity GCD; 990 p.

NTGCD, 2019. District database provided by district representative on October 14, 2019.

Shi, Jerry, 2018. Modeled available groundwater for the Trinity, Woodbine, Edwards (Balcones Fault Zone), Marble Falls, Ellenburger-San Saba, and Hickory aquifers in Groundwater Management Area 8; Texas Water Development Board report GAM Run 17-029 MAG, 102 pp.

TWDB, 2019a, TWDB groundwater database: http://www.twdb.state.tx.us/groundwater/data/gwdbrpt.asp, accessed October, 2019.

TWDB, 2019b, Submitted driller's reports database: http://www.twdb.state.tx.us/groundwater/data/drillersdb.asp, accessed October, 2019.

U.S. Geological Survey, 2019, USGS TNM Hydrography (NHD), accessed October, 2019 at URL https://hydro.nationalmap.gov/arcgis/rest/services/nhd/MapServer.

This page is intentionally left blank.

APPENDIX A:
DATA FOR WELLS WITHIN A TWO-MILE RADIUS OF THE CENTER OF THE PROPERTY

This page is intentionally left blank.

WellID	Source	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	County	Well Depth (ft bgs)	Water Use	Total Dissolved Solids (mg/L)	Yield (gpm)	Top of Screen (ft bgs)	Base of Screen (ft bgs)	Aquifer Unit with Largest Percentage of Screen	Percent	Aquifer Unit with Second Largest Percentage of Screen	Percent	Distance from Center of Big Sky Property (miles)
1946501	GWDB	33.29167	-97.3152778	Denton	880	Unused	416	100	770	870	PEA	100%			4.01
1946502	GWDB	33.29167	-97.3152778	Denton	864	Public Supply	408	175	760	854	PEA	97%	HEN	3%	4.01
1946803	GWDB	33.28861	-97.305	Denton	1000	Public Supply	448	300	510	1000	PEA	35%	GR	30%	4.29
1953501	GWDB	33.20778	-97.417222	Wise	925	Domestic	368	-	-	-	BELOW HOS	100%			4.27
1954102	GWDB	33.23611	-97.357223	Denton	406	Public Supply	-	-	300	386	GR	85%	PAL	15%	0.88
1954201	GWDB	33.24583	-97.329444	Denton	477	De-watering	-	-	-	-	GR	100%			1.87
3652	SDR	33.26306	-97.363889	Denton	450	Domestic	-	14	390	450	GR	100%			1.02
17827	SDR	33.26195	-97.363889	Denton	425	Domestic	-	20	365	395	GR	100%			0.95
25984	SDR	33.24945	-97.347222	Denton	910	Rig Supply	-	190	610	910	HEN	42%	PEA	41%	0.83
27516	SDR	33.2675	-97.343056	Denton	925	Rig Supply	-	150	690	920	PEA	63%	HOS	32%	1.70
27893	SDR	33.24195	-97.348889	Denton	360	Domestic	-	20	280	360	PAL	93%	GR	7%	0.86
28684	SDR	33.25667	-97.354723	Denton	485	Domestic	-	10	405	485	GR	100%			0.70
29576	SDR	33.24945	-97.360556	Denton	700	Rig Supply	-	30	280	700	HEN	46%	GR	43%	0.09
29586	SDR	33.23556	-97.372222	Denton	640	Rig Supply	-	40	180	640	HEN	58%	GR	34%	1.08
43448	SDR	33.2375	-97.337222	Denton	795	Irrigation	-	60	640	736	HEN	100%			1.60
63407	SDR	33.26028	-97.360001	Denton	355	Domestic	-	15	315	355	PAL	85%	GR	15%	0.83
63488	SDR	33.23083	-97.343889	Denton	440	Domestic	-	30	380	440	GR	100%			1.59
87437	SDR	33.26195	-97.359723	Denton	365	Domestic	-	12	285	365	PAL	84%	GR	16%	0.94
96573	SDR	33.26694	-97.350001	Denton	940	Rig Supply	-	120	860	940	HOS	94%	BELOW HOS	6%	1.45
98291	SDR	33.25306	-97.354445	Denton	380	Irrigation	-	22	295	375	PAL	53%	GR	47%	0.52
98825	SDR	33.25472	-97.350278	Denton	380	Irrigation	-	20	290	370	PAL	65%	GR	35%	0.79

WellID	Source	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	County	Well Depth (ft bgs)	Water Use	Total Dissolved Solids (mg/L)	Yield (gpm)	Top of Screen (ft bgs)	Base of Screen (ft bgs)	Aquifer Unit with Largest Percentage of Screen	Percent	Aquifer Unit with Second Largest Percentage of Screen	Percent	Distance from Center of Big Sky Property (miles)
104774	SDR	33.26083	-97.355834	Denton	370	Domestic	-	-	330	370	PAL	92%	GR	8%	0.92
104998	SDR	33.24778	-97.3875	Wise	350	Domestic	-	20	210	350	HEN	71%	GR	29%	1.50
133381	SDR	33.26	-97.360278	Denton	380	Domestic	-	-	340	380	GR	94%	PAL	6%	0.81
134104	SDR	33.25778	-97.358056	Denton	380	Domestic	-	-	340	380	GR	83%	PAL	17%	0.68
153932	SDR	33.27167	-97.359723	Denton	370	Domestic	-	12	290	370	PAL	61%	GR	39%	1.61
190927	SDR	33.25	-97.387222	Denton	535	Domestic	-	25	395	535	HEN	100%			1.49
192081	SDR	33.24417	-97.383889	Wise	260	Domestic	-	-	120	260	HEN	58%	GR	42%	1.32
197173	SDR	33.26056	-97.361112	Denton	980	Domestic	-	10	730	980	PEA	48%	HOS	40%	0.84
202920	SDR	33.22417	-97.345556	Denton	930	Rig Supply	-	180	707	930	HOS	55%	PEA	43%	1.91
204128	SDR	33.2325	-97.3425	Denton	432	Domestic	-	15	372	432	GR	68%	PAL	32%	1.56
235032	SDR	33.26583	-97.380555	Denton	880	Rig Supply	-	190	710	870	HOS	54%	PEA	46%	1.63
235217	SDR	33.24028	-97.351667	Denton	300	Domestic	-	15	-	-	PAL	100%			0.80
235603	SDR	33.26417	-97.342222	Denton	385	Irrigation	-	13	280	360	PAL	90%	GR	10%	1.56
305859	SDR	33.23083	-97.339445	Denton	360	Domestic	-	15	280	360	PAL	100%			1.76
370759	SDR	33.22722	-97.355001	Denton	917	Stock	-	10	660	917	HOS	48%	PEA	33%	1.51
430207	SDR	33.25847	-97.363056	Denton	350	Domestic	-	15	330	350	GR	100%			0.70
436580	SDR	33.22287	-97.34585	Denton	420	Domestic	-	-	360	420	GR	100%			1.98
438557	SDR	33.22473	-97.34232	Denton	355	Domestic	-	10	335	355	PAL	100%			1.98
442663	SDR	33.26264	-97.3525	Denton	425	Domestic	-	12	405	425	GR	100%			1.11
445452	SDR	33.24461	-97.366869	Denton	420	Domestic	-	15	280	420	GR	97%	PAL	3%	0.40
449647	SDR	33.2566	-97.3609	Denton	350	Domestic	-	10	325	345	GR	87%	PAL	13%	0.57
456949	SDR	33.21955	-97.361197	Denton	300	Domestic	-	40	-	-	GR	100%			1.99
482135	SDR	33.22537	-97.353183	Denton	380	Domestic	-	10	320	380	GR	99%	PAL	1%	1.66

WellID	Source	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	County	Well Depth (ft bgs)	Water Use	Total Dissolved Solids (mg/L)	Yield (gpm)	Top of Screen (ft bgs)	Base of Screen (ft bgs)	Aquifer Unit with Largest Percentage of Screen	Percent	Aquifer Unit with Second Largest Percentage of Screen	Percent	Distance from Center of Big Sky Property (miles)
497353	SDR	33.26003	-97.358555	Denton	380	Domestic	-	30	320	380	PAL	70%	GR	30%	0.82
368	NTGCD	33.23612	-97.35717	Denton	406	Public Supply	-	60	300	386	GR	85%	PAL	15%	0.88
407	NTGCD	33.2337	-97.34315	Denton	-	Rig Supply	-	30	-	-	-	-			1.47
803	NTGCD	33.26767	-97.34306	Denton	-	Rig Supply	-	100	-	-	-	-			1.71
976	NTGCD	33.25767	-97.355474	Denton	500	Domestic	-	18	300	500	GR	78%	PAL	22%	0.73
1082	NTGCD	33.23083	-97.339444	Denton	360	Domestic	-	15	280	360	PAL	100%			1.76
1598	NTGCD	33.26306	-97.363971	Denton	450	Domestic	-	20	-	-	-	-			1.02
1653	NTGCD	33.22722	-97.355	Denton	917	Irrigation	-	18	660	917	HOS	48%	PEA	33%	1.51
2179	NTGCD	33.22287	-97.34585	Denton	420	Domestic	-	10	360	420	GR	100%			1.98
2180	NTGCD	33.25847	-97.363056	Denton	350	Domestic	-	10	330	350	GR	100%			0.70
2261	NTGCD	33.26269	-97.35254	Denton	425	Domestic	-	10	405	425	GR	100%			1.12
2272	NTGCD	33.24461	-97.366869	Denton	420	Stock	-	14	280	420	GR	97%	PAL	3%	0.40
2290	NTGCD	33.22474	-97.34232	Denton	355	Domestic	-	10	335	355	PAL	100%			1.98
2347	NTGCD	33.25618	-97.359911	Denton	350	Domestic	-	10	325	345	GR	87%	PAL	13%	0.55
2394	NTGCD	33.21978	-97.36115	Denton	300	Domestic	-	13	260	300	PAL	62%	GR	38%	1.97
2708	NTGCD	33.23767	-97.370519	Denton	-	Public Supply	-	-	-	-	-	-			0.90
2707	NTGCD	33.23767	-97.370565	Denton	-	Public Supply	-	-	-	-	-	-			0.90
2640	NTGCD	33.22538	-97.35317	Denton	380	Domestic	-	10	320	380	GR	99%	PAL	1%	1.66
2857	NTGCD	33.25997	-97.358537	Denton	380	Domestic	-	10	320	380	PAL	70%	GR	30%	0.82
2872	NTGCD	33.24947	-97.36079	Denton	-	Unknown	-	26	-	-	-	-			0.09

This page is intentionally left blank.

01 March 2021

Mr. Lance Stewart, P.E.
Pape-Dawson Engineers, Inc.
5810 Tennyson Parkway; Suite 425
Plano, Texas 75024

Re: Big Sky Development- Waters of the United States Delineation
Approximately 394 acres located predominantly northwest of the intersection of North Jackson Road and U.S. Highway 380 in Ponder, Denton County, Texas

Dear Mr. Stewart,

Integrated Environmental Solutions, LLC. (IES) performed a site survey to identify any aquatic features that meet a definition of a water of the United States on approximately 394 acres located predominantly northwest of the intersection of North Jackson Road and U.S. Highway (US) 380 in Ponder, Denton County, Texas (**Attachment A, Figure 1**). This report will ultimately assess and delineate potentially jurisdictional aquatic features to ensure compliance with Sections 401 and 404 of the Clean Water Act (CWA).

INTRODUCTION

Waters of the United States are protected under guidelines outlined in Sections 401 and 404 of the CWA, in Executive Order (EO) 11990 (Protection of Wetlands), and by the review process of the Texas Commission on Environmental Quality (TCEQ). Agencies that regulate impacts to the nation's water resources within Texas include the U.S. Army Corps of Engineers (USACE), the U.S. Environmental Protection Agency (USEPA), the U.S. Fish and Wildlife Service (USFWS), and the TCEQ. The USACE has the primary regulatory authority for enforcing Section 404 requirements for waters of the United States.

Navigable Waters Protection Rule (Effective 22 June 2020)

On 22 June 2020, the Navigable Waters Protection Rule (NWPR) became effective. The final regulations were published on 21 April 2020 with a 60-day waiting period before becoming a final rule. The streamlined regulations have redefined waters of the United States as the following at 33 Code of Federal Regulations (CFR) 328.3 (a) as:

1. *The territorial seas, and waters which are currently used or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters which are subject to the ebb and flow of the tide;*
2. *Tributaries;*
3. *Lakes and ponds, and impoundments of jurisdictional waters; and*
4. *Adjacent wetlands.*

The following features are excluded from jurisdiction at 33 CFR 328.3 (b) as:

1. *Lake/pond/impoundment or wetland that does not contribute surface water flow directly or indirectly to an (a)(1) water and is not inundated by flooding from an (a)(1)-(a)(3) water in a typical year, surface water channel that does not contribute surface water flow directly or indirectly to an (a)(1) water in a typical year, or Water or water feature that is not identified in (a)(1)-(a)(4) and does not meet the other (b)(1) sub-categories;*
2. *Groundwater, including groundwater drained through subsurface drainage systems;*
3. *Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool;*
4. *Diffuse stormwater run-off over upland or directional sheet flow over upland;*
5. *Ditch that is not an (a)(1) or (a)(2) water;*
6. *Prior converted cropland;*
7. *Artificially irrigated area, including fields flooded for agricultural production, that would revert to upland should application of irrigation water to that area cease;*
8. *Artificial lake/pond constructed or excavated in upland or a non-jurisdictional water, so long as the artificial lake or pond is not an impoundment of a jurisdictional water;*
9. *Water-filled depression constructed/excavated in upland/non-jurisdictional water incidental to mining/construction or pit excavated in upland/non-jurisdictional water to obtain fill/sand/gravel;*
10. *Stormwater control feature constructed or excavated in upland or in a non-jurisdictional water to convey, treat, infiltrate, or store stormwater runoff;*
11. *Groundwater recharge, water reuse, or a wastewater recycling structure constructed or excavated in upland or in a non-jurisdictional water; and*
12. *Waste treatment system.*

Further definitions located at 33 CFR 328.3 (c) include:

(1) *Adjacent wetlands*. The term adjacent wetland means wetlands that:

i. Abut, meaning to touch at least one point or side of, a water identified in paragraph (a)(1), (2), or (3) of this section;

ii. Are inundated by flooding from a water identified in paragraph (a)(1), (2), or (3) of this section in a typical year;

iii. Are physically separated from a water identified in paragraph (a)(1), (2), or (3) of this section only by an artificial dike, barrier, or similar artificial structure so long as that structure allows for a direct hydrologic surface connection between the wetlands and the water identified in paragraph (a)(1), (2), or (3) of the section in atypical year, such as through a culvert, flood or tide gate, pump, or similar artificial feature. An adjacent wetland is jurisdictional in its entirety when a road or similar artificial structure divides the wetland, as long as the structure allows for direct hydrologic connection through or over that structure in a typical year.

(6) *Lakes and ponds, and impoundments of jurisdictional waters*. The term lakes and ponds, and impoundments of jurisdictional waters means standing bodies of open water that contribute surface water flow to a water identified in paragraph (a)(1) of this section in a typical year either directly or through one or more waters identified in paragraph (a)(2), (3), or (4) of this section. A lake, pond, or impoundment of a jurisdictional water does not lose its jurisdictional status if it contributes surface water flow to a downstream jurisdictional water in a typical year through a channelized nonjurisdictional surface water feature, through a culvert, dike, spillway, or similar artificial feature, or through a debris pile, boulder field, or similar natural feature. A lake or pond, or impoundment of a

jurisdictional water is also jurisdictional if it is inundated by flooding from a water identified in paragraph (a)(1), (2), or (3) of this section in a typical year.

(12) *Tributary*. The term tributary means a river, stream, or similar naturally occurring surface water channel that contributes surface water flow to a water identified in paragraph (a)(1) of this section in a typical year either directly or through one or more waters identified in paragraph (a)(2), (3), or (4) of this section. A tributary must be perennial or intermittent in a typical year. The alteration or relocation of a tributary does not modify its jurisdictional status as long as it continues to satisfy the flow conditions of this definition. A tributary does not lose its jurisdictional status if it contributes surface water flow to a downstream jurisdictional water in a typical year through a channelized nonjurisdictional surface water feature, through a subterranean river, through a culvert, dam, tunnel, or similar artificial feature, or through a debris pile, boulder field, or similar natural feature. The term tributary includes a ditch that either relocates a tributary, is constructed in a tributary, or is constructed in an adjacent wetland as long as the ditch satisfies the flow conditions of this definition.

This guidance does not void the January 2001 decision of the U.S. Supreme Court in Solid Waste Agency of Northern Cook County (SWANCC) v. USACE which disallowed regulation of isolated wetlands under the CWA through the "Migratory Bird Rule." Previously, the USACE assumed jurisdiction over isolated waters of the United States based on its 1986 preamble stating that migratory birds used these habitats. The "Migratory Bird Rule" provided the nexus to interstate commerce and thus protection under the CWA. However, the new guidance does require that the "significant nexus" test be performed in addition to an analysis of other potential interstate commerce uses for isolated waters.

METHODOLOGY

Prior to conducting fieldwork, the U.S. Geological Survey (USGS) topographic map (**Attachment A, Figure 2**), the *Soil Survey of Denton County, Texas*, and the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) digital soil databases for Denton County (**Attachment A, Figure 3**), the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) (**Attachment A, Figure 4**), and recent and historic aerial photographs of the proposed survey area were studied to identify possible aquatic features that could meet the definition of waters of the United States and areas prone to wetland development. Mr. Ross Rogers and Ms. Sarah Grubbs of IES conducted the delineation in the field in accordance with the USACE procedures on 12 and 13 September 2018.

Wetland determinations and delineations were performed on location using the methodology outlined in the 1987 Corps of Engineers Wetland Delineation Manual and the Regional Supplement to the Corps of Engineer Wetland Delineation Manual: Great Plains Region (Version 2.0). The presence of a wetland is determined by the positive indication of three criteria (i.e., hydrophytic vegetation, hydrology, and hydric soils). Potential jurisdictional boundaries for other water features (i.e., non-wetland) were delineated in the field at the ordinary high-water mark (OHWM). The 33 CFR 328.3 (c)(7) defines OHWM as the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Water feature boundaries were recorded on a Trimble GeoExplorer XT Global Positioning System (GPS) unit capable of sub-meter accuracy. Photographs were also taken at representative points within the survey area (**Attachment B**). Routine wetland determination data forms are provided in **Attachment C**. Historic aerial photographs, from Environmental Data Resources, Inc. (EDR), were used in the jurisdictional determination of some aquatic features, and are included in **Attachment D.**

RESULTS

Background Review

Topographic Setting

The USGS topographic maps (Era SE 7.5' Quadrangle, 1978; and Ponder 7.5' Quadrangle, 1969) illustrate six blue line features and one on-channel impoundment within the survey area. The blue line features were illustrated as

unnamed tributaries of Denton Creek, separated into three distinct watersheds. Three unnamed tributaries and the impoundment were illustrated within the western watershed, two blue lines were within the southern watershed, and one blue line was within the eastern watershed. The overall topography of the site was located along a ridge and sloped outward to the west, south, and east, and ultimately drains to the south. The maximum elevation of the survey area was approximately 860 feet above mean sea level (amsl) and a minimum elevation of approximately 750 feet amsl (*see* **Attachment A, Figure 2**).

Soils

The *Soil Survey of Denton County, Texas* illustrates six soil map units within the survey area: Aledo association, undulating; Mingo clay loam, 1 to 3 percent slopes; Sanger clay, 1 to 3 percent slopes; Sanger clay, 3 to 5 percent slopes; Slidell clay, 1 to 3 percent slopes; and Somervell gravelly loam, 1 to 5 percent slopes. None of these soils were listed as a hydric soil in Denton County according to the National Hydric Soils List prepared by the National Technical Committee for Hydric Soils (revision December 2015) (*see* **Attachment A, Figure 3**). Hydric soils are described as those soils that are sufficiently wet in the upper part to develop anaerobic conditions during the growing season.

FEMA FIRM

The FEMA FIRM (Denton County; Map Panel 48121C0190G, effective 18 April 2011; and Map Panel 48121C0330G, effective 18 April 2018) illustrates the majority of the survey area within Zone X (Areas determined to be outside the 0.2 percent annual chance floodplain) with a small section of the southwest corner and southeast corner located within Zone A (Special Flood Hazard Areas subject to inundation by the 1 percent annual chance flood; No base flood elevations determined) (*see* **Attachment A, Figure 4**).

Field Investigation

The survey area was dominated by a **rangeland** vegetation community with trees and shrubs scattered throughout. The **rangeland** community was dominated by Bermudagrass (*Cynodon dactylon*), Johnsongrass (*Sorghum halepense*), King Ranch bluestem (*Bothriochloa ischaemum* var. *songarica*), silver bluestem (*Bothriochloa saccharoides*), prairie broomweed (*Amphiachyris dracunculoides*), snow-on-the-prairie (*Euphorbia bicolor*), western ragweed (*Ambrosia trifida*), and prickly pear (*Opunita* spp.), with honey mesquite (*Prosopis glandulosa*) and gum bumelia (*Sideroxylon lanuginosum*) trees and shrubs scattered throughout.

The overall topography of the survey area was rolling hills situated along a ridge, near the top of three watersheds which sloped outward to the west, east, and south. Water from the survey area ultimately drains to the south. Two ephemeral features, three ponds, and 10 wetlands were observed within the survey area. **Table 1** and the following paragraphs detail the aquatic features identified within the survey area at the time of evaluation (**Attachment A, Figure 5**).

Aquatic Features that Meet a Definition of Jurisdictional Waters

Impoundments – (a)(3)

Ponds 1 and **2** were identified in the field by an OHWM delineated based on the presence of OHWM characteristics including a change in vegetation community, the destruction of terrestrial vegetation, wetland fringe, a natural line impressed in the bank, waterline, and natural shelving. A review of historic aerial photography indicates these features were constructed as on-channel impoundments by excavating and placing earthen embankments across the original OHWM of ephemeral, unnamed tributaries to Denton Creek. The 1951 aerial photograph indicates Pond 1 was constructed within the bed and bank of an ephemeral, unnamed tributary present upslope and downslope from the feature. The 2005 aerial photograph indicates the embankment for Pond 2 was constructed, in conjunction with a lease road, across the OHWM of Ephemeral Feature 1. A review of recent and historic aerial photographs indicated that Ponds 1 and 2 are seasonally inundated. As these ponds continue to provide surface water flow to an (a)(1) water through one or more (a)(2) through (a)(4) waters, they would meet the definition of a pond and would be subject to regulation under Section 404 of the CWA at 33 CFR 328.3 (a)(3).

Table 1. Aquatic Features Identified Within the Survey Area

Water Identification	Hydrology Characteristics	Area (Acre)	Length (Linear Feet)	Navigable Waters Protection Rule Classification	33 CFR 328.3 Definition[1]
EF 1	Ephemeral	0.11	1,041	Ephemeral Feature	(b)(3)
EF 2	Ephemeral	0.02	201	Ephemeral Feature	(b)(3)
Pond 1	Seasonally Inundated	1.49	---	Impoundment	(a)(3)
Pond 2	Seasonally Inundated	5.26	---	Impoundment	(a)(3)
Pond 3	Seasonally Inundated	0.35	---	Artificial Pond	(b)(8)
Wetland 1	Seasonally Saturated	0.97	---	Adjacent Wetland	(a)(4)
Wetland 2	Seasonally Saturated	0.57	---	Adjacent Wetland	(a)(4)
Wetland 3	Seasonally Saturated	0.55	---	Adjacent Wetland	(a)(4)
Wetland 4	Seasonally Saturated	0.36	---	Adjacent Wetland	(a)(4)
Wetland 5	Seasonally Saturated	0.22	---	Adjacent Wetland	(a)(4)
Wetland 6	Seasonally Saturated	0.46	---	Adjacent Wetland	(a)(4)
Wetland 7	Seasonally Saturated	0.87	---	Adjacent Wetland	(a)(4)
Wetland 8	Seasonally Saturated	0.05	---	Adjacent Wetland	(a)(4)
Wetland 9	Seasonally Saturated	0.06	---	Wetland	(b)(1)
Wetland 10	Seasonally Saturated	0.07	---	Wetland	(b)(1)

[1]*(a)(1-4) definitions are regulated under Section 404 of the CWA, while (b)(1-12) are excluded from regulation*

Adjacent Wetlands – (a)(4)

Wetlands 1, **2**, **4**, **7**, and **8** were identified in the field as linear run-of-stream herbaceous wetlands. These wetlands shared similar characteristics and were identified by the presence of hydrophytic vegetation, hydric soil, and hydrologic characteristics. The dominant vegetation present in the wetlands included common spikerush (*Eleocharis palustris*), sumpweed (*Iva annua*), and rough cocklebur (*Xanthium strumarium*). Oxidized rhizospheres on living roots and drift deposits were the primary hydrologic indicators with crawfish burrows, drainage patterns, and geomorphic position as secondary hydrologic indicators. The presence of hydric soil was indicated by redox dark surface indicated by a soil matrix of 10YR 3/1 and 2/1 with redoximorphic concentrations of 5YR 4/6 within the pore linings and matrix. The areas surrounding the wetlands were dominated by upland vegetation as detailed in the rangeland community. The review of historic aerial photographs indicates these wetlands are likely the result of sedimentation and changes in the hydrologic regime over time. On-channel impoundments and various land management practices appear to have reduced surface flows, such that the velocities required to maintain normal bed and banks of a natural tributary are no longer present. This has resulted in a series of run-of-stream wetlands dominated by herbaceous wetland vegetation. The aerial photographs from 1942 through 1995, prior to the construction of Pond 2, show evidence of an OHWM as indicated by discontinuous bed and banks throughout the length of Ephemeral Feature 1. Aerial photographs from 2005 to 2016 show changes in color signatures indicating changes in vegetation within the original OHWM. These color signatures were verified in the field as herbaceous hydrophytic vegetation communities within the relic tributary channel. Given the size and location in the landscape of these wetlands, they are likely saturated during wet portions of the year, while deeper portions are potentially inundated following precipitation events. These wetlands all ultimately directly abut jurisdictional tributaries. As such, Wetlands 1, 2, 4, 7, 8, and 10 would meet a definition of an adjacent wetland at 33 CFR 328.3 (a)(4) and would be subject to regulation under Section 404 of the CWA.

Wetlands 3, 5 and **6** were identified in the field as run-of-stream forested wetlands. These wetlands were identified by the presence of hydrophytic vegetation, hydric soil, and hydrological characteristics. The dominant hydric vegetation present in the forested wetlands included black willow (*Salix nigra*), common spikerush, sumpweed, and rough cocklebur. Oxidized rhizospheres on living roots, water marks, water stained leaves and drift deposits were the primary hydrologic indicators with drainage patterns, and geomorphic position as secondary hydrologic indicators. The presence of hydric soil was indicated by redox dark surface indicated by a soil matrix of 10YR 3/1 with redoximorphic concentrations of 5YR 4/6 within the pore linings and matrix. The areas surrounding the wetlands were dominated by upland vegetation as detailed in the rangeland community. The review of historic aerial photographs indicates these wetlands are likely the result of sedimentation and changes in the hydrologic

regime over time, similar to the herbaceous wetlands identified within the site. Aerial photographs from 2005 to 2016 show changes in color signatures indicating changes in vegetation. These color signatures were verified in the field as mature woody hydrophytic vegetation communities. Given the size and location in the landscape of these wetlands, they are likely saturated during wet portions of the year while deeper depressions are potentially inundated following precipitation events. These wetlands all ultimately directly abut jurisdictional tributaries. As such, Wetlands 3, 5, and 6 would meet a definition of an adjacent wetland at 33 CFR 328.3 (a)(4) and would be subject to regulation under Section 404 of the CWA.

Aquatic Features that Meet a Definition of Non-Jurisdictional Waters

Wetlands – (b)(1)

Wetlands 9 and **10** were identified in the field as herbaceous wetlands situated along small ephemeral drainages. The wetlands were identified by the presence of hydrophytic vegetation, hydric soil, and hydrologic characteristics. The dominant vegetation present in the wetland included common spikerush, sumpweed, and rough cocklebur. Oxidized rhizospheres on living roots was the primary hydrologic indicator. The presence of hydric soil was indicated by redox dark surface indicated by a soil matrix of 10YR 3/1 with redoximorphic concentrations of 5YR 4/6 within the pore linings and matrix. The review of historic aerial photographs indicate Wetland 9 formed within a swale as the result of changes in land use practices. The 1942, 1951, 1968, and 1972 aerial photograph shows that the entire field had been plowed with no evidence of OHWM or color signatures indicating the presence of an aquatic feature. The 1981 through 2016 aerial photographs show changes in color signatures indicating the presence of vegetation, within the swale, as the areas surrounding the swale continue to be plowed and the swale is left undisturbed. The 2005 and 2008 aerial photographs show development of residential lots along the swale, downslope of Wetland 9, outside of the site boundary. Changes in land use and topography resulting from the adjacent residential lots appears to have reduced the conveyance of normal surface flows sufficiently enough to support the establishment of Wetland 9. Wetland 10 formed on a terrace along EF 2. Given their location in the landscape and small size, these wetlands are likely only saturated for short periods after rainfall events. Wetlands 9 and 10 lack a surface water connection to an (a)(1) water in a typical year and are much too high in the watershed to be inundated by flooding from an (a)(1) through (a)(3) water in a typical year. Therefore, Wetlands 9 and 10 would be excluded from jurisdiction at 33 CFR 328.3 (b)(1) and would not be subject to regulation under Section 404 of the CWA.

Ephemeral Features – (b)(3)

EF 1 and **2** were identified as ephemeral features located within the westernmost watershed. Both features shared similar characteristics and were identified in the field by an OHWM delineated by the presence of a bed and bank, the destruction of terrestrial vegetation, and drainage patterns. Each had average OHWM widths between 2 to 4 feet and the channels were incised into the landscape between 1 to 3 feet. The channel substrates were composed of silty earthen clay with limestone and gravel throughout. Despite recent rain events, no pooled or flowing water was observed within these channels at the time of the delineation. The review of historic aerial photography (EDR and Historic Aerials.com, **Attachment D**), shows EF 1 with evidence of a discontinuous bed and bank in 1942, 1981, 1990, and 2005 through 2016. EF 2 appears as a swale in early aerial photographs, with 1990, 1995, and 2012 being the only years where indications of a bed and bank are visible. Given the features relatively small size, location near the top of the watershed, and the lack of flowing or pooled water present at the time of the evaluation, it is IES' professional opinion that EF 1 and 2 would be ephemeral. As ephemeral features, EF 1 and 2 would be excluded from jurisdiction at 33 CFR 328.3 (b)(3) and would not be subject to regulation under Section 404 of the CWA.

Artificial Ponds – (b)(8)

Pond 3 was identified based on an OHWM that was delineated according to the natural shelving and a distinct change in vegetation communities. The pond appears to have been constructed for livestock watering purposes, by excavating and placing earthen embankments across the natural gradient of the landscape. No evidence of ingress of egress, or an OHWM downslope of the pond was observed. The review of historic aerial photographs indicate Pond 3 was constructed near the top of the watershed with no evidence of bed and bank or OHWM of an existing feature. The 1942, 1951, 1968, and 1972 aerial photographs show a plowed field with no color signatures indicating scouring, drainage patterns, or increased hydrology within the area currently occupied by Pond 3. The 1968 photograph does show drainage patterns within a swale located downslope from Pond 3, located off site. There is

no indication on the aerial photographs of a channel immediately upslope of downslope of the pond. Drainage patterns with no evidence of scouring or bed and banks are visible in the 1981 aerial photograph. The 1990 and 1995 aerial photographs show drainage patterns within the project site; however, the offsite drainage patterns in the 1968 photograph are not visible. Pond 3 appears in the 2005 aerial photograph; however, there are no color signatures visible upslope or downslope, including the offsite drainage patterns of the 1968 aerial photograph. The aerial photographs from 2008 through 2016 show varying water levels within the pond, and different color signatures associated with changing vegetation throughout the site, but nothing to indicate the presence of an OHWM as indicated by the presence of a defined bed and banks. These color signatures were verified in the field as herbaceous upland vegetation communities within a shallow swale, indicating Pond 3 was constructed within the upland setting. As Pond 3 was artificially constructed in an upland area with no connection to a jurisdictional aquatic feature, it would be excluded from jurisdiction at 33 CFR 328.3 (b)(8) and would not be subject to regulation under Section 404 of the CWA.

CONCLUSIONS

To summarize the delineation, two ephemeral features, nine wetlands, and three ponds were identified and delineated within the survey area. A summary of these features' characteristics and a summary of the jurisdictional assessment is presented in **Table 1** under the NWPR.

Under the ***NWPR***, 10 of the identified aquatic features would meet a definition of a water of the United States, as of the date of this report. **Wetlands 1** through **8** would be considered adjacent wetlands, and therefore would be subject to regulation under Section 404 of the CWA. **Ponds 1** and **2** would be considered ponds that provide surface flow to a navigable water, and therefore would be subject to regulation under Section 404 of the CWA. The remaining water features would not be subject to regulation as the date this report is published.

This delineation is based on professional experience in the approved methodology and from experience with the USACE Fort Worth District regulators; however, this delineation does not constitute a jurisdictional determination of waters of the United States. This delineation has been based on the professional experience of IES staff and our interpretation of USACE regulations at 33 CFR 328.3, IES' interpretation of the NWPR, current judicial reviews, and the Regulatory Guidance Letter (RGL) 08-02. While IES believes our delineation to be accurate, final authority to interpret the regulations lies solely with the USACE and USEPA. The USACE Headquarters in association with the USEPA often issue guidance that changes the interpretation of published regulations. USACE/USEPA guidance issued after the date of this report has the potential to invalidate the report conclusions and/or recommendations, which may create the need to reevaluate the report conclusions. IES has no regulatory authority, as such, proceeding based solely upon this report does not protect the Client from potential sanction or fines from the USACE/USEPA. The Client acknowledges that they have the opportunity to submit this report to the USACE for a preliminary jurisdictional determination for concurrence prior to proceeding with any work within aquatic features located on the survey area. If the Client elects not to do so, then the Client proceeds at their sole risk.

IES appreciates the opportunity to work with you and Pape-Dawson Engineers, Inc. on this project, and we hope we may be of assistance to you in the future. If you have any comments, questions, or concerns, please do not hesitate to contact us. We can be reached at 972-562-7672 or by email at rrogers@intenvsol.com or rreinecke@intenvsol.com.

Sincerely,

Integrated Environmental Solutions, LLC.

Ross Rogers
Biologist

Attachments

File ref: 04.289.027

ATTACHMENT A
Figures

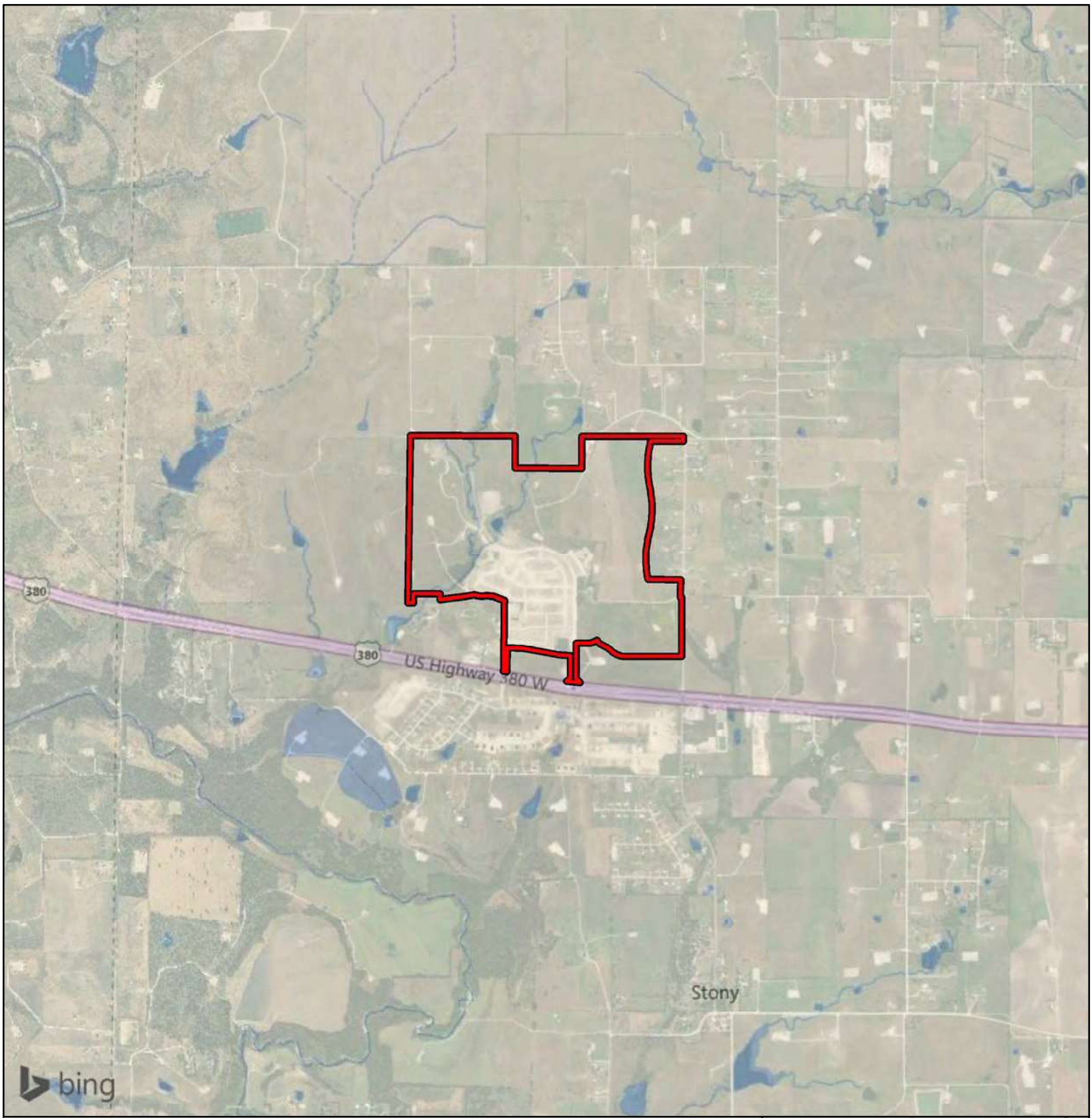


Figure 1.
General Location Map

Big Sky Development
City of Ponder
Denton County, Texas

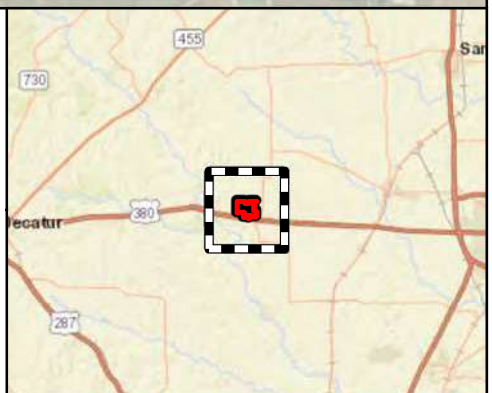
1 in = 2,500 feet

Feet
0 2,500

N
W E
S

File Ref. 04.289.027
Date: 2/16/2021

Survey Area



Area of Detail

Scale: 1 inch equals 10 miles

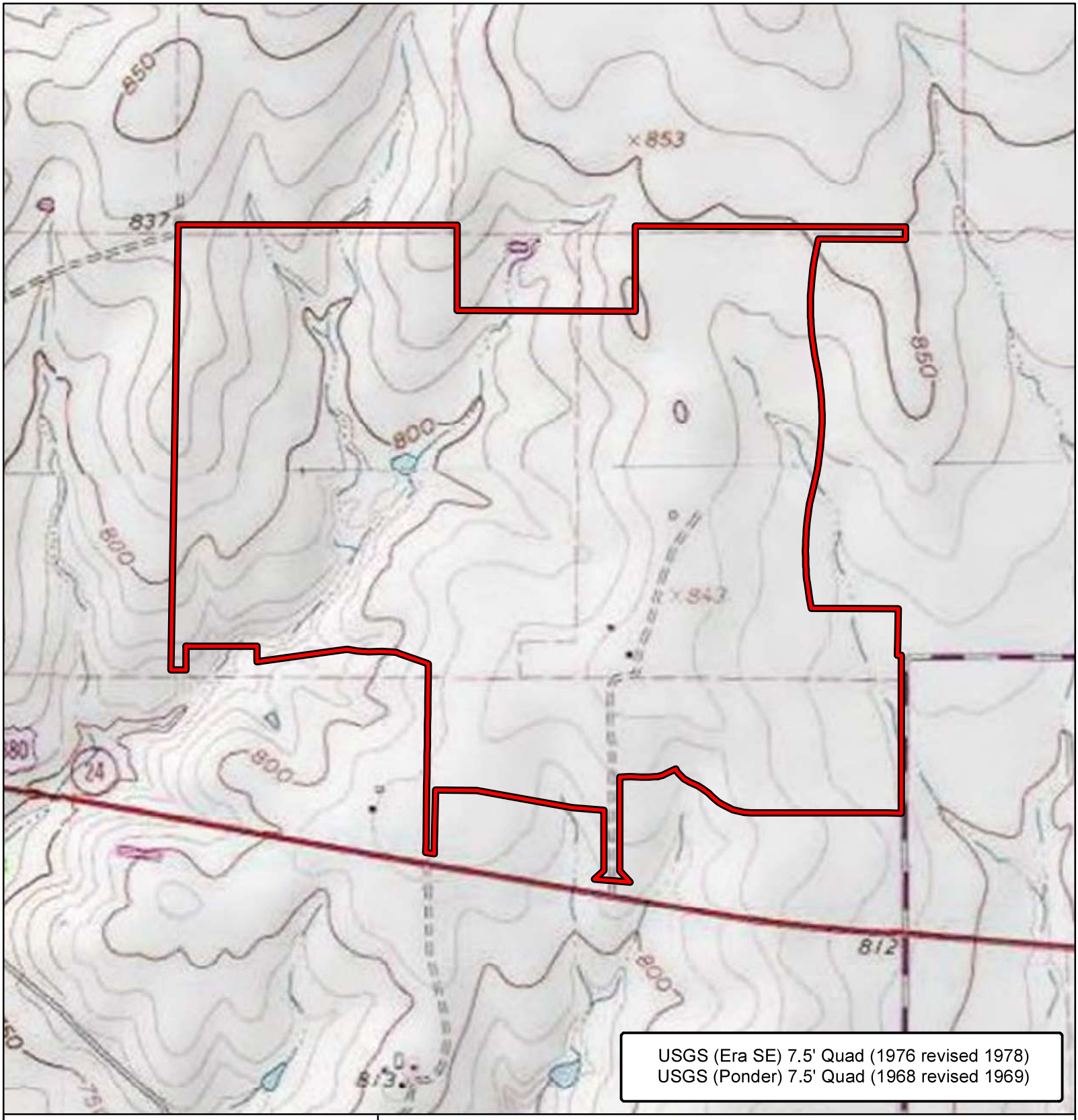


Figure 2.
Topographic Setting

Big Sky Development
City of Ponder
Denton County, Texas

1 in = 925 feet

Feet
0 925

N
W E
S

File Ref. 04.289.027
Date: 2/16/2021

Survey Area

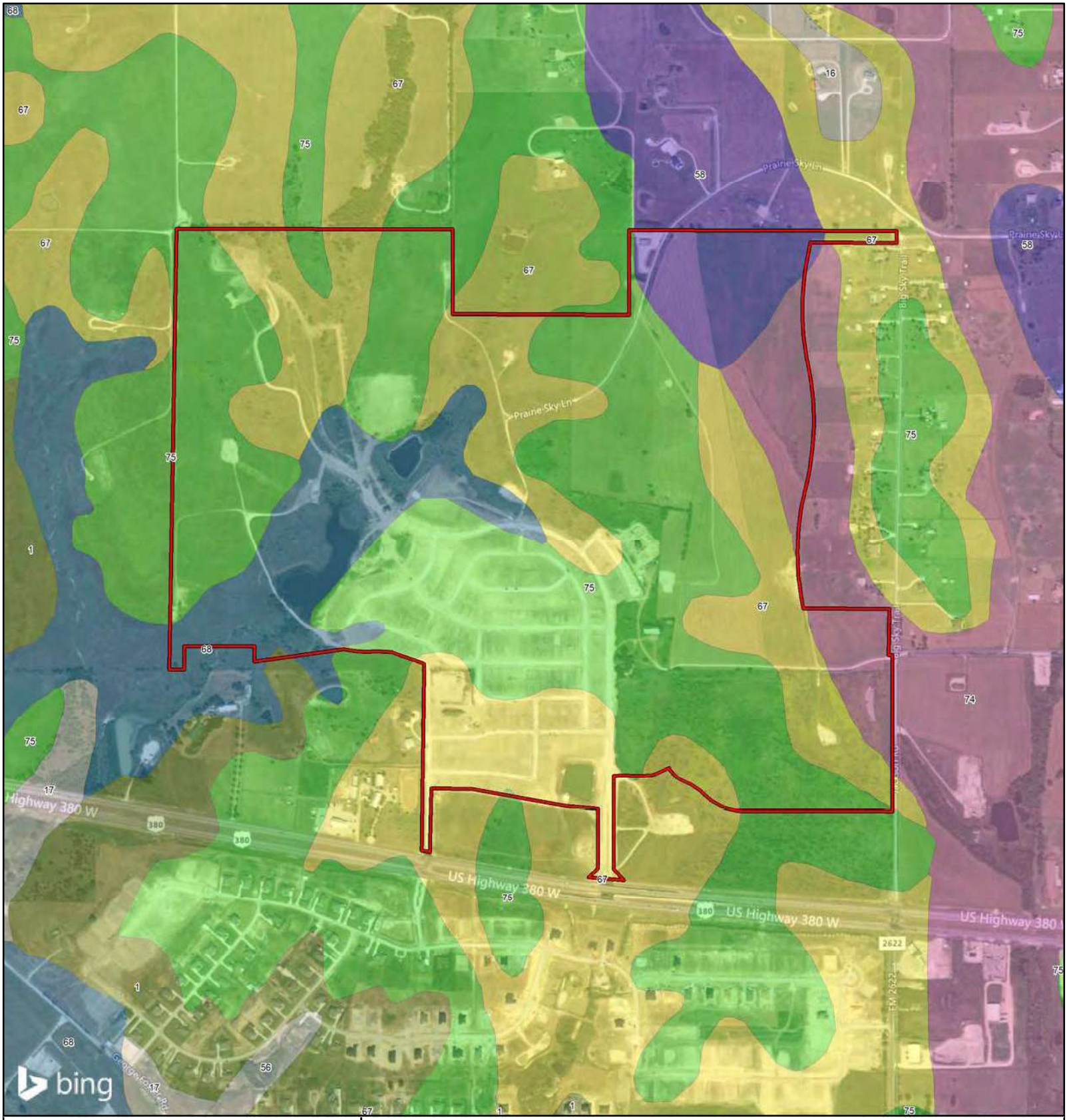


Figure 3.
Soils Map

Big Sky Development
City of Ponder
Denton County, Texas

1 in = 925 feet

Feet
0 925

N
W E
S

File Ref. 04.289.027
Date: 2/16/2021

Survey Area
Soil map units outside survey area

Soil Map Units
1 - Aledo association, undulating
58 - Mingo clay loam, 1 to 3 percent slopes
67 - Sanger clay, 1 to 3 percent slopes
68 - Sanger clay, 3 to 5 percent slopes
74 - Slidell clay, 1 to 3 percent slopes
75 - Somervell gravelly loam, 1 to 5 percent slopes

Figure 4.
Federal Emergency Management Agency
Flood Insurance Rate Map

Big Sky Development
City of Ponder
Denton County, Texas

1 in = 925 feet

Feet
0 925

N
W E
S

File Ref. 04.289.027
Date: 2/16/2021

Survey Area

FEMA FIRM Zone Descriptions

Zone X - Areas determined to be outside the 0.2% annual chance floodplain

Zone X - Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood

Zone A - Special Flood Hazard Areas subject to inundation by the 1% annual chance flood; No base flood elevations determined

