Administrative Package Cover Page

This file contains the following documents:

1. Summary of application (in plain language)
   - English
   - Alternative Language (Spanish)
2. First Notice (NORI-Notice of Receipt of Application and Intent to Obtain a Permit)
   - English
   - Alternative Language (Spanish)
3. Application materials

Portada de Paquete Administrativo

Este archivo contiene los siguientes documentos:

1. Resumen en lenguaje sencillo (PLS, por sus siglas en inglés) de la actividad propuesta
   - Inglés
   - Idioma alternativo (español)
2. Primer aviso (NORI, el Aviso de Recepción de Solicitud e Intención de Obtener un Permiso)
   - Inglés
   - Idioma alternativo (español)
3. Solicitud original

ENGLISH LANGUAGE TEMPLATE FOR CAFO PERMIT APPLICATIONS

The following summary is provided for this pending water quality permit application being reviewed by the Texas Commission on Environmental Quality as required by the TCEQ Public Participation Plan and Language Access Plan. The information provided in this summary may change during the technical review of the application and is not a federal enforceable representation of the permit application.

1) Applicant's Name: Kuiper Cows, LLC
2) Enter Customer Number: CN604631820
3) Name of facility: Kuiper Cows
4) Enter Regulated Entity Number: RN102081056
5) Provide your permit Number: WQ0005293000
6) Facility Business: The facility will confine 899 replacement dairy heifers. The heifer facility has sixteen (16) land management units (LMUs) with the following acreages: LMU #1 - 54, LMU#2 - 26, LMU #C1 - 39, LMU #C2 - 68, LMU #C3 - 120, LMU #C4 - 50, LMU #F1 - 27, LMU #F2 - 49, LMU #F3 - 54, LMU #F4 - 64, LMU #TW1 - 56, LMU #TW2 - 64, LMU #W1 - 76, LMU #W2 - 42, LMU #WN1 - 60 and LMU # WN2 - 26 acres. Two (2) retention control structure (RCS). The required RCS #1 capacity is - 0.55 ac-ft and the required RCS #2 capacity - 6.71 ac-ft. There is twenty-nine (29) onsite wells with seven (7) that are plugged. The facility is located in the Paluxy River in Segment No. 1229 and North Bosque River in Segment No. 1226 of the Brazos River Basin.
7) Facility Location: The facility is located at 1261 County Road 188 in Stephenville, Erath County, Texas.
8) Application Type: Major Amendment of Individual Permit
9) Description of your request: Addition of LMU #DC and Well #30.
10) Potential pollutant sources at the facility include (list the pollutant sources): Manure, manure stockpiles, wastewater, sludge, slurry, compost, feed & bedding, silage stockpiles, dead animals, dust, lubricants, pesticides and fuel storage tanks.
11) The following best management practices will be implemented at the site to manage pollutants from the listed pollutant sources (describe the best management practices that are used): storm water is stored in a lagoon (RCS) until land applied though irrigation, and manure and sludge are stockpiled in the drainage area of the RCS until land applied or hauled offsite for beneficial use.

    Manure, sludge and wastewater generated by the CAFO will be retained and used in an appropriate and beneficial manner in accordance with a certified site-specific nutrient management plan; and wastewater will be contained in the RCS properly designed ((25-year frequency 24-hour duration (24 year/24 hour), constructed, operated and maintained according to the provisions of the permit. Maintain for 150-foot for supply wells. Dust - control speed and regular pen maintenance. Fertilizers - store under roof and handle according to specified label directions. Fuel Tanks - provide secondary containment and prevent overfills/spills. The land application areas is near a water course, therefore vegetative buffers shall be maintained between all waters of the state and any waste/wastewater application.

The production area is not located withing 100-year flood plain. Dead animals - dispose by a third-party rendering service or compost on-site. Collected within 24 hours of death and disposed within three days

Unless otherwise limited, manure, sludge, or wastewater will not be discharged from a land management unit (LMU) or a retention control structure (RCS) into or adjacent to water in the state from a CAFO except resulting from any of the following conditions:

1) a discharge of manure, sludge, or wastewater that the permittee cannot reasonably prevent or control resulting from a catastrophic condition other than a rainfall event;

2) overflow of manure, sludge, or wastewater from a RCS resulting from a chronic/catastrophic rainfall event; or

3) a chronic/catastrophic rainfall discharge from a LMU that occurs because the permittee takes measures to de-water the RCS if the RCS is in danger of imminent overflow.

PLANTILLA DE IDIOMA ESPAÑOL PARA SOLICITUDES DE PERMISO CAFO

El siguiente resumen se proporciona para esta solicitud de permiso de calidad del agua pendiente que está siendo revisada por la Comisión de Calidad Ambiental de Texas según lo requerido por el Plan de Participación Pública y el Plan de Acceso al Idioma de la TCEQ. La información proporcionada en este resumen puede cambiar durante la revisión técnica de la solicitud y no es una representación federal exigible de la solicitud de permiso.

1. Nombre del Solicitante: Kuiper Cows, LLC.
2. Introduzca el Número de Cliente: CN604631820.
3. Nombre de la Instalación: Kuiper Cows.
4. Introduzca el Número de Entidad Regulada: RN102081056.
5. Proporcione su Número de Permiso: WQ0005293000.
6. Negocio de Instalación: La instalación confinará 899 novillas lecheras de reemplazo. La instalación de novillas tiene quince (15) unidades de manejo de tierras (LMU) con los siguientes acres: LMU #1 - 54, LMU#2 - 26, LMU #C1 - 39, LMU #C2 - 68, LMU #C3 - 120, LMU #C4 - 50, LMU #F1 - 27, LMU #F2 - 49, LMU #F3 - 54, LMU #F4 - 64, LMU #TW1 - 56, LMU #TW2 - 64, LMU #W1 - 76, LMU #W2 - 42, LMU #WN1 - 60, LMU # WN2 - 26 acres. Dos (2) estructuras de control de retención (RCS). La capacidad requerida de RCS #1 es - 0.55 ac-ft y la capacidad requerida para RCS #2 es - 6.66 ac-ft. Hay cuatro (4) pozos en el sitio. La instalación está ubicada en Paluxy River en el Segmento No. 1229 y North Bosque River en el Segmento No. 1226 de la Cuenca del Río Brazos.
7. Ubicación de la Instalación: La instalación está ubicada en 1261 County Road 188 en Stephenville, Condado de Erath, Texas..
8. Tipo de Solicitud: Modificación Principal con Permiso Individual.
10. Descripción de su solicitud: Adición de LMU #DC en Well #30.
11. Las fuentes potenciales de contaminantes en la instalación incluyen (liste las fuentes contaminantes): Estiércol, pilas de estiércol, aguas residuales, lodos, purines, compost, piensos y camas, pilas de ensilado, animales muertos, polvo, lubricantes, pesticidas y tanques de almacenamiento de combustible.
11. Las siguientes mejores prácticas de gestión se implementarán en el sitio para gestionar los contaminantes de las fuentes contaminantes listadas (describa las mejores prácticas de gestión que se utilizan): el agua pluvial se almacena en una laguna (RCS) hasta que se aplica a la tierra a través del riego, y el estiércol y los lodos se acumulan en el área de drenaje del RCS hasta que se aplica a la tierra o se transportan fuera del sitio para uso beneficioso.

El estiércol, lodo y aguas residuales generados por el CAFO serán retenidos y utilizados de manera adecuada y beneficiosa de acuerdo con un plan certificado de manejo de nutrientes específico del sitio; y las aguas residuales estarán contenidas en el RCS debidamente diseñado (frecuencia de 25 años, duración de 24 horas (24 años/24 horas), construido, operado y mantenido de acuerdo con

las disposiciones del permiso. Mantenimiento de 150 pies para pozos de suministro. Polvo: controle la velocidad y mantenimiento regular de los corrales. Fertilizantes: almacene bajo techo y manipúlelos de acuerdo con las instrucciones especificadas en la etiqueta. Tanques de combustible: proporcione una contención secundaria y evite sobrellenados/derrames. Las áreas de aplicación de la tierra están cerca de un curso de agua, por lo tanto, se deben mantener las zonas de amortiguamiento vegetativo entre todas las aguas del estado y cualquier aplicación de residuos/aguas residuales.

El área de producción no se encuentra dentro de la planicie de inundación de 100 años. Animales muertos: elimínelos a través de un servicio de procesamiento de terceros o abone en el sitio. Recolectado dentro de las 24 horas posteriores a la muerte y eliminado dentro de los tres días.

A menos que se limite lo contrario, el estiércol, los lodos o las aguas residuales no se descargarán de una unidad de gestión de la tierra (LMU, por sus siglas en inglés) o una estructura de control de retención (RCS, por sus siglas en inglés) hacia o adyacente al agua en el estado de una CAFO, excepto como resultado de cualquiera de las siguientes condiciones:

1) una descarga de estiércol, lodos o aguas residuales que el permisionario no pueda prevenir o controlar razonablemente como resultado de una condición catastrófica que no sea un evento de lluvia;
2) desbordamiento de estiércol, lodo o aguas residuales de un RCS como resultado de un evento de lluvia crónico/catastrófico; o
3) una descarga de lluvia crónica/catastrófica de una LMU que ocurre porque el permisionario toma medidas para desaguar el RCS si el RCS está en peligro de desbordamiento inminente.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

NOTICE OF RECEIPT OF APPLICATION AND INTENT TO OBTAIN WATER QUALITY PERMIT AMENDMENT

PERMIT NO. WQ0005293000

APPLICATION. Kuiper Cows, LLC, 1865 Private Road 1233, Hico, Texas 76457, has applied to the Texas Commission on Environmental Quality (TCEQ) to amend Wastewater Permit No. WQ0005293000 for a Concentrated Animal Feeding Operation (CAFO) to authorize adding LMU #DC and Well #30. The facility is located at 1261 County Road 188, Stephenville, in Erath County, Texas 76401. TCEQ received this application on June 25, 2024. The permit application will be available for viewing and copying at Erath County Extension Office-Erath County Courthouse, 100 Washington Street, Room 206, Stephenville, Texas, prior to the date this notice is published in the newspaper. The application, including any updates, and associated notices are available electronically at the following webpage: https://www.tceq.texas.gov/permitting/wastewater/pending-permits/cafo-applications. This link to an electronic map of the site or facility's general location is provided as a public courtesy and not part of the application or notice. For the exact location, refer to the application. https://gisweb.tceq.texas.gov/LocationMapper/?marker=-98.071666,32.229166&level=18

ALTERNATIVE LANGUAGE NOTICE. Alternative language notice in Spanish is available at: https://www.tceq.texas.gov/permitting/wastewater/pending-permits/cafo-applications. El aviso de idioma alternativo en español está disponible en https://www.tceq.texas.gov/permitting/wastewater/pending-permits/cafo-applications.

ADDITIONAL NOTICE. TCEQ's Executive Director has determined the application is administratively complete and will conduct a technical review of the application. After technical review of the application is complete, the Executive Director may prepare a draft permit and will issue a preliminary decision on the application. **Notice of the Application and Preliminary Decision will be published and mailed to those who are on the county-wide mailing list and to those who are on the mailing list for this application. That notice will contain the deadline for submitting public comments.**

PUBLIC COMMENT / PUBLIC MEETING. You may submit public comments or request a public meeting on this application. The purpose of a public meeting is to provide the opportunity to submit comments or to ask questions about the application. TCEQ will hold a public meeting if the Executive Director determines that there is a significant degree of public interest in the application or if requested by a local legislator. A public meeting is not a contested case hearing.

OPPORTUNITY FOR A CONTESTED CASE HEARING. After the deadline for submitting public comments, the Executive Director will consider all timely comments and prepare a response to all relevant and material, or significant public comments. **Unless the application is directly referred for a contested case hearing, the response to comments, and the Executive Director's decision on the application, will be mailed to everyone who submitted public comments and to those persons who are on the mailing list for this application. If comments are received, the mailing will also provide instructions for requesting reconsideration of the Executive Director's decision and for requesting a contested case hearing.** A contested case hearing is a legal proceeding similar to a civil trial in state district court.

TO REQUEST A CONTESTED CASE HEARING, YOU MUST INCLUDE THE FOLLOWING ITEMS IN YOUR REQUEST: your name, address, phone number; applicant's name and proposed permit number; the location and distance of your property/activities relative to the proposed facility; a specific description of how you would be adversely affected by the facility in a way not common to the general public; a list of all disputed issues of fact that you submit during the comment period and, the statement "[I/we] request a contested case hearing." If the request for contested case hearing is filed on behalf of a group or association, the request must designate the group's representative for receiving future correspondence; identify by name and physical address an individual member of the group who would be adversely affected by the proposed facility or activity; provide the information discussed above regarding the affected member's location and distance from the facility or activity; explain how and why the member would be affected; and explain how the interests the group seeks to protect are relevant to the group's purpose.

Following the close of all applicable comment and request periods, the Executive Director will forward the application and any requests for reconsideration or for a contested case hearing to the TCEQ Commissioners for their consideration at a scheduled Commission meeting.

The Commission may only grant a request for a contested case hearing on issues the requestor submitted in their timely comments that were not subsequently withdrawn. **If a hearing is granted, the subject of a hearing will be limited to disputed issues of fact or mixed questions of fact and law relating to relevant and material water quality concerns submitted during the comment period.**

MAILING LIST. If you submit public comments, a request for a contested case hearing or a reconsideration of the Executive Director's decision, you will be added to the mailing list for this specific application to receive future public notices mailed by the Office of the Chief Clerk. In addition, you may request to be placed on: (1) the permanent mailing list for a specific applicant name and permit number; and/or (2) the mailing list for a specific county. If you wish to be placed on the permanent and/or the county mailing list, clearly specify which list(s) and send your request to TCEQ Office of the Chief Clerk at the address below.

INFORMATION AVAILABLE ONLINE. For details about the status of the application, visit the Commissioners' Integrated Database at www.tceq.texas.gov/goto/cid. Search the database using the permit number for this application, which is provided at the top of this notice.

AGENCY CONTACTS AND INFORMATION. All public comments and requests must be submitted either electronically at **https://www14.tceq.texas.gov/epic/eComment/**, or in writing to the Texas Commission on Environmental Quality, Office of the Chief Clerk, MC-105,

P.O. Box 13087, Austin, Texas 78711-3087. Please be aware that any contact information you provide, including your name, phone number, email address and physical address will become part of the agency's public record. For more information about this permit application or the permitting process, please call the TCEQ Public Education Program, Toll Free, at 1-800-687-4040 or visit their website at www.tceq.texas.gov/goto/pep. Si desea información en Español, puede llamar al 1-800-687-4040.

Further information may also be obtained from Kuiper Cows, LLC at the address stated above or by calling Mr. Clemens Kuiper, Member, at 254-968-4018.

Issuance Date: July 25, 2024

Comisión de Calidad Ambiental del Estado de Texas

AVISO DE RECEPCIÓN DE LA SOLICITUD Y LA INTENCIÓN DE OBTENER CALIDAD DEL AGUA PERMISO MODIFICACION

PERMISO NO. WQ0005293000

SOLICITUD. Kuiper Cows, LLC, 1865 Private Road 1233, Hico, Texas 76457, ha solicitado a la Comisión de Calidad Ambiental de Texas (TCEQ) modificar el Permiso de Aguas Residuales No. WQ0005293000 para una Operación de Alimentación Concentrada para Animales (CAFO) para autorizar añadir la LMU #DC y el Pozo #30. La instalación está ubicada en 1261 County Road 188, Stephenville, en el Condado de Erath, Texas 76401. La TCEQ recibió esta solicitud el 25 de junio de 2024. La solicitud de permiso estará disponible para ver y copiar en la Oficina de Extensión del Condado de Erath, Palacio de Justicia del Condado de Erath, 100 Washington Street, Cuarto 206, Stephenville, Texas, antes de la fecha de publicación de este aviso en el periódico. La solicitud, incluidas las actualizaciones, y los avisos asociados están disponibles electrónicamente en la siguiente página web: https://www.tceq.texas.gov/permitting/wastewater/pending-permits/cafo-applications. Este enlace a un mapa electrónico de la ubicación general del sitio o de la instalación es proporcionado como una cortesía y no es parte de la solicitud o del aviso. Para la ubicación exacta, consulte la solicitud. https://gisweb.tceq.texas.gov/LocationMapper/?marker=-98.071666,32.229166&level=18.

AVISO ADICIONAL. El Director Ejecutivo de la TCEQ ha determinado que la solicitud es administrativamente completa y conducirá una revisión técnica de la solicitud. Después de completar la revisión técnica, el Director Ejecutivo puede preparar un borrador del permiso y emitirá una Decisión Preliminar sobre la solicitud. **El aviso de la solicitud y la decisión preliminar serán publicados y enviado a los que están en la lista de correo de las personas a lo largo del condado que desean recibir los avisos y los que están en la lista de correo que desean recibir avisos de esta solicitud. El aviso dará la fecha límite para someter comentarios públicos.**

COMENTARIO PUBLICO / REUNION PUBLICA. Usted puede presentar comentarios públicos o pedir una reunión pública sobre esta solicitud. El propósito de una reunión pública es dar la oportunidad de presentar comentarios o hacer preguntas acerca de la solicitud. La TCEQ realiza una reunión pública si el Director Ejecutivo determina que hay un grado de interés público suficiente en la solicitud o si un legislador local lo pide. Una reunión pública no es una audiencia administrativa de lo contencioso.

OPORTUNIDAD DE UNA AUDIENCIA ADMINISTRATIVA DE LO CONTENCIOSO. Después del plazo para presentar comentarios públicos, el Director Ejecutivo considerará todos

los comentarios apropiados y preparará una respuesta a todo los comentarios públicos esenciales, pertinentes, o significativos. **A menos que la solicitud haya sido referida directamente a una audiencia administrativa de lo contencioso, la respuesta a los comentarios y la decisión del Director Ejecutivo sobre la solicitud serán enviados por correo a todos los que presentaron un comentario público y a las personas que están en la lista para recibir avisos sobre esta solicitud. Si se reciben comentarios, el aviso también proveerá instrucciones para pedir una reconsideración de la decisión del Director Ejecutivo y para pedir una audiencia administrativa de lo contencioso.** Una audiencia administrativa de lo contencioso es un procedimiento legal similar a un procedimiento legal civil en un tribunal de distrito del estado.

PARA SOLICITAR UNA AUDIENCIA DE CASO IMPUGNADO, USTED DEBE INCLUIR EN SU SOLICITUD LOS SIGUIENTES DATOS: su nombre, dirección, y número de teléfono; el nombre del solicitante y número del permiso; la ubicación y distancia de su propiedad/actividad con respecto a la instalación; una descripción específica de la forma cómo usted sería afectado adversamente por el sitio de una manera no común al público en general; una lista de todas las cuestiones de hecho en disputa que usted presente durante el período de comentarios; y la declaración "[Yo/nosotros] solicito/solicitamos una audiencia de caso impugnado". Si presenta la petición para una audiencia de caso impugnado de parte de un grupo o asociación, debe identificar una persona que representa al grupo para recibir correspondencia en el futuro; identificar el nombre y la dirección de un miembro del grupo que sería afectado adversamente por la planta o la actividad propuesta; proveer la información indicada anteriormente con respecto a la ubicación del miembro afectado y su distancia de la planta o actividad propuesta; explicar cómo y porqué el miembro sería afectado; y explicar cómo los intereses que el grupo desea proteger son pertinentes al propósito del grupo.

Después del cierre de todos los períodos de comentarios y de petición que aplican, el Director Ejecutivo enviará la solicitud y cualquier petición para reconsideración o para una audiencia de caso impugnado a los Comisionados de la TCEQ para su consideración durante una reunión programada de la Comisión. La Comisión sólo puede conceder una solicitud de una audiencia de caso impugnado sobre los temas que el solicitante haya presentado en sus comentarios oportunos que no fueron retirados posteriormente. Si se concede una audiencia, el tema de la audiencia estará limitado a cuestiones de hecho en disputa o cuestiones mixtas de hecho y de derecho relacionadas a intereses pertinentes y materiales de calidad del agua que se hayan presentado durante el período de comentarios.

LISTA DE CORREO. Si somete comentarios públicos, un pedido para una audiencia administrativa de lo contencioso o una reconsideración de la decisión del Director Ejecutivo, la Oficina del Secretario Principal enviará por correo los avisos públicos en relación con la solicitud. Ademas, puede pedir que la TCEQ ponga su nombre en una or mas de las listas correos siguientes (1) la lista de correo permanente para recibir los avisos de el solicitante indicado por nombre y número del permiso específico y/o (2) la lista de correo de todas las solicitudes en un condado especifico. Si desea que se agrega su nombre en una de las listas designe cual lista(s) y envia por correo su pedido a la Oficina del Secretario Principal de la TCEQ.

CONTACTOS E INFORMACIÓN A LA AGENCIA. Todos los comentarios públicos y solicitudes deben ser presentadas electrónicamente vía

http://www14.tceq.texas.gov/epic/eComment/ o por escrito dirigidos a la Comisión de Texas de Calidad Ambiental, Oficial de la Secretaría (Office of Chief Clerk), MC-105, P.O. Box 13087, Austin, Texas 78711-3087. Tenga en cuenta que cualquier información personal que usted proporcione, incluyendo su nombre, número de teléfono, dirección de correo electrónico y dirección física pasarán a formar parte del registro público de la Agencia. Para obtener más información acerca de esta solicitud de permiso o el proceso de permisos, llame al programa de educación pública de la TCEQ, gratis, al 1-800-687-4040. Si desea información en Español, puede llamar al 1-800-687-4040.

También se puede obtener información adicional de Kuiper Cows, LLC a la dirección indicada arriba o llamando al Sr. Clemens Kuiper, Miembro, al 254-968-4018.

Fecha de emisión 25 de julio de 2024

ENVIRO-AG ENGINEERING, INC.
EAE
AMARILLO STEPHENVILLE ARTESIA

Corporate Office:
3404 Airway Blvd.
Amarillo TX 79118

Central Texas:
9855 FM 847
Dublin TX 76446

New Mexico:
203 East Main Street
Artesia NM 88210

June 21, 2024

TCEQ
Registration, Review and Reporting Division
Permits Administration Review Section
Water Quality Applications Team, MC-148
PO Box 13087
Austin, TX 78711-3087

Re: Kuiper Cows, LLC – Permit No. WQ0005293000
Erath County, Texas.

Dear Administrative Review Section,

Enclosed please find the Major Application for the above referenced facility. The $350 application fee was paid electronically, and the voucher is attached. Should you have any questions please do not hesitate to contact me.

Respectfully Submitted,

Jourdan Mullin
Enviro-Ag Engineering, Inc.

Cc: TCEQ Region 4, Stephenville
Kuiper Cows
EAE file

30 TAC 321, SUBCHAPTER B APPLICATION, POLLUTION PREVENTION PLAN & CNMP

Kuiper Cows

Major Amendment

Prepared For:

Kuiper Cows, LLC

1865 PR 1233

Hico, TX 76457

June 11, 2024

Prepared By:

ENVIRO-AG ENGINEERING, INC.
EAE
AMARILLO · STEPHENVILLE · ARTESIA

9855 FM 847 ♦ Dublin, TX 76446 ♦ Tel 254/965-3500 ♦ Fax 254/965-8000

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

ELECTRONIC WAIVER REQUEST FOR A CONCENTRATED ANIMAL FEEDING OPERATION (CAFO)

A Large CAFO, as defined in the CAFO rules at 30 TAC 321.32(14)(A), must request a waiver from e-reporting requirements codified in 40 Code of Federal Regulations §127.15 OR be required to submit CAFO annual reports electronically.

Are you requesting a waiver from e-reporting requirements?

☒ Yes, Indicate the type of waiver below.

☒ Temporary Waiver

☐ Permanent Waiver (available to facilities and entities owned or operated by members of religious communities that choose not to use certain modern technologies (e.g., computers, electricity))

☐ No, you must submit your application electronically through TCEQ ePermits system (STEERS) at https://www3.tceq.texas.gov/steers/index.cfm. Check How to Apply through STEERS.

If an electronic waiver request is granted, the Applicant(s) seeking authorization, or an authorized permittee(s) may continue to submit CAFO annual reports to TCEQ in a paper format.

Note:

- An approved waiver is not transferrable.
- Each Owner or Operator must request his own waiver.
- Temporary waiver will not extend beyond five years. However, permittees may re-apply for a new temporary waiver, if needed.

State Only CAFOs are exempt from this requirement.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

INDIVIDUAL PERMIT APPLICATION FOR A CONCENTRATED ANIMAL FEEDING OPERATION (CAFO)

If you have questions about completing this form, please contact the Applications Review and Processing Team at 512-239-4671.

SECTION 1. APPLICATION FEE

Minor Amendment - $150.00
Renewal - $315.00
New or Major Amendment - $350.00

Mailed	Check/Money Order Number:	
	Check/Money Order Amount:	
	Name Printed on Check:	
EPAY	Voucher Number: 710512 & 710513	
	Copy of Payment Voucher enclosed?	Yes ☒

SECTION 2. TYPE OF APPLICATION

A. Coverage: State Only ☐ TPDES ☒

B. Media Type: Water Quality ☒ Air and Water Quality ☐

C. Application Type: New ☐ Major Amendment ☒
Renewal ☐ Minor Amendment ☐

D. For amendments, describe the proposed changes: Addition of LMU #DC and Well #30.

E. For existing permits:
What is the permit number? WQ0005293000
What is the EPA I.D. Number? TX 0140325

SECTION 3. FACILITY OWNER (APPLICANT) INFORMATION

A. What is the legal name of the facility owner?
Kuiper Cows, LLC

B. If the applicant is an existing TCEQ customer, provide the Customer Number (CN) issued to this entity? CN 604631820

C. What is the contact information for the owner?

Print this voucher for your records. If you are sending the TCEQ hardcopy documents related to this payment, include a copy of this voucher.

Transaction Information

Voucher Number:	710512
Trace Number:	582EA000615107
Date:	06/21/2024 02:43 PM
Payment Method:	CC - Authorization 000000758G
Voucher Amount:	$300.00
Fee Type:	CAFO PERMIT - NEW OR MAJOR AMENDMENT
ePay Actor:	JOURDAN MULLIN
Actor Email:	jmullin@enviroag.com
IP:	156.146.244.233

Payment Contact Information

Name:	JOURDAN MULLIN
Company:	ENVIRO-AG ENGINEERING INC
Address:	3404 AIRWAY BLVD, AMARILLO, TX 79118
Phone:	806-679-5570

Site Information

Site Name:	KUIPER COWS
Site Location:	1261 COUNTY ROAD 188 STEPHENVILLE TX 76401

Customer Information

Customer Name:	KUIPER COWS LLC
Customer Address:	1865 PR 1233, HICO, TX 76457

Other Information

Program Area ID:	5293

Close

Print this voucher for your records. If you are sending the TCEQ hardcopy documents related to this payment, include a copy of this voucher.

Transaction Information

Voucher Number:	710513
Trace Number:	582EA000615107
Date:	06/21/2024 02:43 PM
Payment Method:	CC - Authorization 000000758G
Voucher Amount:	$50.00
Fee Type:	30 TAC 305.53B WQ NOTIFICATION FEE
ePay Actor:	JOURDAN MULLIN
Actor Email:	jmullin@enviroag.com
IP:	156.146.244.233

Payment Contact Information

Name:	JOURDAN MULLIN
Company:	ENVIRO-AG ENGINEERING INC
Address:	3404 AIRWAY BLVD, AMARILLO, TX 79118
Phone:	806-679-5570

Close

Mailing Address: 1865 PR 1233

City, State and Zip Code: Hico, TX 76457

Phone Number: 254/968-4018 Fax Number: n/a

E-mail Address: Clemens.karin@hotmail.com

D. Indicate the type of customer:

- ☐ Individual
- ☐ Limited Partnership
- ☐ General Partnership
- ☐ Trust
- ☐ Sole Proprietorship (D.B.A.)
- ☒ Corporation
- ☐ Estate
- ☐ Federal Government
- ☐ County Government
- ☐ State Government
- ☐ City Government
- ☐ Other Government
- ☐ Other, specify: Click here to enter text.

E. If the customer type is individual, complete Attachment 1.

F. Is this customer an independent entity?

☒ Yes ☐ No government, subsidiary, or part of a larger corporation

G. Number of employees:

☒ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 or higher

H. For Corporations and Limited Partnerships:

What is the Tax Identification Number issued by the State Comptroller: 32041305171

What is the Charter Filing Number issued by the Texas Secretary of State: 0801235462

SECTION 4. CO-APPLICANT INFORMATION

Complete this section only if another person or entity is required to apply as a co-permittee.

A. What is the legal name of the co-applicant?

Click here to enter text.

B. If the applicant is an existing TCEQ customer, provide the Customer Number (CN) issued to this entity? CN Click here to enter text.

C. What is the contact information for the co-applicant?

Mailing Address: Click here to enter text.

City, State and Zip Code: Click here to enter text.

Phone Number: Fax Number: Click here to enter text.

E-mail Address: Click here to enter text.

D. Indicate the type of customer:

- ☐ Individual
- ☐ Limited Partnership

☐ General Partnership
☐ Trust
☐ Sole Proprietorship (D.B.A.)
☐ Corporation
☐ Estate
☐ Federal Government
☐ County Government
☐ State Government
☐ City Government
☐ Other Government
☐ Other, specify: Click here to enter text.

E. If the customer type is individual, complete Attachment 1.

F. Is this customer an independent entity?

☐ Yes ☐ No government, subsidiary, or part of a larger corporation

G. Number of employees:

☐ 0-20 ☐ 21-100 ☐ 101-250 ☐ 251-500 ☐ 501 or higher

H. For Corporations and Limited Partnerships:

What is the Tax Identification Number issued by the State Comptroller: Click here to enter text.

What is the Charter Filing Number issued by the Texas Secretary of State: Click here to enter text.

SECTION 5. APPLICATION CONTACT INFORMATION

This is the person TCEQ will contact if additional information is needed about this application.

Prefix (Mr., Ms., Miss): Mr.

Application Contact First and Last Name: Corey Mullin

Title: Consultant Credentials: Click here to enter text.

Company Name: Enviro-Ag Engineering, Inc.

Mailing Address: 9855 FM 847

City, State and Zip Code: Dublin, TX 76446

Phone Number: 254/965-3500 Fax Number: 254/965-8000

E-mail Address: cmullin@enviroag.com

SECTION 6. PERMIT CONTACT INFORMATION

Provide two names of individuals that TCEQ can contact during the term of the permit.

A. Prefix (Mr., Ms., Miss): Mr.

Permit Contact First and Last Name: Corey Mullin

Title: Consultant Credentials: Click here to enter text.

Company Name: Enviro-Ag Engineering, Inc.

Mailing Address: 9855 FM 847

City, State and Zip Code: Dublin, TX 76446

Phone Number: 254/965-3500 Fax Number: 254/965-8000 E-mail Address: cmullin@enviroag.com

B. Prefix (Mr., Ms., Miss): Mr.

Permit Contact First and Last Name: Clemens Kuiper

Title: Member Credentials: Click here to enter text.

Company Name: Kuiper Cows, LLC

Mailing Address: 1865 PR 1233

City, State and Zip Code: Hico, TX 76457

Phone Number: 254/968-4018 Fax Number: n/a E-mail Address: Clemens.karin@hotmail.com

SECTION 7. ANNUAL BILLING CONTACT INFORMATION

Please identify the individual for receiving the annual fee invoices.

Is the billing contact and contact information the same as the Owner or the Co-Applicant identified in Section 3) or Section 4) above?

☒ Yes, specify which applicant on the line below and go to Section 8)

Owner, Kuiper Cows, LLC

☐ No, complete this section

Prefix (Mr., Ms., Miss): Click here to enter text.

First and Last Name: Click here to enter text.

Title: Click here to enter text. Credentials: Click here to enter text.

Company Name: Click here to enter text.

Mailing Address: Click here to enter text.

City, State and Zip Code: Click here to enter text.

Phone Number: Click here to enter text. Fax Number: Click here to enter text. E-mail Address: Click here to enter text.

SECTION 8. LANDOWNER INFORMATION

A. Landowner where the production area is or will be located

Landowner Name: Kuiper Cows, LLC

B. Landowner of the land management units (LMUs)

Landowner Name: Kuiper Cows, LLC, Clemens Kuiper and Clemens Kuiper & Karin Truus Krikhaar

SECTION 9. PUBLIC NOTICE INFORMATION

A. Individual responsible for publishing the notices in the newspaper

Prefix (Mr., Ms., Miss): Ms. First and Last Name: Jourdan Mullin

Title: Consultant Credentials: Click here to enter text.

Company Name: Enviro-Ag Engineering, Inc.

Mailing Address: 9855 FM 847

City, State and Zip Code: Dublin, TX 76446

Phone Number: 254/965-3500 Fax Number: 254/965-8000 E-mail Address: jmullin@enviroag.com

B. Method for receiving the notice package for the Notice of Receipt and Intent

☒ E-mail: jmullin@enviroag.com

☐ Fax Number: Click here to enter text.

☒ Regular Mail:

Mailing Address: 9855 FM 847

City, State and Zip Code: Dublin, TX 76446

C. Contact person to be listed in the notice

Prefix (Mr., Ms., Miss): Mr.

First and Last Name: Clemens Kuiper

Title: Member Credentials: Click here to enter text.

Company Name: Kuiper Cows, LLC

Phone Number: 254/968-4018

D. Public viewing location

If the facility is located in more than one county, a public viewing location for each county must be provided.

Public Building Name: Erath County Extension Office-Erath County Courthouse

Physical Address of Building: 100 Washington St, Room 206

City: Stephenville County: Erath

Phone Number: 254/965-1460

E. Bilingual Notice Requirement

For new, major amendment, and renewal applications. This information can be obtained by contacting the bilingual/ESL coordinator at the nearest elementary or middle school.

1. Is a bilingual education program required by the Texas Education Code at the nearest elementary or middle school to the facility or proposed facility?
Yes ☒ No ☐

(**If No**, alternative language notice publication is not required; skip to Section 10. Regulated Entity (Site) Information.)

2. Are the students who attend either the elementary school or the middle school enrolled in a bilingual education program at that school?
Yes ☒ No ☐

3. Do the students at these schools attend a bilingual education program at another location?
Yes ☒ No ☐

4. Would the school be required to provide a bilingual education program but the school has waived out of this requirement under 19 TAC §89.1205(g)?
Yes ☒ No ☐

5. If the answer is yes to 1, 2, 3, or 4, public notice in an alternative language is required. Which language is required by the bilingual program? Spanish

6. Complete the CAFO Plain Language Summary Template (English) for CAFO Permit Applications for a new, renewal, major or minor amendment and submit with this application.

If a bilingual education program is required by the Texas Education Code at the nearest elementary or middle school to the facility or proposed facility, also complete the CAFO Plain Language Summary Template (Spanish) or provide a translated copy of the completed English plain language summary in the appropriate alternative language if different from Spanish.

F. **Public Involvement Plan Form**
Complete and attach one Public Involvement Plan (PIP) Form (TCEQ Form 20960) for each application for a new permit or major amendment to a permit.

SECTION 10. REGULATED ENTITY (SITE) INFORMATION

A. Site Name as known by the local community: Kuiper Cows

B. If this is an existing permitted site, provide the Regulated Entity Number (RN) issued to this site? RN 102081056

C. Site Address/Location:

If the site has a physical address such as 12100 Park 35 Circle, Austin, TX 78753, complete Item 1.

If the site does not have a physical address, provide a location description in Item 2. Example: located on the north side of FM 123, 2 miles west of the intersection of FM 123

ENGLISH LANGUAGE TEMPLATE FOR CAFO PERMIT APPLICATIONS

The following summary is provided for this pending water quality permit application being reviewed by the Texas Commission on Environmental Quality as required by the TCEQ Public Participation Plan and Language Access Plan. The information provided in this summary may change during the technical review of the application and is not a federal enforceable representation of the permit application.

1) Applicant's Name: Kuiper Cows, LLC
2) Enter Customer Number: CN604631820
3) Name of facility: Kuiper Cows
4) Enter Regulated Entity Number: RN102081056
5) Provide your permit Number: WQ0005293000
6) Facility Business: The facility will confine 899 replacement dairy heifers. The heifer facility has sixteen (16) land management units (LMUs) with the following acreages: LMU #1 - 54, LMU#2 - 26, LMU #C1 - 39, LMU #C2 - 68, LMU #C3 - 120, LMU #C4 - 50, LMU #F1 - 27, LMU #F2 - 49, LMU #F3 - 54, LMU #F4 - 64, LMU #TW1 - 56, LMU #TW2 - 64, LMU #W1 - 76, LMU #W2 - 42, LMU #WN1 - 60 and LMU # WN2 - 26 acres. Two (2) retention control structure (RCS). The required RCS #1 capacity is - 0.55 ac-ft and the required RCS #2 capacity - 6.71 ac-ft. There is twenty-nine (29) onsite wells with seven (7) that are plugged. The facility is located in the Paluxy River in Segment No. 1229 and North Bosque River in Segment No. 1226 of the Brazos River Basin.
7) Facility Location: The facility is located at 1261 County Road 188 in Stephenville, Erath County, Texas.
8) Application Type: Major Amendment of Individual Permit
9) Description of your request: Addition of LMU #DC and Well #30.
10) Potential pollutant sources at the facility include (list the pollutant sources): Manure, manure stockpiles, wastewater, sludge, slurry, compost, feed & bedding, silage stockpiles, dead animals, dust, lubricants, pesticides and fuel storage tanks.
11) The following best management practices will be implemented at the site to manage pollutants from the listed pollutant sources (describe the best management practices that are used): storm water is stored in a lagoon (RCS) until land applied though irrigation, and manure and sludge are stockpiled in the drainage area of the RCS until land applied or hauled offsite for beneficial use.

    Manure, sludge and wastewater generated by the CAFO will be retained and used in an appropriate and beneficial manner in accordance with a certified site-specific nutrient management plan; and wastewater will be contained in the RCS properly designed ((25-year frequency 24-hour duration (24 year/24 hour), constructed, operated and maintained according to the provisions of the permit. Maintain for 150-foot for supply wells. Dust - control speed and regular pen maintenance. Fertilizers - store under roof and handle according to specified label directions. Fuel Tanks - provide secondary containment and prevent overfills/spills. The land application areas is near a water course, therefore vegetative buffers shall be maintained between all waters of the state and any waste/wastewater application.

The production area is not located withing 100-year flood plain. Dead animals - dispose by a third-party rendering service or compost on-site. Collected within 24 hours of death and disposed within three days

Unless otherwise limited, manure, sludge, or wastewater will not be discharged from a land management unit (LMU) or a retention control structure (RCS) into or adjacent to water in the state from a CAFO except resulting from any of the following conditions:

1) a discharge of manure, sludge, or wastewater that the permittee cannot reasonably prevent or control resulting from a catastrophic condition other than a rainfall event;

2) overflow of manure, sludge, or wastewater from a RCS resulting from a chronic/catastrophic rainfall event; or

3) a chronic/catastrophic rainfall discharge from a LMU that occurs because the permittee takes measures to de-water the RCS if the RCS is in danger of imminent overflow.

PLANTILLA DE IDIOMA ESPAÑOL PARA SOLICITUDES DE PERMISO CAFO

El siguiente resumen se proporciona para esta solicitud de permiso de calidad del agua pendiente que está siendo revisada por la Comisión de Calidad Ambiental de Texas según lo requerido por el Plan de Participación Pública y el Plan de Acceso al Idioma de la TCEQ. La información proporcionada en este resumen puede cambiar durante la revisión técnica de la solicitud y no es una representación federal exigible de la solicitud de permiso.

1. Nombre del Solicitante: Kuiper Cows, LLC.
2. Introduzca el Número de Cliente: CN604631820.
3. Nombre de la Instalación: Kuiper Cows.
4. Introduzca el Número de Entidad Regulada: RN102081056.
5. Proporcione su Número de Permiso: WQ0005293000.
6. Negocio de Instalación: La instalación confinará 899 novillas lecheras de reemplazo. La instalación de novillas tiene quince (15) unidades de manejo de tierras (LMU) con los siguientes acres: LMU #1 - 54, LMU#2 - 26, LMU #C1 - 39, LMU #C2 - 68, LMU #C3 - 120, LMU #C4 - 50, LMU #F1 - 27, LMU #F2 - 49, LMU #F3 - 54, LMU #F4 - 64, LMU #TW1 - 56, LMU #TW2 - 64, LMU #W1 - 76, LMU #W2 - 42, LMU #WN1 - 60, LMU # WN2 - 26 acres. Dos (2) estructuras de control de retención (RCS). La capacidad requerida de RCS #1 es - 0.55 ac-ft y la capacidad requerida para RCS #2 es - 6.66 ac-ft. Hay cuatro (4) pozos en el sitio. La instalación está ubicada en Paluxy River en el Segmento No. 1229 y North Bosque River en el Segmento No. 1226 de la Cuenca del Río Brazos.
7. Ubicación de la Instalación: La instalación está ubicada en 1261 County Road 188 en Stephenville, Condado de Erath, Texas..
8. Tipo de Solicitud: Modificación Principal con Permiso Individual.
10. Descripción de su solicitud: Adición de LMU #DC en Well #30.
11. Las fuentes potenciales de contaminantes en la instalación incluyen (liste las fuentes contaminantes): Estiércol, pilas de estiércol, aguas residuales, lodos, purines, compost, piensos y camas, pilas de ensilado, animales muertos, polvo, lubricantes, pesticidas y tanques de almacenamiento de combustible.
11. Las siguientes mejores prácticas de gestión se implementarán en el sitio para gestionar los contaminantes de las fuentes contaminantes listadas (describa las mejores prácticas de gestión que se utilizan): el agua pluvial se almacena en una laguna (RCS) hasta que se aplica a la tierra a través del riego, y el estiércol y los lodos se acumulan en el área de drenaje del RCS hasta que se aplica a la tierra o se transportan fuera del sitio para uso beneficioso.

El estiércol, lodo y aguas residuales generados por el CAFO serán retenidos y utilizados de manera adecuada y beneficiosa de acuerdo con un plan certificado de manejo de nutrientes específico del sitio; y las aguas residuales estarán contenidas en el RCS debidamente diseñado (frecuencia de 25 años, duración de 24 horas (24 años/24 horas), construido, operado y mantenido de acuerdo con

las disposiciones del permiso. Mantenimiento de 150 pies para pozos de suministro. Polvo: controle la velocidad y mantenimiento regular de los corrales. Fertilizantes: almacene bajo techo y manipúlelos de acuerdo con las instrucciones especificadas en la etiqueta. Tanques de combustible: proporcione una contención secundaria y evite sobrellenados/derrames. Las áreas de aplicación de la tierra están cerca de un curso de agua, por lo tanto, se deben mantener las zonas de amortiguamiento vegetativo entre todas las aguas del estado y cualquier aplicación de residuos/aguas residuales.

El área de producción no se encuentra dentro de la planicie de inundación de 100 años. Animales muertos: elimínelos a través de un servicio de procesamiento de terceros o abone en el sitio. Recolectado dentro de las 24 horas posteriores a la muerte y eliminado dentro de los tres días.

A menos que se limite lo contrario, el estiércol, los lodos o las aguas residuales no se descargarán de una unidad de gestión de la tierra (LMU, por sus siglas en inglés) o una estructura de control de retención (RCS, por sus siglas en inglés) hacia o adyacente al agua en el estado de una CAFO, excepto como resultado de cualquiera de las siguientes condiciones:

1) una descarga de estiércol, lodos o aguas residuales que el permisionario no pueda prevenir o controlar razonablemente como resultado de una condición catastrófica que no sea un evento de lluvia;
2) desbordamiento de estiércol, lodo o aguas residuales de un RCS como resultado de un evento de lluvia crónico/catastrófico; o
3) una descarga de lluvia crónica/catastrófica de una LMU que ocurre porque el permisionario toma medidas para desaguar el RCS si el RCS está en peligro de desbordamiento inminente.

and Highway 1.

Item 1: Physical Address of Project or Site:

Street Number and Name: 1261 County Road 188

City, State and Zip Code: Stephenville, TX 76401

Item 2: Site Location Description:

Location description: Click here to enter text.

City where the site is located or, if not in a city, what is the nearest city: Click here to enter text.

Zip Code where the site is located: Click here to enter text.

D. County or counties if more than 1: Erath

E. Latitude: 32.229166N Longitude: 98.07166W

F. Animal Type:

- ☒ Dairy-0241
- ☐ Beef Cattle- 0211
- ☐ Swine-0213
- ☐ Broiler-0251
- ☐ Laying Hens-0252
- ☐ Sheep/Goats-0214
- ☐ Auction-5154
- ☐ Other, specify: Click here to enter text.

G. Existing Maximum Number of Animals: 899 - of which none are milking

Proposed Maximum Number of Animals: 899 - of which none are milking

H. What is the total LMU acreage? 962

SECTION 11. MISCELLANEOUS INFORMATION

A. Did any person who was formerly employed by the TCEQ represent your company and get paid for service regarding this application? Yes ☐ No ☒
If yes, provide the name(s) of the former TCEQ employee(s): Click here to enter text.

B. Is the facility located on Indian Country Lands? Yes ☐ No ☒
If yes, do not submit this application. You must obtain authorization through EPA Region 6.

C. Is the production area located within the protection zone of a sole source drinking water supply? Yes ☐ No ☒

D. Is any permanent school fund land affected by this application? Yes ☐ No ☒

If yes, provide the location and foreseeable impacts and effects this application has on the land(s). Click here to enter text.

E. Delinquent Fees and Penalties:

Do you owe fees to the TCEQ? Yes ☐ No ☒

Do you owe any penalties to the TCEQ? Yes ☐ No ☒

If you answered yes to either of the above questions, provide the amount owed, the type of fee or penalty, and an identifying number.
Click here to enter text.

SECTION 12. AFFECTED LANDOWNER INFORMATION

This section must be completed if the application type is new or major amendment. If the application type is renewal or minor amendment, skip to Section 13.

A. Landowner map. Attach a landowner map or drawing, with scale, that includes the following. Each landowner should be designated by a letter or number on both the list and the map.
- The applicant's property boundaries, including onsite and offsite LMUs; and
- The property boundaries of all landowners within 500 feet of the applicant's property.

B. Landowner list. Attach a separate list of the landowners' names and mailing addresses. The list must be cross-referenced to the landowners map.

C. Landowner list media. Indicate the format of the landowners list.

☐ Read/Writeable CD

☒ 4 sets of mailing labels

D. Landowner data source. Provide the source of the landowners' names and mailing addresses.

Erath County Appraisal District

SECTION 13. ATTACHMENTS

A. All applications
- Supplemental Permit Information Form, if required by instructions on that form
- Current copy of tax records or deed showing ownership of the land
- Lease agreement, if LMUs are not owned by the applicant or co-applicant

B. New, Major amendment, or Renewal
- Completed Technical Information Packet (TCEQ-00760).

C. New and Major amendment
- Public Involvement Plan Form (TCEQ-20960)

D. Minor Amendment

Attach the following items if applicable:
- Current vicinity map, site map, runoff control map, and LMU map
- RCS design calculations

- Nutrient Management Plan or Land application rate calculations
- Other technical documents affected by the proposed amendment

SIGNATURE PAGE

If co-applicants are required, each co-applicant must submit an original, separate signature page.

Permit Number: WQ0005293000

Applicant: Kuiper Cows, LLC

I 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 30 Texas Administrative Code §305.44 to sign and submit this document, and can provide documentation in proof of such authorization upon request.

Signatory Name: Clemens Kuiper

Title: Member

Signature: _____ Date: 6/21/24

SUBSCRIBED AND SWORN to before me by the said Clemens Kuiper on this 21st day of June, 2024

My commission expires on the 8th day of October, 2024

COREY LYNN MULLIN
ID #126609838
My Commission Expires
October 08, 2024

_____
Notary Public

Erath
County, Texas

Franchise Tax Account Status

As of : 09/12/2022 14:30:31

This page is valid for most business transactions but is not sufficient for filings with the Secretary of State

KUIPER COWS, LLC

Texas Taxpayer Number	32041305171
Mailing Address	1865 PR 1233 HICO, TX 76457-0000
Right to Transact Business in Texas	ACTIVE
State of Formation	TX
Effective SOS Registration Date	02/25/2010
Texas SOS File Number	0801235462
Registered Agent Name	CLEMENS KUIPER
Registered Office Street Address	1865 PR 1233 HICO, TX 76457

Public Information Report

Public Information Report
KUIPER COWS, LLC
Report Year :2021

Information on this site is obtained from the most recent Public Information Report (PIR) processed by the Secretary of State (SOS). PIRs filed with annual franchise tax reports are forwarded to the SOS. After processing, the SOS sends the Comptroller an electronic copy of the information, which is displayed on this web site. The information will be updated as changes are received from the SOS.