Zone AE - Special Flood Hazard Areas subject to inundation by the 1% annual chance flood; Base flood elevations determined

Zone AE - Floodway areas in Zone AE

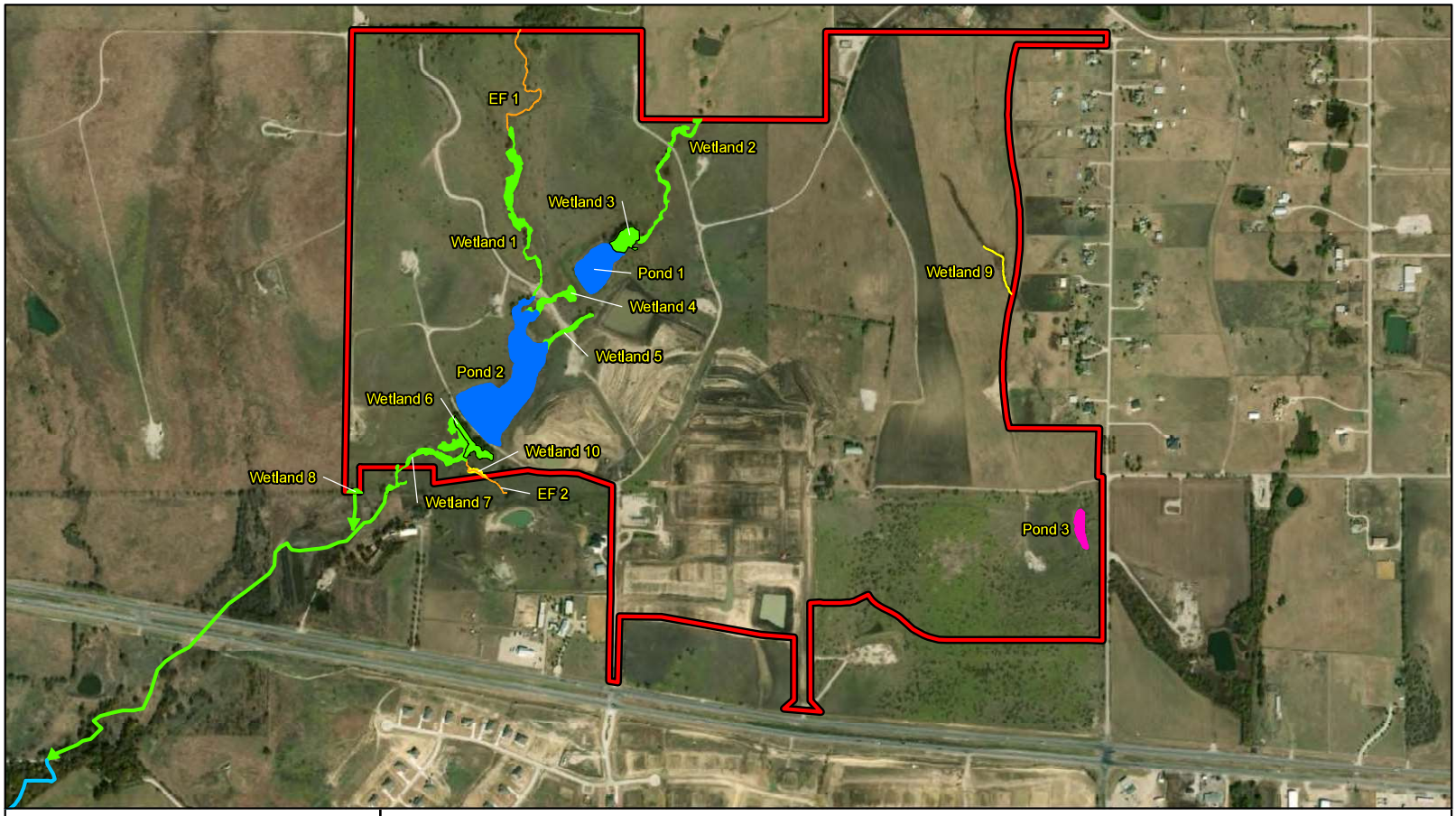


Figure 5.
Aquatic Features Identified within the Survey Area

Big Sky Development
City of Ponder
Denton County, Texas

1 in = 925 feet

Feet
0
925

N
W
E
S

File Ref. 04.289.007
Date: 3/1/2021

Survey

Aquatic Features That Meet a Definition of a Water of the United States

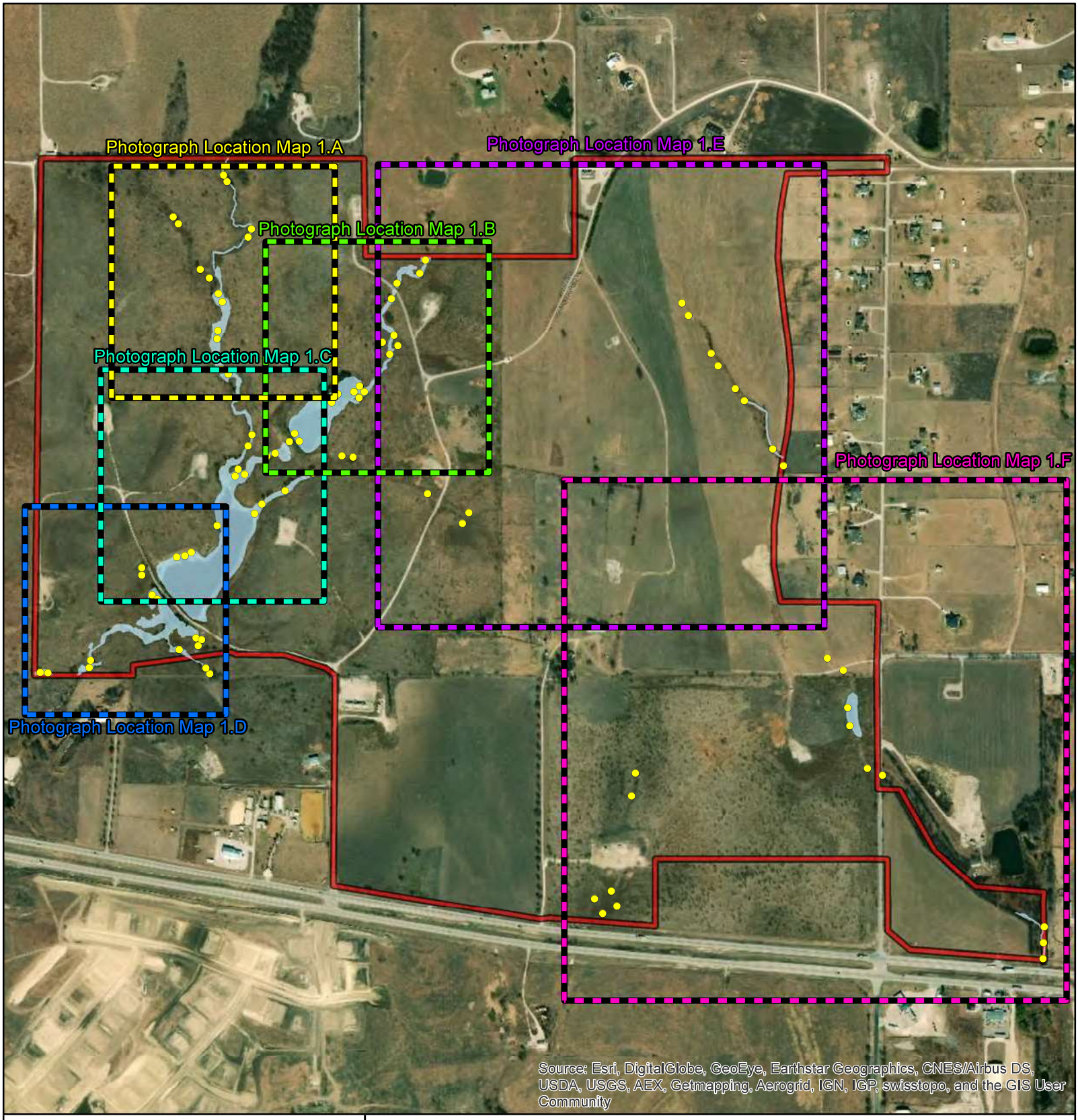
- Impoundment (a)(3)
- Adjacent Wetland (a)(4)
- Tributary (a)(2)

Aquatic Features Excluded From Jurisdiction

- Wetland (b)(1)
- Ephemeral Feature (b)(3)
- Artificial Pond (b)(8)

Water features outside survey area were interpreted via aerial photographs

ATTACHMENT B
Site Photographs



Photograph Location Map Overview

Big Sky Development
City of Ponder
Denton County, Texas

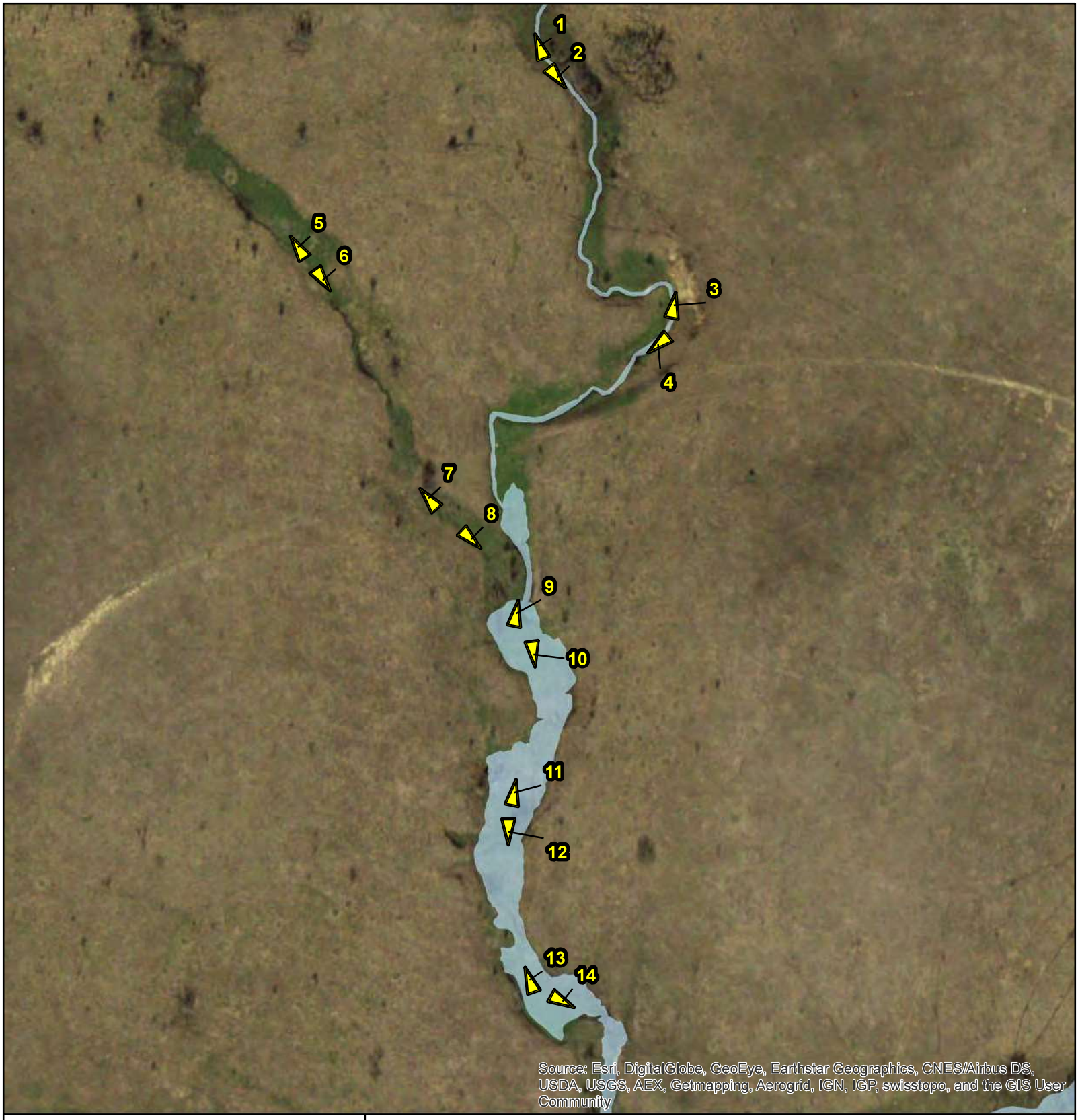
1 in = 800 feet

Feet
0 800

N
W E
S

File Ref. 04.289.027
Date: 9/26/2018

- Survey Area
- Photograph Location
- Aquatic Features



Photograph Location Map 1.A

Big Sky Development
City of Ponder
Denton County, Texas

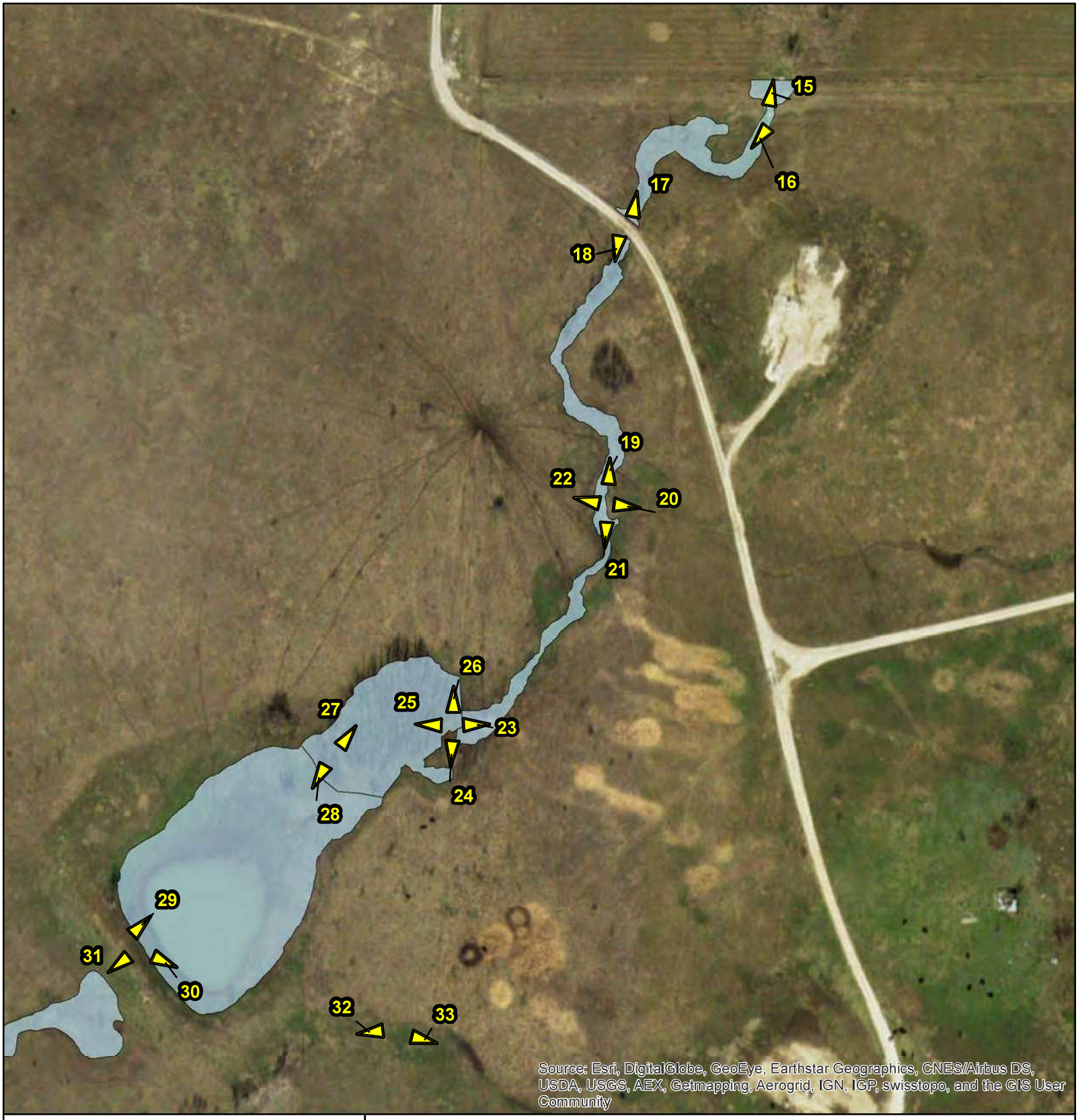
1 in = 800 feet

Feet
0 800

N
W E
S

File Ref. 04.289.027
Date: 9/26/2018

Survey Area
Photograph Location
Aquatic Resources



Photograph Location Map 1.B

Big Sky Development
City of Ponder
Denton County, Texas

1 in = 800 feet

Feet
0 800

N
W E
S

File Ref. 04.289.027
Date: 9/26/2018

Survey Area
Photograph Location
Aquatic Resources

Photograph Location Map 1.C

Big Sky Development
City of Ponder
Denton County, Texas

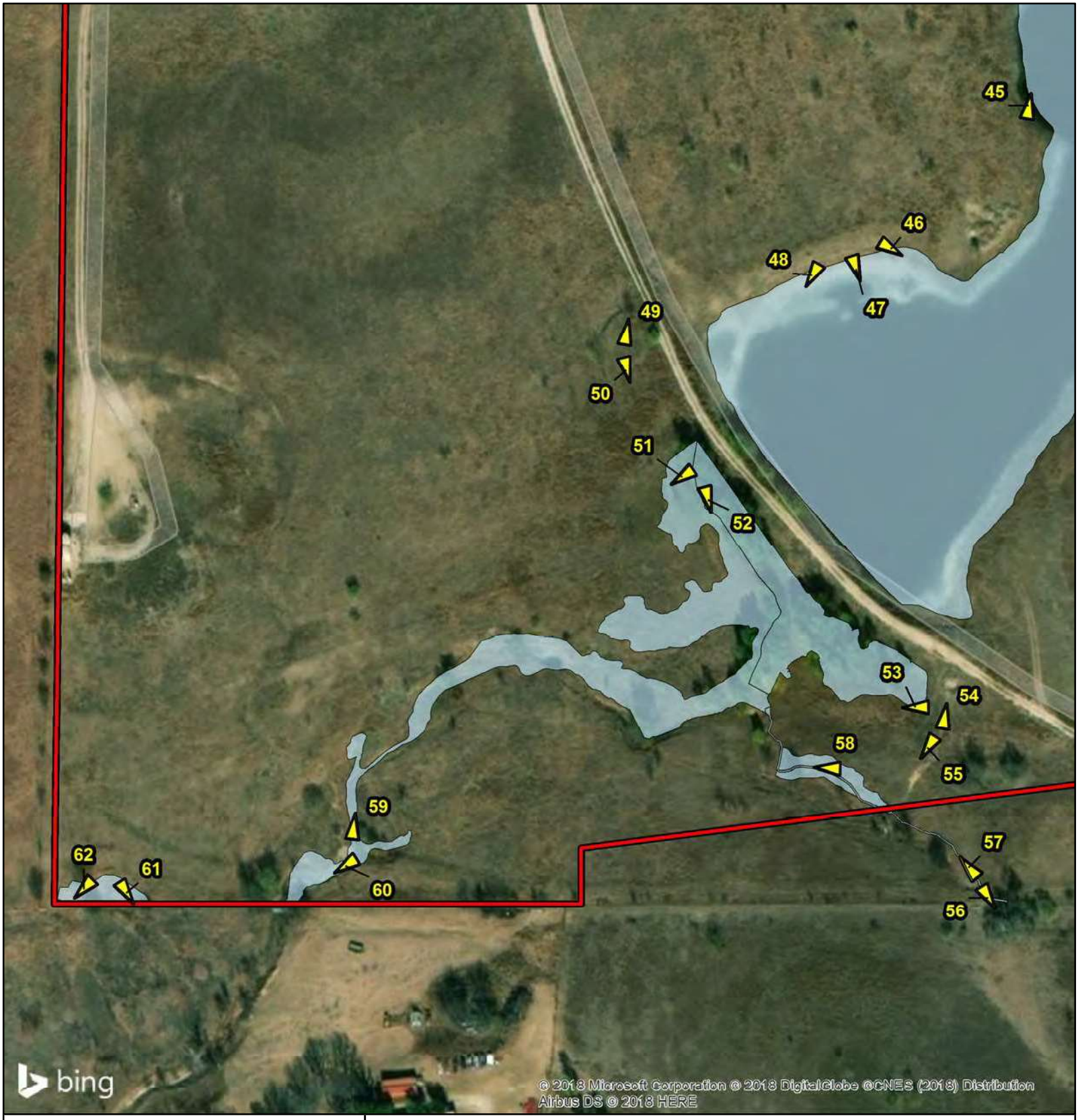
1 in = 800 feet

Feet
0 800

N
W E
S

File Ref. 04.289.027
Date: 9/26/2018

Survey Area
Photograph Location
Aquatic Resources



Photograph Location Map 1.D

Big Sky Development
City of Ponder
Denton County, Texas

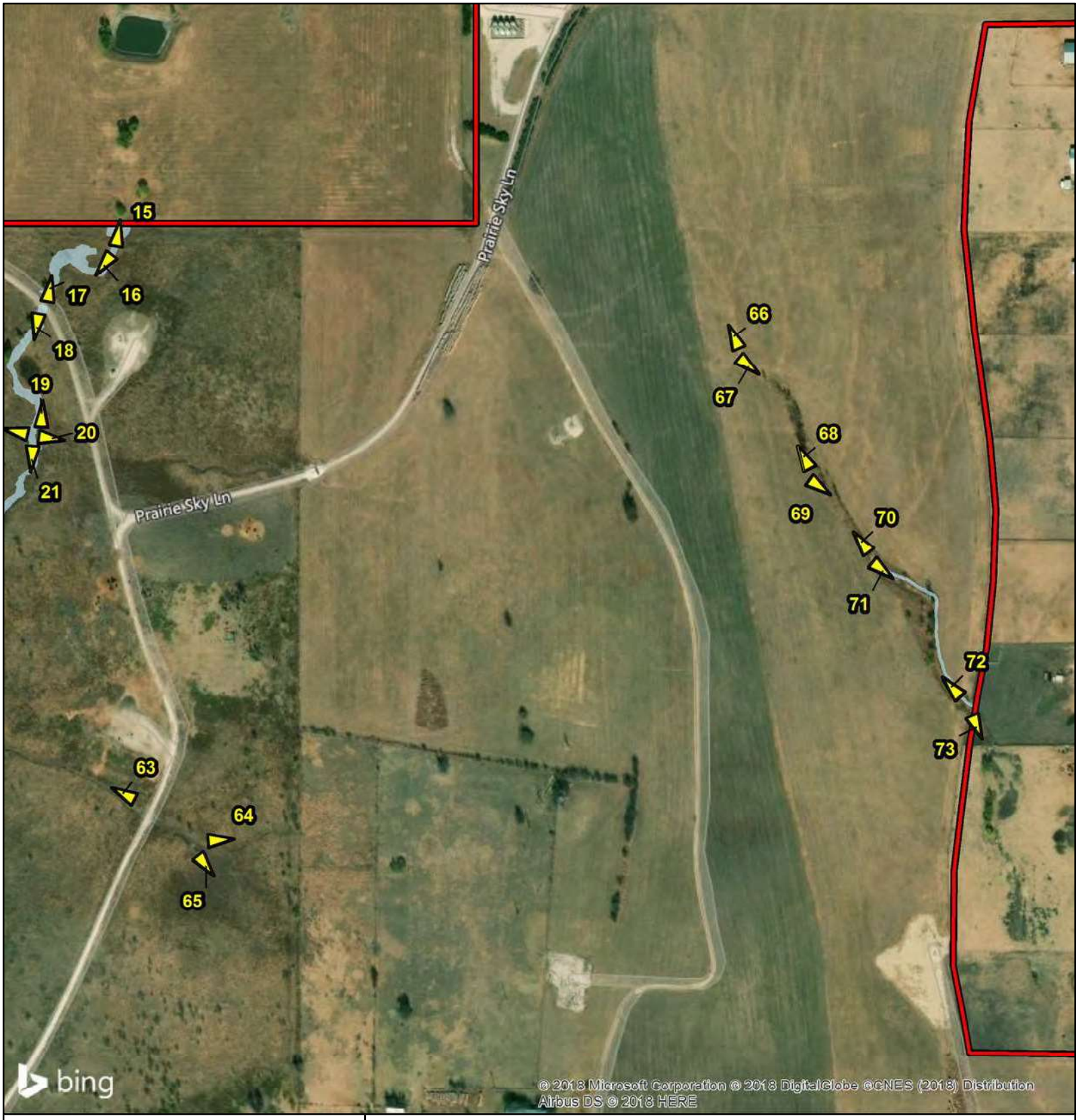
1 in = 800 feet

Feet
0 800

N
W E
S

File Ref. 04.289.027
Date: 9/26/2018

Survey Area
Photograph Location
Aquatic Resources



Photograph Location Map 1.E

Big Sky Development
City of Ponder
Denton County, Texas

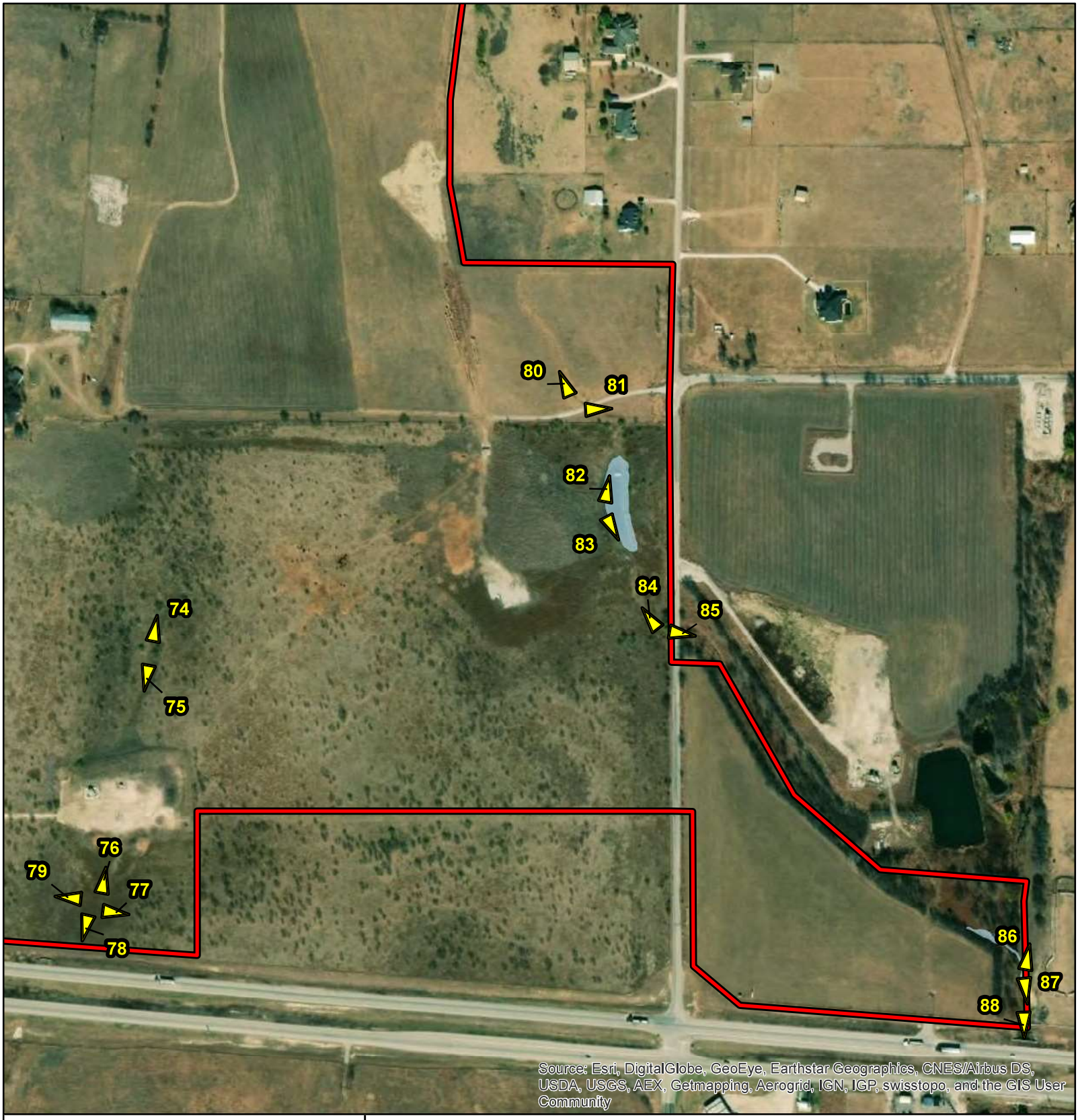
1 in = 800 feet

Feet
0
800

N
W
E
S

File Ref. 04.289.027
Date: 9/26/2018

Survey Area
Photograph Location
Aquatic Resources



Photograph Location Map 1.F

Big Sky Development
City of Ponder
Denton County, Texas

1 in = 800 feet

Feet
0 800

N
W E
S

File Ref. 04.289.027
Date: 9/26/2018

Survey Area
Photograph Location
Aquatic Resources

Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

Photograph 6

Photograph 7

Photograph 8

Photograph 9

Photograph 10

Photograph 11

Photograph 12

Photograph 13

Photograph 14

Photograph 15

Photograph 16

Photograph 17

Photograph 18

Photograph 19

Photograph 20

Photograph 21

Photograph 22

Photograph 23

Photograph 24

Photograph 25

Photograph 26

Photograph 27

Photograph 28

Photograph 29

Photograph 30

Photograph 31

Photograph 32

Photograph 33

Photograph 34

Photograph 35

Photograph 36

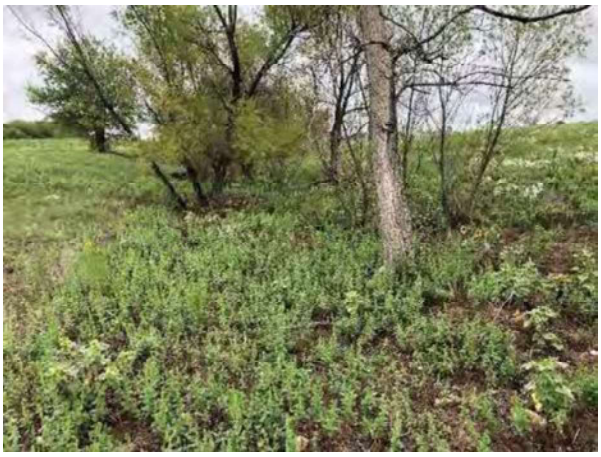
Photograph 37

Photograph 38

Photograph 39

Photograph 40

Photograph 41



Photograph 42

Photograph 43

Photograph 44

Photograph 45

Photograph 46

Photograph 47

Photograph 48

Photograph 49

Photograph 50

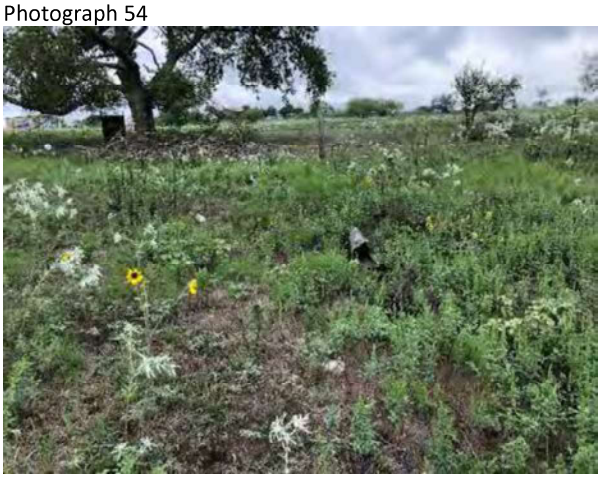
Photograph 51

Photograph 52

Photograph 53

Photograph 54

Photograph 55



Photograph 56

Photograph 57

Photograph 58

Photograph 59

Photograph 60

Photograph 61

Photograph 62

Photograph 63

Photograph 64

Photograph 65

Photograph 66

Photograph 67

Photograph 68

Photograph 69

Photograph 70

Photograph 71

Photograph 72

Photograph 73

Photograph 74

Photograph 75

Photograph 76

Photograph 77

Photograph 78

Photograph 79

Photograph 80

Photograph 81

Photograph 82

Photograph 83

Photograph 84

Photograph 85

Photograph 86

Photograph 87

Photograph 88

ATTACHMENT C
Routine Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 1

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Hillside | Local relief (concave, convex, none): None | Slope %: 3 - 5

Subregion (LRR): J | Lat: 33°14'50.83" N | Long: 97°22'12.38" W | Datum: NAD83

Soil Map Unit Name: Sanger clay, 3 to 5 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	Is the Sampled Area within a wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *Salix nigra*	50	Yes	FACW
2.			
3.			
4.			
	50 = Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *Salix nigra*	30	Yes	FACW
2.			
3.			
4.			
5.			
	30 = Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Eleocharis palustris*	80	Yes	OBL
2. *Iva annua*	10	No	FAC
3. *Xanthium strumarium*	10	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1. *None*	0		
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is > 50%
- ____ 3 - Prevalence Index is ≤ 3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOILS

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 12	10YR 2/1	25	5YR 4/6	25	C	PL/M	Clay	
	10YR 3/1	25						
	10YR 4/2	25						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☒ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☒ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 2

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Swale | Local relief (concave, convex, none): Concave | Slope %: 5%

Subregion (LRR): J | Lat: 33°14'49.29" N | Long: 97°22'11.77" W | Datum: NAD83

Soil Map Unit Name: Sanger clay, 3 to 5 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	Is the Sampled Area within a wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
	= Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Eleocharis palustris*	60	Yes	OBL
2. *Xanthium strumarium*	40	Yes	FAC
3. *Phyla nodiflora*	5	No	FAC
4. *Amphiachyris dracunculoides*	5	No	UPL
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is > 50%
- ____ 3 - Prevalence Index is ≤ 3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOILS

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 12	10YR 3/1	70	5YR 4/6	30	C	PL/M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☒ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point:

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Hillside | Local relief (concave, convex, none): slope | Slope %: 5%

Subregion (LRR): J | Lat: 33°14'49.87" N | Long: 97°22'13.06" W | Datum: NAD83

Soil Map Unit Name: Sanger clay, 3 to 5 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	Is the Sampled Area within a wetland?	Yes ☐	No ☒
Hydric Soil Present?	Yes ☐	No ☒			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Sporobolus compositus var. drummondii*	60	Yes	UPL
2. *Sorghastrum nutans*	20	Yes	FACU
3. *Ambrosia psilostachya*	10	No	FACU
4. *Euphorbia bicolor*	10	No	UPL
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0[1]

4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOILS

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 12	10YR 2/1	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 4

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Swale | Local relief (concave, convex, none): Concave | Slope %: 3%

Subregion (LRR): J | Lat: 33°15'11.09" N | Long: 97°22'7.86" W | Datum: NAD83

Soil Map Unit Name: Sanger clay, 1 to 3 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	Is the Sampled Area within a wetland?	Yes ☐	No ☒
Hydric Soil Present?	Yes ☐	No ☒			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
	= Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	= Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Amphiachyris dracunculoides*	40	Yes	UPL
2. *Iva annua*	20	Yes	FAC
3. *Xanthium strumarium*	10	No	FAC
4. *Croton texensis*	5	No	UPL
5. *Euphorbia bicolor*	5	No	UPL
6. *Ambrosia trifida*	5	No	FAC
7.			
8.			
9.			
10.			
	85 = Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 15

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is > 50%
- 3 - Prevalence Index is ≤ 3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: Bare ground resulting from cattle.

SOILS

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 2	10YR 2/1	98	5YR 4/6	2	C	PL	Clay	
2-12	10YR 3/1	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 5

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Swale | Local relief (concave, convex, none): Concave | Slope %: 3-5%

Subregion (LRR): J | Lat: 33°15'11.90" N | Long: 97°22'9.33" W | Datum: NAD83

Soil Map Unit Name: Sanger clay, 1 to 3 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	Is the Sampled Area within a wetland?	Yes ☐	No ☒
Hydric Soil Present?	Yes ☐	No ☒			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Cynodon dactylon*	50	Yes	FACU
2. *Amphiachyris dracunculoides*	30	Yes	UPL
3. *Iva annua*	10	No	FAC
4. *Xanthium strumarium*	5	No	FAC
5. *Euphorbia bicolor*	5	No	UPL
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is > 50%

_____ 3 - Prevalence Index is ≤ 3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOILS

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 12	10YR 2/1	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 6

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Floodplain bench | Local relief (concave, convex, none): Concave | Slope %: 3 - 5%

Subregion (LRR): J | Lat: 33°15'4.38" N | Long: 97°22'7.09" W | Datum: NAD83

Soil Map Unit Name: Sanger clay, 3 to 5 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	Is the Sampled Area within a wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Eleocharis palustris*	40	Yes	OBL
2. *Xanthium strumarium*	40	Yes	FAC
3. *Iva annua*	15	No	FAC
4. *Phyla nodiflora*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0[1]

4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOILS

Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-8	10YR 3/1	70	5YR 4/6	30	C	PL/M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: Limestone

Depth (inches): 8"

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☒ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☒ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 7

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): concave | Slope %: 3-5%

Subregion (LRR): J | Lat: 33°14'59.52" N | Long: 97°22'3.57" W | Datum: NAD83

Soil Map Unit Name: Sanger clay, 3 to 5 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	Is the Sampled Area within a wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Eleocharis palustris*	60	Yes	OBL
2. *Iva annua*	30	Yes	FAC
3. *Xanthium strumarium*	10	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is > 50%
- ____ 3 - Prevalence Index is ≤ 3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOILS

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-10	10YR 3/1	90	5YR 4/6	10	C	PL/M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: Limestone

Depth (inches): 10"

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☒ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☒ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 8

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): hill | Local relief (concave, convex, none): convex | Slope %: 3-5

Subregion (LRR): J | Lat: 33°14'57.75" N | Long: 97°22'4.41" W | Datum: NAD83

Soil Map Unit Name: Sanger clay, 3 to 5 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	Is the Sampled Area within a wetland?	Yes ☐	No ☒
Hydric Soil Present?	Yes ☐	No ☒			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Cynodon dactylon*	25	Yes	FACU
2. *Ambrosia psilostachya*	25	Yes	FACU
3. *Amphiachyris dracunculoides*	20	Yes	UPL
4. *Euphorbia bicolor*	20	Yes	UPL
5. *Bouteloua curtipendula*	10	No	UPL
6.			
7.			
8.			
9.			
10.			
	= Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is > 50%
- 3 - Prevalence Index is ≤ 3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOILS

Sampling Point: 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 12	10YR 2/1	100					Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 9

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope %: 3-5

Subregion (LRR): J | Lat: 33°14'57.08" N | Long: 97°22'3.13" W | Datum: NAD83

Soil Map Unit Name: Sanger clay, 3 to 5 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	Is the Sampled Area within a wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *Salix nigra*	2	Yes	FACW
2.			
3.			
4.			
	2 = Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Iva annua*	40	Yes	FAC
2. *Xanthium strumarium*	40	Yes	FAC
3. *Eleocharis palustris*	20	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is > 50%
- ____ 3 - Prevalence Index is ≤ 3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOILS

Sampling Point: 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 6	10YR 3/1	85	5YR 4/6	15	C	PL/M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: Limestone

Depth (inches): 6"

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☒ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 10

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Swale | Local relief (concave, convex, none): Concave | Slope %: 3-5%

Subregion (LRR): J | Lat: 33°14'59.14" N | Long: 97°21'58.35" W | Datum: NAD83

Soil Map Unit Name: Sanger clay, 3 to 5 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	Is the Sampled Area within a wetland?	Yes ☐	No ☒
Hydric Soil Present?	Yes ☐	No ☒			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Cynodon dactylon*	40	Yes	FACU
2. *Amphiachyris dracunculoides*	40	Yes	UPL
3. *Iva annua*	10	No	FAC
4. *Euphorbia bicolor*	5	No	UPL
5. *Xanthium strumarium*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is > 50%

_____ 3 - Prevalence Index is ≤ 3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOILS

Sampling Point: 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 10	10YR 2/1	100					Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: Limestone

Depth (inches): 10

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 11

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Swale | Local relief (concave, convex, none): Concave | Slope %: 3-5

Subregion (LRR): J | Lat: 33°15'3.02" N | Long: 97°21'58.71" W | Datum: NAD83

Soil Map Unit Name: Sanger clay, 3 to 5 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	Is the Sampled Area within a wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *Salix nigra*	80	Yes	FACW
2.			
3.			
4.			
	60	= Total Cover	

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot Size: 5')			
1. *Xanthium strumarium*	20	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	20	= Total Cover	

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 80

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is > 50%
- ____ 3 - Prevalence Index is ≤ 3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOILS

Sampling Point: 11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 5	10YR 3/1	90	5YR 4/6	10	C	PL/M	Clay	
5-10	10YR 4/2	98	5YR 4/6	2	C	PL	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: Limestone

Depth (inches): 10"

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☒ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☒ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 12

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Swale | Local relief (concave, convex, none): Concave | Slope %: 3-5

Subregion (LRR): J | Lat: 33°15'10.28" N | Long: 97°21'53.02" W | Datum: NAD83

Soil Map Unit Name: Sanger clay, 1 to 3 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	Is the Sampled Area within a wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *Salix nigra*	2	Yes	FACW
2.			
3.			
4.			
	2	= Total Cover	

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Herb Stratum (Plot Size: 5')			
1. *Xanthium strumarium*	40	Yes	FAC
2. *Iva annua*	40	Yes	FAC
3. *Eleocharis palustris*	20	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100	= Total Cover	

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is > 50%
- ☐ 3 - Prevalence Index is ≤ 3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOILS

Sampling Point: 12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 6	10YR 3/1	85	5YR 4/6	15	C	PL/M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: Limestone

Depth (inches): 6"

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☒ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 13

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): terrace depression | Local relief (concave, convex, none): Concave | Slope %: 3-5

Subregion (LRR): J | Lat: 33°14'46.22" N | Long: 97°22'20.46" W | Datum: NAD83

Soil Map Unit Name: Sanger clay, 3 to 5 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	Is the Sampled Area within a wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: Depression)	Absolute % Coverage	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot Size: Depression)			
1. *None*			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot Size: Depression)			
1. *Eleocharis palustris*	60	Yes	OBL
2. *Xanthium strumarium*	30	Yes	FAC
3. *Iva annua*	10	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot Size: Depression)			
1. *None*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is > 50%
- ____ 3 - Prevalence Index is ≤ 3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOILS

Sampling Point: 13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 8	10YR 3/1	95	5YR 4/6	5	C	PL/M	Clay	
8 - 12	10YR 3/1	98	5YR 4/4	2	C	PL	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☒ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☒ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ☒ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 14

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Swale | Local relief (concave, convex, none): Concave | Slope %: 1-3

Subregion (LRR): J | Lat: 33°15'3.18" N | Long: 97°21'29.82" W | Datum: NAD83

Soil Map Unit Name: Slidell clay, 1 to 3 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	Is the Sampled Area within a wetland?	Yes ☐	No ☒
Hydric Soil Present?	Yes ☐	No ☒			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Sorghum halepense*	50	Yes	FACU
2. *Ambrosia trifida*	30	Yes	FAC
3. *Iva annua*	10	No	FAC
4. *Bothriochloa laguroides*	5	No	UPL
5. *Helianthus annuus*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation

_____ 2 - Dominance Test is > 50%

_____ 3 - Prevalence Index is ≤ 3.0[1]

_____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOILS

Sampling Point: 14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 12	10YR 3/2	100					Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 15

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Swale | Local relief (concave, convex, none): Concave | Slope %: 1-3

Subregion (LRR): J | Lat: 33°14'59.24" N | Long: 97°21'27.09" W | Datum: NAD83

Soil Map Unit Name: Slidell clay, 1 to 3 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	Is the Sampled Area within a wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Eleocharis palustris*	50	Yes	OBL
2. *Iva annua*	20	Yes	FAC
3. *Ambrosia trifida*	20	Yes	FAC
4. *Sorghum halepense*	10	No	UPL
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is > 50%
- ____ 3 - Prevalence Index is ≤ 3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOILS

Sampling Point: 15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 6	10YR 3/1	90	5YR 4/6	10	C	PL/M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: Limestone

Depth (inches): 6

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☒ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 16

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Swale | Local relief (concave, convex, none): Concave | Slope %: 1-3

Subregion (LRR): J | Lat: 33°14'39.80" N | Long: 97°21'20.40" W | Datum: NAD83

Soil Map Unit Name: Slidell clay, 1 to 3 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	Is the Sampled Area within a wetland?	Yes ☐	No ☒
Hydric Soil Present?	Yes ☐	No ☒			
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Amphiachyris dracunculoides*	40	Yes	UPL
2. *Ambrosia psilostachya*	20	Yes	FACU
3. *Cynodon dactylon*	20	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	80 = Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is > 50%
- 3 - Prevalence Index is ≤ 3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: bare ground resulting from presence of cattle.

SOILS

Sampling Point: 16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 12	10YR 3/1	100					Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): 6

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/12/2018

Applicant/Owner: | State: Texas | Sampling Point: 17

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Swale | Local relief (concave, convex, none): concave | Slope %: 1-3%

Subregion (LRR): J | Lat: 33°14'29.05" N | Long: 97°21'8.05" W | Datum: NAD83

Soil Map Unit Name: Slidell clay, 1 to 3 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	Is the Sampled Area within a wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒	No ☐		
Wetland Hydrology Present?	Yes ☒	No ☐		

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Eleocharis palustris*	60	Yes	OBL
2. *Justicia americana*	20	Yes	OBL
3. *Solidago gigantea*	10	No	FAC
4. *Ambrosia trifida*	10	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is > 50%
- ____ 3 - Prevalence Index is ≤ 3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOILS

Sampling Point: 17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-10	10YR 3/1	85	5YR 4/6	15	C	PL/M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: Limestone

Depth (inches): 10"

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☒ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☒ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☒ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Sky | City/County: Denton | Sampling Date: 09/13/2018

Applicant/Owner: | State: Texas | Sampling Point: 18

Investigator(s): Ross Rogers, Sarah Grubbs | Section, Township, Range:

Landform (hillslope, terrace, etc.): Swale | Local relief (concave, convex, none): Concave | Slope %: 1-3

Subregion (LRR): J | Lat: 33°14'31.12" N | Long: 97°21'10.58" W | Datum: NAD83

Soil Map Unit Name: Slidell clay, 1 to 3 percent slopes | NWI Classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are vegetation, ☐ Soil, ☐ Or hydrology ☐ Naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	Is the Sampled Area within a wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☐	No ☒		
Wetland Hydrology Present?	Yes ☐	No ☒		

Remarks: Trees along fence line are located outside of sample area.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot Size: 30')	Absolute % Coverage	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot Size: 15')			
1. *Gleditsia triacanthos*	5	Yes	FACU
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot Size: 5')			
1. *Ambrosia trifida*	40	Yes	FAC
2. *Sorghum halepense*	40	Yes	FACU
3. *Iva annua*	20	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100 = Total Cover		

Woody Vine Stratum (Plot Size: 15')			
1. *None*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply By:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is > 50%
- 3 - Prevalence Index is ≤ 3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOILS

Sampling Point: 18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 12	10YR 3/1	100					Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR F)**
- ☐ 1 cm Muck (A9) (**LRR F, G, H)**
- ☐ Depleted below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ☐ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16 **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 CM Muck (A9) **(LRR I, J)**
- ☐ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ☐ Dark Surface (S7) **(LRR G)**
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distributed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes? ☐ No? ☒ Depth (inches): _____

Water Table Present? Yes? ☐ No? ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes? ☐ No? ☒ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

ATTACHMENT D
Historic Aerial Photographs

Big Sky

15348-15058 US 380 E

Ponder, TX 76259

Inquiry Number: 5434209.1

September 26, 2018

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

09/26/18

Site Name:

Big Sky
15348-15058 US 380 E
Ponder, TX 76259
EDR Inquiry # 5434209.1

Client Name:

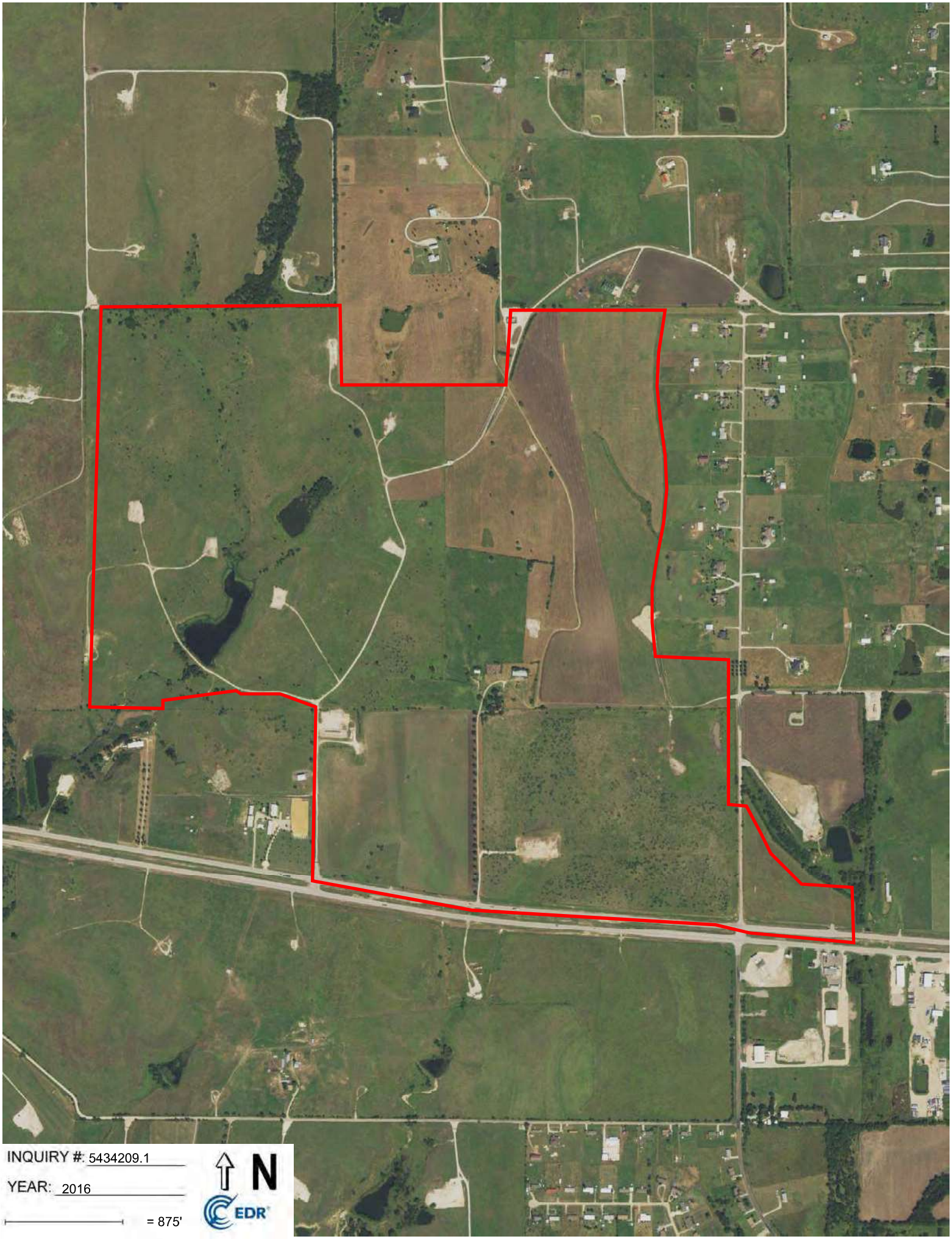
Integrated Env. Solutions, Inc.
610 Elm St Suite 300
McKinney, TX 75069
Contact: Ross Rogers

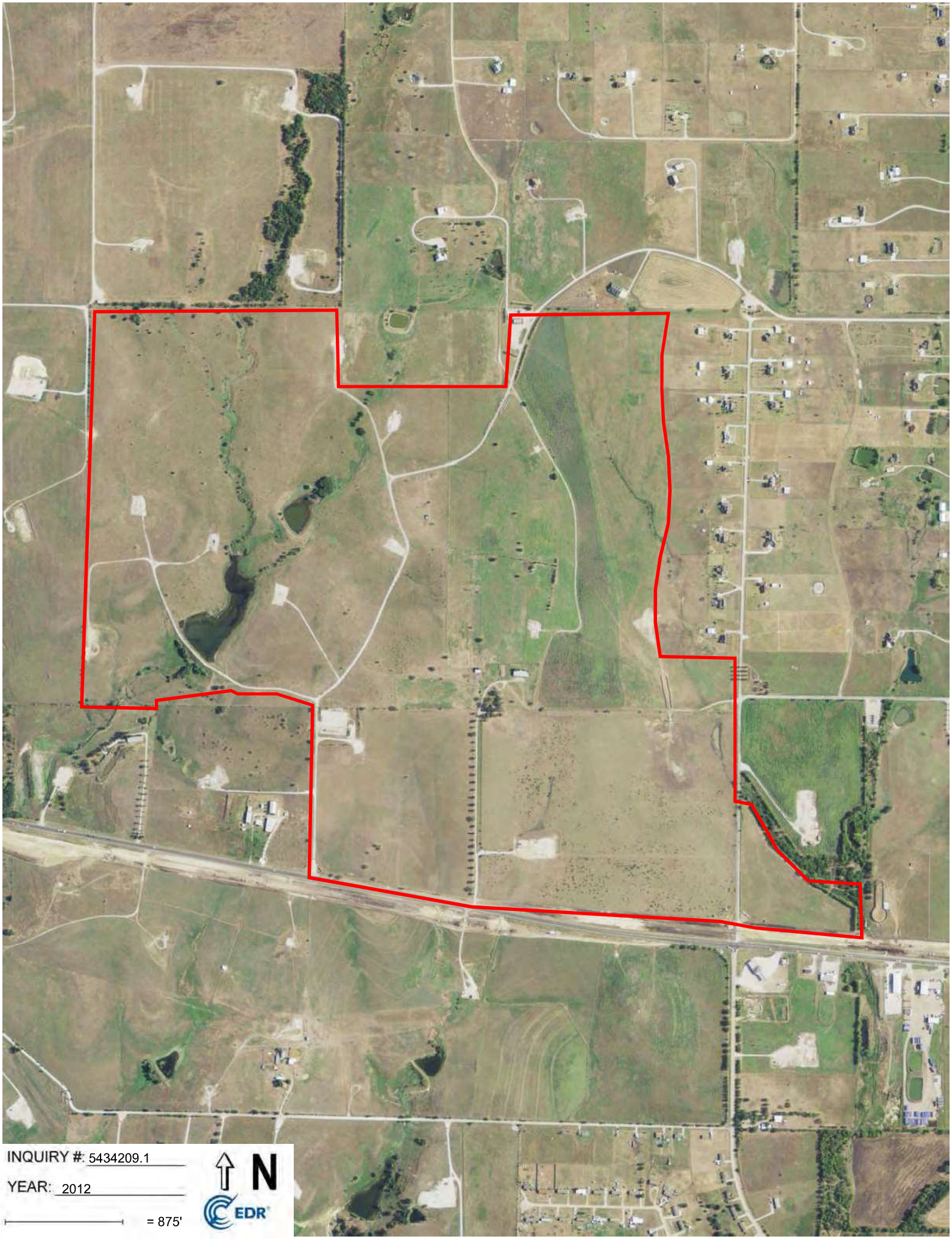
Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

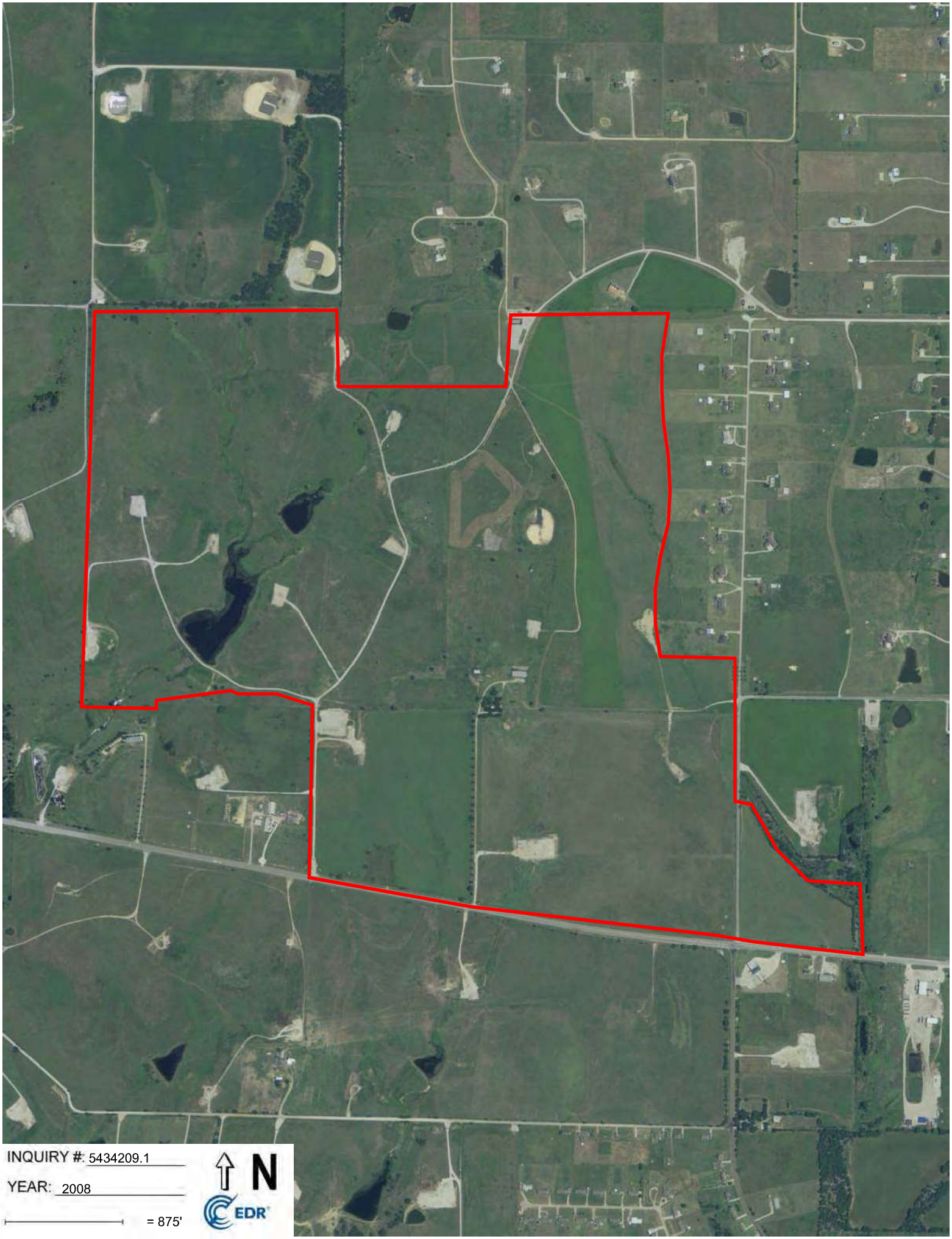
Search Results:

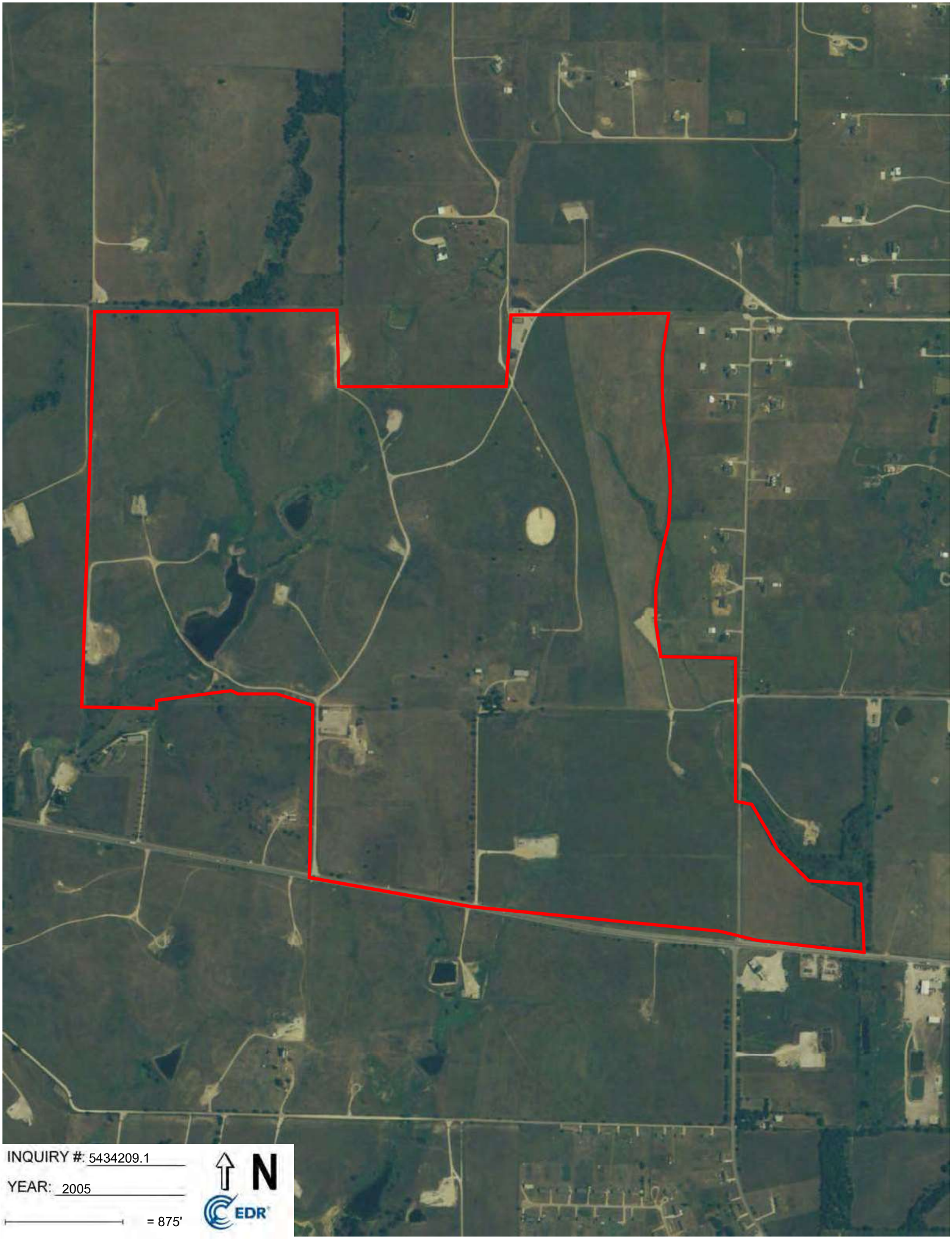
Year	Scale	Details	Source
2016	1"=875'	Flight Year: 2016	USDA/NAIP
2012	1"=875'	Flight Year: 2012	USDA/NAIP
2008	1"=875'	Flight Year: 2008	USDA/NAIP
2005	1"=875'	Flight Year: 2005	USDA/NAIP
1995	1"=875'	Acquisition Date: January 31, 1995	USGS/DOQQ
1990	1"=875'	Flight Date: January 26, 1990	NAPP
1981	1"=875'	Flight Date: October 27, 1981	USDA
1972	1"=875'	Flight Date: February 24, 1972	USDA
1968	1"=875'	Flight Date: May 01, 1968	USGS
1951	1"=875'	Flight Date: January 19, 1951	USDA
1942	1"=875'	Flight Date: April 01, 1942	USDA

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

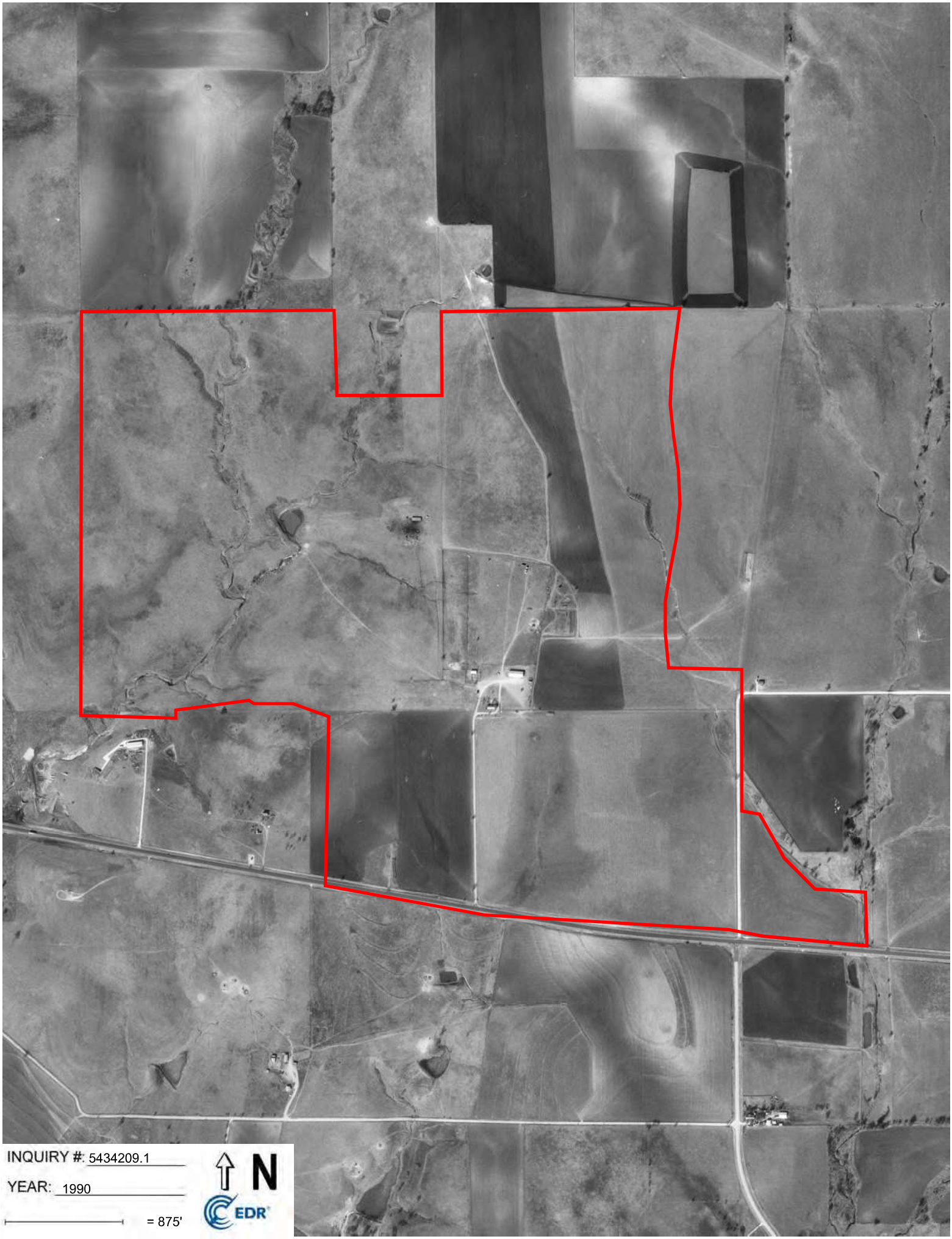

INQUIRY #: 5434209.1
YEAR: 2016
= 875'
N
EDR

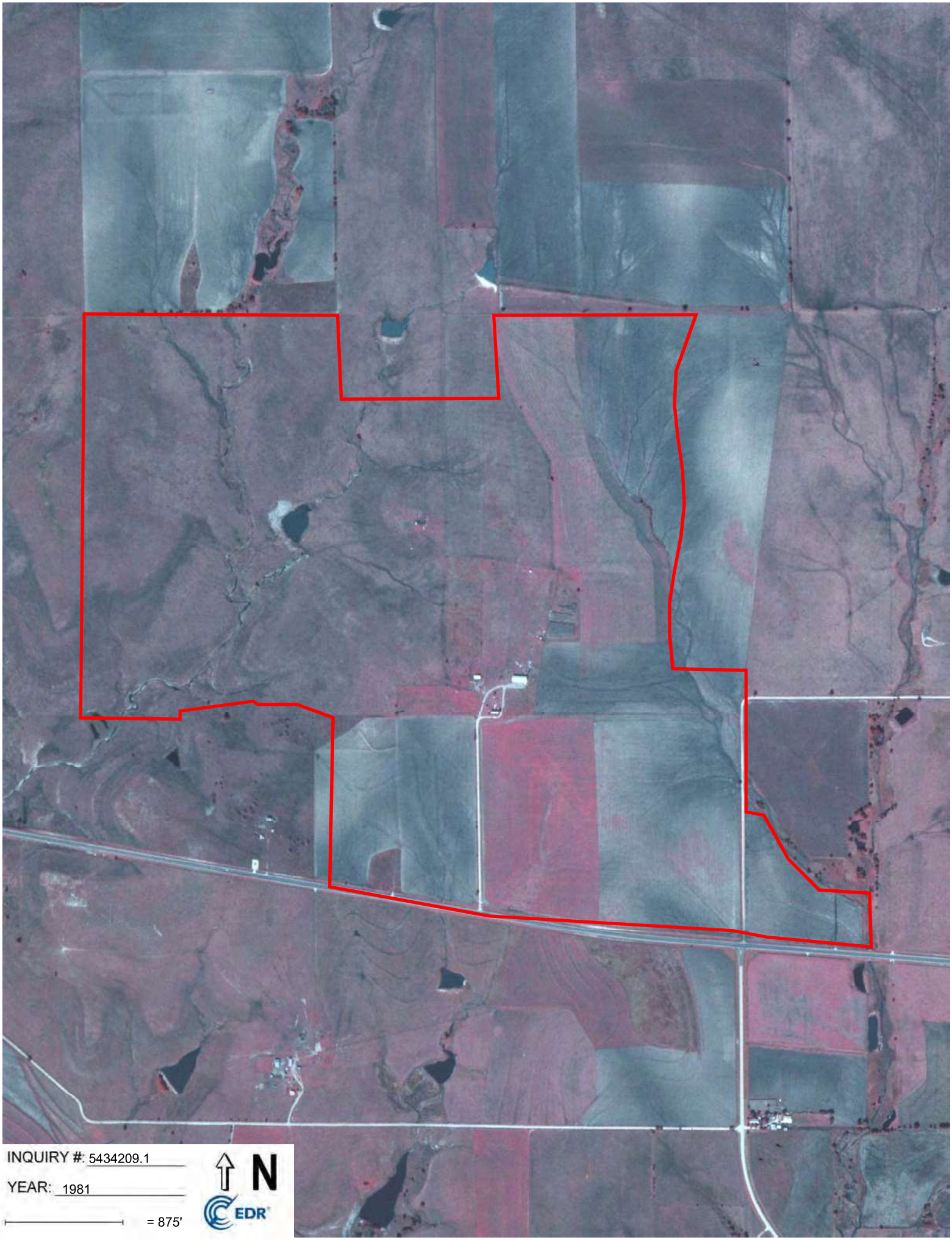

INQUIRY #: 5434209.1
YEAR: 2012
= 875'
N
EDR

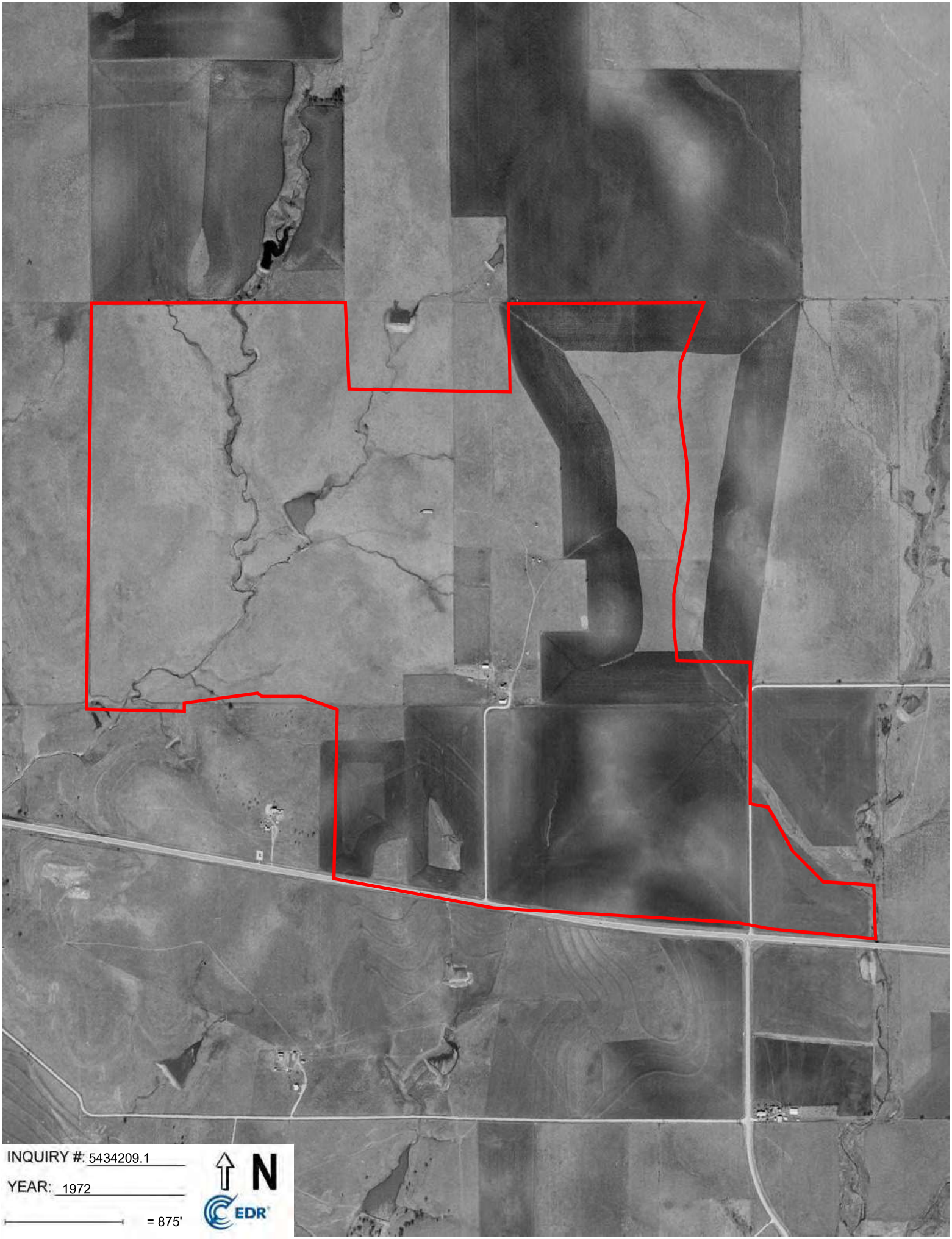

INQUIRY #: 5434209.1
YEAR: 2008
= 875'
N
EDR

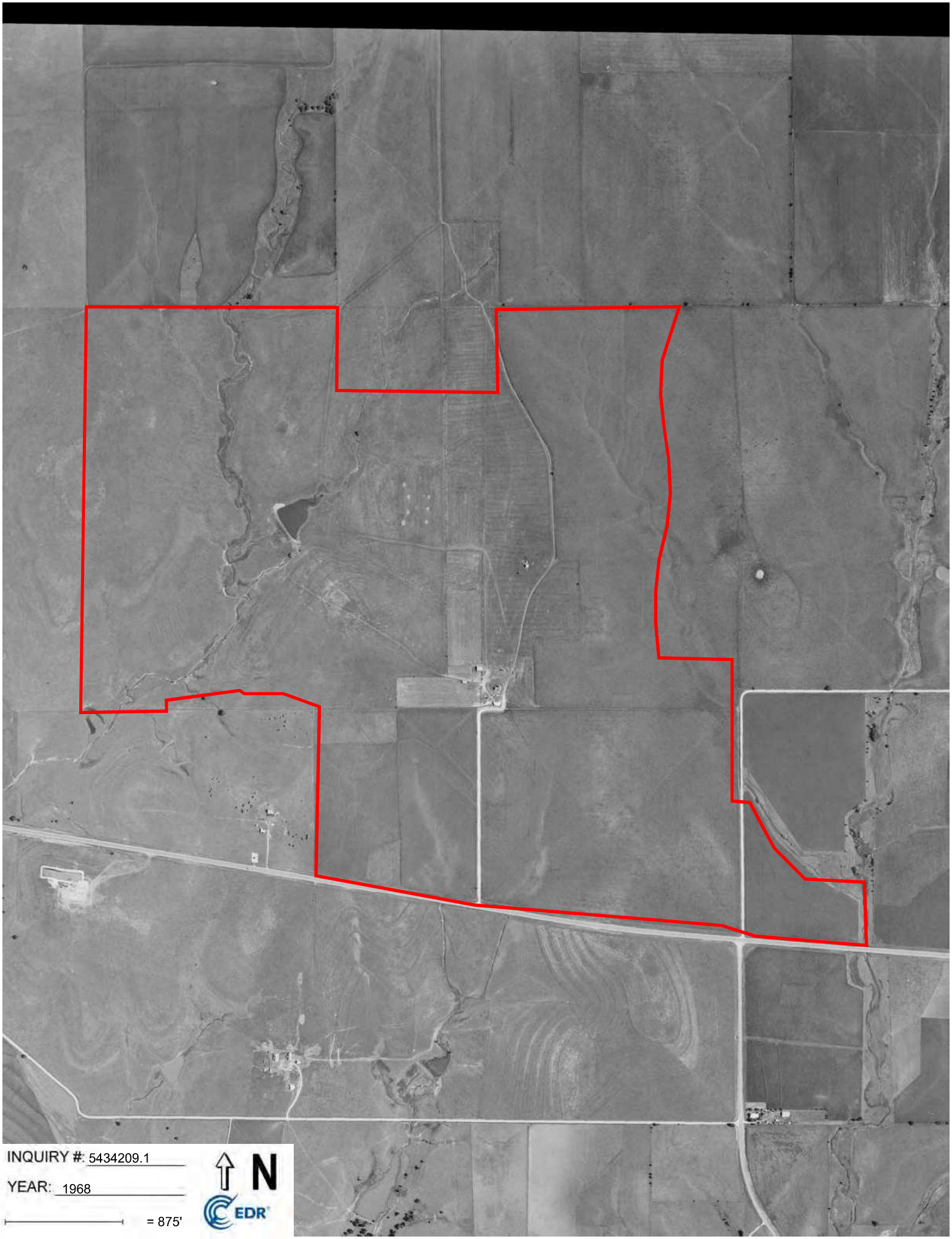

INQUIRY #: 5434209.1
YEAR: 2005
= 875'
N
EDR

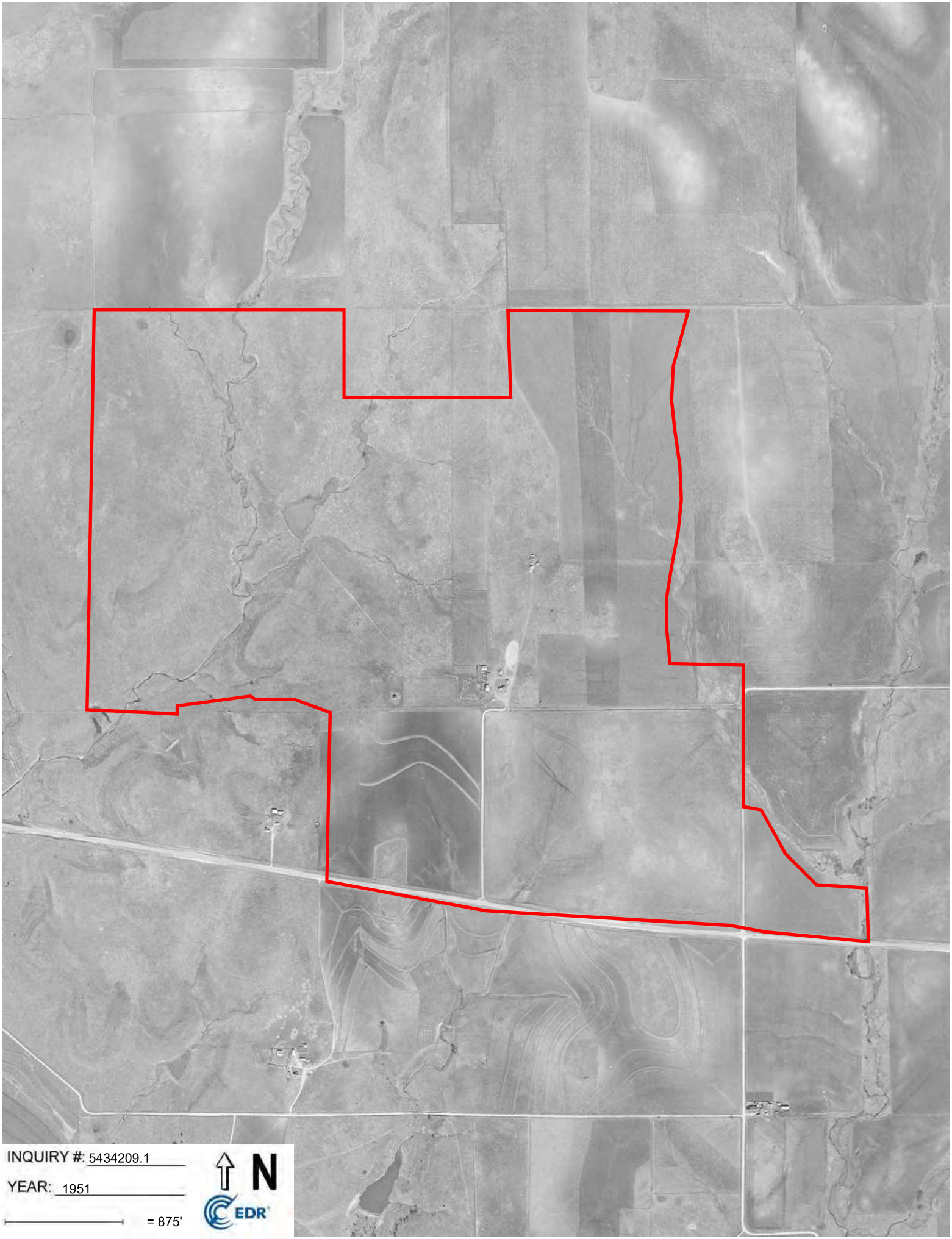

INQUIRY #: 5434209.1
YEAR: 1995
= 875'
N
EDR

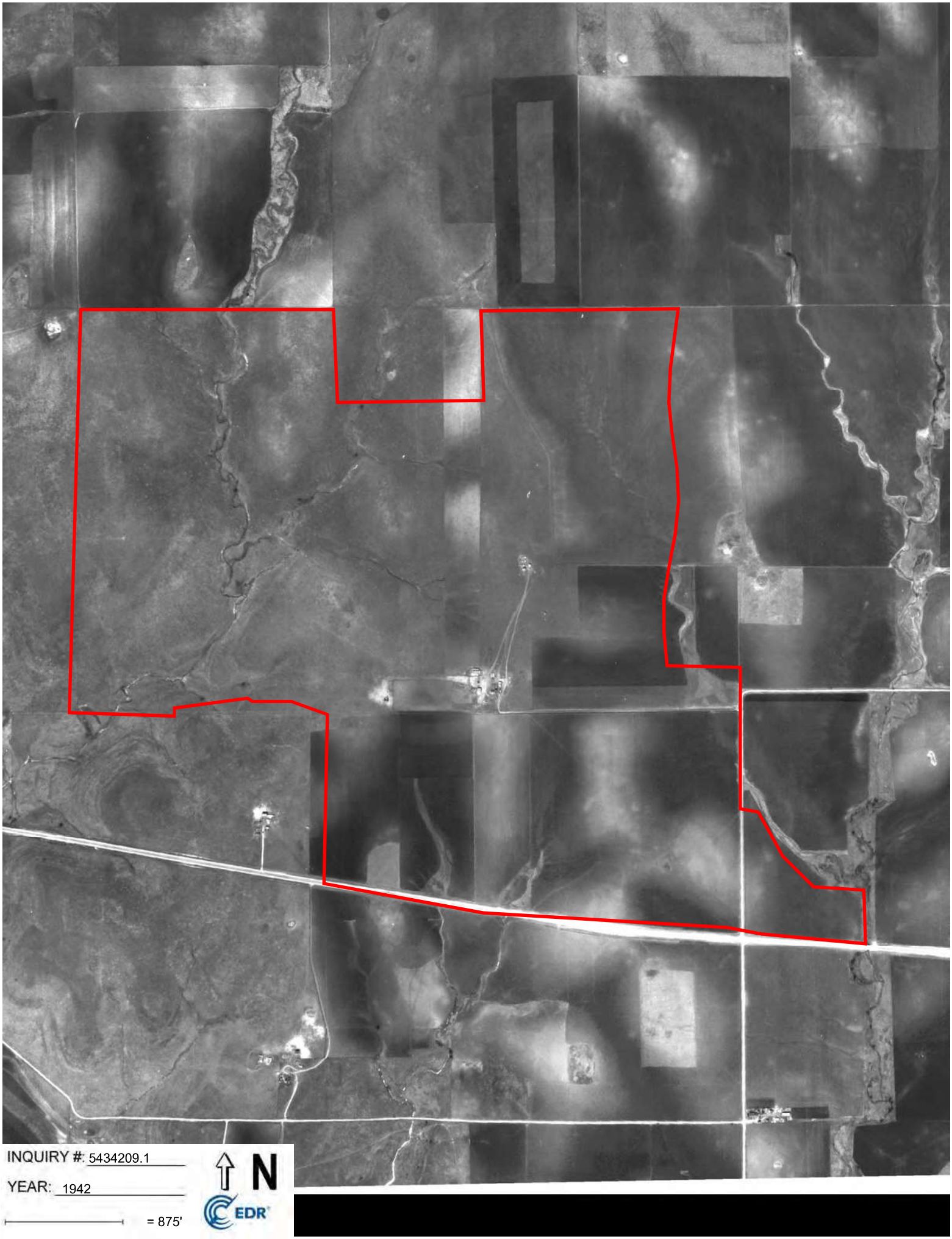

INQUIRY #: 5434209.1
YEAR: 1990
= 875'
N
EDR


INQUIRY #: 5434209.1
YEAR: 1981
= 875'
N
EDR


INQUIRY #: 5434209.1
YEAR: 1972
= 875'
N
EDR


INQUIRY #: 5434209.1
YEAR: 1968
= 875'
N
EDR


INQUIRY #: 5434209.1
YEAR: 1951
= 875'
N
EDR


INQUIRY #: 5434209.1
YEAR: 1942
= 875'
N
EDR

NORTH TEXAS GROUNDWATER CONSERVATION DISTRICT

PRODUCTION PERMIT

Permit No. NPA006

Well Owner ("Permittee"):

Big Sky Municipal Utility District
1980 Post Oak Boulevard, Suite 1380
Houston Texas 77056

Total Number of Wells: 2
Purpose of Use: Municipal/Public Water System
Aquifer: Antlers

Well(s) Information:

ID	Well Name	Latitude	Longitude	Capacity	Drilling Deadline
3134	Well 1	33.2483669	-97.3617867	180 GPM	1/13/2021
3135	Well 1A	33.2481713	-97.3681288	180 GPM	1/13/2021

Term and Renewal: This permit is effective beginning on **1/14/2020**. This permit is perpetual in nature; provided, however, that the District will conduct inspections and will request information from a permit holder from time-to-time as required to ensure the accuracy and integrity of the District's information, and to enforce compliance with District Rules, the District Act, and Chapter 36 of the Texas Water Code.

Notice of Revocation: Failure to pay groundwater use fees, report pumpage, comply with District rules, orders, special provisions, and permit conditions can result in revocation of this permit.

Amount of Authorized Production: The amount of groundwater needed for use by Permittee for beneficial use, which shall not exceed: **58,860,000 gallons/year** for only that well or well system identified above.

Permit Conditions – This Permit is conditioned on each of the following precise terms:

1. This permit is granted subject to the District's rules, orders of the District Board of Directors, special provisions, permit conditions, and laws of the State of Texas, including but not limited to Chapter 36 of the Texas Water Code and the District's enabling legislation codified at Chapter 8856 of the Special District Local Laws Code.
2. Acceptance of this permit and production of groundwater under the authority granted herein by Permittee constitutes acknowledgement and agreement that Permittee is required to abide by the precise terms of this permit and comply with the District's rules, orders of the District Board of Directors, special provisions, permit conditions, and laws applicable to Permittee.
3. Violation of the terms of this permit shall result in enforcement in accordance with the District's Enforcement Policy and Civil Penalty Schedule, Chapter 36 of the Texas Water Code, and the District's enabling legislation codified at Chapter 8856 of the Special District Local Laws Code.
4. This permit does not confer any rights and/or privileges to Permittee other than those expressly set forth herein.

5. The well(s) identified in this permit shall be installed, equipped, operated, maintained, plugged, capped, or closed, as may be appropriate in accordance with the District's rules.
6. Permittee's production shall not exceed the Amount of Authorized Production set forth in this permit.
7. Produced groundwater shall be put to a beneficial use at all times. Operation of the well(s) under this permit shall be conducted in a manner so as to avoid waste, pollution, or harm to groundwater resources.
8. The well site shall be accessible to District representatives and/or agents for inspection during business hours and during emergencies. The Permittee agrees to cooperate fully in any reasonable monitoring or sampling of the well(s).
9. Permittee shall provide written notice to the District of any change of ownership, name of Permittee or Permittee's authorized representative, well operator, mailing address or telephone number in accordance with District rules.
10. Permittee shall reduce water production as required by District rules and orders of the Board of Directors, including but not limited to proportional adjustments issued based on achievement of the District's Desired Future Conditions, and/or adjustments due to times of drought and in accordance with the District's Drought Contingency Plan, as applicable.
11. The application pursuant to which this permit has been granted is incorporated herein, and this permit has been granted based on the accuracy thereof. A finding that false information has been supplied to the District shall be grounds for immediate revocation of this permit, and shall subject Permittee to enforcement.
12. This permit contains all matters approved by the District related to Permittee's use of groundwater, and all other matters requested by Permittee not included in this Permit are denied.
13. Any production of groundwater above the Authorized Production Amount, or above any additional amount as otherwise authorized by District Rules (e.g., initiation of Drought Buffer under District Rule 6.2), or a change to the well(s) or use authorized under this permit requires the submission of a Permit Amendment Application prior to such change being made.
14. In the event of a conflict between the terms of this permit and the application pursuant to which this permit has been granted, the terms of this permit shall prevail.

Special Conditions/Terms: None

District Approval

Signature

Drew Satterwhite, P.E.
Print Name

General Manager
Title

1/27/20
Date

Applicant Signature
Required for permit to be effective

Signature

Naveen Khammampati
Print Name

Vice President
Title

01/22/2020
Date

Return one signed original copy to the District at: P.O. Box 508, Gainesville, TX 76241

Ana-Lab Corp.
2600 Dudley Rd. Kilgore, Texas 75662
P.O. Box 9000 Kilgore, Texas 75663
*Office: 903-984-0551 * Fax: 903-984-5914*

ANA LAB
Testing the Limits of Science and Service

Project
949160

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Printed 01/06/2021 14:40

TABLE OF CONTENTS

This report consists of this Table of Contents and the following pages:

Report Name	Description	Pages
949160_r03_03_ProjectResults	Ana-Lab Project P:949160 C:DWAT Project Results t:304	2
949160_r10_05_ProjectQC	Ana-Lab Project P:949160 C:DWAT Project Quality Control Groups	1
949160_r99_09_CoC__1_of_1	Ana-Lab CoC DWAT 949160_1_of_1	2
	Total Pages:	5

NELAP-accredited #T104704201-20-17

Ana-Lab Corp.
2600 Dudley Rd. Kilgore, Texas 75662
P.O. Box 9000 Kilgore, Texas 75663
Office: 903-984-0551 * Fax: 903-984-5914

ANA LAB
Testing the Limits of Science and Service

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Project
949160

Printed: 01/06/2021

Results

Sample Results

1951391 **BIG SKY WELL #1** Received: 01/05/2021

Drinking Water Collected by: LC2 Ana-Lab PO:
Taken: 01/04/2021 13:00:00

Prepared: 01/06/2021 11:05:22 Calculated 01/06/2021 11:05:22 CAL

	Parameter	Results	Units	RL	Flags	CAS	Bottle
z	**Pickup/Transportation**	**Verified**					

SM 4500-Cl G-2011 Prepared: 932421 01/04/2021 13:00:00 Analyzed 932421 01/04/2021 13:00:00 LC2

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**Chlorine Residual (Onsite/TC)**	**0.0**	**mg/L**	0.1			

SM 9223 B (Colilert-18)-97 Prepared: 932567 01/06/2021 10:47:00 Analyzed 932567 01/06/2021 10:47:00 MDM

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**Total Coliform Colilert 18**	**NEGATIVE**	**in 100 mL**				01

SM 9223 B (Colilert-18)-97 Prepared: 932568 01/06/2021 10:47:00 Analyzed 932568 01/06/2021 10:47:00 MDM

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**E-coli Colilert-18**	**NEGATIVE**	**in 100 mL**				01

Sample Preparation

1951391 **BIG SKY WELL #1** Received: 01/05/2021

01/04/2021

Prepared: 01/05/2021 14:18:00 Analyzed 01/05/2021 14:18:00 MDM

	Parameter	Results
NELAC	**Micro Lab Cl2 Check**	**Negative**

NELAP-accredited #T104704201-20-17

Ana-Lab Corp.
2600 Dudley Rd. Kilgore, Texas 75662
P.O. Box 9000 Kilgore, Texas 75663
*Office: 903-984-0551 * Fax: 903-984-5914*

ANA LAB
Testing the Limits of Science and Service

1

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Project
949160

Printed: 01/06/2021

1951391 **BIG SKY WELL #1** *Received:* 01/05/2021

01/04/2021

		Prepared:		*01/06/2021*	*11:05:22*	*Calculated*	*01/06/2021*	*11:05:22*	*CAL*
z	**Environmental Fee (per Project)**	**Verified**							
	SM 9223 B (Colilert-18)-97	*Prepared:*	*932565*	*01/05/2021*	*14:18:00*	*Analyzed*	*932565*	*01/05/2021*	*14:18:00*	*MDM*
NELAC	**TC / E.coli Set Started**	**STARTED**							01

Qualifiers:

We report results on an As Received or wet basis unless marked Dry Weight. Unless otherwise noted, testing was performed at Ana-labs corporate laboratory that holds the following Federal and State certificates: EPA Lab Number TX00063, US Department of Agriculture Soil Import Permit P330-17-00117, Texas Commission on Environmental Quality Commercial Drinking Water Lab Approval (Lab ID: TX219), Texas Commission on Environmental Quality NELAP T104704201-20-17, Louisiana Department of Environmental Quality Laboratory Certification (NELAP, LELAP) #02008, Louisiana Department of Health and Hospitals Drinking Water (NELAP) Certificate No LA026, Oklahoma Department of Environmental Quality TNI Laboratory Accreditation Program Certificate No. 2018-126, Arkansas Department of Environmental Quality Certification #18-068-0. The Accredited column designates accreditation by N -- NELAC, or z -- not covered under NELAC scope of accreditation.
These analytical results relate to the sample tested. This report may NOT be reproduced EXCEPT in FULL without written approval of Ana-Lab Corp. Unless otherwise specified, these test results meet the requirements of NELAC.
RL is the Reporting Limit (sample specific quantitation limit) and is at or above the Method Detection Limit (MDL). CAS is Chemical Abstract Service number. RL is our Reporting Limit, or Minimum Quantitation Level. The RL takes into account the Instrument Detection Limit (IDL), Method Detection Limit (MDL), and Practical Quantitation Limit (PQL), and any dilutions and/or concentrations performed during sample preparation (EQL). Our analytical result must be above this RL before we report a value in the 'Results' column of our report (without a 'J' flag). Otherwise, we report ND (Not Detected above RL), because the result is "<" (less than) the number in the RL column. MAL is Minimum Analytical Level and is typically from regulatory agencies. Unless we report a result in the result column, or interferences prevent it, we work to have our RL at or below the MAL.