You may order a copy of a Public Information Report from open.records@cpa.texas.gov or Comptroller of Public Accounts, Open Records Section, PO Box 13528, Austin, Texas 78711.

Title	Name and Address
MEMBER	**CLEMENS KUIPER** 1865 PR 1233 HICO, TX 76457

Land Lease Agreement

Lessor: Kuiper Clemens & Karin Truus Krikhaar
1865 Private Road 1233
Hico, TX 76457

Lessee: Kuiper Cows, LLC
1865 Private Road 1233
Hico, TX 76457

Subject Property Legal Description & Address:
Acres: 119.01, A0546 McCarty Jacob & A0776 JM Thomas
Situs Address: 43425; FM 2481 Erath County, TX;
(Geo ID R.0546.00020.00.0)
Total of 119.01 Leased Acres.

Term: 5 year renewable lease. Two years must be given by either party to terminate lease.

Price: Undisclosed

Lessee further agrees to leave property in as good or better condition, to abide by any and all state and federal laws, work with Lessee for other possible income opportunities. Lessee will indemnify Lessor of any and all liability due to farming activities.

The above terms have been reviewed and are in mutual agreement between both the lessee and the lessor on this date: 6/21/2024.

Lessor:_____ Lessor:_____

Lessee:_____

Land Lease Agreement

Lessor: Kuiper Clemens & Karin Truus Krikhaar
1865 Private Road 1233
Hico, TX 76457

Lessee: Kuiper Cows, LLC
1865 Private Road 1233
Hico, TX 76457

Subject Property Legal Description & Address:
Acres: 117.085, A0166 COFFIN A G;
Situs Address: CR 539 & CR 203 0 Erath County, TX;
(Geo ID R.0166.00021.00.0)
Total of 117.085 Leased Acres.

Term: 5 year renewable lease. Two years must be given by either party to terminate lease.

Price: Undisclosed

Lessee further agrees to leave property in as good or better condition, to abide by any and all state and federal laws, work with Lessee for other possible income opportunities. Lessee will indemnify Lessor of any and all liability due to farming activities.

The above terms have been reviewed and are in mutual agreement between both the lessee and the lessor on this date: 6/21/2024.

Lessor:_____ Lessor:_____

Lessee:_____

Land Lease Agreement

Lessor: Kuiper Clemens
1865 PR 1233
Hico, TX 76457

Lessee: Kuiper Cows, LLC
1865 PR 1233
Hico, TX 76457

Subject Property Legal Description & Address:
Acres: 44.50, A0602 O Dell Henry;
Situs Address: CR 208 0 Erath County, TX;
(Geo ID R.0602.00190.00.0)
Total of 44.50 Leased Acres.

Term: 5 year renewable lease. Two years must be given by either party to terminate lease.

Price: Undisclosed

Lessee further agrees to leave property in as good or better condition, to abide by any and all state and federal laws, work with Lessee for other possible income opportunities. Lessee will indemnify Lessor of any and all liability due to farming activities.

The above terms have been reviewed and are in mutual agreement between both the lessee and the lessor on this date: 6/21/2024.

Lessor: _____

Lessee: _____

Map

Property Details

Account

Property ID:	R000026753	**Geographic ID:**	R.0825.00032.00.0
Type:	Real	**Zoning:**	
Property Use:		**Condo:**	
Location			
Situs Address:	1375 CR186		
Map ID:	18-16-1	**Mapsco:**	
Legal Description:	Acres 127.430, A0825 WOODY HENRY T; DAIRY BARN OUT & MH, MODEL 14X60, NO LABEL # FOUND		
Abstract/Subdivision:			
Owner			
Name:	KUIPER COWS LLC		
Agent:			
Mailing Address:	1865 PR1233 HICO, TX 76457		
% Ownership:	100.0%		
Exemptions:	For privacy reasons not all exemptions are shown online.		

Property Values

Improvement Homesite Value:	$11,320 (+)
Improvement Non-Homesite Value:	$10,730 (+)
Land Homesite Value:	$0 (+)
Land Non-Homesite Value:	$0 (+)
Agricultural Market Valuation:	$993,950 (+)
Market Value:	$1,016,000 (=)
Agricultural Value Loss:	$970,500 (-)
Appraised Value:	$1,016,000 (=)
Homestead Cap Loss:	$0 (-)
Assessed Value:	$45,500
Ag Use Value:	$23,450

VALUES DISPLAYED ARE 2024 PRELIMINARY VALUES AND ARE SUBJECT TO CHANGE PRIOR TO CERTIFICATION.

Information provided for research purposes only. Legal descriptions and acreage amounts are for appraisal district use only and should be verified prior to using for legal purpose and or documents. Please contact the Appraisal District to verify all information for accuracy.

Property Taxing Jurisdiction

Owner: KUIPER COWS LLC **%Ownership:** 100.0%

Entity	Description	Market Value	Taxable Value
072	ERATH COUNTY	$1,016,000	$45,500
903	STEPHENVILLE ISD	$1,016,000	$45,500
MTD	MIDDLE TRINITY WATER	$1,016,000	$45,500
RER	ERATH ROAD & BRIDGE	$1,016,000	$45,500

Property Improvement - Building

Type: DBO **State Code:** E **Living Area:** 1,732.00 sqft **Value:** $4,409

Type	Description	Year Built
DBO	DAIRY BARN OUT	
CHP	HOLD PEN COVERED	
P	COVERPORCH	

Type: SHE3 **State Code:** E **Living Area:** 520.00 sqft **Value:** $2,606

Type	Description	Year Built
SHE3	3SIDE SHED	
WH	WELLHOUSE	
STG	STRG BUILDING	
GBN	GRAINBN NO	1990
GBY	GRAINBN YS	1987
GBY	GRAINBN YS	1987
STG	STRG BUILDING	2011

Type: AS **State Code:** E **Living Area:** 200.00 sqft **Value:** $6,467

Type	Description	Year Built
AS	ANIMALSHADE	1990
AS	ANIMALSHADE	1990
AS	ANIMALSHADE	1990
AS	ANIMALSHADE	1990

AS	ANIMALSHADE	1990
FSL	LOCKED FEED STANCHION	2001
AS	ANIMALSHADE	2011
AS	ANIMALSHADE	2011
AS	ANIMALSHADE	2011
AS	ANIMALSHADE	2011
AS	ANIMALSHADE	2011

Type: MA **State Code:** E1 **Living Area:** 840.00 sqft **Value:** $8,562

Type	Description	Year Built
MA	MAIN AREA	1980
MA	MAIN AREA	2021

Property Land

Type	Description	Acreage	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
SAE		127.4300	5,550,851.00	0.00	0.00	$993,954	$23,445

Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap Loss	Assessed
2024	$22,050	$993,950	$23,450	$1,016,000	$0	$45,500
2023	$21,360	$1,146,870	$22,900	$1,168,230	$0	$44,260
2022	$20,980	$892,010	$27,480	$912,990	$0	$48,460
2021	$21,690	$598,920	$29,460	$620,610	$0	$51,150
2020	$21,690	$560,690	$27,940	$582,380	$0	$49,630
2019	$21,170	$509,720	$28,010	$530,890	$0	$48,180
2018	$21,170	$496,010	$27,760	$517,180	$0	$48,930
2017	$20,500	$426,800	$27,790	$447,300	$0	$48,290
2016	$20,500	$395,830	$26,210	$416,330	$0	$46,710
2015	$13,190	$395,830	$21,030	$409,020	$0	$34,220
2014	$13,190	$390,350	$18,860	$403,540	$0	$32,050

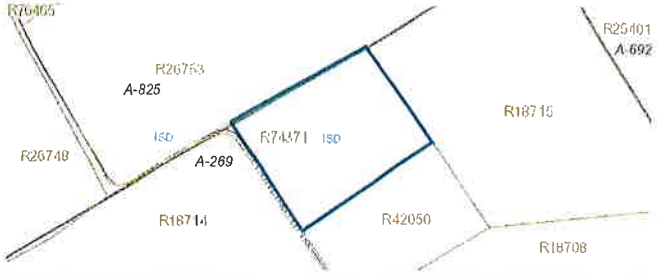
Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
4/1/2010	LI		HUCKABEE JAMES & WANDA ET AL	KUIPER COWS LLC			2010-02719
1/7/2009			HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL			
12/22/2008			HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL			
1/3/2006			HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL	1316	267-290	2/3/2006
12/27/2006			HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL	1315	358-361	2/3/2006

12/29/1999	HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL	1005	105		

11/1/2005	HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL	1264	432	2/3/2006
1/3/2002	HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL	1087	164	
1/3/2002	HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL	1087	156	
1/3/2002	HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL	1087	148	
12/27/2001	HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL	1078	212	
12/27/2001	HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL	1078	202	
12/27/2001	HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL	1078	194	
1/3/2000	HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL	1005	137	
1/3/2000	HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL	1005	129	
1/3/2000	HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL	1005	121	
12/29/1999	HUCKABEE JAMES & WANDA ET AL	HUCKABEE JAMES & WANDA ET AL	1005	113	
12/29/1999	HUCKABEE JAMES R	HUCKABEE JAMES & WANDA ET AL	1005	97	

Map



Property Details

Account

Property ID:	R000074371	**Geographic ID:**	R.0269.00052.00.0
Type:	Real	**Zoning:**	
Property Use:		**Condo:**	
Location			
Situs Address:	CR188		
Map ID:	18-16-1	**Mapsco:**	
Legal Description:	Acres 26.130, A0269 FOSTER IRA H;		
Abstract/Subdivision:			
Owner			
Name:	KUIPER COWS LLC		
Agent:			
Mailing Address:	1865 PR1233 HICO, TX 76457		
% Ownership:	100.0%		
Exemptions:	For privacy reasons not all exemptions are shown online.		

Property Values

Improvement Homesite Value:	$0 (+)
Improvement Non-Homesite Value:	$0 (+)
Land Homesite Value:	$0 (+)
Land Non-Homesite Value:	$0 (+)
Agricultural Market Valuation:	$203,810 (+)
Market Value:	$203,810 (=)
Agricultural Value Loss:	$199,730 (-)
Appraised Value:	$203,810 (=)
Homestead Cap Loss:	$0 (-)
Assessed Value:	$4,080
Ag Use Value:	$4,080

VALUES DISPLAYED ARE 2024 PRELIMINARY VALUES AND ARE SUBJECT TO CHANGE PRIOR TO CERTIFICATION.

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Property Taxing Jurisdiction

Owner: KUIPER COWS LLC **%Ownership:** 100.0%

Entity	Description	Market Value	Taxable Value
072	ERATH COUNTY	$203,810	$4,080
903	STEPHENVILLE ISD	$203,810	$4,080
MTD	MIDDLE TRINITY WATER	$203,810	$4,080
RER	ERATH ROAD & BRIDGE	$203,810	$4,080

Property Land

Type	Description	Acreage	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
SAE		26.1300	1,138,223.00	0.00	0.00	$203,814	$4,076

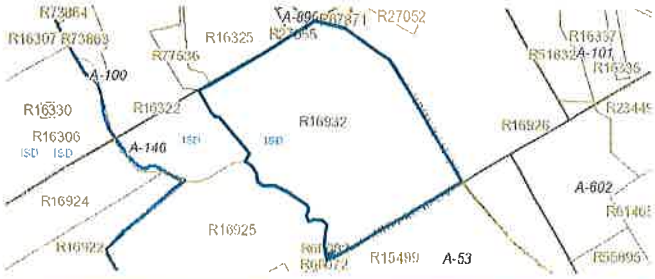
Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap Loss	Assessed
2024	$0	$203,810	$4,080	$203,810	$0	$4,080
2023	$0	$235,170	$4,080	$235,170	$0	$4,080
2022	$0	$182,910	$4,440	$182,910	$0	$4,440
2021	$0	$122,810	$4,860	$122,810	$0	$4,860
2020	$0	$114,970	$4,600	$114,970	$0	$4,600
2019	$0	$104,520	$4,570	$104,520	$0	$4,570
2018	$0	$93,960	$4,570	$93,960	$0	$4,570
2017	$0	$76,660	$4,570	$76,660	$0	$4,570
2016	$0	$67,210	$4,310	$67,210	$0	$4,310
2015	$0	$67,210	$4,310	$67,210	$0	$4,310
2014	$0	$62,990	$3,870	$62,990	$0	$3,870

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
4/1/2010	L		HUCKABEE JAMES & WANDA ET AL	KUIPER COWS LLC			2010-02719

Map



Property Details

Account

Property ID:	R000016932	**Geographic ID:**	R.0146.00110.00.0
Type:	Real	**Zoning:**	
Property Use:		**Condo:**	

Location

Situs Address:	6131 CR230
Map ID:	18-16-4 **Mapsco:**
Legal Description:	Acres 176.700, A0146 CHRISTOPHER JOHN;, HOUSE & 2 MOBIEL HOMES, LABEL TEX0406498, MAKE FLEETWOOD HOMES, SERIAL TXFLBR1AH131211351, MODEL BRIARWOOD, MODEL 18X76, YR 1987
Abstract/Subdivision:	

Owner

Name:	KUIPER COWS LLC
Agent:	
Mailing Address:	1865 PR1233 HICO, TX 76457
% Ownership:	100.0%
Exemptions:	For privacy reasons not all exemptions are shown online.

Property Values

Improvement Homesite Value:	$107,050 (+)
Improvement Non-Homesite Value:	$33,470 (+)
Land Homesite Value:	$7,800 (+)
Land Non-Homesite Value:	$7,800 (+)
Agricultural Market Valuation:	$1,378,260 (+)
Market Value:	$1,534,380 (=)
Agricultural Value Loss:	$1,357,920 (-)
Appraised Value:	$1,534,380 (=)
Homestead Cap Loss:	$0 (-)
Assessed Value:	$176,460
Ag Use Value:	$20,340

VALUES DISPLAYED ARE 2024 PRELIMINARY VALUES AND ARE SUBJECT TO CHANGE PRIOR TO CERTIFICATION.

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Property Taxing Jurisdiction

Owner: KUIPER COWS LLC **%Ownership:** 100.0%

Entity	Description	Market Value	Taxable Value
072	ERATH COUNTY	$1,534,380	$176,460
901	THREE WAY ISD	$1,534,380	$176,460
MTD	MIDDLE TRINITY WATER	$1,534,380	$176,460
RER	ERATH ROAD & BRIDGE	$1,534,380	$176,460

Property Improvement - Building

Type: MA **State Code:** E **Living Area:** 2,060.00 sqft **Value:** $107,051

Type	Description	Year Built
MA	MAIN AREA	
P	COVERPORCH	
STG	STRG BUILDING	
WH	WELLHOUSE	
WH	WELLHOUSE	1984
P	COVERPORCH	2018
SHED	SHED	2021
UTIL1	UTILITIES 1	2023

Type: MA **Living Area:** 1,368.00 sqft **Value:** $33,472

Type	Description	Year Built
MA	MAIN AREA	1987
MA	MAIN AREA	1984
UTIL2	UTILITIES 2	2023

Property Land

Type	Description	Acreage	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
SAE		176.7000	7,697,052.00	0.00	0.00	$1,378,260	$20,343
SAE		1.0000	43,560.00	0.00	0.00	$7,800	$0

SAE	1.0000	43,560.00	0.00	0.00	$7,800	$0

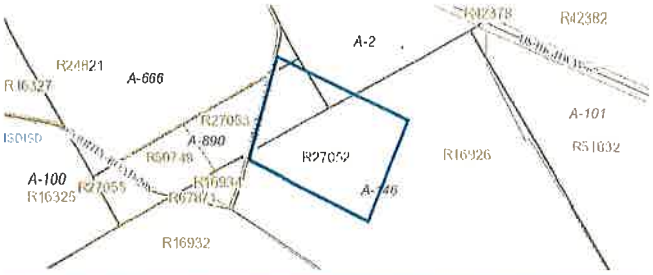
Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap Loss	Assessed
2024	$140,520	$1,393,860	$20,340	$1,534,380	$0	$176,460
2023	$84,630	$1,665,300	$16,370	$1,749,930	$0	$176,000
2022	$87,090	$1,281,900	$19,060	$1,368,990	$0	$151,150
2021	$81,000	$858,990	$21,890	$939,990	$0	$131,390
2020	$75,250	$805,980	$22,510	$881,230	$0	$126,260
2019	$68,900	$735,300	$22,750	$804,200	$0	$120,150
2018	$51,200	$656,950	$22,820	$708,150	$0	$90,020
2017	$47,740	$540,160	$24,650	$587,900	$0	$88,390
2016	$45,910	$431,870	$20,730	$477,780	$0	$81,640
2015	$45,910	$431,870	$21,580	$477,780	$0	$82,490
2014	$45,910	$405,950	$19,730	$451,860	$0	$80,640

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
9/2/2016	LI		WALKER-NIXON DONNA ET AL	KUIPER COWS LLC			2016-04802
9/27/2007			PUTTY LAMONA IND EXE	WALKER-NIXON DONNA ET AL	1355	437	
9/4/2007			WALKER D C	PUTTY LAMONA IND EXE	190	849	
2/11/1983			DUDLEY VIRTIE JOINER	WALKER VERLYN	612	570	

Map



Property Details

Account

Property ID:	R000027052	**Geographic ID:**	R.0890.00010.00.0
Type:	Real	**Zoning:**	
Property Use:		**Condo:**	

Location

Situs Address:	CR206
Map ID:	18-16-4 **Mapsco:**
Legal Description:	Acres 20.000, A0890 RICHARDSON T; A0002 G L ADDISON; A0146 J CHRISTOPHER
Abstract/Subdivision:	

Owner

Name:	KUIPER COWS LLC
Agent:	
Mailing Address:	1865 PR1233 HICO, TX 76457
% Ownership:	100.0%
Exemptions:	For privacy reasons not all exemptions are shown online.

Property Values

Improvement Homesite Value:	$0 (+)
Improvement Non-Homesite Value:	$0 (+)
Land Homesite Value:	$0 (+)
Land Non-Homesite Value:	$0 (+)
Agricultural Market Valuation:	$156,000 (+)
Market Value:	$156,000 (=)
Agricultural Value Loss:	$150,940 (-)
Appraised Value:	$156,000 (=)
Homestead Cap Loss:	$0 (-)
Assessed Value:	$5,060
Ag Use Value:	$5,060

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Property Taxing Jurisdiction

Owner: KUIPER COWS LLC %Ownership: 100.0%

Entity	Description	Market Value	Taxable Value
072	ERATH COUNTY	$156,000	$5,060
901	THREE WAY ISD	$156,000	$5,060
MTD	MIDDLE TRINITY WATER	$156,000	$5,060
RER	ERATH ROAD & BRIDGE	$156,000	$5,060

Property Land

Type	Description	Acreage	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
SAE		20.0000	871,200.00	0.00	0.00	$156,000	$5,060

Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap Loss	Assessed
2024	$0	$156,000	$5,060	$156,000	$0	$5,060
2023	$0	$180,000	$4,120	$180,000	$0	$4,120
2022	$0	$140,000	$6,440	$140,000	$0	$6,440
2021	$0	$94,000	$6,740	$94,000	$0	$6,740
2020	$0	$88,000	$6,700	$88,000	$0	$6,700
2019	$0	$80,000	$2,340	$80,000	$0	$2,340
2018	$0	$80,000	$2,320	$80,000	$0	$2,320
2017	$0	$180,000	$2,160	$180,000	$0	$2,160
2016	$0	$15,690	$560	$15,690	$0	$560
2015	$0	$15,690	$560	$15,690	$0	$560
2014	$0	$15,690	$480	$15,690	$0	$480

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
2/19/2019			DAILEY DALEN	KUIPER COWS LLC			2019-00863
4/17/2017			FRALEY JOHN D	DAILEY DALEN			2017-01910
1/29/2008			FRALEY JOHN D	FRALEY JOHN D	1368	380	
10/4/1991			CUNNINGHAM JOHN H & E LILLIAN	FRALEY JOHN D	829	950	

Map

Property Details

Account

Property ID:	R000016926	**Geographic ID:**	R.0146.00060.00.0
Type:	Real	**Zoning:**	
Property Use:		**Condo:**	

Location

Situs Address:	18954 US67
Map ID:	18-16-4 **Mapsco:**
Legal Description:	Acres 243.380, A0146 CHRISTOPHER JOHN; A0002 G L ADDISON; A0053 N P BROWNING; A0101 R A BAKER; A0602 O HENRY; 2 HOUSES, BARN & MH SITE (KUIPER COWS)
Abstract/Subdivision:	

Owner

Name:	KUIPER COWS LLC
Agent:	
Mailing Address:	1865 PR1233 HICO, TX 76457
% Ownership:	100.0%
Exemptions:	For privacy reasons not all exemptions are shown online.

Property Values

Improvement Homesite Value:	$118,640 (+)
Improvement Non-Homesite Value:	$83,840 (+)
Land Homesite Value:	$7,800 (+)
Land Non-Homesite Value:	$7,800 (+)
Agricultural Market Valuation:	$1,882,760 (+)
Market Value:	$2,100,840 (=)
Agricultural Value Loss:	$1,836,280 (-)
Appraised Value:	$2,100,840 (=)
Homestead Cap Loss:	$0 (-)
Assessed Value:	$264,560
Ag Use Value:	$46,480

VALUES DISPLAYED ARE 2024 PRELIMINARY VALUES AND ARE SUBJECT TO CHANGE PRIOR TO CERTIFICATION.

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Property Taxing Jurisdiction

Owner: KUIPER COWS LLC **%Ownership:** 100.0%

Entity	Description	Market Value	Taxable Value
072	ERATH COUNTY	$2,100,840	$264,560
901	THREE WAY ISD	$2,100,840	$264,560
MTD	MIDDLE TRINITY WATER	$2,100,840	$264,560
RER	ERATH ROAD & BRIDGE	$2,100,840	$264,560

Property Improvement - Building

Type: BARN **State Code:** E **Living Area:** 1,728.00 sqft **Value:** $12,110

Type	Description	Year Built
BARN	BARN	
STG	STRG BUILDING	
GBN	GRAINBN NO	1990
GBN	GRAINBN NO	1990
ASHE	SHED ATTACHED	
ASHE	SHED ATTACHED	

Type: MA **State Code:** E **Living Area:** 1,398.00 sqft **Value:** $118,053

Type	Description	Year Built
MA	MAIN AREA	1951
P	COVERPORCH	1951
WH	WELLHOUSE	1951
SHOP	SHOP	1951
STG	STRG BUILDING	1951
UTIL1	UTILITIES 1	2023

Type: MA **State Code:** E **Living Area:** 838.00 sqft **Value:** $72,318

Type	Description	Year Built
MA	MAIN AREA	1962
P	COVERPORCH	1962

CPD	COVPATIO DETACHED	2008
DG2B	2CAR BRICK GARAGE DETACHED	1962
UTIL2	UTILITIES 2	2023

Property Land

Type	Description	Acreage	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
SAE		241.3800	10,514,513.00	0.00	0.00	$1,882,764	$46,478
SAE		1.0000	43,560.00	0.00	0.00	$7,800	$0
SAE		1.0000	43,560.00	0.00	0.00	$7,800	$0

Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap Loss	Assessed
2024	$202,480	$1,898,360	$46,480	$2,100,840	$0	$264,560
2023	$131,320	$2,247,420	$37,360	$2,378,740	$0	$243,680
2022	$128,750	$1,734,660	$54,110	$1,863,410	$0	$227,860
2021	$118,860	$1,174,290	$57,720	$1,293,150	$0	$221,080
2020	$110,990	$1,102,170	$58,340	$1,213,160	$0	$213,830
2019	$98,800	$1,006,020	$28,120	$1,104,820	$0	$171,420
2018	$13,910	$396,950	$12,560	$410,860	$0	$38,970
2017	$11,550	$322,660	$11,690	$334,210	$0	$35,740
2016	$12,350	$308,290	$13,180	$320,640	$0	$33,030
2015	$12,100	$308,290	$13,180	$320,390	$0	$32,780
2014	$12,100	$285,390	$11,210	$297,490	$0	$30,810

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
1/7/2019	LI		FRALEY JOHN D (CLIFFORD)	KUIPER COWS LLC			2019-00160
1/29/2008			FRALEY JOHN D	FRALEY JOHN D	1368	380	
10/4/1991			CUNNINGHAM JOHN H & E LILLIAN	FRALEY JOHN D	829	950	
1/1/1968			CUNNINGHAM JOHN H & E LILLIAN	FRALEY JOHN D	818	577	
1/1/1968			CUNNINGHAM JOHN H MR & MRS	CUNNINGHAM JOHN H & E LILLIAN			

Map

Property Details

Account

Property ID:	R000075568	**Geographic ID:**	R.0770.00010.00.0
Type:	Real	**Zoning:**	
Property Use:		**Condo:**	
Location			
Situs Address:	CR539		
Map ID:	18-17-3	**Mapsco:**	
Legal Description:	Acres 42.690, A0770 FRANZ T SCHAKKE		
Abstract/Subdivision:			
Owner			
Name:	KUIPER COWS LLC		
Agent:			
Mailing Address:	1865 PR1233 HICO, TX 76457		
% Ownership:	100.0%		
Exemptions:	For privacy reasons not all exemptions are shown online.		

Property Values

Improvement Homesite Value:	$0 (+)
Improvement Non-Homesite Value:	$0 (+)
Land Homesite Value:	$0 (+)
Land Non-Homesite Value:	$0 (+)
Agricultural Market Valuation:	$448,250 (+)
Market Value:	$448,250 (=)
Agricultural Value Loss:	$441,590 (-)
Appraised Value:	$448,250 (=)
Homestead Cap Loss:	$0 (-)
Assessed Value:	$6,660
Ag Use Value:	$6,660

VALUES DISPLAYED ARE 2024 PRELIMINARY VALUES AND ARE SUBJECT TO CHANGE PRIOR TO CERTIFICATION.

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Property Taxing Jurisdiction

Owner: KUIPER COWS LLC **%Ownership:** 100.0%

Entity	Description	Market Value	Taxable Value
072	ERATH COUNTY	$448,250	$6,660
901	THREE WAY ISD	$448,250	$6,660
MTD	MIDDLE TRINITY WATER	$448,250	$6,660
RER	ERATH ROAD & BRIDGE	$448,250	$6,660

Property Land

Type	Description	Acreage	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
SAE		42.6900	1,859,576.00	0.00	0.00	$448,245	$6,660

Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap Loss	Assessed
2024	$0	$448,250	$6,660	$448,250	$0	$6,660
2023	$0	$490,940	$6,660	$490,940	$0	$6,660
2022	$0	$490,940	$7,260	$490,940	$0	$7,260
2021	$0	$341,520	$7,940	$341,520	$0	$7,940
2020	$0	$298,830	$7,510	$298,830	$0	$7,510
2019	$0	$298,830	$7,470	$298,830	$0	$7,470
2018	$0	$256,140	$7,470	$256,140	$0	$7,470
2017	$0	$213,450	$7,470	$213,450	$0	$7,470
2016	$0	$170,760	$7,040	$170,760	$0	$7,040
2015	$0	$170,760	$7,040	$170,760	$0	$7,040

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
6/19/2015	L		PEARSON DANA	KUIPER COWS LLC			2015-03382

Map

Property Details

Account

Property ID:	R000075703	**Geographic ID:**	R.0166.00024.00.0
Type:	Real	**Zoning:**	
Property Use:		**Condo:**	

Location

Situs Address:	CR539
Map ID:	17-17-1
Mapsco:	
Legal Description:	Acres 106.800, A0166 COFFIN A G
Abstract/Subdivision:	

Owner

Name:	KUIPER COWS LLC
Agent:	
Mailing Address:	1865 PR1233 HICO, TX 76457
% Ownership:	100.0%
Exemptions:	For privacy reasons not all exemptions are shown online.

Property Values

Improvement Homesite Value:	$0 (+)
Improvement Non-Homesite Value:	$0 (+)
Land Homesite Value:	$0 (+)
Land Non-Homesite Value:	$0 (+)
Agricultural Market Valuation:	$534,000 (+)
Market Value:	$534,000 (=)
Agricultural Value Loss:	$511,800 (-)
Appraised Value:	$534,000 (=)
Homestead Cap Loss:	$0 (-)
Assessed Value:	$22,200
Ag Use Value:	$22,200

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Property Taxing Jurisdiction

Owner: KUIPER COWS LLC **%Ownership:** 100.0%

Entity	Description	Market Value	Taxable Value
072	ERATH COUNTY	$534,000	$22,200
901	THREE WAY ISD	$534,000	$22,200
MTD	MIDDLE TRINITY WATER	$534,000	$22,200
RER	ERATH ROAD & BRIDGE	$534,000	$22,200

Property Land

Type	Description	Acreage	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
SAE		106.8000	4,652,208.00	0.00	0.00	$534,000	$22,200

Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap Loss	Assessed
2024	$0	$534,000	$22,200	$534,000	$0	$22,200
2023	$0	$961,200	$17,920	$961,200	$0	$17,920
2022	$0	$747,600	$26,590	$747,600	$0	$26,590
2021	$0	$501,960	$28,230	$501,960	$0	$28,230
2020	$0	$469,920	$28,380	$469,920	$0	$28,380
2019	$0	$427,200	$28,760	$427,200	$0	$28,760
2018	$0	$380,800	$14,200	$380,800	$0	$14,200
2017	$0	$308,840	$16,020	$308,840	$0	$16,020
2016	$0	$264,720	$16,660	$264,720	$0	$16,660

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
11/17/2015	L		GREENWAY SUE	KUIPER COWS LLC			2015-07250

Map

Property Details

Account

Property ID:	R000072770	**Geographic ID:**	R.0166.00022.00.0
Type:	Real	**Zoning:**	
Property Use:		**Condo:**	
Location			
Situs Address:	CR539		
Map ID:	17-17-1	**Mapsco:**	
Legal Description:	Acres 73.490, A0166 COFFIN A G & A0770 T S FRANZ		
Abstract/Subdivision:			
Owner			
Name:	KUIPER COWS LLC		
Agent:			
Mailing Address:	1865 PR1233 HICO, TX 76457		
% Ownership:	100.0%		
Exemptions:	For privacy reasons not all exemptions are shown online.		

Property Values

Improvement Homesite Value:	$950 (+)
Improvement Non-Homesite Value:	$0 (+)
Land Homesite Value:	$0 (+)
Land Non-Homesite Value:	$0 (+)
Agricultural Market Valuation:	$367,450 (+)
Market Value:	$368,400 (=)
Agricultural Value Loss:	$350,970 (-)
Appraised Value:	$368,400 (=)
Homestead Cap Loss:	$0 (-)
Assessed Value:	$17,236
Ag Use Value:	$16,480

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Property Taxing Jurisdiction

Owner: KUIPER COWS LLC **%Ownership:** 100.0%

Entity	Description	Market Value	Taxable Value
072	ERATH COUNTY	$368,400	$17,236
901	THREE WAY ISD	$368,400	$17,236
MTD	MIDDLE TRINITY WATER	$368,400	$17,236
RER	ERATH ROAD & BRIDGE	$368,400	$17,236

Property Improvement - Building

Type: SHED **Living Area:** 63.00 sqft **Value:** $945

Type	Description	Year Built
SHED	SHED	2018

Property Land

Type	Description	Acreage	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
SAE		73.4900	3,201,224.00	0.00	0.00	$367,450	$16,475

Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap Loss	Assessed
2024	$950	$367,450	$16,480	$368,400	$0	$17,236
2023	$630	$661,410	$13,520	$662,040	$0	$14,150
2022	$630	$514,430	$20,700	$515,060	$0	$21,330
2021	$500	$345,400	$21,810	$345,900	$0	$22,310
2020	$500	$323,360	$21,570	$323,860	$0	$22,070
2019	$340	$293,960	$22,040	$294,300	$0	$22,380
2018	$0	$258,220	$9,740	$258,220	$0	$9,740
2017	$0	$207,170	$10,940	$207,170	$0	$10,940
2016	$0	$177,580	$11,370	$177,580	$0	$11,370
2015	$0	$196,600	$12,520	$196,600	$0	$12,520
2014	$0	$182,710	$11,180	$182,710	$0	$11,180

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
11/3/2015	L		BROWN DAVID LEON JR	KUIPER COWS LLC			2015-06238
7/26/2005			BROWN DAVID LEON JR	BROWN DAVID LEON JR	1397	320	
7/26/2005			GREENWAY SUE	BROWN DAVID LEON JR	1237	1087	

Map

Property Details

Account

Property ID:	R000072740	**Geographic ID:**	R.0166.00021.00.0
Type:	Real	**Zoning:**	
Property Use:		**Condo:**	

Location

Situs Address:	CR539 & CR203
Map ID:	17-17-1
Mapsco:	
Legal Description:	Acres 117.085, A0166 COFFIN A G;
Abstract/Subdivision:	

Owner

Name:	KUIPER CLEMENS & KARIN TRUUS KRIKHAAR
Agent:	
Mailing Address:	1865 PR1233 HICO, TX 76457
% Ownership:	100.0%
Exemptions:	For privacy reasons not all exemptions are shown online.

Property Values

Improvement Homesite Value:	$950 (+)
Improvement Non-Homesite Value:	$0 (+)
Land Homesite Value:	$0 (+)
Land Non-Homesite Value:	$0 (+)
Agricultural Market Valuation:	$585,430 (+)
Market Value:	$586,380 (=)
Agricultural Value Loss:	$561,190 (-)
Appraised Value:	$586,380 (=)
Homestead Cap Loss:	$0 (-)
Assessed Value:	$24,996
Ag Use Value:	$24,240

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Property Taxing Jurisdiction

Owner: KUIPER CLEMENS & KARIN TRUUS KRIKHAAR **%Ownership:** 100.0%

Entity	Description	Market Value	Taxable Value
072	ERATH COUNTY	$586,380	$24,996
901	THREE WAY ISD	$586,380	$24,996
MTD	MIDDLE TRINITY WATER	$586,380	$24,996
RER	ERATH ROAD & BRIDGE	$586,380	$24,996

Property Improvement - Building

Type: SHED **Living Area:** 63.00 sqft **Value:** $945

Type	Description	Year Built
SHED	SHED	2018

Property Land

Type	Description	Acreage	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
SAE		117.0850	5,100,223.00	0.00	0.00	$585,425	$24,240

Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap Loss	Assessed
2024	$950	$585,430	$24,240	$586,380	$0	$24,996
2023	$630	$1,053,770	$19,560	$1,054,400	$0	$20,190
2022	$630	$819,600	$28,990	$820,230	$0	$29,620
2021	$500	$550,300	$30,790	$550,800	$0	$31,290
2020	$500	$515,170	$30,970	$515,670	$0	$31,470
2019	$340	$468,340	$31,380	$468,680	$0	$31,720
2018	$0	$429,800	$38,870	$429,800	$0	$38,870
2017	$0	$355,840	$40,980	$355,840	$0	$40,980
2016	$0	$305,000	$40,510	$305,000	$0	$40,510
2015	$0	$305,000	$42,390	$305,000	$0	$42,390
2014	$0	$289,590	$42,500	$289,590	$0	$42,500

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
1/2/2014	L		SULLIVAN JOHN MICHAEL	KUIPER CLEMENS & KARIN TRUUS KRIKHAAR			2014-00127
7/20/2005	L		GREENWAY SUE	SULLIVAN JOHN MICHAEL	1233	474	

Map

Property Details

Account

Property ID:	R000016893	**Geographic ID:**	R.0143.00100.00.0
Type:	Real	**Zoning:**	
Property Use:		**Condo:**	

Location

Situs Address:	2278 CR236
Map ID:	17-16-4 **Mapsco:**
Legal Description:	Acres 99.870, A0143 CHAMBERLAIN WILLARD; HOUSE & MH SITE (JOHNNY WATSON)
Abstract/Subdivision:	

Owner

Name:	KUIPER COWS LLC
Agent:	
Mailing Address:	1865 PR1233 HICO, TX 76457
% Ownership:	100.0%
Exemptions:	For privacy reasons not all exemptions are shown online.

Property Values

Improvement Homesite Value:	$64,800 (+)
Improvement Non-Homesite Value:	$0 (+)
Land Homesite Value:	$7,800 (+)
Land Non-Homesite Value:	$0 (+)
Agricultural Market Valuation:	$771,190 (+)
Market Value:	$843,790 (=)
Agricultural Value Loss:	$755,770 (-)
Appraised Value:	$843,790 (=)
Homestead Cap Loss:	$0 (-)
Assessed Value:	$88,020
Ag Use Value:	$15,420

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Property Taxing Jurisdiction

Owner: KUIPER COWS LLC **%Ownership:** 100.0%

Entity	Description	Market Value	Taxable Value
072	ERATH COUNTY	$843,790	$88,020
HM	HICO EMERGENCY SERVI	$843,790	$88,020
MTD	MIDDLE TRINITY WATER	$843,790	$88,020
RER	ERATH ROAD & BRIDGE	$843,790	$88,020
SHI	HICO ISD	$843,790	$88,020

Property Improvement - Building

Type: MA **Living Area:** 1,120.00 sqft **Value:** $61,066

Type	Description	Year Built
MA	MAIN AREA	1920
P	COVERPORCH	1920
SHED	SHED	1920
BARN	BARN	1920
WH	WELLHOUSE	1920
UTIL1	UTILITIES 1	2023

Type: MA State Code: E1 **Living Area:** 980.00 sqft **Value:** $3,736

Type	Description	Year Built
MA	MAIN AREA	1981
WD	WOOD DECK	2015
CKHS	CHICKEN HS	1981

Property Land

Type	Description	Acreage	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
SAE		98.8700	4,306,777.00	0.00	0.00	$771,186	$15,424
SAE		1.0000	43,560.00	0.00	0.00	$7,800	$0

Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap Loss	Assessed
2024	$64,800	$778,990	$15,420	$843,790	$0	$88,020
2023	$34,050	$1,028,700	$15,420	$1,062,750	$0	$89,470
2022	$33,780	$766,530	$16,810	$800,310	$0	$75,590
2021	$23,650	$517,850	$18,200	$541,500	$0	$70,350
2020	$23,650	$459,130	$17,230	$482,780	$0	$69,380
2019	$20,800	$419,980	$17,130	$440,780	$0	$66,430
2018	$20,800	$380,550	$17,130	$401,350	$0	$66,430
2017	$8,470	$301,380	$17,220	$309,850	$0	$38,190
2016	$3,080	$255,110	$16,240	$258,190	$0	$26,820
2015	$0	$255,110	$16,240	$255,110	$0	$23,740
2014	$0	$239,220	$14,570	$239,220	$0	$22,070

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
6/15/2018	LI		WATSON JOHNNY R	KUIPER COWS LLC			2018-03399
10/28/1992	L		GAINES GEORGE & LLOYD THORNTON	WATSON JOHNNY R	833	747	
7/23/1996			ST; CLAIR-HARVISON-DELP	GAINES GEORGE & LLOYD THORNTON	833	743	

Map

Property Details

Account			
Property ID:	R000023435	**Geographic ID:**	R.0602.00200.00.0
Type:	Real	**Zoning:**	
Property Use:		**Condo:**	
Location			
Situs Address:	FM2481		
Map ID:	18-16-4	**Mapsco:**	
Legal Description:	Acres 103.600, A0602 O DELL HENRY;		
Abstract/Subdivision:	/		
Owner			
Name:	KUIPER COWS LLC		
Agent:			
Mailing Address:	1865 PR1233 HICO, TX 76457		
% Ownership:	100.0%		
Exemptions:	For privacy reasons not all exemptions are shown online.		

Property Values

Improvement Homesite Value:	$0 (+)
Improvement Non-Homesite Value:	$0 (+)
Land Homesite Value:	$0 (+)
Land Non-Homesite Value:	$0 (+)
Agricultural Market Valuation:	$808,080 (+)
Market Value:	$808,080 (=)
Agricultural Value Loss:	$781,780 (-)
Appraised Value:	$808,080 (=)
Homestead Cap Loss:	$0 (-)
Assessed Value:	$26,300
Ag Use Value:	$26,300

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Property Taxing Jurisdiction

Owner: KUIPER COWS LLC %Ownership: 100.0%

Entity	Description	Market Value	Taxable Value
072	ERATH COUNTY	$808,080	$26,300
901	THREE WAY ISD	$808,080	$26,300
MTD	MIDDLE TRINITY WATER	$808,080	$26,300
RER	ERATH ROAD & BRIDGE	$808,080	$26,300

Property Land

Type	Description	Acreage	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
SAE		103.6000	4,512,816.00	0.00	0.00	$808,080	$26,302

Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap Loss	Assessed
2024	$0	$808,080	$26,300	$808,080	$0	$26,300
2023	$0	$932,400	$24,740	$932,400	$0	$24,740
2022	$0	$725,200	$11,930	$725,200	$0	$11,930
2021	$0	$486,920	$13,590	$486,920	$0	$13,590
2020	$0	$455,840	$12,630	$455,840	$0	$12,630
2019	$0	$414,400	$13,280	$414,400	$0	$13,280
2018	$0	$354,370	$12,530	$354,370	$0	$12,530
2017	$0	$282,300	$11,910	$282,300	$0	$11,910
2016	$0	$241,970	$11,630	$241,970	$0	$11,630
2015	$0	$241,970	$11,630	$241,970	$0	$11,630
2014	$0	$224,800	$10,040	$224,800	$0	$10,040

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
7/14/2022			2022 DUKES PLACE LLC	KUIPER COWS LLC			2022-05031
6/14/2022			LITTLE CHERYL JEAN	2022 DUKES PLACE LLC			2022-04472
1/1/1900			LITTLE S C MRS	LITTLE CHERYL JEAN			
8/14/2019			LITTLE S C MRS (BILLIE JEAN)	LITTLE CHERYL JEAN			2019-04732
1/1/1968			LITTLE S C (DECEASED)	LITTLE S C MRS	PER M		

Map

Property Details

Account			
Property ID:	R000023434	**Geographic ID:**	R.0602.00190.00.0
Type:	Real	**Zoning:**	
Property Use:		**Condo:**	
Location			
Situs Address:	CR208		
Map ID:	18-16-4	**Mapsco:**	
Legal Description:	Acres 44.500, A0602 O DELL HENRY;		
Abstract/Subdivision:	/		
Owner			
Name:	KUIPER CLEMENS		
Agent:			
Mailing Address:	1865 PR1233 HICO, TX 76457		
% Ownership:	100.0%		
Exemptions:	For privacy reasons not all exemptions are shown online.		

Property Values

Improvement Homesite Value:	$0 (+)
Improvement Non-Homesite Value:	$0 (+)
Land Homesite Value:	$0 (+)
Land Non-Homesite Value:	$0 (+)
Agricultural Market Valuation:	$467,250 (+)
Market Value:	$467,250 (=)
Agricultural Value Loss:	$461,820 (-)
Appraised Value:	$467,250 (=)
Homestead Cap Loss:	$0 (-)
Assessed Value:	$5,430
Ag Use Value:	$5,430

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Property Taxing Jurisdiction

Owner: KUIPER CLEMENS %Ownership: 100.0%

Entity	Description	Market Value	Taxable Value
072	ERATH COUNTY	$467,250	$5,430
901	THREE WAY ISD	$467,250	$5,430
MTD	MIDDLE TRINITY WATER	$467,250	$5,430
RER	ERATH ROAD & BRIDGE	$467,250	$5,430

Property Land

Type	Description	Acreage	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
SAE		44.5000	1,938,420.00	0.00	0.00	$467,250	$5,429

Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap Loss	Assessed
2024	$0	$467,250	$5,430	$467,250	$0	$5,430
2023	$0	$511,750	$4,230	$511,750	$0	$4,230
2022	$0	$511,750	$4,900	$511,750	$0	$4,900
2021	$0	$356,000	$5,610	$356,000	$0	$5,610
2020	$0	$311,500	$5,960	$311,500	$0	$5,960
2019	$0	$311,500	$5,920	$311,500	$0	$5,920
2018	$0	$267,000	$5,920	$267,000	$0	$5,920
2017	$0	$222,500	$6,680	$222,500	$0	$6,680
2016	$0	$178,000	$6,940	$178,000	$0	$6,940
2015	$0	$178,000	$7,700	$178,000	$0	$7,700
2014	$0	$178,000	$7,700	$178,000	$0	$7,700

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
5/18/2018	L		LITTLE LARRY D	KUIPER CLEMENS			2018-02635
7/26/2004			LITTLE LARRY	LITTLE LARRY D	1181	691	
1/1/1900			LITTLE RICHARD	LITTLE LARRY	915	480	

Map

Property Details

Account

Property ID:	R000023017	**Geographic ID:**	R.0546.00020.00.0
Type:	Real	**Zoning:**	
Property Use:		**Condo:**	

Location

Situs Address:	43425 FM2481
Map ID:	17-16-4 **Mapsco:**
Legal Description:	Acres 153.134, A0546 MCCARTY JACOB & A0776 J M THOMAS(8.65 ACS); HOUSE & BARNS
Abstract/Subdivision:	

Owner

Name:	THOMAS PAT A & DEBRA L
Agent:	
Mailing Address:	701 PALUXY RD GRANBURY, TX 76048
% Ownership:	100.0%
Exemptions:	For privacy reasons not all exemptions are shown online.

Property Values

Improvement Homesite Value:	$183,820 (+)
Improvement Non-Homesite Value:	$68,880 (+)
Land Homesite Value:	$7,800 (+)
Land Non-Homesite Value:	$0 (+)
Agricultural Market Valuation:	$1,186,650 (+)
Market Value:	$1,447,150 (=)
Agricultural Value Loss:	$1,168,080 (-)
Appraised Value:	$1,447,150 (=)
Homestead Cap Loss:	$42,801 (-)
Assessed Value:	$229,165
Ag Use Value:	$18,570

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Property Taxing Jurisdiction

Owner: THOMAS PAT A & DEBRA L **%Ownership:** 100.0%

Entity	Description	Market Value	Taxable Value
072	ERATH COUNTY	$1,447,150	$217,165
HM	HICO EMERGENCY SERVI	$1,447,150	$229,165
MTD	MIDDLE TRINITY WATER	$1,447,150	$229,165
RER	ERATH ROAD & BRIDGE	$1,447,150	$217,165

SHI	HICO ISD	$1,447,150	$119,165

Property Improvement - Building

Type: MA **State Code:** E **Living Area:** 2,212.00 sqft **Value:** $183,818

Type	Description	Year Built
MA	MAIN AREA	
P	COVERPORCH	
MA2	MAIN AREA2 STORY	1998
DCPP	DTCARPORT+	2001
CPD	COVPATIO DETACHED	2008
CPD	COVPATIO DETACHED	2008
WH	WELLHOUSE	2008
UTIL1	UTILITIES 1	

Type: HAY **Living Area:** 2,700.00 sqft **Value:** $68,880

Type	Description	Year Built
HAY	HAYBARN	
WARE	WAREHOUSE	
STG	STRG BUILDING	
STG	STRG BUILDING	2008
SHE3	3SIDE SHED	2008
SHED	SHED	2021

Property Land

Type	Description	Acreage	Sqft	Eff Front	Eff Depth	Market Value	Prod. Value
SAW		1.0000	43,560.00	0.00	0.00	$7,800	$0
SAW		152.1340	6,626,957.00	0.00	0.00	$1,186,645	$18,565

Property Roll Value History

Year	Improvements	Land Market	Ag Valuation	Appraised	HS Cap Loss	Assessed
2024	$252,700	$1,194,450	$18,570	$1,447,150	$42,801	$229,165

2023	$200,900	$1,257,070	$16,420	$1,457,970	$54,130	$203,190
2022	$177,950	$861,740	$18,720	$1,039,690	$28,480	$193,190
2021	$114,640	$624,540	$21,150	$739,180	$0	$151,790
2020	$114,640	$563,680	$20,760	$678,320	$4,200	$147,200
2019	$95,260	$563,680	$21,080	$658,940	$0	$132,340
2018	$94,580	$564,970	$21,030	$659,550	$0	$131,610
2017	$91,510	$457,380	$21,630	$548,890	$0	$129,140
2016	$91,510	$393,320	$21,540	$484,830	$0	$128,050
2015	$91,510	$393,320	$22,560	$484,830	$0	$129,070
2014	$91,510	$367,300	$21,040	$458,810	$0	$127,550

Property Deed History

Deed Date	Type	Description	Grantor	Grantee	Volume	Page	Number
7/8/1998			ELLIS BETTY JEAN	THOMAS PAT A & DEBRA L	959	114	

ADJACENT LANDOWNERS LIST

Name Bill & Kathleen Huckabee Number on Map 1 Address 937 CR 188 Address Stephenville, TX 76401	Name Charles D & Linda G Fulton Number on Map 9 Address 5775 CR 208 Address Hico, TX 76457
Name James & Wanda Huckabee Number on Map 2 Address 1320 Harpers Mill RD Address Stephenville, TX 76401	Name Milton & Linda Taylor Number on Map 10 Address 5485 CR 208 Address Hico, TX 76457
Name Oncore Electric Delivery Number on Map 3 Address PO Box 139100 Address Dallas, TX 75313	Name Michelle R Rose Number on Map 11 Address 34488 N US Hwy 281 Address Lipan, TX 76462
Name William & Debbie Dean Number on Map 4 Address PO Box 1316 Address Stephenville, TX 76401	Name Petra Sandoval Number on Map 12 Address 5446 CR 208 Address Hico, TX 76457
Name 6 + 6 Ranch Corporation Number on Map 5 Address PO Box 15173 Address San Antonio, TX 78212	Name Kenneth & Donna Mills Number on Map 13 Address 1572 CR 211 Address Hico, TX 76457
Name Dawna Beth & John Bryon Rumph Randolph Number on Map 6 Address 19142 US 67 Address Stephenville, TX 76401	Name Patsy ET AL Little Number on Map 14 Address 5302 CR 208 Address Hico, TX 76457
Name Spencer L & Dawna B Randolph Number on Map 7 Address 19142 US 67 Address Stephenville, TX 76401	Name Brian W Hoelscher Number on Map 15 Address 5030 CR 208 Address Hico, TX 76457
Name Sharlene Martinez Trust Number on Map 8 Address 29448 FM 2481 Address Stephenville, TX 76401	Name Bruce Family Revocable Living Trust Number on Map 16 Address 4750 CR 208 Address Hico, TX 76457

Please identify where you obtained the landowner information.