Trey Peery, MA, Project Manager

NELAP-accredited #T104704201-20-17

Quality Control

ANALAB
Testing the Limits of Science and Service

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Project
949160

Printed 01/06/2021

Analytical Set 932567 — SM 9223 B (Colilert-18)-97

Standard

Parameter	Sample	Reading	Known	Units	Recover%	Limits%	File
P. aeruginosa	932565	NEGATIVE	NEGATIV	in 100 mL		-	121916853
Standard E. coli	932565	POSITIVE	POSITIVI	in 100 mL		-	121916855
Standard K.varicola	932565	POSITIVE	POSITIVI	in 100 mL		-	121916854

Analytical Set 932568 — SM 9223 B (Colilert-18)-97

Standard

Parameter	Sample	Reading	Known	Units	Recover%	Limits%	File
P. aeruginosa	932565	NEGATIVE	NEGATIV	in 100 mL		-	121916929
Standard E. coli	932565	POSITIVE	POSITIVI	in 100 mL		-	121916931
Standard K.varicola	932565	NEGATIVE	NEGATIV	in 100 mL		-	121916930

Analytical Set 932421 — SM 4500-Cl G-2011

Standard

Parameter	Sample	Reading	Known	Units	Recover%	Limits%	File
Chlorine Residual (Onsite/TC)	932421	0.21	0.23	mg/L	91.3	90 - 110	
Chlorine Residual (Onsite/TC)	932421	0.93	0.94	mg/L	98.9	90 - 110	
Chlorine Residual (Onsite/TC)	932421	1.60	1.62	mg/L	98.8	90 - 110	

* Out RPD is Relative Percent Difference: abs(r1-r2) / mean(r1,r2) * 100%

Recover% is Recovery Percent: result / known * 100%

NELAP-accredited #T104704201-20-17

PuCh 65.00

Chain of Custody

ANA-LAB CORP. THE COMPLETE SERVICE LAB

Shipping: 2600 Dudley · Kilgore TX 75662
Mailing: P.O. BOX 9000 · Kilgore, TX 75663-9000
Phone (903) 984-0551 · Fax (903) 984-5914 · Email: corp@ana-lab.com

Abilene	ArkLaMiss	Central TX	Gulf Coast	New Orleans	North TX	Oklahoma	Panhandle	Rio Grande Valley
325.669.2422	318.219.9300	512.821.0045	281.333.9414	504.330.0021	817.261.6404	405.292.6630	806.355.3556	956.831.6437

Report to: Brad Davis		Project- Name/Location	☐ Wastewater ☐ Drinking Water ☐ SW846
Company name: Davis Water Well	Client Code: DWAT	Billing (if different)	Analysis Requested
Address:			
City Whitesboro State TX Zip 76273		City State Zip	
Phone 903 647-9908 Fax	E-mail	Phone Fax	
Sampler Signature Lane Carlisle	Printed Name Lane Carlisle	Affiliation Ana-Lab	PO Number

Lab Number Do Not Use	Field Identification	Date	Time	Matrix	# of Containers		Comments	TC
195139	Big Sky Well #1	1/4/21 CP 1/6/21	1300	DW	1	Comp/Grab	Cl2 0.0	X
						Comp/Grab		
						Comp/Grab		
						Comp/Grab		
						Comp/Grab		
						Comp/Grab		
						Comp/Grab		
						Comp/Grab		
						Comp/Grab		
						Comp/Grab		

Date	Time	Relinquished by: Printed Name	Signature	Affiliation	Received by: Printed Name	Signature	Affiliation
1/4/21	1630	Lane Carlisle	Lane Carlisle	Ana-Lab	LSO		
1/5/21	0900	Lone Star			Kathy Tarver Ana-Lab		

Samples Received on Ice? ☑ Yes ☐ No Method of Shipment ☐ Bus ☐ FedEx ☑ Lone Star ☐ UPS ☐ Hand delivered ☐ DHL ☐ other
Cooler/Sample Secure? ☑ Yes ☐ No Requested TAT ☐ Routine ☐ 3 day ☐ 2 Day ☐ next day

Tracking or Shipping Number _____ Samples contain: ☐ HF ☐ Cyanide ☐ Sulfide
Ana-Lab Personnel collect samples as specified by Ana-Lab SOP #000323.

Comments: Non Regulatory
See Attached for Tracking # and Temp

949160 CoC Print Group 001 of 001

LSO
It's all in the delivery.

Airbill No. Z1000TWX

LSO
1-800-800-8984
www.lso.com

SHIP TO:
ANA-LAB LOGIN
ANA-LAB CORP
2600 DUDLEY RD.
KILGORE, TX 75663
9039840551

From:
ANA-LAB NORTH TEXAS
ANA-LAB NTX
11105 SHADY TRAIL
DALLAS, TX 75229
9728379412

B GGG **LSO PRIORITY NEXT DAY**
10:30 IN MOST CITIES
LATER IN REMOTE CITIES

PRINT DATE: 1/4/2021 REF 3:
QUICKCODE: CORP WEIGHT: 65.00LBS
REF 1: MPWC DWAT EVPR MTLP 1D00V.0000 REF 2:

1-5-21 0915 AMB
Date Time Tech
Temp: 0.2/0.2 C

Therm#: 6443 Corr Fact: 0.0 C

Fold on above line and place shipping label in pouch on package. Please be sure the barcodes and addresses can be read and scanned. Shipping Instructions

1. Fold this page along the horizontal line above.
2. Place this Airbill in the shipping label pouch on the package you are shipping. Please be sure the barcodes and addresses can be read and scanned.
3. To locate a drop box near you, click on **Find A Drop Box** from the home page main menu.
4. To schedule a pickup, click on **Request Pickup**.

WARNING: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your Lone Star Overnight account number.

This label is valid for use for 3 months from the date printed. Use of expired labels may result in delayed billing and / or additional research charges. LIMIT OF LIABILITY: We are not responsible for claims in excess of $100 for any reason unless you: 1) declare a greater value (not to exceed $25,000); 2) pay an additional fee; 3) and document your actual loss in a timely manner. We will not pay any claim in excess of the actual loss. We are not liable for any special or consequential damages. Additional limitations of liability are contained in our current Service Guide. If you ask us to deliver a package without obtaining a delivery signature, you release us of all liability for claims resulting from such service. NO DELIVERY SIGNATURE WILL BE OBTAINED FOR 8:30 AM DELIVERIES OR RESIDENTIAL DELIVERIES.

Ana-Lab Corp.
2600 Dudley Rd. Kilgore, Texas 75662
P.O. Box 9000 Kilgore, Texas 75663
*Office: 903-984-0551 * Fax: 903-984-5914*

ANA LAB
Testing the Limits of Science and Service

Project
948457

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Printed 01/06/2021 11:22

TABLE OF CONTENTS

This report consists of this Table of Contents and the following pages:

Report Name	Description	Pages
948457_r03_03_ProjectResults	Ana-Lab Project P:948457 C:DWAT Project Results t:304	4
948457_r10_05_ProjectQC	Ana-Lab Project P:948457 C:DWAT Project Quality Control Groups	7
948457_r99_09_CoC__1_of_1	Ana-Lab CoC DWAT 948457_1_of_1	3
	Total Pages:	14

NELAP-accredited #T104704201-20-17

Ana-Lab Corp.
2600 Dudley Rd. Kilgore, Texas 75662
P.O. Box 9000 Kilgore, Texas 75663
Office: 903-984-0551 * Fax: 903-984-5914

ANA LAB
Testing the Limits of Science and Service

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Project
948457

Printed: 01/06/2021

Results

Sample Results

1949897 **Big Sky Estates. Well #1** Received: 12/23/2020

Drinking Water | Collected by: Client | Ana-Lab Corp. | PO:
Taken: 12/23/2020 09:25:00

	Parameter	Results	Units	RL	Flags	CAS	Bottle
	Prepared: 12/28/2020 10:17:22 Calculated 12/28/2020 10:17:22 CAL						
z	Pickup/Sampling/Transport	Verified					
	EPA 200.7 4.4 Prepared: 931708 12/29/2020 11:00:00 Analyzed 931974 12/30/2020 11:21:00 LPS						
NELAC	Calcium	10.5	mg/L	0.500		7440-70-2	04
NELAC	Iron, Total	0.650	mg/L	0.025		7439-89-6	04
NELAC	Magnesium, Total	4.64	mg/L	0.250		7439-95-4	04
	EPA 200.7 4.4 Prepared: 931708 12/29/2020 11:00:00 Analyzed 931974 12/30/2020 12:26:00 LPS						
NELAC	Sodium	205	mg/L	5.00	PD	7440-23-5	04
	EPA 200.7, Rev. 4.4 Prepared: 12/30/2020 15:37:55 Calculated 12/30/2020 15:37:55 CAL						
z	Calcium (as CaCO3)	26.1	mg/L	1.24			
	EPA 200.8 5.4 Prepared: 931708 12/29/2020 11:00:00 Analyzed 931853 12/29/2020 17:06:00 SAM						
NELAC	Arsenic, Total	0.00157	mg/L	0.0005		7440-38-2	04
NELAC	Copper, Total	0.00246	mg/L	0.001		7440-50-8	04
NELAC	Lead, Total	<0.0005	mg/L	0.0005		7439-92-1	04
NELAC	Manganese, Total	0.0325	mg/L	0.001		7439-96-5	04
NELAC	Zinc, Total	<0.003	mg/L	0.003		7440-66-6	04
	EPA 200.8 5.4 Prepared: 931708 12/29/2020 11:00:00 Analyzed 932263 01/04/2021 12:23:00 SAM						
	Parameter	Results	Units	RL	Flags	CAS	Bottle

NELAP-accredited #T104704201-20-17

Ana-Lab Corp.
2600 Dudley Rd. Kilgore, Texas 75662
P.O. Box 9000 Kilgore, Texas 75663
Office: 903-984-0551 * Fax: 903-984-5914

ANA LAB
Testing the Limits of Science and Service

DWAT-N

Project
948457

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Printed: 01/06/2021

1949897 **Big Sky Estates. Well #1** Received: 12/23/2020

Drinking Water Collected by: Client Ana-Lab Corp. PO:
Taken: 12/23/2020 09:25:00

EPA 200.8 5.4 Prepared: 931708 12/29/2020 11:00:00 Analyzed 932263 01/04/2021 12:23:00 SAM

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**Aluminum, Total**	**0.393**	**mg/L**	0.025		**7429-90-5**	04

EPA 300.0 2.1 Prepared: 931509 12/23/2020 19:15:00 Analyzed 931509 12/23/2020 19:15:00 ATN

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**Chloride**	**144**	**mg/L**	3.00			01
NELAC	**Sulfate**	**35.8**	**mg/L**	1.00			01

EPA 300.0 2.1 Prepared: 931510 12/23/2020 18:51:00 Analyzed 931510 12/23/2020 18:51:00 ATN

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**DW Nitrate-Nitrogen Total**	**<0.0304**	**mg/L**	0.0304		**14797-55-8**	01
NELAC	**DW Nitrite-Nitrogen, Total**	**<0.020**	**mg/L**	0.020			01

NACE Calculation Prepared: 12/30/2020 17:26:32 Calculated 12/30/2020 17:26:32 CAL

	Parameter	Results	Units	RL	Flags	CAS	Bottle
	Ryznar Stability Index	**7.897**					

SM 2320 B-2011 Prepared: 931727 12/29/2020 08:19:00 Analyzed 931727 12/29/2020 08:19:00 ELS

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**Total Alkalinity (as CaCO3)**	**287**	**mg/L**	1.00			01

SM 2330 B-1993 Prepared: 12/30/2020 17:26:31 Calculated 12/30/2020 17:26:31 CAL

	Parameter	Results	Units	RL	Flags	CAS	Bottle
z	**Langelier Saturation Index @22C**	**0.2513**					

SM 2340 B-2011 Prepared: 12/30/2020 15:37:55 Calculated 12/30/2020 15:37:55 CAL

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**Calcium Hardness (as CaCO3)**	**26.2**	**mg/L**	1.25			
NELAC	**Total Hardness as CaCO3 -Ca/MgEq**	**45.3**	**mg/L**	0.500			

NELAP-accredited #T104704201-20-17

Ana-Lab Corp.
2600 Dudley Rd. Kilgore, Texas 75662
P.O. Box 9000 Kilgore, Texas 75663
Office: 903-984-0551 * Fax: 903-984-5914

ANA LAB
Testing the Limits of Science and Service

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Project
948457

Printed: 01/06/2021

1949897 **Big Sky Estates. Well #1** Received: 12/23/2020

Drinking Water Collected by: Client Ana-Lab Corp. PO:
Taken: 12/23/2020 09:25:00

SM 2340 B-97 Prepared: 12/30/2020 16:02:06 Calculated 12/30/2020 16:02:06 CAL

	Parameter	Results	Units	RL	Flags	CAS	Bottle
z	**Aggressive Index (AI)**	**12.3**					

SM 2510 B-97 Prepared: 932114 12/31/2020 08:51:00 Analyzed 932114 12/31/2020 08:51:00 ELS

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**Lab Spec. Conductance at 25 C**	**1050**	**umhos/cm**				01

SM 2540 C-2011 Prepared: 931745 12/28/2020 10:05:00 Analyzed 931745 12/28/2020 10:05:00 TH2

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**Total Dissolved Solids**	**620**	**mg/L**	50.0			01

SM 4500-H+ B-2011 Prepared: 931992 12/30/2020 08:49:00 Analyzed 931992 12/30/2020 08:49:00 ELS

	Parameter	Results	Units	RL	Flags	CAS	Bottle
NELAC	**Laboratory pH**	**8.4 @ 18 C**	**SU**	2.00			01

Sample Preparation

1949897 **Big Sky Estates. Well #1** Received: 12/23/2020

12/23/2020

Prepared: 12/23/2020 15:29:00 Analyzed 12/23/2020 15:29:00 AAJ

z	**Bottle pH**	**<2**	**SU**				03

Prepared: 12/28/2020 10:17:21 Calculated 12/28/2020 10:17:21 CAL

z	**Environmental Fee (per Project)**	**Verified**					

NELAP-accredited #T104704201-20-17

Ana-Lab Corp.
2600 Dudley Rd. Kilgore, Texas 75662
P.O. Box 9000 Kilgore, Texas 75663
*Office: 903-984-0551 * Fax: 903-984-5914*

ANA LAB
Testing the Limits of Science and Service

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Project
948457

Printed: 01/06/2021

1949897 **Big Sky Estates. Well #1** *Received:* 12/23/2020

12/23/2020

EPA 200.2 2.8	*Prepared:*	*931708*	*12/29/2020*	*11:00:00*	*Analyzed*	*931708*	*12/29/2020*	*11:00:00*	*TES*
NELAC **Liquid Metals Digestion**	**50/50**		**ml**						03
SM 2540 C-2011	*Prepared:*	*931500*	*12/28/2020*	*10:05:00*	*Analyzed*	*931500*	*12/28/2020*	*10:05:00*	*TH2*
NELAC **Total Dissolved Solids Started**	**Started**								

Qualifiers:

D - Duplicate RPD was higher than expected

P - Spike recovery outside control limits due to matrix effects.

We report results on an As Received or wet basis unless marked Dry Weight. Unless otherwise noted, testing was performed at Ana-labs corporate laboratory that holds the following Federal and State certificates: EPA Lab Number TX00063, US Department of Agriculture Soil Import Permit P330-17-00117, Texas Commission on Environmental Quality Commercial Drinking Water Lab Approval (Lab ID: TX219), Texas Commission on Environmental Quality NELAP T104704201-20-17, Louisiana Department of Environmental Quality Laboratory Certification (NELAP, LELAP) #02008, Louisiana Department of Health and Hospitals Drinking Water (NELAP) Certificate No LA026, Oklahoma Department of Environmental Quality TNI Laboratory Accreditation Program Certificate No. 2018-126, Arkansas Department of Environmental Quality Certification #18-068-0. The Accredited column designates accreditation by N -- NELAC, or z -- not covered under NELAC scope of accreditation.
These analytical results relate to the sample tested. This report may NOT be reproduced EXCEPT in FULL without written approval of Ana-Lab Corp. Unless otherwise specified, these test results meet the requirements of NELAC.
RL is the Reporting Limit (sample specific quantitation limit) and is at or above the Method Detection Limit (MDL). CAS is Chemical Abstract Service number. RL is our Reporting Limit, or Minimum Quantitation Level. The RL takes into account the Instrument Detection Limit (IDL), Method Detection Limit (MDL), and Practical Quantitation Limit (PQL), and any dilutions and/or concentrations performed during sample preparation (EQL). Our analytical result must be above this RL before we report a value in the 'Results' column of our report (without a 'J' flag). Otherwise, we report ND (Not Detected above RL), because the result is "<" (less than) the number in the RL column. MAL is Minimum Analytical Level and is typically from regulatory agencies. Unless we report a result in the result column, or interferences prevent it, we work to have our RL at or below the MAL.

Trey Peery, MA, Project Manager

NELAP-accredited #T104704201-20-17

Quality Control

ANALAB
Testing the Limits of Science and Service

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Project
948457

Printed 01/06/2021

Analytical Set 931745 — SM 2540 C-2011

Blank

Parameter	PrepSet	Reading	MDL	MQL	Units	File
Total Dissolved Solids	931745	ND	5.00	5.00	mg/L	121902648

ControlBlk

Parameter	PrepSet	Reading	MDL	MQL	Units	File
Total Dissolved Solids	931745	0			grams	121902635

Duplicate

Parameter	Sample	Result	Unknown	Unit	RPD	Limit%
Total Dissolved Solids	1949518	162	152	mg/L	6.37	20.0

LCS

Parameter	PrepSet	Reading	Known	Units	Recover%	Limits	File
Total Dissolved Solids	931745	204	200	mg/L	102	85.0 - 115	121902649

Standard

Parameter	Sample	Reading	Known	Units	Recover%	Limits%	File
Total Dissolved Solids		94.0	100	mg/L	94.0	90.0 - 110	121902636

Analytical Set 931509 — EPA 300.0 2.1

Blank

Parameter	PrepSet	Reading	MDL	MQL	Units	File
Chloride	931509	0.059	0.0385	0.300	mg/L	121898332
Sulfate	931509	ND	0.0871	0.100	mg/L	121898332

CCV

Parameter	Reading	Known	Units	Recover%	Limits%	File
Chloride	10.3	10.0	mg/L	103	90.0 - 110	121898329
Chloride	9.39	10.0	mg/L	93.9	90.0 - 110	121898346
Chloride	10.3	10.0	mg/L	103	90.0 - 110	121898355
Sulfate	10.3	10.0	mg/L	103	90.0 - 110	121898329
Sulfate	9.19	10.0	mg/L	91.9	90.0 - 110	121898346
Sulfate	10.3	10.0	mg/L	103	90.0 - 110	121898355

LCS Dup

Parameter	PrepSet	LCS	LCSD	Known	Limits%	LCS%	LCSD%	Units	RPD	Limit%
Chloride	931509	4.80	4.91	5.00	85.0 - 110	96.0	98.2	mg/L	2.27	20.0
Sulfate	931509	4.97	5.04	5.00	88.0 - 110	99.4	101	mg/L	1.40	20.0

MSD

Parameter	Sample	MS	MSD	UNK	Known	Limits	MS%	MSD%	Units	RPD	Limit%
Chloride	1949231	289	287	243	50.0	80.0 - 120	92.0	88.0	mg/L	4.44	20.0
Sulfate	1949231	47.6	47.1	5.35	50.0	80.0 - 120	84.5	83.5	mg/L	1.19	20.0
Chloride	1949298	109	120	74.6	50.0	80.0 - 120	68.8 *	90.8	mg/L	27.6 *	20.0
Sulfate	1949298	115	130	84.9	50.0	80.0 - 120	60.2 *	90.2	mg/L	39.9 *	20.0

NELAP-accredited #T104704201-20-17

Quality Control

ANALAB
Testing the Limits of Science and Service

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Project
948457

Printed 01/06/2021

Analytical Set 931510 — EPA 300.0 2.1

AWRL/MRL C

Parameter	Reading	Known	Units	Recover%	Limits%	File
DW Nitrate-Nitrogen Total	0.0221	0.0226	mg/L	97.8	70.0 - 130	121898358

Blank

Parameter	PrepSet	Reading	MDL	MQL	Units	File
DW Nitrate-Nitrogen Total	931510	ND	0.00541	0.0304	mg/L	121898359
DW Nitrite-Nitrogen, Total	931510	ND	0.00367	0.020	mg/L	121898359

CCV

Parameter	Reading	Known	Units	Recover%	Limits%	File
DW Nitrate-Nitrogen Total	2.25	2.26	mg/L	99.6	90.0 - 110	121898356
DW Nitrate-Nitrogen Total	2.06	2.26	mg/L	91.2	90.0 - 110	121898364
DW Nitrate-Nitrogen Total	2.26	2.26	mg/L	100	90.0 - 110	121898370
DW Nitrite-Nitrogen, Total	3.15	3.04	mg/L	104	90.0 - 110	121898356
DW Nitrite-Nitrogen, Total	2.90	3.04	mg/L	95.4	90.0 - 110	121898364
DW Nitrite-Nitrogen, Total	3.17	3.04	mg/L	104	90.0 - 110	121898370

LCS Dup

Parameter	PrepSet	LCS	LCSD	Known	Limits%	LCS%	LCSD%	Units	RPD	Limit%
DW Nitrate-Nitrogen Total	931510	1.10	1.13	1.13	70.0 - 130	97.3	100	mg/L	2.69	30.0
DW Nitrite-Nitrogen, Total	931510	1.50	1.54	1.52	70.0 - 130	98.7	101	mg/L	2.63	30.0

MSD

Parameter	Sample	MS	MSD	UNK	Known	Limits	MS%	MSD%	Units	RPD	Limit%
DW Nitrate-Nitrogen Total	1949231	9.99	10.1	0.181	11.3	70.0 - 130	86.8	87.8	mg/L	1.12	30.0
DW Nitrite-Nitrogen, Total	1949231	13.2	13.4	ND	15.2	70.0 - 130	86.8	88.2	mg/L	1.50	30.0
DW Nitrate-Nitrogen Total	1949298	23.9	26.3	15.7	11.3	70.0 - 130	72.6	93.8	mg/L	25.5	30.0
DW Nitrite-Nitrogen, Total	1949298	13.3	14.3	ND	15.2	70.0 - 130	87.5	94.1	mg/L	7.25	30.0

Analytical Set 931853 — EPA 200.8 5.4

Blank

Parameter	PrepSet	Reading	MDL	MQL	Units	File
Arsenic, Total	931708	ND	0.000359	0.0005	mg/L	121904680
Copper, Total	931708	ND	0.0005	0.001	mg/L	121904680
Lead, Total	931708	ND	0.00025	0.0005	mg/L	121904680
Manganese, Total	931708	ND	0.000105	0.001	mg/L	121904680
Zinc, Total	931708	ND	0.001	0.003	mg/L	121904680

CCV

Parameter	Reading	Known	Units	Recover%	Limits%	File
Arsenic, Total	0.0494	0.05	mg/L	98.8	90.0 - 110	121904679
Arsenic, Total	0.0495	0.05	mg/L	99.0	90.0 - 110	121904690
Copper, Total	0.0503	0.05	mg/L	101	90.0 - 110	121904679
Copper, Total	0.0501	0.05	mg/L	100	90.0 - 110	121904690
Lead, Total	0.0495	0.05	mg/L	99.0	90.0 - 110	121904679

NELAP-accredited #T104704201-20-17

Quality Control

ANALAB
Testing the Limits of Science and Service

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Project
948457

Printed 01/06/2021

CCV

Parameter	Reading	Known	Units	Recover%	Limits%	File
Lead, Total	0.0498	0.05	mg/L	99.6	90.0 - 110	121904690
Manganese, Total	0.0497	0.05	mg/L	99.4	90.0 - 110	121904679
Manganese, Total	0.050	0.05	mg/L	100	90.0 - 110	121904690
Zinc, Total	0.050	0.05	mg/L	100	90.0 - 110	121904679
Zinc, Total	0.050	0.05	mg/L	100	90.0 - 110	121904690

ICV

Parameter	Reading	Known	Units	Recover%	Limits%	File
Arsenic, Total	0.0508	0.05	mg/L	102	90.0 - 110	121904678
Copper, Total	0.0515	0.05	mg/L	103	90.0 - 110	121904678
Lead, Total	0.0505	0.05	mg/L	101	90.0 - 110	121904678
Manganese, Total	0.0503	0.05	mg/L	101	90.0 - 110	121904678
Zinc, Total	0.0501	0.05	mg/L	100	90.0 - 110	121904678

LCS Dup

Parameter	PrepSet	LCS	LCSD	Known	Limits%	LCS%	LCSD%	Units	RPD	Limit%
Arsenic, Total	931708	0.488	0.475	0.500	85.0 - 115	97.6	95.0	mg/L	2.70	20.0
Copper, Total	931708	0.501	0.483	0.500	85.0 - 115	100	96.6	mg/L	3.66	20.0
Lead, Total	931708	0.508	0.495	0.500	85.0 - 115	102	99.0	mg/L	2.59	20.0
Manganese, Total	931708	0.495	0.489	0.500	85.0 - 115	99.0	97.8	mg/L	1.22	20.0
Zinc, Total	931708	0.500	0.484	0.500	85.0 - 115	100	96.8	mg/L	3.25	20.0

LDR

Parameter	Reading	Known	Units	Recover%	Limits%	File
Arsenic, Total	4.88	5	mg/L	97.6	90.0 - 110	121904669
Copper, Total	4.82	5	mg/L	96.4	90.0 - 110	121904669
Lead, Total	9.40	10	mg/L	94.0	90.0 - 110	121904670
Manganese, Total	9.45	10	mg/L	94.5	90.0 - 110	121904670
Zinc, Total	9.25	10	mg/L	92.5	90.0 - 110	121904670

MRL Check

Parameter	Reading	Known	Units	Recover%	Limits%	File
Copper, Total	0.001	0.001	mg/L	100	25.0 - 175	121904677
Lead, Total	0.000988	0.001	mg/L	98.8	25.0 - 175	121904677
Manganese, Total	0.00108	0.001	mg/L	108	25.0 - 175	121904677

MSD

Parameter	Sample	MS	MSD	UNK	Known	Limits	MS%	MSD%	Units	RPD	Limit%
Arsenic, Total	1949897	0.491	0.487	0.00157	0.500	70.0 - 130	97.9	97.1	mg/L	0.821	20.0
Copper, Total	1949897	0.480	0.487	0.00246	0.500	70.0 - 130	95.5	96.9	mg/L	1.46	20.0
Lead, Total	1949897	0.486	0.494	ND	0.500	70.0 - 130	97.2	98.8	mg/L	1.63	20.0
Manganese, Total	1949897	0.518	0.521	0.0325	0.500	70.0 - 130	97.1	97.7	mg/L	0.616	20.0
Zinc, Total	1949897	0.471	0.474	0.00178	0.500	70.0 - 130	93.8	94.4	mg/L	0.637	20.0

Analytical Set 931974 EPA 200.7 4.4

NELAP-accredited #T104704201-20-17

Quality Control

ANALAB
Testing the Limits of Science and Service

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Project
948457

Printed 01/06/2021

Blank

Parameter	PrepSet	Reading	MDL	MQL	Units	File
Calcium	931708	ND	0.0156	0.500	mg/L	121907310
Iron, Total	931708	ND	0.00379	0.025	mg/L	121907310
Magnesium, Total	931708	0.00844	0.00367	0.250	mg/L	121907310
Sodium	931708	ND	0.0139	0.500	mg/L	121907310

CCV

Parameter	Reading	Known	Units	Recover%	Limits%	File
Calcium	25.4	25.0	mg/L	102	90.0 - 110	121907309
Calcium	25.4	25.0	mg/L	102	90.0 - 110	121907313
Calcium	25.2	25.0	mg/L	101	90.0 - 110	121907323
Calcium	25.5	25.0	mg/L	102	90.0 - 110	121907334
Calcium	25.3	25.0	mg/L	101	90.0 - 110	121907343
Calcium	25.3	25.0	mg/L	101	90.0 - 110	121907351
Iron, Total	2.50	2.50	mg/L	100	90.0 - 110	121907309
Iron, Total	2.51	2.50	mg/L	100	90.0 - 110	121907313
Iron, Total	2.50	2.50	mg/L	100	90.0 - 110	121907323
Iron, Total	2.53	2.50	mg/L	101	90.0 - 110	121907334
Iron, Total	2.52	2.50	mg/L	101	90.0 - 110	121907343
Iron, Total	2.53	2.50	mg/L	101	90.0 - 110	121907351
Magnesium, Total	25.2	25.0	mg/L	101	90.0 - 110	121907309
Magnesium, Total	25.3	25.0	mg/L	101	90.0 - 110	121907313
Magnesium, Total	25.2	25.0	mg/L	101	90.0 - 110	121907323
Magnesium, Total	25.4	25.0	mg/L	102	90.0 - 110	121907334
Magnesium, Total	25.3	25.0	mg/L	101	90.0 - 110	121907343
Magnesium, Total	25.3	25.0	mg/L	101	90.0 - 110	121907351
Sodium	24.9	25.0	mg/L	99.6	90.0 - 110	121907309
Sodium	25.0	25.0	mg/L	100	90.0 - 110	121907313
Sodium	24.9	25.0	mg/L	99.6	90.0 - 110	121907323
Sodium	25.0	25.0	mg/L	100	90.0 - 110	121907334
Sodium	24.9	25.0	mg/L	99.6	90.0 - 110	121907343
Sodium	24.8	25.0	mg/L	99.2	90.0 - 110	121907351

Dir. SPKD

Parameter	Sample	DSPK	DSPKD	UNK	Known	Limits%	DSPK%	DSPKD%	Units	RPD	Limit%
Calcium	1949897	62.6	63.2	12.4	50.0	75.0 - 125	100	102	mg/L	0.954	25.0
Iron, Total	1949897	5.19	5.23	0.672	5.00	75.0 - 125	90.4	91.2	mg/L	0.768	25.0
Magnesium, Total	1949897	52.4	52.9	4.74	50.0	75.0 - 125	95.3	96.3	mg/L	0.950	25.0
Sodium	1949897	246	250	205	50.0	75.0 - 125	82.0	90.0	mg/L	1.61	25.0

Direct SPK

Parameter	Sample	DSPK	UNK	Known	Limits%	DSPK%	Units	
Calcium	1949897	62.6	12.4	50.0	75.0 - 125	100	mg/L	25.0
Iron, Total	1949897	5.19	0.672	5.00	75.0 - 125	90.4	mg/L	25.0
Magnesium, Total	1949897	52.4	4.74	50.0	75.0 - 125	95.3	mg/L	25.0
Sodium	1949897	246	205	50.0	75.0 - 125	82.0	mg/L	25.0

NELAP-accredited #T104704201-20-17

Quality Control

ANALAB
Testing the Limits of Science and Service

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Project
948457

Printed 01/06/2021

ICL

Parameter	Reading	Known	Units	Recover%	Limits%	File
Calcium	49.3	50.0	mg/L	98.6	95.0 - 105	121907303
Iron, Total	4.76	5.00	mg/L	95.2	95.0 - 105	121907303
Magnesium, Total	49.9	50.0	mg/L	99.8	95.0 - 105	121907303
Sodium	50.1	50.0	mg/L	100	95.0 - 105	121907303

ICV

Parameter	Reading	Known	Units	Recover%	Limits%	File
Calcium	26.4	25.0	mg/L	106	90.0 - 110	121907307
Iron, Total	2.39	2.50	mg/L	95.6	90.0 - 110	121907307
Magnesium, Total	26.4	25.0	mg/L	106	90.0 - 110	121907307
Sodium	25.8	25.0	mg/L	103	90.0 - 110	121907307

LCS Dup

Parameter	PrepSet	LCS	LCSD	Known	Limits%	LCS%	LCSD%	Units	RPD	Limit%
Calcium	931708	4.97	4.81	5.00	85.0 - 115	99.4	96.2	mg/L	3.27	25.0
Iron, Total	931708	0.471	0.452	0.500	85.0 - 115	94.2	90.4	mg/L	4.12	25.0
Magnesium, Total	931708	4.95	4.79	5.00	85.0 - 115	99.0	95.8	mg/L	3.29	25.0
Sodium	931708	4.88	4.71	5.00	85.0 - 115	97.6	94.2	mg/L	3.55	25.0

LDR

Parameter	Reading	Known	Units	Recover%	Limits%	File
Calcium	98.0	100	mg/L	98.0	90.0 - 110	121907304
Iron, Total	9.44	10.0	mg/L	94.4	90.0 - 110	121907304
Magnesium, Total	101	100	mg/L	101	90.0 - 110	121907304
Sodium	108	100	mg/L	108	90.0 - 110	121907304

MRL Check

Parameter	Reading	Known	Units	Recover%	Limits%	File
Calcium	0.504	0.500	mg/L	101	25.0 - 175	121907308
Iron, Total	0.0498	0.050	mg/L	99.6	25.0 - 175	121907308
Sodium	0.473	0.500	mg/L	94.6	25.0 - 175	121907308

MSD

Parameter	Sample	MS	MSD	UNK	Known	Limits	MS%	MSD%	Units	RPD	Limit%
Calcium	1949897	15.6	15.9	10.5	5.00	75.0 - 125	102	108	mg/L	5.71	25.0
Iron, Total	1949897	1.09	1.11	0.650	0.500	75.0 - 125	88.0	92.0	mg/L	4.44	25.0
Magnesium, Total	1949897	8.72	8.86	4.64	5.00	75.0 - 125	81.6	84.4	mg/L	3.37	25.0
Sodium	1949897	231	238	224	5.00	75.0 - 125	140 *	280 *	mg/L	66.7 *	25.0
Calcium	1950115	395	402	389	5.00	75.0 - 125	120	260 *	mg/L	73.7 *	25.0
Iron, Total	1950115	1.07	1.09	0.637	0.500	75.0 - 125	86.6	90.6	mg/L	4.51	25.0
Magnesium, Total	1950115	15.6	16.0	10.8	5.00	75.0 - 125	96.0	104	mg/L	8.00	25.0
Sodium	1950115	173	176	165	5.00	75.0 - 125	160 *	220 *	mg/L	31.6 *	25.0

Analytical Set 932263 EPA 200.8 5.4

Quality Control

ANALAB
Testing the Limits of Science and Service

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Project
948457

Printed 01/06/2021

Blank

Parameter	PrepSet	Reading	MDL	MQL	Units		File
Aluminum, Total	931708	0.00622	0.00204	0.005	mg/L	*	121912286

CCV

Parameter	Reading	Known	Units	Recover%	Limits%	File
Aluminum, Total	0.0489	0.05	mg/L	97.8	90.0 - 110	121912277
Aluminum, Total	0.0494	0.05	mg/L	98.8	90.0 - 110	121912287
Aluminum, Total	0.0497	0.05	mg/L	99.4	90.0 - 110	121912297

ICV

Parameter	Reading	Known	Units	Recover%	Limits%	File
Aluminum, Total	0.0488	0.05	mg/L	97.6	90.0 - 110	121912269

LCS Dup

Parameter	PrepSet	LCS	LCSD	Known	Limits%	LCS%	LCSD%	Units	RPD	Limit%
Aluminum, Total	931708	0.486	0.487	0.500	85.0 - 115	97.2	97.4	mg/L	0.206	20.0

MSD

Parameter	Sample	MS	MSD	UNK	Known	Limits	MS%	MSD%	Units	RPD	Limit%
Aluminum, Total	1949897	0.866	0.814	0.393	0.500	70.0 - 130	94.6	84.2	mg/L	11.6	20.0

Analytical Set 931727 — SM 2320 B-2011

Blank

Parameter	PrepSet	Reading	MDL	MQL	Units	File
Total Alkalinity (as CaCO3)	931727	ND	1.00	1.00	mg/L	121902351

CCV

Parameter	Reading	Known	Units	Recover%	Limits%	File
Total Alkalinity (as CaCO3)	25.1	25.0	mg/L	100	90.0 - 110	121902350
Total Alkalinity (as CaCO3)	25.6	25.0	mg/L	102	90.0 - 110	121902364
Total Alkalinity (as CaCO3)	25.6	25.0	mg/L	102	90.0 - 110	121902372

Duplicate

Parameter	Sample	Result	Unknown	Unit	RPD	Limit%
Total Alkalinity (as CaCO3)	1949485	45.3	47.7	mg/L	5.16	20.0
Total Alkalinity (as CaCO3)	1949718	343	334	mg/L	2.66	20.0

ICV

Parameter	Reading	Known	Units	Recover%	Limits%	File
Total Alkalinity (as CaCO3)	25.1	25.0	mg/L	100	90.0 - 110	121902349

Mat. Spike

Parameter	Sample	Spike	Unknown	Known	Units	Recovery %	Limits %	File
Total Alkalinity (as CaCO3)	1949485	71.4	47.7	25.0	mg/L	94.8	70.0 - 130	121902354
Total Alkalinity (as CaCO3)	1949718	362	334	25.0	mg/L	112	70.0 - 130	121902367

Analytical Set 931992 — SM 4500-H+ B-2011

Quality Control

ANALAB
Testing the Limits of Science and Service

DWAT-N

Davis Water Well, LLC
Hunter Goodman
45 Knight Road
Whitesboro, TX 76273

Project
948457

Printed 01/06/2021

Duplicate

Parameter	Sample	Result	Unknown	Unit	RPD	Limit%
Laboratory pH	1949836	8.1	8.1	SU	0	20.0
Laboratory pH	1950156	8.9	8.8	SU	1.13	20.0

Standard

Parameter	Sample	Reading	Known	Units	Recover%	Limits%	File
Laboratory pH	931992	7.01	7.00	SU	100	90.0 - 110	121907661
Laboratory pH	931992	4.00	4.00	SU	100	90.0 - 110	121907662
Laboratory pH	931992	10.05	10.00	SU	100	90.0 - 110	121907663
Laboratory pH	931992	6.03	6.00	SU	100	90.0 - 110	121907664
Laboratory pH	931992	8.01	8.00	SU	100	90.0 - 110	121907665
Laboratory pH	931992	6.07	6.00	SU	101	90.0 - 110	121907677
Laboratory pH	931992	8.02	8.00	SU	100	90.0 - 110	121907678
Laboratory pH	931992	6.09	6.00	SU	102	90.0 - 110	121907690
Laboratory pH	931992	8.03	8.00	SU	100	90.0 - 110	121907691

Analytical Set 932114 — SM 2510 B-97

Blank

Parameter	PrepSet	Reading	MDL	MQL	Units	File
Lab Spec. Conductance at 25 C	932114	1.00			umhos/cm	121909817

Duplicate

Parameter	Sample	Result	Unknown	Unit	RPD	Limit%
Lab Spec. Conductance at 25 C	1949627	452	451	umhos/cm	0.221	20.0
Lab Spec. Conductance at 25 C	1950725	1750	1750	umhos/cm	0	20.0

ICV

Parameter	Reading	Known	Units	Recover%	Limits%	File
Lab Spec. Conductance at 25 C	13100	12900	umhos/cm	102	90.0 - 110	121909820

Standard

Parameter	Sample	Reading	Known	Units	Recover%	Limits%	File
Lab Spec. Conductance at 25 C	932114	1440	1410	umhos/cm	102	90.0 - 110	121909818
Lab Spec. Conductance at 25 C	932114	101	100	umhos/cm	101	90.0 - 110	121909819
Lab Spec. Conductance at 25 C	932114	1430	1410	umhos/cm	101	90.0 - 110	121909832
Lab Spec. Conductance at 25 C	932114	1430	1410	umhos/cm	101	90.0 - 110	121909838

* Out RPD is Relative Percent Difference: abs(r1-r2) / mean(r1,r2) * 100%

Recover% is Recovery Percent: result / known * 100%

Blank - Method Blank; CCV - Continuing Calibration Verification; AWRL/MRL C - Ambient Water Reporting Limit/Minimum Reporting Limit Check Std; ICV - Initial Calibration Verification; LCS - Laboratory Control Sample; LDR - Linear Dynamic Range Standard; MRL Check - Minimum Reporting Limit Check Std

NELAP-accredited #T104704201-20-17

ANA-LAB CORP. THE COMPLETE SERVICE LAB

Chain of Custody

Shipping: 2600 Dudley · Kilgore TX 75662
Mailing: P.O. BOX 9000 · Kilgore, TX 75663-9000
Phone (903) 984-0551 · Fax (903) 984-5914 · Email: corp@ana-lab.com

Abilene	ArkLaMiss	Central TX	Gulf Coast	New Orleans	North TX	Oklahoma	Panhandle	Rio Grande Valley
325.669.2422	318.219.9300	512.821.0045	281.333.9414	504.330.0021	817.261.6404	405.292.6630	806.355.3556	956.831.6437

Report to: Brad Davis

Company Name: Davis Well Srvc. Client Code:

Address:

City State Zip

Phone Fax E-mail

Project- Name/Location

Billing (if different)

City State Zip

Phone Fax

Sampler Signature | Printed Name | Affiliation | PO Number

☐ Wastewater ☐ Drinking Water ☐ SW846

Analysis Requested: See attached

Lab Number Do Not Use	Field Identification	Date	Time	Matrix	# of Containers		Comments	See attached
949 8?7	Big Sky Estates Well #1	12/22/20	0925	DW	3	Comp/Grab (Grab circled)		X
						Comp/Grab		
						Comp/Grab		
						Comp/Grab		
						Comp/Grab		
						Comp/Grab		
						Comp/Grab		
						Comp/Grab		
						Comp/Grab		
						Comp/Grab		

Date 12/22/20 Time 1531 Tech AA
Temp: 3.1/2.1 C
Therm#: 6205 Corr Fact: 0.0 C

Date	Time	Relinquished by: Printed Name	Signature	Affiliation	Received by: Printed Name	Signature	Affiliation
12/22/20	1150	Leone Carlisle	Leone Carlisle	Ana-Lab	Anece Moore	[signature]	AC
12/23/20	1535	Anece Moore	[signature]	AC	Antonio James AnaLab	[signature]	

Samples Received on Ice? ☑ Yes ☐ No
Cooler/Sample Secure? ☑ Yes ☐ No

Method of Shipment ☐ Bus ☐ FedEx ☐ Lone Star ☐ UPS ☑ Hand delivered ☐ DHL ☐ other
Requested TAT ☐ Routine ☐ 3 day ☐ 2 Day ☐ next day

Tracking or Shipping Number ______
Samples contain: ☐ HF ☐ Cyanide ☐ Sulfide

Ana-Lab Personnel collect samples as specified by Ana-Lab SOP #000323.

Comments: Short Hold Nitrate

2600 Dudley Rd. Kilgore, Texas 75662
P.O. Box 9000 Kilgore, Texas 75663
Office: 903-984-0551 * Fax: 903-984-5914

ANA LAB
Testing the Limits of Science and Service

KACT Page 2 of 3

QUOTATION 125497

Quoted: 12/21/2020
Printed: 12/21/2020

Ana-Lab Corp.
Kevin Canon
2600 Dudley Road
Kilgore, TX 75662

Prepared For: Ana-Lab Corp.
Kevin Canon
2600 Dudley Road
Kilgore, TX 75662

SERVICES

Chain of Custody ID: 341
Sample ID: Davis Water Well
Sample Matrix: Liquid Aqueous
Price list by Turn Around Time (TAT) Normal TAT

Accredited by	Analysis Name	Method	Fee
	Pickup/Sampling/Transport		150.00
NELAC	Liquid Metals Digestion	EPA 200.2 2.8	16.00
NELAC	Iron, Total	EPA 200.7 4.4 CAS:7439-89-6	13.00
NELAC	Magnesium, Total	EPA 200.7 4.4 CAS:7439-95-4	13.00
NELAC	Sodium	EPA 200.7 4.4 CAS:7440-23-5	13.00
NELAC	Calcium	EPA 200.7 4.4 CAS:7440-70-2	13.00
	Calcium (as CaCO3)	EPA 200.7, Rev. 4.4	10.00
NELAC	Aluminum, Total	EPA 200.8 5.4 CAS:7429-90-5	13.00
NELAC	Lead, Total	EPA 200.8 5.4 CAS:7439-92-1	13.00
NELAC	Manganese, Total	EPA 200.8 5.4 CAS:7439-96-5	13.00
NELAC	Arsenic, Total	EPA 200.8 5.4 CAS:7440-38-2	13.00
NELAC	Copper, Total	EPA 200.8 5.4 CAS:7440-50-8	13.00
NELAC	Zinc, Total	EPA 200.8 5.4 CAS:7440-66-6	13.00
NELAC	Chloride	EPA 300.0 2.1	22.00
NELAC	DW Nitrite-Nitrogen, Total	EPA 300.0 2.1	22.00
NELAC	Sulfate	EPA 300.0 2.1	22.00
NELAC	DW Nitrate-Nitrogen Total	EPA 300.0 2.1 CAS:14797-55-8	22.00
	Ryznar Stability Index	NACE Calculation	10.00
NELAC	Total Alkalinity (as CaCO3)	SM 2320 B-2011	21.00
	Langelier Saturation Index @22C	SM 2330 B-1993	20.00
NELAC	Calcium Hardness (as CaCO3)	SM 2340 B-2011	10.00
NELAC	Total Hardness as CaCO3 -Ca/MgEq	SM 2340 B-2011	21.00
	Aggressive Index (AI)	SM 2340 B-97	21.00
NELAC	Lab Spec. Conductance at 25 C	SM 2510 B-97	13.00
NELAC	Total Dissolved Solids	SM 2540 C-2011	20.00
NELAC	Laboratory pH	SM 4500-H+ B-2011	12.00

Quantity: 1

Subtotal: $542.00 Total: $542.00

Corporate: 2600 Dudley Road Kilgore TX 75662

NELAP-accredited #T104704201-20-17

2600 Dudley Rd. Kilgore, Texas 75662
P.O. Box 9000 Kilgore, Texas 75663
Office: 903-984-0551 * Fax: 903-984-5914

ANA LAB
Testing the Limits of Science and Service

QUOTATION 125497

KACT Page 1 of 3
Quoted: 12/21/2020
Printed: 12/21/2020

Ana-Lab Corp.
Kevin Canon
2600 Dudley Road
Kilgore, TX 75662

Prepared For: Ana-Lab Corp.
Kevin Canon
2600 Dudley Road
Kilgore, TX 75662

SERVICES

Chain of Custody ID: ENV
Sample ID:
Sample Matrix: Liquid Aqueous
Price list by Turn Around Time (TAT)

Accredited by	Analysis Name	Method	Fee
	Environmental Fee (per Project)		10.00

Quantity: 1

Subtotal: $10.00 Total: **$10.00**

N. Jackson Rd

midway Ridge Homes

STATE OF TEXAS WELL REPORT for Tracking #29576

Owner:	**Burlington Resources**	Owner Well #:	**No Data**
Address:	**P. O. Box 909 Krum, TX 76248**	Grid #:	**19-54-1**
Well Location:	**Off of South Branch Road Krum, TX 76248**	Latitude:	**33° 14' 58" N**
		Longitude:	**097° 21' 38" W**
Well County:	**Denton**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Rig Supply**

Drilling Start Date: **4/17/2003** Drilling End Date: **6/6/2003**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
12.5	**0**	**10**
7.875	**10**	**700**

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
200	**700**	**Gravel**	

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**10**	**7 Cement**
190	**200**	**5 Cement**

Seal Method: **Hand Mix and Pellets**

Sealed By: **Driller**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **No Data**

Surface Completion: **Surface Sleeve Installed**

Water Level: **No Data** on **2003-05-06**

Measurement Method: **Unknown**

Packers: **No Data**

Type of Pump: **Submersible**

Well Tests: **Pump** **Yield: 30 GPM**

Water Quality:

Strata Depth (ft.)	Water Type
No Data	**No Data**

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **American Water Well Inc.**

6337 E. Highway 380
Decatur, TX 76234

Driller Name: **Cullen Calame** License Number: **54659**

Comments: **$dfs**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	**1**	**Top Soil**
1	**3**	**Caliche**
3	**7**	**Light Brown Clay**
7	**240**	**Gray Shale and Limestone**
240	**300**	**Light Gray Sand**
300	**310**	**Green Shale**
310	**580**	**Shale and Limestone**
580	**680**	**Sand**
680	**700**	**Green and Gray Shale**

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
8 5/8 New Steel 0 10 40
4 1/2 New Mill Slot Steel 680 700 40
4 1/2 New Steel 660 680 40
4 1/2 New Mill Slot Steel 580 660 40
4 1/2 New Steel 300 580 40
4 1/2 New Mill Sloot 280 300 40
4 1/2 New Steel 0 280 40

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

Texas Water Development Board (TWDB)
Groundwater Database (GWDB)
Well Information Report for State Well Number 19-46-803

GWDB Reports and Downloads

Well Basic Details

Scanned Documents

State Well Number	1946803
County	Denton
River Basin	Trinity
Groundwater Management Area	8
Regional Water Planning Area	C - Region C
Groundwater Conservation District	North Texas GCD
Latitude (decimal degrees)	33.2886111
Latitude (degrees minutes seconds)	33° 17' 19" N
Longitude (decimal degrees)	-97.305
Longitude (degrees minutes seconds)	097° 18' 18" W
Coordinate Source	Global Positioning System - GPS
Aquifer Code	218TWMT - Twin Mountains Formation
Aquifer	Trinity
Aquifer Pick Method	
Land Surface Elevation (feet above sea level)	821
Land Surface Elevation Method	Digital Elevation Model -DEM
Well Depth (feet below land surface)	1000
Well Depth Source	Driller's Log
Drilling Start Date	6/11/2002
Drilling End Date	10/23/2002
Drilling Method	Mud (Hydraulic) Rotary
Borehole Completion	Gravel Pack w/Screen

Well Type	Withdrawal of Water
Well Use	Public Supply
Water Level Observation	Miscellaneous Measurements
Water Quality Available	Yes
Pump	Submersible
Pump Depth (feet below land surface)	950
Power Type	Electric Motor
Annular Seal Method	Pressure
Surface Completion	Surface Slab Installed
Owner	Bolivar WSC
Driller	Tim Hall, Inc.
Other Data Available	Drillers Log
Well Report Tracking Number	13761
Plugging Report Tracking Number	
U.S. Geological Survey Site Number	
Texas Commission on Environmental Quality Source Id	G0610049T
Groundwater Conservation District Well Number	
Owner Well Number	Shiflett well
Other Well Number	
Previous State Well Number	
Reporting Agency	Texas Commission on Environmental Quality
Created Date	3/4/2011
Last Update Date	5/17/2018

Remarks	

Casing

Diameter (in.)	Casing Type	Casing Material	Schedule	Gauge	Top Depth (ft.)	Bottom Depth (ft.)
13	Blank	Steel			0	510
9	Blank	Steel			0	510
9	Screen	Stainless Steel			510	570
9	Blank	Steel			570	684
9	Screen	Stainless Steel			684	726
9	Blank	Steel			726	760
9	Screen	Stainless Steel			760	822
9	Blank	Steel			822	880
9	Screen	Stainless Steel			880	900
9	Blank	Steel			900	932
9	Screen	Stainless Steel			932	950
9	Blank	Steel			950	968
9	Screen	Stainless Steel			968	1000

Well Tests

Test Date	Test Type	Yield (gallons per minute)	Drawdown (ft.)	Test Hours
2002-10-23	Estimated	300		

Lithology

Top Depth (ft.)	Bottom Depth (ft.)	Description
0	10	TOP SOIL AND CLAY
10	120	LIME STREAKS AND GREY SHALE
120	190	HARD LIME AND SHALE
190	220	SAND STKS. AND SHALE
220	265	GREY SHALE
265	350	SAND AND SANDY SHALE
350	380	GREY SHALE
380	480	SANDY SHALE AND SAND
480	495	GREY SHALE
495	510	SANDY LIME AND HARD STKS.
510	570	SAND
570	620	GREY SHALE
620	670	SIME STKS. AND SANDY SHALE
670	720	SAND
720	760	SHALE AND SAND STKS.
760	815	SAND AND SHALE STKS.
815	880	SHALE AND SAND STKS.
880	905	SAND
905	935	STICKY SHALE
935	950	SAND
950	970	SHALE
970	1000	SAND

Annular Seal Range

Annular Seal Material	Amount	Unit	Top Depth (ft.)	Bottom Depth (ft.)
Cement	350	Bags/Sacks	0	510

Borehole

Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
20	0	1000

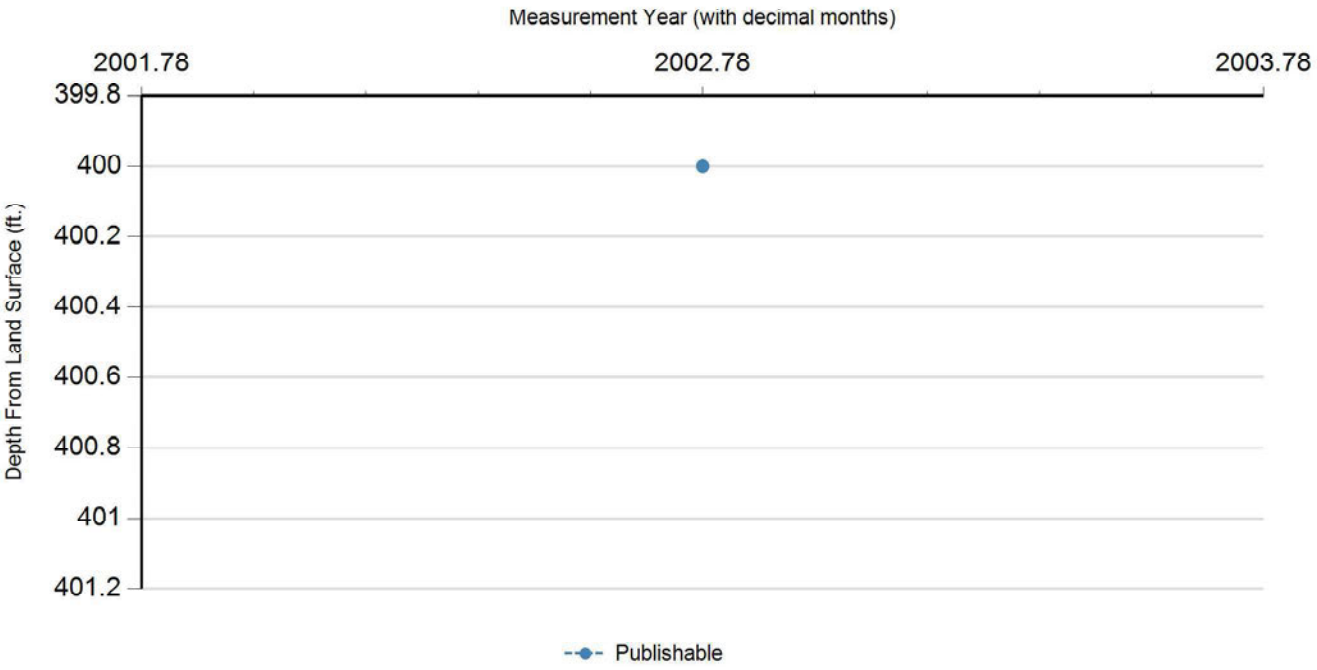
Plugged Back - No Data

Filter Pack

Filter Material	Top Depth (ft.)	Bottom Depth (ft.)	Size
Gravel	510	1000	

Packers - No Data

Water Level Measurements



Status Code	Date	Time	Water Level (ft. below land surface)	Change value in ( ) indicates rise in level	Water Elevation (ft. above sea level)	Meas #	Measuring Agency	Method	Remark ID	Comments
P	10/15/2002		400		421	1	Registered Water Well Driller	Unknown		

Code Descriptions

Status Code	Status Description
P	Publishable

Water Quality Analysis

Sample Date: 9/8/2005 **Sample Time:** **Sample Number:** 1 **Collection Entity:** Municipal Water Agency or Public Water Supply Corp

Sampled Aquifer: Twin Mountains Formation

Analyzed Lab: Laboratory Unknown **Reliability:** Reliability unknown or not available

Collection Remarks: No Data

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
00410	ALKALINITY, TOTAL (MG/L AS CACO3)		364	mg/L	
01105	ALUMINUM, TOTAL (UG/L AS AL)		508	ug/L	
01097	ANTIMONY, TOTAL (UG/L AS SB)	<	1	ug/L	
01002	ARSENIC, TOTAL (UG/L AS AS)	<	2	ug/L	
01007	BARIUM, TOTAL (UG/L AS BA)		6.6	ug/L	
01012	BERYLLIUM, TOTAL (UG/L AS BE)	<	0.8	ug/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		376	mg/L	
01027	CADMIUM, TOTAL (UG/L)	<	1	ug/L	
00916	CALCIUM, TOTAL (MG/L AS CA)		1.22	mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		34	mg/L	
00940	CHLORIDE, TOTAL (MG/L AS CL)		4	mg/L	
01034	CHROMIUM, TOTAL (UG/L AS CR)	<	10	ug/L	
01042	COPPER, TOTAL (UG/L AS CU)		0.0049	ug/L	
00951	FLUORIDE, TOTAL (MG/L AS F)		0.2	mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CACO3)		3.04	mg/L	
71885	IRON (UG/L AS FE)		547	ug/L	
01051	LEAD, TOTAL (UG/L AS PB)	<	1	ug/L	
00927	MAGNESIUM, TOTAL (MG/L AS MG)	<	1	mg/L	
01055	MANGANESE, TOTAL (UG/L AS MN)		5.6	ug/L	
71900	MERCURY, TOTAL (UG/L AS HG)	<	0.4	ug/L	
01067	NICKEL, TOTAL (UG/L AS NI)	<	1	ug/L	
00620	NITRATE NITROGEN, TOTAL (MG/L AS N)		0.17	mg/L	
00615	NITRITE NITROGEN, TOTAL (MG/L AS N)		0.09	mg/L	
00403	PH (STANDARD UNITS) LAB		8.9	SU	
01147	SELENIUM, TOTAL (UG/L)	<	3	ug/L	
01077	SILVER, TOTAL (UG/L AS AG)	<	10	ug/L	
00929	SODIUM, TOTAL (MG/L AS NA)		179	mg/L	
00945	SULFATE, TOTAL (MG/L AS SO4)		31	mg/L	
01059	THALLIUM, TOTAL (UG/L AS TL)	<	0.4	ug/L	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		448	mg/L	
01092	ZINC, TOTAL (UG/L AS ZN)		5.8	ug/L	

** Value may not display all significant digits for parameter in results, check Scanned Documents for laboratory paperwork..*

Texas Water Development Board (TWDB)
Groundwater Database (GWDB)
Well Information Report for State Well Number 19-46-803

GWDB DISCLAIMER: Except where noted, all of the information provided in the Texas Water Development Board (TWDB) Groundwater Database (http://www.twdb.texas.gov/groundwater/data/gwdbrpt.asp) is believed to be accurate and reliable; however, the TWDB assumes no responsibility for any errors appearing in rules or otherwise. Further, TWDB assumes no responsibility for the use of the information provided. PLEASE NOTE that users of these data are responsible for checking the accuracy, completeness, currency and/or suitability of all information themselves. TWDB makes no guarantees or warranties as to the accuracy, completeness, currency, or suitability of the information provided via the Groundwater Database (GWDB). TWDB specifically disclaims any and all liability for any claims or damages that may result from providing GWDB data or the information it contains. For additional information or answers to questions concerning the TWDB GWDB, contact the Groundwater Data Team at GroundwaterData@twdb.texas.gov.

Texas Water Development Board (TWDB)
Groundwater Database (GWDB)
Well Information Report for State Well Number 19-46-501

GWDB Reports and Downloads

Well Basic Details

Scanned Documents

State Well Number	1946501
County	Denton
River Basin	Trinity
Groundwater Management Area	8
Regional Water Planning Area	C - Region C
Groundwater Conservation District	North Texas GCD
Latitude (decimal degrees)	33.2916667
Latitude (degrees minutes seconds)	33° 17' 30" N
Longitude (decimal degrees)	-97.3152778
Longitude (degrees minutes seconds)	097° 18' 55" W
Coordinate Source	Global Positioning System - GPS
Aquifer Code	218TWMT - Twin Mountains Formation
Aquifer	Trinity
Aquifer Pick Method	
Land Surface Elevation (feet above sea level)	844
Land Surface Elevation Method	Digital Elevation Model -DEM
Well Depth (feet below land surface)	880
Well Depth Source	Driller's Log
Drilling Start Date	
Drilling End Date	10/29/1974
Drilling Method	Mud (Hydraulic) Rotary
Borehole Completion	Gravel Pack w/Screen

Well Type	Withdrawal of Water
Well Use	Unused
Water Level Observation	Miscellaneous Measurements
Water Quality Available	Yes
Pump	Submersible
Pump Depth (feet below land surface)	555
Power Type	Electric Motor
Annular Seal Method	Unknown
Surface Completion	
Owner	Bolivar WSC
Driller	J.L. Myers
Other Data Available	Aquifer Test; Drillers Log; Electric Log
Well Report Tracking Number	
Plugging Report Tracking Number	
U.S. Geological Survey Site Number	
Texas Commission on Environmental Quality Source Id	G0610049D
Groundwater Conservation District Well Number	
Owner Well Number	#4 Plainview #1
Other Well Number	
Previous State Well Number	
Reporting Agency	Texas Water Development Board
Created Date	3/23/1995
Last Update Date	5/16/2018

Remarks	Aquifer test data in TWDB files. TCEQ reports well is abandoned.

Casing

Diameter (in.)	Casing Type	Casing Material	Schedule	Gauge	Top Depth (ft.)	Bottom Depth (ft.)
12	Blank	Steel			0	20
7	Blank	Steel			0	770
3	Blank	Steel			730	770
3	Screen	Stainless Steel			770	796
3	Blank	Steel			796	816
3	Screen	Stainless Steel			816	831
3	Blank	Steel			831	845
3	Screen	Stainless Steel			845	855
3	Blank	Steel			855	860
3	Screen	Stainless Steel			860	870
3	Blank	Steel			870	880

Well Tests

Test Date	Test Type	Yield (gallons per minute)	Drawdown (ft.)	Test Hours
11/1/1974	Pump	100	70	15

Lithology

Top Depth (ft.)	Bottom Depth (ft.)	Description
0	3	Surface soil
3	150	Broken lime
150	256	Shale and lime
256	536	Shale with sand streaks
536	553	Shale
553	768	Sandy shale
768	800	Sand
800	819	Shale
819	878	Sand with shale streaks
878	900	Shale

Annular Seal Range

Annular Seal Material	Amount	Unit	Top Depth (ft.)	Bottom Depth (ft.)
Cement	185	Cubic Feet	0	770

Borehole

Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
9	0	900

Plugged Back

Plug Material	Top Depth (ft.)	Bottom Depth (ft.)
Gravel	870	900

Filter Pack

Filter Material	Top Depth (ft.)	Bottom Depth (ft.)	Size
Gravel	733	870	

Packers - No Data

Water Level Measurements

Status Code	Date	Time	Water Level (ft. below land surface)	Change value in ( ) indicates rise in level	Water Elevation (ft. above sea level)	Meas #	Measuring Agency	Method	Remark ID	Comments
P	11/1/1974		370		474	1	Registered Water Well Driller	Unknown		
P	5/8/1975		395	25.00	449	1	Other or Source of Measurement Unknown	Unknown		

Code Descriptions

Status Code	Status Description
P	Publishable

Water Quality Analysis

Sample Date: 11/1/1974 **Sample Time:** 0000 **Sample Number:** 1 **Collection Entity:** Well Owner or Operator

Sampled Aquifer: Twin Mountains Formation

Analyzed Lab: Pope Testing Lab **Reliability:** Reliability unknown or not available

Collection Remarks: No Data

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		30	mg/L	
00410	ALKALINITY, TOTAL (MG/L AS CACO3)		312	mg/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		307.53	mg/L	
00910	CALCIUM (MG/L)		3	mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		36	mg/L	
00940	CHLORIDE, TOTAL (MG/L AS CL)		14	mg/L	
00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.3	mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CACO3)		8	mg/L	
01045	IRON, TOTAL (UG/L AS FE)		60	ug/L	
00920	MAGNESIUM (MG/L)		0.3	mg/L	
01055	MANGANESE, TOTAL (UG/L AS MN)	<	50	ug/L	
71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.04	mg/L	
00400	PH (STANDARD UNITS), FIELD		8.7	SU	
71860	RESIDUAL SODIUM CARBONATE, CALCULATED		6.07		
00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		27.03		
00932	SODIUM, CALCULATED, PERCENT		97	PCT	
00929	SODIUM, TOTAL (MG/L AS NA)		170	mg/L	
00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		620	MICR	
00945	SULFATE, TOTAL (MG/L AS SO4)		46	mg/L	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		420	mg/L	

Water Quality Analysis

Sample Date: 4/21/1983 **Sample Time:** 0000 **Sample Number:** 1 **Collection Entity:** Texas Water Development Board

Sampled Aquifer: Twin Mountains Formation

Analyzed Lab: Texas Department of Health **Reliability:** Collected from pumped well, but not filtered or preserved

Collection Remarks: No Data

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		9	mg/L	
00410	ALKALINITY, TOTAL (MG/L AS CACO3)		305	mg/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		350.24	mg/L	
00910	CALCIUM (MG/L)		1.8	mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		10.8	mg/L	
00940	CHLORIDE, TOTAL (MG/L AS CL)		9	mg/L	
00950	FLUORIDE, DISSOLVED (MG/L AS F)	<	0.1	mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CACO3)		6	mg/L	
00920	MAGNESIUM (MG/L)		0.6	mg/L	
71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)		0.04	mg/L	
00400	PH (STANDARD UNITS), FIELD		8.7	SU	
71860	RESIDUAL SODIUM CARBONATE, CALCULATED		5.96		
00955	SILICA, DISSOLVED (MG/L AS SI02)		13	mg/L	
00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		27.58		
00932	SODIUM, CALCULATED, PERCENT		98	PCT	
00929	SODIUM, TOTAL (MG/L AS NA)		163	mg/L	
00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		725	MICR	
00945	SULFATE, TOTAL (MG/L AS SO4)		49	mg/L	
00010	TEMPERATURE, WATER (CELSIUS)		23	C	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		419	mg/L	

Water Quality Analysis

Sample Date: 3/23/1995 **Sample Time:** 1400 **Sample Number:** 1 **Collection Entity:** Texas Water Development Board

Sampled Aquifer: Twin Mountains Formation

Analyzed Lab: Texas Department of Health **Reliability:** Sampled using TWDB protocols

Collection Remarks: No Data

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
39086	ALKALINITY FIELD DISSOLVED AS CACO3		286	mg/L	
82244	ALKALINITY PHENOLPHTHALEIN FIELD DATA (MG/L)		16	mg/L	
00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		12	mg/L	
00410	ALKALINITY, TOTAL (MG/L AS CACO3)		308	mg/L	
01503	ALPHA, DISSOLVED (PC/L)	<	3.5	PC/L	
01106	ALUMINUM, DISSOLVED (UG/L AS AL)	<	20	ug/L	
01095	ANTIMONY, DISSOLVED (UG/L AS SB)	<	2	ug/L	
01000	ARSENIC, DISSOLVED (UG/L AS AS)	<	2	ug/L	
01005	BARIUM, DISSOLVED (UG/L AS BA)		9	ug/L	
01010	BERYLLIUM, DISSOLVED (UG/L AS BE)	<	1	ug/L	
03503	BETA, DISSOLVED (PC/L)	<	5.2	PC/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		346.58	mg/L	
01020	BORON, DISSOLVED (UG/L AS B)		210	ug/L	
71870	BROMIDE, DISSOLVED, (MG/L AS BR)	<	0.1	mg/L	
01025	CADMIUM, DISSOLVED (UG/L AS CD)	<	0.5	ug/L	
00915	CALCIUM, DISSOLVED (MG/L AS CA)		1.6	mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		14.4	mg/L	
00941	CHLORIDE, DISSOLVED (MG/L AS CL)		8	mg/L	
01030	CHROMIUM, DISSOLVED (UG/L AS CR)	<	8	ug/L	
01035	COBALT, DISSOLVED (UG/L AS CO)	<	8	ug/L	
01040	COPPER, DISSOLVED (UG/L AS CU)	<	6	ug/L	
00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.18	mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CACO3)		6	mg/L	
01046	IRON, DISSOLVED (UG/L AS FE)	<	6	ug/L	
01049	LEAD, DISSOLVED (UG/L AS PB)	<	5	ug/L	
01130	LITHIUM, DISSOLVED (UG/L AS LI)		36	ug/L	
00925	MAGNESIUM, DISSOLVED (MG/L AS MG)		0.66	mg/L	
01056	MANGANESE, DISSOLVED (UG/L AS MN)		2	ug/L	
71890	MERCURY, DISSOLVED (UG/L AS HG)	<	0.13	ug/L	
01060	MOLYBDENUM, DISSOLVED (UG/L AS MO)	<	50	ug/L	
01065	NICKEL, DISSOLVED (UG/L AS NI)	<	20	ug/L	
00618	NITRATE NITROGEN, DISSOLVED (MG/L AS N)	<	0.01	mg/L	
71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.04	mg/L	
00613	NITRITE NITROGEN, DISSOLVED (MG/L AS N)	<	0.01	mg/L	
00608	NITROGEN, AMMONIA, DISSOLVED (MG/L AS N)		0.47	mg/L	
00623	NITROGEN, KJELDAHL, DISSOLVED (MG/L AS N)		0.6	mg/L	

Texas Water Development Board (TWDB)
Groundwater Database (GWDB)
Well Information Report for State Well Number 19-46-501

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
00400	PH (STANDARD UNITS), FIELD		9.15	SU	
00935	POTASSIUM, DISSOLVED (MG/L AS K)		1.16	mg/L	
71860	RESIDUAL SODIUM CARBONATE, CALCULATED		6.03		
01145	SELENIUM, DISSOLVED (UG/L AS SE)	<	4	ug/L	
00955	SILICA, DISSOLVED (MG/L AS SI02)		12	mg/L	
01075	SILVER, DISSOLVED (UG/L AS AG)	<	6	ug/L	
00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		26.2		
00932	SODIUM, CALCULATED, PERCENT		98	PCT	
00930	SODIUM, DISSOLVED (MG/L AS NA)		156	mg/L	
00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		663	MICR	
01080	STRONTIUM, DISSOLVED (UG/L AS SR)		210	ug/L	
00946	SULFATE, DISSOLVED (MG/L AS SO4)		46	mg/L	
00010	TEMPERATURE, WATER (CELSIUS)		22.6	C	
01057	THALLIUM, DISSOLVED (UG/L AS TL)	<	2	ug/L	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		410	mg/L	
01085	VANADIUM, DISSOLVED (UG/L AS V)	<	8	ug/L	
01090	ZINC, DISSOLVED (UG/L AS ZN)	<	5	ug/L	

** Value may not display all significant digits for parameter in results, check Scanned Documents for laboratory paperwork..*

Texas Water Development Board (TWDB)
Groundwater Database (GWDB)
Well Information Report for State Well Number 19-46-502

GWDB Reports and Downloads

Well Basic Details

Scanned Documents

State Well Number	1946502
County	Denton
River Basin	Trinity
Groundwater Management Area	8
Regional Water Planning Area	C - Region C
Groundwater Conservation District	North Texas GCD
Latitude (decimal degrees)	33.2916667
Latitude (degrees minutes seconds)	33° 17' 30" N
Longitude (decimal degrees)	-97.3152778
Longitude (degrees minutes seconds)	097° 18' 55" W
Coordinate Source	Global Positioning System - GPS
Aquifer Code	218TWMT - Twin Mountains Formation
Aquifer	Trinity
Aquifer Pick Method	
Land Surface Elevation (feet above sea level)	844
Land Surface Elevation Method	Digital Elevation Model -DEM
Well Depth (feet below land surface)	864
Well Depth Source	Driller's Log
Drilling Start Date	
Drilling End Date	9/29/1997
Drilling Method	Mud (Hydraulic) Rotary
Borehole Completion	Gravel Pack w/Perforations

Well Type	Withdrawal of Water
Well Use	Public Supply
Water Level Observation	Miscellaneous Measurements
Water Quality Available	Yes
Pump	Submersible
Pump Depth (feet below land surface)	690
Power Type	Electric Motor
Annular Seal Method	Halliburton
Surface Completion	Surface Slab Installed
Owner	Bolivar WSC
Driller	Milican Well Service
Other Data Available	Drillers Log; Specific Capacity
Well Report Tracking Number	
Plugging Report Tracking Number	
U.S. Geological Survey Site Number	
Texas Commission on Environmental Quality Source Id	G0610049P
Groundwater Conservation District Well Number	
Owner Well Number	Plainview #2
Other Well Number	
Previous State Well Number	
Reporting Agency	Texas Water Development Board
Created Date	6/23/1998
Last Update Date	5/16/2018

Remarks	

Casing

Diameter (in.)	Casing Type	Casing Material	Schedule	Gauge	Top Depth (ft.)	Bottom Depth (ft.)
8	Blank	Steel			0	760
4	Blank	Steel			710	760
4	Screen	Steel			760	796
4	Blank	Steel			796	814
4	Screen	Steel			814	854
4	Blank	Steel			854	864

Well Tests

Test Date	Test Type	Yield (gallons per minute)	Drawdown (ft.)	Test Hours
10/29/1997	Pump	175	78	36

Lithology

Top Depth (ft.)	Bottom Depth (ft.)	Description
0	10	Black dirt and rock
10	135	Sandy shale
135	175	Shale
175	290	Sand
290	500	Lime
500	580	Sand and shale
580	700	Lime and shale
700	796	Sand
796	814	Shale
814	854	Sand
854	864	Lime and shale

Annular Seal Range

Annular Seal Material	Amount	Unit	Top Depth (ft.)	Bottom Depth (ft.)
Cement	300	Bags/Sacks	0	760

Borehole

Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
14	0	864

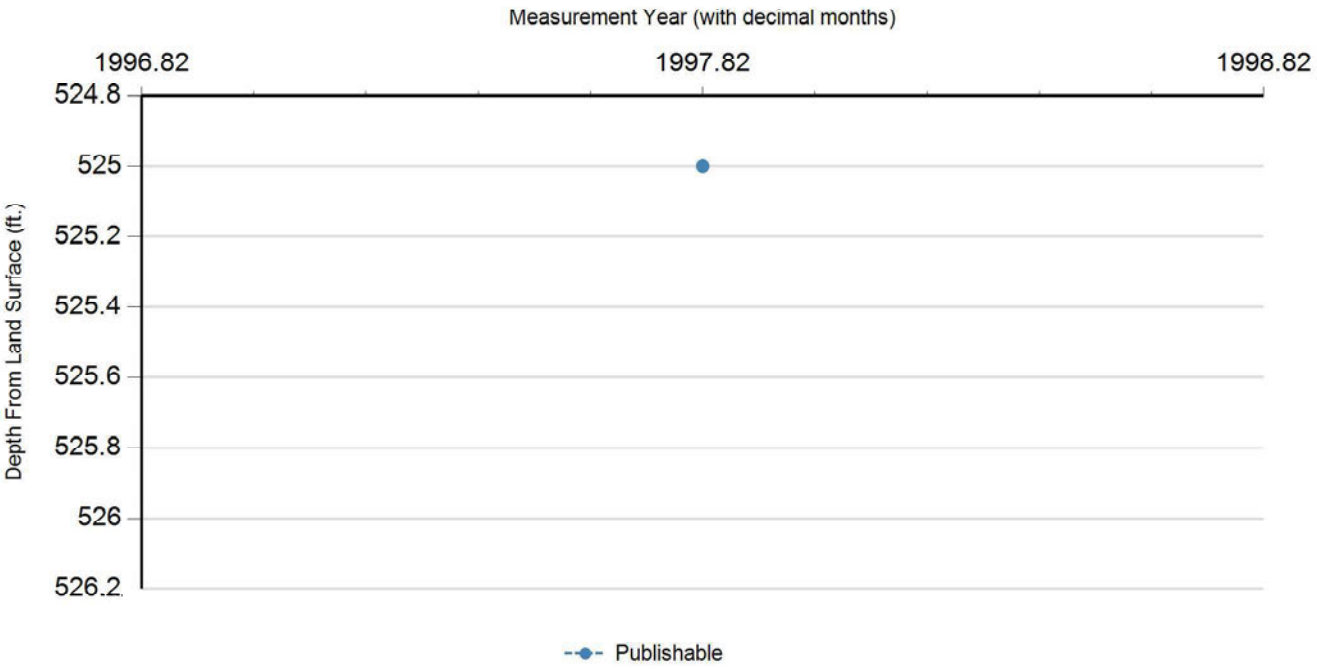
Plugged Back - No Data

Filter Pack

Filter Material	Top Depth (ft.)	Bottom Depth (ft.)	Size
Gravel	720	864	

Packers - No Data

Water Level Measurements



Status Code	Date	Time	Water Level (ft. below land surface)	Change value in ( ) indicates rise in level	Water Elevation (ft. above sea level)	Meas #	Measuring Agency	Method	Remark ID	Comments
P	10/29/1997		525		319	1	Registered Water Well Driller	Unknown		

Code Descriptions

Status Code	Status Description
P	Publishable

Water Quality Analysis

Sample Date: 9/25/2003 **Sample Time:** 1000 **Sample Number:** 1 **Collection Entity:** Texas Water Development Board

Sampled Aquifer: Twin Mountains Formation

Analyzed Lab: LCRA - Lower Colorado River Authority **Reliability:** Sampled using TWDB protocols

Collection Remarks: No Data

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
39086	ALKALINITY FIELD DISSOLVED AS CACO3		306	mg/L	
82244	ALKALINITY PHENOLPHTHALEIN FIELD DATA (MG/L)		14	mg/L	
00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		18.4	mg/L	
00410	ALKALINITY, TOTAL (MG/L AS CACO3)		295	mg/L	
01106	ALUMINUM, DISSOLVED (UG/L AS AL)		7.94	ug/L	
01095	ANTIMONY, DISSOLVED (UG/L AS SB)	<	1	ug/L	
01000	ARSENIC, DISSOLVED (UG/L AS AS)	<	2	ug/L	
01005	BARIUM, DISSOLVED (UG/L AS BA)		8.76	ug/L	
01010	BERYLLIUM, DISSOLVED (UG/L AS BE)	<	1	ug/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		315.09	mg/L	
01020	BORON, DISSOLVED (UG/L AS B)		167	ug/L	
71870	BROMIDE, DISSOLVED, (MG/L AS BR)		0.0278	mg/L	
01025	CADMIUM, DISSOLVED (UG/L AS CD)	<	1	ug/L	
00915	CALCIUM, DISSOLVED (MG/L AS CA)		1.67	mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		22.08	mg/L	
00941	CHLORIDE, DISSOLVED (MG/L AS CL)		7.73	mg/L	
01030	CHROMIUM, DISSOLVED (UG/L AS CR)	<	1	ug/L	
01035	COBALT, DISSOLVED (UG/L AS CO)	<	1	ug/L	
01040	COPPER, DISSOLVED (UG/L AS CU)		2.35	ug/L	
00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.11	mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CACO3)		7	mg/L	
01046	IRON, DISSOLVED (UG/L AS FE)	<	50	ug/L	
01049	LEAD, DISSOLVED (UG/L AS PB)	<	1	ug/L	
01130	LITHIUM, DISSOLVED (UG/L AS LI)		24.3	ug/L	
00925	MAGNESIUM, DISSOLVED (MG/L AS MG)		0.71	mg/L	
01056	MANGANESE, DISSOLVED (UG/L AS MN)		1.02	ug/L	
01060	MOLYBDENUM, DISSOLVED (UG/L AS MO)	<	1	ug/L	
01065	NICKEL, DISSOLVED (UG/L AS NI)	<	1	ug/L	
71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.09	mg/L	
00631	NITRITE PLUS NITRATE, DISSOLVED (MG/L AS N)	<	0.02	mg/L	
00400	PH (STANDARD UNITS), FIELD		8.87	SU	
00935	POTASSIUM, DISSOLVED (MG/L AS K)		0.75	mg/L	
71860	RESIDUAL SODIUM CARBONATE, CALCULATED		5.76		
01145	SELENIUM, DISSOLVED (UG/L AS SE)	<	4	ug/L	
00955	SILICA, DISSOLVED (MG/L AS SI02)		12.6	mg/L	

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		26.31		
00932	SODIUM, CALCULATED, PERCENT		98	PCT	
00930	SODIUM, DISSOLVED (MG/L AS NA)		161	mg/L	
00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		683	MICR	
01080	STRONTIUM, DISSOLVED (UG/L AS SR)		225	ug/L	
00946	SULFATE, DISSOLVED (MG/L AS SO4)		46.6	mg/L	
00010	TEMPERATURE, WATER (CELSIUS)		22.6	C	
01057	THALLIUM, DISSOLVED (UG/L AS TL)	<	1	ug/L	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		408	mg/L	
07013	TRITIUM COUNTING ERROR		0.09	TU	
07012	TRITIUM IN WATER (TRITIUM UNITS)		0.01	TU	
01085	VANADIUM, DISSOLVED (UG/L AS V)	<	1	ug/L	
01090	ZINC, DISSOLVED (UG/L AS ZN)	<	4	ug/L	

Water Quality Analysis

Sample Date: 9/25/2003 **Sample Time:** **Sample Number:** 1 **Collection Entity:** Texas Commission on Environmental Quality

Sampled Aquifer: Twin Mountains Formation

Analyzed Lab: Immunoassay at TCEQ **Reliability:** Sampled using TWDB protocols, but NOT filtered

Collection Remarks: No Data

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
39033	ATRAZINE, TOTAL, UG/L	<	0.05	ug/L	
82612	METOLACHLOR, WHOLE WATER, TOTAL RECOVERABLE, UG/L	<	0.05	ug/L	

** Value may not display all significant digits for parameter in results, check Scanned Documents for laboratory paperwork..*

Texas Water Development Board (TWDB)
Groundwater Database (GWDB)
Well Information Report for State Well Number 19-53-501

GWDB Reports and Downloads

Well Basic Details

Scanned Documents

State Well Number	1953501
County	Wise
River Basin	Trinity
Groundwater Management Area	8
Regional Water Planning Area	C - Region C
Groundwater Conservation District	Upper Trinity GCD
Latitude (decimal degrees)	33.207778
Latitude (degrees minutes seconds)	33° 12' 28" N
Longitude (decimal degrees)	-97.417222
Longitude (degrees minutes seconds)	097° 25' 02" W
Coordinate Source	Global Positioning System - GPS
Aquifer Code	218TWMT - Twin Mountains Formation
Aquifer	Trinity
Aquifer Pick Method	
Land Surface Elevation (feet above sea level)	833
Land Surface Elevation Method	Interpolated From Topo Map
Well Depth (feet below land surface)	925
Well Depth Source	Owner
Drilling Start Date	
Drilling End Date	
Drilling Method	
Borehole Completion	

Well Type	Withdrawal of Water
Well Use	Domestic
Water Level Observation	None
Water Quality Available	Yes
Pump	Submersible
Pump Depth (feet below land surface)	
Power Type	Electric Motor
Annular Seal Method	
Surface Completion	
Owner	Bob Huggins
Driller	Bursitus Water Well
Other Data Available	
Well Report Tracking Number	
Plugging Report Tracking Number	
U.S. Geological Survey Site Number	
Texas Commission on Environmental Quality Source Id	
Groundwater Conservation District Well Number	
Owner Well Number	
Other Well Number	
Previous State Well Number	
Reporting Agency	Texas Water Development Board
Created Date	9/11/2003
Last Update Date	9/17/2003

Remarks	

Casing - No Data

Well Tests - No Data

Lithology - No Data

Annular Seal Range - No Data

Borehole - No Data

Plugged Back - No Data

Filter Pack - No Data

Packers - No Data

Water Level Measurements

No Data Available

Water Quality Analysis

Sample Date: 9/11/2003 **Sample Time:** 1130 **Sample Number:** 1 **Collection Entity:** Texas Water Development Board

Sampled Aquifer: Twin Mountains Formation

Analyzed Lab: LCRA - Lower Colorado River Authority **Reliability:** Sampled using TWDB protocols

Collection Remarks: No Data

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
39086	ALKALINITY FIELD DISSOLVED AS CACO3		272	mg/L	
00415	ALKALINITY, PHENOLPHTHALEIN (MG/L)		0	mg/L	
00410	ALKALINITY, TOTAL (MG/L AS CACO3)		264	mg/L	
01106	ALUMINUM, DISSOLVED (UG/L AS AL)		7.07	ug/L	
01095	ANTIMONY, DISSOLVED (UG/L AS SB)	<	1	ug/L	
01000	ARSENIC, DISSOLVED (UG/L AS AS)	<	2	ug/L	
01005	BARIUM, DISSOLVED (UG/L AS BA)		185	ug/L	
01010	BERYLLIUM, DISSOLVED (UG/L AS BE)	<	1	ug/L	
00440	BICARBONATE ION, CALCULATED (MG/L AS HCO3)		322.17	mg/L	
01020	BORON, DISSOLVED (UG/L AS B)		105	ug/L	
71870	BROMIDE, DISSOLVED, (MG/L AS BR)	<	0.02	mg/L	
01025	CADMIUM, DISSOLVED (UG/L AS CD)	<	1	ug/L	
00915	CALCIUM, DISSOLVED (MG/L AS CA)		20.8	mg/L	
00445	CARBONATE ION, CALCULATED (MG/L AS CO3)		0	mg/L	
00941	CHLORIDE, DISSOLVED (MG/L AS CL)		11	mg/L	
01030	CHROMIUM, DISSOLVED (UG/L AS CR)	<	1	ug/L	
01035	COBALT, DISSOLVED (UG/L AS CO)	<	1	ug/L	
01040	COPPER, DISSOLVED (UG/L AS CU)		3.53	ug/L	
00950	FLUORIDE, DISSOLVED (MG/L AS F)		0.19	mg/L	
00900	HARDNESS, TOTAL, CALCULATED (MG/L AS CACO3)		75	mg/L	
01046	IRON, DISSOLVED (UG/L AS FE)	<	50	ug/L	
01049	LEAD, DISSOLVED (UG/L AS PB)	<	1	ug/L	
01130	LITHIUM, DISSOLVED (UG/L AS LI)		33.2	ug/L	
00925	MAGNESIUM, DISSOLVED (MG/L AS MG)		5.33	mg/L	
01056	MANGANESE, DISSOLVED (UG/L AS MN)		29.3	ug/L	
01060	MOLYBDENUM, DISSOLVED (UG/L AS MO)		1.33	ug/L	
01065	NICKEL, DISSOLVED (UG/L AS NI)	<	1	ug/L	
71851	NITRATE NITROGEN, DISSOLVED, CALCULATED (MG/L AS NO3)	<	0.09	mg/L	
00631	NITRITE PLUS NITRATE, DISSOLVED (MG/L AS N)	<	0.02	mg/L	
00400	PH (STANDARD UNITS), FIELD		7.42	SU	
00935	POTASSIUM, DISSOLVED (MG/L AS K)		5.73	mg/L	
71860	RESIDUAL SODIUM CARBONATE, CALCULATED		3.8		
01145	SELENIUM, DISSOLVED (UG/L AS SE)	<	4	ug/L	
00955	SILICA, DISSOLVED (MG/L AS SI02)		16.2	mg/L	
00931	SODIUM ADSORPTION RATIO, CALCULATED (SAR)		5.32		

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
00932	SODIUM, CALCULATED, PERCENT		75	PCT	
00930	SODIUM, DISSOLVED (MG/L AS NA)		105	mg/L	
00094	SPECIFIC CONDUCTANCE, FIELD (UMHOS/CM AT 25C)		626	MICR	
01080	STRONTIUM, DISSOLVED (UG/L AS SR)		1290	ug/L	
00946	SULFATE, DISSOLVED (MG/L AS SO4)		44.1	mg/L	
00010	TEMPERATURE, WATER (CELSIUS)		25	C	
01057	THALLIUM, DISSOLVED (UG/L AS TL)	<	1	ug/L	
70301	TOTAL DISSOLVED SOLIDS , SUM OF CONSTITUENTS (MG/L)		368	mg/L	
01085	VANADIUM, DISSOLVED (UG/L AS V)	<	1	ug/L	
01090	ZINC, DISSOLVED (UG/L AS ZN)		12.7	ug/L	

Texas Water Development Board (TWDB)
Groundwater Database (GWDB)
Well Information Report for State Well Number 19-53-501

Water Quality Analysis

Sample Date: 9/11/2003 **Sample Time:** **Sample Number:** 1 **Collection Entity:** Texas Commission on Environmental Quality

Sampled Aquifer: Twin Mountains Formation

Analyzed Lab: Immunoassay at TCEQ **Reliability:** Sampled using TWDB protocols, but NOT filtered

Collection Remarks: No Data

Parameter Code	Parameter Description	Flag	Value*	Units	Plus/Minus
39033	ATRAZINE, TOTAL, UG/L	<	0.05	ug/L	
82612	METOLACHLOR, WHOLE WATER, TOTAL RECOVERABLE, UG/L	<	0.05	ug/L	

** Value may not display all significant digits for parameter in results, check Scanned Documents for laboratory paperwork..*

TPDES PERMIT NO. WQ0015479001
[For TCEQ office use only - EPA I.D. No. TX0137138]

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
P.O. Box 13087
Austin, Texas 78711-3087

PERMIT TO DISCHARGE WASTES
under provisions of
Section 402 of the Clean Water Act
and Chapter 26 of the Texas Water Code

Big Sky Trails, Ltd

whose mailing address is

4347 West Northwest Highway, Suite 130-248
Dallas, Texas 75220

is authorized to treat and discharge wastes from the Big Sky Wastewater Treatment Facility, SIC Code 4952

located approximately 1 mile northwest of the intersection of U.S. Highway 380 and Jackson Road, and approximately 8 miles west of the City of Krum, in Denton County, Texas 76259

to an unnamed tributary; thence to Denton Creek; thence to Grapevine Lake in Segment No. 0826 of the Trinity River Basin

only according to effluent limitations, monitoring requirements and other conditions set forth in this permit, as well as the rules of the Texas Commission on Environmental Quality (TCEQ), the laws of the State of Texas, and other orders of the TCEQ. The issuance of this permit does not grant to the permittee the right to use private or public property for conveyance of wastewater along the discharge route described in this permit. This includes, but is not limited to, property belonging to any individual, partnership, corporation, or other entity. Neither does this permit authorize any invasion of personal rights nor any violation of federal, state, or local laws or regulations. It is the responsibility of the permittee to acquire property rights as may be necessary to use the discharge route.

This permit shall expire at midnight, **September 1, 2021.**

ISSUED DATE: October 17, 2017

For the Commission

INTERIM I EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS Outfall Number 001

1. During the period beginning upon the date of issuance and lasting through the completion of expansion to the 0.22 million gallons per day (MGD) facility, the permittee is authorized to discharge subject to the following effluent limitations:

   The daily average flow of effluent shall not exceed 0.11 MGD, nor shall the average discharge during any two-hour period (2-hour peak) exceed 306 gallons per minute (gpm).

Effluent Characteristic	Discharge Limitations				Min. Self-Monitoring Requirements	
	Daily Avg	7-day Avg	Daily Max	Single Grab	Report Daily Avg. & Max. Single Grab	
	mg/l (lbs/day)	mg/l	mg/l	mg/l	Measurement Frequency	Sample Type
Flow, MGD	Report	N/A	Report	N/A	Continuous	Totalizing Meter
Carbonaceous Biochemical Oxygen Demand (5-day)	10 (9.2)	15	25	35	One/week	Grab
Total Suspended Solids	15 (14)	25	40	60	One/week	Grab
Ammonia Nitrogen	3 (2.8)	6	10	15	One/week	Grab
Total Phosphorus	1 (0.92)	2	4	6	One/week	Grab
E. coli, colony-forming units or most probable number per 100 ml	126	N/A	N/A	399	One/month	Grab

2. The effluent shall contain a chlorine residual of at least 1.0 mg/l and shall not exceed a chlorine residual of 4.0 mg/l after a detention time of at least 20 minutes (based on peak flow), and shall be monitored five times per week by grab sample. An equivalent method of disinfection may be substituted only with prior approval of the Executive Director.

3. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored once per month by grab sample.

4. There shall be no discharge of floating solids or visible foam in other than trace amounts and no discharge of visible oil.

5. Effluent monitoring samples shall be taken at the following location(s): Following the final treatment unit.

6. The effluent shall contain a minimum dissolved oxygen of 4.0 mg/l and shall be monitored once per week by grab sample.

INTERIM II EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS Outfall Number 001

1. During the period beginning upon the date of the completion of expansion to the 0.22 million gallons per day (MGD) facility through the completion of expansion to the 0.68 MGD facility, the permittee is authorized to discharge subject to the following effluent limitations:

   The daily average flow of effluent shall not exceed 0.22 MGD, nor shall the average discharge during any two-hour period (2-hour peak) exceed 611 gallons per minute (gpm).

Effluent Characteristic	Discharge Limitations				Min. Self-Monitoring Requirements	
	Daily Avg mg/l (lbs/day)	7-day Avg mg/l	Daily Max mg/l	Single Grab mg/l	Report Daily Avg. & Max. Single Grab Measurement Frequency	Sample Type
Flow, MGD	Report	N/A	Report	N/A	Continuous	Totalizing Meter
Carbonaceous Biochemical Oxygen Demand (5-day)	10 (18)	15	25	35	One/week	Grab
Total Suspended Solids	15 (28)	25	40	60	One/week	Grab
Ammonia Nitrogen	3 (5.5)	6	10	15	One/week	Grab
Total Phosphorus	1 (1.8)	2	4	6	One/week	Grab
E. coli, colony-forming units or most probable number per 100 ml	126	N/A	N/A	399	One/month	Grab

2. The effluent shall contain a chlorine residual of at least 1.0 mg/l and shall not exceed a chlorine residual of 4.0 mg/l after a detention time of at least 20 minutes (based on peak flow), and shall be monitored five times per week by grab sample. An equivalent method of disinfection may be substituted only with prior approval of the Executive Director.

3. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored once per month by grab sample.

4. There shall be no discharge of floating solids or visible foam in other than trace amounts and no discharge of visible oil.

5. Effluent monitoring samples shall be taken at the following location(s): Following the final treatment unit.

6. The effluent shall contain a minimum dissolved oxygen of 4.0 mg/l and shall be monitored once per week by grab sample.

FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS Outfall Number 001

1. During the period beginning upon the completion of expansion to the 0.68 million gallons per day (MGD) facility and lasting through the date of expiration, the permittee is authorized to discharge subject to the following effluent limitations:

   The daily average flow of effluent shall not exceed 0.68 MGD, nor shall the average discharge during any two-hour period (2-hour peak) exceed 1,889 gallons per minute (gpm).