Erath County Appraisal District; May 2024

Facility Name Kuiper Cows

ADJACENT LANDOWNERS LIST

Name David Cook Number on Map 17 Address 5504 CR 230 Address Hico, TX 76457	Name David Newman Number on Map 25 Address 1026 CR 206 Address Hico, TX 76457
Name David R Carey Number on Map 18 Address 1343 CR 230 Address Hico, TX 76457	Name Heath Headge and Clemens Kuiper Number on Map 26 Address 1865 PR 1233 Address Hico, TX 76457
Name Kelly Deane Crawley Number on Map 19 Address PO Box 1919 Address Stephenville, TX 76401	Name Perry A & Kathryn A Wakefield Number on Map 27 Address 18093 US 67 Address Stephenville, TX 76401
Name Sleeth Marie E Revocable Living Trust Number on Map 20 Address 2040 CR 208 Address Hico, TX 76457	Name Perry Wakefield Number on Map 28 Address 18093 US 67 Address Stephenville, TX 76401
Name VLB%Loftis-Been Christie Lee Number on Map 21 Address 2802 CR 208 Address Hico, TX 76457	Name Donnie H & Donna Lynn Edwards Number on Map 29 Address 2653 N HWY 144 Address Meridian, TX 76665
Name Jessica L Patterson Number on Map 22 Address 2769 CR 208 Address Hico, TX 76457	Name Timothy & Sarah Thompson Number on Map 30 Address 639 CR 138 Address Stephenville, TX 76401
Name Putty Lamona ET AL Number on Map 23 Address 1676 CR 133 Address Hico, TX 76457	Name Ariel & Krystal Winders Number on Map 31 Address 1113 Westminster Dr Address Waxahachie, TX 75165
Name Lophelia Ridings Number on Map 24 Address 1026 CR 206 Address Hico, TX 76457	Name Morris Threadgill Number on Map 32 Address 1556 CR 138 Address Stephenville, TX 76401

Please identify where you obtained the landowner information.

Erath County Appraisal District; May 2024

Facility Name Kuiper Cows

ADJACENT LANDOWNERS LIST

Name Jason & Allison Nitschke Number on Map 33 Address 636 CR 539 Address Hico, TX 76457	Name Mark Wayne & Ruby Faye Turner Number on Map 41 Address 954 CR 204 Address Stephenville, TX 76401
Name Kenneth Mills Number on Map 34 Address 1572 CR 211 Address Hico, TX 76457	Name Jay Mills Trustee Number on Map 42 Address PO Box 1669 Address Stephenville, TX 76401
Name Kevin Joel Rood Number on Map 35 Address 2677 Pierce Ave Address Sanborn, IA 51248	Name Jessica Horton Number on Map 43 Address 2837 CR 204 Address Stephenville, TX 76401
Name Jerry G & Laverne Mills Number on Map 36 Address 464 PR 1244 Address Hico, TX 76457	Name Judi Mauk Number on Map 44 Address 1010 Carroll Meadows CT Address Southlake, TX 76092
Name Terry & Kaye Humberson Number on Map 37 Address 6441 CR 208 Address Hico, TX 76457	Name Clemens and Carmen Kuiper Number on Map 45 Address 1605 PR 1233 Address Hico, TX 76457
Name Wanda Louise Campbell Number on Map 38 Address 30647 FM 2481 Address Hico, TX 76457	Name Klint Elbert Roberts Number on Map 46 Address 6498 CR 203 Address Hico, TX 76457
Name Stephanie Mills Number on Map 39 Address 31112 FM 2481 Address Hico, TX 76457	Name David L Brown Number on Map 47 Address 6660 CR 203 Address Hico, TX 76457
Name Chalk Mountain Sisters LP Number on Map 40 Address 1826 CR 393 Address Stephenville, TX 76401	Name Gedyco Investments, LLC Number on Map 48 Address 250 Grandview DR. #400 Address Fort Mitchell, KY 41017

Please identify where you obtained the landowner information.

Erath County Appraisal District; May 2024

Facility Name Kuiper Cows

ADJACENT LANDOWNERS LIST

Name Fred Fielder Number on Map 49 Address 7081 CR 203 Address Hico, TX 76457	Name Kevin Steward Number on Map 57 Address 2740 CR 236 Address Hico, TX 76457
Name Bobby Joe Anderson (Revocable Life Estate) Number on Map 50 Address 9716 Parkmere Address Fort Worth, TX 76108	Name John & Angela Kealey Number on Map 58 Address 4780 FM 1824 Address Hico, TX 76457
Name Anthony Charles & Cynthia Ann Tordiglione Number on Map 51 Address 178 Sams Lane Address Aledo, TX 76008	Name Leslie Craig and Lavonne Mills Number on Map 59 Address 31112 FM 2481 Address Hico, TX 76457
Name Edwin Fred Shannon Number on Map 52 Address 6338 CR 539 Address Hico, TX 76457	Name Benjamin & Savannah McGraw Number on Map 60 Address 12550 Grumper CT Address Fort Worth, TX 76126
Name Lloyd Roberson Number on Map 53 Address PO Box 7 Address Hico, TX 76457	Name Michael & Jeannette Conner Number on Map 61 Address 398 CR 539 Address Hico, TX 76457
Name Kevin S & Marcia K Averhoff Number on Map 54 Address 4392 CR 229 Address Hico, TX 76457	Name Larry Little Number on Map 62 Address 32798 FM 2481 Address Hico, TX 76457
Name Three Sisters Equity, LP Number on Map 55 Address 181 S Graham ST Address Stephenville, TX 76401	Name Sterling Ingle & Hanna Rose Crawley Number on Map 63 Address 1990 CR 208 Address Hico, TX 76457
Name Willard III & Carla Peacock Sellman Number on Map 56 Address 514 W Ave 8 Address Hico, TX 76457	Name John & Stephanie Moseley Number on Map 64 Address 301 CR 214 Address Hico, TX 76457

Please identify where you obtained the landowner information.

Erath County Appraisal District; May 2024

Facility Name Kuiper Cows

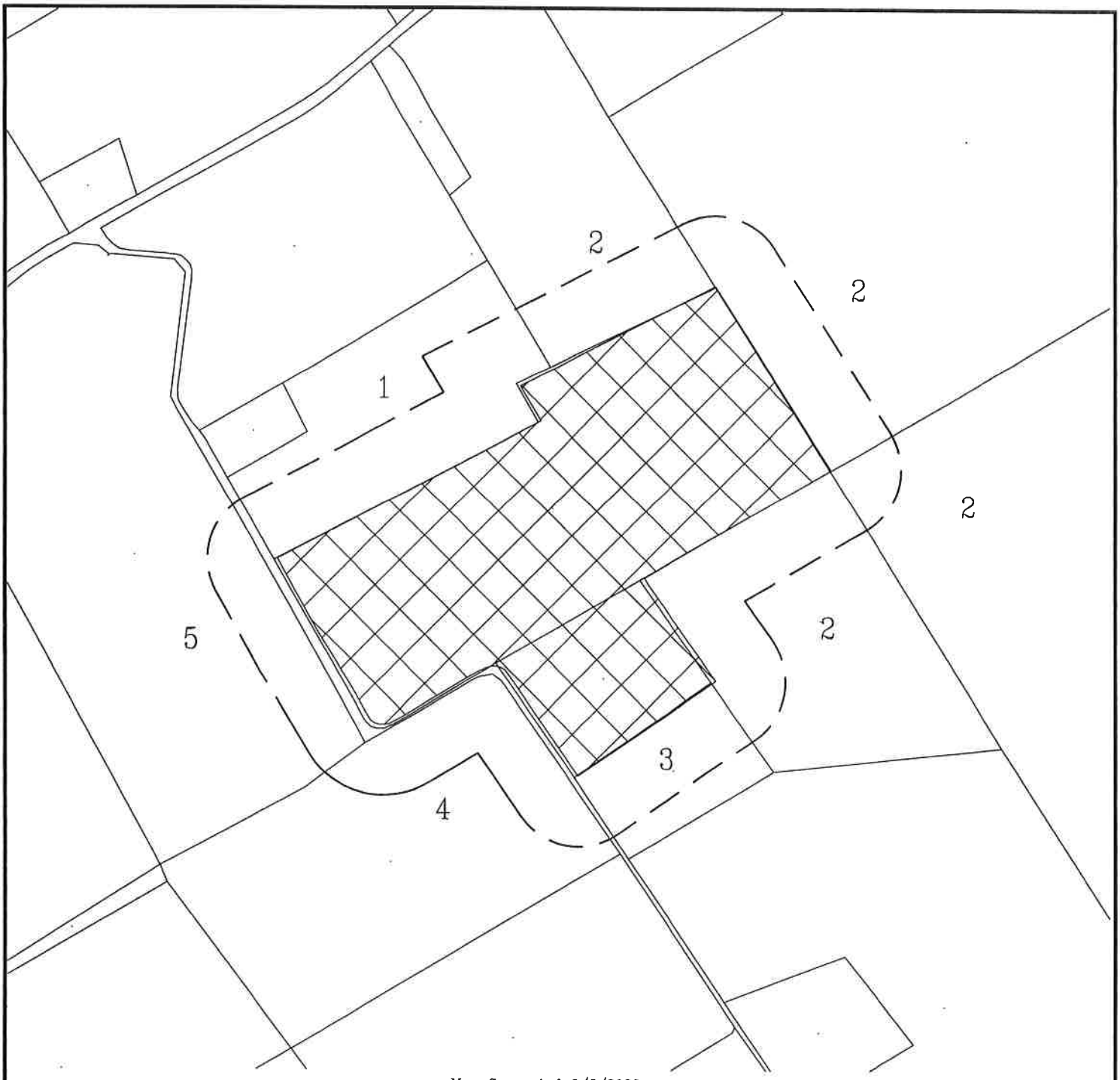
ADJACENT LANDOWNERS LIST

Name Taylor Smith Number on Map 65 Address 955 CR 214 Address Hico, TX 76457	Name Richard & Jessie Uptergrove Number on Map 73 Address 43590 FM 2481 Address Hico, TX 76457
Name Jerry Kerr Number on Map 66 Address 1085 CR 214 Address Hico, TX 76457	
Name Duffau Cemetery Number on Map 67 Address PO Box 972 Address Stephenville, TX 76401	
Name Leonard & Laura Blake Number on Map 68 Address 1460 CR 214 Address Hico, TX 76457	
Name Monica Avery Number on Map 69 Address PO Box 293 Address Rainbow, TX 76077	
Name Ronnie Nachitigall (Revocable Life Estate) Number on Map 70 Address 45109 FM 2481 Address Hico, TX 76457	
Name William & Kimberly Vinson Number on Map 71 Address PO Box 279 Address Hico, TX 76457	
Name John & Beverly White Number on Map 72 Address 44110 FM 2481 Address Hico, TX 76457	

Please identify where you obtained the landowner information.

Erath County Appraisal District; May 2024

Facility Name Kuiper Cows



Map Generated 9/8/2022

LEGEND:

- Denotes Kuiper Cows Property
- Denotes Adjacent Landowner Boundary
- Denotes 500 Ft. Radius From Property Boundary

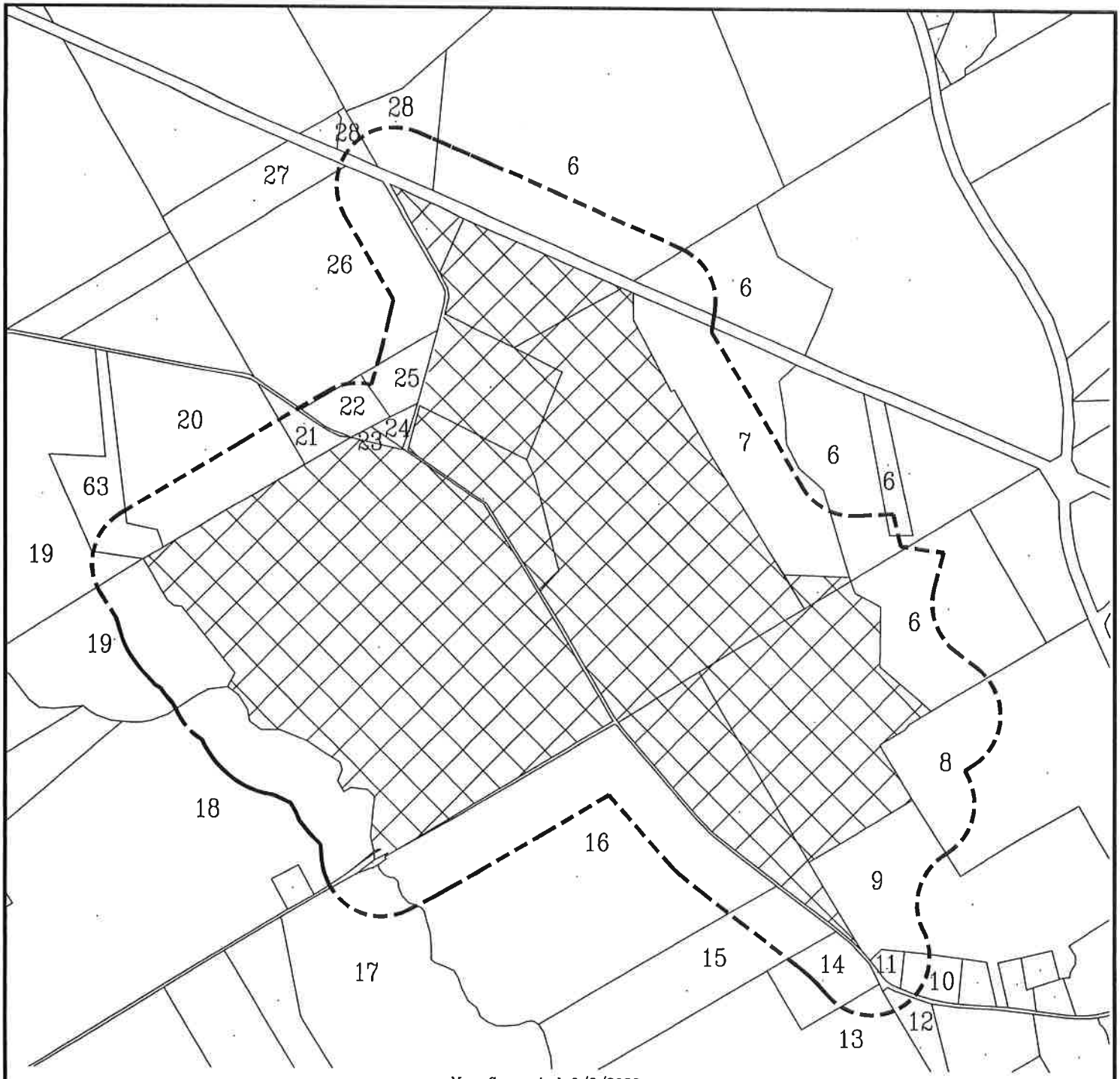
N
W E
S

600' 0 600' 1000'

SCALED AS SHOWN

Source: Erath County Appraisal District

Kuiper Cows Stephenville, Texas Erath County	Adjacent Landowner Map A	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 9/8/2022

LEGEND:

- Denotes Kuiper Cows Property
- Denotes Adjacent Landowner Boundary
- Denotes 500 Ft. Radius From Property Boundary

N

W E

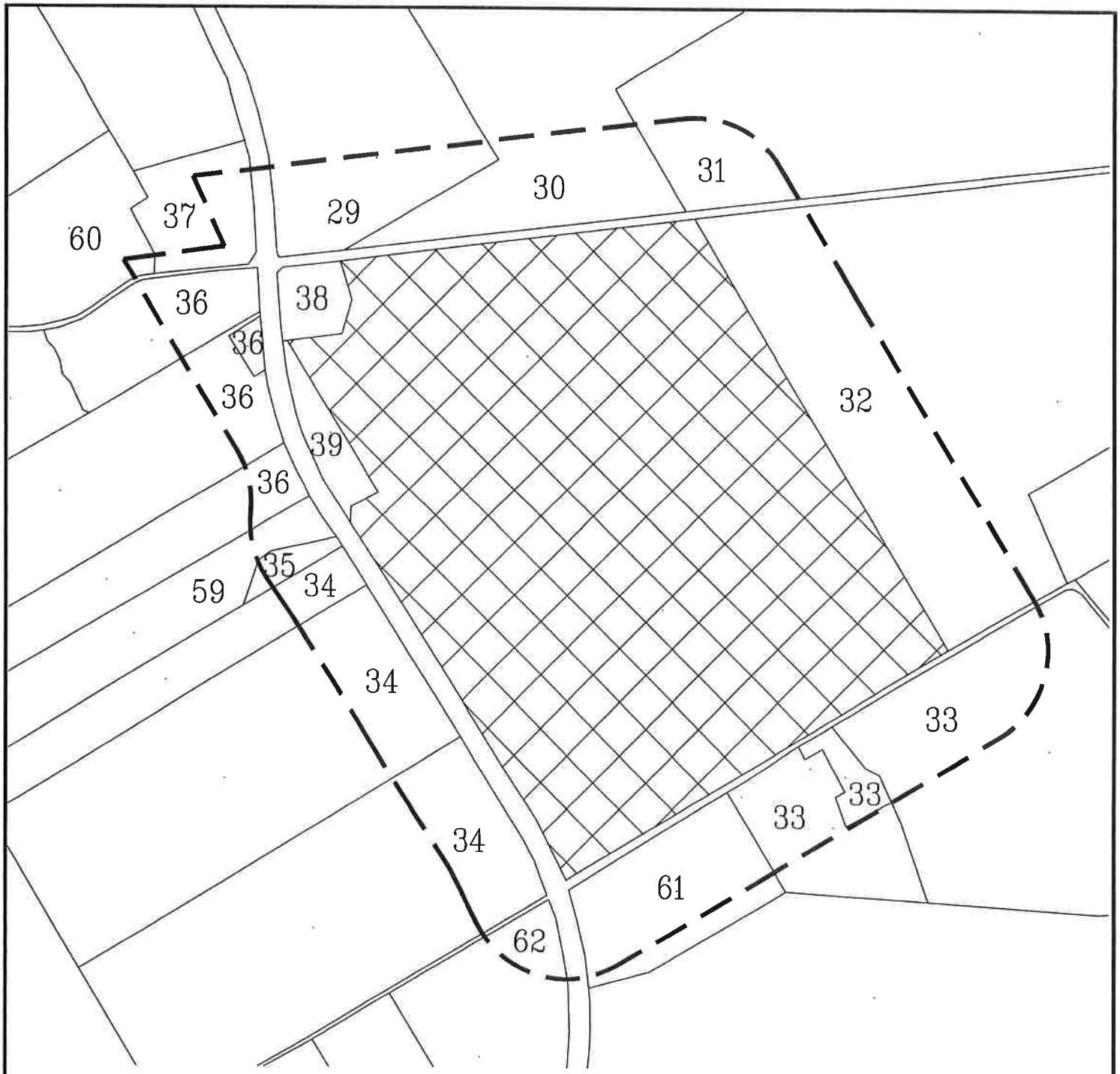
S

800' 0 800' 1600'

SCALED AS SHOWN

Source: Erath County Appraisal District

Kuiper Cows Stephenville, Texas Erath County	Adjacent Landowner Map B	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Revised 9/8/2022

LEGEND:

- Denotes Kuiper Cows Property
- Denotes Adjacent Landowner Boundary
- Denotes 500 Ft. Radius From Property Boundary

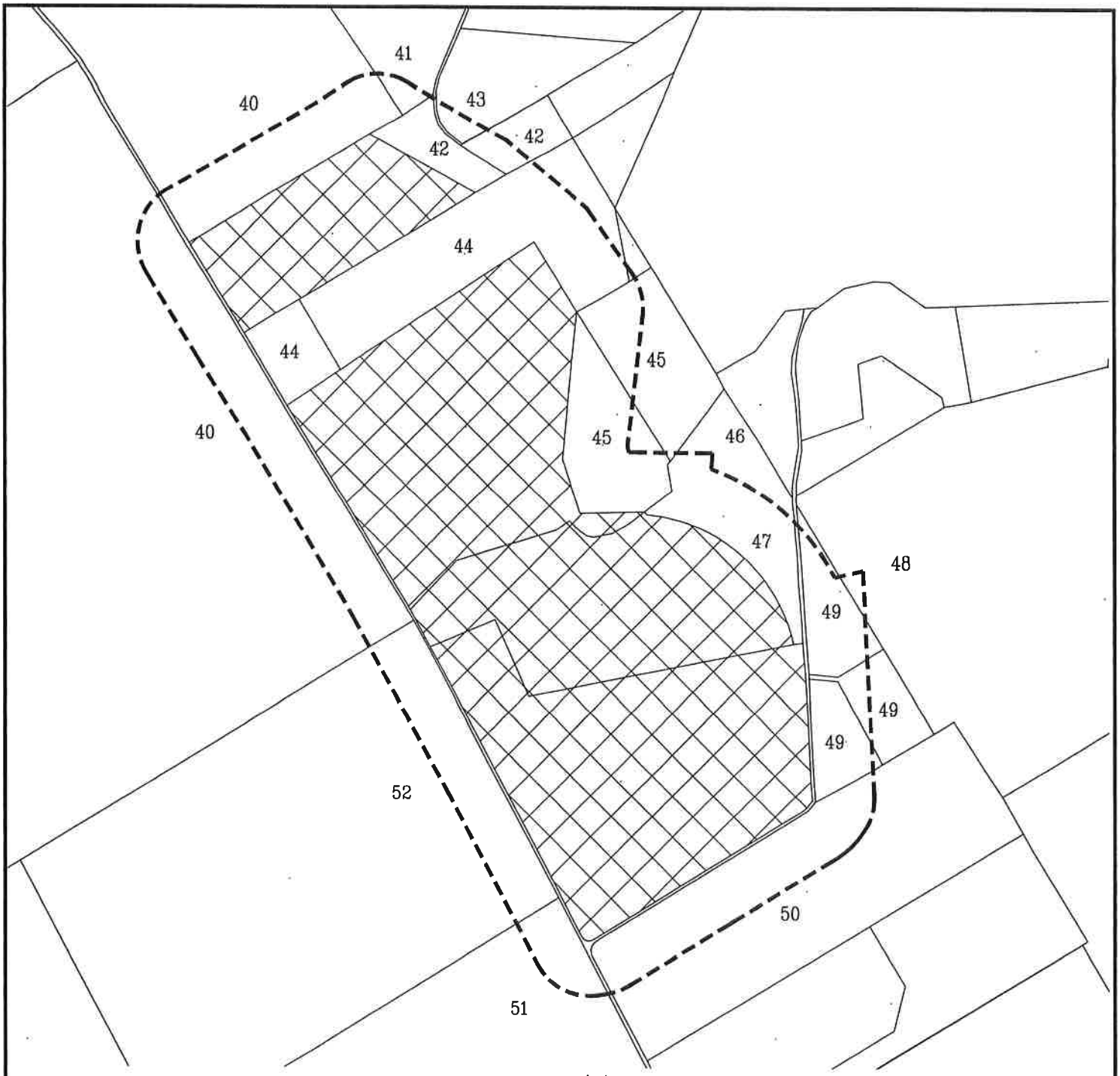
N
W E
S

300' 0 300' 600'

SCALED AS SHOWN

Source: Erath County Appraisal District

Kuiper Cows Stephenville, Texas Erath County	Adjacent Landowner Map C	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 9/8/2022

LEGEND:

- Denotes Kuiper Cows Property
- Denotes Adjacent Landowner Boundary
- Denotes 500 Ft. Radius From Property Boundary

N

W E

S

600' 0 600' 1200'

SCALED AS SHOWN

Source: Erath County Appraisal District

Kuiper Cows Stephenville, Texas Erath County	Adjacent Landowner Map D	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

2) Total Number of Animals:

In Open Lots: 899 In Buildings: 0

3) Animal Housing Location, hours/day:

Open Lots: 24 Buildings: 0

4) Average Liveweight, pounds per head: 970 lbs

5) Volatile Solids Removed by Separator System: 0.00

6) Volatile Solids Loading Rate, lbs/day/1000 ft^3: 0.00

7) Spilled Drinking Water, gallons/day: 0.00

8) Water for Cleanup, gallons/day: 0.00

9) Water for Manure Removal, gallons/day: 0.00

10) Recycled Wastewater, gallons/day: 0.00

B. Wastewater Runoff

1) Design Rainfall Amount, inches: 7.3

2) Design Rainfall Event:

☒ 25-year, 24 hour

☐ Soil Plant Air and Water (SPAW) Field and Pond Hydrology Model

☐ 25-year, 10 day

☐ Other; specify: Click here to enter text.

C. Retention Control Structure(s) (RCS) Volume Allocations

Table 2. RCS Volume Allocations (Acre-Feet)

RCS Name	Design Rainfall Event Runoff	Process Generated Wastewater	Minimum Treatment Volume	Sludge Accumulation	Water Balance	Required Capacity	Actual Capacity
2	4.72	0.00	0.00	0.63	1.35	6.71*	9.3
1	0.55	0.00	0.00	0.00	0.00	0.55	4.9
						*Rounded Figure	

Indicate which RCSs are in-series: RCS #1 & RCS #2

D. RCS Liner or Lack of Hydrologic Connection Certification

Table 3: RCS Hydrologic Connection

RCS Name	Construction Date	Type of Hydrologic Connection Certification
1	1994	Liner Cert., Jerry Holligan, P.E. 1994
2	1994	Liner Cert., Jerry Holligan, P.E. 1994

E. Playa Lakes

Are any playa lakes used for RCSs? Yes ☐ No ☒

SECTION 3. MANURE, SLUDGE, AND WASTEWATER HANDLING

A. Manure:

1) Use or Disposal Method:
   - ☒ Land Application to LMUs
   - ☒ Transfer to other persons
   - ☐ Third Party Fields
   - ☐ Other; specify: Click here to enter text.
2) Land Application Location:
   - ☒ Onsite ☒ Offsite ☐ Not Applicable
3) Composting Location:
   - ☒ Onsite ☐ Offsite ☐ Not Applicable

B. Sludge:

1) Use or Disposal Method:
   - ☒ Land Application to LMUs
   - ☒ Transfer to other persons
   - ☐ Third Party Fields
   - ☐ Other; specify: Click here to enter text.
2) Land Application Location:
   - ☒ Onsite ☒ Offsite ☐ Not Applicable

C. Wastewater:

1) Use or Disposal Method:

☒ Land Application to LMUs

☐ Total Evaporation

☐ Third Party Fields

☐ Other; specify: Click here to enter text.

2) Land Application Location:

☒ Onsite ☒ Offsite ☐ Not Applicable

D. Land Application Summary from the Nutrient Management Plan

For each Land Management Unit (LMU), provide the name, acre, crops/yield goals and application rates on Table 4 below. Add rows if needed or attach additional pages.

Table 4: Land Management Unit Summary from the Current NMP

LMU Name	Acre	Crop(s) and Yield Goal(s)	Application Rate (Ac-ft/Ac/Year OR Tons/Ac/Year)
1	54	Coastal Graze 1 AU/1ac; RG mod Graze M	0.542 ac-ft/ac/yr
2	26	Coastal Graze 1 AU/1ac; RG mod Graze M	1 ac-ft/ac/yr
F1	27	Silage-Corn 16-20T; SG Silage 8-9T M	2.8 tons/ac/yr
F2	49	Silage-Corn 16-20T; SG Silage 8-9T M	2.8 tons/ac/yr
F3	54	Silage-Corn 16-20T; SG Silage 8-9T M	2.8 tons/ac/yr
F4	64	Coastal GC 9-11T; SG GC 6-7T H	2.9 tons/ac/yr
W1	76	Coastal GC 9-11T; SG GC 6-7T M	3.9 tons/ac/yr
W2	42	Silage-Corn 21-25T; SG Silage 5-7T M	2.8 tons/ac/yr
C1	39	Coastal GC 9-11T; SG GC 6-7T M	3.9 tons/ac/yr
C2	68	Silage-Corn 16-20T; SG Green Chop 8-9T M	3.6 tons/ac/yr

LMU Name	Acre	Crop(s) and Yield Goal(s)	Application Rate (Ac-ft/Ac/Year OR Tons/Ac/Year)
C3	120	Silage-Corn 16-20T; SG Green Chop 8-9T M	3.6 tons/ac/yr
C4	50	Coastal GC 9-11T; SG GC 6-7T M	3.9 tons/ac/yr
WN1	60	Coastal GC 9-11T; SG GC 6-7T M	3.9 tons/ac/yr
WN2	26	Silage-Corn 16-20T; SG Silage 8-9T M	2.8 tons/ac/yr
TW1	56	Coastal GC 9-11T; SG GC 6-7T M	3.9 tons/ac/yr
TW2	64	Coastal GC 9-11T; SG GC 6-7T M	3.9 tons/ac/yr
DC	87	Coastal GC 9-11T; SG GC 6-7T H	2.9 tons/ac/yr

1) Wastewater production, ac-in/year: 152.64 ac-in/yr (Tables 2.3a-b, Col. 4)
2) Estimated Wastewater application, ac-in/year: 55.56 ac-in/yr (Tables 2.3a-b, Col. 10)
3) Manure production, tons/year: 1,805 tons/yr (Table 2.1)
4) Estimated manure application, tons/year: 1,805 tons/yr (Table 2.1)
5) Estimated manure transferred to other persons, tons/year: 0

E. Floodplain Information

1) Is any part of the production area within a 100-year floodplain? Yes ☐ No ☒

If YES, describe management practices to protect the sites. Click here to enter text.

2) Is land application or temporary storage of manure in a 100-year floodplain or near a water course? Yes ☒ No ☐

If YES, describe management practices. Vegetative buffers will be maintained between all waters of the state and waste/wastewater application.

F. Soil Limitations

Table 5: Soil Limiting Characteristics and Best Management Practices

Soil Types	Limiting Characteristics	Best Management Practices
NdC	Filtering Capacity Seepage	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.

Soil Types	Limiting Characteristics	Best Management Practices
SdC	Depth to Saturated Zone	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
WkA, WaB	Slow Water Movement Depth to Saturated Zone	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
BdC, CrB	Slow Water Movement Depth to Bedrock	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils. - Land Application will be based upon the AWC (refer to NMP) of the soil and will not exceed agronomic rates for nutrients.
DIC, WnC	Filtering Capacity	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
FriA, Go, Bu	Flooding	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
PcB, PcC	Depth to Bedrock Droughty Slow Water Movement	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils. - Land Application will be based upon the AWC (refer to NMP) of the soil and will not exceed agronomic rates for nutrients.
Ma	Depth to Bedrock Droughty	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
CtB	Slow Water Movement Depth to Saturated Zone Droughty	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils. - Land Application will be based upon the AWC (refer to NMP) of the soil and will not exceed agronomic rates for nutrients.

Soil Types	Limiting Characteristics	Best Management Practices
FhC2	Slow Water Movement Seepage	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
HwD3, BcC2	Depth to Soft Bedrock	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
GrB, GrB2	Depth to Hard Bedrock	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
Pd	Droughty Depth to Bedrock Slow Water Movement Large Surface Stones	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
HoB, DeB	Slow Water Movement	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
MfB	Seepage	- Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.

G. Well Protection

Table 6: Water Well Status and Protective Measures

Well ID Number	Well Type	Producing or Non-Producing	Open, Cased, or Capped	Protective Measures
1	Domestic	Producing	Cased	See Approved Well Buffer Exception
2	Domestic	Producing	Cased	See Approved Well Buffer Exception
3	Domestic	Producing	Cased	Maintain 150-ft Buffer
4	Domestic	Producing	Cased	Maintain 150-ft Buffer

Well ID Number	Well Type	Producing or Non-Producing	Open, Cased, or Capped	Protective Measures
5	Irrigation	Producing	Cased	Maintain 100-ft Buffer
6	Domestic	Non-Producing	Cased	See Attached Plugging Report
7	Domestic	Non-Producing	Cased	See Attached Plugging Report
8	Irrigation	Producing	Cased	Maintain 100-ft Buffer
9	Irrigation	Producing	Cased	Maintain 100-ft Buffer
10	Domestic	Non-Producing	Cased	See Attached Plugging Report
11	Irrigation	Producing	Cased	Maintain 100-ft Buffer
12	Irrigation	Producing	Cased	Maintain 100-ft Buffer
13	Domestic	Producing	Cased	Maintain 150-ft Buffer
14	Domestic	Producing	Cased	Maintain 150-ft Buffer
15	Irrigation	Producing	Cased	Maintain 100-ft Buffer
16	Irrigation	Producing	Cased	Maintain 100-ft Buffer
17	Irrigation	Producing	Cased	Maintain 100-ft Buffer
18	Irrigation	Producing	Cased	Maintain 100-ft Buffer
19	Domestic	Non-Producing	Cased	See Attached Plugging Report
20	Irrigation	Producing	Cased	Maintain 100-ft Buffer

Well ID Number	Well Type	Producing or Non-Producing	Open, Cased, or Capped	Protective Measures
21	Domestic	Non-Producing	Cased	See Attached Plugging Report
22	Irrigation	Producing	Cased	Maintain 100-ft Buffer
23	Irrigation	Producing	Cased	Maintain 100-ft Buffer
24	Domestic	Producing	Cased	Maintain 150-ft Buffer
25	Domestic	Non-Producing	Cased	See Attached Plugging Report
26	Domestic	Non-Producing	Cased	See Attached Plugging Report
27	Irrigation	Producing	Cased	Maintain 100-ft Buffer
28	Irrigation	Producing	Cased	Maintain 100-ft Buffer
29	Irrigation	Producing	Cased	Maintain 100-ft Buffer
30	Irrigation	Producing	Cased	Maintain 100-ft Buffer

SECTION 4. AIR AUTHORIZATION SUMMARY

A. Type of Air Authorization

- ☐ Air Standard Permit in 30 TAC § 321.43
- ☒ Permit By Rule in 30 TAC Chapter 106 Subchapter F
- ☐ Individual Air Quality Permit

If Air Standard Permit is selected, then complete Sections B and C below.

B. Indicate the AFO Status and Buffer Option.

- ☐ Operation started after August 19, 1998:
  - ☐ ½ mile buffer*
  - ☐ ¼ mile buffer* and an odor control plan
- ☐ Operation started on or before August 19, 1998:
  - ☐ ¼ mile buffer*
  - ☐ odor control plan

*A written letter of consent from an affected landowner may be used in lieu of meeting the buffer distances specified.

C. Odor Receptors

Identify the number of occupied residences or business structures, schools (including associated recreational areas), places of worship, or public parks located within the following distances from permanent odor sources as defined in 30 TAC §321.32(43):

0 - ¼ mile: Click here to enter text.

¼ - ½ mile: Click here to enter text.

½ - 1 mile: Click here to enter text.

SECTION 5. ATTACHMENTS

A. Maps

1) Site Map
2) Land Management Unit Map
3) Vicinity Map
4) Original United States Geological Survey 7.5 Minute Quadrangle Map
5) 100 Year Floodplain Map (if applicable)
6) Runoff Control Map
7) Natural Resource Conservation Service (NRCS) Soil Survey Map

B. Professional Certifications

1) Recharge Feature Certification Statement and Supporting Documents
2) RCS Design Calculations (Water Nutr, Animal Waste Management (AWM), or equivalent)
3) RCS As-Built Capacity Certifications (if constructed)
4) RCS Hydrologic Connection Certifications (if constructed)

C. Land Application

1) Nutrient Management Plan
2) Nutrient Utilization Plan. If the NUP is already approved, include the approval letter.
3) Copy of Annual Soil Sampling Analyses (used for the NMP that was submitted with the application)

4) Copy of Annual Manure and Wastewater Analyses (used for the NMP that was submitted with the application

D. Air Standard Permit Documentation (if required)

1) Area Land Use Map,
2) Odor Control Plan, if applicable
3) Written Consent Letters, if applicable

E. Groundwater Monitoring (if required)

1) Groundwater Monitoring Plan
2) Groundwater Monitoring Analyses

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1.0 FACILITY MAPS

1.1 Vicinity Map

Figure 1.1, Vicinity Map, is a general highway map generated in AutoCAD using Tiger Primary and Secondary roads data from geospatial Data Gateway at http://datagateway.nrcs.usda.gov/ (retrieved 2015). The location of the facility is depicted on the map.

1.2 USGS Quadrangle Map

Figures 1.2a-d, entitled 7.5-Minute USGS Map is a seamless, high-quality copy of the 7.5-minute USGS quadrangle map (Camp, Chalk Mountain, Clairette and Johnsville TX, quadrangles) that shows the boundaries of land owned, operated, or controlled by Kuiper Cows, LLC and used as part of the concentrated animal feeding operation; and all springs, lakes, or ponds located on-site and within 1 mile of the property boundary.

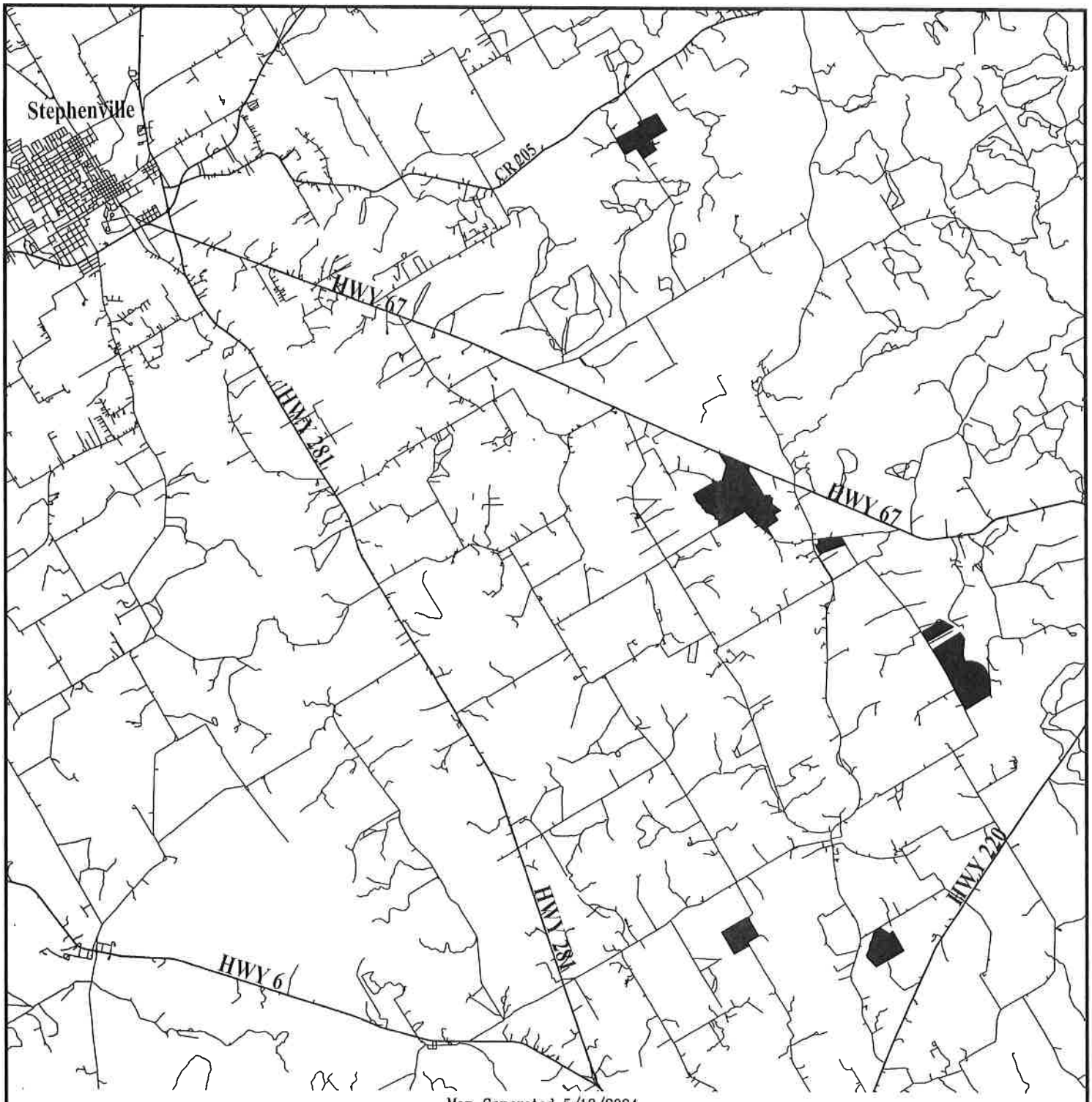
1.3 Site Map

Figures 1.3a-f, Site Map, is a scaled drawing of the entire property to be permitted showing the locations of the following information:

- Pens/Open Lots
- Retention Control Structures
- Land Management Units
- Buffer zones
- Wells
- Borrow Area
- Freshwater Ponds
- Berms/Diversions
- Manure/Compost Storage Areas

1.4 Runoff Control Map

Figure 1.4 is a scaled drawing of the production area showing the pens, roofed areas, wells, RCSs, compost areas, drainage area boundaries and flow directions.



Map Generated 5/13/2024

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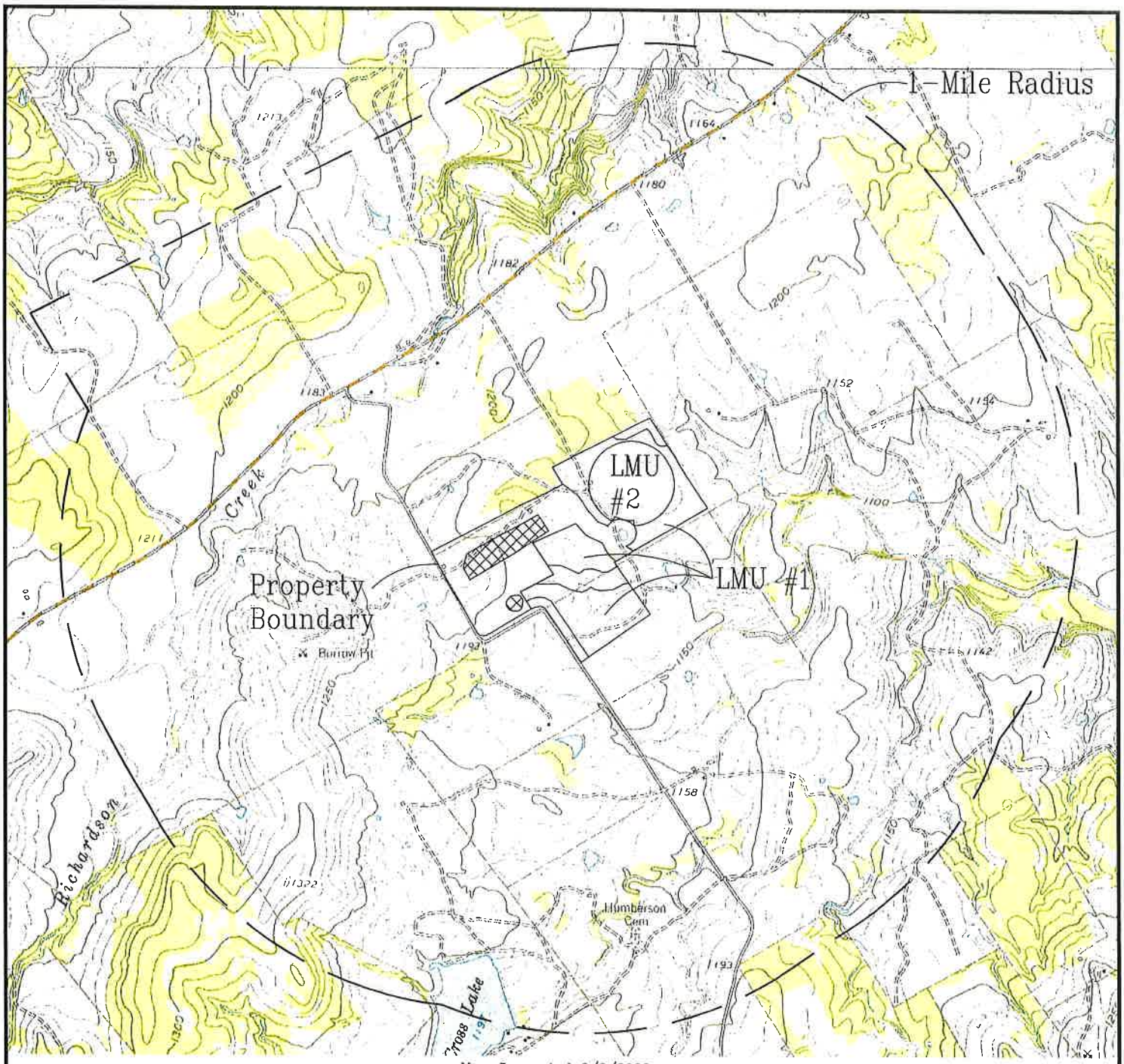
1 Mile 0 1 Mile 2 Miles

SCALE: 1" = 2 Miles

Source: Tiger Roads of Texas, 2015

Kuiper Cows Stephenville Erath County, Texas	Vicinity Map Figure 1.1 Page 2	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 9/8/2022

LEGEND:

Denotes Production Area

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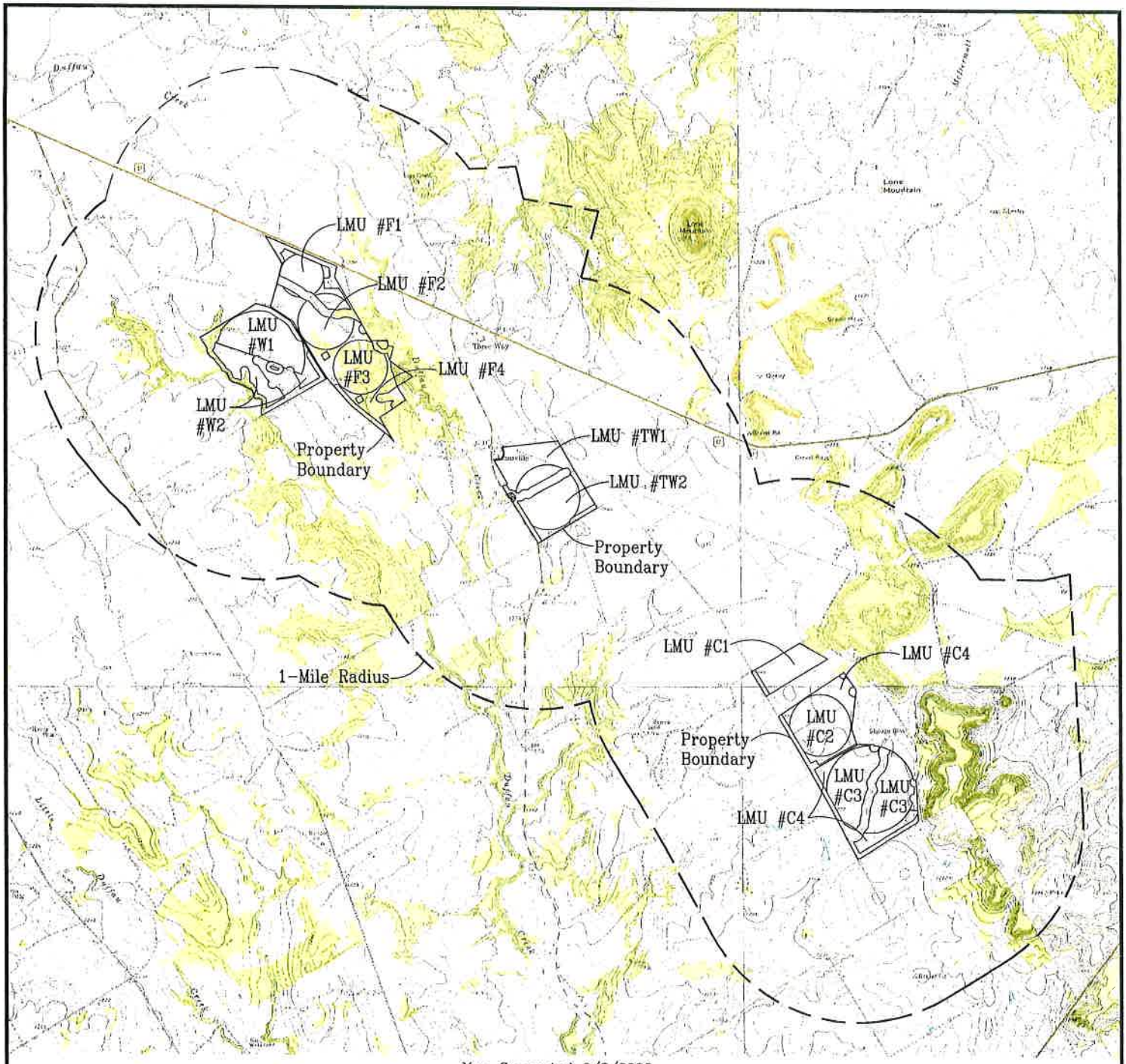
1800' 0 1800' 3600'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS - December 2017.