Effluent Characteristic	Discharge Limitations				Min. Self-Monitoring Requirements	
	Daily Avg mg/l (lbs/day)	7-day Avg mg/l	Daily Max mg/l	Single Grab mg/l	Report Daily Avg. & Daily Max. Measurement Frequency	Sample Type
Flow, MGD	Report	N/A	Report	N/A	Continuous	Totalizing Meter
Carbonaceous Biochemical Oxygen Demand (5-day)	7 (40)	12	22	32	One/week	Composite
Total Suspended Solids	12 (68)	20	40	60	One/week	Composite
Ammonia Nitrogen	2 (11)	5	10	15	One/week	Composite
Total Phosphorus	1 (5.7)	2	4	6	One/week	Composite
E. coli, colony forming units or most probable number per 100 ml	126	N/A	399	N/A	Two/month	Grab

2. The effluent shall contain a chlorine residual of at least 1.0 mg/l and shall not exceed a chlorine residual of 4.0 mg/l after a detention time of at least 20 minutes (based on peak flow), and shall be monitored daily by grab sample. An equivalent method of disinfection may be substituted only with prior approval of the Executive Director.

3. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored twice per month by grab sample.

4. There shall be no discharge of floating solids or visible foam in other than trace amounts and no discharge of visible oil.

5. Effluent monitoring samples shall be taken at the following location(s): Following the final treatment unit.

6. The effluent shall contain a minimum dissolved oxygen of 4.0 mg/l and shall be monitored once per week by grab sample.

DEFINITIONS AND STANDARD PERMIT CONDITIONS

As required by Title 30 Texas Administrative Code (TAC) Chapter 305, certain regulations appear as standard conditions in waste discharge permits. 30 TAC § 305.121 - 305.129 (relating to Permit Characteristics and Conditions) as promulgated under the Texas Water Code (TWC) §§ 5.103 and 5.105, and the Texas Health and Safety Code (THSC) §§ 361.017 and 361.024(a), establish the characteristics and standards for waste discharge permits, including sewage sludge, and those sections of 40 Code of Federal Regulations (CFR) Part 122 adopted by reference by the Commission. The following text includes these conditions and incorporates them into this permit. All definitions in TWC § 26.001 and 30 TAC Chapter 305 shall apply to this permit and are incorporated by reference. Some specific definitions of words or phrases used in this permit are as follows:

1. Flow Measurements

   a. Annual average flow - the arithmetic average of all daily flow determinations taken within the preceding 12 consecutive calendar months. The annual average flow determination shall consist of daily flow volume determinations made by a totalizing meter, charted on a chart recorder and limited to major domestic wastewater discharge facilities with one million gallons per day or greater permitted flow.

   b. Daily average flow - the arithmetic average of all determinations of the daily flow within a period of one calendar month. The daily average flow determination shall consist of determinations made on at least four separate days. If instantaneous measurements are used to determine the daily flow, the determination shall be the arithmetic average of all instantaneous measurements taken during that month. Daily average flow determination for intermittent discharges shall consist of a minimum of three flow determinations on days of discharge.

   c. Daily maximum flow - the highest total flow for any 24-hour period in a calendar month.

   d. Instantaneous flow - the measured flow during the minimum time required to interpret the flow measuring device.

   e. 2-hour peak flow (domestic wastewater treatment plants) - the maximum flow sustained for a two-hour period during the period of daily discharge. The average of multiple measurements of instantaneous maximum flow within a two-hour period may be used to calculate the 2-hour peak flow.

   f. Maximum 2-hour peak flow (domestic wastewater treatment plants) - the highest 2-hour peak flow for any 24-hour period in a calendar month.

2. Concentration Measurements

   a. Daily average concentration - the arithmetic average of all effluent samples, composite or grab as required by this permit, within a period of one calendar month, consisting of at least four separate representative measurements.

      i. For domestic wastewater treatment plants - When four samples are not available in a calendar month, the arithmetic average (weighted by flow) of all values in the previous four consecutive month period consisting of at least four measurements shall be utilized as the daily average concentration.

ii. For all other wastewater treatment plants - When four samples are not available in a calendar month, the arithmetic average (weighted by flow) of all values taken during the month shall be utilized as the daily average concentration.

b. 7-day average concentration - the arithmetic average of all effluent samples, composite or grab as required by this permit, within a period of one calendar week, Sunday through Saturday.

c. Daily maximum concentration - the maximum concentration measured on a single day, by the sample type specified in the permit, within a period of one calendar month.

d. Daily discharge - the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in terms of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the sampling day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the average measurement of the pollutant over the sampling day.

The daily discharge determination of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the daily discharge determination of concentration shall be the arithmetic average (weighted by flow value) of all samples collected during that day.

e. Bacteria concentration (*E. coli* or Enterococci) - Colony Forming Units (CFU) or Most Probable Number (MPN) of bacteria per 100 milliliters effluent. The daily average bacteria concentration is a geometric mean of the values for the effluent samples collected in a calendar month. The geometric mean shall be determined by calculating the nth root of the product of all measurements made in a calendar month, where n equals the number of measurements made; or, computed as the antilogarithm of the arithmetic mean of the logarithms of all measurements made in a calendar month. For any measurement of bacteria equaling zero, a substituted value of one shall be made for input into either computation method. If specified, the 7-day average for bacteria is the geometric mean of the values for all effluent samples collected during a calendar week.

f. Daily average loading (lbs/day) - the arithmetic average of all daily discharge loading calculations during a period of one calendar month. These calculations must be made for each day of the month that a parameter is analyzed. The daily discharge, in terms of mass (lbs/day), is calculated as (Flow, MGD x Concentration, mg/l x 8.34).

g. Daily maximum loading (lbs/day) - the highest daily discharge, in terms of mass (lbs/day), within a period of one calendar month.

3. Sample Type

a. Composite sample - For domestic wastewater, a composite sample is a sample made up of a minimum of three effluent portions collected in a continuous 24-hour period or during the period of daily discharge if less than 24 hours, and combined in volumes proportional to flow, and collected at the intervals required by 30 TAC § 319.9 (a). For industrial wastewater, a composite sample is a sample made up of a minimum of three effluent portions collected in a continuous 24-hour period or during the period of daily discharge if less than 24 hours, and combined in volumes proportional to flow, and collected at the intervals required by 30 TAC § 319.9 (b).

b. Grab sample - an individual sample collected in less than 15 minutes.

4. Treatment Facility (facility) - wastewater facilities used in the conveyance, storage, treatment, recycling, reclamation and/or disposal of domestic sewage, industrial wastes, agricultural wastes, recreational wastes, or other wastes including sludge handling or disposal facilities under the jurisdiction of the Commission.

5. The term "sewage sludge" is defined as solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in 30 TAC Chapter 312. This includes the solids that have not been classified as hazardous waste separated from wastewater by unit processes.

6. Bypass - the intentional diversion of a waste stream from any portion of a treatment facility.

MONITORING AND REPORTING REQUIREMENTS

1. Self-Reporting

Monitoring results shall be provided at the intervals specified in the permit. Unless otherwise specified in this permit or otherwise ordered by the Commission, the permittee shall conduct effluent sampling and reporting in accordance with 30 TAC §§ 319.4 - 319.12. Unless otherwise specified, a monthly effluent report shall be submitted each month, to the Enforcement Division (MC 224), by the 20th day of the following month for each discharge which is described by this permit whether or not a discharge is made for that month. Effective December 21, 2016, monitoring results must be submitted online using the NetDMR reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver. Monitoring results must be signed and certified as required by Monitoring and Reporting Requirements No. 10.

As provided by state law, the permittee is subject to administrative, civil and criminal penalties, as applicable, for negligently or knowingly violating the Clean Water Act (CWA); TWC §§ 26, 27, and 28; and THSC § 361, including but not limited to knowingly making any false statement, representation, or certification on any report, record, or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, or falsifying, tampering with or knowingly rendering inaccurate any monitoring device or method required by this permit or violating any other requirement imposed by state or federal regulations.

2. Test Procedures

a. Unless otherwise specified in this permit, test procedures for the analysis of pollutants shall comply with procedures specified in 30 TAC §§ 319.11 - 319.12. Measurements, tests, and calculations shall be accurately accomplished in a representative manner.

b. All laboratory tests submitted to demonstrate compliance with this permit must meet the requirements of 30 TAC § 25, Environmental Testing Laboratory Accreditation and Certification.

3. Records of Results

a. Monitoring samples and measurements shall be taken at times and in a manner so as to be representative of the monitored activity.

b. Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503), monitoring and reporting records, including strip charts and records of calibration and maintenance, copies of all records required by this permit, records of all data used to complete the application for this permit, and the certification required by 40 CFR § 264.73(b)(9) shall be retained at the facility site, or shall be readily available for review by a TCEQ representative for a period of three years from the date of the record or sample, measurement, report, application or certification. This period shall be extended at the request of the Executive Director.

c. Records of monitoring activities shall include the following:

i. date, time and place of sample or measurement;

ii. identity of individual who collected the sample or made the measurement.

iii. date and time of analysis;

iv. identity of the individual and laboratory who performed the analysis;

v. the technique or method of analysis; and

vi. the results of the analysis or measurement and quality assurance/quality control records.

The period during which records are required to be kept shall be automatically extended to the date of the final disposition of any administrative or judicial enforcement action that may be instituted against the permittee.

4. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit using approved analytical methods as specified above, all results of such monitoring shall be included in the calculation and reporting of the values submitted on the approved self-report form. Increased frequency of sampling shall be indicated on the self-report form.

5. Calibration of Instruments

All automatic flow measuring or recording devices and all totalizing meters for measuring flows shall be accurately calibrated by a trained person at plant start-up and as often thereafter as necessary to ensure accuracy, but not less often than annually unless authorized by the Executive Director for a longer period. Such person shall verify in writing that the device is operating properly and giving accurate results. Copies of the verification shall be retained at the facility site and/or shall be readily available for review by a TCEQ representative for a period of three years.

6. Compliance Schedule Reports

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of the permit shall be submitted no later

than 14 days following each schedule date to the Regional Office and the Enforcement Division (MC 224).

7. Noncompliance Notification

   a. In accordance with 30 TAC § 305.125(9) any noncompliance which may endanger human health or safety, or the environment shall be reported by the permittee to the TCEQ. Except as allowed by 30 TAC § 305.132, report of such information shall be provided orally or by facsimile transmission (FAX) to the Regional Office within 24 hours of becoming aware of the noncompliance. A written submission of such information shall also be provided by the permittee to the Regional Office and the Enforcement Division (MC 224) within five working days of becoming aware of the noncompliance. For Publicly Owned Treatment Works (POTWs), effective September 1, 2020, the permittee must submit the written report for unauthorized discharges and unanticipated bypasses that exceed any effluent limit in the permit using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver. The written submission shall contain a description of the noncompliance and its cause; the potential danger to human health or safety, or the environment; the period of noncompliance, including exact dates and times; if the noncompliance has not been corrected, the time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance, and to mitigate its adverse effects.

   b. The following violations shall be reported under Monitoring and Reporting Requirement 7.a.:

      i. Unauthorized discharges as defined in Permit Condition 2(g).

      ii. Any unanticipated bypass that exceeds any effluent limitation in the permit.

      iii. Violation of a permitted maximum daily discharge limitation for pollutants listed specifically in the Other Requirements section of an Industrial TPDES permit.

   c. In addition to the above, any effluent violation which deviates from the permitted effluent limitation by more than 40% shall be reported by the permittee in writing to the Regional Office and the Enforcement Division (MC 224) within 5 working days of becoming aware of the noncompliance.

   d. Any noncompliance other than that specified in this section, or any required information not submitted or submitted incorrectly, shall be reported to the Enforcement Division (MC 224) as promptly as possible. For effluent limitation violations, noncompliances shall be reported on the approved self-report form.

8. In accordance with the procedures described in 30 TAC §§ 35.301 - 35.303 (relating to Water Quality Emergency and Temporary Orders) if the permittee knows in advance of the need for a bypass, it shall submit prior notice by applying for such authorization.

9. Changes in Discharges of Toxic Substances

   All existing manufacturing, commercial, mining, and silvicultural permittees shall notify the Regional Office, orally or by facsimile transmission within 24 hours, and both the Regional Office and the Enforcement Division (MC 224) in writing within five (5) working days, after

becoming aware of or having reason to believe:

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant listed at 40 CFR Part 122, Appendix D, Tables II and III (excluding Total Phenols) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   i. One hundred micrograms per liter (100 µg/L);

   ii. Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

   iii. Five (5) times the maximum concentration value reported for that pollutant in the permit application; or

   iv. The level established by the TCEQ.

b. That any activity has occurred or will occur which would result in any discharge, on a nonroutine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   i. Five hundred micrograms per liter (500 µg/L);

   ii. One milligram per liter (1 mg/L) for antimony;

   iii. Ten (10) times the maximum concentration value reported for that pollutant in the permit application; or

   iv. The level established by the TCEQ.

10. Signatories to Reports

All reports and other information requested by the Executive Director shall be signed by the person and in the manner required by 30 TAC § 305.128 (relating to Signatories to Reports).

11. All POTWs must provide adequate notice to the Executive Director of the following:

a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to CWA § 301 or § 306 if it were directly discharging those pollutants;

b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit; and

c. For the purpose of this paragraph, adequate notice shall include information on:

   i. The quality and quantity of effluent introduced into the POTW; and

   ii. Any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

PERMIT CONDITIONS

1. General

   a. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in an application or in any report to the Executive Director, it shall promptly submit such facts or information.

   b. This permit is granted on the basis of the information supplied and representations made by the permittee during action on an application, and relying upon the accuracy and completeness of that information and those representations. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked, in whole or in part, in accordance with 30 TAC Chapter 305, Subchapter D, during its term for good cause including, but not limited to, the following:

      i. Violation of any terms or conditions of this permit;

      ii. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

      iii. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

   c. The permittee shall furnish to the Executive Director, upon request and within a reasonable time, any information to determine whether cause exists for amending, revoking, suspending or terminating the permit. The permittee shall also furnish to the Executive Director, upon request, copies of records required to be kept by the permit.

2. Compliance

   a. Acceptance of the permit by the person to whom it is issued constitutes acknowledgment and agreement that such person will comply with all the terms and conditions embodied in the permit, and the rules and other orders of the Commission.

   b. The permittee has a duty to comply with all conditions of the permit. Failure to comply with any permit condition constitutes a violation of the permit and the Texas Water Code or the Texas Health and Safety Code, and is grounds for enforcement action, for permit amendment, revocation, or suspension, or for denial of a permit renewal application or an application for a permit for another facility.

   c. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit.

   d. The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal or other permit violation that has a reasonable likelihood of adversely affecting human health or the environment.

   e. Authorization from the Commission is required before beginning any change in the permitted facility or activity that may result in noncompliance with any permit requirements.

f. A permit may be amended, suspended and reissued, or revoked for cause in accordance with 30 TAC §§ 305.62 and 305.66 and TWC§ 7.302. The filing of a request by the permittee for a permit amendment, suspension and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

g. There shall be no unauthorized discharge of wastewater or any other waste. For the purpose of this permit, an unauthorized discharge is considered to be any discharge of wastewater into or adjacent to water in the state at any location not permitted as an outfall or otherwise defined in the Other Requirements section of this permit.

h. In accordance with 30 TAC § 305.535(a), the permittee may allow any bypass to occur from a TPDES permitted facility which does not cause permitted effluent limitations to be exceeded or an unauthorized discharge to occur, but only if the bypass is also for essential maintenance to assure efficient operation.

i. The permittee is subject to administrative, civil, and criminal penalties, as applicable, under TWC §§ 7.051 - 7.075 (relating to Administrative Penalties), 7.101 - 7.111 (relating to Civil Penalties), and 7.141 - 7.202 (relating to Criminal Offenses and Penalties) for violations including, but not limited to, negligently or knowingly violating the federal CWA §§ 301, 302, 306, 307, 308, 318, or 405, or any condition or limitation implementing any sections in a permit issued under the CWA § 402, or any requirement imposed in a pretreatment program approved under the CWA §§ 402 (a)(3) or 402 (b)(8).

3. Inspections and Entry

a. Inspection and entry shall be allowed as prescribed in the TWC Chapters 26, 27, and 28, and THSC § 361.

b. The members of the Commission and employees and agents of the Commission are entitled to enter any public or private property at any reasonable time for the purpose of inspecting and investigating conditions relating to the quality of water in the state or the compliance with any rule, regulation, permit or other order of the Commission. Members, employees, or agents of the Commission and Commission contractors are entitled to enter public or private property at any reasonable time to investigate or monitor or, if the responsible party is not responsive or there is an immediate danger to public health or the environment, to remove or remediate a condition related to the quality of water in the state. Members, employees, Commission contractors, or agents acting under this authority who enter private property shall observe the establishment's rules and regulations concerning safety, internal security, and fire protection, and if the property has management in residence, shall notify management or the person then in charge of his presence and shall exhibit proper credentials. If any member, employee, Commission contractor, or agent is refused the right to enter in or on public or private property under this authority, the Executive Director may invoke the remedies authorized in TWC § 7.002. The statement above, that Commission entry shall occur in accordance with an establishment's rules and regulations concerning safety, internal security, and fire protection, is not grounds for denial or restriction of entry to any part of the facility, but merely describes the Commission's duty to observe appropriate rules and regulations during an inspection.

4. Permit Amendment and/or Renewal

   a. The permittee shall give notice to the Executive Director as soon as possible of any planned physical alterations or additions to the permitted facility if such alterations or additions would require a permit amendment or result in a violation of permit requirements. Notice shall also be required under this paragraph when:

      i. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in accordance with 30 TAC § 305.534 (relating to New Sources and New Dischargers); or

      ii. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are subject neither to effluent limitations in the permit, nor to notification requirements in Monitoring and Reporting Requirements No. 9;

      iii. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

   b. Prior to any facility modifications, additions, or expansions that will increase the plant capacity beyond the permitted flow, the permittee must apply for and obtain proper authorization from the Commission before commencing construction.

   c. The permittee must apply for an amendment or renewal at least 180 days prior to expiration of the existing permit in order to continue a permitted activity after the expiration date of the permit. If an application is submitted prior to the expiration date of the permit, the existing permit shall remain in effect until the application is approved, denied, or returned. If the application is returned or denied, authorization to continue such activity shall terminate upon the effective date of the action. If an application is not submitted prior to the expiration date of the permit, the permit shall expire and authorization to continue such activity shall terminate.

   d. Prior to accepting or generating wastes which are not described in the permit application or which would result in a significant change in the quantity or quality of the existing discharge, the permittee must report the proposed changes to the Commission. The permittee must apply for a permit amendment reflecting any necessary changes in permit conditions, including effluent limitations for pollutants not identified and limited by this permit.

   e. In accordance with the TWC § 26.029(b), after a public hearing, notice of which shall be given to the permittee, the Commission may require the permittee, from time to time, for good cause, in accordance with applicable laws, to conform to new or additional conditions.

   f. If any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under CWA § 307(a) for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this permit, this permit shall be

modified or revoked and reissued to conform to the toxic effluent standard or prohibition. The permittee shall comply with effluent standards or prohibitions established under CWA § 307(a) for toxic pollutants within the time provided in the regulations that established those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

5. Permit Transfer

   a. Prior to any transfer of this permit, Commission approval must be obtained. The Commission shall be notified in writing of any change in control or ownership of facilities authorized by this permit. Such notification should be sent to the Applications Review and Processing Team (MC 148) of the Water Quality Division.

   b. A permit may be transferred only according to the provisions of 30 TAC § 305.64 (relating to Transfer of Permits) and 30 TAC § 50.133 (relating to Executive Director Action on Application or WQMP update).

6. Relationship to Hazardous Waste Activities

   This permit does not authorize any activity of hazardous waste storage, processing, or disposal that requires a permit or other authorization pursuant to the Texas Health and Safety Code.

7. Relationship to Water Rights

   Disposal of treated effluent by any means other than discharge directly to water in the state must be specifically authorized in this permit and may require a permit pursuant to TWC Chapter 11.

8. Property Rights

   A permit does not convey any property rights of any sort, or any exclusive privilege.

9. Permit Enforceability

   The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

10. Relationship to Permit Application

    The application pursuant to which the permit has been issued is incorporated herein; provided, however, that in the event of a conflict between the provisions of this permit and the application, the provisions of the permit shall control.

11. Notice of Bankruptcy

    a. Each permittee shall notify the Executive Director, in writing, immediately following the filing of a voluntary or involuntary petition for bankruptcy under any chapter of Title 11 Bankruptcy) of the United States Code (11 USC) by or against:

i. the permittee;

ii. an entity (as that term is defined in 11 USC, § 101(14)) controlling the permittee or listing the permit or permittee as property of the estate; or

iii. an affiliate (as that term is defined in 11 USC, § 101(2)) of the permittee.

b. This notification must indicate:

i. the name of the permittee and the permit number(s);

ii. the bankruptcy court in which the petition for bankruptcy was filed; and

iii. the date of filing of the petition.

OPERATIONAL REQUIREMENTS

1. The permittee shall at all times ensure that the facility and all of its systems of collection, treatment, and disposal are properly operated and maintained. This includes, but is not limited to, the regular, periodic examination of wastewater solids within the treatment plant by the operator in order to maintain an appropriate quantity and quality of solids inventory as described in the various operator training manuals and according to accepted industry standards for process control. Process control, maintenance, and operations records shall be retained at the facility site, or shall be readily available for review by a TCEQ representative, for a period of three years.

2. Upon request by the Executive Director, the permittee shall take appropriate samples and provide proper analysis in order to demonstrate compliance with Commission rules. Unless otherwise specified in this permit or otherwise ordered by the Commission, the permittee shall comply with all applicable provisions of 30 TAC Chapter 312 concerning sewage sludge use and disposal and 30 TAC §§ 319.21 - 319.29 concerning the discharge of certain hazardous metals.

3. Domestic wastewater treatment facilities shall comply with the following provisions:

   a. The permittee shall notify the Municipal Permits Team, Wastewater Permitting Section (MC 148) of the Water Quality Division, in writing, of any facility expansion at least 90 days prior to conducting such activity.

   b. The permittee shall submit a closure plan for review and approval to the Municipal Permits Team, Wastewater Permitting Section (MC 148) of the Water Quality Division, for any closure activity at least 90 days prior to conducting such activity. Closure is the act of permanently taking a waste management unit or treatment facility out of service and includes the permanent removal from service of any pit, tank, pond, lagoon, surface impoundment and/or other treatment unit regulated by this permit.

4. The permittee is responsible for installing prior to plant start-up, and subsequently maintaining, adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failures by means of alternate power sources, standby generators, and/or retention of inadequately treated wastewater.

5. Unless otherwise specified, the permittee shall provide a readily accessible sampling point and, where applicable, an effluent flow measuring device or other acceptable means by which effluent flow may be determined.

6. The permittee shall remit an annual water quality fee to the Commission as required by 30 TAC Chapter 21. Failure to pay the fee may result in revocation of this permit under TWC § 7.302(b)(6).

7. Documentation

   For all written notifications to the Commission required of the permittee by this permit, the permittee shall keep and make available a copy of each such notification under the same conditions as self-monitoring data are required to be kept and made available. Except for information required for TPDES permit applications, effluent data, including effluent data in permits, draft permits and permit applications, and other information specified as not confidential in 30 TAC §§ 1.5(d), any information submitted pursuant to this permit may be claimed as confidential by the submitter. Any such claim must be asserted in the manner prescribed in the application form or by stamping the words confidential business information on each page containing such information. If no claim is made at the time of submission, information may be made available to the public without further notice. If the Commission or Executive Director agrees with the designation of confidentiality, the TCEQ will not provide the information for public inspection unless required by the Texas Attorney General or a court pursuant to an open records request. If the Executive Director does not agree with the designation of confidentiality, the person submitting the information will be notified.

8. Facilities that generate domestic wastewater shall comply with the following provisions; domestic wastewater treatment facilities at permitted industrial sites are excluded.

   a. Whenever flow measurements for any domestic sewage treatment facility reach 75% of the permitted daily average or annual average flow for three consecutive months, the permittee must initiate engineering and financial planning for expansion and/or upgrading of the domestic wastewater treatment and/or collection facilities. Whenever the flow reaches 90% of the permitted daily average or annual average flow for three consecutive months, the permittee shall obtain necessary authorization from the Commission to commence construction of the necessary additional treatment and/or collection facilities. In the case of a domestic wastewater treatment facility which reaches 75% of the permitted daily average or annual average flow for three consecutive months, and the planned population to be served or the quantity of waste produced is not expected to exceed the design limitations of the treatment facility, the permittee shall submit an engineering report supporting this claim to the Executive Director of the Commission.

      If in the judgment of the Executive Director the population to be served will not cause permit noncompliance, then the requirement of this section may be waived. To be effective, any waiver must be in writing and signed by the Director of the Enforcement Division (MC 169) of the Commission, and such waiver of these requirements will be reviewed upon expiration of the existing permit; however, any such waiver shall not be interpreted as condoning or excusing any violation of any permit parameter.

b. The plans and specifications for domestic sewage collection and treatment works associated with any domestic permit must be approved by the Commission and failure to secure approval before commencing construction of such works or making a discharge is a violation of this permit and each day is an additional violation until approval has been secured.

c. Permits for domestic wastewater treatment plants are granted subject to the policy of the Commission to encourage the development of area-wide waste collection, treatment, and disposal systems. The Commission reserves the right to amend any domestic wastewater permit in accordance with applicable procedural requirements to require the system covered by this permit to be integrated into an area-wide system, should such be developed; to require the delivery of the wastes authorized to be collected in, treated by or discharged from said system, to such area-wide system; or to amend this permit in any other particular to effectuate the Commission's policy. Such amendments may be made when the changes required are advisable for water quality control purposes and are feasible on the basis of waste treatment technology, engineering, financial, and related considerations existing at the time the changes are required, exclusive of the loss of investment in or revenues from any then existing or proposed waste collection, treatment or disposal system.

9. Domestic wastewater treatment plants shall be operated and maintained by sewage plant operators holding a valid certificate of competency at the required level as defined in 30 TAC Chapter 30.

10. For Publicly Owned Treatment Works (POTWs), the 30-day average (or monthly average) percent removal for BOD and TSS shall not be less than 85%, unless otherwise authorized by this permit.

11. Facilities that generate industrial solid waste as defined in 30 TAC § 335.1 shall comply with these provisions:

    a. Any solid waste, as defined in 30 TAC § 335.1 (including but not limited to such wastes as garbage, refuse, sludge from a waste treatment, water supply treatment plant or air pollution control facility, discarded materials, discarded materials to be recycled, whether the waste is solid, liquid, or semisolid), generated by the permittee during the management and treatment of wastewater, must be managed in accordance with all applicable provisions of 30 TAC Chapter 335, relating to Industrial Solid Waste Management.

    b. Industrial wastewater that is being collected, accumulated, stored, or processed before discharge through any final discharge outfall, specified by this permit, is considered to be industrial solid waste until the wastewater passes through the actual point source discharge and must be managed in accordance with all applicable provisions of 30 TAC Chapter 335.

    c. The permittee shall provide written notification, pursuant to the requirements of 30 TAC § 335.8(b)(1), to the Environmental Cleanup Section (MC 127) of the Remediation Division informing the Commission of any closure activity involving an Industrial Solid Waste Management Unit, at least 90 days prior to conducting such an activity.

d. Construction of any industrial solid waste management unit requires the prior written notification of the proposed activity to the Registration and Reporting Section (MC 129) of the Registration, Review, and Reporting Division. No person shall dispose of industrial solid waste, including sludge or other solids from wastewater treatment processes, prior to fulfilling the deed recordation requirements of 30 TAC § 335.5.

e. The term "industrial solid waste management unit" means a landfill, surface impoundment, waste-pile, industrial furnace, incinerator, cement kiln, injection well, container, drum, salt dome waste containment cavern, or any other structure vessel, appurtenance, or other improvement on land used to manage industrial solid waste.

f. The permittee shall keep management records for all sludge (or other waste) removed from any wastewater treatment process. These records shall fulfill all applicable requirements of 30 TAC § 335 and must include the following, as it pertains to wastewater treatment and discharge:

   i. Volume of waste and date(s) generated from treatment process;
   ii. Volume of waste disposed of on-site or shipped off-site;
   iii. Date(s) of disposal;
   iv. Identity of hauler or transporter;
   v. Location of disposal site; and
   vi. Method of final disposal.

   The above records shall be maintained on a monthly basis. The records shall be retained at the facility site, or shall be readily available for review by authorized representatives of the TCEQ for at least five years.

12. For industrial facilities to which the requirements of 30 TAC § 335 do not apply, sludge and solid wastes, including tank cleaning and contaminated solids for disposal, shall be disposed of in accordance with THSC § 361.

TCEQ Revision 08/2008

SLUDGE PROVISIONS

The permittee is authorized to dispose of sludge only at a Texas Commission on Environmental Quality (TCEQ) authorized land application site or co-disposal landfill. **The disposal of sludge by land application on property owned, leased or under the direct control of the permittee is a violation of the permit unless the site is authorized with the TCEQ. This provision does not authorize Distribution and Marketing of Class A or Class AB Sewage Sludge. This provision does not authorize the permittee to land apply sludge on property owned, leased or under the direct control of the permittee.**

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE LAND APPLICATION

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge in accordance with 30 TAC § 312 and all other applicable state and federal regulations in a manner that protects public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present in the sludge.

2. In all cases, if the person (permit holder) who prepares the sewage sludge supplies the sewage sludge to another person for land application use or to the owner or lease holder of the land, the permit holder shall provide necessary information to the parties who receive the sludge to assure compliance with these regulations.

3. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the sewage sludge disposal practice.

B. Testing Requirements

1. Sewage sludge shall be tested once during the term of this permit in accordance with the method specified in both 40 CFR Part 261, Appendix II and 40 CFR Part 268, Appendix I [Toxicity Characteristic Leaching Procedure (TCLP)] or other method that receives the prior approval of the TCEQ for the contaminants listed in 40 CFR Part 261.24, Table 1. Sewage sludge failing this test shall be managed according to RCRA standards for generators of hazardous waste, and the waste's disposition must be in accordance with all applicable requirements for hazardous waste processing, storage, or disposal. Following failure of any TCLP test, the management or disposal of sewage sludge at a facility other than an authorized hazardous waste processing, storage, or disposal facility shall be prohibited until such time as the permittee can demonstrate the sewage sludge no longer exhibits the hazardous waste toxicity characteristics (as demonstrated by the results of the TCLP tests). A written report shall be provided to both the TCEQ Registration and Reporting Section (MC 129) of the Permitting and Remediation Support Division and the Regional Director (MC Region 4) within seven (7) days after failing the TCLP Test.

The report shall contain test results, certification that unauthorized waste management has stopped and a summary of alternative disposal plans that comply with RCRA standards for the management of hazardous waste. The report shall be addressed to: Director, Registration, Review, and Reporting Division (MC 129), Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087. In addition, the permittee shall prepare an annual report on the results of all sludge toxicity testing. This annual report shall be submitted to the TCEQ Regional Office (MC Region 4) and the Compliance Monitoring Team (MC 224) of the Enforcement Division by September 30th of each year. Effective September 1, 2020, the permittee must submit this annual report using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver.

2. Sewage sludge shall not be applied to the land if the concentration of the pollutants exceeds the pollutant concentration criteria in Table 1. The frequency of testing for pollutants in Table 1 is found in Section I.C.

TABLE 1

Pollutant	Ceiling Concentration (Milligrams per kilogram)*
Arsenic	75
Cadmium	85
Chromium	3000
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
PCBs	49
Selenium	100
Zinc	7500

* Dry weight basis

3. Pathogen Control

All sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site must be treated by one of the following methods to ensure that the sludge meets either the Class A, Class AB or Class B pathogen requirements.

a. For sewage sludge to be classified as Class A with respect to pathogens, the density of fecal coliform in the sewage sludge be less than 1,000 most probable number (MPN) per gram of total solids (dry weight basis), or the density of *Salmonella* sp. bacteria in the sewage sludge be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. In addition, one of the alternatives listed below must be met.

Alternative 1 - The temperature of the sewage sludge that is used or disposed shall be maintained at or above a specific value for a period of time. See 30 TAC § 312.82(a)(2)(A) for specific information.

Alternative 5 (PFRP) - Sewage sludge that is used or disposed of must be treated in one of the Processes to Further Reduce Pathogens (PFRP) described in 40 CFR Part 503, Appendix B. PFRP include composting, heat drying, heat treatment, and thermophilic aerobic digestion.

Alternative 6 (PFRP Equivalent) - Sewage sludge that is used or disposed of must be treated in a process that has been approved by the U. S. Environmental Protection Agency as being equivalent to those in Alternative 5.

b. For sewage sludge to be classified as Class AB with respect to pathogens, the density of fecal coliform in the sewage sludge be less than 1,000 MPN per gram of total solids (dry weight basis), or the density of *Salmonella* sp. bacteria in the sewage sludge be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. In addition, one of the alternatives listed below must be met.

Alternative 2 - The pH of the sewage sludge that is used or disposed shall be raised to above 12 std. units and shall remain above 12 std. units for 72 hours.

The temperature of the sewage sludge shall be above 52° Celsius for 12 hours or longer during the period that the pH of the sewage sludge is above 12 std. units.

At the end of the 72-hour period during which the pH of the sewage sludge is above 12 std. units, the sewage sludge shall be air dried to achieve a percent solids in the sewage sludge greater than 50%.

Alternative 3 - The sewage sludge shall be analyzed for enteric viruses prior to pathogen treatment. The limit for enteric viruses is less than one Plaque-forming Unit per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 30 TAC § 312.82(a)(2)(C)(i-iii) for specific information. The sewage sludge shall be analyzed for viable helminth ova prior to pathogen treatment. The limit for viable helminth ova is less than one per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 30 TAC § 312.82(a)(2)(C)(iv-vi) for specific information.

Alternative 4 - The density of enteric viruses in the sewage sludge shall be less than one Plaque-forming Unit per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. The density of viable helminth ova in the sewage sludge shall be less than one per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed.

c. Sewage sludge that meets the requirements of Class AB sewage sludge may be classified a Class A sewage sludge if a variance request is submitted in writing that is supported by substantial documentation demonstrating equivalent methods for reducing odors and written approval is granted by the executive director. The executive director may deny the variance request or revoke that approved variance if it is determined that the variance may potentially endanger human health or the environment, or create nuisance odor conditions.

d. Three alternatives are available to demonstrate compliance with Class B criteria for sewage sludge.

Alternative 1

i. A minimum of seven random samples of the sewage sludge shall be collected within 48 hours of the time the sewage sludge is used or disposed of during each monitoring episode for the sewage sludge.

ii. The geometric mean of the density of fecal coliform in the samples collected shall be less than either 2,000,000 MPN per gram of total solids (dry weight basis) or 2,000,000 Colony Forming Units per gram of total solids (dry weight basis).

Alternative 2 - Sewage sludge that is used or disposed of shall be treated in one of the Processes to Significantly Reduce Pathogens (PSRP) described in 40 CFR Part 503, Appendix B, so long as all of the following requirements are met by the generator of the sewage sludge.

i. Prior to use or disposal, all the sewage sludge must have been generated from a single location, except as provided in paragraph v. below;

ii. An independent Texas Licensed Professional Engineer must make a certification to the generator of a sewage sludge that the wastewater treatment facility generating the sewage sludge is designed to achieve one of the PSRP at the permitted design loading of the facility. The certification need only be repeated if the design loading of the facility is increased. The certification shall include a statement indicating the design meets all the applicable standards specified in Appendix B of 40 CFR Part 503;

iii. Prior to any off-site transportation or on-site use or disposal of any sewage sludge generated at a wastewater treatment facility, the chief certified operator of the wastewater treatment facility or other responsible official who manages the processes to significantly reduce pathogens at the wastewater treatment facility for the permittee, shall certify that the sewage sludge underwent at least the minimum operational requirements necessary in order to meet one of the PSRP. The acceptable processes and the minimum operational and record keeping requirements shall be in accordance with established U.S. Environmental Protection Agency final guidance;

iv. All certification records and operational records describing how the requirements of this paragraph were met shall be kept by the generator for a minimum of three years and be available for inspection by commission staff for review; and

v. If the sewage sludge is generated from a mixture of sources, resulting from a person who prepares sewage sludge from more than one wastewater treatment facility, the resulting derived product shall meet one of the PSRP, and shall meet the certification, operation, and record keeping requirements of this paragraph.

Alternative 3 - Sewage sludge shall be treated in an equivalent process that has been approved by the U.S. Environmental Protection Agency, so long as all of the following requirements are met by the generator of the sewage sludge.

i. Prior to use or disposal, all the sewage sludge must have been generated from a single location, except as provided in paragraph v. below;

ii. Prior to any off-site transportation or on-site use or disposal of any sewage sludge generated at a wastewater treatment facility, the chief certified operator of the wastewater treatment facility or other responsible official who manages the processes to significantly reduce pathogens at the wastewater treatment facility for the permittee, shall certify that the sewage sludge underwent at least the minimum operational requirements necessary in order to meet one of the PSRP. The acceptable processes and the minimum operational and record keeping requirements shall be in accordance with established U.S. Environmental Protection Agency final guidance;

iii. All certification records and operational records describing how the requirements of this paragraph were met shall be kept by the generator for a minimum of three years and be available for inspection by commission staff for review;

iv. The Executive Director will accept from the U.S. Environmental Protection Agency a finding of equivalency to the defined PSRP; and

v. If the sewage sludge is generated from a mixture of sources resulting from a person who prepares sewage sludge from more than one wastewater treatment facility, the resulting derived product shall meet one of the Processes to Significantly Reduce Pathogens, and shall meet the certification, operation, and record keeping requirements of this paragraph.

In addition, the following site restrictions must be met if Class B sludge is land applied:

i. Food crops with harvested parts that touch the sewage sludge/soil mixture and are totally above the land surface shall not be harvested for 14 months after application of sewage sludge.

ii. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of sewage sludge when the sewage sludge remains on the land surface for 4 months or longer prior to incorporation into the soil.

iii. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of sewage sludge when the sewage sludge remains on the land surface for less than 4 months prior to incorporation into the soil.

iv. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of sewage sludge.

v. Animals shall not be allowed to graze on the land for 30 days after application of sewage sludge.

vi. Turf grown on land where sewage sludge is applied shall not be harvested for 1 year after application of the sewage sludge when the harvested turf is placed on either land with a high potential for public exposure or a lawn.

vii. Public access to land with a high potential for public exposure shall be restricted for 1 year after application of sewage sludge.

viii. Public access to land with a low potential for public exposure shall be restricted for 30 days after application of sewage sludge.

ix. Land application of sludge shall be in accordance with the buffer zone requirements found in 30 TAC § 312.44.

4. Vector Attraction Reduction Requirements

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by one of the following Alternatives 1 through 10 for vector attraction reduction.

Alternative 1 - The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38%.

Alternative 2 - If Alternative 1 cannot be met for an anaerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30° and 37° Celsius. Volatile solids must be reduced by less than 17% to demonstrate compliance.

Alternative 3 - If Alternative 1 cannot be met for an aerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge with percent solids of two percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20° Celsius. Volatile solids must be reduced by less than 15% to demonstrate compliance.

Alternative 4 - The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20° Celsius.

Alternative 5 - Sewage sludge shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the sewage sludge shall be higher than 40° Celsius and the average temperature of the sewage sludge shall be higher than 45° Celsius.

Alternative 6 - The pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali shall remain at 12 or higher for two hours and then remain at a pH of 11.5 or higher for an additional 22 hours at the time the sewage sludge is prepared for sale or given away in a bag or other container.

Alternative 7 - The percent solids of sewage sludge that does not contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 75% based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 8 - The percent solids of sewage sludge that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90% based on the moisture content and total solids prior to mixing with other materials at the time the sludge is used. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 9 -

i. Sewage sludge shall be injected below the surface of the land.

ii. No significant amount of the sewage sludge shall be present on the land surface within one hour after the sewage sludge is injected.

iii. When sewage sludge that is injected below the surface of the land is Class A or Class AB with respect to pathogens, the sewage sludge shall be injected below the land surface within eight hours after being discharged from the pathogen treatment process.

Alternative 10-

i. Sewage sludge applied to the land surface or placed on a surface disposal site shall be incorporated into the soil within six hours after application to or placement on the land.

ii. When sewage sludge that is incorporated into the soil is Class A or Class AB with respect to pathogens, the sewage sludge shall be applied to or placed on the land within eight hours after being discharged from the pathogen treatment process.

C. Monitoring Requirements

Toxicity Characteristic Leaching Procedure (TCLP) Test	- once during the term of this permit
PCBs	- once during the term of this permit

All metal constituents and fecal coliform or *Salmonella* sp. bacteria shall be monitored at the appropriate frequency shown below, pursuant to 30 TAC § 312.46(a)(1):

Amount of sewage sludge (*) metric tons per 365-day period	Monitoring Frequency
0 to less than 290	Once/Year
290 to less than 1,500	Once/Quarter
1,500 to less than 15,000	Once/Two Months
15,000 or greater	Once/Month

(*) *The amount of bulk sewage sludge applied to the land (dry wt. basis).*

Representative samples of sewage sludge shall be collected and analyzed in accordance with the methods referenced in 30 TAC § 312.7.

Identify each of the analytic methods used by the facility to analyze enteric viruses, fecal coliforms, helminth ova, *Salmonella* sp., and other regulated parameters.

Identify in the following categories (as applicable) the sewage sludge treatment process or processes at the facility: preliminary operations (e.g., sludge grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

Identify the nature of material generated by the facility (such as a biosolid for beneficial use or land-farming, or sewage sludge for disposal at a monofill) and whether the material is ultimately conveyed off-site in bulk or in bags.

SECTION II. REQUIREMENTS SPECIFIC TO BULK SEWAGE SLUDGE FOR APPLICATION TO THE LAND MEETING CLASS A, CLASS AB or B PATHOGEN REDUCTION AND THE CUMULATIVE LOADING RATES IN TABLE 2, OR CLASS B PATHOGEN REDUCTION AND THE POLLUTANT CONCENTRATIONS IN TABLE 3

For those permittees meeting Class A, Class AB or B pathogen reduction requirements and that meet the cumulative loading rates in Table 2 below, or the Class B pathogen reduction requirements and contain concentrations of pollutants below listed in Table 3, the following conditions apply:

A. Pollutant Limits

Table 2

Pollutant	Cumulative Pollutant Loading Rate (pounds per acre)*
Arsenic	36
Cadmium	35
Chromium	2677
Copper	1339
Lead	268
Mercury	15
Molybdenum	Report Only
Nickel	375
Selenium	89
Zinc	2500

Table 3

Pollutant	Monthly Average Concentration (milligrams per kilogram)*
Arsenic	41
Cadmium	39
Chromium	1200
Copper	1500
Lead	300
Mercury	17
Molybdenum	Report Only
Nickel	420
Selenium	36
Zinc	2800

*Dry weight basis

B. Pathogen Control

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, a reclamation site, shall be treated by either Class A, Class AB or Class B pathogen reduction requirements as defined above in Section I.B.3.

C. Management Practices

1. Bulk sewage sludge shall not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen, or snow-covered so that the bulk sewage sludge enters a wetland or other waters in the State.

2. Bulk sewage sludge not meeting Class A requirements shall be land applied in a manner which complies with Applicability in accordance with 30 TAC § 312.41 and the Management Requirements in accordance with 30 TAC § 312.44.

3. Bulk sewage sludge shall be applied at or below the agronomic rate of the cover crop.

4. An information sheet shall be provided to the person who receives bulk sewage sludge sold or given away. The information sheet shall contain the following information:

   a. The name and address of the person who prepared the sewage sludge that is sold or given away in a bag or other container for application to the land.

   b. A statement that application of the sewage sludge to the land is prohibited except in accordance with the instruction on the label or information sheet.

   c. The annual whole sludge application rate for the sewage sludge application rate for the sewage sludge that does not cause any of the cumulative pollutant loading rates in Table 2 above to be exceeded, unless the pollutant concentrations in Table 3 found in Section II above are met.

D. Notification Requirements

1. If bulk sewage sludge is applied to land in a State other than Texas, written notice shall be provided prior to the initial land application to the permitting authority for the State in which the bulk sewage sludge is proposed to be applied. The notice shall include:

   a. The location, by street address, and specific latitude and longitude, of each land application site.

   b. The approximate time period bulk sewage sludge will be applied to the site.

   c. The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) for the person who will apply the bulk sewage sludge.

2. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the sewage sludge disposal practice.

E. Record keeping Requirements

The sludge documents will be retained at the facility site and/or shall be readily available for review by a TCEQ representative. The person who prepares bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information at

the facility site and/or shall be readily available for review by a TCEQ representative for a period of five years. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for record keeping found in 30 TAC § 312.47 for persons who land apply.

1. The concentration (mg/kg) in the sludge of each pollutant listed in Table 3 above and the applicable pollutant concentration criteria (mg/kg), or the applicable cumulative pollutant loading rate and the applicable cumulative pollutant loading rate limit (lbs/ac) listed in Table 2 above.

2. A description of how the pathogen reduction requirements are met (including site restrictions for Class AB and Class B sludge, if applicable).

3. A description of how the vector attraction reduction requirements are met.

4. A description of how the management practices listed above in Section II.C are being met.

5. The following certification statement:

   "I certify, under penalty of law, that the applicable pathogen requirements in 30 TAC § 312.82(a) or (b) and the vector attraction reduction requirements in 30 TAC § 312.83(b) have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

6. The recommended agronomic loading rate from the references listed in Section II.C.3. above, as well as the actual agronomic loading rate shall be retained. The person who applies bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information at the facility site and/or shall be readily available for review by a TCEQ representative indefinitely. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for record keeping found in 30 TAC § 312.47 for persons who land apply:

   a. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 30 TAC § 312.47(a)(4)(A)(ii) or 30 TAC § 312.47(a)(5)(A)(ii), as applicable, and to the permittee's specific sludge treatment activities.

   b. The location, by street address, and specific latitude and longitude, of each site on which sludge is applied.

   c. The number of acres in each site on which bulk sludge is applied.

   d. The date and time sludge is applied to each site.

e. The cumulative amount of each pollutant in pounds/acre listed in Table 2 applied to each site.

f. The total amount of sludge applied to each site in dry tons.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

F. Reporting Requirements

The permittee shall report annually to the TCEQ Regional Office (MC Region 4) and Compliance Monitoring Team (MC 224) of the Enforcement Division, by September 30th of each year the following information. Effective September 1, 2020, the permittee must submit this annual report using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver.

1. Identify in the following categories (as applicable) the sewage sludge treatment process or processes at the facility: preliminary operations (e.g., sludge grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

2. Identify the nature of material generated by the facility (such as a biosolid for beneficial use or land-farming, or sewage sludge for disposal at a monofill) and whether the material is ultimately conveyed off-site in bulk or in bags.

3. Results of tests performed for pollutants found in either Table 2 or 3 as appropriate for the permittee's land application practices.

4. The frequency of monitoring listed in Section I.C. that applies to the permittee.

5. Toxicity Characteristic Leaching Procedure (TCLP) results.

6. PCB concentration in sludge in mg/kg.

7. Identity of hauler(s) and TCEQ transporter number.

8. Date(s) of transport.

9. Texas Commission on Environmental Quality registration number, if applicable.

10. Amount of sludge disposal dry weight (lbs/acre) at each disposal site.

11. The concentration (mg/kg) in the sludge of each pollutant listed in Table 1 (defined as a monthly average) as well as the applicable pollutant concentration criteria (mg/kg) listed in Table 3 above, or the applicable pollutant loading rate limit (lbs/acre) listed in Table 2 above if it exceeds 90% of the limit.

12. Level of pathogen reduction achieved (Class A, Class AB or Class B).

13. Alternative used as listed in Section I.B.3.(a. or b.). Alternatives describe how the pathogen reduction requirements are met. If Class B sludge, include information on how site restrictions were met.