- Refer to Figures 1.3a-e & 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	USGS 7.5-Minute Quadrangle Map Figure 1.2a Page 3	ENVIRO-AG EAE ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 9/8/2022

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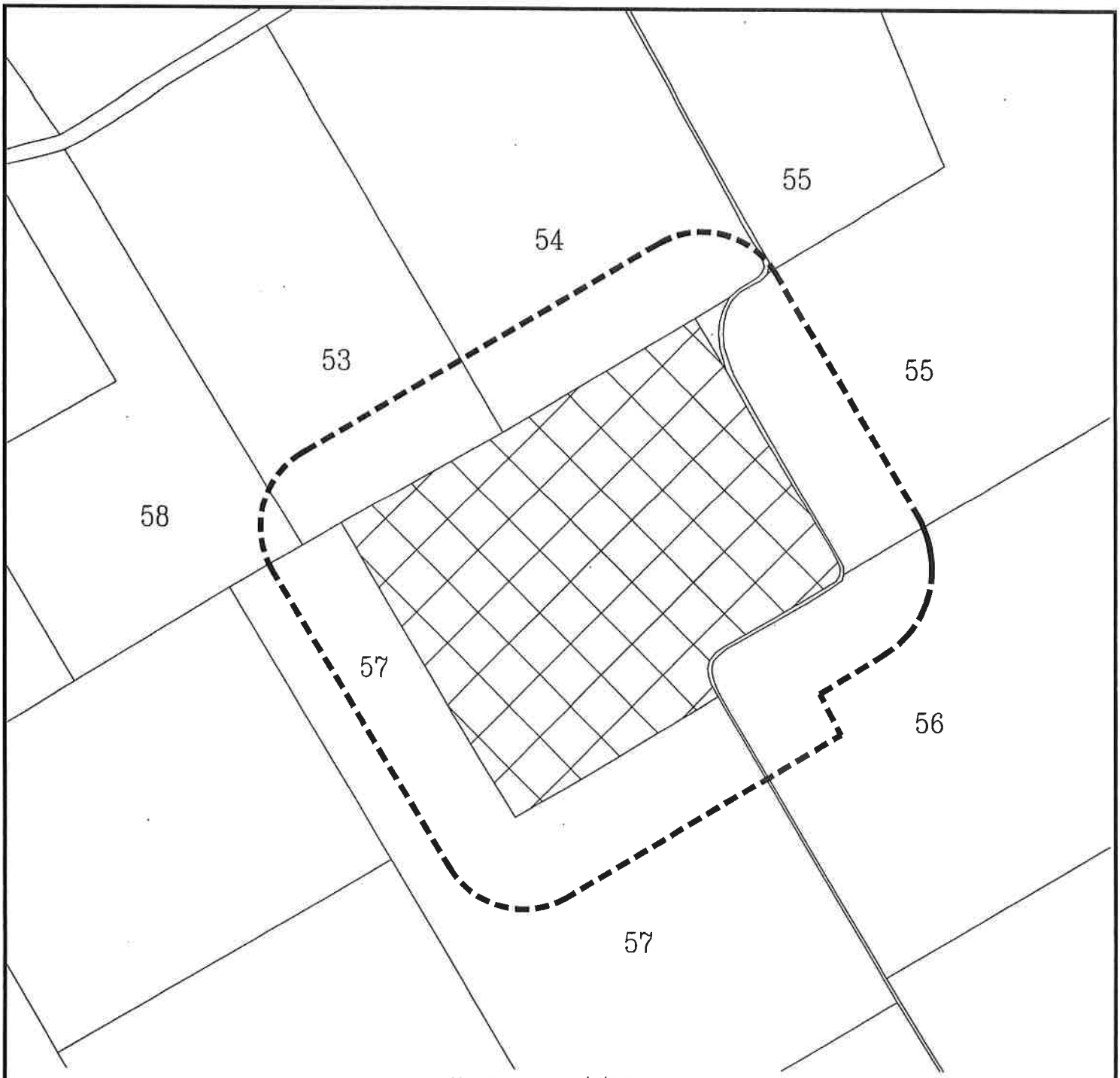
2250' 0 2250' 4500'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS - December 2017.

- Refer to Figures 1.3a-e & 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	USGS 7.5-Minute Quadrangle Map Figure 1.2b Page 4	ENVIRO-AG EAE ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 9/8/2022

LEGEND:

Denotes Kuiper Cows Property

Denotes Adjacent Landowner Boundary

Denotes 500 Ft. Radius From Property Boundary

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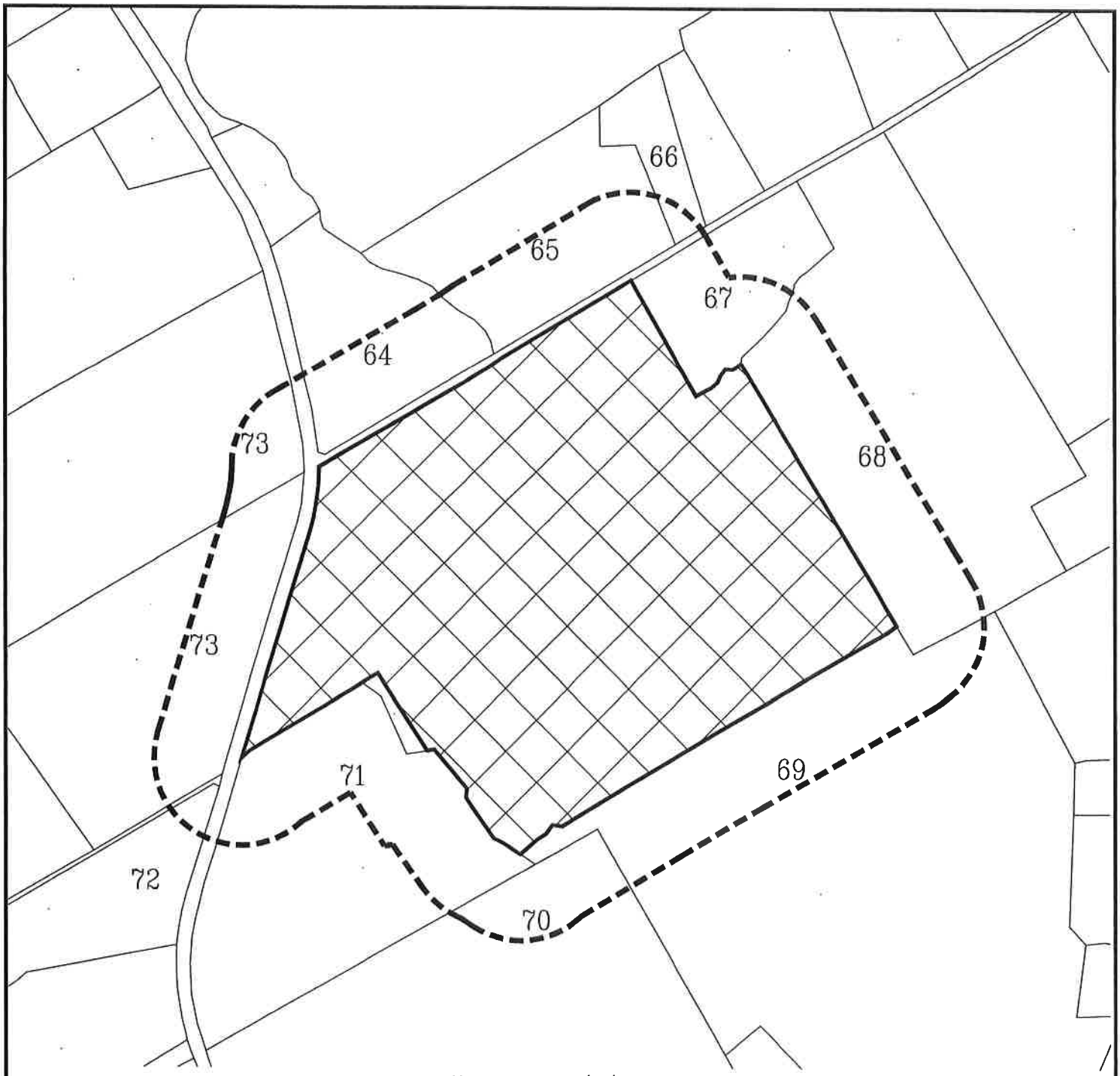
400' 0 400' 800'

SCALED AS SHOWN

Source: Erath County Appraisal District

Kuiper Cows Stephenville, Texas Erath County	Adjacent Landowner Map E	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 5/13/2024

LEGEND:

- Denotes Kuiper Cows Property
- Denotes Adjacent Landowner Boundary
- Denotes 500 Ft. Radius From Property Boundary

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400' 0 400' 800'

SCALED AS SHOWN

Source: Erath County Appraisal District

Kuiper Cows Stephenville, Texas Erath County	Adjacent Landowner Map F	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

TCEQ USE ONLY

Application type: ☐ Renewal ☐ Major Amendment ☐ Minor Amendment ☐ New County: _____ Admin Complete Date: _____ Agency Receiving SPIF: ☐ Texas Historical Commission ☐ U.S. Fish and Wildlife ☐ Texas Parks and Wildlife ☐ Army Corps of Engineers

SUPPLEMENTAL PERMIT INFORMATION FORM (SPIF)

This form is required for all TPDES applications

1. Applicant: Kuiper Cows, LLC
2. Permit Number: WQ0005293000 EPA ID Number: TX0140325
3. Address of the project (location description that includes street/highway, city/vicinity, and county). The facility is located at 1261 County Road 188 in Stephenville, Erath County.
4. Provide the name, address, telephone and fax number of an individual that can be contacted to answer specific questions about the property.

   First and Last Name: Corey Mullin

   Company Name: Enviro-Ag Engineering, Inc.

   Mailing Address: 9855 FM 87

   City, State, and Zip Code: Dublin, TX 76446

   Phone Number: 254/965-3500 Fax Number: 254/965-8000
5. County where the facility is located: Erath
6. If the property is publicly owned and the owner is different than the permittee/applicant, please identify the owner. n/a
7. Identify the name of the water body (receiving waters) and TCEQ segment number that will receive the discharge. North Bosque River 1226 and Paluxy River 1229 of the Brazos River Basin
8. Provide a 7.5-minute USGS quadrangle map with the project boundaries plotted and a general location map showing the project area. (This map is required in addition to the map in the administrative report.)
9. Provide photographs of any structures 50 years or older on the property.
10. Does your project involve any of the following? Select all that apply.
    - ☐ Proposed access roads, utility lines, and construction easements
    - ☐ Visual effects that could damage or detract from a historic property's integrity
    - ☐ Vibration effects during construction or as a result of project design
    - ☐ Additional phases of development that are planned for the future
    - ☐ Sealing of caves, fractures, sinkholes, or other karst features
    - ☐ Disturbance of vegetation or wetlands
11. List proposed construction impact (surface acres to be impacted, depth of excavation, sealing of caves or other karst features): No proposed construction

12. Describe existing disturbances, vegetation & land use (plowing, other ground disturbances): The LMUs at the facility are planted in coastal and winter wheat grass and normal expected farming practices to maintain this crop will be utilized.

The following applies to New TPDES and Major Amendment to TPDES Permits:

13. List construction dates of any buildings or structures on the property: N/A

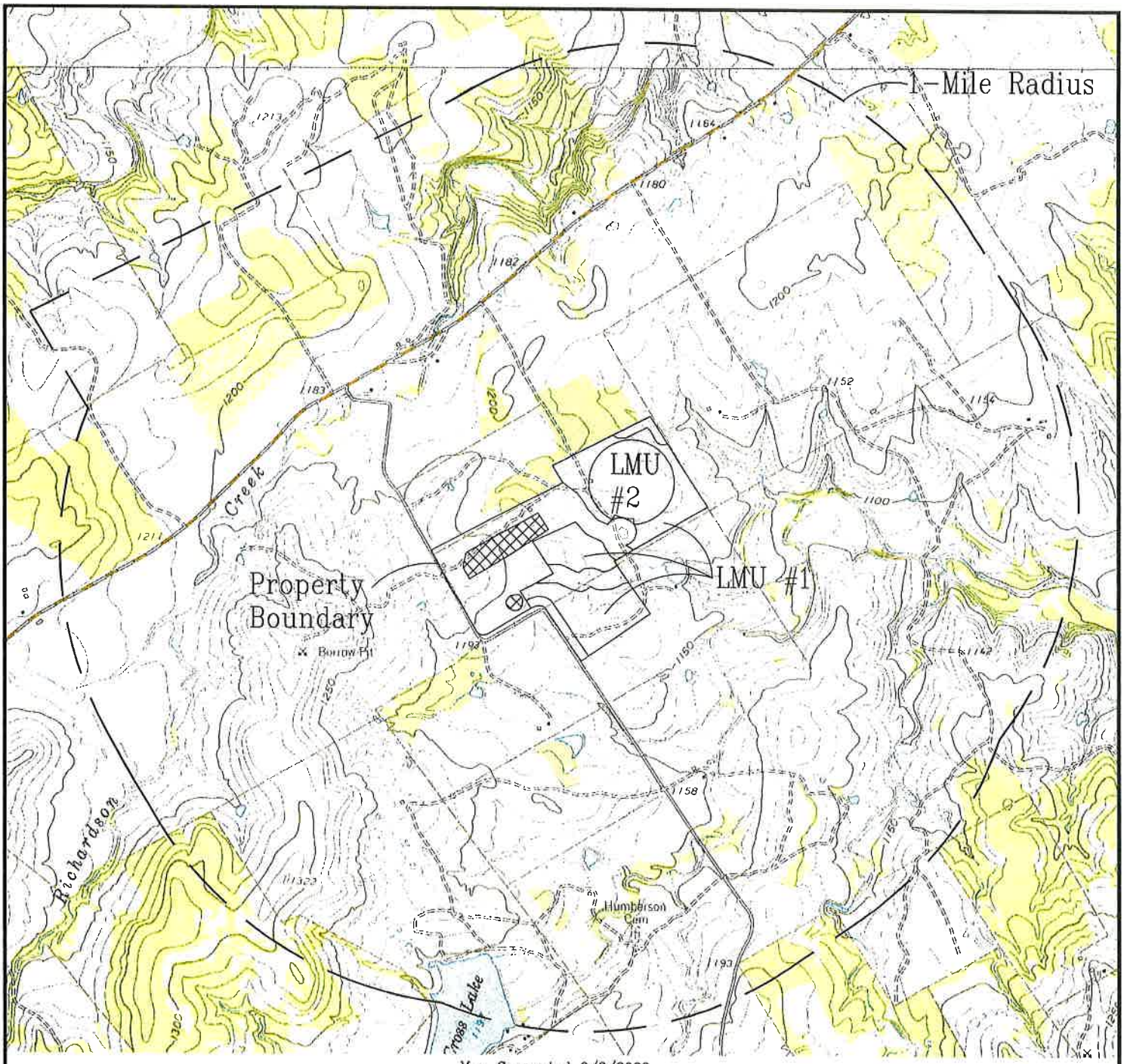
14. Provide a brief history of the property, and name of the architect/builder, if known: N/A

The following applies to New, Amended and Renewal TPDES applications:

15. List each Retention Control Structure and its required capacity (Acre Feet). RCS #2 - 6.71 and RCS #1 - 0.55

16. Provide the location and number of acres where wastewater and manure are land applied: The application has 962 acres for waste and wastewater application. See attached Figures 1.3a-f for exact LMU locations.

17. List the maximum number of head to be permitted. 899



Map Generated 9/8/2022

LEGEND:

Denotes Production Area

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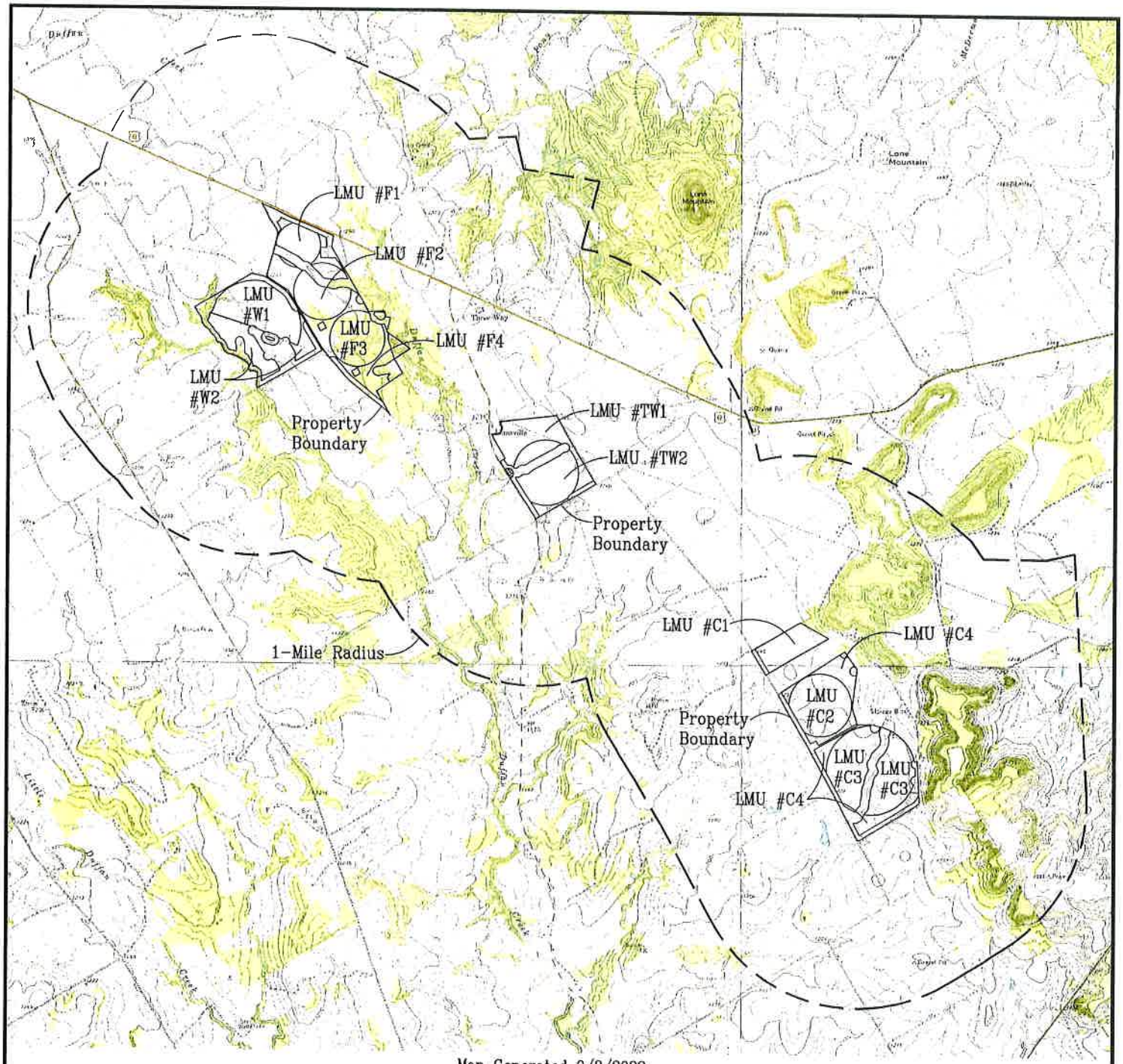
SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS – December 2017.

- Refer to Figures 1.3a-e & 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	SPIF Map A	ENVIRO-AG EAE ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 9/8/2022

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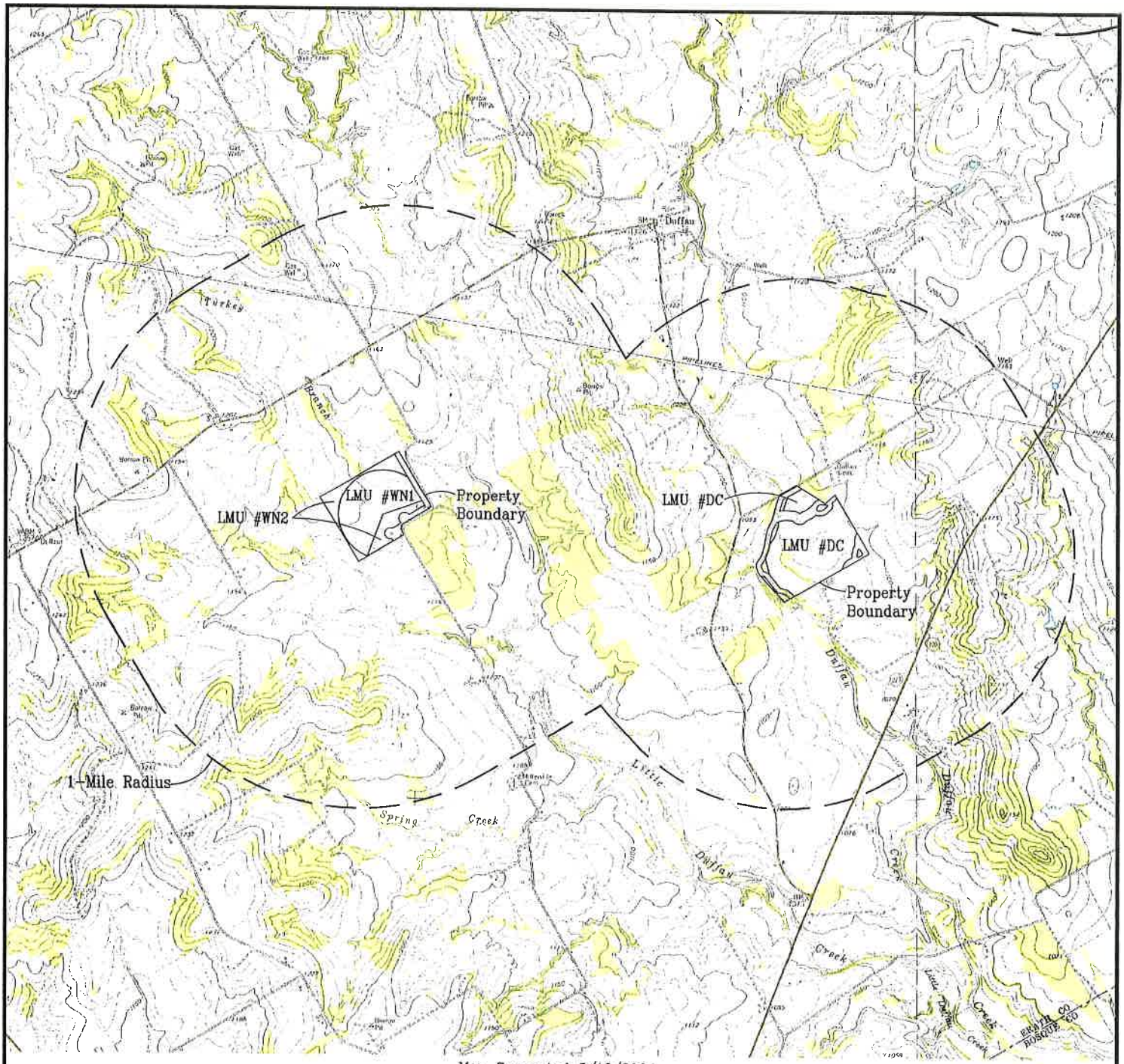
SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS – December 2017.

- Refer to Figures 1.3a–e & 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	SPIF Map B	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 5/13/2024

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1800' 0 1800' 3600'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS - December 2017.

- Refer to Figures 1.3a-e & 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	SPIF Map C	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

TECHNICAL INFORMATION PACKET FOR CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOS)

Submit this Form with your Individual Permit Application (TCEQ – 000728)

Name of Site: Kuiper Cows

TCEQ Permit Number, if assigned: WQ000 5293000

Date Prepared: June 2024

SECTION 1. POLLUTANT SOURCES MANAGEMENT

For each potential pollutant source listed in the table below, provide the management practices utilized or enter "Not Applicable". Management practices should address the collection, storage and final disposition of each potential pollutant source. You may attach your list.

Table 1: Potential Pollutant Sources and Best Management Practices

Potential Pollutant Source	Best Management Practices
Manure and Manure Stockpiles	See Attached BMPs
Wastewater	See Attached BMPs
Sludge	See Attached BMPs
Compost	See Attached BMPs
Feed and Bedding	See Attached BMPs
Silage stockpiles	See Attached BMPs
Dead animals	See Attached BMPs
Dust	See Attached BMPs
Lubricants	See Attached BMPs
Pesticides	See Attached BMPs
Bulk cleaning chemicals	N/A
Inorganic fertilizers	N/A
Fuel storage tanks	See Attached BMPs
Other, specify: Click here to enter text.	N/A

SECTION 2. RETENTION CONTROL STRUCTURE DESIGN

A. Design Summary

1) Design Standards, Characteristic, and Values Sources Used

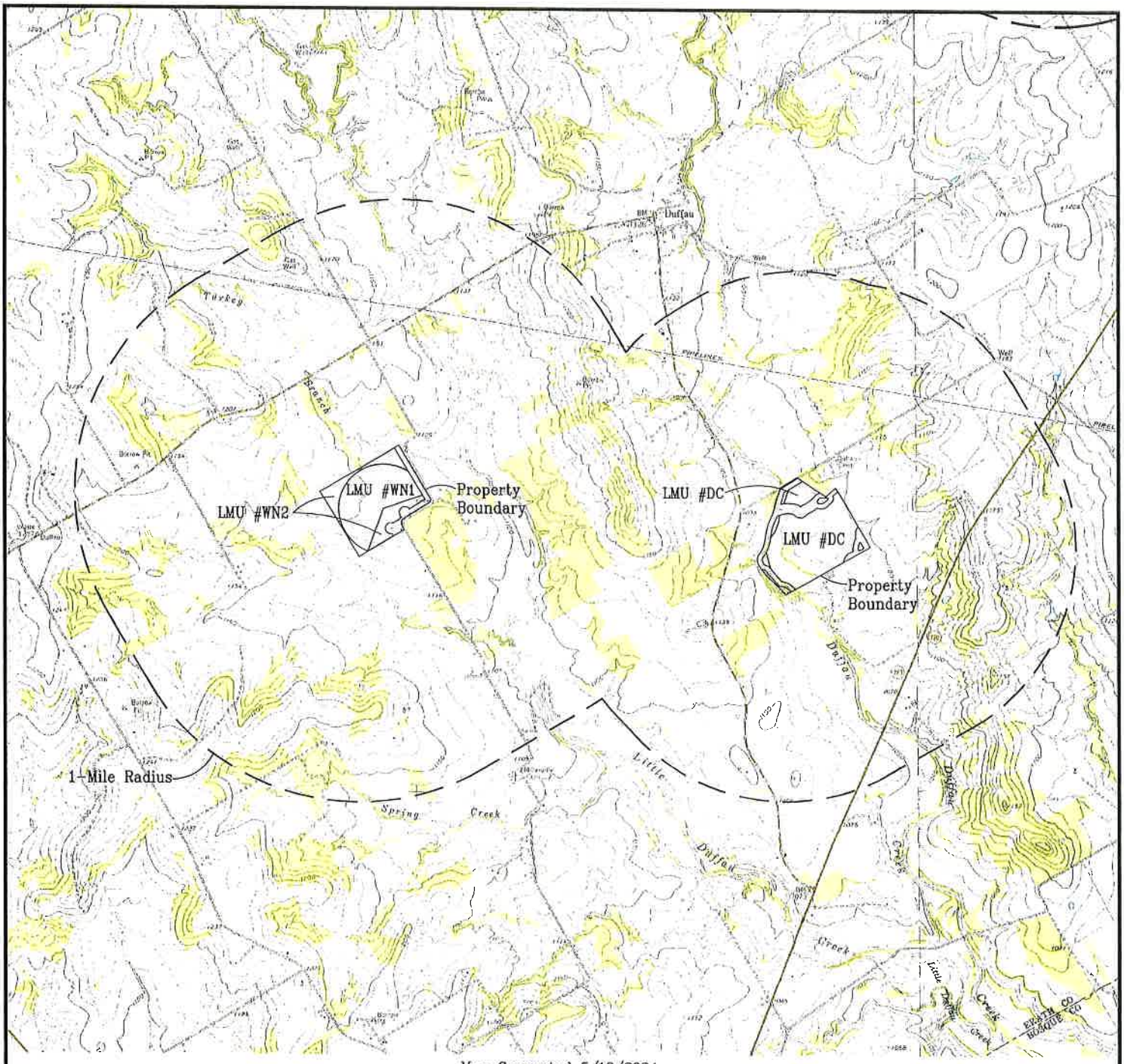
- ☐ Natural Resource Conservation Service
- ☒ American Society of Agricultural and Biological Engineers
- ☐ Other; specify: Click here to enter text.

I. POLLUTANT SOURCES AND MANAGEMENT

B. For each potential pollutant source, provide the management practices utilized.

Note: A Best Management Practice, as defined in 30 TAC §321.32(7), is the schedule of activities, prohibitions of practices, maintenance procedures, and other management and conservation practices to prevent or reduce the pollution of water in the state. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge, land application, or drainage from raw material storage. The following practices should be updated in the on-site PPP as changes to facility operating procedures occur. Employee training should be provided upon development & implementation of any BMP.

Potential Pollutant Sources:	Potential Best Management Practices (BMPs)
Manure, Sludge, Stockpiles, Slurry, Bedding, Feed Waste & Compost	Temporary (< 30 days) & Permanent Storage (>30 days) Store in drainage area of the RCS - OR - If not located within drainage area, berm area to contain runoff. Annually sample manure/manure stockpiles/compost/slurry for nutrient concentrations. Manure, Sludge, Slurry and/or Compost -Land application on-site. Regular pen maintenance (scraping & drainage)
Dust - Vehicle Traffic	Control speeds around the facility. Reduce travel on unpaved facility roads, or manage dust by sprinkling road with water and/or a suppressant on an as needed basis. Utilize paving products and/or gravel to manage dust on facility roads.
Dust - Feed Handling/Processing	Utilize dust abatement measures for feed handling equipment, Utilize choke feeding when handling feed ingredients & Utilize feed ingredients, such as moisture or other additives, to manage dust.
Feedstuff/Silage Stockpiles	Contain leachate in an earthen berm or in the RCS Minimize feed spoilage & utilize plastic covers or roofed areas for storage when applicable.
Lubricants/Pesticides/Herbicides/Parlor Chemicals	Store under roof Handle and dispose according to label directions
Fuel Tanks	Provide secondary containment Prevent overfills/spills
Wastewater	Store in RCS Land application according to NUP/NMP Land application will not occur during periods of saturation or frozen conditions (except in the event of imminent overflow) Annually sample for nutrient concentrations Maintain liner and capacity certifications Maintain adequate capacity as determined by the pond marker schematic
Dead Animals	Disposed by a third-party rendering service or composted on-site Collected within 24 hours of death and disposed within three days of death



Map Generated 5/13/2024

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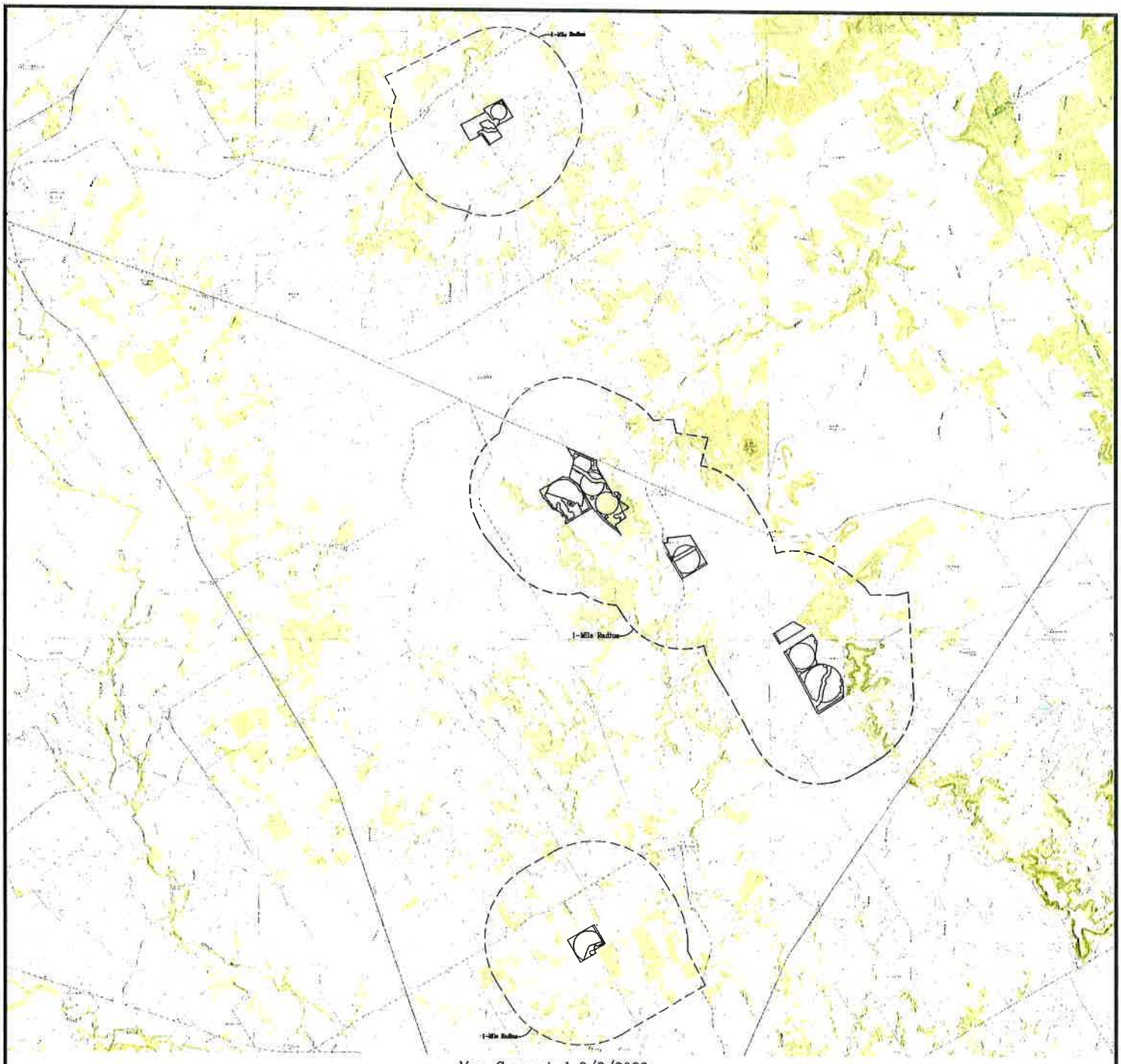
1800' 0 1800' 3600'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS - December 2017.

- Refer to Figures 1.3a-e & 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	USGS 7.5-Minute Quadrangle Map Figure 1.2c Page 5	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 9/8/2022

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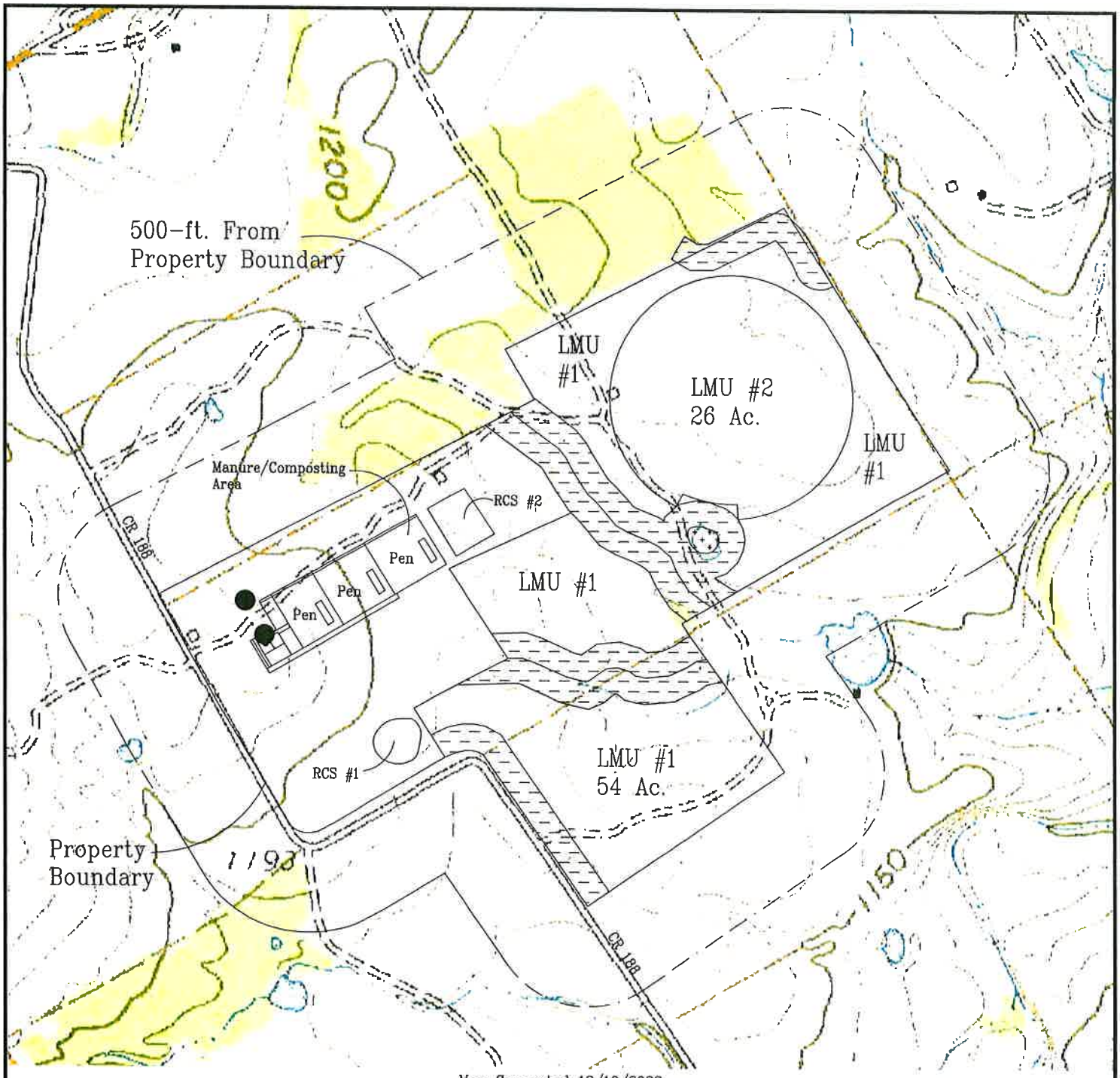
1 Mile 0 1 Mile 2 Miles

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS – December 2017.

- Refer to Figures 1.3a-e & 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	USGS 7.5-Minute Quadrangle Map Figure 1.2d Page 6	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 12/19/2022

LEGEND:

- Denotes Well
- Denotes 130-ft Buffer
- Denotes Fresh Water Pond

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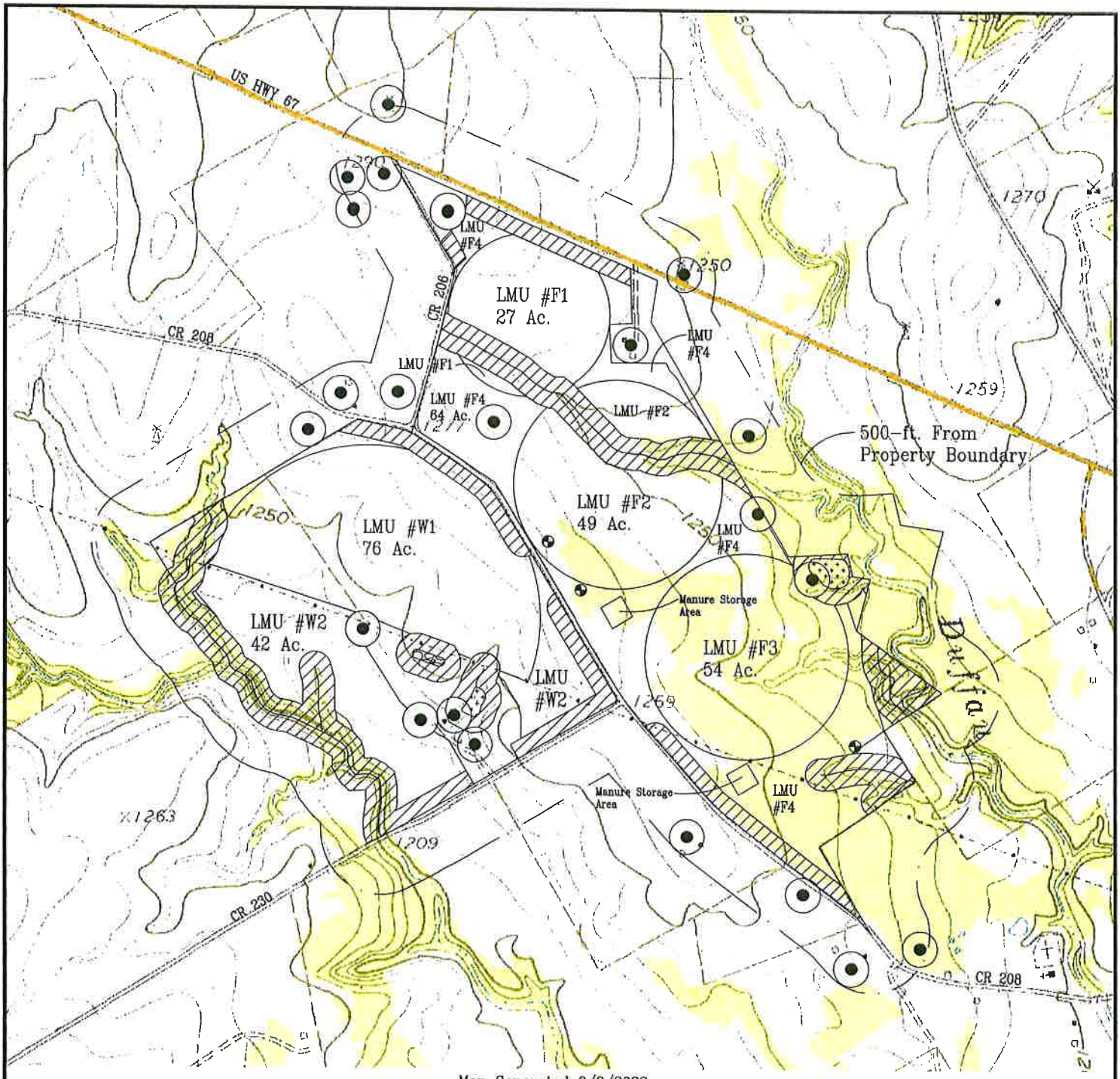
350' 0 350' 700'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS - Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Site Map Figure 1.3a Page 7	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 9/8/2022

LEGEND:

- Denotes Plugged Well
- Denotes Well w/Buffer
- Denotes 136-ft Buffer
- Denotes Fresh Water Pond
- Denotes Borrow Area

N
W E
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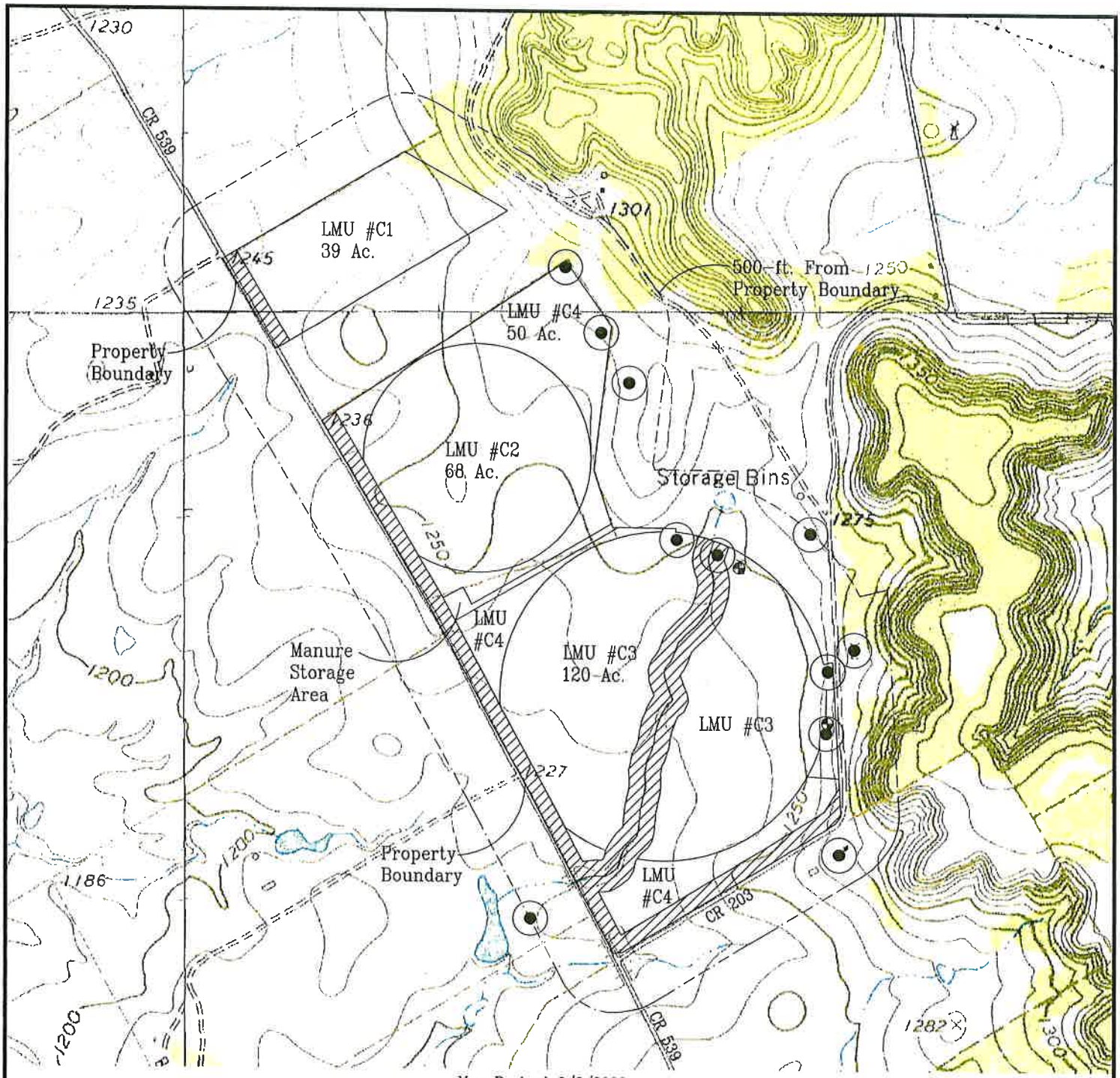
600' 0 600' 1200'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS - Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Site Map Figure 1.3b Page 8	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Revised 9/8/2022

LEGEND:

- Denotes Plugged Water Well
- Denotes Well w/Buffer
- Denotes 136-ft Buffer

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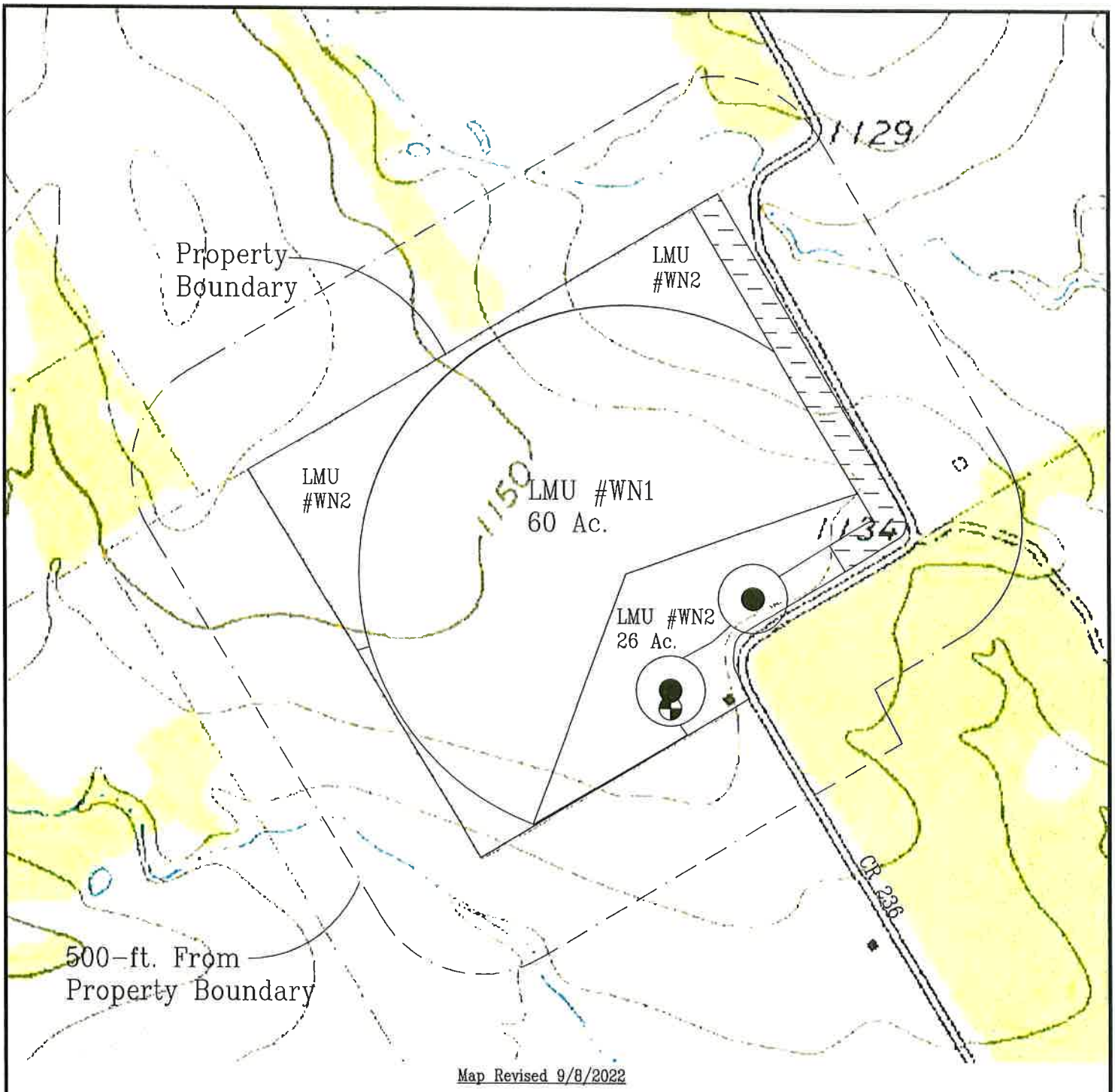
600' 0 600' 1200'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS – Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Site Map Figure 1.3c Page 9	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Revised 9/8/2022

LEGEND:

- Denotes Plugged Well
- Denotes Well w/Buffer
- Denotes 130-ft Buffer

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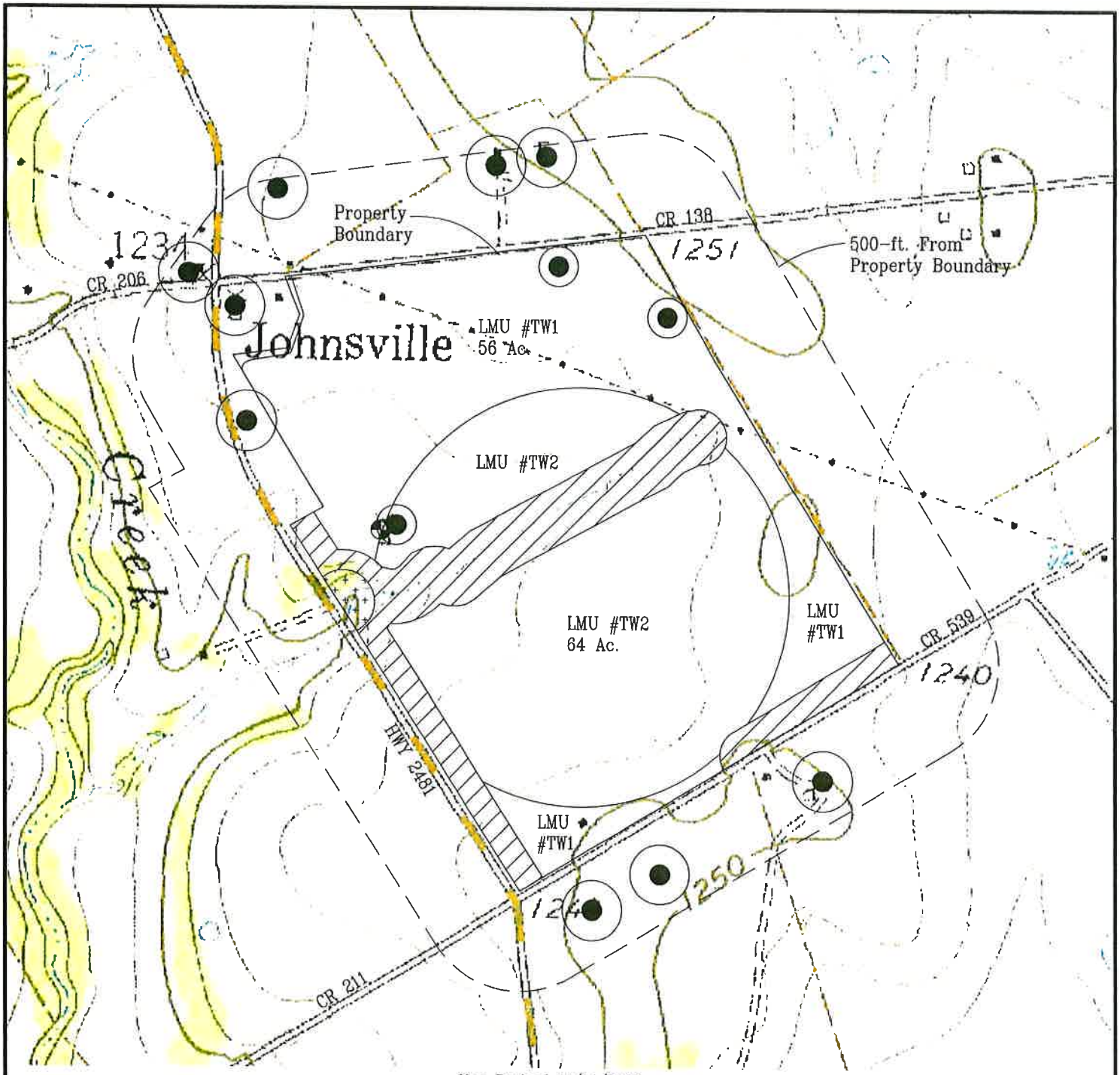
300' 0 300' 600'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS – Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Site Map Figure 1.3d Page 10	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Revised 11/14/2022

LEGEND:

- Denotes Plugged Well
- Denotes Well w/Buffer
- Denotes 136-ft Buffer
- Denotes Fresh Water Pond

N
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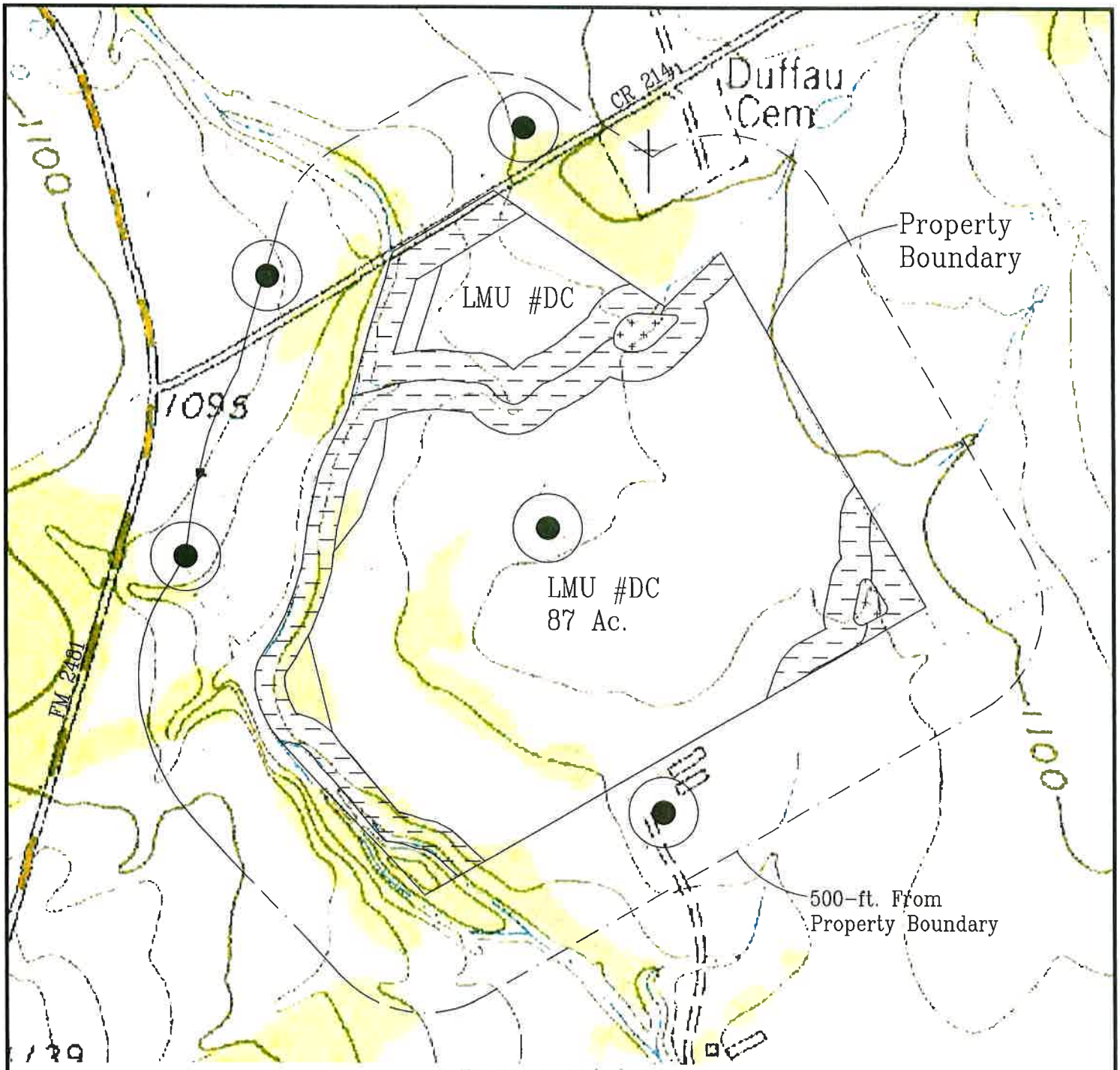
350' 0 350' 700'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS – Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Site Map Figure 1.3e Page 11	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 5/13/2024

LEGEND:

- Denotes Well w/Buffer
- Denotes 130-ft Buffer
- Denotes Fresh Water Pond

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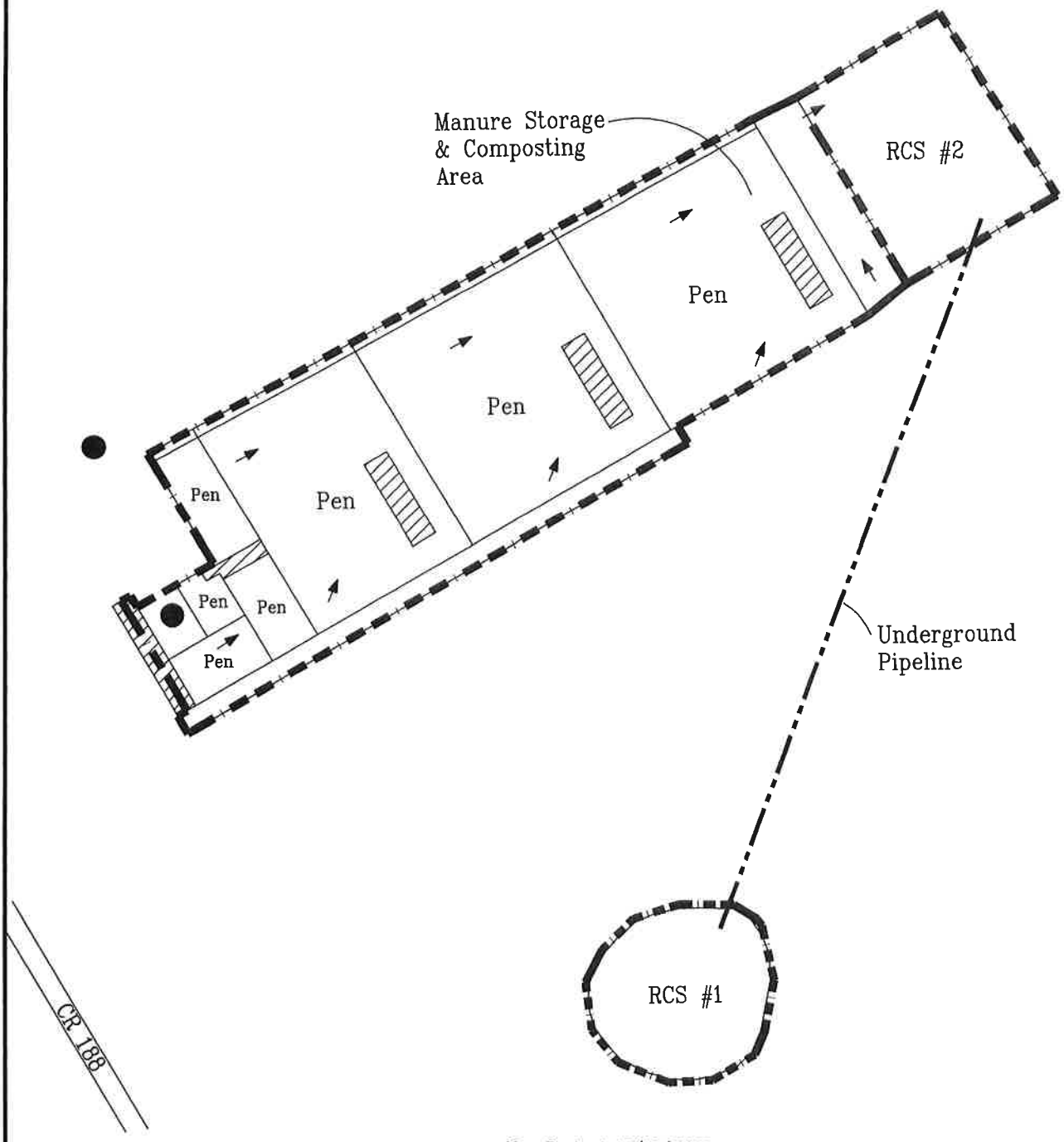
300' 0 300' 600'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS - Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Site Map Figure 1.3f Page 12	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Revised 12/19/2022

LEGEND:

- ● Denotes Water Well
- — · — Denotes Ditches and/or Berms
- ▨ Denotes Roofed Areas

Note: Drainage is depicted by arrows shown on the map. The drainage will be directed to RCS #2 via ditches or berms. RCS #1 will maintain two foot of freeboard plus the 25-yr/24-hr. rainfall event. Wastewater is pumped from RCS #2 to RCS #1 and from RCS #1 to RCS #2 in times of emergency in order to help prevent a discharge.

N W E S

100' 0 100' 200'

SCALE AS SHOWN

- Refer to Figures 1.3a-e for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Runoff Control Map Figure 1.4 Page 13	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

2.0 CALCULATIONS & SPECIFICATIONS

2.1 Facility Overview

The existing facility consists of pens and two retention control structures to confine 899 head of Holstein heifers.

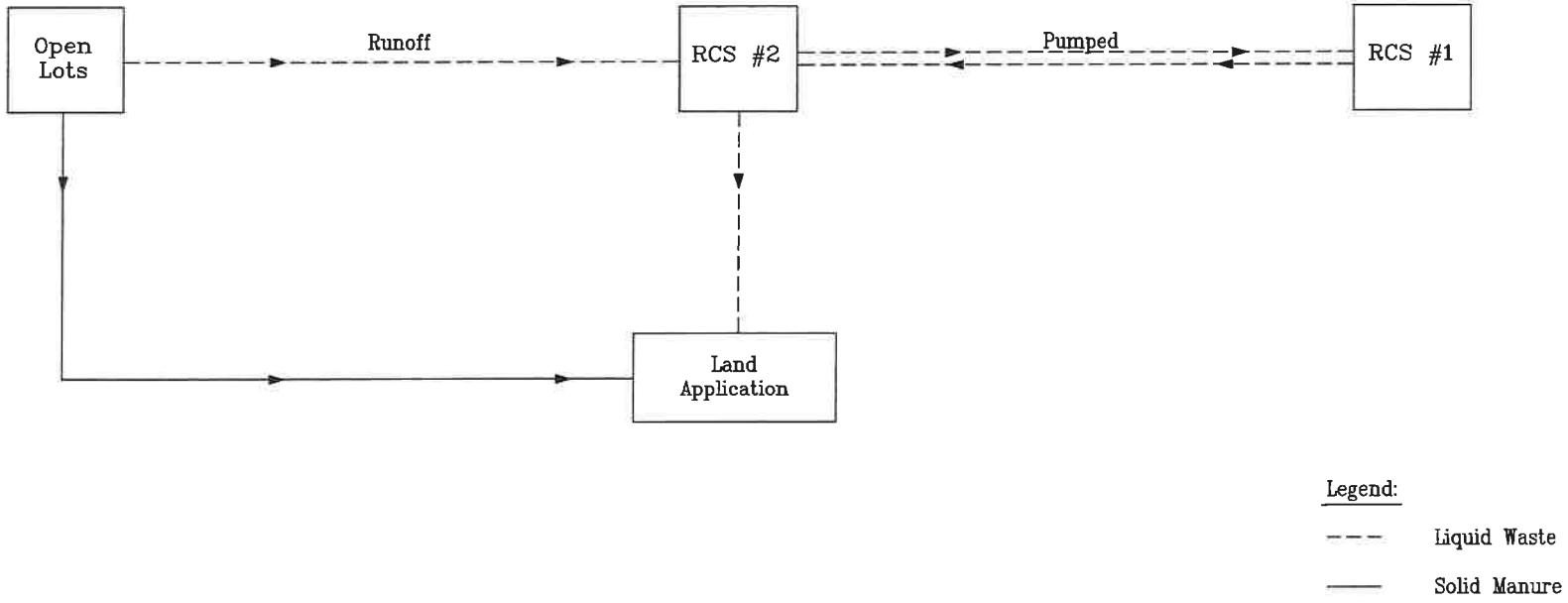
This major amendment is for the addition of LMU #DC and Well #30.

The existing manure and/or wastewater storage structures have been certified as meeting TCEQ requirements for soil liner. Figure 2.1, Manure & Wastewater Flow Chart, shows the waste handling procedures and storage practices at the facility.

2.2 Manure Production

Table 2.1, As-Excreted Manure Characteristics Existing Dairy Facility, is included as a summary of the annual manure and nutrient production for the facility. The totals in Table 2.1 represent as-excreted manure and nutrient values for the maximum head count shown in the application.

Note: This data is intended for planning and design purposes and is not to be used for whole-farm nutrient mass balance calculations.



Kuiper Cows Stephenville, Texas Erath County	Manure & Wastewater Flow Chart Figure 2.1 Page 15	ENVIRO–AG EAE ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

ESTIMATED MANURE PRODUCTION
for a DAIRY FACILITY
Table 2.1
ENVIRO-AG ENGINEERING, INC.

NAME OF CAFO: Kuiper Cows
LOCATION: Stephenville, TX
DATE: September-22

FACILITY TOTAL	MANURE PRODUCTION CRITERIA (a) Heifers	Total
1. Maximum Number of Animals Confined (head):	**899**	**899**
2. Confinement period, hrs/hd/day	24	24
3. Percent of time in Confinement	100%	100
4. Total Manure Production, lbs/day	74,617	74,617
5. Total Solids Production, lbs/day	9,889	9,889
6. Manure Production, tons/year	1,805	1,805
7. Volatile Solids Production, lbs/day	n/a	0
8. Total Nitrogen Production, lbs/day	450	450
9. Total Phosphorus, P2O5 lbs/day (b)	136	136
10. Total Potassium, K2O lbs/day (b)	356	356

NOTES:
(a) - Manure and nutrient production values are taken from American Society of Agricultural and Biological Engineers Data: (ASABE D384.2 MAR05_R2010) Manure Production and Characteristics, Table 1.b - Section 3 (Dairy-dry cow was used as a worst case scenario). Production values given in terms of lb/day-animal (wet-basis).
(b) - The ASAE Manure Production and Characteristics Tables give P and K in the elemental forms. Convert to P2O5 by multiplying by 2.29 and to K2O by multiplying by 1.2.

2.3 25-Year, 24-Hour Rainfall Storage Volume

In accordance with 30 TAC §321.38(e)(7)(A), RCS #2 and RCS #1 are designed to maintain a margin of safety to contain the runoff and direct precipitation from the 25-year, 24-hour storm event for this location, which is 7.3 inches of rainfall. Drainage area runoff volumes are calculated using the SCS method with curve numbers (CN) selected based on soil type and land use. The pen area runoff was calculated using a CN of 90, the pond area was calculated using a CN of 100, and the adjacent areas were calculated a CN of 85. Run-on from areas outside the control facility is directed away from the RCS. Tables 2.2a-b shows the calculated storage volume required for the rainfall runoff from a 25-year, 24-hour storm.

2.4 Sludge Accumulation Volume

A 5-year sludge accumulation volume is included in each retention pond. The sludge volume in the runoff ponds is estimated using the USDA/Agricultural Field Waste Handbook (Kansas Part 651.1082, Suggested Procedures for Sediment Volume Estimation).

2.5 Water Balance Model

Tables 2.3a-b, Water Balance Model, estimates the inflows and withdrawals from RCS #2 and RCS #1 including runoff, direct rainfall, process-generated wastewater, evaporation, and irrigation withdrawal based on crop demand in accordance with 30 TAC §321.38(e)(7)(C). Actual pond withdrawal amounts will vary with changing weather conditions. An additional volume is included in the RCS to provide flexibility in managing RCS levels.

REQUIRED STORAGE VOLUMES
for RETENTION CONTROL STRUCTURES
Table 2.2a
ENVIRO-AG ENGINEERING, INC.

NAME OF CAFO: Kuiper Cows
LOCATION: Stephenville, TX
DATE: September-22

RCS #2 - RUNOFF POND REQUIREMENT

RAINFALL VOLUME

Drainage Areas	CN	Area (ac)
Pen/Open Lot areas	90	6.05
Adjacent area between pens and RCS	85	0.81
Paved/Roofed area	100	0.63
RCS surface area	100	1.45
Total Area (acres)		8.94

25-Year, 24-Hour Rainfall Event	(Inches)	7.3

Runoff Volume Determination (a)	(Inches)	(ac-ft)
Pen/Open Lot areas	6.12	3.08
Adjacent area between pens and RCS	5.54	0.37
Paved/Roofed area	7.30	0.38
RCS surface area	7.30	0.88
Total Runoff (ac-ft):		4.72

TOTAL RCS VOLUME REQUIRED

	(ac-ft)
Required Volume for Rainfall Runoff	4.72
Sludge Accumulation Volume (b)	0.63
Additional Required Volume from Water Balance	1.35
Total Volume Required for RCS	**6.71**

NOTES:
(a) Using SCS method:
Where:

S = (1000/CN) - 10
Q = ((P - 0.2S)^2)/(P + 0.8S)
S = Potential maximum retention after runoff begins in)
Q = Runoff (in)
P = 25-year, 24-Hour rainfall (in)
CN = Curve Number from SCS 210-VI-TR-55,
2nd Edition, June 1986

(b) USDA Agricultural Field Waste Handbook, Kansas, Part 651.1082, Suggested procedures for sediment volume estimation (1.5 % Solids for 5 years).

NOTE: Calculations were performed in Microsoft Excel using floating point arithmetic in order to maintain the accuracy of the data. Any inconsistencies in rounding of the displayed values are not to be construed as errors in the calculation. For more information, please refer to http://support.microsoft.com/kb/42980

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REQUIRED STORAGE VOLUMES
for RETENTION CONTROL STRUCTURES
Table 2.2b
ENVIRO-AG ENGINEERING, INC.

NAME OF CAFO: Kuiper Cows
LOCATION: Stephenville, TX
DATE: September-22

RCS #1 - POND REQUIREMENT

RAINFALL VOLUME

Drainage Areas:	CN	Area (ac)
Pen/Open Lot Areas:	90	0.00
Adjacent Area Between Pens and RCS:	85	0.00
Paved/Roofed Area:	100	0.00
RCS #1 Surface Area:	100	0.90
Total Area (acres):		0.90

25-Year, 24-Hour Rainfall Event:	(Inches)	7.3

Runoff Volume Determination (a)	(Inches)	(ac-ft)
Pen/Open Lot Areas:	6.12	0.00
Adjacent Area Between Pens and RCS:	5.54	0.00
Paved/Roofed Area:	7.30	0.00
RCS #1 Surface Area:	7.30	0.55
Total Runoff (ac-ft):		0.55

TOTAL RCS VOLUME REQUIRED

	(ac-ft)
Required Volume for Rainfall Runoff:	0.55
Additional Required Volume from Water Balance:	0.00
Total Volume Required for RCS	**0.55**

NOTES:
(a) Using SCS method:
Where:

S = (1000/CN) - 10
Q = ((P - 0.2S)^2)/(P + 0.8S)
S = Potential maximum retention after runoff begins in)
Q = Runoff (in)
P = 25-year, 24-Hour rainfall (In)
CN = Curve Number from SCS 210-VI-TR-55,
2nd Edition, June 1986

NOTE: Calculations were performed in Microsoft Excel using floating point arithmetic in order to maintain the accuracy of the data. Any inconsistencies in rounding of the displayed values are not to be construed as errors in the calculation. For more information, please refer to http://support.microsoft.com/kb/42980

WATER BALANCE MODEL
IRRIGATION AND EVAPORATION for RCS #2

Table 2.3a

ENVIRO-AG ENGINEERING, INC.

NAME: Kuiper Cows
LOCATION: Stephenville, TX
DATE: September-22

HYDROLOGIC CHARACTERISTICS

Pen Area (acres):	6.05	
Adjacent Areas (acres):	0.81	
Paved/Roof Area (acres):	0.63	
Total RCS Surface Area (acres):	1.45	
Total Irrigated Area (acres)(12):	26.0	26.0
Cropping scheme:	Coastal	Winter Wheat
Effective Evaporation Surface Area (acres):	1.25	

IRRIGATION CELL VOLUME SUMMARY DATA

25-Year, 24-Hour Rainfall Volume (ac-ft):	4.72
Process Generated Wastewater Volume (ac-ft):	0.00
Sludge Accumulation Volume (ac-ft):	0.63
Additional Volume (ac-ft):	1.35
Total Required Capacity (ac-ft):	6.71

	RCS INFLOW CALCULATIONS					HYDRAULIC CROP DEMAND CALCULATIONS					RCS STORAGE SUMMARY			
MONTH	(1) (inches)	(2) (inches)	(3) (inches)	(3) (ac-ft)	(4) (ac-ft)	(5) (inches)	(6) (inches)	(6) (inches)	(7) (ac-ft)	(7) (ac-ft)	(8) (inches)	(9) (ac-ft)	(10) (ac-ft)	(11) (ac-ft)
													start value →	0.63
JAN	1.56	0.24	0.06	0.00	0.39	1.56	2.10	2.74	1.17	2.56	2.36	0.24	0.15	0.63
FEB	1.89	0.39	0.14	0.00	0.54	1.89	2.45	3.11	1.24	2.64	2.69	0.28	0.26	0.63
MAR	2.16	0.54	0.23	0.00	0.66	2.16	4.06	4.97	4.12	6.09	4.29	0.44	0.22	0.63
APR	2.92	1.02	0.55	0.00	1.06	2.87	4.98	5.74	4.58	6.23	5.19	0.53	0.52	0.63
MAY	4.35	2.08	1.36	0.00	1.89	3.95	5.73	5.33	3.85	2.98	5.24	0.54	1.35	0.63
JUN	3.29	1.28	0.74	0.00	1.27	3.18	6.82	3.22	7.90	0.10	7.00	0.72	0.55	0.63
JUL	2.14	0.53	0.22	0.00	0.65	2.14	7.66	0.00	11.96	0.00	8.20	0.65	0.00	0.63
AUG	2.28	0.61	0.27	0.00	0.72	2.28	7.56	0.00	11.44	0.00	7.70	0.72	0.00	0.63
SEP	3.03	1.10	0.50	0.00	1.12	2.96	5.78	0.00	6.11	0.00	5.89	0.60	0.51	0.63
OCT	3.18	1.20	0.58	0.00	1.20	3.09	4.29	2.15	2.61	0.00	4.87	0.50	0.70	0.63
NOV	1.89	0.39	0.14	0.00	0.54	1.89	2.81	1.70	1.99	0.00	3.34	0.34	0.19	0.63
DEC	1.61	0.26	0.07	0.00	0.41	1.61	2.34	2.33	1.37	1.56	2.46	0.25	0.16	0.63
TOTALS	30.28	9.64	5.07	0.00	10.45	29.57	56.49	31.29	58.34	22.16	59.25	5.82	4.63	

NOTES:

(1) AVERAGE PRECIPITATION - Average precipitation taken from the Texas Water Development Board, Erath County, Quad #509, Retrieved September 9, 2022

(2) RUNOFF PENS AND ADJACENT AREA - Runoff from pens, adjacent areas calculated using SCS Curve Number Method adjusted from 1 to 30-day Curve Number (Pen CN-77, Adj CN-67). (Ref. NRCS Animal Waste Management Software Help File-Program Documentation for Runoff)

(3) INFLOW - No process generated wastewater at this facility.

(4) TOTAL INFLOW - Total inflow is calculated as that volume of rainfall that falls on the RCS and process water that enters the RCS.

(5) RAINFALL ON IRRIGATED AREA - Effective monthly rainfall on the irrigated area. Runoff from irrigated fields was calculated using SCS Curve Number Method adjusted from 1 to 30-day Curve Number (Irr Fields CN-48). (Ref. NRCS Animal Waste Management Software Help File-Program Documentation for Runoff)

(6) CONSUMPTIVE USE values from Berroth, et al., 1998. Mean Crop Consumptive Use and Free-Water Evaporation for Texas, Dept. of Civil Engineering, Texas Tech University, Lubbock, Texas (Tables 16 & 25 Stephenville).

(7) NET CROP DEMAND - Net Crop Demand = ((Consumptive Use(6) - Effective Rainfall(5))/12) x Irrigated Area.

(8) MONTHLY LAKE SURFACE EVAPORATION - Average monthly lake surface evaporation taken from the Texas Water Development Board, Erath County, Quad #509, Retrieved September 9, 2022.

(9) NET POND EVAPORATION - Net Evaporation from the water surface is taken as (Monthly Lake Surface Evap/12) x (RCS Surface Area).

(10) ACTUAL WITHDRAWAL - Actual Withdrawal from the irrigation cell not to exceed Net Crop Demand. (No consideration given for nutrient demand of crop)

(11) STORAGE AT END OF MONTH - Storage volume in the irrigation cell at the end of the month. The storage calculated in this column should not encroach in the volume reserved for the 25-year, 24-hour rainfall event.

(12)Total Irrigated Area Acres Include: LMU #2

NOTE: Calculations were performed in Microsoft Excel using floating point arithmetic in order to maintain the accuracy of the data. Any inconsistencies in rounding of the displayed values are not to be construed as errors in the calculation. For more information, please refer to http://support.microsoft.com/kb/42980

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WATER BALANCE MODEL
IRRIGATION AND EVAPORATION for RCS #1
Table 2.3b
ENVIRO-AG ENGINEERING, INC.

NAME: Kuiper Cows
LOCATION: Stephenville, TX
DATE: September-22

HYDROLOGIC CHARACTERISTICS

Pen Area (acres):	0.00	
Adjacent Areas (acres):	0.00	
Paved/Roof Area (acres):	0.00	
Total RCS Surface Area (acres):	0.90	
Total Irrigated Area (acres)(12):	26.0	26.0
Cropping scheme:	Coastal	Winter Wheat
Effective Evaporation Surface Area (acres):	0.77	

IRRIGATION CELL VOLUME SUMMARY DATA

25-Year, 24-Hour Rainfall Volume (ac-ft):	0.55
Process Generated Wastewater Volume (ac-ft):	0.00
Sludge Accumulation Volume (ac-ft):	0.00
Additional Volume (ac-ft):	0.00
Total Required Capacity (ac-ft):	0.55

	RCS INFLOW CALCULATIONS					HYDRAULIC CROP DEMAND CALCULATIONS					RCS STORAGE SUMMARY			
MONTH	(1) (inches)	(2) (inches)	(2) (inches)	(3) (ac-ft)	(4) (ac-ft)	(5) (inches)	(6) (inches)	(6) (inches)	(7) (ac-ft)	(7) (ac-ft)	(8) (inches)	(9) (ac-ft)	(10) (ac-ft)	(11) (ac-ft)
													start value -->	0.00
JAN	1.56	0.00	0.00	0.00	0.12	1.56	2.10	2.74	1.17	2.56	2.36	0.12	0.00	0.00
FEB	1.89	0.00	0.00	0.00	0.14	1.89	2.46	3.11	1.24	2.64	2.69	0.14	0.00	0.00
MAR	2.16	0.00	0.00	0.00	0.16	2.16	4.06	4.97	4.12	6.09	4.29	0.16	0.00	0.00
APR	2.92	0.00	0.00	0.00	0.22	2.87	4.98	5.74	4.58	6.25	5.19	0.22	0.00	0.00
MAY	4.35	0.00	0.00	0.00	0.32	3.95	5.73	5.53	3.85	2.98	5.24	0.32	0.00	0.00
JUN	3.29	0.00	0.00	0.00	0.25	3.18	6.82	3.22	7.90	0.10	7.00	0.25	0.00	0.00
JUL	2.14	0.00	0.00	0.00	0.16	2.14	7.66	0.00	11.96	0.00	8.20	0.16	0.00	0.00
AUG	2.28	0.00	0.00	0.00	0.17	2.28	7.56	0.00	11.44	0.00	7.70	0.17	0.00	0.00
SEP	3.03	0.00	0.00	0.00	0.23	2.96	5.78	0.00	8.11	0.00	5.89	0.23	0.00	0.00
OCT	3.18	0.00	0.00	0.00	0.24	3.09	4.29	2.15	2.61	0.00	4.87	0.24	0.00	0.00
NOV	1.89	0.00	0.00	0.00	0.14	1.89	2.81	1.70	1.99	0.00	3.54	0.14	0.00	0.00
DEC	1.61	0.00	0.00	0.00	0.12	1.61	2.24	2.33	1.57	1.56	2.46	0.12	0.00	0.00
TOTALS	30.28	0.00	0.00	0.00	2.27	29.37	56.49	31.29	58.34	22.16	59.23	2.27	0.00	

NOTES:

(1) AVERAGE PRECIPITATION - Average precipitation taken from the Texas Water Development Board, Erath County, Quad #509, Retrieved September 9, 2022.

(2) RUNOFF PENS AND ADJACENT AREA - Runoff from pens, adjacent areas calculated using SCS Curve Number Method adjusted from 1 to 30-day Curve Number (Pen CN-77, Adj CN-57). (Ref. NRCS Animal Waste Management Software Help File-Program Documentation for Runoff)

(3) INFLOW - No process generated wastewater at this facility.

(4) TOTAL INFLOW - Total Inflow is calculated as that volume of rainfall that falls on the RCS and process water that enters the RCS

(5) RAINFALL ON IRRIGATED AREA - Effective monthly rainfall on the irrigated area. Runoff from irrigated fields was calculated using SCS Curve Number Method adjusted from 1 to 30-day Curve Number (Ir. Fields CN-48). (Ref. NRCS Animal Waste Management Software Help File-Program Documentation for Runoff)

(6) CONSUMPTIVE USE values from Borrelli, et al., 1998. Mean Crop Consumptive Use and Free-Water Evaporation for Texas, Dept. of Civil Engineering, Texas Tech University, Lubbock, Texas (Tables 16 & 25).

(7) NET CROP DEMAND - Net Crop Demand = ((Consumptive Use(6) - Effective Rainfall(5))/12) x Irrigated Area.

(8) MONTHLY LAKE SURFACE EVAPORATION - Average monthly lake surface evaporation taken from the Texas Water Development Board, Erath County, Quad #509, Retrieved September 9, 2022.

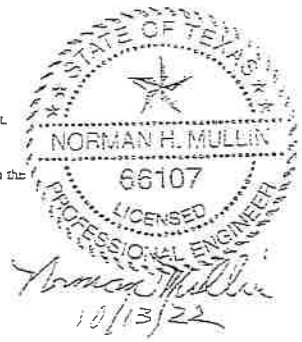
(9) NET POND EVAPORATION - Net Evaporation from the water surface is taken as (Monthly Lake Surface Evap/12) x (RCS Surface Area).

(10) ACTUAL WITHDRAWAL - Actual Withdrawal from the irrigation cell not to exceed Net Crop Demand. (No consideration given for nutrient demand of crop)

(11) STORAGE AT END OF MONTH - Storage volume in the irrigation cell at the end of the month. The storage calculated in this column should not encroach in the volume reserved for the 25-year, 24-hour rainfall event.

(12)Total Irrigated Area Acres Include: LMU #2

NOTE: Calculations were performed in Microsoft Excel using floating point arithmetic in order to maintain the accuracy of the data. Any inconsistencies in rounding of the displayed values are not to be construed as errors in the calculation. For more information, please refer to http://support.microsoft.com/kb/42980



Form No. F-2507

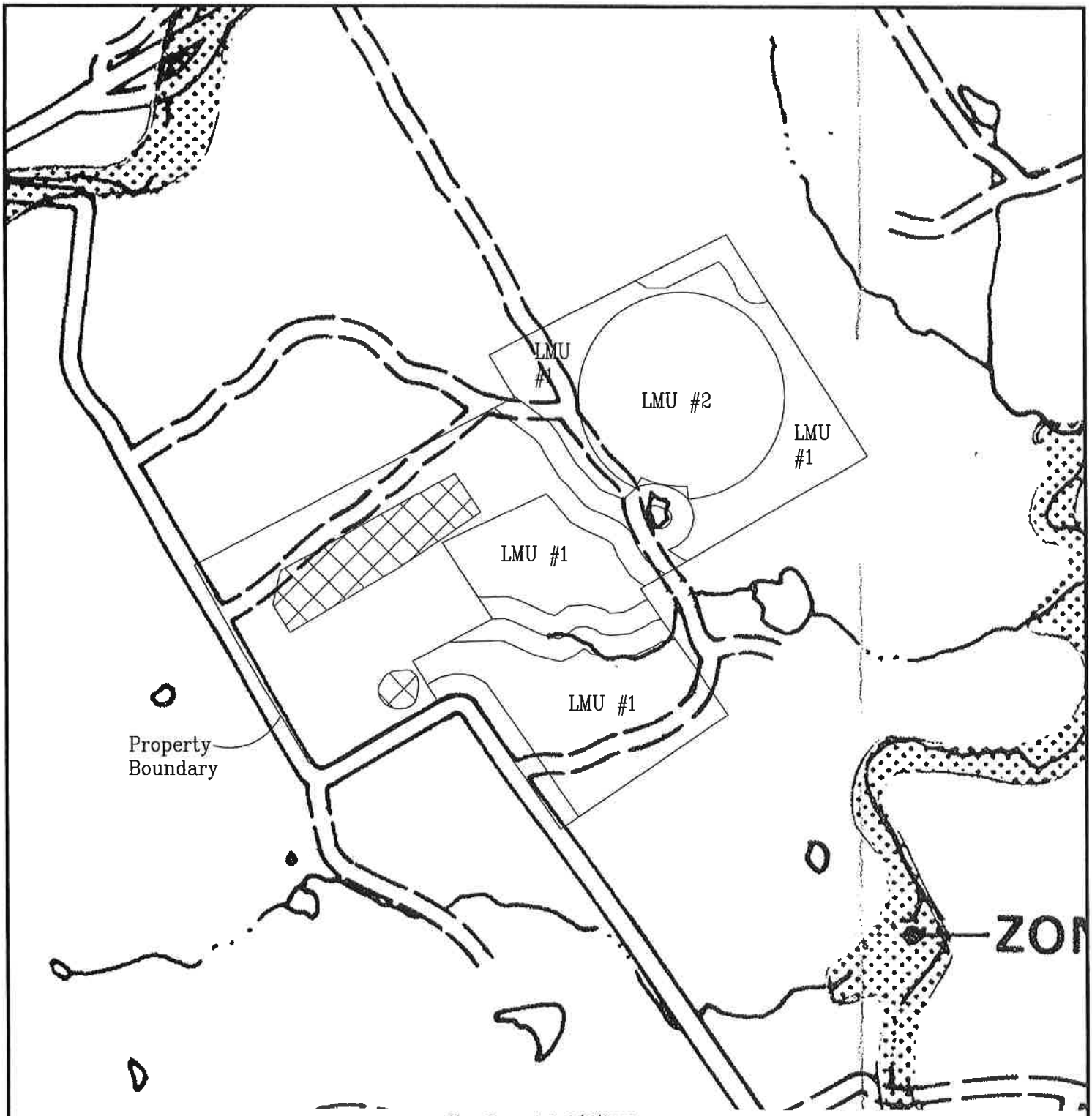
3.0 FACILITY INFORMATION

3.1 Required Certifications

RCS #1 and RCS #2 have been certified by a licensed Texas professional engineer as meeting the liner and capacity requirements of the TCEQ. Existing liner and capacity certifications are attached.

3.2 100-Year Flood Plain Evaluation

Figures 3.1a-e, entitled FEMA Flood Map, shows the subject property overlain on a copy of the FEMA Flood Insurance Rate Map for the area. The production area is not located in a flood plain.



Map Generated 9/8/2022

LEGEND:

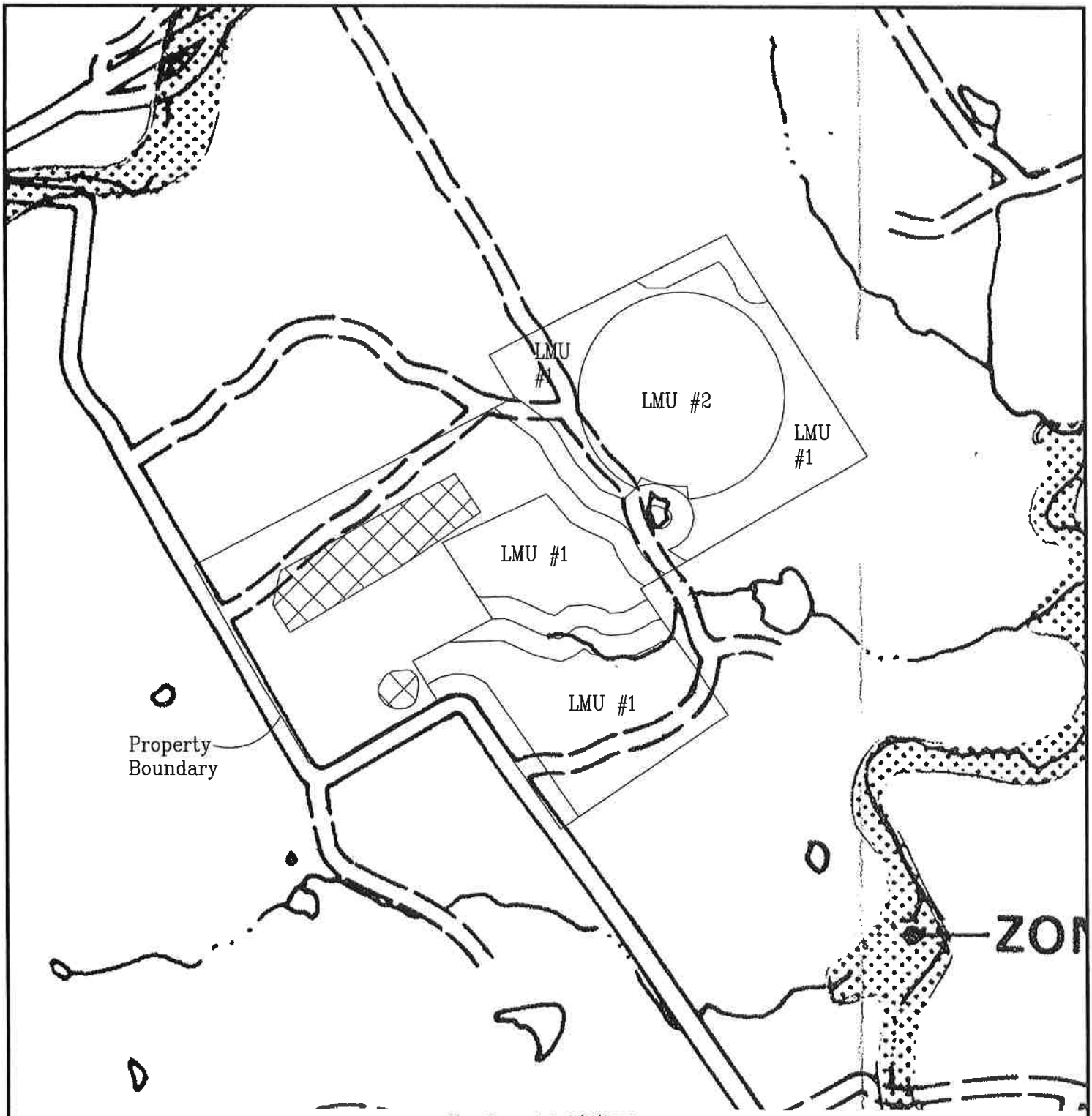
Denotes Production Area

N
W E
S

Source: FEMA, Flood Plain Maps

No Scale

Kuiper Cows Stephenville, Texas Erath County	FEMA Flood Map Figure 3.1a Page 23	ENVIRO-AG EAF ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 9/8/2022

LEGEND:

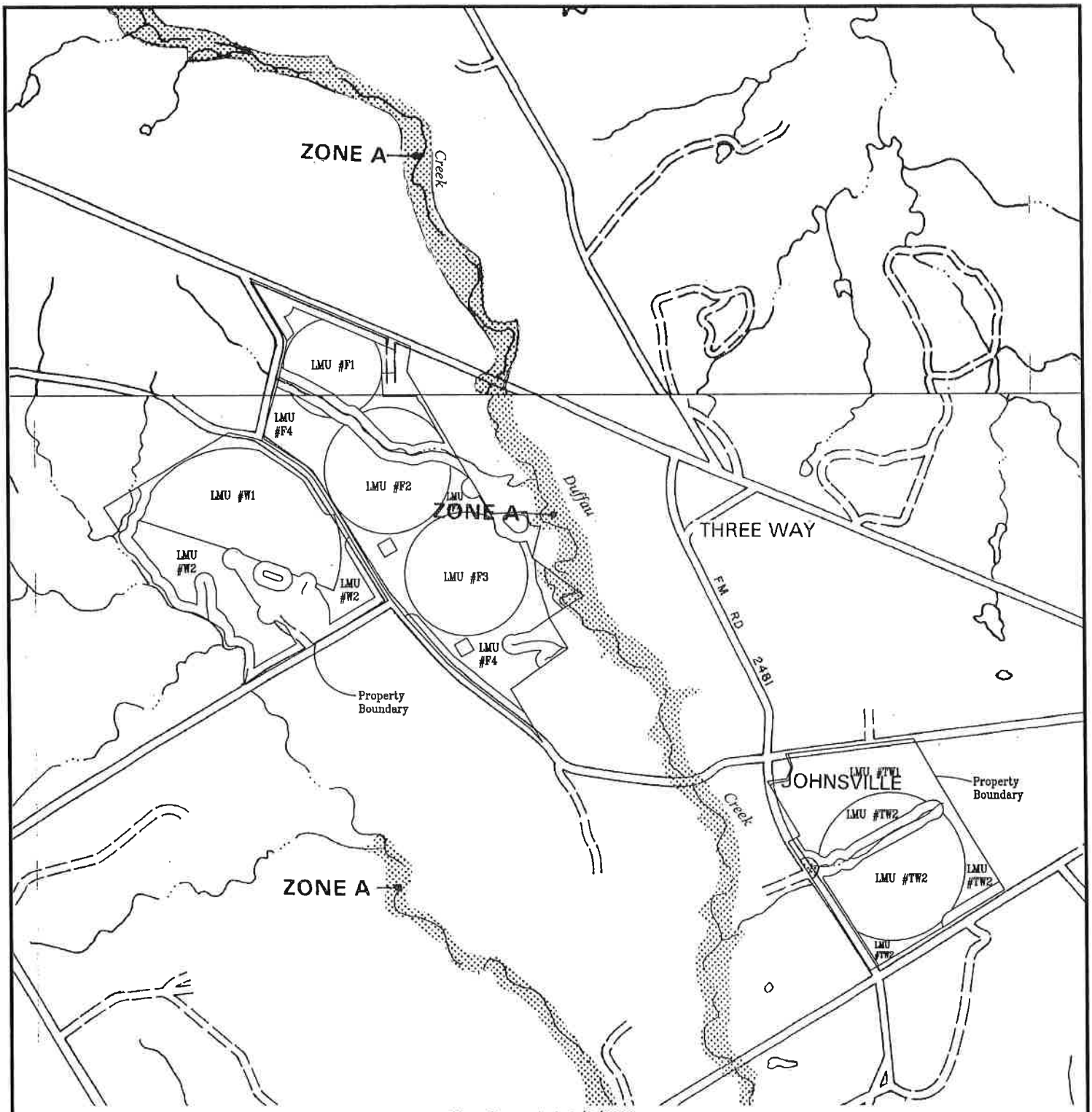
Denotes Production Area

N
W E
S

Source: FEMA, Flood Plain Maps

No Scale

Kuiper Cows Stephenville, Texas Erath County	FEMA Flood Map Figure 3.1a Page 23	ENVIRO-AG EAF ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



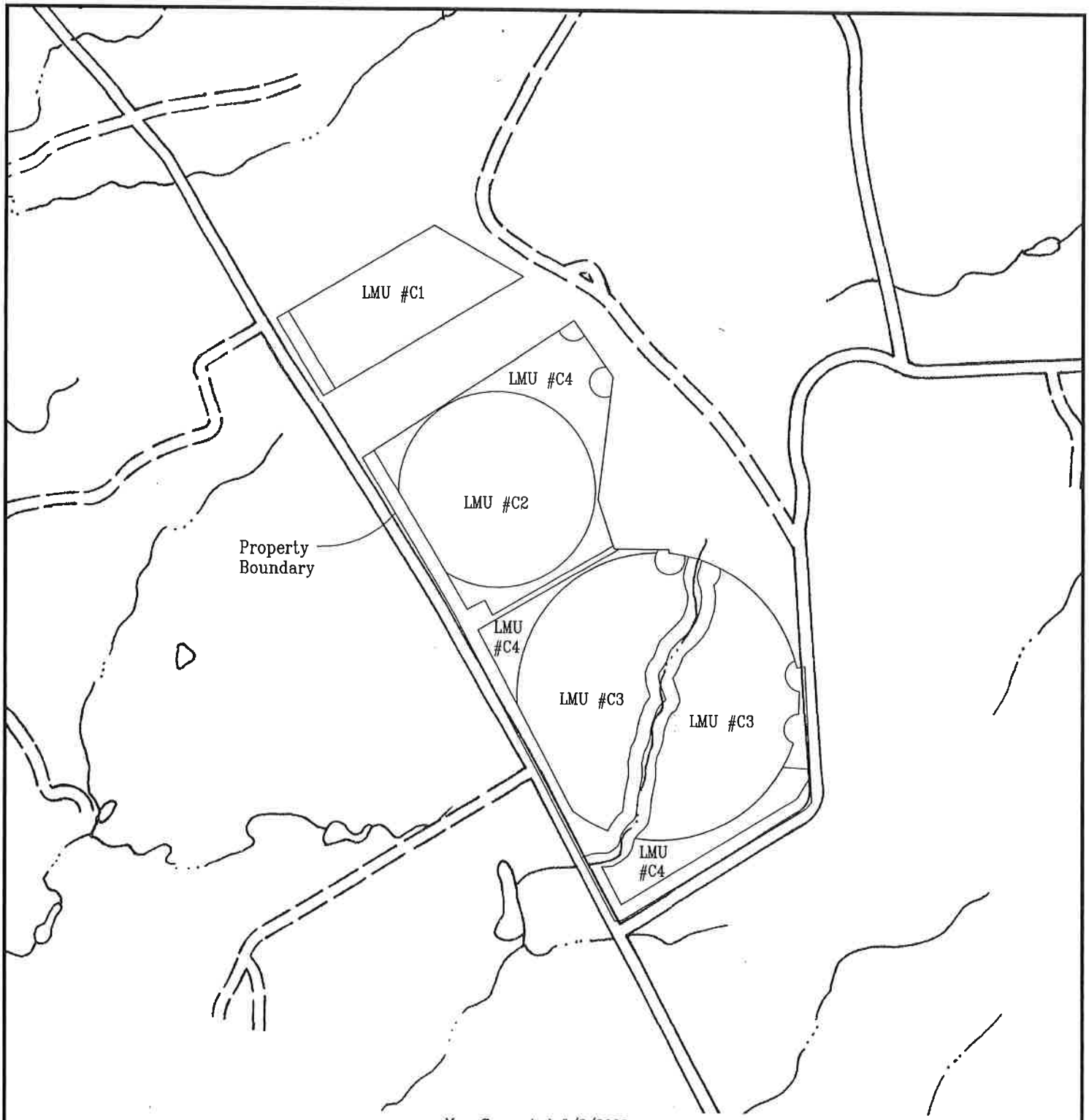
Map Generated 9/8/2022

N
W E
S

Source: FEMA, Flood Plain Maps

No Scale

Kuiper Cows Stephenville, Texas Erath County	FEMA Flood Map Figure 3.1b Page 24	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



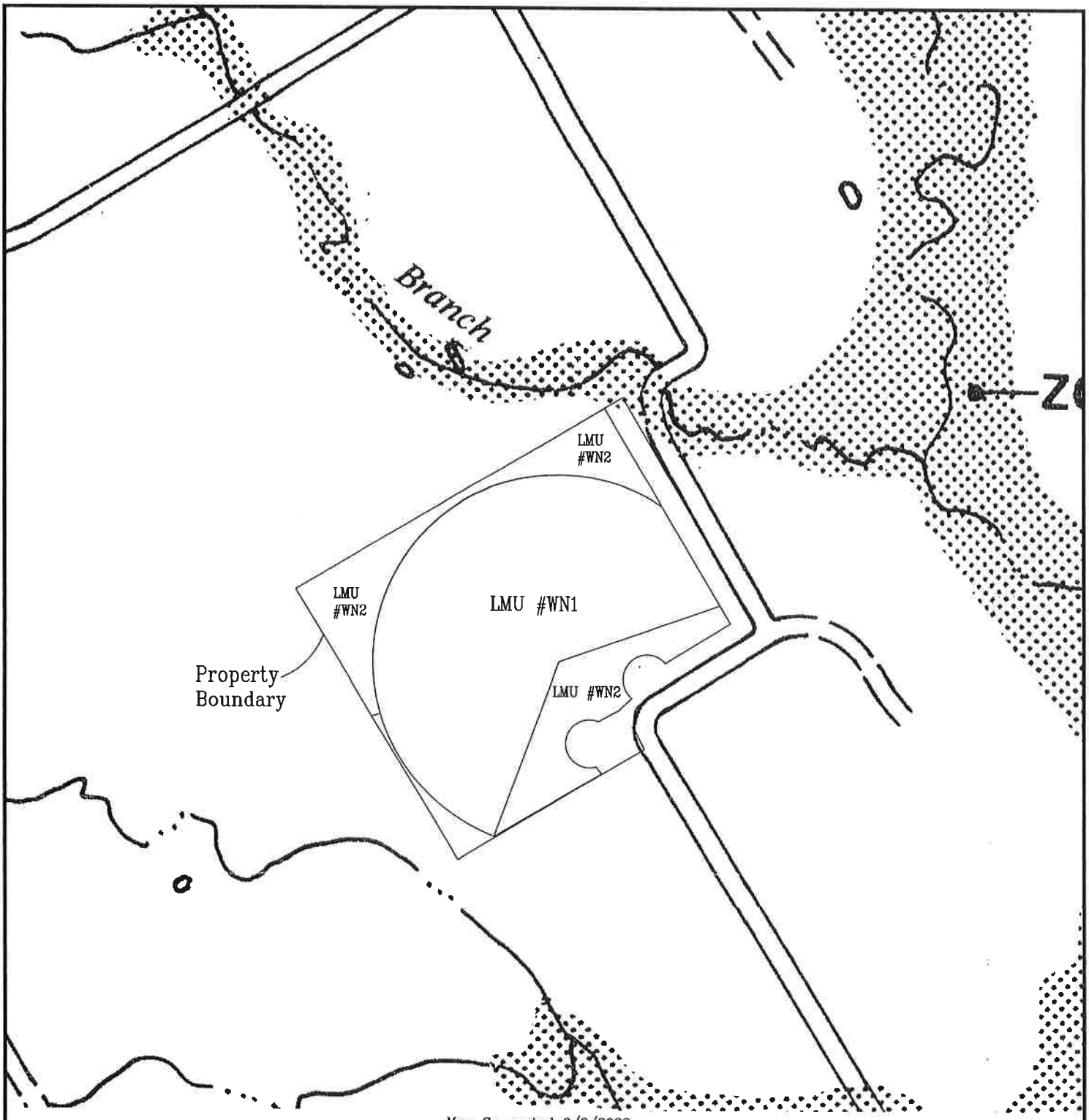
Map Generated 9/8/2022

N
W E
S

Source: FEMA, Flood Plain Maps

No Scale

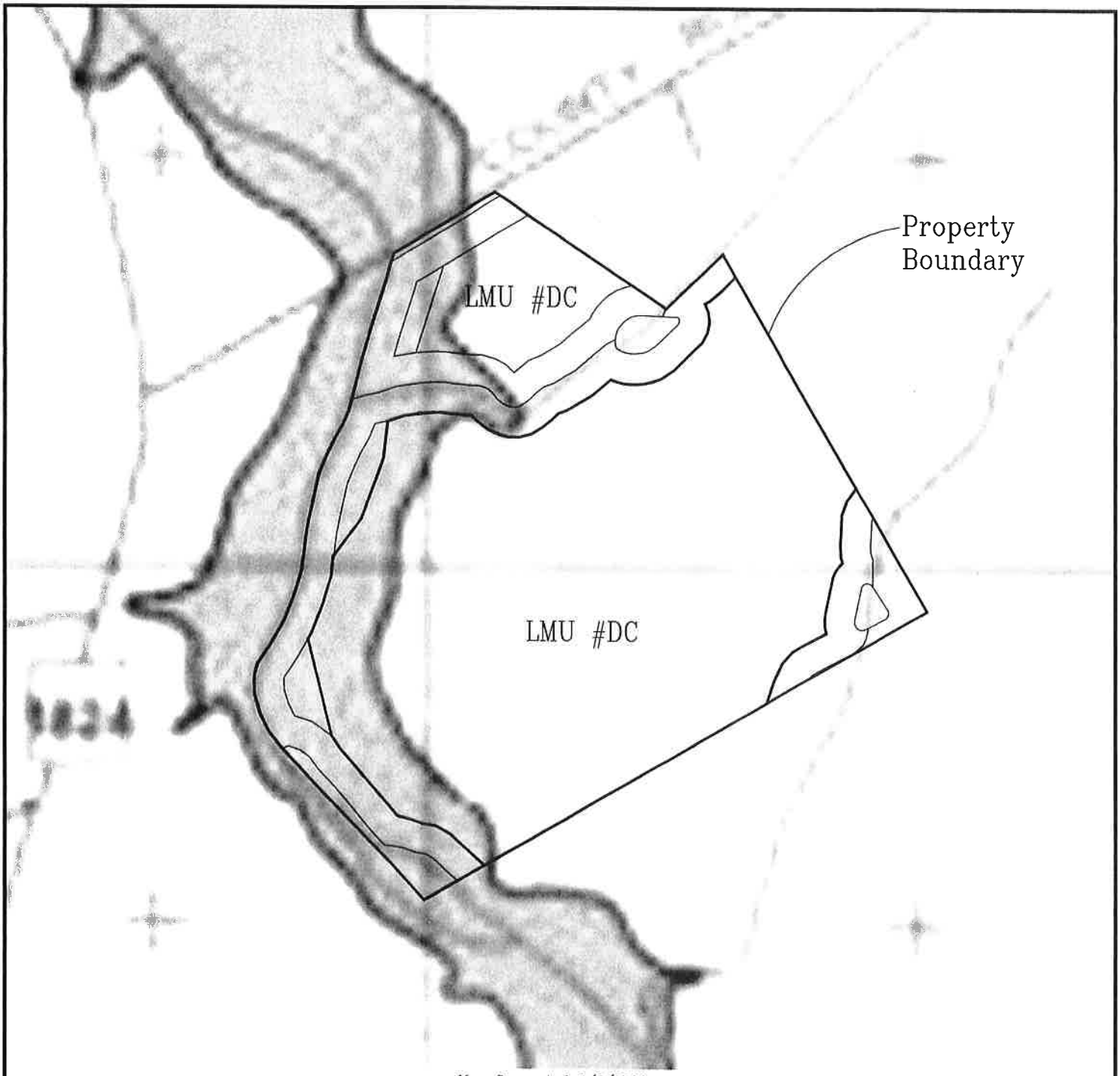
Kuiper Cows Stephenville, Texas Erath County	FEMA Flood Map Figure 3.1c Page 25	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Source: FEMA, Flood Plain Maps

No Scale

Kuiper Cows Stephenville, Texas Erath County	FEMA Flood Map Figure 3.1d Page 26	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 9/8/2022

N
W E
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No Scale

Source: FEMA, Flood Plain Maps

Kuiper Cows Stephenville, Texas Erath County	FEMA Flood Map Figure 3.1e Page 27	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

A.C. Lowther
Cert. Professional Soil Scientist
3310 Santa Monica
Abilene, Texas 79605

October 12, 1994

Texas Natural Resources and Conservation Commission
P.O. Box 13087
Capitol Station
Austin, Texas 78711-3087

Attn: Tom Haberle

Re: Bill Huckaby Dairy

Dear Mr. Haberle:

A.C. Lowther has completed sampling and testing of the soil liner for the Waste Storage Ponds at the Huckaby Dairy Stephenville, Erath County, Texas. The test results including sample thickness, Atterberg limits, permeability and percent passing the number 200 sieve are tabulated on the attached report. Our findings indicate the soils meet the criteria established by the Texas Water Commission.

Sincerely,

A.C. Lowther, CPSS

STATE OF TEXAS
JERRY E. HOLLIGAN
29146
REGISTERED
PROFESSIONAL ENGINEER

Jerry E. Holligan PE
9503 Mountain Quail
Austin, Texas 78758

Submitted by: Bill Huckaby

Signed by: Bill Huckaby

Date: 11-7-94

A.C. Lowther
Cert. Professional Soil Scientist
3310 Santa Monica
Abilene, Texas 79605

Name: Mr. Bill Huckaby

Stephenville, Texas

Pond No. 1 Date Sampled: 9/26/94 Sampled By: A.C. Lowther

Test Location	No. 1	No. 2	No. 3	No. 4	Min.Req
Soil Description					
Color	Reddish Brown	Reddish Brown	Reddish Brown	Reddish Brown	
Texture	Sandy Clay	Sandy Clay	Sandy Clay	Clay	
Unified	CL	CL	CL	CH	
Sample Depth	12	12	12	12	12
Atterberg Limits					
Liquid Limits %	43.4	45.6	42.3	51.6	30
Plastic Limit %	18.6	17.4	21.1	25.8	
Plasticity Index %	24.8	28.2	21.2	25.8	15
Passing No. 200 Seive %	76	74	72	89	35
Permeability (Composite sample)	2.1 X 10 -8				1X10-7 cm/sec.

A.C. Lowther
Cert. Professional Soil Scientist
3310 Santa Monica
Abilene, Texas 79605

Name: Bill Huckaby Dairy

Stephenville, Texas

Pond No. 2 Date Sampled: 9/26/94 Sampled By: A.C. Lowther

Test Location	No.1	No.2	No.3	No.4	Min.Req.
Soil Description					
Color	Yellow Brown	Yellow Brown	Yellow Brown	Yellow Brown	
Texture	Silty Clay	Silty Clay	Silty Clay	Silty Clay	
Unified	CL	CL	CL	CL	
Sample Depth	12	12	12	12	12
Atterberg Limits					
Liquid Limit %	36.3	42.0	38.5	39.6	30
Plastic Limit %	15.1	16.1	16.3	16.6	
Plasticity Index%	21.2	25.9	22.2	23.0	15
Passing No.200 Seive %	85.6	89.3	91.4	88.7	30

Permeability (Composite sample)

2.15 X 10 -8 1X10-7 cm./sec

UNITED STATES
DEPARTMENT OF
AGRICULTURE

NATURAL RESOURCES
CONSERVATION
SERVICE

239 E. McNEILL
STEPHENVILLE,
TEXAS 76401-4390

DATE: November 17, 1994

SUBJECT: Permit No. 03220
Huckabee & Sons Dairy, Inc.
Construction Certification

Texas Natural Resource Conservation Commission
District Office No. 4
1019 North Ducanville Road
Ducanville, Texas 75116-2201

The following facilities have been constructed in accordance with the permit (excepting permeability*) and with NRCS Standards and Specfications:

Waste Storage Pond No. 1	constructed storage = 4.9 ac-ft
Waste Storage Pond No. 2	constructed storage = 9.3 ac-ft
Waterway 1	
All required Blocks	

All construction on the above facilities was completed on November 17, 1994.

*NRCS does not certify permeability rates; if required, certification will be from a private consultant or lab.

Certification made by USDA,
Natural Resources Conservation Service
by or under the supervision of

Jerry E. Stanford, Engineer

Jerry E. Stanford

Date 11-17-94

NOV 22 1994
NRCS

4.0 WASTE UTILIZATION & NUTRIENT MANAGEMENT PLAN

4.1 Nutrient Utilization

Agronomic application of heifer replacement facility wastewater enhances soil productivity and provides the crop and forage growth with needed nutrients for optimum growth and vigor. Land application of wastewater will take place according to a Nutrient Utilization/Nutrient Management Plan (NUP/NMP) in accordance with NRCS Codes 590 and 633. The NUP/NMP for crop year 2024 is attached.

A Texas State Soil and Water Conservation Board (TSSWCB) certified Comprehensive Nutrient Management Plan (CNMP) has been developed.

4.2 Waste Handling Procedures

The dairy shall operate under the provisions of 30 TAC §321.42, which describes certain waste management and disposal requirements for individual water quality permits for dairy concentrated animal feeding operations (CAFOs) when an operation is located in a major sole-source impairment zone. Waste disposal options include:

- Beneficial use outside the watershed
- Disposed in permitted landfills outside the watershed
- Delivered to a composting facility approved by the Executive Director
- Other beneficial use approved by the Executive Director
- Applied on-site in accordance with a certified NRCS Code 590/633 NMP or NUP, as dictated by annual soil test results

Waste Utilization and Nutrient Management Plan

Kuiper Cows

Owner
Kuiper Cows
1261 Private Road 188
Stephenville, TX 76401
254-968-4018

Type of Organic Nutrient Management Plan:
Other AFO-CAFO Waste Plan
located in Erath County

Prepared By:

(Signature)

Corey Mullin
Certified Nutrient Management Specialist
Certificate Number = TX20171
Expiration Date = December 31, 2024
Enviro-Ag Engineering, Inc
9855 FM 847
Dublin, TX 76446
(254) 965-3500

This plan is based on:
590 Organic Nutrient Management Plan V 5.0

6/21/24 2:40 PM

Waste Utilization and Nutrient Management Plan

EXECUTIVE SUMMARY: Kuiper Cows

This Nutrient Management Plan has fields that meet NMP and/or NUP requirements.

This plan was revised on 2/23/16.

See attached executive summary.

LOCATION AND PURPOSE OF THE PLAN

This animal operation is located in **Erath** County (see attached topo map and plan map for location.) The purpose of this plan is to outline the details of the land application of the effluent and solids produced by this operation. When the plan is fully implemented, it should minimize the effects of the land application of animal wastes on the soil, water, air, plant, and animal resources in and around the application area. This plan, when applied, will meet the requirements of the Natural Resources Conservation Service Waste Utilization Standard and Nutrient Management Standard.

The plan is for the year of **2024** and will remain in effect until revision based on new soil or manure analysis or crop change (yield or crop) result in a new P-Index rating or plan classification (NMP-NUP). The waste has been stored in a **Dairy Lagoon** . Approximately **899** head will be confined with the average weight of **1400** pounds. The animals will be confined **24** hours per day for **365** days per year.

TABLES 1, 2 and 2a

Values in Table 1 may be based on actual analysis or "book" values during the initial planning to determine land application rates for the initial plan. When "book" values are used, they will be from NRCS, Texas Cooperative Extension or averages from other TX testing lab sources. Site specific data will be used as soon as feasible after production begins. Manure and/or effluent will be tested at least annually or in the year of application if it is stored for more than one year. If the actual values are more than 10% higher or lower than the estimated values, this plan will need to be revised accordingly.

Application of waste products may be made up to the Maximum Rate given in Table 2 or 2a as applicable. Table 2 applies to those that are subject to Nutrient Management Plan (NMP) requirements while Table 2a applies when subject to Nutrient Utilization Plan (NUP) requirements. Current requirements for both the NMP and NUP are given in the headers of the tables. Table 2a has a criteria involving the distance to a named stream when the Soil Test P Level is above 200 ppm in arid areas as well as special requirements when the site is in a TMDL watershed designated by TCEQ. For various P Index Ratings, the maximum rates in Table 2 are based on crop requirements, whereas the maximum rates in Table 2a are based on crop removal rates. County avg. rainfall information can be found in the TX Agronomy Technical Note 15, Phosphorus Assessment Tool for Texas, located in the eFOTG at the address given in the section entitled **"Collecting Soil Samples for Analyses"**.

CROP REMOVAL RATES:

Crop Removal Rates of nitrogen (N), phosphorus (P), and potassium (K) in pounds per acre are given in Table 3 for the crop and yield planned for each field. This Table is included for information only, and should be used during the planning process to compare planned or maximum application rates to crop removal. Crop removal rates may be based on actual analysis of harvested material or default values in the database. P build-up will occur at higher rates when crop removal rates are exceeded..

SOLIDS APPLICATION:

The maximum solids application rates are given in Table 4 along with the current soil test P level, maximum P_2O_5 application rate, maximum tons per acre of solids and the total tons of solids per field that can be applied to each field. The maximum tons of solids that can be utilized on the fields planned is indicated in the box near the lower left corner of Table 4. When the total application acres of the fields are adequate to allow all of the solids to be applied, "Adequate" will be indicated below the tonnage in this box. If "Not Adequate" is indicated, then the lower box will indicate the tons of solids that must be utilized off-site unless more fields/acres are added. This plan is valid only if the application of waste to the crops listed does not exceed the per acre rates by more than 10%. If the yield of a crop does not meet the expected goal, the application rate should be adjusted the following year.

The estimated amounts of N, P_2O_5, and K_2O contained in the solids are provided in Table 5 for the maximum application rate. Supplemental N and K_2O will be applied to achieve the yield goals in Table 4 when recommended by the soil test and the maximum rate of the solids does not meet the crop needs. When the maximum application rate is applied and Table 5 indicates additional commercial nutrients, they **must** be applied to fields as indicated. **NOTE:** If additional nitrogen is recommended, the producer should consider collecting soil samples from the 6 - 36 inch layer to see if there is any additional deep nitrogen available. Additional deep nitrogen within the root zone of the crop can be substituted for supplemental commercial nitrogen, and should be included in the soil test N ppm entry.

SOLIDS APPLICATION: (cont) Kuiper Cows

In situations where more land is available than is needed to utilize the maximum application rate on each field, the application rates in Table 6 have been reduced to the level that does not exceed the amount of solids produced. Table 7 indicates the amount of nutrients provided and, if needed, the supplemental nutrients which **must** be applied when the application is based on these rates. The amounts of supplemental nutrients in Table 7 are based on the actual amount of waste available rather than the **maximum** rate that **"could"** be applied.

The second line from the bottom of Table 6 on the right has a box that will be **"YES"** or **"NO"**. When the reduced rates use all solids to be produced in a year, this box will be **"Yes"**. If the percentages are too low, it will be **"No"**. If **"No"**, either more acreage is needed on which to apply the solids or the solids will need to be transported off-site. The amount is located on the bottom line on the extreme right of the page.

Actual application will be based on the quantities produced, as well as, current manure analyses. **Application at the MAXIMUM rates shown in Table 4 will result in a more rapid build-up of phosphorus than if applied at lower rates. A different percentage may be used as long as the rate does not exceed the maximum shown in Table 4 for the field and the proper amount of supplemental nutrients are applied. Applying a lower rate to the fields with higher soil test P levels will slow down the P buildup and extend their land application life. Phosphorus will also build up more rapidly on pastureland than on hayland or cropland, since very few nutrients are actually removed by grazing animals.**

The solids may be applied to the same acreage every year according to Table 2 or 2a. The annual rates in both Table 4 and 6 may be doubled not to exceed the 2X the annual nitrogen requirement or nitrogen removal rate, as applicable. When the full biennial rate has been used, no additional phosphorus fertilizer or animal wastes may be applied in the alternate year. A column in both tables indicates whether the rates given are Annual Rates (A) or Biennial Rates (B). Rates given are based on Table 2 or 2a as applicable. Annual application rate for fields in a TMDL area with a Soil Test P level equal to or greater than 500 ppm or any field in a TMDL area with P Index Rating of Very High is 0.5 annual crop removal rate.

EFFLUENT APPLICATION:

The maximum effluent application rates are given in Table 8 for each field. This table provides the current soil test P level, maximum P_2O_5 application rate, effluent either in gallons per acre or acre inches per acre and the amount of effluent that can be applied per field. The maximum amount of effluent that can be utilized on the fields planned is indicated in a box near the lower left corner of Table 8. When the total application acres are adequate to allow all of the effluent to be applied, "Adequate" will be indicated below this box. If "Not Adequate" is indicated, then the lower box will indicate the amount of effluent that must be utilized off-site unless more field acres are added.

The estimated amounts of N, P, and K contained in the effluent are provided in Table 9 for the maximum application rate indicated in Table 8. Supplemental N and K_2O will be applied to achieve the yield goals when recommended by the soil test and the maximum rates of the effluent do not meet the crop requirements. **NOTE:** If additional nitrogen is recommended, the producer should consider collecting soil samples from the 6 - 36 inch layer to see if there is any additional deep nitrogen available. Additional deep nitrogen within the root zone of the crop can be substituted for supplemental commercial nitrogen.

EFFLUENT APPLICATION: (cont) Kuiper Cows

In situations where more land is available than is needed to utilize the maximum application rate on each field, the application rates in Table 10 have been reduced to the level that does not exceed the amount of effluent produced. Table 11 indicates the amount of nutrients provided and, if needed, the supplemental nutrients which **must** be applied when application is made based on the rates in Table 10. These amounts of supplemental nutrients in Table 11 are based on the planned amount of effluent available rather than the **maximum** rate that **"could"** be applied.

The bottom line on the right of Table 10 has a box that will be **"YES"** or **"NO"**. When the reduced rates uses all effluent to be produced in a year, this box will be **"Yes"**. If the percentages are too low, it will be **"No"**. If **"No"** is indicated, either more acreage is needed on which to apply the effluent or the effluent will need to be transported off-site.

Actual application will be based on the quantities produced, as well as, current manure analyses. **Application at the MAXIMUM rates shown in Table 8 will result in a more rapid build-up of phosphorus than if applied at lower rates. A different percentage may be used as long as the rate does not exceed the maximum shown in Table 8 for the field and the proper amount of supplemental nutrients are applied. Applying a lower rate to fields with higher soil test P levels will slow down the P buildup and extend their land application life. Phosphorus will also build up more rapidly on pastureland than on hayland or cropland, since very few nutrients are actually removed by grazing animals.**

The effluent may be applied to the same acreage every year according to Table 2 or 2a. The annual rates in both Table 8 and 10 may be doubled not to exceed the 2X the annual nitrogen requirement or nitrogen removal rate, as applicable, when the full biennial rate has been used, no additional phosphorus fertilizer or animal wastes may be applied in the alternate year. A column in both tables indicates whether the rates given are Annual Rates (A) or Biennial Rates (B). Rates given are based on Table 2 or 2a as applicable. Annual application rate for fields in a TMDL area with a Soil Test P level equal to or greater than 500 ppm or any field in a TMDL area with P Index Rating of Very High is 0.5 annual crop removal rate.

Maximum Hourly Application Rate - The maximum hourly application rate is determined by the texture of the soil layer with the lowest permeability within the upper 24 inches of the of the predominant soil in each field. The hourly application rate must be low enough to avoid runoff and/or ponding. For effluent with 0.5% solids or less, **DO NOT** exceed the rates shown in Table 1 of the attached Job Sheet titled, *"Waste Utilization, Determining Effluent Application Rates"*. If the effluent contains more than 0.5% solids, those values must be reduced by the appropriate amount shown in Table 2 of the attached *"Waste Utilization, Determining Effluent Application Rates"* Job Sheet.

Maximum One-Time Application Rate - The maximum amount of effluent that can be applied to a given field at any one-time is the amount that will bring the top 24 inches of the soil to 100% field capacity. This amount is determined by subtracting the amount of water stored in the soil (estimated by feel and appearance method) from the available water holding capacity (AWC) of the soil. The available water holding capacity of the top 24 inches of the predominant soil of each field receiving effluent and the texture of the most restrictive layer in the upper 24 inches are given in Table 12.

EFFLUENT APPLICATION: (cont) Kuiper Cows

To determine any one-time application amount, the current percent of field capacity (FC) of the upper 24 inches of the predominant soil in the field should be estimated using the guidance in Table 3 of the attached Job Sheet, *"Waste Utilization, Determining Effluent Application Rates, rev 4/06"*. Additional information on estimating soil moisture can be found in the NRCS Program Aid 1619, *"Estimating Soil Moisture by Feel and Appearance"*, or from the University of Nebraska Extension publication No. G84-690-A by the same name. Both of these publications have pictures of various soils at different percentages of field capacity to be used as a guide to estimating soil moisture. Once the current percent of FC is estimated, it is subtracted from the AWC amount in Table 12 for the given field and the difference is the maximum application for those soil conditions on that day. Remember, the maximum hourly application and the maximum one time application rates are only estimates to be used as a guide.

Solids/Effluent Land Application: - Land application of solids and/or effluent should be made at appropriate times to meet crop needs, but can be made at any time as long as the total annual (or biennial) rate, maximum hourly rate, and the maximum one time application rates are not exceeded. Effluent should be surface applied uniformly. No runoff or ponding should occur during application thus frequent observations should be made. Neither effluent or solids will be applied to slopes >8% with a runoff curve >80, or steeper than 16% slope with a runoff curve of 70 or greater, unless the application is part of an erosion control plan. Waste will not be spread at night, during rainfall events, or on frozen or saturated soils if a potential risk for runoff exists. Waste will not be applied to frequently flooded soils during months when the soils typically flood. If frequently flooded soil occur on any potential application field see attached, "Water Features Table", for months when flooding is expected. Solids should be applied with a manure spreader as uniformly as feasible. Surface applications with trucks should only be made when soil conditions are favorable in order to minimize soil compaction.

Managing Runoff -
A minimum 100 ft. setback or vegetated buffer (Filter Strip, Field Border, Riparian Forested Buffer, etc.) will be established and maintained between the application area and all surface water bodies, sink holes, and watercourses as designated on Soil Survey sheets or USGS topographic maps. A minimum application distance from private and public will be 150 ft. and 500 ft. respectively. A minimum application distance from water wells used exclusively for agricultural irrigation will be 100 ft. Table 9 provides a summary of the setbacks and out areas of each field.

Managing Leaching -
When soils with sandy, loamy sand, or gravelly surface textures have a Nitrogen Leaching Index score of >2 appropriate measures will be used to minimize the potential of leaching. These measures will include, split applications of waste, and may include double cropping, or cover crops, and irrigation water management (on fields that receive supplemental or full irrigation).

MORTALITY MANAGEMENT:
All mortality will be disposed of properly within 3 days according to the Texas Commission on Environmental Quality (TCEQ) rules. The preferred method for disposal of routine mortality is by a rendering plant. Before planning this method, contact the facility or its representative to be informed of special handling procedures, equipment needs, scheduling requirements, etc. Maintain a list of contact phone numbers so information will be readily available following a catastrophic die-off. Verify that local companies which have previously picked up and/or rendered dead animals are still doing so. A number of rendering companies across the state have stopped dead animal pick up service, and others have raised their fees significantly. Periodically review the availability and cost of rendering so that the plan can be modified if necessary. This can be an excellent option if mortality can be loaded and transported while still fresh or the mortality can be refrigerated until loaded and transported.

MORTALITY MANAGEMENT: (cont) Kuiper Cows

Disposal in a landfill may be an option in some locations. Before planning this option, the closest commercial, regional, county, or municipal landfill should be contacted to determine if the landfill has a permit which would allow acceptance of dead animals (swine, sheep, cattle, etc.). Also ask if there are any restrictions on type and volume of animal mortality that will be accepted at the facility. Landfill fees and transport, offloading, and handling procedures should be discussed with landfill managers and documented for reference when needed. The landfill is not a viable option if the producer does not own or have access to a vehicle capable of transporting mortality quickly in an emergency situation. After a catastrophic die-off is not a good time to find out that a driver and truck to transport mortality will not be available for several weeks **(MAKE ARRANGEMENTS NOW, NOT AFTER THE ANIMALS ARE DEAD).**

On-farm disposal of catastrophic mortality may be considered if site conditions permit. On-farm methods include burial, composting, and incineration. Incinerators and composters are excellent options for routine mortality but usually do not have the capacity to handle mortality volumes associated with catastrophic events. Composting and incineration should not be relied on for catastrophic mortality handling without a documented evaluation of worst anticipated mortality condition (number, type, and weight of animals), and the anticipated capacity of the system (i.e., lb./hr. incineration rate, hrs/day of operation). NRCS Mortality Facility Standard 316 will be used for all mortality management.

See the attached soil interpretation, ENG - Animal Mortality Disposal (Catastrophic) Trench, to make a preliminary assessment of the limitations of the soils on this farm for burial of catastrophic mortality. The attached TX NRCS Technical Guidance, Catastrophic Animal Mortality Management (Burial Method) should be used as a guide to overcome minor limitations and as design criteria for the construction of burial pits for catastrophic mortality. Mortality burial sites shall be located outside the 100 -year floodplain. Mortality burial will not be less than 200 feet from a well, spring, or water course. A FIELD INVESTIGATION BY A QUALIFIED PROFESSIONAL SHOULD BE MADE BEFORE AN AREA IS USED FOR A BURIAL SITE FOR CATASTROPHIC MORTALITY EVENTS. **The TCEQ Industrial and Hazardous Waste Permits Section, MC-130, must be contacted before burial of catastrophic mortality.**

TCEQ
Industrial and Hazardous Waste Permits Section, MC-130
PO Box 13087
Austin, TX 78711-3087
Phone: 512-239-2334 Fax: 512-239-6383

Air Quality:

The following steps should be taken when spreading effluent or solids to reduce problems associated with odor.
1. Avoid spreading effluent or solids when wind will blow odors toward populated areas.
2. Avoid spreading effluent or solids immediately before weekends or holidays, if people are likely to be engaged in nearby outdoor activities.
3. Avoid spreading effluent or solids near heavily traveled highways.
4. Make applications in the morning when the air is warming, rather than in the late afternoon.
5. All materials will be handled in a manner to minimize the generation of particulate matter, odors, and greenhouse gas emissions.

EFFLUENT AND SOLIDS STORAGE & TESTING:

Kuiper Cows

Effluent and solids will be stored in facilities designed, constructed, and maintained according to USDA NRCS Standards and specifications.

Effluent and solids sampling is needed to get a better idea of the nutrients actually being applied. Effluent and/or solids samples will be collected at least annually, or in the year of its use if waste is typically stored for more than 1 year. The samples will be submitted immediately to a lab for testing. If sent to Texas A&M soil lab or SFASU Soil Testing Lab for analysis, use the "plant and forage analysis" form and note the type of operation. Request that the manure be analyzed for percent dry matter, solids, total nitrogen, total phosphorus, and total potassium. Further information on collecting effluent and manure samples for analysis can be found in the TCE publication No. L-5175, *"Managing Crop Nutrients Through Soil, Manure and Effluent Testing"*. **TCEQ sampling rules and testing requirements will be followed on permitted sites.**

COLLECTING SOIL SAMPLES FOR ANALYSIS:

Collect a composite sample for each field (or area of similar soils and management not more than 40 acres in size) comprised of 10 - 15 randomly selected cores. Each core should represent 0 - 6 inches below the surface except for when injection has been done over 6" in depth, then the core should represent the 3-9" layer. Thoroughly mix each set of core samples, and select about a pint of the mixture as the sample for analysis. Label each sample for the field that it represents. Request that the samples be analyzed for nitrate nitrogen, plant-available phosphorus, potassium, sodium, magnesium, calcium, sulfur, boron, conductivity; and pH. Also note on the samples that they are from an effluent or solids application area. **TCEQ sampling rules and testing requirements will be followed on permitted sites.** A weighted average of 0-2 and 2-6 inch layers will be used for calculations on permitted sites.

Further information on collecting soil samples can be found on the TCE Form D-494, p 2, TCE Publication No. L-1793, and TCEQ RG-408. Additional NRCS guidance and requirements can be found in the Nutrient Management (590) standard located in the Texas electronic Field Office Technical Guide (eFOTG) at:

http://efotg.nrcs.usda.gov/efotg_locator.aspx?map=TX

Click the county desired.
Click Section IV in the left column under eFOTG
Type: 590 in the Search Menu above eFOTG and click: **GO**
Click on the desired item under Nutrient Management in the left column

SOIL ANALYSIS:

A soil analysis will be completed for all areas to be used for all effluent or solids application areas. The soil test analysis method will be **Mehlich III with inductively coupled plasma (ICP)**. The area will be tested and analyzed at least annually to monitor P build up.

Waste Utilization and Nutrient Management Plan

RECORD KEEPING:

Kuiper Cows

Detailed records should be maintained by the producer for all application of animal waste to land owned and operated by the producer. Records should include date, time, location, amount of application, weather conditions, estimated wind speed and direction, etc. A rain gauge should be in place at the application site and accurate records of rainfall should be maintained at the site. All records must be kept for at least 5 years. **TCEQ requirements will be followed on permitted sites.**

Records should also be kept showing amounts of litter given or sold to others. **A copy of the effluent analysis and/or solids analysis and a Waste Utilization Guidelines Sheet should be given to anyone who will use either the effluent or solids off-site. If they routinely use animal wastes for fertilizer, they should be directed to the local Soil and Water Conservation District or NRCS office to develop a Waste Utilization and Nutrient Management Plan for their land.**

This portion may be completed by producer, if desired or recorded elsewhere.

Record of waste leaving the farm or used as feed. **Estimated Annual Excess**

Date	Amount	Hauler or Recipient

Excess Remaining

May be continued on additional sheets

OPERATION AND MAINTENANCE: Kuiper Cows

Application equipment should be maintained in good working order and it should be calibrated annually so that the desired rate and amount of effluent and solids will be applied.

Information on calibrating manure spreaders can be found in the TCE publication No. L-5175, *"Managing Crop Nutrients Through Soil, Manure and Effluent Testing"*. Information on calibrating big gun sprinklers can be found in the Arkansas Extension publication, *"Calibrating Stationary Big Gun Sprinklers for Manure Application"*. For information on calibrating tank spreaders, traveling guns, and additional information on other manure spreading equipment, see Nebraska Extension publication No. G95-1267-A, *"Manure Applicator Calibration"*. Observe and follow manufacturer's recommended maintenance schedules for all equipment and facilities involved in the waste management system. For information on lagoon functions, refer to TCE publication E9, *"Proper Lagoon Management"*.

Any changes in this system should be discussed with the local Soil and Water Conservation District, USDA Natural Resources Conservation Service, or other qualified professional prior to their implementation.

Plan Prepared by: **Corey Mullin** Date: **6/21/2024**

Plan Approved by: Date: 6/21/24

Producer Signature: Date:

The producer's signature indicates that this plan has been discussed with him/her.
If this plan is not signed by the producer, indicate how the plan was provided to the producer.

Waste Utilization and Nutrient Management Plan

Table 1 - Estimated Effluent and Solids Quantities Produced

Kuiper Cows

Avg. Number of Animals	Type of Waste
899	Dairy Lagoon
	Dairy Solids

Contact the local Soil and Water Conservation District or USDA Natural Resources Conservation Service office if the total number of animals change by more than 10% so your plan can be revised.

Estimated Acre Inches of Effluent to be Available Annually* 56

Estimated Tons Solids to be Land Applied Annually (on or off site)* 1,974.8

*From engineering design.

Estimated Nutrient Availabilty Effluent

	pounds/yr	Pounds / 1000 gal	Pounds / Acre Inch	
N	342	0.23	6.2	**
P2O5	288	0.19	5.2	
K2O	11,635	7.71	209.4	

** Effluent Values Based on Analysis dated: August 4, 2023

Estimated Nutrient Availabilty Solids

	pounds / yr	pounds / ton	
N	40,605	20.6	**
P2O5	41,583	21.1	
K2O	47,219	23.9	

** Solids Values Based on Analysis dated: August 4, 2023

Default values were used on all fields for plant removal of nutrients and yield levels.

Waste Utilization and Nutrient Management Plan

TABLE 2. A Nutrient Management Plan (NMP) is required where Soil Test P Level [1/] is:

- **less than 200 ppm statewide or**
- **or < 350 ppm in arid areas 2/ with a named stream > one mile.**

P – Index Rating	Maximum TMDL Annual P Application Rate [5/]	Maximum Annual P Application	Maximum Biennial Application Rate
Very Low, Low	Annual Nitrogen (N) Requirement	Annual Nitrogen (N) Requirement	2.0 Times Annual N Requirement
Medium	2.0 Times Annual Crop P Requirement [3/]	2.0 Times Annual Crop P Requirement [3/]	2.0 Times Annual N Requirement
High [5]	1.5 Times Annual Crop P Requirement [3/]	1.5 Times Annual Crop P Requirement [3/]	Double the Maximum Annual P Application Not to Exceed 2 times the Annual N Requirement
Very High [5]	1.0 Times Annual Crop P Requirement [3/]	1.0 Times Annual Crop P Requirement [3/]	Double the Maximum Annual P Application Not to Exceed 2 times the Annual N Requirement

TABLE 2a. A Nutrient Utilization Plan (NUP) is required by TCEQ where Soil Test P Level [1/] is:

- **equal to or greater than 200 ppm in non-arid areas [2/] or**
- **equal to or greater than 350 ppm in arid areas [2/] with a named stream greater than one mile or**
- **equal to or greater than 200 ppm in arid areas [2/] with a named stream less than one mile.**

P – Index Rating	Maximum TMDL Annual P Application Rate [5/]	Maximum Annual P Application	Maximum Biennial Application Rate
Very Low, Low	1.0 Times Annual Crop P Removal [4/]	Annual N Crop Removal	2.0 Times Annual N Removal
Medium	1.0 Times Annual Crop P Removal [4/]	1.5 Times Annual Crop P Removal [4/]	Double the Maximum Annual P Application Not to Exceed 2 times the Annual N Crop Removal
High [5]	1.0 Times Annual Crop P Removal [4/]	1.0 Times Annual Crop P Removal [4/]	Double the Maximum Annual P Application Not to Exceed 2 times the Annual N Crop Removal
Very High [5]	0.5 Times Annual Crop P Removal [4/]	0.5 Times Annual Crop P Removal [4/]	Double the Maximum Annual P Application Not to Exceed 2 times the Annual N Crop Removal

Footnotes Applicable to both Tables

1/ Soil test P will be Mehlich III by inductively coupled plasma (ICP).

2/ Non-arid areas, counties receiving => 25 inches annual rainfall, will use the 200 ppm P level while arid areas, counties receiving < 25 inches of annual rainfall, will use the 350 ppm P level. See map in TX Agronomy Technical Note 15, Phosphorus Assessment Tool for Texas, for county designations.

3/ Not to exceed the annual nitrogen requirement rate.

4/ Not to exceed the annual nitrogen removal rate.

5/ When soil test phosphorus levels are ≥ 500 ppm, with a P-Index rating of "High" or "Very High", there will be no additional application of phosphorus to a CMU or field.

Waste Utilization and Nutrient Management Plan

Table 3 - Crop Removal Rates (For Information Only)

Kuiper Cows

LMU or Field No.	Acres	Crop and P Index Level	TCEQ Plan Type	Actual Crop Analysis or Default	Total Est. N Removal lbs/Ac/Yr	Total Est. P_2O_5 Removal lbs/Ac/Yr	Total Est. K_2O Removal lbs/Ac/Yr
1	54.0	Coastal graze 1 AU/1 ac, RG mod Graze M	NUP	Default	298	90	266
2	26.0	Coastal graze 1 AU/1 ac, RG mod Graze M	NMP	Default	298	90	266
C1	39.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	NMP	Default	330	104	190
C2	68.0	Silage - Corn16-20T;SG GreenChop-8-9T M	NMP	Default	387	148	226
C3	120.0	Silage - Corn16-20T;SG GreenChop-8-9T M	NMP	Default	387	148	226
C4	50.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	NMP	Default	330	104	190
F1	27.0	Silage - Corn16-20T;SG Silage-8-9T M	NMP	Default	270	119	255
F2	49.0	Silage - Corn16-20T;SG Silage-8-9T M	NMP	Default	270	119	255
F3	54.0	Silage - Corn16-20T;SG Silage-8-9T M	NMP	Default	270	119	255
F4	64.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T H	NMP	Default	330	104	190
TW1	56.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	NMP	Default	330	104	190
W1	76.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	NMP	Default	330	104	190
W2	42.0	Silage - Corn21-25T;SG Silage-5-7T M	NMP	Default	328	128	236
WN1	60.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	NMP	Default	330	104	190
WN2	26.0	Silage - Corn16-20T;SG Silage-8-9T M	NMP	Default	270	119	255
TW2	64.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	NMP	Default	330	104	190
DC	87.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T H	NMP	Default	330	104	190

NOTE: When crops are used for grazing, only a portion of the nutrients used by the crop are removed from the field in the live weight gain of the livestock, the remainder is returned to the land in manure and urine. The book "Southern Forages" estimates the N, P, & K removed in 100 pounds live weight gain as follows: **2.5 lbs N, 0.68 lbs P, 0.15 lbs K**

Waste Utilization and Nutrient Management Plan

Table 4 - Maximum Solids Application per Field

Kuiper Cows

Est. Solids Produced Annually (wet tons)	LMU or Field No.	Acres	Crop Management and PI runoff potential	Current Soil Test P Level (ppm)	Max Annual P2O5 lbs/acre	Annual/Biennial	Maximum Solids Allowable Tons/Acre	Maximum Allowable Application Per field (Tons)
1,975	1							
	2							
	C1	39.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	78	410	A	19.5	759
	C2	68.0	Silage - Corn16-20T;SG GreenChop-8-9T M	118	380	A	18.0	1227
	C3	120.0	Silage - Corn16-20T;SG GreenChop-8-9T M	48	380	A	18.0	2166
	C4	50.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	66	410	A	19.5	973
	F1	27.0	Silage - Corn16-20T;SG Silage-8-9T M	6	300	A	14.2	385
	F2	49.0	Silage - Corn16-20T;SG Silage-8-9T M	4	300	A	14.2	698
	F3	54.0	Silage - Corn16-20T;SG Silage-8-9T M	56	300	A	14.2	769
	F4	64.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T H	85	308	A	14.6	935
	TW1	56.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	25	410	A	19.5	1089
	W1	76.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	51	410	A	19.5	1479
	W2	42.0	Silage - Corn21-25T;SG Silage-5-7T M	67	290	A	13.8	578
	WN1	60.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	1	410	A	19.5	1167
	WN2	26.0	Silage - Corn16-20T;SG Silage-8-9T M	64	300	A	14.2	370
	TW2	64.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	25	410	A	19.5	1245
	DC	87.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T H	7	308	A	14.6	1271
Total Solids Application Acres								
882								
Application Allowable on-site (tons)								
15110.7								
Adequate								
Solids to be used off-site (tons)								
0.0								

End of Table 4

Waste Utilization and Nutrient Management Plan

Table 5 - Nutrients Applied/Needs at Maximum Solids Rates Kuiper Cows

	Nutrients Applied When Application is at Maximum Rates			Supplemental Nutrients Needed When Application is at Maximum Rates			
LMU / Field #	N Lb/ac	P_2O_5 Lb/ac	K_2O Lb/ac	N Lb/ac	P_2O_5 Lb/ac	K_2O Lb/ac	Lime T/Ac
1							
2							
C1	400	410	465	0	0	0	0
C2	371	380	432	85	0	0	0
C3	371	380	432	110	0	0	0
C4	400	410	465	0	0	0	0
F1	293	300	341	0	0	0	0
F2	293	300	341	10	0	0	0
F3	293	300	341	0	0	0	0
F4	300	308	349	50	0	0	0
TW1	400	410	465	0	0	0	0
W1	400	410	465	0	0	0	0
W2	283	290	329	90	0	0	0
WN1	400	410	465	0	0	0	0
WN2	293	300	341	0	0	0	0
TW2	400	410	465	0	0	0	0
DC	300	308	349	95	0	0	0

Waste Utilization and Nutrient Management Plan

Table 6 - Planned Solids Application Rates

Kuiper Cows

LMU or Field No.	Double crop	Acres	Crop Management and PI runoff potential	Current Soil Test P ppm	Annual / Biennial	Max Rate tons/ac	% of Maximum to apply	Planned Solids tons/ac	Planned Solids per field (tons)
1									
2									
C1		39.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	78	A	19.5	20	3.9	151.7
C2		68.0	Silage - Corn16-20T;SG GreenChop-8-9T M	118	A	18.0	20	3.6	245.4
C3		120.0	Silage - Corn16-20T;SG GreenChop-8-9T M	48	A	18.0	20	3.6	433.1
C4		50.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	66	A	19.5	20	3.9	194.5
F1		27.0	Silage - Corn16-20T;SG Silage-8-9T M	6	A	14.2	20	2.8	76.9
F2		49.0	Silage - Corn16-20T;SG Silage-8-9T M	4	A	14.2	20	2.8	139.6
F3		54.0	Silage - Corn16-20T;SG Silage-8-9T M	56	A	14.2	20	2.8	153.9
F4		64.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T H	85	A	14.6	20	2.9	186.9
TW1		56.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	25	A	19.5	20	3.9	217.9
W1		76.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	51	A	19.5	20	3.9	295.7
W2		42.0	Silage - Corn21-25T;SG Silage-5-7T M	67	A	13.8	20	2.8	115.7
WN1		60.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	1	A	19.5	20	3.9	233.4
WN2		26.0	Silage - Corn16-20T;SG Silage-8-9T M	64	A	14.2	20	2.8	74.1
TW2		64.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	25	A	19.5	20	3.9	249.0
DC		87.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T H	7	A	14.6	20	2.9	254.1
Acres		882.0							3022.1
1975			Tons of wet solids produced Annually				Will the planned per acre application rates use all of the Solids?		YES
0			Tons to be used off-site at Max. rates				Tons to be used off-site at planned rates		0

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Plan is based on: 590 Organic Nutrient Management Pl

Waste Utilization and Nutrient Management Plan

Table 7 - Nutrients Applied/Needed at Planned Solids Rates

Kuiper Cows

Red cells? Proceed to adjustment page and fix.