14. Identify each of the analytic methods used by the facility to analyze enteric viruses, fecal coliforms, helminth ova, *Salmonella* sp., and other regulated parameters.

15. Vector attraction reduction alternative used as listed in Section I.B.4.

16. Amount of sludge transported in dry tons/year.

17. The certification statement listed in either 30 TAC § 312.47(a)(4)(A)(ii) or 30 TAC § 312.47(a)(5)(A)(ii) as applicable to the permittee's sludge treatment activities, shall be attached to the annual reporting form.

18. When the amount of any pollutant applied to the land exceeds 90% of the cumulative pollutant loading rate for that pollutant, as described in Table 2, the permittee shall report the following information as an attachment to the annual reporting form.

    a. The location, by street address, and specific latitude and longitude.

    b. The number of acres in each site on which bulk sewage sludge is applied.

    c. The date and time bulk sewage sludge is applied to each site.

    d. The cumulative amount of each pollutant (i.e., pounds/acre) listed in Table 2 in the bulk sewage sludge applied to each site.

    e. The amount of sewage sludge (i.e., dry tons) applied to each site.

    The above records shall be maintained on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

SECTION III. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE DISPOSED IN A MUNICIPAL SOLID WASTE LANDFILL

A. The permittee shall handle and dispose of sewage sludge in accordance with 30 TAC § 330 and all other applicable state and federal regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present. The permittee shall ensure that the sewage sludge meets the requirements in 30 TAC § 330 concerning the quality of the sludge disposed in a municipal solid waste landfill.

B. If the permittee generates sewage sludge and supplies that sewage sludge to the owner or operator of a municipal solid waste landfill (MSWLF) for disposal, the permittee shall provide to the owner or operator of the MSWLF appropriate information needed to be in compliance with the provisions of this permit.

C. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the sewage sludge disposal practice.

D. Sewage sludge shall be tested once during the term of this permit in accordance with the method specified in both 40 CFR Part 261, Appendix II and 40 CFR Part 268, Appendix I (Toxicity Characteristic Leaching Procedure) or other method, which receives the prior approval of the TCEQ for contaminants listed in Table 1 of 40 CFR § 261.24. Sewage sludge failing this test shall be managed according to RCRA standards for generators of hazardous waste, and the waste's disposition must be in accordance with all applicable requirements for hazardous waste processing, storage, or disposal.

   Following failure of any TCLP test, the management or disposal of sewage sludge at a facility other than an authorized hazardous waste processing, storage, or disposal facility shall be prohibited until such time as the permittee can demonstrate the sewage sludge no longer exhibits the hazardous waste toxicity characteristics (as demonstrated by the results of the TCLP tests). A written report shall be provided to both the TCEQ Registration and Reporting Section (MC 129) of the Permitting and Remediation Support Division and the Regional Director (MC Region 4) of the appropriate TCEQ field office within 7 days after failing the TCLP Test.

   The report shall contain test results, certification that unauthorized waste management has stopped and a summary of alternative disposal plans that comply with RCRA standards for the management of hazardous waste. The report shall be addressed to: Director, Registration, Review, and Reporting Division (MC 129), Texas Commission on Environmental Quality, P. O. Box 13087, Austin, Texas 78711-3087. In addition, the permittee shall prepare an annual report on the results of all sludge toxicity testing. This annual report shall be submitted to the TCEQ Regional Office (MC Region 4) and the Compliance Monitoring Team (MC 224) of the Enforcement Division by September 30 of each year.

E. Sewage sludge shall be tested as needed, in accordance with the requirements of 30 TAC Chapter 330.

F. Record keeping Requirements

   The permittee shall develop the following information and shall retain the information for five years.

1. The description (including procedures followed and the results) of all liquid Paint Filter Tests performed.

2. The description (including procedures followed and results) of all TCLP tests performed.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

G. Reporting Requirements

The permittee shall report annually to the TCEQ Regional Office (MC Region 4) and Compliance Monitoring Team (MC 224) of the Enforcement Division by September 30th of each year the following information. Effective September 1, 2020, the permittee must submit this annual report using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver.

1. Identify in the following categories (as applicable) the sewage sludge treatment process or processes at the facility: preliminary operations (e.g., sludge grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

2. Toxicity Characteristic Leaching Procedure (TCLP) results.

3. Annual sludge production in dry tons/year.

4. Amount of sludge disposed in a municipal solid waste landfill in dry tons/year.

5. Amount of sludge transported interstate in dry tons/year.

6. A certification that the sewage sludge meets the requirements of 30 TAC § 330 concerning the quality of the sludge disposed in a municipal solid waste landfill.

7. Identity of hauler(s) and transporter registration number.

8. Owner of disposal site(s).

9. Location of disposal site(s).

10. Date(s) of disposal.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

SECTION IV. REQUIREMENTS APPLYING TO SLUDGE TRANSPORTED TO ANOTHER FACILITY FOR FURTHER PROCESSING

These provisions apply to sludge that is transported to another wastewater treatment facility or facility that further processes sludge. These provisions are intended to allow transport of sludge to facilities that have been authorized to accept sludge. These provisions do not limit the ability of the receiving facility to determine whether to accept the sludge, nor do they limit the ability of the receiving facility to request additional testing or documentation.

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge in accordance with 30 TAC Chapter 312 and all other applicable state and federal regulations in a manner that protects public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present in the sludge.

2. Sludge may only be transported using a registered transporter or using an approved pipeline.

B. Record Keeping Requirements

1. For sludge transported by an approved pipeline, the permittee must maintain records of the following:

   a. the amount of sludge transported;

   b. the date of transport;

   c. the name and TCEQ permit number of the receiving facility or facilities;

   d. the location of the receiving facility or facilities;

   e. the name and TCEQ permit number of the facility that generated the waste; and

   f. copy of the written agreement between the permittee and the receiving facility to accept sludge.

2. For sludge transported by a registered transporter, the permittee must maintain records of the completed trip tickets in accordance with 30 TAC § 312.145(a)(1)-(7) and amount of sludge transported.

3. The above records shall be maintained on-site on a monthly basis and shall be made available to the TCEQ upon request. These records shall be retained for at least five years.

C. Reporting Requirements

The permittee shall report the following information annually to the TCEQ Regional Office (MC Region 4) and Compliance Monitoring Team (MC 224) of the Enforcement Division, by September 30th of each year. Effective September 1, 2020, the permittee must submit this annual report using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver.

1. Identify in the following categories (as applicable) the sewage sludge treatment process or processes at the facility: preliminary operations (e.g., sludge grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.
2. the annual sludge production;
3. the amount of sludge transported;
4. the owner of each receiving facility;
5. the location of each receiving facility; and
6. the date(s) of disposal at each receiving facility.

TCEQ Revision 01/2016

OTHER REQUIREMENTS

1. The permittee shall employ or contract with one or more licensed wastewater treatment facility operators or wastewater system operations companies holding a valid license or registration according to the requirements of 30 TAC Chapter 30, Occupational Licenses and Registrations and in particular 30 TAC Chapter 30, Subchapter J, Wastewater Operators and Operations Companies.

   This Category C facility must be operated by a chief operator or an operator holding a Category C license or higher. The facility must be operated a minimum of five days per week by the licensed chief operator or an operator holding the required level of license or higher. The licensed chief operator or operator holding the required level of license or higher must be available by telephone or pager seven days per week. Where shift operation of the wastewater treatment facility is necessary, each shift that does not have the on-site supervision of the licensed chief operator must be supervised by an operator in charge who is licensed not less than one level below the category for the facility.

2. The facility is not located in the Coastal Management Program boundary.

3. The permittee is hereby placed on notice that this permit may be reviewed by the TCEQ after the completion of any new intensive water quality survey on Segment No. 0826 of the Trinity River Basin and any subsequent updating of the water quality model for Segment No. 0826 to determine if the limitations and conditions contained herein are consistent with any such revised model. The permit may be amended, pursuant to 30 TAC § 305.62, as a result of such review. The permittee is also hereby placed on notice that effluent limits may be made more stringent at renewal based on, for example, any change to modeling protocol approved in the TCEQ Continuing Planning Process.

4. The permittee shall comply with the requirements of 30 TAC § 309.13(a) through (d). In addition, by ownership of the required buffer zone area, the permittee shall comply with the requirements of 30 TAC § 309.13(e).

5. The permittee shall provide facilities for the protection of its wastewater treatment facility from a 100-year flood.

6. In accordance with 30 TAC § 319.9, a permittee that has at least twelve months of uninterrupted compliance with its bacteria limit may notify the commission in writing of its compliance and request a less frequent measurement schedule. To request a less frequent schedule, the permittee shall submit a written request to the TCEQ Wastewater Permitting Section (MC 148) for each phase that includes a different monitoring frequency. The request must contain all of the reported bacteria values (Daily Avg. and Daily Max/Single Grab) for the twelve consecutive months immediately prior to the request. If the Executive Director finds that a less frequent measurement schedule is protective of human health and the environment, the permittee may be given a less frequent measurement schedule. For this permit, 1/month may be reduced to 1/quarter in the Interim I and Interim II phases, and 2/month may be reduced to 1/month in the Final phase. **A violation of any bacteria limit by a facility that has been granted a less frequent measurement schedule will require the permittee to return to the standard frequency schedule and submit written notice to the TCEQ Wastewater Permitting Section (MC 148).** The permittee may not apply for another reduction in measurement frequency for at least 24 months from the date of the last violation. The Executive Director may establish a more frequent measurement schedule if necessary to protect human health or the environment.

7. Prior to construction of the Interim I, Interim II, and Final phase treatment facilities, the permittee shall submit to the TCEQ Wastewater Permitting Section (MC 148) a summary transmittal letter in accordance with the requirements in 30 TAC § 217.6(d). If requested by the Wastewater Permitting Section, the permittee shall submit plans and specifications and a final engineering design report which comply with 30 TAC Chapter 217, Design Criteria for Domestic Wastewater Systems. The permittee shall clearly show how the treatment system will meet the final permitted effluent limitations required on Pages 2, 2a, and 2b of this permit. A copy of the summary transmittal letter shall be available at the plant site for inspection by authorized representatives of the TCEQ.

8. Reporting requirements according to 30 TAC §§ 319.1-319.11 and any additional effluent reporting requirements contained in this permit are suspended from the effective date of the permit until plant startup or discharge from the facility described by this permit, whichever occurs first. The permittee shall provide written notice to the TCEQ Regional Office (MC Region 4) and the Applications Review and Processing Team (MC 148) of the Water Quality Division at least forty-five (45) days prior to plant startup or anticipated discharge, whichever occurs first, and prior to completion of each additional phase on Notification of Completion Form 20007.

Texas Commission on Environmental Quality

INTEROFFICE MEMORANDUM

To: Office of Chief Clerk **DATE:** May 16, 2017

From: Michael Parr
Staff Attorney
Environmental Law Division

Subject: Backup Documents Filed for Consideration of Hearing Requests at Agenda

Applicant:	Big Sky Trails, LTD
Proposed Permit No.:	WQ0015479001
Program:	Water
Docket No.:	TCEQ Docket No. 2017-0491-MWD

Enclosed please find an original and seven copies of the following documents for inclusion in the backup material for this permit application:

- Draft permit
- Fact sheet and ED's preliminary decision
- Compliance history report

TPDES PERMIT NO. WQ0015479001
[For TCEQ office use only - EPA I.D. No. TX0137138]

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
P.O. Box 13087
Austin, Texas 78711-3087

PERMIT TO DISCHARGE WASTES
under provisions of
Section 402 of the Clean Water Act
and Chapter 26 of the Texas Water Code

Big Sky Trails, Ltd

whose mailing address is

4347 West Northwest Highway, Suite 130-248
Dallas, Texas 75220

is authorized to treat and discharge wastes from the Big Sky Wastewater Treatment Facility, SIC Code 4952

located approximately 1 mile northwest of the intersection of U.S. Highway 380 and Jackson Road, and approximately 8 miles west of the City of Krum, in Denton County, Texas 76259

to an unnamed tributary; thence to Denton Creek; thence to Grapevine Lake in Segment No. 0826 of the Trinity River Basin

only according to effluent limitations, monitoring requirements and other conditions set forth in this permit, as well as the rules of the Texas Commission on Environmental Quality (TCEQ), the laws of the State of Texas, and other orders of the TCEQ. The issuance of this permit does not grant to the permittee the right to use private or public property for conveyance of wastewater along the discharge route described in this permit. This includes, but is not limited to, property belonging to any individual, partnership, corporation, or other entity. Neither does this permit authorize any invasion of personal rights nor any violation of federal, state, or local laws or regulations. It is the responsibility of the permittee to acquire property rights as may be necessary to use the discharge route.

This permit shall expire at midnight, **September 1, 2019**.

ISSUED DATE:

For the Commission

INTERIM I EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS Outfall Number 001

1. During the period beginning upon the date of issuance and lasting through the completion of expansion to the 0.22 million gallons per day (MGD) facility, the permittee is authorized to discharge subject to the following effluent limitations:

   The daily average flow of effluent shall not exceed 0.11 MGD, nor shall the average discharge during any two-hour period (2-hour peak) exceed 306 gallons per minute (gpm).

Effluent Characteristic	Discharge Limitations				Min. Self-Monitoring Requirements	
	Daily Avg mg/l (lbs/day)	7-day Avg mg/l	Daily Max mg/l	Single Grab mg/l	Report Daily Avg. & Max. Single Grab Measurement Frequency	Sample Type
Flow, MGD	Report	N/A	Report	N/A	Continuous	Totalizing Meter
Carbonaceous Biochemical Oxygen Demand (5-day)	10 (9.2)	15	25	35	One/week	Grab
Total Suspended Solids	15 (14)	25	40	60	One/week	Grab
Ammonia Nitrogen	3 (2.8)	6	10	15	One/week	Grab
Total Phosphorus	1 (0.92)	2	4	6	One/week	Grab
E. coli, colony-forming units or most probable number per 100 ml	126	N/A	N/A	399	One/month	Grab

2. The effluent shall contain a chlorine residual of at least 1.0 mg/l and shall not exceed a chlorine residual of 4.0 mg/l after a detention time of at least 20 minutes (based on peak flow), and shall be monitored five times per week by grab sample. An equivalent method of disinfection may be substituted only with prior approval of the Executive Director.

3. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored once per month by grab sample.

4. There shall be no discharge of floating solids or visible foam in other than trace amounts and no discharge of visible oil.

5. Effluent monitoring samples shall be taken at the following location(s): Following the final treatment unit.

6. The effluent shall contain a minimum dissolved oxygen of 4.0 mg/l and shall be monitored once per week by grab sample.

INTERIM II EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS Outfall Number 001

1. During the period beginning upon the date of the completion of expansion to the 0.22 million gallons per day (MGD) facility through the completion of expansion to the 0.68 MGD facility, the permittee is authorized to discharge subject to the following effluent limitations:

   The daily average flow of effluent shall not exceed 0.22 MGD, nor shall the average discharge during any two-hour period (2-hour peak) exceed 611 gallons per minute (gpm).

Effluent Characteristic	Discharge Limitations				Min. Self-Monitoring Requirements	
	Daily Avg mg/l (lbs/day)	7-day Avg mg/l	Daily Max mg/l	Single Grab mg/l	Report Daily Avg. & Max. Single Grab Measurement Frequency	Sample Type
Flow, MGD	Report	N/A	Report	N/A	Continuous	Totalizing Meter
Carbonaceous Biochemical Oxygen Demand (5-day)	10 (18)	15	25	35	One/week	Grab
Total Suspended Solids	15 (28)	25	40	60	One/week	Grab
Ammonia Nitrogen	3 (5.5)	6	10	15	One/week	Grab
Total Phosphorus	1 (1.8)	2	4	6	One/week	Grab
E. coli, colony-forming units or most probable number per 100 ml	126	N/A	N/A	399	One/month	Grab

2. The effluent shall contain a chlorine residual of at least 1.0 mg/l and shall not exceed a chlorine residual of 4.0 mg/l after a detention time of at least 20 minutes (based on peak flow), and shall be monitored five times per week by grab sample. An equivalent method of disinfection may be substituted only with prior approval of the Executive Director.

3. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored once per month by grab sample.

4. There shall be no discharge of floating solids or visible foam in other than trace amounts and no discharge of visible oil.

5. Effluent monitoring samples shall be taken at the following location(s): Following the final treatment unit.

6. The effluent shall contain a minimum dissolved oxygen of 4.0 mg/l and shall be monitored once per week by grab sample.

FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS Outfall Number 001

1. During the period beginning upon the completion of expansion to the 0.68 million gallons per day (MGD) facility and lasting through the date of expiration, the permittee is authorized to discharge subject to the following effluent limitations:

   The daily average flow of effluent shall not exceed 0.68 MGD, nor shall the average discharge during any two-hour period (2-hour peak) exceed 1,889 gallons per minute (gpm).

Effluent Characteristic	Discharge Limitations				Min. Self-Monitoring Requirements	
	Daily Avg mg/l (lbs/day)	7-day Avg mg/l	Daily Max mg/l	Single Grab mg/l	Report Daily Avg. & Daily Max. Measurement Frequency	Sample Type
Flow, MGD	Report	N/A	Report	N/A	Continuous	Totalizing Meter
Carbonaceous Biochemical Oxygen Demand (5-day)	7 (40)	12	22	32	One/week	Composite
Total Suspended Solids	12 (68)	20	40	60	One/week	Composite
Ammonia Nitrogen	2 (11)	5	10	15	One/week	Composite
Total Phosphorus	1 (5.7)	2	4	6	One/week	Composite
E. coli, colony forming units or most probable number per 100 ml	126	N/A	399	N/A	Two/month	Grab

2. The effluent shall contain a chlorine residual of at least 1.0 mg/l and shall not exceed a chlorine residual of 4.0 mg/l after a detention time of at least 20 minutes (based on peak flow), and shall be monitored daily by grab sample. An equivalent method of disinfection may be substituted only with prior approval of the Executive Director.

3. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored twice per month by grab sample.

4. There shall be no discharge of floating solids or visible foam in other than trace amounts and no discharge of visible oil.

5. Effluent monitoring samples shall be taken at the following location(s): Following the final treatment unit.

6. The effluent shall contain a minimum dissolved oxygen of 4.0 mg/l and shall be monitored once per week by grab sample.

DEFINITIONS AND STANDARD PERMIT CONDITIONS

As required by Title 30 Texas Administrative Code (TAC) Chapter 305, certain regulations appear as standard conditions in waste discharge permits. 30 TAC § 305.121 - 305.129 (relating to Permit Characteristics and Conditions) as promulgated under the Texas Water Code (TWC) §§ 5.103 and 5.105, and the Texas Health and Safety Code (THSC) §§ 361.017 and 361.024(a), establish the characteristics and standards for waste discharge permits, including sewage sludge, and those sections of 40 Code of Federal Regulations (CFR) Part 122 adopted by reference by the Commission. The following text includes these conditions and incorporates them into this permit. All definitions in TWC § 26.001 and 30 TAC Chapter 305 shall apply to this permit and are incorporated by reference. Some specific definitions of words or phrases used in this permit are as follows:

1. Flow Measurements

    a. Annual average flow - the arithmetic average of all daily flow determinations taken within the preceding 12 consecutive calendar months. The annual average flow determination shall consist of daily flow volume determinations made by a totalizing meter, charted on a chart recorder and limited to major domestic wastewater discharge facilities with one million gallons per day or greater permitted flow.

    b. Daily average flow - the arithmetic average of all determinations of the daily flow within a period of one calendar month. The daily average flow determination shall consist of determinations made on at least four separate days. If instantaneous measurements are used to determine the daily flow, the determination shall be the arithmetic average of all instantaneous measurements taken during that month. Daily average flow determination for intermittent discharges shall consist of a minimum of three flow determinations on days of discharge.

    c. Daily maximum flow - the highest total flow for any 24-hour period in a calendar month.

    d. Instantaneous flow - the measured flow during the minimum time required to interpret the flow measuring device.

    e. 2-hour peak flow (domestic wastewater treatment plants) - the maximum flow sustained for a two-hour period during the period of daily discharge. The average of multiple measurements of instantaneous maximum flow within a two-hour period may be used to calculate the 2-hour peak flow.

    f. Maximum 2-hour peak flow (domestic wastewater treatment plants) - the highest 2-hour peak flow for any 24-hour period in a calendar month.

2. Concentration Measurements

    a. Daily average concentration - the arithmetic average of all effluent samples, composite or grab as required by this permit, within a period of one calendar month, consisting of at least four separate representative measurements.

        i. For domestic wastewater treatment plants - When four samples are not available in a calendar month, the arithmetic average (weighted by flow) of all values in the previous four consecutive month period consisting of at least four measurements shall be utilized as the daily average concentration.

ii. For all other wastewater treatment plants - When four samples are not available in a calendar month, the arithmetic average (weighted by flow) of all values taken during the month shall be utilized as the daily average concentration.

b. 7-day average concentration - the arithmetic average of all effluent samples, composite or grab as required by this permit, within a period of one calendar week, Sunday through Saturday.

c. Daily maximum concentration - the maximum concentration measured on a single day, by the sample type specified in the permit, within a period of one calendar month.

d. Daily discharge - the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in terms of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the sampling day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the average measurement of the pollutant over the sampling day.

The daily discharge determination of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the daily discharge determination of concentration shall be the arithmetic average (weighted by flow value) of all samples collected during that day.

e. Bacteria concentration (*E. coli* or Enterococci) - Colony Forming Units (CFU) or Most Probable Number (MPN) of bacteria per 100 milliliters effluent. The daily average bacteria concentration is a geometric mean of the values for the effluent samples collected in a calendar month. The geometric mean shall be determined by calculating the nth root of the product of all measurements made in a calendar month, where n equals the number of measurements made; or, computed as the antilogarithm of the arithmetic mean of the logarithms of all measurements made in a calendar month. For any measurement of bacteria equaling zero, a substituted value of one shall be made for input into either computation method. If specified, the 7-day average for bacteria is the geometric mean of the values for all effluent samples collected during a calendar week.

f. Daily average loading (lbs/day) - the arithmetic average of all daily discharge loading calculations during a period of one calendar month. These calculations must be made for each day of the month that a parameter is analyzed. The daily discharge, in terms of mass (lbs/day), is calculated as (Flow, MGD x Concentration, mg/l x 8.34).

g. Daily maximum loading (lbs/day) - the highest daily discharge, in terms of mass (lbs/day), within a period of one calendar month.

3. Sample Type

a. Composite sample - For domestic wastewater, a composite sample is a sample made up of a minimum of three effluent portions collected in a continuous 24-hour period or during the period of daily discharge if less than 24 hours, and combined in volumes proportional to flow, and collected at the intervals required by 30 TAC § 319.9 (a). For industrial wastewater, a composite sample is a sample made up of a minimum of three effluent portions collected in a continuous 24-hour period or during the period of daily discharge if less than 24 hours, and combined in volumes proportional to flow, and collected at the intervals required by 30 TAC § 319.9 (b).

b. Grab sample - an individual sample collected in less than 15 minutes.

4. Treatment Facility (facility) - wastewater facilities used in the conveyance, storage, treatment, recycling, reclamation and/or disposal of domestic sewage, industrial wastes, agricultural wastes, recreational wastes, or other wastes including sludge handling or disposal facilities under the jurisdiction of the Commission.

5. The term "sewage sludge" is defined as solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in 30 TAC Chapter 312. This includes the solids that have not been classified as hazardous waste separated from wastewater by unit processes.

6. Bypass - the intentional diversion of a waste stream from any portion of a treatment facility.

MONITORING AND REPORTING REQUIREMENTS

1. Self-Reporting

Monitoring results shall be provided at the intervals specified in the permit. Unless otherwise specified in this permit or otherwise ordered by the Commission, the permittee shall conduct effluent sampling and reporting in accordance with 30 TAC §§ 319.4 - 319.12. Unless otherwise specified, a monthly effluent report shall be submitted each month, to the Enforcement Division (MC 224), by the 20th day of the following month for each discharge which is described by this permit whether or not a discharge is made for that month. Effective December 21, 2016, monitoring results must be submitted online using the NetDMR reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver. Monitoring results must be signed and certified as required by Monitoring and Reporting Requirements No. 10.

As provided by state law, the permittee is subject to administrative, civil and criminal penalties, as applicable, for negligently or knowingly violating the Clean Water Act (CWA); TWC §§ 26, 27, and 28; and THSC § 361, including but not limited to knowingly making any false statement, representation, or certification on any report, record, or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, or falsifying, tampering with or knowingly rendering inaccurate any monitoring device or method required by this permit or violating any other requirement imposed by state or federal regulations.

2. Test Procedures

a. Unless otherwise specified in this permit, test procedures for the analysis of pollutants shall comply with procedures specified in 30 TAC §§ 319.11 - 319.12. Measurements, tests, and calculations shall be accurately accomplished in a representative manner.

b. All laboratory tests submitted to demonstrate compliance with this permit must meet the requirements of 30 TAC § 25, Environmental Testing Laboratory Accreditation and Certification.

3. Records of Results

a. Monitoring samples and measurements shall be taken at times and in a manner so as to be representative of the monitored activity.

b. Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503), monitoring and reporting records, including strip charts and records of calibration and maintenance, copies of all records required by this permit, records of all data used to complete the application for this permit, and the certification required by 40 CFR § 264.73(b)(9) shall be retained at the facility site, or shall be readily available for review by a TCEQ representative for a period of three years from the date of the record or sample, measurement, report, application or certification. This period shall be extended at the request of the Executive Director.

c. Records of monitoring activities shall include the following:

i. date, time and place of sample or measurement;

ii. identity of individual who collected the sample or made the measurement.

iii. date and time of analysis;

iv. identity of the individual and laboratory who performed the analysis;

v. the technique or method of analysis; and

vi. the results of the analysis or measurement and quality assurance/quality control records.

The period during which records are required to be kept shall be automatically extended to the date of the final disposition of any administrative or judicial enforcement action that may be instituted against the permittee.

4. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit using approved analytical methods as specified above, all results of such monitoring shall be included in the calculation and reporting of the values submitted on the approved self-report form. Increased frequency of sampling shall be indicated on the self-report form.

5. Calibration of Instruments

All automatic flow measuring or recording devices and all totalizing meters for measuring flows shall be accurately calibrated by a trained person at plant start-up and as often thereafter as necessary to ensure accuracy, but not less often than annually unless authorized by the Executive Director for a longer period. Such person shall verify in writing that the device is operating properly and giving accurate results. Copies of the verification shall be retained at the facility site and/or shall be readily available for review by a TCEQ representative for a period of three years.

6. Compliance Schedule Reports

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of the permit shall be submitted no later

than 14 days following each schedule date to the Regional Office and the Enforcement Division (MC 224).

7. Noncompliance Notification

   a. In accordance with 30 TAC § 305.125(9) any noncompliance which may endanger human health or safety, or the environment shall be reported by the permittee to the TCEQ. Except as allowed by 30 TAC § 305.132, report of such information shall be provided orally or by facsimile transmission (FAX) to the Regional Office within 24 hours of becoming aware of the noncompliance. A written submission of such information shall also be provided by the permittee to the Regional Office and the Enforcement Division (MC 224) within five working days of becoming aware of the noncompliance. For Publicly Owned Treatment Works (POTWs), effective September 1, 2020, the permittee must submit the written report for unauthorized discharges and unanticipated bypasses that exceed any effluent limit in the permit using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver. The written submission shall contain a description of the noncompliance and its cause; the potential danger to human health or safety, or the environment; the period of noncompliance, including exact dates and times; if the noncompliance has not been corrected, the time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance, and to mitigate its adverse effects.

   b. The following violations shall be reported under Monitoring and Reporting Requirement 7.a.:

      i. Unauthorized discharges as defined in Permit Condition 2(g).

      ii. Any unanticipated bypass that exceeds any effluent limitation in the permit.

      iii. Violation of a permitted maximum daily discharge limitation for pollutants listed specifically in the Other Requirements section of an Industrial TPDES permit.

   c. In addition to the above, any effluent violation which deviates from the permitted effluent limitation by more than 40% shall be reported by the permittee in writing to the Regional Office and the Enforcement Division (MC 224) within 5 working days of becoming aware of the noncompliance.

   d. Any noncompliance other than that specified in this section, or any required information not submitted or submitted incorrectly, shall be reported to the Enforcement Division (MC 224) as promptly as possible. For effluent limitation violations, noncompliances shall be reported on the approved self-report form.

8. In accordance with the procedures described in 30 TAC §§ 35.301 - 35.303 (relating to Water Quality Emergency and Temporary Orders) if the permittee knows in advance of the need for a bypass, it shall submit prior notice by applying for such authorization.

9. Changes in Discharges of Toxic Substances

   All existing manufacturing, commercial, mining, and silvicultural permittees shall notify the Regional Office, orally or by facsimile transmission within 24 hours, and both the Regional Office and the Enforcement Division (MC 224) in writing within five (5) working days, after

becoming aware of or having reason to believe:

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant listed at 40 CFR Part 122, Appendix D, Tables II and III (excluding Total Phenols) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   i. One hundred micrograms per liter (100 µg/L);

   ii. Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

   iii. Five (5) times the maximum concentration value reported for that pollutant in the permit application; or

   iv. The level established by the TCEQ.

b. That any activity has occurred or will occur which would result in any discharge, on a nonroutine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   i. Five hundred micrograms per liter (500 µg/L);

   ii. One milligram per liter (1 mg/L) for antimony;

   iii. Ten (10) times the maximum concentration value reported for that pollutant in the permit application; or

   iv. The level established by the TCEQ.

10. Signatories to Reports

    All reports and other information requested by the Executive Director shall be signed by the person and in the manner required by 30 TAC § 305.128 (relating to Signatories to Reports).

11. All POTWs must provide adequate notice to the Executive Director of the following:

    a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to CWA § 301 or § 306 if it were directly discharging those pollutants;

    b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit; and

    c. For the purpose of this paragraph, adequate notice shall include information on:

       i. The quality and quantity of effluent introduced into the POTW; and

       ii. Any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

PERMIT CONDITIONS

1. General

    a. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in an application or in any report to the Executive Director, it shall promptly submit such facts or information.

    b. This permit is granted on the basis of the information supplied and representations made by the permittee during action on an application, and relying upon the accuracy and completeness of that information and those representations. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked, in whole or in part, in accordance with 30 TAC Chapter 305, Subchapter D, during its term for good cause including, but not limited to, the following:

        i. Violation of any terms or conditions of this permit;

        ii. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

        iii. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

    c. The permittee shall furnish to the Executive Director, upon request and within a reasonable time, any information to determine whether cause exists for amending, revoking, suspending or terminating the permit. The permittee shall also furnish to the Executive Director, upon request, copies of records required to be kept by the permit.

2. Compliance

    a. Acceptance of the permit by the person to whom it is issued constitutes acknowledgment and agreement that such person will comply with all the terms and conditions embodied in the permit, and the rules and other orders of the Commission.

    b. The permittee has a duty to comply with all conditions of the permit. Failure to comply with any permit condition constitutes a violation of the permit and the Texas Water Code or the Texas Health and Safety Code, and is grounds for enforcement action, for permit amendment, revocation, or suspension, or for denial of a permit renewal application or an application for a permit for another facility.

    c. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit.

    d. The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal or other permit violation that has a reasonable likelihood of adversely affecting human health or the environment.

    e. Authorization from the Commission is required before beginning any change in the permitted facility or activity that may result in noncompliance with any permit requirements.

f. A permit may be amended, suspended and reissued, or revoked for cause in accordance with 30 TAC §§ 305.62 and 305.66 and TWC§ 7.302. The filing of a request by the permittee for a permit amendment, suspension and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

g. There shall be no unauthorized discharge of wastewater or any other waste. For the purpose of this permit, an unauthorized discharge is considered to be any discharge of wastewater into or adjacent to water in the state at any location not permitted as an outfall or otherwise defined in the Other Requirements section of this permit.

h. In accordance with 30 TAC § 305.535(a), the permittee may allow any bypass to occur from a TPDES permitted facility which does not cause permitted effluent limitations to be exceeded or an unauthorized discharge to occur, but only if the bypass is also for essential maintenance to assure efficient operation.

i. The permittee is subject to administrative, civil, and criminal penalties, as applicable, under TWC §§ 7.051 - 7.075 (relating to Administrative Penalties), 7.101 - 7.111 (relating to Civil Penalties), and 7.141 - 7.202 (relating to Criminal Offenses and Penalties) for violations including, but not limited to, negligently or knowingly violating the federal CWA §§ 301, 302, 306, 307, 308, 318, or 405, or any condition or limitation implementing any sections in a permit issued under the CWA § 402, or any requirement imposed in a pretreatment program approved under the CWA §§ 402 (a)(3) or 402 (b)(8).

3. Inspections and Entry

a. Inspection and entry shall be allowed as prescribed in the TWC Chapters 26, 27, and 28, and THSC § 361.

b. The members of the Commission and employees and agents of the Commission are entitled to enter any public or private property at any reasonable time for the purpose of inspecting and investigating conditions relating to the quality of water in the state or the compliance with any rule, regulation, permit or other order of the Commission. Members, employees, or agents of the Commission and Commission contractors are entitled to enter public or private property at any reasonable time to investigate or monitor or, if the responsible party is not responsive or there is an immediate danger to public health or the environment, to remove or remediate a condition related to the quality of water in the state. Members, employees, Commission contractors, or agents acting under this authority who enter private property shall observe the establishment's rules and regulations concerning safety, internal security, and fire protection, and if the property has management in residence, shall notify management or the person then in charge of his presence and shall exhibit proper credentials. If any member, employee, Commission contractor, or agent is refused the right to enter in or on public or private property under this authority, the Executive Director may invoke the remedies authorized in TWC § 7.002. The statement above, that Commission entry shall occur in accordance with an establishment's rules and regulations concerning safety, internal security, and fire protection, is not grounds for denial or restriction of entry to any part of the facility, but merely describes the Commission's duty to observe appropriate rules and regulations during an inspection.

4. Permit Amendment and/or Renewal

   a. The permittee shall give notice to the Executive Director as soon as possible of any planned physical alterations or additions to the permitted facility if such alterations or additions would require a permit amendment or result in a violation of permit requirements. Notice shall also be required under this paragraph when:

      i. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in accordance with 30 TAC § 305.534 (relating to New Sources and New Dischargers); or

      ii. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are subject neither to effluent limitations in the permit, nor to notification requirements in Monitoring and Reporting Requirements No. 9;

      iii. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

   b. Prior to any facility modifications, additions, or expansions that will increase the plant capacity beyond the permitted flow, the permittee must apply for and obtain proper authorization from the Commission before commencing construction.

   c. The permittee must apply for an amendment or renewal at least 180 days prior to expiration of the existing permit in order to continue a permitted activity after the expiration date of the permit. If an application is submitted prior to the expiration date of the permit, the existing permit shall remain in effect until the application is approved, denied, or returned. If the application is returned or denied, authorization to continue such activity shall terminate upon the effective date of the action. If an application is not submitted prior to the expiration date of the permit, the permit shall expire and authorization to continue such activity shall terminate.

   d. Prior to accepting or generating wastes which are not described in the permit application or which would result in a significant change in the quantity or quality of the existing discharge, the permittee must report the proposed changes to the Commission. The permittee must apply for a permit amendment reflecting any necessary changes in permit conditions, including effluent limitations for pollutants not identified and limited by this permit.

   e. In accordance with the TWC § 26.029(b), after a public hearing, notice of which shall be given to the permittee, the Commission may require the permittee, from time to time, for good cause, in accordance with applicable laws, to conform to new or additional conditions.

   f. If any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under CWA § 307(a) for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this permit, this permit shall be

modified or revoked and reissued to conform to the toxic effluent standard or prohibition. The permittee shall comply with effluent standards or prohibitions established under CWA § 307(a) for toxic pollutants within the time provided in the regulations that established those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

5. Permit Transfer

   a. Prior to any transfer of this permit, Commission approval must be obtained. The Commission shall be notified in writing of any change in control or ownership of facilities authorized by this permit. Such notification should be sent to the Applications Review and Processing Team (MC 148) of the Water Quality Division.

   b. A permit may be transferred only according to the provisions of 30 TAC § 305.64 (relating to Transfer of Permits) and 30 TAC § 50.133 (relating to Executive Director Action on Application or WQMP update).

6. Relationship to Hazardous Waste Activities

   This permit does not authorize any activity of hazardous waste storage, processing, or disposal that requires a permit or other authorization pursuant to the Texas Health and Safety Code.

7. Relationship to Water Rights

   Disposal of treated effluent by any means other than discharge directly to water in the state must be specifically authorized in this permit and may require a permit pursuant to TWC Chapter 11.

8. Property Rights

   A permit does not convey any property rights of any sort, or any exclusive privilege.

9. Permit Enforceability

   The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

10. Relationship to Permit Application

    The application pursuant to which the permit has been issued is incorporated herein; provided, however, that in the event of a conflict between the provisions of this permit and the application, the provisions of the permit shall control.

11. Notice of Bankruptcy

    a. Each permittee shall notify the Executive Director, in writing, immediately following the filing of a voluntary or involuntary petition for bankruptcy under any chapter of Title 11 Bankruptcy) of the United States Code (11 USC) by or against:

i. the permittee;

ii. an entity (as that term is defined in 11 USC, § 101(14)) controlling the permittee or listing the permit or permittee as property of the estate; or

iii. an affiliate (as that term is defined in 11 USC, § 101(2)) of the permittee.

b. This notification must indicate:

i. the name of the permittee and the permit number(s);

ii. the bankruptcy court in which the petition for bankruptcy was filed; and

iii. the date of filing of the petition.

OPERATIONAL REQUIREMENTS

1. The permittee shall at all times ensure that the facility and all of its systems of collection, treatment, and disposal are properly operated and maintained. This includes, but is not limited to, the regular, periodic examination of wastewater solids within the treatment plant by the operator in order to maintain an appropriate quantity and quality of solids inventory as described in the various operator training manuals and according to accepted industry standards for process control. Process control, maintenance, and operations records shall be retained at the facility site, or shall be readily available for review by a TCEQ representative, for a period of three years.

2. Upon request by the Executive Director, the permittee shall take appropriate samples and provide proper analysis in order to demonstrate compliance with Commission rules. Unless otherwise specified in this permit or otherwise ordered by the Commission, the permittee shall comply with all applicable provisions of 30 TAC Chapter 312 concerning sewage sludge use and disposal and 30 TAC §§ 319.21 - 319.29 concerning the discharge of certain hazardous metals.

3. Domestic wastewater treatment facilities shall comply with the following provisions:

   a. The permittee shall notify the Municipal Permits Team, Wastewater Permitting Section (MC 148) of the Water Quality Division, in writing, of any facility expansion at least 90 days prior to conducting such activity.

   b. The permittee shall submit a closure plan for review and approval to the Municipal Permits Team, Wastewater Permitting Section (MC 148) of the Water Quality Division, for any closure activity at least 90 days prior to conducting such activity. Closure is the act of permanently taking a waste management unit or treatment facility out of service and includes the permanent removal from service of any pit, tank, pond, lagoon, surface impoundment and/or other treatment unit regulated by this permit.

4. The permittee is responsible for installing prior to plant start-up, and subsequently maintaining, adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failures by means of alternate power sources, standby generators, and/or retention of inadequately treated wastewater.

5. Unless otherwise specified, the permittee shall provide a readily accessible sampling point and, where applicable, an effluent flow measuring device or other acceptable means by which effluent flow may be determined.

6. The permittee shall remit an annual water quality fee to the Commission as required by 30 TAC Chapter 21. Failure to pay the fee may result in revocation of this permit under TWC § 7.302(b)(6).

7. Documentation

   For all written notifications to the Commission required of the permittee by this permit, the permittee shall keep and make available a copy of each such notification under the same conditions as self-monitoring data are required to be kept and made available. Except for information required for TPDES permit applications, effluent data, including effluent data in permits, draft permits and permit applications, and other information specified as not confidential in 30 TAC §§ 1.5(d), any information submitted pursuant to this permit may be claimed as confidential by the submitter. Any such claim must be asserted in the manner prescribed in the application form or by stamping the words confidential business information on each page containing such information. If no claim is made at the time of submission, information may be made available to the public without further notice. If the Commission or Executive Director agrees with the designation of confidentiality, the TCEQ will not provide the information for public inspection unless required by the Texas Attorney General or a court pursuant to an open records request. If the Executive Director does not agree with the designation of confidentiality, the person submitting the information will be notified.

8. Facilities that generate domestic wastewater shall comply with the following provisions; domestic wastewater treatment facilities at permitted industrial sites are excluded.

   a. Whenever flow measurements for any domestic sewage treatment facility reach 75% of the permitted daily average or annual average flow for three consecutive months, the permittee must initiate engineering and financial planning for expansion and/or upgrading of the domestic wastewater treatment and/or collection facilities. Whenever the flow reaches 90% of the permitted daily average or annual average flow for three consecutive months, the permittee shall obtain necessary authorization from the Commission to commence construction of the necessary additional treatment and/or collection facilities. In the case of a domestic wastewater treatment facility which reaches 75% of the permitted daily average or annual average flow for three consecutive months, and the planned population to be served or the quantity of waste produced is not expected to exceed the design limitations of the treatment facility, the permittee shall submit an engineering report supporting this claim to the Executive Director of the Commission.

      If in the judgment of the Executive Director the population to be served will not cause permit noncompliance, then the requirement of this section may be waived. To be effective, any waiver must be in writing and signed by the Director of the Enforcement Division (MC 169) of the Commission, and such waiver of these requirements will be reviewed upon expiration of the existing permit; however, any such waiver shall not be interpreted as condoning or excusing any violation of any permit parameter.

b. The plans and specifications for domestic sewage collection and treatment works associated with any domestic permit must be approved by the Commission and failure to secure approval before commencing construction of such works or making a discharge is a violation of this permit and each day is an additional violation until approval has been secured.

c. Permits for domestic wastewater treatment plants are granted subject to the policy of the Commission to encourage the development of area-wide waste collection, treatment, and disposal systems. The Commission reserves the right to amend any domestic wastewater permit in accordance with applicable procedural requirements to require the system covered by this permit to be integrated into an area-wide system, should such be developed; to require the delivery of the wastes authorized to be collected in, treated by or discharged from said system, to such area-wide system; or to amend this permit in any other particular to effectuate the Commission's policy. Such amendments may be made when the changes required are advisable for water quality control purposes and are feasible on the basis of waste treatment technology, engineering, financial, and related considerations existing at the time the changes are required, exclusive of the loss of investment in or revenues from any then existing or proposed waste collection, treatment or disposal system.

9. Domestic wastewater treatment plants shall be operated and maintained by sewage plant operators holding a valid certificate of competency at the required level as defined in 30 TAC Chapter 30.

10. For Publicly Owned Treatment Works (POTWs), the 30-day average (or monthly average) percent removal for BOD and TSS shall not be less than 85%, unless otherwise authorized by this permit.

11. Facilities that generate industrial solid waste as defined in 30 TAC § 335.1 shall comply with these provisions:

a. Any solid waste, as defined in 30 TAC § 335.1 (including but not limited to such wastes as garbage, refuse, sludge from a waste treatment, water supply treatment plant or air pollution control facility, discarded materials, discarded materials to be recycled, whether the waste is solid, liquid, or semisolid), generated by the permittee during the management and treatment of wastewater, must be managed in accordance with all applicable provisions of 30 TAC Chapter 335, relating to Industrial Solid Waste Management.

b. Industrial wastewater that is being collected, accumulated, stored, or processed before discharge through any final discharge outfall, specified by this permit, is considered to be industrial solid waste until the wastewater passes through the actual point source discharge and must be managed in accordance with all applicable provisions of 30 TAC Chapter 335.

c. The permittee shall provide written notification, pursuant to the requirements of 30 TAC § 335.8(b)(1), to the Environmental Cleanup Section (MC 127) of the Remediation Division informing the Commission of any closure activity involving an Industrial Solid Waste Management Unit, at least 90 days prior to conducting such an activity.

d. Construction of any industrial solid waste management unit requires the prior written notification of the proposed activity to the Registration and Reporting Section (MC 129) of the Registration, Review, and Reporting Division. No person shall dispose of industrial solid waste, including sludge or other solids from wastewater treatment processes, prior to fulfilling the deed recordation requirements of 30 TAC § 335.5.

e. The term "industrial solid waste management unit" means a landfill, surface impoundment, waste-pile, industrial furnace, incinerator, cement kiln, injection well, container, drum, salt dome waste containment cavern, or any other structure vessel, appurtenance, or other improvement on land used to manage industrial solid waste.

f. The permittee shall keep management records for all sludge (or other waste) removed from any wastewater treatment process. These records shall fulfill all applicable requirements of 30 TAC § 335 and must include the following, as it pertains to wastewater treatment and discharge:

   i. Volume of waste and date(s) generated from treatment process;
   ii. Volume of waste disposed of on-site or shipped off-site;
   iii. Date(s) of disposal;
   iv. Identity of hauler or transporter;
   v. Location of disposal site; and
   vi. Method of final disposal.

   The above records shall be maintained on a monthly basis. The records shall be retained at the facility site, or shall be readily available for review by authorized representatives of the TCEQ for at least five years.

12. For industrial facilities to which the requirements of 30 TAC § 335 do not apply, sludge and solid wastes, including tank cleaning and contaminated solids for disposal, shall be disposed of in accordance with THSC § 361.

TCEQ Revision 08/2008

SLUDGE PROVISIONS

The permittee is authorized to dispose of sludge only at a Texas Commission on Environmental Quality (TCEQ) authorized land application site or co-disposal landfill. **The disposal of sludge by land application on property owned, leased or under the direct control of the permittee is a violation of the permit unless the site is authorized with the TCEQ. This provision does not authorize Distribution and Marketing of Class A or Class AB Sewage Sludge. This provision does not authorize the permittee to land apply sludge on property owned, leased or under the direct control of the permittee.**

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE LAND APPLICATION

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge in accordance with 30 TAC § 312 and all other applicable state and federal regulations in a manner that protects public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present in the sludge.

2. In all cases, if the person (permit holder) who prepares the sewage sludge supplies the sewage sludge to another person for land application use or to the owner or lease holder of the land, the permit holder shall provide necessary information to the parties who receive the sludge to assure compliance with these regulations.

3. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the sewage sludge disposal practice.

B. Testing Requirements

1. Sewage sludge shall be tested once during the term of this permit in accordance with the method specified in both 40 CFR Part 261, Appendix II and 40 CFR Part 268, Appendix I [Toxicity Characteristic Leaching Procedure (TCLP)] or other method that receives the prior approval of the TCEQ for the contaminants listed in 40 CFR Part 261.24, Table 1. Sewage sludge failing this test shall be managed according to RCRA standards for generators of hazardous waste, and the waste's disposition must be in accordance with all applicable requirements for hazardous waste processing, storage, or disposal. Following failure of any TCLP test, the management or disposal of sewage sludge at a facility other than an authorized hazardous waste processing, storage, or disposal facility shall be prohibited until such time as the permittee can demonstrate the sewage sludge no longer exhibits the hazardous waste toxicity characteristics (as demonstrated by the results of the TCLP tests). A written report shall be provided to both the TCEQ Registration and Reporting Section (MC 129) of the Permitting and Remediation Support Division and the Regional Director (MC Region 4) within seven (7) days after failing the TCLP Test.

The report shall contain test results, certification that unauthorized waste management has stopped and a summary of alternative disposal plans that comply with RCRA standards for the management of hazardous waste. The report shall be addressed to: Director, Registration, Review, and Reporting Division (MC 129), Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087. In addition, the permittee shall prepare an annual report on the results of all sludge toxicity testing. This annual report shall be submitted to the TCEQ Regional Office (MC Region 4) and the Compliance Monitoring Team (MC 224) of the Enforcement Division by September 30th of each year. Effective September 1, 2020, the permittee must submit this annual report using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver.

2. Sewage sludge shall not be applied to the land if the concentration of the pollutants exceeds the pollutant concentration criteria in Table 1. The frequency of testing for pollutants in Table 1 is found in Section I.C.