	Nutrients Applied at Planned Rates			Supplemental Nutrients Needed at Planned Rates			
LMU / Field #	N Lb/ac	P_2O_5 Lb/ac	K_2O Lb/ac	N Lb/ac	P_2O_5 Lb/ac	K_2O Lb/ac	Lime T/Ac
1							
2							
C1	80	82	93	245	0	0	0
C2	74	76	86	385	0	0	0
C3	74	76	86	410	10	0	0
C4	80	82	93	285	5	0	0
F1	59	60	68	190	75	0	0
F2	59	60	68	245	80	30	0
F3	59	60	68	200	0	0	0
F4	60	62	70	290	0	0	0
TW1	80	82	93	270	75	0	0
W1	80	82	93	245	30	0	0
W2	57	58	66	315	0	0	0
WN1	80	82	93	300	120	10	0
WN2	59	60	68	225	0	15	0
TW2	80	82	93	260	75	0	0
DC	60	62	70	335	130	0	0

Waste Utilization and Nutrient Management Plan

Table 8 - Maximum Effluent Application Per Field

Kuiper Cows

Est. Available Effluent (ac inches)	LMU or Field No.	Acres	Double crop	Crop Management and PI runoff potential	Current Soil Test P Level (ppm)	Max Annual P_2O_5 (lbs/acre)	Annual/Biennial	Maximum Effluent Allowable (ac in/ac)	Maximum Effluent Allowable / Field (ac in)
56	1	54.0		Coastal graze 1 AU/1 ac, RG mod Graze M	341	135	A	26.0	1403
Source:	2	26.0		Coastal graze 1 AU/1 ac, RG mod Graze M	160	250	A	48.2	1252
Dairy Lagoon	C1								
	C2								
	C3								
	C4								
	F1								
	F2								
	F3								
	F4								
	TW1								
	W1								
	W2								
	WN1								
	WN2								
	TW2								
	DC								
Total Effluent Application Acres									
80									
Maximum Effluent Application Allowable On-Site (ac in)									
2655									
Adequate									
Effluent to be used Off-Site (ac in)									
0									

End of Table 8

Waste Utilization and Nutrient Management Plan

Table 9 - Nutrients Applied/Needed at Maximum Effluent Rates

Kuiper Cows

	Nutrients Applied When Application is at Maximum Rates			Supplemental Nutrients Needed When Application is at Maximum Rates			
LMU / Field #	N Lb/ac	P_2O_5 Lb/ac	K_2O Lb/ac	N Lb/ac	P_2O_5 Lb/ac	K_2O Lb/ac	Lime T/Ac
1	160	135	5440	110	0	0	0
2	297	250	10087	0	0	0	0
C1							
C2							
C3							
C4							
F1							
F2							
F3							
F4							
TW1							
W1							
W2							
WN1							
WN2							
TW2							
DC							

Waste Utilization and Nutrient Management Plan

Table 10 - Planned Effluent Application Rates

Kuiper Cows

LMU or Field No.	Acres	Double crop	Crop Management and PI runoff potential	Current Soil Test P ppm	Annual / Biennial	Maximum Effluent (ac in/ac)	% of Maximum to apply	Planned Effluent (ac in/ac)	Planned Effluent / field (Ac. In)
1	54.0		Coastal graze 1 AU/1 ac, RG mod Graze M	341	A	26	25.0	6.5	350
2	26.0		Coastal graze 1 AU/1 ac, RG mod Graze M	160	A	48.2	25.0	12.0	313
C1									
C2									
C3									
C4									
F1									
F2									
F3									
F4									
TW1									
W1									
W2									
WN1									
WN2									
TW2									
DC									
Acres	80.0								664
							Will the planned application rates use all of the Effluent?		YES

Plan is based on: 590 Organic Nutrient Management Plan

Waste Utilization and Nutrient Management Plan

Table 11 - Nutrients Applied/Needed at the Planned Effluent Rates

Kuiper Cows

Red cells? Proceed to adjustment page and fix.

	Nutrients Applied at Planned Rates			Supplemental Nutrients Needed at Planned Rates			
LMU / Field #	N Lb/ac	P_2O_5 Lb/ac	K_2O Lb/ac	N Lb/ac	P_2O_5 Lb/ac	K_2O Lb/ac	Lime T/Ac
1	40	34	1360	230	0	0	0
2	74	62	2522	205	0	0	0
C1							
C2							
C3							
C4							
F1							
F2							
F3							
F4							
TW1							
W1							
W2							
WN1							
WN2							
TW2							
DC							

Table 12 - Available Water Capacity to 24 inches(or less) of predominant soil in fields receiving effluent and Texture of the most restrictive soil layer in the upper 24 inches

Kuiper Cows

LMU / Field #	AWC (inches)	Restrictive Texture
1	3.465	Sandy Loam
2	3.465	Sandy Loam
C1		
C2		
C3		
C4		
F1		
F2		
F3		
F4		
TW1		
W1		
W2		
WN1		
WN2		
TW2		
DC		

LMU / Field #	AWC (inches)	Restrictive Texture

Waste Utilization and Nutrient Management Plan

Table 13 - Non Application Areas by Field

Kuiper Cows

FS = 393-Filter Strip; **FB** = 386-Field Border, **RFB** = 391-Riparian Forest Buffer; **OLEA** = Other Land Excluded Ar

LMU / Field #	FS Acres	FB Acres	RFB Acres	OLEA Acres	Total Excluded
1	0.0	0.0			
2	0.0	0.0			
C1	0.0	0.0			
C2	0.0	0.0			
C3	0.0	0.0			
C4	0.0	0.0			
F1	0.0	0.0			
F2	0.0	0.0			
F3	0.0	0.0			
F4	0.0	0.0			
TW1	0.0	0.0			
W1	0.0	0.0			
W2	0.0	0.0			
WN1	0.0	0.0			
WN2	0.0	0.0			
TW2	0.0	0.0			
DC	0.0	0.0			

LMU / Field #	FS Acres	FB Acres	RFB Acres	OLEA Acres	Total Excluded
Totals	0.0	0.0	0.0	0.0	0.0

See Application Map for location of buffers

Total 590-633 application acres: 962.0

Total 590-633 Field Acres: 962.0

Waste Utilization and Nutrient Management Data Entries

General Data

Date :	6/21/2024
Farmer Name :	Kuiper Cows
County in which the Land is located :	Erath
Type of Waste Plan :	Other AFO-CAFO Waste Plan
Is this plan in a TMDL watershed for nutrients? Yes or No :	No
Is any field PERMITTED by TCEQ? Yes or No :	Yes
Permit # :	

All other entries on General Page appear on the Cover Page

Animal Information

Plan Year :	2024
Are you receiving waste from another producer?	No
Number of animals :	899
Approximate Weight :	1400
Days per year in confinement :	365
Hours per day confined :	24
ACRE FEET of effluent to be irrigated* :	4.63
Estimated annual gallons of effluent to be irrigated/applied annually :	1508676.24
For effluent, do you want application rates shown in gallons or acre inches? :	acre inches
Estimated Tons Solids to be Land Applied Annually (on or off site)* :	1805
Is this the first Year of the AFO-CAFO Operation? :	No

Analysis Information

Effluent Information

Date of Analysis:	8/4/2023
Manure Source:	Dairy Lagoon
Nitrogen % From Analysis:	0.0034
Phosphorus % From Analysis:	0.001
Potassium % From Analysis:	0.077
Moisture % From Analysis:	99.7

Manure / Solids Information

Date of Analysis:	8/4/2023
Manure Source:	Dairy Solids
Nitrogen % From Analysis:	1.406
Phosphorus % From Analysis:	0.503
Potassium % From Analysis:	1.09
Moisture % From Analysis:	8.6
What will be Applied to Fields on this Farm?	Both Effluent and Solids
Is this Farm part of an AFO-CAFO?	No

This plan is based on: rganic Nutrient Management Plan

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Field and Buffer Entries

Kuiper Cows

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Plan is based on: 590 Organic Nutrient Management Plar

FS = 393-Filter Strip, FB = 386-Field Border, RFB = 391-Riparian Forest Buffer, OLEA = Other Land Exclusion Areas or non-application areas (i.e. headquarters, freq. flooded areas, wooded areas, water bodies, etc)

NOTE: Field Border (FB) is expressed in ACRES on this spreadsheet, but as LINEAR FEET on the CPO.

Field No.	Total LMU or Field Acres	FS	FB	RFB	OLEA	Total Buffer Acres	Actual Application Acres	This Column Intentionally Left Blank
1	54					0.0	54.0	
2	26					0.0	26.0	
C1	39					0.0	39.0	
C2	68					0.0	68.0	
C3	120					0.0	120.0	
C4	50					0.0	50.0	
F1	27					0.0	27.0	
F2	49					0.0	49.0	
F3	54					0.0	54.0	
F4	64					0.0	64.0	
TW1	56					0.0	56.0	
W1	76					0.0	76.0	
W2	42					0.0	42.0	
WN1	60					0.0	60.0	
WN2	26					0.0	26.0	
TW2	64					0.0	64.0	
DC	87					0.0	87.0	

Soil Test, Crop Information and Plant Analysis Data Entries

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Soil Test Analysis				This column only for Dry Poultry	LMU or Field #	Appl. Area Acres	Crop/Land-Use and P Index Runoff Potential VL - L; M; H; or VH	E = Effluent S = Solids	Plant Analysis (Y / N)	Plant Analysis & Yield (optional) Use Only When Crop Removal is Required			
N (ppm)	P (ppm)	K (ppm)	Lime (enter amt or leave blank)							% N	% P	% K	Yield Air Dry Production (lbs/ac/yr)
55.18	341	476			1	54.0	Coastal graze 1 AU/1 ac, RG mod Graze M	E	N				
50.33	160	681			2	26.0	Coastal graze 1 AU/1 ac, RG mod Graze M	E	N				
37.27	78.2	240			C1	39.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	S	N				
20.983	118	199			C2	68.0	Silage - Corn16-20T;SG GreenChop-8-9T M	S	N				
8.55	48.2	212			C3	120.0	Silage - Corn16-20T;SG GreenChop-8-9T M	S	N				
17.83	65.8	279			C4	50.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	S	N				
43.9	6	242			F1	27.0	Silage - Corn16-20T;SG Silage-8-9T M	S	N				
15.93	4	208			F2	49.0	Silage - Corn16-20T;SG Silage-8-9T M	S	N				
38.75	56	337			F3	54.0	Silage - Corn16-20T;SG Silage-8-9T M	S	N				
24.33	84.7	302			F4	64.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T H	S	N				
24.7	25.4	223			TW1	56.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	S	N				
37.45	51	229			W1	76.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	S	N				
23.178	66.6	264			W2	42.0	Silage - Corn21-25T;SG Silage-5-7T M	S	N				
10.17	1	76.5			WN1	60.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	S	N				
26.6	63.7	225			WN2	26.0	Silage - Corn16-20T;SG Silage-8-9T M	S	N				
29.18	25.4	302			TW2	64.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	S	N				
2.5	7	194			DC	87.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T H	S	N				

Solids Application Rate Entries

Solids - Set the Planned Application Rates

Ku

1975 "Wet tons" of solids produced Annually							Will the planned rates use all of the Tons to be used off-site at plann	
LMU or Field No.	Acres	Crop Management and PI runoff potential	Current Soil Test P ppm	Crop P_2O_5 Req.	Annual or Biennial Application Cycle	Maximum Solids Allowable Tons/Ac	Enter % of Maximum Planned to Apply	
1								
2								
C1	39.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	78	205	Annual	19.5	20.0	
C2	68.0	Silage - Corn16-20T;SG GreenChop-8-9T M	118	190	Annual	18.0	20.0	
C3	120.0	Silage - Corn16-20T;SG GreenChop-8-9T M	48	190	Annual	18.0	20.0	
C4	50.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	66	205	Annual	19.5	20.0	
F1	27.0	Silage - Corn16-20T;SG Silage-8-9T M	6	150	Annual	14.2	20.0	
F2	49.0	Silage - Corn16-20T;SG Silage-8-9T M	4	150	Annual	14.2	20.0	
F3	54.0	Silage - Corn16-20T;SG Silage-8-9T M	56	150	Annual	14.2	20.0	
F4	64.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T H	85	205	Annual	14.6	20.0	
TW1	56.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	25	205	Annual	19.5	20.0	
W1	76.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	51	205	Annual	19.5	20.0	
W2	42.0	Silage - Corn21-25T;SG Silage-5-7T M	67	145	Annual	13.8	20.0	
WN1	60.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	1	205	Annual	19.5	20.0	
WN2	26.0	Silage - Corn16-20T;SG Silage-8-9T M	64	150	Annual	14.2	20.0	
TW2	64.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T M	25	205	Annual	19.5	20.0	
DC	87.0	Coastal GC (30%DM) 9-11T; SG GC 6-7T H	7	205	Annual	14.6	20.0	

Effluent Application Rate Entries

Effluent - Set the Planned Application Rates

Kuiper Cows

1508676	Gallons of Effluent to be used annually				Will the planned rates use all of the effluent?				Yes
56	Acre inches of Effluent to be used annually								
LMU or Field No.	Acres	Crop Management and PI runoff potential	Current Soil Test P (ppm)	Crop P2O5 Req.	Annual or Biennial Application Cycle	Max Effluent Allowable (ac in/ac)	Enter % of Maximum Planned to Apply	Planned Effluent (ac in/ac)	Planned Effluent per field (acre inches)
1	54.0	Coastal graze 1 AU/1 ac, RG mod Graze M	341	125	Annual	26.0	25.0	6.49	350
2	26.0	Coastal graze 1 AU/1 ac, RG mod Graze M	160	125	Annual	48.2	25.0	12.04	313
C1									
C2									
C3									
C4									
F1									
F2									
F3									
F4									
TW1									
W1									
W2									
WN1									
WN2									
TW2									
DC									
							Total Effluent This Page		664

Printed on: 6/21/24 2:40 PM

Plan is based on: 590 Organic Nutrient Management Plan

Available Water Capacity Entries

Printed on: 6/21/24 2:40 PM Plan is based on: 590 Organic Nutrient Management Pla Kuiper Cows

LMU or Fields receiving Effluent	Texture of the soil layer within the upper 24 inches of the soil profile that has the lowest permeability (Don't Abbreviate)	Depth of First Layer (inches)		AWC of First Layer (in/in)		Depth of Second Layer (inches)		AWC of Second Layer (in/in)		Depth of Third Layer (inches)		AWC of Third Layer (in/in)		Depth of Fourth Layer (inches)		AWC of Fourth Layer (in/in)		Available Water Holding Capacity (AWC) of the upper 24 inches of the soil profile (Inches)
EXAMPLE ENTRIES		0	3	0.12	0.2	3	14	0.16	0.21	14	18	0.08	0.12	18	24	0	0	
		Enter Data for the top 24" only																
1	Sandy Loam	0	3	0.12	0.16	3	30	0.12	0.17	30				0				3.47
2	Sandy Loam	0	3	0.12	0.16	3	30	0.12	0.17	30				0				3.47

Alternative Crop List
Kuiper Cows
WQ0005293000

Crop and Yield Goal	Nitrogen		P2O5	
	Requirement	Removal	Requirement	Removal
Alfalfa Hay 10 Tons	530	532	180	101
Alfalfa Hay 12 Tons	640	638	180	121
Alfalfa Hay 2 Tons	120	106	35	20
Alfalfa Hay 4 Tons	210	213	80	40
Alfalfa Hay 6 Tons	300	319	130	60
Alfalfa Hay 8 Tons	420	426	180	81
Bahia 2 Cut Hay 7000 #	140	89	70	21
Bahia 3 Cut Hay 8000 #	210	102	80	24
Bahia 4 Cut Hay 9000 #	280	114	115	27
Bahia Grazing + 1 Hay	110	83	70	19
Bahia Grazing 1 AU/1 ac	260	114	70	27
Bahia Grazing 1 AU/2 ac	220	108	45	25
Bahia Grazing 1 AU/3 ac	180	102	45	24
Bahia Grazing 1 AU/4 ac	140	95	45	22
Bahia Grazing 1 AU/5 ac	100	79	45	18
Bahia Grazing 1 AU/6 ac	60	65	45	15
Cantaloupes 15-20 tons	120	88	105	82
Coastal 2 Cut + Graze	260	198	125	62
Coastal 2 Cut Hay	200	169	125	39
Coastal 3 Cut + Graze	360	257	125	80
Coastal 3 Cut Hay	300	238	125	74
Coastal 4 Cut Hay	400	257	170	80
Coastal 5-6 Cut Hay	500	297	170	93
Coastal Grazing + 1 Hay	160	145	70	34
Coastal Grazing 1 AU/0.5 ac	300	218	70	68
Coastal Grazing 1 AU/1 ac	240	198	70	62
Coastal Grazing 1 AU/2 ac	200	169	70	39
Coastal Grazing 1 AU/3 ac	160	145	70	34
Coastal Grazing 1 AU/4 ac	120	120	70	28
Coastal Grazing 1 AU/5 ac	90	103	70	24
Coastal Grazing 1 AU/6 ac	60	86	70	20
Coastal GC (30%DM) 21-23 Ton	400	345	170	95
Coastal GC (30%DM) 18-20 Ton	350	300	170	82
Coastal GC (30%DM) 15-17 Ton	300	255	125	70
Coastal GC (30%DM) 9-11 Ton	200	170	125	47
Common 2 Cut Hay 6000 #	140	113	80	26
Common 3 Cut Hay 7400 #	210	141	80	46
Common 4 Cut Hay 8000 #	280	152	80	49
Common 5-6 Cut Hay 9000 #	350	171	80	56
Common Grazing + 1 Hay	110	100	70	23
Common Grazing + 2 Hay	180	132	80	30
Common Grazing + 3 Hay	250	148	80	48
Common Grazing 1 AU/1ac	260	152	70	49
Common Grazing 1 AU/2 ac	220	143	45	46
Common Grazing 1 AU/3 ac	180	132	45	30
Common Grazing 1 AU/4 ac	140	113	45	26
Common Grazing 1 AU/5 ac	100	94	45	22
Common Grazing 1 AU/6 ac	60	79	45	18

Crop and Yield Goal	Nitrogen		P2O5	
	Requirement	Removal	Requirement	Removal
Corn 111 - 130 bu	144	117	105	47
Corn 131 - 150 bu	164	135	105	54
Corn 151 - 170 bu	180	153	130	61
Corn 171 - 190 bu	210	171	130	68
Corn 191 - 210 bu	250	189	130	75
Corn 211 - 230 bu	280	207	130	83
Corn 231 - 250 bu	300	225	130	90
Corn 250 - 275 bu	325	243	130	97
Corn 276 - 300 bu	350	261	130	104
Corn 301 - 350 bu	375	279	130	111
Corn 50 - 70 bu	70	63	80	25
Corn 71 - 90 bu	90	81	80	32
Corn 91 - 110 bu	120	99	105	39
Cotton 0.5 Bale	25	18	30	9
Cotton 1.0 Bale	50	36	55	18
Cotton 2.0 Bale	100	71	105	35
Cotton 3.0 Bale	150	107	105	53
Cotton 3.5 Bale	175	125	105	62
Cotton 4.0 Bale	200	142	105	71
Cotton 4.5 Bale	225	160	105	80
Cotton 5.0 Bale	250	178	105	89
Eastern gamagrass- 3000 #	80	57	40	21
Eastern gamagrass- 6000 #	120	114	60	41
Fescue, Tall Hay/Graze 7000#	150	140	80	42
Grain Sorg. 1000 #	20	17	30	8
Grain Sorg. 10000 #	200	167	130	82
Grain Sorg. 1500 #	30	25	30	12
Grain Sorg. 2000 #	40	33	30	16
Grain Sorg. 3000 #	60	50	55	25
Grain Sorg. 4000 #	80	67	55	33
Grain Sorg. 5000 #	100	84	80	41
Grain Sorg. 6000 #	120	100	80	49
Grain Sorg. 7000 #	140	117	130	58
Grain Sorg. 8000 #	160	134	130	66
Grain Sorg. 9000 #	180	150	130	74
Guar 3500 lbs	25	22	80	76
Johnsongrass Hay 6000 #	140	101	80	32
Klein 3 Cut Hay 7200 #	150	83	55	16
Klein 4 Cut Hay 7800 #	150	90	55	18
Klein Grazing + 1 Hay	80	69	55	14
Klein Grazing 1 AU/1.5 ac	150	90	80	18
Klein Grazing 1 AU/2.5 ac	80	69	55	14
Klein Grazing 1 AU/6 ac	40	58	55	11
Legume Overseeded	80	60	105	15
Legume w/ryegrass	160	94	160	38
Midland Bermuda 4000 #	120	75	80	17
Midland Bermuda 6000 #	150	113	105	26
Midland Bermuda 8000 #	200	150	105	35

Alternative Crop List
Kuiper Cows
WQ0005293000

Crop and Yield Goal	Nitrogen		P2O5	
	Requirement	Removal	Requirement	Removal
Native Grazing or Hay 4000#	80	44	70	34
Native Grazing or Hay 3000#	40	33	55	25
Native Grazing or Hay 1500#	20	17	27	13
Native Grazing or Hay 750#	10	8	13	6
Oat Light Grazing	120	107	55	40
Oat Moderate Grazing	160	110	80	41
Oats Hay 2-3 tons	120	100	55	37
Oats Heavy Grazing plus Hay	200	117	80	43
Old World Bluestem- 3000 #	40	33	55	25
Old World Bluestem- 6000 #	80	66	55	51
Peanut Hay Dryland 1 Ton	50	47	70	11
Peanut Hay Dryland 2 Tons	100	93	70	22
Peanut Hay Irrigated 3 Tons	150	140	95	33
Peanuts Irrigated 4500 #	180	162	95	18
Rice Early 7500 #	195	104	45	41
Rice Late 7500 #	180	104	45	41
Rice plus Ratoon Early 10000 #	295	139	60	55
Rice plus Ratoon Late 10000 #	280	139	60	55
Rye Forage 5000 #	140	84	55	31
Rye Forage 7000 #	240	117	80	43
Ryegrass Hay 6000	140	100	55	37
Ryegrass Heavy Grazing	200	117	80	43
Ryegrass Moderate Grazing	140	84	55	31
SG Green Chop(25% DM) 8 to 9 tons	260	203	90	73
SG Green Chop(25% DM) 6 to 7 tons	200	158	80	57
SG Green Chop(25% DM) 4 to 5 tons	135	113	60	41
SG Green Chop(25% DM) 2 to 3 tons	75	68	40	24
SG Silage(35% DM) 12 to 14 tons	160	128	90	67
SG Silage(35% DM) 10 to 11 tons	120	101	70	53
SG Silage(35% DM) 8 to 9 tons	95	83	40	43
SG Silage(35% DM) 5 to 7 tons	70	64	30	34
Silage - Corn(35% DM) 11 - 15 Ton	140	119	80	58
Silage - Corn(35% DM) 16 - 20 Ton	240	183	100	77
Silage - Corn(35% DM) 21 - 25 Ton	350	263	105	96
Silage - Corn(35% DM) 26 - 30 Ton	420	315	135	115
Silage - Corn(35% DM) 7 - 10 Ton	85	79	60	38
Silage - Sorg(35% DM) 11 - 15 Ton	200	179	75	55
Silage - Sorg(35% DM) 16 - 20 Ton	280	238	95	74
Silage - Sorg(35% DM) 21 - 25 Ton	360	298	115	92
Silage - Sorg(35% DM) 26 - 30 Ton	380	315	130	111
Silage - Sorg(35% DM) 31 - 40 Ton	450	364	155	135
Silage - Sorg(35% DM) 41 - 50 Ton	580	455	190	168
Silage - Sorg(35% DM) 51 - 60 Ton	700	550	220	202
Silage - Sorg(35% DM) 7 - 10 Ton	125	119	60	37
Small Grain Heavy Grazing	240	112	105	41
Small Grain Light Grazing	60	75	80	28
Small Grain Moderate Grazing	160	97	105	36
Sorg. - Sudan Hay/Graze 11000 #	240	219	105	83
Sorg. - Sudan Hay/Graze 7500 #	160	149	55	57
Sorg Forage Hay/Graze 11000 #	240	219	105	83
Sorg Forage Hay/Graze 7500 #	160	151	55	57
Soybean 30 bu	110	119	60	24
Soybean 50 bu	180	180	80	40
Sunflower 2000#	100	71	56	30
Sunflower 3000#	175	107	65	45
Triticale Graze or Hay 7000 #	160	117	105	43
Triticale Graze or Hay 9000 #	240	150	105	56
Watermelons 12 tons	80	53	55	49
Weeping Lovegrass 3500 #	70	39	55	30
Wheat Forage 2000 #	60	33	80	12
Wheat Forage 4000 #	160	67	105	25
Wheat Forage 6000 #	240	100	105	37
Wheat Grain 20 - 30 bu + Grazing	60	58	55	40
Wheat Grain 20 - 30 bu	45	37	55	26
Wheat Grain 31 - 40 bu + Grazing	80	71	75	48
Wheat Grain 31 - 40 bu	60	50	75	34
Wheat Grain 41 - 50 bu + Grazing	100	83	75	57
Wheat Grain 41 - 50 bu	75	62	75	43
Wheat Grain 51 - 60 bu + Grazing	120	96	90	65
Wheat Grain 51 - 60 bu	90	75	90	51
Wheat Grain 61 - 70 bu + Grazing	140	108	90	74
Wheat Grain 61 - 70 bu	105	87	90	60
Wheat Grain 71 - 80 bu + Grazing	160	121	95	82
Wheat Grain 71 - 80 bu	120	100	95	68
Wheat Grain 81 - 90 bu + Grazing	180	133	95	91
Wheat Grain 81 - 90 bu	135	112	95	77
Wheat Grain 91 - 100 bu + Grazing	200	146	95	99
Wheat Grain 91 - 100 bu	150	125	95	85
Wheat Heavy Grazing	240	114	105	42
Wheat Light Grazing	60	75	80	28
Wheat Moderate Grazing	160	97	105	36
Millet GC (25% DM) 18 - 24 Ton	180	140	60	46
Millet Hay/Graze 11000 #	150	95	45	40
Silage - Millet(35% DM) 15 - 18 Ton	190	139	60	46
Popcorn Shelled 3000 - 4000 #	80	74	80	27
Popcorn Shelled 4000 - 5000 #	100	92	80	33
Popcorn Shelled 5000 - 6000 #	120	110	80	40
Vetch Hay 1 Ton	70	60	105	14
Vetch Hay 2 Tons	140	120	105	28
Vetch Green chop(25%DM) 4 Tons	70	56	105	7
Vetch Green chop(25%DM) 8 Tons	140	112	105	14
Winter Pea Hay 5000#	140	137	105	35
Winter Pea Green chop(25%DM)8-9 Tons	140	123	105	32
Cowpea Hay 2 Tons	140	120	105	26
Cowpea GreenChop 8Tons(25%DM) Tons	140	120	105	26

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Phone: 806.677.0093
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Fax: 806.677.0329

Lab No.: **4028**

LABORATORY ANALYSIS REPORT

Report Date: 08/22/2023 07:23 am

Send To: 6224

ENVIRO-AG ENGINEERING INC
3404 AIRWAY BLVD
AMARILLO, TX 79118

Amy Meier
Data Review Coordinator

Results For: KUIPER COWS
Sample ID: MANURE
Location ERATH COUNTY

Received: 08/10/2023
Sampled: 08/04/2023
Invoice No: 423675
P.O. #: COREY MULLIN

		Analysis (dry basis)	Analysis (as rec'd)	Total content lbs per ton (as rec'd)	Estimated available first year* lbs per ton (as rec'd)
NUTRIENTS					
Nitrogen					
Total Nitrogen	%	1.409	1.288	25.8	10.4
Organic Nitrogen	%	1.393	1.273	25.5	10.0
Ammonium Nitrogen	%	0.016	0.015	0.3	0.3
Nitrate+Nitrite Nitrogen	%	0.0069	0.0064	0.1	0.1
Major and Secondary Nutrients					
Phosphorus	%	0.503	0.466		
Phosphorus as P2O5	%	1.15	1.065	21.3	19.2
Potassium	%	1.09	1.009		
Potassium as K2O	%	1.31	1.213	24.3	24.3
OTHER PROPERTIES					
Moisture	%		8.60		
Total Solids	%		91.4	1828	
Organic Matter	%	33.5	30.6	612	
Ash	%		60.8	1216	
C:N Ratio	ratio		13.7		

* Assumes 39% of organic nitrogen available during first crop year after application. Assumes 100% of ammonium and nitrate nitrogen available, but should be adjusted for potential field losses at application site.

Your opinion is valuable to us. Please let us know what you think about our services! Send an email to feedback@servitech.com.

Enviro-Ag Engineering, Inc.
9855 FM 847, Dublin, TX 76446
Tel. 254-965-3500 Fax 254-965-8000

MANURE CHAIN OF CUSTODY RECORD

Producer/Facility: Kuiper Cows

County: Erath

Date Sampled: 8/4/2023

Date Shipped: 8/7/2023

Project Manager: Corey Mullin

Sample Type	Sample ID	Number of Containers	Test Package	Proper Preservation	Matrix
Manure	Manure	4028 1	EAE TX CO KS MANURE	Y	OT

Relinquished By: Ref. Internal COC

Company: EAE

Relinquished By: Lisa Postmus

Company: EAE

Date/Time:

Received By: UPS

Relinquished By:

Company: Servi-Tech Lab

servi tech
6921 S. Bell • Amarillo, TX 79109
www.servitech.com

Phone: 806.677.0093
800.557.7509
Fax: 806.677.0329

Lab No: **4360**

LABORATORY ANALYSIS REPORT

Report Date: 09/01/2023 09:00 am

Send To: 6224	ENVIRO-AG ENGINEERING INC 3404 AIRWAY BLVD AMARILLO, TX 79118

Amy Meier
Data Review Coordinator

Client Name:	KUIPER COWS	**Received:**	08/16/2023
Sample ID:	WW	**Sampled:**	08/04/2023
Location	ERATH COUNTY	**Invoice No:**	423780
		P.O. #:	COREY MULLIN

	Analysis results		lbs/acre-in	meq/L
NUTRIENTS				
Nitrogen				
Total Nitrogen	34	ppm	8	2.4
Organic Nitrogen	34	ppm	8	2.4
Ammonium Nitrogen	<1	ppm	0	0
Nitrate+Nitrite Nitrogen	<0.20	ppm	0	0
Major and Secondary Nutrients				
Phosphorus	<10	ppm		
Phosphorus as P2O5	<20	ppm	0	
Potassium	770	ppm		19.7
Potassium as K2O	920	ppm	209	
OTHER PROPERTIES				
Moisture	99.7	%		
Total Solids	0.3	%	680	
Organic Matter	0.1	%	227	
Ash	0.2	%		
C:N Ratio	17.1	ratio		

Enviro-Ag Engineering, Inc.
9855 FM 847, Dublin, TX 76446
Tel. 254-965-3500 Fax 254-965-8000

WASTEWATER CHAIN OF CUSTODY RECORD

Producer/Facility: Kuiper Cows

County: Erath

Date Sampled: 8/4/2023

Date Shipped: 8/7/2023

Project Manager: Corey Mullin

Sample Type	Sample ID	Number of Containers	Test Package	Proper Preservation	Matrix
Wastewater	WW 4360	2	EAE TX CO KS LAGOON	Y	OT

Relinquished By: Ref. Internal COC
Company: EAE

Relinquished By: Lisa Postmus
Company: EAE
Date/Time:

Relinquished By:
Company: Servi-Tech Lab

Received By: UPS

SOIL ANALYSIS REPORT

CLIENT:	ENVIRO-AG ENGINEERING INC 3404 AIRWAY BLVD AMARILLO, TX 79118
6224	

Servi-Tech Laboratories
www.servitechlabs.com

6921 S. Bell
Amarillo, TX 79109
800.557.7509
806.677.0093
Fax 806.677.0329

LAB NO:	47520 - 47523
INVOICE NO:	171904
DATE RECEIVED:	4/26/2024
DATE REPORTED:	04/30/2024

SOIL ANALYSIS RESULTS FOR: KUIPER DAIRY **FIELD IDENTIFICATION:** COREY MULLIN

METHOD USED:			1:2 Soil-Water		1:2 Soil-Water	XSL(i)	LOI(r)	Cd Reduction		Mehlich 3 ICP	Ammonium Acetate					DTPA				DTPA Sorbitol
Lab Number	Sample ID	Sample Depth	Soil pH	Buffer pH	Sol. Salts mmho/cm	Excess Lime	% Organic Matter	Nitrate-Nitrogen ppm	lb. N/A	Phosphorus ppm P	Potassium ppm K	Sulfur ppm	lb. S/A	Calcium ppm Ca	Magnesium ppm Mg	Sodium ppm Na	Zinc ppm Zn	Iron ppm Fe	Manganese ppm Mn	Copper ppm Cu	Boron ppm B
47520	BOUND KT 1	0 - 6	6.6		0.07	No	1.5	1.6	3	8	269	5	9	1483	178	17	3.7	19	6.7	0.4	0.76
47521	BOUND KT 2	0 - 6	7.4		0.10	No	1.8	3.5	6	8	214	7	13	2763	140	17	1.1	20	6.0	0.4	0.80
47522	KT 1	0 - 6	7.6		0.13	Lo	1.4	2.5	5	7	194	9	16	3496	225	46	0.3	27	5.4	0.6	0.73
47523	KT 2	0 - 6	7.2		0.10	No	1.2	2.5	5	12	160	8	14	2428	193	26	0.2	32	5.3	0.5	0.67

METHOD USED:				Hydrometer			
Lab Number	Sample ID	Sample Depth	Soil Textural Classification	Sand %	Silt %	Clay %	Soil Density g/cc
47520	BOUND KT 1	0 - 6	Sandy Loam	70.0	15.0	15.0	20094007
47521	BOUND KT 2	0 - 6	Sandy Loam	67.5	15.0	17.5	17273795
47522	KT 1	0 - 6	Sandy Clay Loam	65.0	15.0	20.0	20564042
47523	KT 2	0 - 6	Sandy Clay Loam	70.0	10.0	20.0	21151588

FERTILIZER RECOMMENDATIONS: POUNDS ACTUAL NUTRIENT PER ACRE

Lab Number	Sample ID	Crop To Be Grown	Yield Goal	Lime, ECC Tons/A to raise pH to:			N	P2O5	K2O	Zn	S	Mn	Cu	MgO	B	Ca	Cl
				8.0	8.5	7.0											
47520	BOUND KT 1																
47521	BOUND KT 2																
47522	KT 1																
47523	KT 2																

Cation Exchange Capacity

CEC	%H	%K	%Ca	%Mg	%Na
10	0	7	77	15	1
16	0	4	89	7	0
20	0	2	87	9	1
14	0	3	85	11	1

SPECIAL COMMENTS AND SUGGESTIONS:

Lab Number(s): 47520, 47521, 47522, 47523

Servi-Tech Laboratory fertilizer recommendations were not requested.

Analyses are representative of the samples submitted

Samples are retained 30 days after report of analysis

Explanations of soil analysis terms are available upon request

Reviewed and Approved By: Ashleigh Richeson Signer

SOIL MONITORING REPORT FOR CAFO INDIVIDUAL PERMITS IN THE SOLE SOURCE IMPAIRMENT ZONES

A. Sample collection

1) Samples were collected for the land management unit (LMU) identified below.

☑ Yes, complete this form and Tables 1 and 2 below. **Attach a copy of the laboratory analyses to this soil monitoring report form.**

☐ No, provide the facility information for the LMU below with the exception of the tables.

2) Reporting Year: 2022 Sample Collection Date: 12/6/2022

B. Facility Information

1) Permit Number: WQ0005293000
2) Site Name: Kuiper Cows
3) Name of LMU (**LMU Name should correspond to field designation located on the Map included in the PPP**): C2
4) Name of Owner/Operator: Kuiper Cows, LLC
5) Mailing Address for Owner/Operator: 1865 Private Road 1233, Hico, TX 76457

Table 1. Soil Analysis Report Where Manure, Sludge and Wastewater are not Incorporated

Soil Sample Parameter	0-2 inches soil depth	2-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm			
Phosphorus (extractable), ppm			
Potassium (extractable), ppm			
Sodium (extractable), ppm			
Magnesium (extractable), ppm			
Calcium (extractable), ppm			
Electrical Conductivity/Soluble Salts, dS/m			
pH, SU			

Table 2. Soil Analysis Report Where Manure, Sludge and Wastewater are Incorporated

Soil Sample Parameter	0-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm	20.983	16.027
Phosphorus (extractable), ppm	118	2.55
Potassium (extractable), ppm	199	116
Sodium (extractable), ppm	77.0	98.5
Magnesium (extractable), ppm	449	177
Calcium (extractable), ppm	12746	22839
Electrical Conductivity/Soluble Salts, dS/m	0.209	0.264
pH, SU	7.98	8.14

Note: ppm = parts per million, considered to be equivalent to milligrams per liter (mg/l); dS/m = decisiemins per meter, equivalent to millimhols per centimeter (mmhols/cm); SU = standard units.

C. Certification

I 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 information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name and Title of Responsible Official or Authorized Agent: Clemens Kuiper / Member

Signature:

Date: 4/12/23

Telephone Number: 254/968-4018

D. How to Submit

The soil monitoring report with attached soil analyses should be included in the Annual Report that is required to be submitted by March 31 of each year. For State Only CAFOs, submit this soil monitoring report form to the TCEQ, Enforcement Division (MC-224), P.O. Box 13087, Austin, Texas 78711-3087 and provide a copy to the TCEQ Regional Office.

If you have any additional questions about this form or soil sample collection and soil analyses requirements, contact:

By e-mail: CAFO@tceq.texas.gov or call (512) -239-4671

SOIL MONITORING REPORT FOR CAFO INDIVIDUAL PERMITS IN THE SOLE SOURCE IMPAIRMENT ZONES

A. Sample collection

1) Samples were collected for the land management unit (LMU) identified below.

☑ Yes, complete this form and Tables 1 and 2 below. **Attach a copy of the laboratory analyses to this soil monitoring report form.**

☐ No, provide the facility information for the LMU below with the exception of the tables.

2) Reporting Year: 2022 Sample Collection Date: 12/6/2022

B. Facility Information

1) Permit Number: WQ0005293000
2) Site Name: Kuiper Cows
3) Name of LMU (**LMU Name should correspond to field designation located on the Map included in the PPP**): C3
4) Name of Owner/Operator: Kuiper Cows, LLC
5) Mailing Address for Owner/Operator: 1865 Private Road 1233, Hico, TX 76457

Table 1. Soil Analysis Report Where Manure, Sludge and Wastewater are not Incorporated

Soil Sample Parameter	0-2 inches soil depth	2-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm			
Phosphorus (extractable), ppm			
Potassium (extractable), ppm			
Sodium (extractable), ppm			
Magnesium (extractable), ppm			
Calcium (extractable), ppm			
Electrical Conductivity/Soluble Salts, dS/m			
pH, SU			

Table 2. Soil Analysis Report Where Manure, Sludge and Wastewater are Incorporated

Soil Sample Parameter	0-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm	8.549	18.037
Phosphorus (extractable), ppm	48.2	154
Potassium (extractable), ppm	212	358
Sodium (extractable), ppm	68.4	63.3
Magnesium (extractable), ppm	372	311
Calcium (extractable), ppm	13499	12695
Electrical Conductivity/Soluble Salts, dS/m	0.191	0.43
pH, SU	8.07	8.15

Note: ppm = parts per million, considered to be equivalent to milligrams per liter (mg/l); dS/m = decisiemins per meter, equivalent to millimhols per centimeter (mmhols/cm); SU = standard units.

C. Certification

I 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 information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name and Title of Responsible Official or Authorized Agent: Clemens Kuiper / Member

Signature:

Date: 4/12/23

Telephone Number: 254/968-4018

D. How to Submit

The soil monitoring report with attached soil analyses should be included in the Annual Report that is required to be submitted by March 31 of each year. For State Only CAFOs, submit this soil monitoring report form to the TCEQ, Enforcement Division (MC-224), P.O. Box 13087, Austin, Texas 78711-3087 and provide a copy to the TCEQ Regional Office.

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SOIL MONITORING REPORT FOR CAFO INDIVIDUAL PERMITS IN THE SOLE SOURCE IMPAIRMENT ZONES

A. Sample collection

1) Samples were collected for the land management unit (LMU) identified below.

☑ Yes, complete this form and Tables 1 and 2 below. **Attach a copy of the laboratory analyses to this soil monitoring report form.**

☐ No, provide the facility information for the LMU below with the exception of the tables.

2) Reporting Year: 2022 Sample Collection Date: 12/6/2022

B. Facility Information

1) Permit Number: WQ0005293000
2) Site Name: Kuiper Cows
3) Name of LMU (**LMU Name should correspond to field designation located on the Map included in the PPP**): WN1
4) Name of Owner/Operator: Kuiper Cows, LLC
5) Mailing Address for Owner/Operator: 1865 Private Road 1233, Hico, TX 76457

Table 1. Soil Analysis Report Where Manure, Sludge and Wastewater are not Incorporated

Soil Sample Parameter	0-2 inches soil depth	2-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm			
Phosphorus (extractable), ppm			
Potassium (extractable), ppm			
Sodium (extractable), ppm			
Magnesium (extractable), ppm			
Calcium (extractable), ppm			
Electrical Conductivity/Soluble Salts, dS/m			
pH, SU			

Table 2. Soil Analysis Report Where Manure, Sludge and Wastewater are Incorporated

Soil Sample Parameter	0-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm	10.173	13.249
Phosphorus (extractable), ppm	1	59.5
Potassium (extractable), ppm	76.5	181
Sodium (extractable), ppm	66.9	20.5
Magnesium (extractable), ppm	292	194
Calcium (extractable), ppm	6029	2008
Electrical Conductivity/Soluble Salts, dS/m	0.85	0.83
pH, SU	8.08	7.85

Note: ppm = parts per million, considered to be equivalent to milligrams per liter (mg/l); dS/m = decisiemins per meter, equivalent to millimhols per centimeter (mmhols/cm); SU = standard units.

C. Certification

I 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 information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name and Title of Responsible Official or Authorized Agent: Clemens Kuiper / Member

Signature: John Mulkin for

Date: 4/12/23

Telephone Number: 254/968-4018

D. How to Submit

The soil monitoring report with attached soil analyses should be included in the Annual Report that is required to be submitted by March 31 of each year. For State Only CAFOs, submit this soil monitoring report form to the TCEQ, Enforcement Division (MC-224), P.O. Box 13087, Austin, Texas 78711-3087 and provide a copy to the TCEQ Regional Office.

If you have any additional questions about this form or soil sample collection and soil analyses requirements, contact:

By e-mail: CAFO@tceq.texas.gov or call (512) -239-4671

CAFO SOIL MONITORING REPORT FOR DAIRY CAFO INDIVIDUAL PERMIT IN SOLE SOURCE IMPAIRMENT ZONES

☐ **No samples were collected for the LMUs listed below**

For Samples Collected in Calendar Year 2021

Note: This form may only be used by CAFOs located in a sole impairment zones authorized under an individual Permit.

Permit Number: WQ000 5293000 *LMU Name or Number: W1 Date Samples Collected: 11/17/2021

Owner Name: Kuiper Cows, LLC

Facility Name: Kuiper Cows

Mailing Address: 1865 Private Road 1233, Hico, TX 76457

*** Should correspond to field designation located on the map included in the PPP**

Parameter	Units	Manure/Sludge/Wastewater Not Incorporated			Manure/Sludge/Wastewater Incorporated (includes irrigation)	
		0-2 Inches	2-6 Inches	6-24 Inches	0-6 Inches	6-24 Inches
Nitrate-Nitrogen (NO_3-N)	ppm				37.45	15.71
Phosphorus (extractable)	ppm				51	1
Potassium (extractable)	ppm				229	158
Sodium (extractable)	ppm				50	61
Magnesium (extractable)	ppm				346	169
Calcium (extractable)	ppm				9658	16120
Electrical Conductivity/Soluble Salts	dS/m				0.218	0.201
pH	SU				7.73	7.84

Note: ppm = parts per million; considered to be equivalent to milligrams per liter (mg/l) dS/m = decisiemins per meter; equivalent to millimhols per centimeter (mmhols/cm) SU = standard units

ATTACH SOIL ANALYSES TO THE REPORT FORM.

I 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 information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Clemens Kuiper /Member — Printed Name and Title of Responsible Official or Authorized Agent

Signature — Date: 1/17/22 — (254) 968-4018 Telephone Number

How to submit: The soil monitoring report with attached soil analyses should be included in the Annual Report that is required to be submitted by March 31 of each year. For State Only CAFOs, submit the form to the TCEQ, Enforcement Division (MC-224), P.O. Box 13087, Austin, Texas 78711-3087 and provide a copy to the TCEQ Regional Office.

CAFO SOIL MONITORING REPORT FOR DAIRY CAFO INDIVIDUAL PERMIT IN SOLE SOURCE IMPAIRMENT ZONES

☐ **No samples were collected for the LMUs listed below**

For Samples Collected in Calendar Year 2021

Note: This form may only be used by CAFOs located in a sole impairment zones authorized under an individual Permit.