TABLE 1

Pollutant	Ceiling Concentration (Milligrams per kilogram)*
Arsenic	75
Cadmium	85
Chromium	3000
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
PCBs	49
Selenium	100
Zinc	7500

* Dry weight basis

3. Pathogen Control

All sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site must be treated by one of the following methods to ensure that the sludge meets either the Class A, Class AB or Class B pathogen requirements.

a. For sewage sludge to be classified as Class A with respect to pathogens, the density of fecal coliform in the sewage sludge be less than 1,000 most probable number (MPN) per gram of total solids (dry weight basis), or the density of *Salmonella* sp. bacteria in the sewage sludge be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. In addition, one of the alternatives listed below must be met.

Alternative 1 - The temperature of the sewage sludge that is used or disposed shall be maintained at or above a specific value for a period of time. See 30 TAC § 312.82(a)(2)(A) for specific information.

Alternative 5 (PFRP) - Sewage sludge that is used or disposed of must be treated in one of the Processes to Further Reduce Pathogens (PFRP) described in 40 CFR Part 503, Appendix B. PFRP include composting, heat drying, heat treatment, and thermophilic aerobic digestion.

Alternative 6 (PFRP Equivalent) - Sewage sludge that is used or disposed of must be treated in a process that has been approved by the U. S. Environmental Protection Agency as being equivalent to those in Alternative 5.

b. For sewage sludge to be classified as Class AB with respect to pathogens, the density of fecal coliform in the sewage sludge be less than 1,000 MPN per gram of total solids (dry weight basis), or the density of *Salmonella* sp. bacteria in the sewage sludge be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. In addition, one of the alternatives listed below must be met.

   Alternative 2 - The pH of the sewage sludge that is used or disposed shall be raised to above 12 std. units and shall remain above 12 std. units for 72 hours.

   The temperature of the sewage sludge shall be above 52° Celsius for 12 hours or longer during the period that the pH of the sewage sludge is above 12 std. units.

   At the end of the 72-hour period during which the pH of the sewage sludge is above 12 std. units, the sewage sludge shall be air dried to achieve a percent solids in the sewage sludge greater than 50%.

   Alternative 3 - The sewage sludge shall be analyzed for enteric viruses prior to pathogen treatment. The limit for enteric viruses is less than one Plaque-forming Unit per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 30 TAC § 312.82(a)(2)(C)(i-iii) for specific information. The sewage sludge shall be analyzed for viable helminth ova prior to pathogen treatment. The limit for viable helminth ova is less than one per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 30 TAC § 312.82(a)(2)(C)(iv-vi) for specific information.

   Alternative 4 - The density of enteric viruses in the sewage sludge shall be less than one Plaque-forming Unit per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. The density of viable helminth ova in the sewage sludge shall be less than one per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed.

c. Sewage sludge that meets the requirements of Class AB sewage sludge may be classified a Class A sewage sludge if a variance request is submitted in writing that is supported by substantial documentation demonstrating equivalent methods for reducing odors and written approval is granted by the executive director. The executive director may deny the variance request or revoke that approved variance if it is determined that the variance may potentially endanger human health or the environment, or create nuisance odor conditions.

d. Three alternatives are available to demonstrate compliance with Class B criteria for sewage sludge.

Alternative 1

i. A minimum of seven random samples of the sewage sludge shall be collected within 48 hours of the time the sewage sludge is used or disposed of during each monitoring episode for the sewage sludge.

ii. The geometric mean of the density of fecal coliform in the samples collected shall be less than either 2,000,000 MPN per gram of total solids (dry weight basis) or 2,000,000 Colony Forming Units per gram of total solids (dry weight basis).

Alternative 2 - Sewage sludge that is used or disposed of shall be treated in one of the Processes to Significantly Reduce Pathogens (PSRP) described in 40 CFR Part 503, Appendix B, so long as all of the following requirements are met by the generator of the sewage sludge.

i. Prior to use or disposal, all the sewage sludge must have been generated from a single location, except as provided in paragraph v. below;

ii. An independent Texas Licensed Professional Engineer must make a certification to the generator of a sewage sludge that the wastewater treatment facility generating the sewage sludge is designed to achieve one of the PSRP at the permitted design loading of the facility. The certification need only be repeated if the design loading of the facility is increased. The certification shall include a statement indicating the design meets all the applicable standards specified in Appendix B of 40 CFR Part 503;

iii. Prior to any off-site transportation or on-site use or disposal of any sewage sludge generated at a wastewater treatment facility, the chief certified operator of the wastewater treatment facility or other responsible official who manages the processes to significantly reduce pathogens at the wastewater treatment facility for the permittee, shall certify that the sewage sludge underwent at least the minimum operational requirements necessary in order to meet one of the PSRP. The acceptable processes and the minimum operational and record keeping requirements shall be in accordance with established U.S. Environmental Protection Agency final guidance;

iv. All certification records and operational records describing how the requirements of this paragraph were met shall be kept by the generator for a minimum of three years and be available for inspection by commission staff for review; and

v. If the sewage sludge is generated from a mixture of sources, resulting from a person who prepares sewage sludge from more than one wastewater treatment facility, the resulting derived product shall meet one of the PSRP, and shall meet the certification, operation, and record keeping requirements of this paragraph.

Alternative 3 - Sewage sludge shall be treated in an equivalent process that has been approved by the U.S. Environmental Protection Agency, so long as all of the following requirements are met by the generator of the sewage sludge.

i. Prior to use or disposal, all the sewage sludge must have been generated from a single location, except as provided in paragraph v. below;

ii. Prior to any off-site transportation or on-site use or disposal of any sewage sludge generated at a wastewater treatment facility, the chief certified operator of the wastewater treatment facility or other responsible official who manages the processes to significantly reduce pathogens at the wastewater treatment facility for the permittee, shall certify that the sewage sludge underwent at least the minimum operational requirements necessary in order to meet one of the PSRP. The acceptable processes and the minimum operational and record keeping requirements shall be in accordance with established U.S. Environmental Protection Agency final guidance;

iii. All certification records and operational records describing how the requirements of this paragraph were met shall be kept by the generator for a minimum of three years and be available for inspection by commission staff for review;

iv. The Executive Director will accept from the U.S. Environmental Protection Agency a finding of equivalency to the defined PSRP; and

v. If the sewage sludge is generated from a mixture of sources resulting from a person who prepares sewage sludge from more than one wastewater treatment facility, the resulting derived product shall meet one of the Processes to Significantly Reduce Pathogens, and shall meet the certification, operation, and record keeping requirements of this paragraph.

In addition, the following site restrictions must be met if Class B sludge is land applied:

i. Food crops with harvested parts that touch the sewage sludge/soil mixture and are totally above the land surface shall not be harvested for 14 months after application of sewage sludge.

ii. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of sewage sludge when the sewage sludge remains on the land surface for 4 months or longer prior to incorporation into the soil.

iii. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of sewage sludge when the sewage sludge remains on the land surface for less than 4 months prior to incorporation into the soil.

iv. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of sewage sludge.

v. Animals shall not be allowed to graze on the land for 30 days after application of sewage sludge.

vi. Turf grown on land where sewage sludge is applied shall not be harvested for 1 year after application of the sewage sludge when the harvested turf is placed on either land with a high potential for public exposure or a lawn.

vii. Public access to land with a high potential for public exposure shall be restricted for 1 year after application of sewage sludge.

viii. Public access to land with a low potential for public exposure shall be restricted for 30 days after application of sewage sludge.

ix. Land application of sludge shall be in accordance with the buffer zone requirements found in 30 TAC § 312.44.

4. Vector Attraction Reduction Requirements

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by one of the following Alternatives 1 through 10 for vector attraction reduction.

Alternative 1 - The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38%.

Alternative 2 - If Alternative 1 cannot be met for an anaerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30° and 37° Celsius. Volatile solids must be reduced by less than 17% to demonstrate compliance.

Alternative 3 - If Alternative 1 cannot be met for an aerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge with percent solids of two percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20° Celsius. Volatile solids must be reduced by less than 15% to demonstrate compliance.

Alternative 4 - The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20° Celsius.

Alternative 5 - Sewage sludge shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the sewage sludge shall be higher than 40° Celsius and the average temperature of the sewage sludge shall be higher than 45° Celsius.

Alternative 6 - The pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali shall remain at 12 or higher for two hours and then remain at a pH of 11.5 or higher for an additional 22 hours at the time the sewage sludge is prepared for sale or given away in a bag or other container.

Alternative 7 - The percent solids of sewage sludge that does not contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 75% based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 8 - The percent solids of sewage sludge that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90% based on the moisture content and total solids prior to mixing with other materials at the time the sludge is used. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 9 -

i. Sewage sludge shall be injected below the surface of the land.

ii. No significant amount of the sewage sludge shall be present on the land surface within one hour after the sewage sludge is injected.

iii. When sewage sludge that is injected below the surface of the land is Class A or Class AB with respect to pathogens, the sewage sludge shall be injected below the land surface within eight hours after being discharged from the pathogen treatment process.

Alternative 10-

i. Sewage sludge applied to the land surface or placed on a surface disposal site shall be incorporated into the soil within six hours after application to or placement on the land.

ii. When sewage sludge that is incorporated into the soil is Class A or Class AB with respect to pathogens, the sewage sludge shall be applied to or placed on the land within eight hours after being discharged from the pathogen treatment process.

C. Monitoring Requirements

Toxicity Characteristic Leaching Procedure (TCLP) Test	- once during the term of this permit
PCBs	- once during the term of this permit

All metal constituents and fecal coliform or *Salmonella* sp. bacteria shall be monitored at the appropriate frequency shown below, pursuant to 30 TAC § 312.46(a)(1):

Amount of sewage sludge (*) metric tons per 365-day period	Monitoring Frequency
0 to less than 290	Once/Year
290 to less than 1,500	Once/Quarter
1,500 to less than 15,000	Once/Two Months
15,000 or greater	Once/Month

(*) *The amount of bulk sewage sludge applied to the land (dry wt. basis).*

Representative samples of sewage sludge shall be collected and analyzed in accordance with the methods referenced in 30 TAC § 312.7.

Identify each of the analytic methods used by the facility to analyze enteric viruses, fecal coliforms, helminth ova, *Salmonella* sp., and other regulated parameters.

Identify in the following categories (as applicable) the sewage sludge treatment process or processes at the facility: preliminary operations (e.g., sludge grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

Identify the nature of material generated by the facility (such as a biosolid for beneficial use or land-farming, or sewage sludge for disposal at a monofill) and whether the material is ultimately conveyed off-site in bulk or in bags.

SECTION II. REQUIREMENTS SPECIFIC TO BULK SEWAGE SLUDGE FOR APPLICATION TO THE LAND MEETING CLASS A, CLASS AB or B PATHOGEN REDUCTION AND THE CUMULATIVE LOADING RATES IN TABLE 2, OR CLASS B PATHOGEN REDUCTION AND THE POLLUTANT CONCENTRATIONS IN TABLE 3

For those permittees meeting Class A, Class AB or B pathogen reduction requirements and that meet the cumulative loading rates in Table 2 below, or the Class B pathogen reduction requirements and contain concentrations of pollutants below listed in Table 3, the following conditions apply:

A. Pollutant Limits

Table 2

Pollutant	Cumulative Pollutant Loading Rate (pounds per acre)*
Arsenic	36
Cadmium	35
Chromium	2677
Copper	1339
Lead	268
Mercury	15
Molybdenum	Report Only
Nickel	375
Selenium	89
Zinc	2500

Table 3

Pollutant	Monthly Average Concentration (milligrams per kilogram)*
Arsenic	41
Cadmium	39
Chromium	1200
Copper	1500
Lead	300
Mercury	17
Molybdenum	Report Only
Nickel	420
Selenium	36
Zinc	2800

*Dry weight basis

B. Pathogen Control

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, a reclamation site, shall be treated by either Class A, Class AB or Class B pathogen reduction requirements as defined above in Section I.B.3.

C. Management Practices

1. Bulk sewage sludge shall not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen, or snow-covered so that the bulk sewage sludge enters a wetland or other waters in the State.

2. Bulk sewage sludge not meeting Class A requirements shall be land applied in a manner which complies with Applicability in accordance with 30 TAC § 312.41 and the Management Requirements in accordance with 30 TAC § 312.44.

3. Bulk sewage sludge shall be applied at or below the agronomic rate of the cover crop.

4. An information sheet shall be provided to the person who receives bulk sewage sludge sold or given away. The information sheet shall contain the following information:

    a. The name and address of the person who prepared the sewage sludge that is sold or given away in a bag or other container for application to the land.

    b. A statement that application of the sewage sludge to the land is prohibited except in accordance with the instruction on the label or information sheet.

    c. The annual whole sludge application rate for the sewage sludge application rate for the sewage sludge that does not cause any of the cumulative pollutant loading rates in Table 2 above to be exceeded, unless the pollutant concentrations in Table 3 found in Section II above are met.

D. Notification Requirements

1. If bulk sewage sludge is applied to land in a State other than Texas, written notice shall be provided prior to the initial land application to the permitting authority for the State in which the bulk sewage sludge is proposed to be applied. The notice shall include:

    a. The location, by street address, and specific latitude and longitude, of each land application site.

    b. The approximate time period bulk sewage sludge will be applied to the site.

    c. The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) for the person who will apply the bulk sewage sludge.

2. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the sewage sludge disposal practice.

E. Record keeping Requirements

The sludge documents will be retained at the facility site and/or shall be readily available for review by a TCEQ representative. The person who prepares bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information at

the facility site and/or shall be readily available for review by a TCEQ representative for a period of five years. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for record keeping found in 30 TAC § 312.47 for persons who land apply.

1. The concentration (mg/kg) in the sludge of each pollutant listed in Table 3 above and the applicable pollutant concentration criteria (mg/kg), or the applicable cumulative pollutant loading rate and the applicable cumulative pollutant loading rate limit (lbs/ac) listed in Table 2 above.

2. A description of how the pathogen reduction requirements are met (including site restrictions for Class AB and Class B sludge, if applicable).

3. A description of how the vector attraction reduction requirements are met.

4. A description of how the management practices listed above in Section II.C are being met.

5. The following certification statement:

   "I certify, under penalty of law, that the applicable pathogen requirements in 30 TAC § 312.82(a) or (b) and the vector attraction reduction requirements in 30 TAC § 312.83(b) have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

6. The recommended agronomic loading rate from the references listed in Section II.C.3. above, as well as the actual agronomic loading rate shall be retained. The person who applies bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information at the facility site and/or shall be readily available for review by a TCEQ representative indefinitely. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for record keeping found in 30 TAC § 312.47 for persons who land apply:

   a. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 30 TAC § 312.47(a)(4)(A)(ii) or 30 TAC § 312.47(a)(5)(A)(ii), as applicable, and to the permittee's specific sludge treatment activities.

   b. The location, by street address, and specific latitude and longitude, of each site on which sludge is applied.

   c. The number of acres in each site on which bulk sludge is applied.

   d. The date and time sludge is applied to each site.

e. The cumulative amount of each pollutant in pounds/acre listed in Table 2 applied to each site.

f. The total amount of sludge applied to each site in dry tons.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

F. Reporting Requirements

The permittee shall report annually to the TCEQ Regional Office (MC Region 4) and Compliance Monitoring Team (MC 224) of the Enforcement Division, by September 30th of each year the following information. Effective September 1, 2020, the permittee must submit this annual report using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver.

1. Identify in the following categories (as applicable) the sewage sludge treatment process or processes at the facility: preliminary operations (e.g., sludge grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

2. Identify the nature of material generated by the facility (such as a biosolid for beneficial use or land-farming, or sewage sludge for disposal at a monofill) and whether the material is ultimately conveyed off-site in bulk or in bags.

3. Results of tests performed for pollutants found in either Table 2 or 3 as appropriate for the permittee's land application practices.

4. The frequency of monitoring listed in Section I.C. that applies to the permittee.

5. Toxicity Characteristic Leaching Procedure (TCLP) results.

6. PCB concentration in sludge in mg/kg.

7. Identity of hauler(s) and TCEQ transporter number.

8. Date(s) of transport.

9. Texas Commission on Environmental Quality registration number, if applicable.

10. Amount of sludge disposal dry weight (lbs/acre) at each disposal site.

11. The concentration (mg/kg) in the sludge of each pollutant listed in Table 1 (defined as a monthly average) as well as the applicable pollutant concentration criteria (mg/kg) listed in Table 3 above, or the applicable pollutant loading rate limit (lbs/acre) listed in Table 2 above if it exceeds 90% of the limit.

12. Level of pathogen reduction achieved (Class A, Class AB or Class B).

13. Alternative used as listed in Section I.B.3.(a. or b.). Alternatives describe how the pathogen reduction requirements are met. If Class B sludge, include information on how site restrictions were met.

14. Identify each of the analytic methods used by the facility to analyze enteric viruses, fecal coliforms, helminth ova, *Salmonella* sp., and other regulated parameters.

15. Vector attraction reduction alternative used as listed in Section I.B.4.

16. Amount of sludge transported in dry tons/year.

17. The certification statement listed in either 30 TAC § 312.47(a)(4)(A)(ii) or 30 TAC § 312.47(a)(5)(A)(ii) as applicable to the permittee's sludge treatment activities, shall be attached to the annual reporting form.

18. When the amount of any pollutant applied to the land exceeds 90% of the cumulative pollutant loading rate for that pollutant, as described in Table 2, the permittee shall report the following information as an attachment to the annual reporting form.

    a. The location, by street address, and specific latitude and longitude.

    b. The number of acres in each site on which bulk sewage sludge is applied.

    c. The date and time bulk sewage sludge is applied to each site.

    d. The cumulative amount of each pollutant (i.e., pounds/acre) listed in Table 2 in the bulk sewage sludge applied to each site.

    e. The amount of sewage sludge (i.e., dry tons) applied to each site.

    The above records shall be maintained on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

SECTION III. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE DISPOSED IN A MUNICIPAL SOLID WASTE LANDFILL

A. The permittee shall handle and dispose of sewage sludge in accordance with 30 TAC § 330 and all other applicable state and federal regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present. The permittee shall ensure that the sewage sludge meets the requirements in 30 TAC § 330 concerning the quality of the sludge disposed in a municipal solid waste landfill.

B. If the permittee generates sewage sludge and supplies that sewage sludge to the owner or operator of a municipal solid waste landfill (MSWLF) for disposal, the permittee shall provide to the owner or operator of the MSWLF appropriate information needed to be in compliance with the provisions of this permit.

C. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the sewage sludge disposal practice.

D. Sewage sludge shall be tested once during the term of this permit in accordance with the method specified in both 40 CFR Part 261, Appendix II and 40 CFR Part 268, Appendix I (Toxicity Characteristic Leaching Procedure) or other method, which receives the prior approval of the TCEQ for contaminants listed in Table 1 of 40 CFR § 261.24. Sewage sludge failing this test shall be managed according to RCRA standards for generators of hazardous waste, and the waste's disposition must be in accordance with all applicable requirements for hazardous waste processing, storage, or disposal.

   Following failure of any TCLP test, the management or disposal of sewage sludge at a facility other than an authorized hazardous waste processing, storage, or disposal facility shall be prohibited until such time as the permittee can demonstrate the sewage sludge no longer exhibits the hazardous waste toxicity characteristics (as demonstrated by the results of the TCLP tests). A written report shall be provided to both the TCEQ Registration and Reporting Section (MC 129) of the Permitting and Remediation Support Division and the Regional Director (MC Region 4) of the appropriate TCEQ field office within 7 days after failing the TCLP Test.

   The report shall contain test results, certification that unauthorized waste management has stopped and a summary of alternative disposal plans that comply with RCRA standards for the management of hazardous waste. The report shall be addressed to: Director, Registration, Review, and Reporting Division (MC 129), Texas Commission on Environmental Quality, P. O. Box 13087, Austin, Texas 78711-3087. In addition, the permittee shall prepare an annual report on the results of all sludge toxicity testing. This annual report shall be submitted to the TCEQ Regional Office (MC Region 4) and the Compliance Monitoring Team (MC 224) of the Enforcement Division by September 30 of each year.

E. Sewage sludge shall be tested as needed, in accordance with the requirements of 30 TAC Chapter 330.

F. Record keeping Requirements

   The permittee shall develop the following information and shall retain the information for five years.

1. The description (including procedures followed and the results) of all liquid Paint Filter Tests performed.

2. The description (including procedures followed and results) of all TCLP tests performed.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

G. Reporting Requirements

The permittee shall report annually to the TCEQ Regional Office (MC Region 4) and Compliance Monitoring Team (MC 224) of the Enforcement Division by September 30th of each year the following information. Effective September 1, 2020, the permittee must submit this annual report using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver.

1. Identify in the following categories (as applicable) the sewage sludge treatment process or processes at the facility: preliminary operations (e.g., sludge grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

2. Toxicity Characteristic Leaching Procedure (TCLP) results.

3. Annual sludge production in dry tons/year.

4. Amount of sludge disposed in a municipal solid waste landfill in dry tons/year.

5. Amount of sludge transported interstate in dry tons/year.

6. A certification that the sewage sludge meets the requirements of 30 TAC § 330 concerning the quality of the sludge disposed in a municipal solid waste landfill.

7. Identity of hauler(s) and transporter registration number.

8. Owner of disposal site(s).

9. Location of disposal site(s).

10. Date(s) of disposal.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

SECTION IV. REQUIREMENTS APPLYING TO SLUDGE TRANSPORTED TO ANOTHER FACILITY FOR FURTHER PROCESSING

These provisions apply to sludge that is transported to another wastewater treatment facility or facility that further processes sludge. These provisions are intended to allow transport of sludge to facilities that have been authorized to accept sludge. These provisions do not limit the ability of the receiving facility to determine whether to accept the sludge, nor do they limit the ability of the receiving facility to request additional testing or documentation.

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge in accordance with 30 TAC Chapter 312 and all other applicable state and federal regulations in a manner that protects public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present in the sludge.

2. Sludge may only be transported using a registered transporter or using an approved pipeline.

B. Record Keeping Requirements

1. For sludge transported by an approved pipeline, the permittee must maintain records of the following:

   a. the amount of sludge transported;

   b. the date of transport;

   c. the name and TCEQ permit number of the receiving facility or facilities;

   d. the location of the receiving facility or facilities;

   e. the name and TCEQ permit number of the facility that generated the waste; and

   f. copy of the written agreement between the permittee and the receiving facility to accept sludge.

2. For sludge transported by a registered transporter, the permittee must maintain records of the completed trip tickets in accordance with 30 TAC § 312.145(a)(1)-(7) and amount of sludge transported.

3. The above records shall be maintained on-site on a monthly basis and shall be made available to the TCEQ upon request. These records shall be retained for at least five years.

C. Reporting Requirements

The permittee shall report the following information annually to the TCEQ Regional Office (MC Region 4) and Compliance Monitoring Team (MC 224) of the Enforcement Division, by September 30th of each year. Effective September 1, 2020, the permittee must submit this annual report using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver.

1. Identify in the following categories (as applicable) the sewage sludge treatment process or processes at the facility: preliminary operations (e.g., sludge grinding and degritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

2. the annual sludge production;

3. the amount of sludge transported;

4. the owner of each receiving facility;

5. the location of each receiving facility; and

6. the date(s) of disposal at each receiving facility.

TCEQ Revision 01/2016

OTHER REQUIREMENTS

1. The permittee shall employ or contract with one or more licensed wastewater treatment facility operators or wastewater system operations companies holding a valid license or registration according to the requirements of 30 TAC Chapter 30, Occupational Licenses and Registrations and in particular 30 TAC Chapter 30, Subchapter J, Wastewater Operators and Operations Companies.

   This Category C facility must be operated by a chief operator or an operator holding a Category C license or higher. The facility must be operated a minimum of five days per week by the licensed chief operator or an operator holding the required level of license or higher. The licensed chief operator or operator holding the required level of license or higher must be available by telephone or pager seven days per week. Where shift operation of the wastewater treatment facility is necessary, each shift that does not have the on-site supervision of the licensed chief operator must be supervised by an operator in charge who is licensed not less than one level below the category for the facility.

2. The facility is not located in the Coastal Management Program boundary.

3. The permittee is hereby placed on notice that this permit may be reviewed by the TCEQ after the completion of any new intensive water quality survey on Segment No. 0826 of the Trinity River Basin and any subsequent updating of the water quality model for Segment No. 0826 to determine if the limitations and conditions contained herein are consistent with any such revised model. The permit may be amended, pursuant to 30 TAC § 305.62, as a result of such review. The permittee is also hereby placed on notice that effluent limits may be made more stringent at renewal based on, for example, any change to modeling protocol approved in the TCEQ Continuing Planning Process.

4. The permittee shall comply with the requirements of 30 TAC § 309.13(a) through (d). In addition, by ownership of the required buffer zone area, the permittee shall comply with the requirements of 30 TAC § 309.13(e).

5. The permittee shall provide facilities for the protection of its wastewater treatment facility from a 100-year flood.

6. In accordance with 30 TAC § 319.9, a permittee that has at least twelve months of uninterrupted compliance with its bacteria limit may notify the commission in writing of its compliance and request a less frequent measurement schedule. To request a less frequent schedule, the permittee shall submit a written request to the TCEQ Wastewater Permitting Section (MC 148) for each phase that includes a different monitoring frequency. The request must contain all of the reported bacteria values (Daily Avg. and Daily Max/Single Grab) for the twelve consecutive months immediately prior to the request. If the Executive Director finds that a less frequent measurement schedule is protective of human health and the environment, the permittee may be given a less frequent measurement schedule. For this permit, 1/month may be reduced to 1/quarter in the Interim I and Interim II phases, and 2/month may be reduced to 1/month in the Final phase. **A violation of any bacteria limit by a facility that has been granted a less frequent measurement schedule will require the permittee to return to the standard frequency schedule and submit written notice to the TCEQ Wastewater Permitting Section (MC 148).** The permittee may not apply for another reduction in measurement frequency for at least 24 months from the date of the last violation. The Executive Director may establish a more frequent measurement schedule if necessary to protect human health or the environment.

7. Prior to construction of the Interim I, Interim II, and Final phase treatment facilities, the permittee shall submit to the TCEQ Wastewater Permitting Section (MC 148) a summary transmittal letter in accordance with the requirements in 30 TAC § 217.6(d). If requested by the Wastewater Permitting Section, the permittee shall submit plans and specifications and a final engineering design report which comply with 30 TAC Chapter 217, Design Criteria for Domestic Wastewater Systems. The permittee shall clearly show how the treatment system will meet the final permitted effluent limitations required on Pages 2, 2a, and 2b of this permit. A copy of the summary transmittal letter shall be available at the plant site for inspection by authorized representatives of the TCEQ.

8. Reporting requirements according to 30 TAC §§ 319.1-319.11 and any additional effluent reporting requirements contained in this permit are suspended from the effective date of the permit until plant startup or discharge from the facility described by this permit, whichever occurs first. The permittee shall provide written notice to the TCEQ Regional Office (MC Region 4) and the Applications Review and Processing Team (MC 148) of the Water Quality Division at least forty-five (45) days prior to plant startup or anticipated discharge, whichever occurs first, and prior to completion of each additional phase on Notification of Completion Form 20007.

STATEMENT OF BASIS/TECHNICAL SUMMARY
AND EXECUTIVE DIRECTOR'S PRELIMINARY DECISION

DESCRIPTION OF APPLICATION

Applicant:	Big Sky Trails, Ltd; Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0015479001, EPA I.D. No. TX0137138
Regulated Activity:	Domestic Wastewater Permit
Type of Application:	New Permit
Request:	New Permit.
Authority:	Federal Clean Water Act (CWA) § 402; Texas Water Code § 26.027; 30 Texas Administrative Code (TAC) Chapters 30, 305, 307, 309, 312, and 319; Commission policies; and United States Environmental Protection Agency (EPA) guidelines.

EXECUTIVE DIRECTOR RECOMMENDATION

The Executive Director has made a preliminary decision that this permit, if issued, meets all statutory and regulatory requirements. The draft permit includes an expiration date of **September 1, 2021** according to 30 TAC § 305.71, Basin Permitting.

REASON FOR PROJECT PROPOSED

The applicant has applied to the Texas Commission on Environmental Quality (TCEQ) for a new permit to authorize the discharge of treated domestic wastewater at a daily average flow not to exceed 0.11 million gallons per day (MGD) in the Interim I phase, a daily average flow not to exceed 0.22 MGD in the Interim II phase, and a daily average flow not to exceed 0.68 MGD in the Final phase. The proposed wastewater treatment facility will serve the proposed residential Big Sky development.

PROJECT DESCRIPTION AND LOCATION

The Big Sky Wastewater Treatment Facility will be an activated sludge process plant operated in the conventional mode. Treatment units in the Interim I phase will include a lift station, a bar screen, an aeration basin, a final clarifier, an aerobic sludge digester, two sludge drying beds, a cloth filter, and a chlorine contact chamber. Treatment units in the Interim II phase will include a lift station, a bar screen, two aeration basins, two final clarifiers, two aerobic sludge digesters, two sludge drying beds, two cloth filters, and a chlorine contact chamber. Treatment units in the Final phase will include a lift station, a bar screen, four aeration basins, four final clarifiers, five aerobic sludge digesters, four sludge drying beds, two cloth filters, and a chlorine contact chamber. The facility has not been constructed.

The draft permit authorizes the disposal of sludge at a TCEQ-authorized land application site, co-disposal landfill, or wastewater treatment facility.

The plant site will be located approximately 1 mile northwest of the intersection of U.S. Highway 380 and Jackson Road, and approximately 8 miles west of the City of Krum, in Denton County, Texas 76259.

The treated effluent will be discharged to an unnamed tributary; thence to Denton Creek; thence to Grapevine Lake in Segment No. 0826 of the Trinity River Basin. The unclassified receiving water use is limited aquatic life use for the unnamed tributary. The designated uses for Segment No. 0826 are high aquatic life use, public water supply, and primary contact recreation. The effluent limitations in the draft permit will maintain and protect the existing instream uses. In accordance with 30 TAC § 307.5 and the TCEQ implementation procedures (June 2010) for the Texas Surface Water Quality Standards, an antidegradation review of the receiving waters was performed. A Tier 1 antidegradation review has preliminarily determined that existing water quality uses will not be impaired by this permit action. Numerical and narrative criteria to protect existing uses will be maintained. A Tier 2 review has preliminarily determined that no significant degradation of water quality is expected in Denton Creek, which has been identified as having high aquatic life uses. Existing uses will be maintained and protected. The preliminary determination can be reexamined and may be modified if new information is received.

Effluent limitations for the conventional effluent parameters (i.e., Biochemical Oxygen Demand or Carbonaceous Biochemical Oxygen Demand, Ammonia Nitrogen, etc.) are based on stream standards and waste load allocations for water quality limited streams as established in the Texas Surface Water Quality Standards (TSWQS) and the State of Texas Water Quality Management Plan (WQMP).

In a case such as this, end-of-pipe compliance with pH limits from 6.0 to 9.0 standard units reasonably assures instream compliance with TSWQS for pH due to the relatively small discharge volume authorized and the often-corresponding minimal or limited aquatic life uses within unclassified waterbodies. This conservative assumption is based on TCEQ sampling conducted throughout the state that indicates that instream buffering quickly restores pH levels to ambient conditions.

The effluent limitations in the draft permit have been reviewed for consistency with the WQMP. The proposed limits are not contained in the approved WQMP. However, these limits will be included in the next WQMP update.

The discharge from this permit action is not expected to have an effect on any federal endangered or threatened aquatic or aquatic-dependent species or proposed species or their critical habitat. This determination is based on the United States Fish and Wildlife Service's (USFWS's) biological opinion on the State of Texas authorization of the TPDES (September 14, 1998; October 21, 1998, update). To make this determination for TPDES permits, TCEQ and EPA only considered aquatic or aquatic-dependent species occurring in watersheds of critical concern or high priority as listed in Appendix A of the USFWS biological opinion. The determination is subject to reevaluation due to subsequent updates or amendments to the biological opinion. The permit does not require EPA review with respect to the presence of endangered or threatened species.

Segment No. 0826 is currently listed on the State's inventory of impaired and threatened waters (2014 Clean Water Act Section 303(d) list). The listing is specifically for pH and applies to the upper portion of the reservoir east of Marshall Creek Park (AU 0826_07). This facility is designed to produce treated effluent with a pH in the range between 6.0 and 9.0 standard units. This facility, when operated properly, should not contribute to the pH impairment of the segment.

SUMMARY OF EFFLUENT DATA

Self-reporting data is not available since the facility is not in operation.

DRAFT PERMIT CONDITIONS

The draft permit authorizes a discharge of treated domestic wastewater at an Interim I volume not to exceed a daily average flow of 0.11 MGD, an Interim II volume not to exceed a daily average flow of 0.22 MGD, and a Final volume not to exceed a daily average flow of 0.68 MGD.

The effluent limitations in the Interim I and Interim II phases of the draft permit, based on a 30-day average, are 10 mg/l five-day carbonaceous biochemical oxygen demand ($CBOD_5$), 15 mg/l total suspended solids (TSS), 3 mg/l ammonia-nitrogen (NH_3-N), 126 colony-forming units (CFU) or most probable number (MPN) of *E. coli* per 100 ml, 1.0 mg/l Total Phosphorus (P), and 4.0 mg/l minimum dissolved oxygen (DO). The effluent shall contain a chlorine residual of at least 1.0 mg/l and shall not exceed a chlorine residual of 4.0 mg/l after a detention time of at least 20 minutes based on peak flow.

The effluent limitations in the Final phase of the draft permit, based on a 30-day average, are 7 mg/l $CBOD_5$, 12 mg/l TSS, 2 mg/l NH_3-N, 126 CFU or MPN of *E. coli* per 100 ml, 1.0 mg/l total P, and 4.0 mg/l minimum DO. The effluent shall contain a chlorine residual of at least 1.0 mg/l and shall not exceed a chlorine residual of 4.0 mg/l after a detention time of at least 20 minutes based on peak flow.

The permittee shall comply with the requirements of 30 TAC § 309.13(a) through (d). In addition, by ownership of the required buffer zone area, the permittee shall comply with the requirements of 30 TAC § 309.13(e).

The draft permit includes Sludge Provisions according to the requirements of 30 TAC Chapter 312, Sludge Use, Disposal, and Transportation. The draft permit authorizes the disposal of sludge at a TCEQ-authorized land application site, co-disposal landfill, or wastewater treatment facility.

SUMMARY OF CHANGES FROM APPLICATION

None.

SUMMARY OF CHANGES FROM EXISTING PERMIT

Standard Permit Conditions, Sludge Provisions, and Other Requirements sections have been included in the draft permit.

E. coli bacteria limits have been included in the draft permit in accordance with the recent amendments to 30 TAC Chapters 309 and 319.

Effective December 21, 2016, monitoring results must be submitted online using the NetDMR reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver. Monitoring results must be signed and certified as required by Monitoring and Reporting Requirements No. 10.

Effective September 1, 2020, the permittee must submit the annual sludge report using the online electronic reporting system available through the TCEQ website unless the permittee

requests and obtains an electronic reporting waiver. The Reporting Requirements of the Sludge Provisions have also been updated.

SECTION IV, REQUIREMENTS APPLYING TO SLUDGE TRANSPORTED TO ANOTHER FACILITY FOR FURTHER PROCESSING, has been added to the Sludge Provisions of the draft permit to allow the transportation of sludge to another facility.

Water Quality Division Standards and Implementation Team staff recommends a total phosphorus limit of 1.0 mg/L to preclude excessive algae accumulation in the unnamed tributary, on-channel impoundment and Denton Creek.

BASIS FOR DRAFT PERMIT

The following items were considered in developing the draft permit:

1. Application received on May 20, 2016, and additional information received on June 15, 2016.

2. The effluent limitations and conditions in the draft permit comply with the TSWQS, 30 TAC §§ 307.1 - 307.10, effective July 22, 2010, and the EPA-approved portions of the 2014 Texas Surface Water Quality Standards, effective March 6, 2014.

3. The effluent limitations in the draft permit meet the requirements for secondary treatment and the requirements for disinfection according to 30 TAC Chapter 309, Subchapter A: Effluent Limitations.

4. Interoffice memoranda from the Water Quality Assessment Section of the TCEQ Water Quality Division.

5. Consistency with the Coastal Management Plan: The facility is not located in the Coastal Management Program boundary.

6. *Procedures to Implement the Texas Surface Water Quality Standards* (IP), Texas Commission on Environmental Quality, June 2010, as approved by EPA, and the IP, January 2003, for portions of the 2010 IP not approved by EPA.

7. Texas 2014 Clean Water Act Section 303(d) List, Texas Commission on Environmental Quality, June 3, 2015; approved by the EPA on November 19, 2015.

8. Texas Natural Resource Conservation Commission Guidance Document for Establishing Monitoring Frequencies for Domestic and Industrial Wastewater Discharge Permits, Document No. 98-001.000-OWR-WQ, May 1998.

PROCEDURES FOR FINAL DECISION

When an application is declared administratively complete, the Chief Clerk sends a letter to the applicant advising the applicant to publish the Notice of Receipt of Application and Intent to Obtain Permit in the newspaper. In addition, the Chief Clerk instructs the applicant to place a copy of the application in a public place for review and copying in the county where the facility is or will be located. This application will be in a public place throughout the comment period. The Chief Clerk also mails this notice to any interested persons and, if required, to landowners identified in the permit application. This notice informs the public about the application and

provides that an interested person may file comments on the application or request a contested case hearing or a public meeting.

Once a draft permit is completed, it is sent, along with the Executive Director's preliminary decision, as contained in the technical summary or fact sheet, to the Chief Clerk. At that time, the Notice of Application and Preliminary Decision will be mailed to the same people and published in the same newspaper as the prior notice. This notice sets a deadline for making public comments. The applicant must place a copy of the Executive Director's preliminary decision and draft permit in the public place with the application.

Any interested person may request a public meeting on the application until the deadline for filing public comments. A public meeting is intended for the taking of public comment and is not a contested case proceeding.

After the public comment deadline, the Executive Director prepares a response to all significant public comments on the application or the draft permit raised during the public comment period. The Chief Clerk then mails the Executive Director's response to comments and final decision to people who have filed comments, requested a contested case hearing, or requested to be on the mailing list. This notice provides that if a person is not satisfied with the Executive Director's response and decision, they can request a contested case hearing or file a request to reconsider the Executive Director's decision within 30 days after the notice is mailed.

The Executive Director will issue the permit unless a written hearing request or request for reconsideration is filed within 30 days after the Executive Director's response to comments and final decision is mailed. If a hearing request or request for reconsideration is filed, the Executive Director will not issue the permit and will forward the application and request to the TCEQ Commissioners for their consideration at a scheduled Commission meeting. If a contested case hearing is held, it will be a legal proceeding similar to a civil trial in state district court.

If the Executive Director calls a public meeting or the Commission grants a contested case hearing as described above, the Commission will give notice of the date, time, and place of the meeting or hearing. If a hearing request or request for reconsideration is made, the Commission will consider all public comments in making its decision and shall either adopt the Executive Director's response to public comments or prepare its own response.

For additional information about this application, contact Larry Diamond at (512) 239-0037.

_____ _____

Larry Diamond Date
Municipal Permits Team
Wastewater Permitting Section (MC 148)

The TCEQ is committed to accessibility.
To request a more accessible version of this report, please contact the TCEQ Help Desk at (512) 239-4357.

Compliance History Report

Compliance History Report for CN605153634, RN109222414, Rating Year 2015 which includes Compliance History (CH) components from September 1, 2010, through August 31, 2015.

Customer, Respondent, or Owner/Operator: CN605153634, BIG SKY TRAILS LTD **Classification:** NOT APPLICABLE **Rating:** N/A

Regulated Entity: RN109222414, BIG SKY WRRF **Classification:** NOT APPLICABLE **Rating:** N/A

Complexity Points: N/A **Repeat Violator:** N/A

CH Group: 14 - Other

Location: 1.0 MI NW OF THE INTERSECTION OF US 380 AND JACKSON RD APPROXIMATELY 8.0 MILES WEST OF CITY OF KRUM DENTON, TX, DENTON COUNTY

TCEQ Region: REGION 04 - DFW METROPLEX

ID Number(s):
WASTEWATER EPA ID TX0137138 **WASTEWATER** PERMIT WQ0015479001

Compliance History Period: September 01, 2010 to August 31, 2015 **Rating Year:** 2015 **Rating Date:** 09/01/2015

Date Compliance History Report Prepared: July 19, 2016

Agency Decision Requiring Compliance History: Permit - Issuance, renewal, amendment, modification, denial, suspension, or revocation of a permit.

Component Period Selected: May 20, 2011 to July 19, 2016

TCEQ Staff Member to Contact for Additional Information Regarding This Compliance History.

Name: GMT **Phone:** (512) 239-3581

Site and Owner/Operator History:

1) Has the site been in existence and/or operation for the full five year compliance period? NO
2) Has there been a (known) change in ownership/operator of the site during the compliance period? NO

Components (Multimedia) for the Site Are Listed in Sections A - J

A. Final Orders, court judgments, and consent decrees:
N/A

B. Criminal convictions:
N/A

C. Chronic excessive emissions events:
N/A

D. The approval dates of investigations (CCEDS Inv. Track. No.):
N/A

E. Written notices of violations (NOV) (CCEDS Inv. Track. No.):
A notice of violation represents a written allegation of a violation of a specific regulatory requirement from the commission to a regulated entity. A notice of violation is not a final enforcement action, nor proof that a violation has actually occurred.

N/A

F. Environmental audits:
N/A

G. Type of environmental management systems (EMSs):
N/A

H. Voluntary on-site compliance assessment dates:

N/A

I. Participation in a voluntary pollution reduction program:

N/A

J. Early compliance:

N/A

Sites Outside of Texas:

N/A

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 27, 2016

Thomas Fletcher, P.E.
Kimley-Horn
5750 Genesis Court, Suite 200
Frisco, Texas 75034

Re: **Proposed Creation of Big SKY MUD No. 1**
Denton County

Dear Mr. Fletcher:

In the electronic mail of June 21, 2016, you requested our review of the proposed creation of the referenced MUD for dam safety issues. We have reviewed and have the following comments.

There is a dam in the proposed MUD that is not in the Inventory of Dams. It has a significant amount of water (possibly as much as 85 acre-feet at top of dam). If the dam is to be removed as part of the development, plans and specifications need to be submitted to my office for removal.

If the dam is to remain, it needs to be evaluated by an engineer to determine if the dam meets current standards for maintenance, hazard classification due to proposed development (appears to be high due to US Hwy 380 downstream), and structural and hydraulic adequacy. The engineer's report needs to be submitted to my office for review. Any modification plans will need to be submitted for review before any work is performed.

In addition, the District will need to pursue a water right permit if the lake is to remain since it will become a recreational lake as part of the subdivision.

If you have any questions, please feel free to call me (512/239-5195).

Sincerely,

Warren D. Samuelson

Warren D. Samuelson, P. E., Manager
Dam Safety Section
Critical Infrastructure Division, MC-177

Erin Stiggins @PD

From: Johnny Cosgrove [redacted]
Sent: Wednesday, October 16, 2019 3:25 PM
To: Vamshi Konduru [redacted]
Cc: Steven Dean [redacted] Alexander Wallen
Subject: RE: Big Sky Dam - Breach Analysis
Attachments: h&h eval smmry_form no.20346.pdf; exist dam info_form no.20344.pdf; dam info_cnst-mod-rmvl_form no.20345.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Mr. Konduru –

Thank you for the breach analysis submittal. A cursory review indicates that we will need a few additional items to initiate our formal internal evaluation. Please address/revise/submit/etc., with regard to the following:

- Under Sect. VII - Results and Conclusions in the submitted report, it is stated that "Based on the analysis and results presented in this report, we request TCEQ to give a permit to either make modifications or demolish the dam." As stated in our October 11, 2019, telephone conversation, TCEQ Dam Safety does not issue permits; we will issue an approval letter for proposed construction plans and specifications to modify and/or remove (demolish) a dam. As per TCEQ Dam Safety's prior June 27, 2016, letter regarding our initial review of the proposed MUD creation, "the District will need to pursue a water right permit if the lake is to remain since it will become a recreational lake as part of the subdivision."
    - Thus, if the dam will *not be demolished*, then it appears a water right permit will be required.
    - If the dam will be modified, then the submitted breach analysis should be revised to reflect ultimate conditions of the dam's modified configuration. Please clarify and/or revise.
- Under Sect. V – Dam Breach Hydrology in the submitted report, the following is noted: "It was identified that the 48-hour storm resulted in the maximum flow, and hence this was used as the design storm (PMF) for this project." However, the critical storm duration should be based on the maximum reservoir elevation, not the maximum flow. Dams (such as Big Sky Dam) with smaller drainage areas typically have critical storm durations much less than the 48-hr duration. Please clarify and/or revise.
- Under Sect. V – Dam Breach Hydrology in the submitted report, the following is noted: "In the Barely-Overtopping scenario, the dam is not breached, and it is allowed to overtop" and "For the Design Flood Breach scenario, the dam breach is triggered at an elevation equal to the top of dam". Please note that for the Barely-Overtopping Breach scenario, the dam breach is typically triggered with about 6 to 8 inches of overtopping. For the Design Flood Breach scenario, the dam breach should NOT be triggered at the top of dam elevation; it should be allowed to overtop, with the breach triggered at the peak reservoir elevation. Please clarify and/or revise.
- Under Sect. V – Dam Breach Hydrology in the submitted report, the following is noted: "Field survey indicates that the dam does not have an emergency spillway." However, according to 2011 Collin, Denton, & Kaufman Counties LiDAR data, there appears to be an approximately 40-ft wide earthen spillway on the left end of the dam with a control section elevation at 787.5 ft-msl, which would contribute nontrivial flows. Note that right and left indications are from the perspective of an observer looking downstream. Please clarify and/or revise.
- The reported Water Surface Elevations at downstream Highway 380 (at Cross-Section 4992) are shown to be lower than the road deck elevation for the Design Flood Breach scenario, which would be 75 percent of the Probable Maximum Flood (PMF). Nevertheless, it appears that the highway is overtopped by a 100-yr storm according to FEMA data/mapping. Thus, it is unclear how the highway lacks enough conveyance for a 100-yr flood event, but it is adequate (does not overtop) from a 75% PMF event. Please clarify and/or revise.

- There is a smaller dam downstream of the subject and upstream of the highway; it is not clear how/if this smaller dam was included in the submitted breach analysis. A full breach analysis should address the existence of this dam, and it should delineate how it was incorporated into the breach modeling (i.e. dams-in-series failures). Please clarify and/or revise.

Thank you,

Johnny Cosgrove, PE
Dam Safety Section
Critical Infrastructure Division
(512) 239-4307

Texas Commission on Environmental Quality
Physical: 12100 Park 35 Circle, Bldg. A, MC-177
Austin, TX 78753
Mail: P.O. Box 13087, MC-177
Austin, TX 78711-3087

Dam Safety Section Website

From: Vamshi Konduru [redacted]
Sent: Saturday, October 12, 2019 12:29 PM
To: Johnny Cosgrove [redacted]
Cc: Steven Dean [redacted]; Dustin Wentz [redacted]
Subject: Big Sky Dam - Breach Analysis

Hello Johnny. Thank for taking the time to discuss the details about Big Sky Dam yesterday. Per you request, please find attached a report containing the details regarding the dam and dam-breach scenarios. Please review the report and let us know if you have any questions or concerns. I am hoping that this report has enough information for you to provide us directions on next steps. I look forward to hearing back from you next week.

Thanks,
Vamshi

Vamshi Konduru, P.E., CFM, PH | **Principal Engineer**
Pape-Dawson Engineers, Inc.
TBPE Firm Registration #470 | TBPLS Firm Registration #10028800

2000 NW Loop 410, San Antonio, TX 78213
P: 210.375.9000 | **E:** [redacted]

San Antonio | Austin | Houston | Fort Worth | Dallas