Permit Number: WQ000 5293000 *LMU Name or Number: F1 Date Samples Collected: 11/17/2021

Owner Name: Kuiper Cows, LLC

Facility Name: Kuiper Cows

Mailing Address: 1865 Private Road 1233, Hico, TX 76457

*** Should correspond to field designation located on the map included in the PPP**

Parameter	Units	Manure/Sludge/Wastewater Not Incorporated			Manure/Sludge/Wastewater Incorporated (includes irrigation)	
		0-2 Inches	2-6 Inches	6-24 Inches	0-6 Inches	6-24 Inches
Nitrate-Nitrogen (NO_3-N)	ppm				43.9	14
Phosphorus (extractable)	ppm				6	1
Potassium (extractable)	ppm				242	187
Sodium (extractable)	ppm				60	47
Magnesium (extractable)	ppm				224	149
Calcium (extractable)	ppm				11370	16797
Electrical Conductivity/Soluble Salts	dS/m				0.353	0.269
pH	SU				7.7	7.75

Note: ppm = parts per million; considered to be equivalent to milligrams per liter (mg/l) dS/m = decisiemins per meter; equivalent to millimhols per centimeter (mmhols/cm) SU = standard units

ATTACH SOIL ANALYSES TO THE REPORT FORM.

I 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 information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Clemens Kuiper /Member — Printed Name and Title of Responsible Official or Authorized Agent

↑ for — Signature

1/17/22 — Date

(254) 968-4018 — Telephone Number

How to submit: The soil monitoring report with attached soil analyses should be included in the Annual Report that is required to be submitted by March 31 of each year. For State Only CAFOs, submit the form to the TCEQ, Enforcement Division (MC-224), P.O. Box 13087, Austin, Texas 78711-3087 and provide a copy to the TCEQ Regional Office.

CAFO SOIL MONITORING REPORT FOR DAIRY CAFO INDIVIDUAL PERMIT IN SOLE SOURCE IMPAIRMENT ZONES

☐ **No samples were collected for the LMUs listed below**

For Samples Collected in Calendar Year 2021

Note: This form may only be used by CAFOs located in a sole impairment zones authorized under an individual Permit.

Permit Number: WQ000 5293000 *LMU Name or Number: F2 Date Samples Collected: 11/17/2021

Owner Name: Kuiper Cows, LLC

Facility Name: Kuiper Cows

Mailing Address: 1865 Private Road 1233, Hico, TX 76457

*** Should correspond to field designation located on the map included in the PPP**

Parameter	Units	Manure/Sludge/Wastewater Not Incorporated			Manure/Sludge/Wastewater Incorporated (includes irrigation)	
		0-2 Inches	2-6 Inches	6-24 Inches	0-6 Inches	6-24 Inches
Nitrate-Nitrogen (NO_3-N)	ppm				15.93	10.14
Phosphorus (extractable)	ppm				4	1
Potassium (extractable)	ppm				208	185
Sodium (extractable)	ppm				79	409
Magnesium (extractable)	ppm				207	194
Calcium (extractable)	ppm				11475	14721
Electrical Conductivity/Soluble Salts	dS/m				0.216	0.346
pH	SU				7.71	7.86

Note: ppm = parts per million; considered to be equivalent to milligrams per liter (mg/l) dS/m = decisiemins per meter; equivalent to millimhols per centimeter (mmhols/cm) SU = standard units

ATTACH SOIL ANALYSES TO THE REPORT FORM.

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Clemens Kuiper /Member — Printed Name and Title of Responsible Official or Authorized Agent

Signature — Date: 1/17/22 — (254) 968-4018 Telephone Number

How to submit: The soil monitoring report with attached soil analyses should be included in the Annual Report that is required to be submitted by March 31 of each year. For State Only CAFOs, submit the form to the TCEQ, Enforcement Division (MC-224), P.O. Box 13087, Austin, Texas 78711-3087 and provide a copy to the TCEQ Regional Office.

SOIL MONITORING REPORT FOR CAFO INDIVIDUAL PERMITS IN THE SOLE SOURCE IMPAIRMENT ZONES

A. Sample collection

1) Samples were collected for the land management unit (LMU) identified below.

☑ Yes, complete this form and Tables 1 and 2 below. **Attach a copy of the laboratory analyses to this soil monitoring report form.**

☐ No, provide the facility information for the LMU below with the exception of the tables.

2) Reporting Year: 2023 Sample Collection Date: 09/7/2023

B. Facility Information

1) Permit Number: WQ0005293000
2) Site Name: Kuiper Cows
3) Name of LMU (**LMU Name should correspond to field designation located on the Map included in the PPP**): 1
4) Name of Owner/Operator: Kuiper Cows, LLC
5) Mailing Address for Owner/Operator: 1865 Private Road 1233, Hico, TX 76457

Table 1. Soil Analysis Report Where Manure, Sludge and Wastewater are not Incorporated

Soil Sample Parameter	0-2 inches soil depth	2-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm			
Phosphorus (extractable), ppm			
Potassium (extractable), ppm			
Sodium (extractable), ppm			
Magnesium (extractable), ppm			
Calcium (extractable), ppm			
Electrical Conductivity/Soluble Salts, dS/m			
pH, SU			

Table 2. Soil Analysis Report Where Manure, Sludge and Wastewater are Incorporated

Soil Sample Parameter	0-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm	55.182	34.337
Phosphorus (extractable), ppm	341	50.3
Potassium (extractable), ppm	476	455
Sodium (extractable), ppm	25.9	97.8
Magnesium (extractable), ppm	330	665
Calcium (extractable), ppm	2929	6186
Electrical Conductivity/Soluble Salts, dS/m	0.282	0.456
pH, SU	6.52	7.33

Note: ppm = parts per million, considered to be equivalent to milligrams per liter (mg/l); dS/m = decisiemins per meter, equivalent to millimhols per centimeter (mmhols/cm); SU = standard units.

C. Certification

I 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 information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name and Title of Responsible Official or Authorized Agent: Clemens Kuiper / Member

Signature:

Date: 11/6/23

Telephone Number: 254/968-4018

D. How to Submit

The soil monitoring report with attached soil analyses should be included in the Annual Report that is required to be submitted by March 31 of each year. For State Only CAFOs, submit this soil monitoring report form to the TCEQ, Enforcement Division (MC-224), P.O. Box 13087, Austin, Texas 78711-3087 and provide a copy to the TCEQ Regional Office.

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By e-mail: CAFO@tceq.texas.gov or call (512) -239-4671

SOIL MONITORING REPORT FOR CAFO INDIVIDUAL PERMITS IN THE SOLE SOURCE IMPAIRMENT ZONES

A. Sample collection

1) Samples were collected for the land management unit (LMU) identified below.

☑ Yes, complete this form and Tables 1 and 2 below. **Attach a copy of the laboratory analyses to this soil monitoring report form.**

☐ No, provide the facility information for the LMU below with the exception of the tables.

2) Reporting Year: 2023 Sample Collection Date: 09/7/2023

B. Facility Information

1) Permit Number: WQ0005293000
2) Site Name: Kuiper Cows
3) Name of LMU (**LMU Name should correspond to field designation located on the Map included in the PPP**): 2
4) Name of Owner/Operator: Kuiper Cows, LLC
5) Mailing Address for Owner/Operator: 1865 Private Road 1233, Hico, TX 76457

Table 1. Soil Analysis Report Where Manure, Sludge and Wastewater are not Incorporated

Soil Sample Parameter	0-2 inches soil depth	2-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm			
Phosphorus (extractable), ppm			
Potassium (extractable), ppm			
Sodium (extractable), ppm			
Magnesium (extractable), ppm			
Calcium (extractable), ppm			
Electrical Conductivity/Soluble Salts, dS/m			
pH, SU			

Table 2. Soil Analysis Report Where Manure, Sludge and Wastewater are Incorporated

Soil Sample Parameter	0-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm	50.331	11.285
Phosphorus (extractable), ppm	160	18.5
Potassium (extractable), ppm	681	307
Sodium (extractable), ppm	26.5	63.4
Magnesium (extractable), ppm	300	486
Calcium (extractable), ppm	3363	7156
Electrical Conductivity/Soluble Salts, dS/m	0.323	0.292
pH, SU	6.92	7.39

Note: ppm = parts per million, considered to be equivalent to milligrams per liter (mg/l); dS/m = decisiemins per meter, equivalent to millimhols per centimeter (mmhols/cm); SU = standard units.

C. Certification

I 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 information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name and Title of Responsible Official or Authorized Agent: Clemens Kuiper / Member

Signature: John Mallen for →

Date: 11/6/23

Telephone Number: 254/968-4018

D. How to Submit

The soil monitoring report with attached soil analyses should be included in the Annual Report that is required to be submitted by March 31 of each year. For State Only CAFOs, submit this soil monitoring report form to the TCEQ, Enforcement Division (MC-224), P.O. Box 13087, Austin, Texas 78711-3087 and provide a copy to the TCEQ Regional Office.

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SOIL MONITORING REPORT FOR CAFO INDIVIDUAL PERMITS IN THE SOLE SOURCE IMPAIRMENT ZONES

A. Sample collection

1) Samples were collected for the land management unit (LMU) identified below.

☑ Yes, complete this form and Tables 1 and 2 below. **Attach a copy of the laboratory analyses to this soil monitoring report form.**

☐ No, provide the facility information for the LMU below with the exception of the tables.

2) Reporting Year: 2023 Sample Collection Date: 09/7/2023

B. Facility Information

1) Permit Number: WQ0005293000
2) Site Name: Kuiper Cows
3) Name of LMU (**LMU Name should correspond to field designation located on the Map included in the PPP**): C1
4) Name of Owner/Operator: Kuiper Cows, LLC
5) Mailing Address for Owner/Operator: 1865 Private Road 1233, Hico, TX 76457

Table 1. Soil Analysis Report Where Manure, Sludge and Wastewater are not Incorporated

Soil Sample Parameter	0-2 inches soil depth	2-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm			
Phosphorus (extractable), ppm			
Potassium (extractable), ppm			
Sodium (extractable), ppm			
Magnesium (extractable), ppm			
Calcium (extractable), ppm			
Electrical Conductivity/Soluble Salts, dS/m			
pH, SU			

Table 2. Soil Analysis Report Where Manure, Sludge and Wastewater are Incorporated

Soil Sample Parameter	0-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm	37.269	24.089
Phosphorus (extractable), ppm	78.2	6.99
Potassium (extractable), ppm	240	176
Sodium (extractable), ppm	76.0	436
Magnesium (extractable), ppm	317	209
Calcium (extractable), ppm	12701	19267
Electrical Conductivity/Soluble Salts, dS/m	0.218	1.42
pH, SU	7.53	7.54

Note: ppm = parts per million, considered to be equivalent to milligrams per liter (mg/l); dS/m = decisiemins per meter, equivalent to millimhols per centimeter (mmhols/cm); SU = standard units.

C. Certification

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Print Name and Title of Responsible Official or Authorized Agent: Clemens Kuiper / Member

Signature: John Mallie for

Date: 11/6/23

Telephone Number: 254/968-4018

D. How to Submit

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By e-mail: CAFO@tceq.texas.gov or call (512) -239-4671

SOIL MONITORING REPORT FOR CAFO INDIVIDUAL PERMITS IN THE SOLE SOURCE IMPAIRMENT ZONES

A. Sample collection

1) Samples were collected for the land management unit (LMU) identified below.

☑ Yes, complete this form and Tables 1 and 2 below. **Attach a copy of the laboratory analyses to this soil monitoring report form.**

☐ No, provide the facility information for the LMU below with the exception of the tables.

2) Reporting Year: 2023 Sample Collection Date: 09/7/2023

B. Facility Information

1) Permit Number: WQ0005293000
2) Site Name: Kuiper Cows
3) Name of LMU (**LMU Name should correspond to field designation located on the Map included in the PPP**): C4
4) Name of Owner/Operator: Kuiper Cows, LLC
5) Mailing Address for Owner/Operator: 1865 Private Road 1233, Hico, TX 76457

Table 1. Soil Analysis Report Where Manure, Sludge and Wastewater are not Incorporated

Soil Sample Parameter	0-2 inches soil depth	2-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm			
Phosphorus (extractable), ppm			
Potassium (extractable), ppm			
Sodium (extractable), ppm			
Magnesium (extractable), ppm			
Calcium (extractable), ppm			
Electrical Conductivity/Soluble Salts, dS/m			
pH, SU			

Table 2. Soil Analysis Report Where Manure, Sludge and Wastewater are Incorporated

Soil Sample Parameter	0-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm	17.83	7.179
Phosphorus (extractable), ppm	65.8	6.72
Potassium (extractable), ppm	279	200
Sodium (extractable), ppm	51.0	93.2
Magnesium (extractable), ppm	243	201
Calcium (extractable), ppm	11595	18139
Electrical Conductivity/Soluble Salts, dS/m	0.109	0.216
pH, SU	7.64	7.66

Note: ppm = parts per million, considered to be equivalent to milligrams per liter (mg/l); dS/m = decisiemins per meter, equivalent to millimhols per centimeter (mmhols/cm); SU = standard units.

C. Certification

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Print Name and Title of Responsible Official or Authorized Agent: Clemens Kuiper / Member

Signature: John Mallin Pur

Date: 11/6/23

Telephone Number: 254/968-4018

D. How to Submit

The soil monitoring report with attached soil analyses should be included in the Annual Report that is required to be submitted by March 31 of each year. For State Only CAFOs, submit this soil monitoring report form to the TCEQ, Enforcement Division (MC-224), P.O. Box 13087, Austin, Texas 78711-3087 and provide a copy to the TCEQ Regional Office.

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By e-mail: CAFO@tceq.texas.gov or call (512) -239-4671

SOIL MONITORING REPORT FOR CAFO INDIVIDUAL PERMITS IN THE SOLE SOURCE IMPAIRMENT ZONES

A. Sample collection

1) Samples were collected for the land management unit (LMU) identified below.

☑ Yes, complete this form and Tables 1 and 2 below. **Attach a copy of the laboratory analyses to this soil monitoring report form.**

☐ No, provide the facility information for the LMU below with the exception of the tables.

2) Reporting Year: 2023 Sample Collection Date: 09/7/2023

B. Facility Information

1) Permit Number: WQ0005293000
2) Site Name: Kuiper Cows
3) Name of LMU (**LMU Name should correspond to field designation located on the Map included in the PPP**): F4
4) Name of Owner/Operator: Kuiper Cows, LLC
5) Mailing Address for Owner/Operator: 1865 Private Road 1233, Hico, TX 76457

Table 1. Soil Analysis Report Where Manure, Sludge and Wastewater are not Incorporated

Soil Sample Parameter	0-2 inches soil depth	2-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm			
Phosphorus (extractable), ppm			
Potassium (extractable), ppm			
Sodium (extractable), ppm			
Magnesium (extractable), ppm			
Calcium (extractable), ppm			
Electrical Conductivity/Soluble Salts, dS/m			
pH, SU			

Table 2. Soil Analysis Report Where Manure, Sludge and Wastewater are Incorporated

Soil Sample Parameter	0-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm	24.333	4.325
Phosphorus (extractable), ppm	84.7	5.15
Potassium (extractable), ppm	302	189
Sodium (extractable), ppm	80.4	130
Magnesium (extractable), ppm	296	236
Calcium (extractable), ppm	8324	13595
Electrical Conductivity/Soluble Salts, dS/m	0.212	0.285
pH, SU	7.5	7.58

Note: ppm = parts per million, considered to be equivalent to milligrams per liter (mg/l); dS/m = decisiemins per meter, equivalent to millimhols per centimeter (mmhols/cm); SU = standard units.

C. Certification

I 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 information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name and Title of Responsible Official or Authorized Agent: Clemens Kuiper / Member

Signature: John Mallon for

Date: 11/6/23

Telephone Number: 254/968-4018

D. How to Submit

The soil monitoring report with attached soil analyses should be included in the Annual Report that is required to be submitted by March 31 of each year. For State Only CAFOs, submit this soil monitoring report form to the TCEQ, Enforcement Division (MC-224), P.O. Box 13087, Austin, Texas 78711-3087 and provide a copy to the TCEQ Regional Office.

If you have any additional questions about this form or soil sample collection and soil analyses requirements, contact:

By e-mail: CAFO@tceq.texas.gov or call (512) -239-4671

SOIL MONITORING REPORT FOR CAFO INDIVIDUAL PERMITS IN THE SOLE SOURCE IMPAIRMENT ZONES

A. Sample collection

1) Samples were collected for the land management unit (LMU) identified below.

☑ Yes, complete this form and Tables 1 and 2 below. **Attach a copy of the laboratory analyses to this soil monitoring report form.**

☐ No, provide the facility information for the LMU below with the exception of the tables.

2) Reporting Year: 2023 Sample Collection Date: 09/7/2023

B. Facility Information

1) Permit Number: WQ0005293000
2) Site Name: Kuiper Cows
3) Name of LMU (**LMU Name should correspond to field designation located on the Map included in the PPP**): TW1
4) Name of Owner/Operator: Kuiper Cows, LLC
5) Mailing Address for Owner/Operator: 1865 Private Road 1233, Hico, TX 76457

Table 1. Soil Analysis Report Where Manure, Sludge and Wastewater are not Incorporated

Soil Sample Parameter	0-2 inches soil depth	2-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm			
Phosphorus (extractable), ppm			
Potassium (extractable), ppm			
Sodium (extractable), ppm			
Magnesium (extractable), ppm			
Calcium (extractable), ppm			
Electrical Conductivity/Soluble Salts, dS/m			
pH, SU			

Table 2. Soil Analysis Report Where Manure, Sludge and Wastewater are Incorporated

Soil Sample Parameter	0-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm	24.706	9.918
Phosphorus (extractable), ppm	25.4	7.82
Potassium (extractable), ppm	223	195
Sodium (extractable), ppm	38.8	34.1
Magnesium (extractable), ppm	87.1	101
Calcium (extractable), ppm	10883	15014
Electrical Conductivity/Soluble Salts, dS/m	0.194	0.172
pH, SU	7.53	7.65

Note: ppm = parts per million, considered to be equivalent to milligrams per liter (mg/l); dS/m = decisiemins per meter, equivalent to millimhols per centimeter (mmhols/cm); SU = standard units.

C. Certification

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Print Name and Title of Responsible Official or Authorized Agent: Clemens Kuiper / Member

Signature:

Date: 11/6/23

Telephone Number: 254/968-4018

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By e-mail: CAFO@tceq.texas.gov or call (512) -239-4671

SOIL MONITORING REPORT FOR CAFO INDIVIDUAL PERMITS IN THE SOLE SOURCE IMPAIRMENT ZONES

A. Sample collection

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☑ Yes, complete this form and Tables 1 and 2 below. **Attach a copy of the laboratory analyses to this soil monitoring report form.**

☐ No, provide the facility information for the LMU below with the exception of the tables.

2) Reporting Year: 2023 Sample Collection Date: 09/7/2023

B. Facility Information

1) Permit Number: WQ0005293000
2) Site Name: Kuiper Cows
3) Name of LMU (**LMU Name should correspond to field designation located on the Map included in the PPP**): TW2
4) Name of Owner/Operator: Kuiper Cows, LLC
5) Mailing Address for Owner/Operator: 1865 Private Road 1233, Hico, TX 76457

Table 1. Soil Analysis Report Where Manure, Sludge and Wastewater are not Incorporated

Soil Sample Parameter	0-2 inches soil depth	2-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm			
Phosphorus (extractable), ppm			
Potassium (extractable), ppm			
Sodium (extractable), ppm			
Magnesium (extractable), ppm			
Calcium (extractable), ppm			
Electrical Conductivity/Soluble Salts, dS/m			
pH, SU			

Table 2. Soil Analysis Report Where Manure, Sludge and Wastewater are Incorporated

Soil Sample Parameter	0-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm	29.178	9.912
Phosphorus (extractable), ppm	25.4	1.67
Potassium (extractable), ppm	302	193
Sodium (extractable), ppm	60.6	54.3
Magnesium (extractable), ppm	217	171
Calcium (extractable), ppm	14437	18312
Electrical Conductivity/Soluble Salts, dS/m	0.307	0.295
pH, SU	7.65	7.76

Note: ppm = parts per million, considered to be equivalent to milligrams per liter (mg/l); dS/m = decisiemins per meter, equivalent to millimhols per centimeter (mmhols/cm); SU = standard units.

C. Certification

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Print Name and Title of Responsible Official or Authorized Agent: Clemens Kuiper / Member

Signature: Julian Mallin for

Date: 11/6/23

Telephone Number: 254/968-4018

D. How to Submit

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SOIL MONITORING REPORT FOR CAFO INDIVIDUAL PERMITS IN THE SOLE SOURCE IMPAIRMENT ZONES

A. Sample collection

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☑ Yes, complete this form and Tables 1 and 2 below. **Attach a copy of the laboratory analyses to this soil monitoring report form.**

☐ No, provide the facility information for the LMU below with the exception of the tables.

2) Reporting Year: 2023 Sample Collection Date: 09/7/2023

B. Facility Information

1) Permit Number: WQ0005293000
2) Site Name: Kuiper Cows
3) Name of LMU (**LMU Name should correspond to field designation located on the Map included in the PPP**): W2
4) Name of Owner/Operator: Kuiper Cows, LLC
5) Mailing Address for Owner/Operator: 1865 Private Road 1233, Hico, TX 76457

Table 1. Soil Analysis Report Where Manure, Sludge and Wastewater are not Incorporated

Soil Sample Parameter	0-2 inches soil depth	2-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm			
Phosphorus (extractable), ppm			
Potassium (extractable), ppm			
Sodium (extractable), ppm			
Magnesium (extractable), ppm			
Calcium (extractable), ppm			
Electrical Conductivity/Soluble Salts, dS/m			
pH, SU			

Table 2. Soil Analysis Report Where Manure, Sludge and Wastewater are Incorporated

Soil Sample Parameter	0-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm	23.178	16.149
Phosphorus (extractable), ppm	66.6	14.7
Potassium (extractable), ppm	264	188
Sodium (extractable), ppm	44.6	52.5
Magnesium (extractable), ppm	237	132
Calcium (extractable), ppm	9769	14555
Electrical Conductivity/Soluble Salts, dS/m	0.208	0.191
pH, SU	7.62	7.74

Note: ppm = parts per million, considered to be equivalent to milligrams per liter (mg/l); dS/m = decisiemins per meter, equivalent to millimhols per centimeter (mmhols/cm); SU = standard units.

C. Certification

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Print Name and Title of Responsible Official or Authorized Agent: Clemens Kuiper / Member

Signature: John Mullin for

Date: 11/2/23

Telephone Number: 254/968-4018

D. How to Submit

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By e-mail: CAFO@tceq.texas.gov or call (512) -239-4671

SOIL MONITORING REPORT FOR CAFO INDIVIDUAL PERMITS IN THE SOLE SOURCE IMPAIRMENT ZONES

A. Sample collection

1) Samples were collected for the land management unit (LMU) identified below.

☑ Yes, complete this form and Tables 1 and 2 below. **Attach a copy of the laboratory analyses to this soil monitoring report form.**

☐ No, provide the facility information for the LMU below with the exception of the tables.

2) Reporting Year: 2023 Sample Collection Date: 09/7/2023

B. Facility Information

1) Permit Number: WQ0005293000
2) Site Name: Kuiper Cows
3) Name of LMU (**LMU Name should correspond to field designation located on the Map included in the PPP**): WN2
4) Name of Owner/Operator: Kuiper Cows, LLC
5) Mailing Address for Owner/Operator: 1865 Private Road 1233, Hico, TX 76457

Table 1. Soil Analysis Report Where Manure, Sludge and Wastewater are not Incorporated

Soil Sample Parameter	0-2 inches soil depth	2-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm			
Phosphorus (extractable), ppm			
Potassium (extractable), ppm			
Sodium (extractable), ppm			
Magnesium (extractable), ppm			
Calcium (extractable), ppm			
Electrical Conductivity/Soluble Salts, dS/m			
pH, SU			

Table 2. Soil Analysis Report Where Manure, Sludge and Wastewater are Incorporated

Soil Sample Parameter	0-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm	26.571	3.168
Phosphorus (extractable), ppm	63.7	6.78
Potassium (extractable), ppm	225	209
Sodium (extractable), ppm	25.6	46.2
Magnesium (extractable), ppm	185	287
Calcium (extractable), ppm	1811	6693
Electrical Conductivity/Soluble Salts, dS/m	0.109	0.215
pH, SU	6.76	7.46

Note: ppm = parts per million, considered to be equivalent to milligrams per liter (mg/l); dS/m = decisiemins per meter, equivalent to millimhols per centimeter (mmhols/cm); SU = standard units.

C. Certification

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Print Name and Title of Responsible Official or Authorized Agent: Clemens Kuiper / Member

Signature: John Mulle for

Date: 11/6/23

Telephone Number: 254/968-4018

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SOIL MONITORING REPORT FOR CAFO INDIVIDUAL PERMITS IN THE SOLE SOURCE IMPAIRMENT ZONES

A. Sample collection

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☑ Yes, complete this form and Tables 1 and 2 below. **Attach a copy of the laboratory analyses to this soil monitoring report form.**

☐ No, provide the facility information for the LMU below with the exception of the tables.

2) Reporting Year: 2023 Sample Collection Date: 09/7/2023

B. Facility Information

1) Permit Number: WQ0005293000
2) Site Name: Kuiper Cows
3) Name of LMU (**LMU Name should correspond to field designation located on the Map included in the PPP**): F3
4) Name of Owner/Operator: Kuiper Cows, LLC
5) Mailing Address for Owner/Operator: 1865 Private Road 1233, Hico, TX 76457

Table 1. Soil Analysis Report Where Manure, Sludge and Wastewater are not Incorporated

Soil Sample Parameter	0-2 inches soil depth	2-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm			
Phosphorus (extractable), ppm			
Potassium (extractable), ppm			
Sodium (extractable), ppm			
Magnesium (extractable), ppm			
Calcium (extractable), ppm			
Electrical Conductivity/Soluble Salts, dS/m			
pH, SU			

Table 2. Soil Analysis Report Where Manure, Sludge and Wastewater are Incorporated

Soil Sample Parameter	0-6 inches soil depth	6-24 inches soil depth
Nitrate-Nitrogen (NO_3-N), ppm	38.748	20.646
Phosphorus (extractable), ppm	56.0	17.6
Potassium (extractable), ppm	337	154
Sodium (extractable), ppm	164	133
Magnesium (extractable), ppm	458	288
Calcium (extractable), ppm	8017	9573
Electrical Conductivity/Soluble Salts, dS/m	0.373	0.223
pH, SU	7.6	7.66

Note: ppm = parts per million, considered to be equivalent to milligrams per liter (mg/l); dS/m = decisiemins per meter, equivalent to millimhols per centimeter (mmhols/cm); SU = standard units.

C. Certification

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Print Name and Title of Responsible Official or Authorized Agent: Clemens Kuiper / Member

Signature: John Mullin for

Date: 11/6/23

Telephone Number: 254/968-4018

D. How to Submit

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5.0 RECHARGE FEATURE CERTIFICATION

CERTIFICATION

I certify that potential Recharge Features in the form of artificial penetrations and natural features exist on property utilized under this application as defined in 30 TAC §321.32(50). The protective measures in the form of best management practices identified in this report, when implemented, are designed to avoid adverse impacts to these features and associated groundwater formations.

All information presented on this page and in the following supporting documents is true and accurate to the best of my knowledge.

Norman Mullin, P.E.

Enviro-Ag Engineering, Inc.

Firm #F-2507

5.1 General

This recharge feature certification report was authorized by Mr. Clemens Kuiper representing Kuiper Cows, LLC. The findings and recommendations contained herein were compiled by Ms. Jourdan Mullin and Mr. Norman Mullin, P.E., of Enviro-Ag Engineering, Inc., Amarillo, Texas.

5.2 Purpose of Report

Kuiper Cows, LLC is applying for major amendment of current TPDES #5293 under 30 TAC, Chapter 321, Subchapter B, Concentrated Animal Feeding Operations. The purpose of this report is to determine if the subject property has any natural or artificial features, either on or beneath the ground surface, which would provide a significant pathway for effluent or solids from the facility into the underlying aquifer. At a minimum, the records and/or maps of the following entities/agencies were reviewed to locate any artificial recharge features: A) Texas Railroad Commission, B) local water district, C) Texas Water Development Board, D) TCEQ, E) Natural Resource Conservation Service (NRCS), F) current landowners and G) onsite inspection. The TCEQ Regulatory Guidance RG-433 was followed to identify recharge features and recommend best management practices.

5.3 Property Under Evaluation

The property under evaluation consists of approximately 1,290 acres in Erath County, Texas.

5.4 Definition of Waste Production

The process of wastewater production involves the accumulation of manure solids in the open confinement lots. Rain falling on the open lots comes into contact with the manure layer and absorbs some of the excreted nutrients present in manure. The nutrient enriched runoff is considered wastewater, which flows by designed slopes from the open lots toward the RCS #2.

Manure solids accumulated in the open confinement lots are collected at least annually and hauled off-site to farmland by a waste transporter. While in the open lots, manure becomes compacted and slowly permeable due to hoof action by the cattle. This compacted manure layer results in an increase of the overall runoff volume during rainfall events. Infiltration of nutrients downward through the manure layer into the underlying soils is considered minimal as a result of pen surface compaction (Sweeten, 1990).

5.5 Definition of Recharge Feature

TCEQ rules define a "Recharge Feature" as: *"Those natural or artificial features either on or beneath the ground surface at the site under evaluation that provide or create a significant hydrologic connection between the ground surface and the underlying groundwater within an aquifer. Significant artificial features include, but are not limited*

to, wells and excavation or material pits. Significant natural hydrologic connections include, but are not limited to: faults, fractures, sinkholes or other macro pores that allow direct surface infiltration; a permeable or shallow soil material that overlies and aquifer; exposed geologic formations that are identified as an aquifer; or a water course bisecting an aquifer." (30 TAC §321.32(50))

The TCEQ Regulatory Guidance RG-433 further defines a "recharge feature" as: *"A natural or artificial feature either on or beneath the ground surface that provides or creates a significant hydrologic connection (or pathway) between the ground surface and the underlying groundwater within an aquifer."*

The guidance document also defines a "significant pathway" as: *"A significant pathway between the land surface and the subsurface has the ability to transmit waste, wastewater, or precipitation mixed with waste to groundwater. The wastewater may impact the groundwater quality within an aquifer or migrate laterally to discharge as seeps that may impact surface water quality. Recharge features with significant pathways include geomorphologic, geologic, soil, and artificial features. Agricultural practices may also enhance existing recharge features."*

EVALUATION OF NATURAL FEATURES

5.6 Geomorphologic/Geologic Features

The Windthorst-Duffau and Maloterre-Dugout-Purves soils in this area of Erath County are immediately underlain by the Paluxy, Walnut, Comanche Peak and Glen Rose Formations and by recently deposited Alluvium in the area of the North Bosque River, as shown in Figures 5.1a-b, Geologic Atlas. Allluvium consists of floodplain deposits, including low terrace deposits near floodplain level and bedrock locally in stream channels; gravel, sand, silt, clay and organic matter up to 35 feet thick. The Paluxy Formation consists of sandstone interbedded with claystone and siltstone, up to 100 feet thick, thinning southward. The Glen Rose Formation of Cretaceous age consists of alternating limestone and claystone with some sandstone, up to 250 feet thick in the southeastern area of the formation. (Geologic Atlas, 1976).

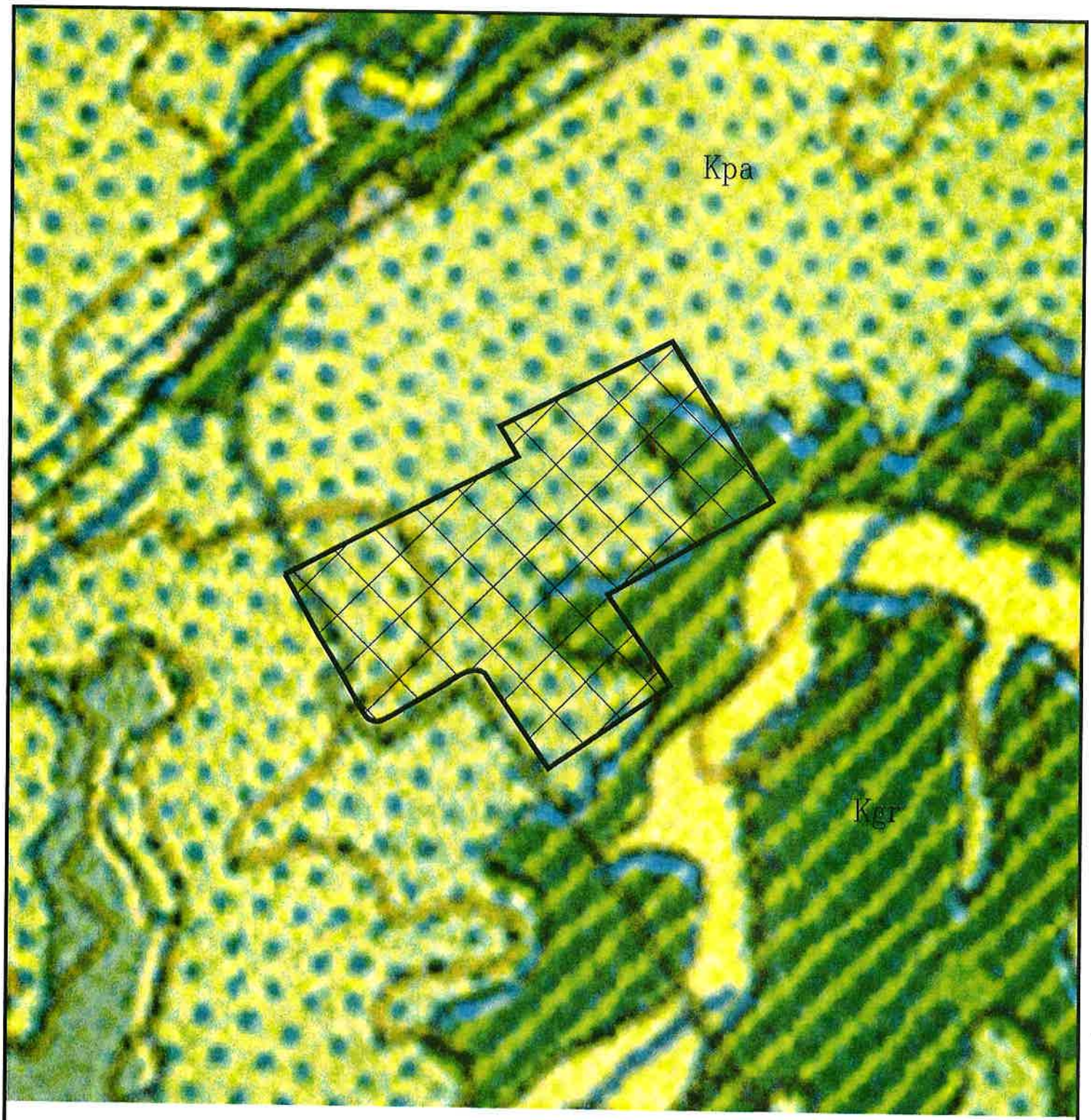
Forming the upper unit of the Trinity Group, the Paluxy Formation consists of up to 400 feet of predominantly fine to coarse-grained sand interbedded with clay and shale. Underlying the Paluxy, the Glen Rose Formation forms a gulfward-thickening wedge of marine carbonates consisting primarily of limestone. Paluxy bedrock outcrops along the northeast portion of this site. Limiting application rates of wastewater and manure will protect this feature form adverse impacts.

The Walnut Formation comprises the beds of clay and nonchalky limestones at the base of the Fredericksburg division. They consist of alternations of calcareous laminated clays, weathering yellow on oxidation, semicrystalline limestone flags, and shell agglomerate, all of which grade upward without break into the more chalky beds of the Edwards limestones. In places they weather into rich black soils and make extensive agricultural belts (Hill, 1901.)

Comanche Peak Limestone. Limestone and some clay. Limestone mostly aphanitic, bioclastic to fossiliferous, soft, a few harder GRYPHAEA-bearing beds about 25 feet above base form benches, light- to medium-gray; weathers various shades of gray, locally mottled yellowish brown; marine megafossils are gastropods, ammonites, echinoids, PECTEN, LIMA, GRYPHAEA, and EXOGYRA TEXANA. Clay, calcareous, intergradational with nodular limestone, beds 1 to 5 feet thick, medium- to dark-gray, weathers yellowish brown, fossiliferous. Thickness 90+/- feet. Lies above Walnut Clay and below Edwards Limestone. Northward, at Hood-Parker County line, grades laterally into Goodland Limestone. Age is Early Cretaceous.

The Pleistocene-age fluviatile terrace deposits occur along the terraces of streams and consist of sand, silt, clay and gravel in various proportions with gravel more prominent in the older, higher terraces.

The basal unit of the Trinity Group consists of the Twin Mountains and Travis Peak formations, which are laterally separated by a facies change. To the north, the Twin Mountains Formation consists mainly of medium-to coarse-grained sands, silty clays, and conglomerates (Ashworth, 1995).



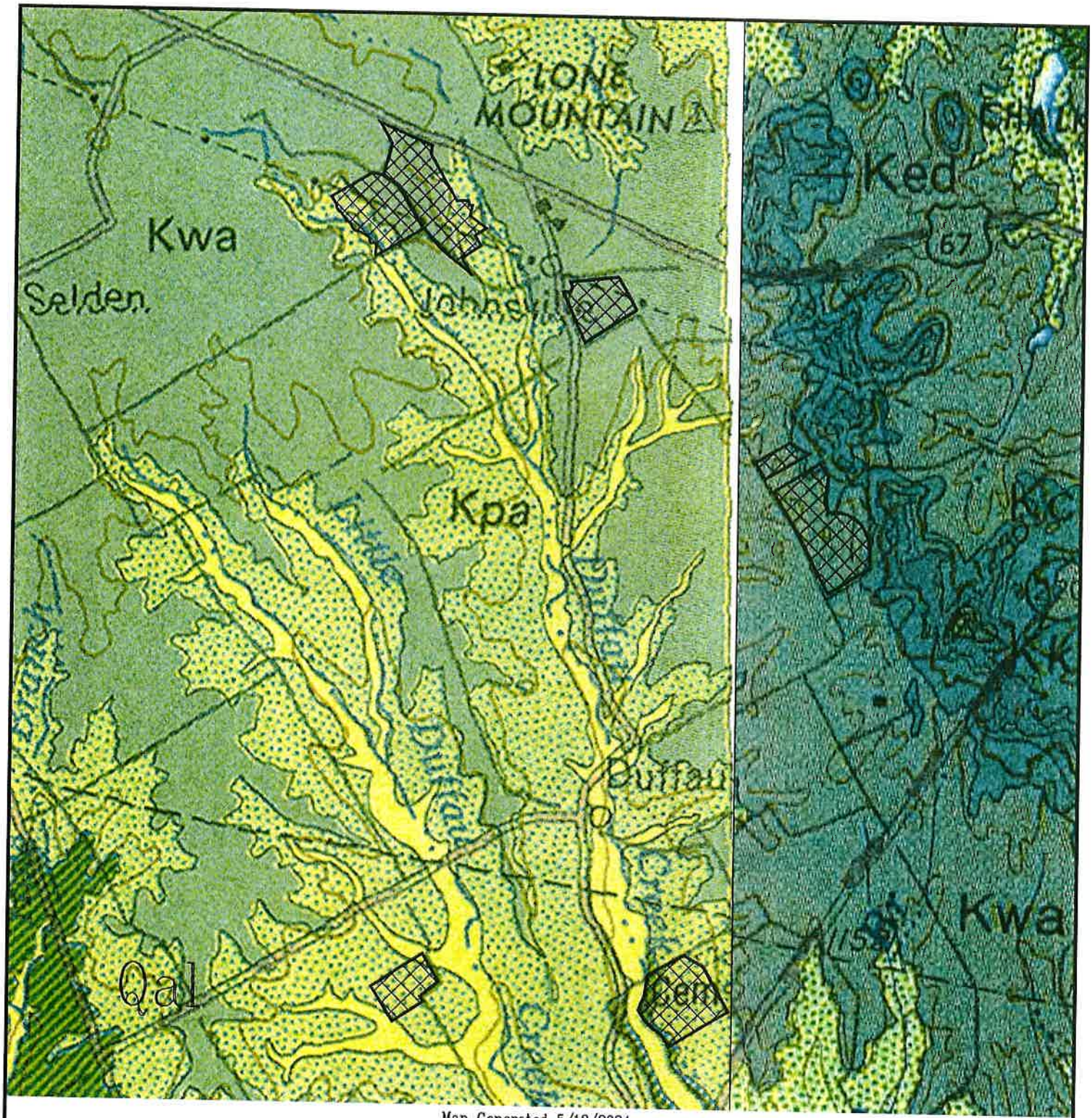
Legend:
Kpa Cretaceous Paluxy Formation
Kgr Cretaceous Glen Rose Formation
Denotes Facility Location

Source: Geologic Atlas of Texas, Abilene Sheet, 1972.

N
W E
S

No Scale

Kuiper Cows Stephenville, Texas Erath County	Geologic Atlas of Texas Figure 5.1a Page 35	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 5/13/2024

Legend:

- Kpa Cretaceous Paluxy Formation
- Kwa Cretaceous Walnut Formation
- Kcp Cretaceous Comanche Peak Limestone Formation
- Qal Quaternary Alluvium
- Denotes Facility Locations

N
W E
S

Source: Geologic Atlas of Texas, Abilene (1972) & Dallas (1987) Sheets.

No Scale

Kuiper Cows Stephenville, Texas Erath County	Geologic Atlas of Texas Figure 5.1b Page 36	ENVIRO-AG EAF ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

5.6.1 Outcrops/Stream Interception

An inspection of the CAFO property and review of the USGS topographic map of the area shows tributaries to Sycamore Creek located in LMUs #1 and LMU #2. These areas are buffered from waste and wastewater application. The freshwater ponds located in LMUs #1, #F4, #DC and LMU #TW2 are buffered and protected from waste and wastewater application. Tributaries to Duffau Creek are located in LMUs #F1, #F2, #F4, #W1, #W2, #TW1, #TW2, #C3 #C4, and #DC. These areas are protected with the required buffers from waste and wastewater application. The freshwater ponds previously located in LMUs #F1, #F3 and #WN1 have been back filled in with dirt. The borrow pit located south of LMU #W1 is protected with a buffer from land application.

5.6.2 Excessive Slopes

No slopes of greater than 8 percent are present on the property.

5.6.3 Other Large-Scale Conduits

No faults, fractured sediments, caves, sinkholes, solution cavities, vugs or concentrated or extensive animal burrowing was observed during an on-site visit, nor is identified on the geologic atlas, soil surveys or USGS maps.

5.6.4 Surface Water

The "water in the state" designation is based on Enviro-Ag Engineering, Inc., site inspections, the permittee's knowledge of the property and the USDA-FSA aerial photograph (2017). The buffer zones and LMU boundaries in Figures 6.1a-f (Refer to Section 6) are submitted with this application for TCEQ approval.

5.6.5 Aquifer

The Trinity aquifer consist of early Cretaceous age formations of the Trinity Group where they occur in a band extending through the central part of the state in all or parts of 55 counties, from the Red River in North Texas to the Hill Country of South-Central Texas.

Formations comprising the Trinity Group are (from youngest to oldest) the Paluxy, Glen Rose, and Twin Mountains-Travis peak. Updip, where the Glen Rose thins or is missing, the Paluxy and Twin Mountains coalesce to form the Antlers Formation. The Antlers consists of up to 900 feet of sand and gravel, with clay beds in the middle section. Water from the Antlers is mainly used for irrigation in the outcrop area of North and Central Texas (Ashworth and Hopkins, 1995).

The aquifer is underlain and confined by low-permeability rocks that range in age from Precambrian to Jurassic. Where the aquifer does not crop out, it is confined above by the Walnut Formation in most of the area.

Recharge to the Trinity aquifer is generally as precipitation that falls on aquifer outcrop areas and as seepage from streams and ponds where the head gradient is downward. In the Hill Country, water might flow laterally into the Trinity aquifer form the adjacent Edwards-Trinity aquifer. The aquifer discharges by evapotranspiration, spring discharges,

diffuse lateral or upward leakage into shallower aquifers, and withdrawals from wells (USGS, 2003). Land application at agronomic rates and maintain permanent cover crops will protect the feature from adverse impacts associated with this operation.

5.7 Soil Features

Soil mapping units included in this section for the production area and land application areas were taken from the electronic NRCS Soil Survey for Erath County. Soils descriptions are included in the supporting documentation and were obtained from the most current version of the NRCS electronic soil information database for Erath County available on the NRCS Web Soil Survey.

5.7.1 Production Area

Soils underlying the pen and pond areas are predominately of the Windthorst (WnC) and Hico-Windthorst (HwD3) series. The RCSs have been certified as meeting TCEQ guidelines for soil liner (30 TAC §321.38(g). Best management practices pertaining to surface drainage, surface compaction and manure management within the open lot confinement area will be followed. Steve Evans, Ph.D., soil physicist with the USDA Agricultural Research Service in Bushland, Texas, stated that his work with lysimeters and potential evapotranspiration indicated limited infiltration and even less deep percolation will occur on areas with sloped surfaces (1996). Work performed by the NRCS calculated the feedlot surface curve number (potential for runoff) as 90 on a scale of 100.

5.7.2 Land Application Areas

Soils underlying the land application areas are primarily of the Slidell (HoB), Purves (PcC and PcB), Purves-Dugout (Pd), Frio (FriA), Hico-Windthorst (HwD3), Granbury (GrB), Fairy-Hico (FhC2), Maloterre (Ma), Bolar-Denton (BdC), Hassee (WkA) Selden (SdC), Denton (DeB) and Windthorst (WoB2) series. The application of wastewater and/or manure will be performed at agronomic rates according to an approved NUP/NMP. No pooling or ponding is anticipated due to application through sprinklers.

Figures 5.2a-f shows the soils underlying the property as delineated from the electronic NRCS Soil Survey map for Erath County. The electronic version of the soil survey is considered the most current soils information available. Table 5.1 is a summary of the estimated physical properties of the soils in the subject area, obtained from the NRCS Web Soil Survey.

Table 5.1: Estimated Soil Properties

Soil Series (Map ID)	Slope (%)	HSG	Depth (in)	USDA Soil Texture	Permeability / Infiltration Rate (in/hr)	Available Water Capacity (in/in of soil)
Bolar – BdC	3-5	C	0-16 16-32	Clay Loam	0.6-2.0 0.6-2.0	0.11-0.18 0.11-0.18
Denton		D	0-10 10-24	Silty Clay	0.06-0.20 0.06-0.20	0.10-0.15 -----

Clairette – CtB	1-3	C	0-4	Fine Sandy	2.0-6.0	0.10-0.17
			4-10	Loam	0.6-2.0	0.15-0.19
			10-26		0.20-0.6	0.10-0.18
Hassee	1-3	D	0-5	Fine Sandy	0.6-2.0	0.10-0.14
			5-14	Loam	0.6-2.0	0.07-0.12
			14-35		0.001-0.06	0.06-0.10
Crawford – CrB	1-3	D	0-12	Silty Clay	0.06-0.20	0.12-0.18
			12-21		.001-0.06	0.12-0.18
			21-28		.001-0.06	0.12-0.18
Duffau – DIC	1-5	B	0-12	Loamy Fine	6.0-20	0.06-0.13
			12-64	Sand	0.6-2.0	0.05-0.17
Fairy – FhC2	1-5	B	0-13	Fine Sandy	2.0-6.0	0.10-0.17
			13-45	Loam	0.6-2.0	0.05-0.17
Hico		B	0-12	Fine Sandy	2.0-6.0	0.10-0.15
			12-51	Loam	0.6-2.0	0.05-0.17
Frio – FriA	0-1	C	0-22	Silty Clay	0.20-0.6	0.12-0.20
Hico – HwD3	1-8	B	0-7	Sandy Clay	0.6-6.0	0.11-0.13
			7-44	Loam	0.6-2.0	0.11-0.13
Windthorst	1-8	C	0-6	Sandy Clay	0.20-2.0	0.11-0.14
			6-16	Loam	0.20-0.6	0.15-0.19
			16-25		0.20-0.6	0.16-0.20
Granbury – GrB	1-5	C	0-7	Fine Sandy	2.0-6.0	0.10-0.17
			7-23	Loam	0.20-0.6	0.10-0.20
			23-40		0.06-2.0	------
Slidell - HoB	1-3	D	0-19	Clay	.001-0.06	0.10-0.18
			19-32		.001-0.06	0.10-0.18
Maloterre – Ma		D	0-8	Gravelly Clay	0.20-0.6	0.13-0.16
			8-12	Loam	0.06-2.0	------
Puves – PcB	1-3	D	0-8	Clay	0.06-0.20	0.12-0.20
			8-12		0.06-0.6	0.08-0.18
			12-14		0.06-0.6	0.04-0.07
			14-40		0.06-2.0	------
Purves – PcC	3-5	D	0-7	Clay	0.06-0.20	0.12-0.20
			7-12		0.06-0.6	0.08-0.18
			12-17		0.06-0.6	0.04-0.07
			17-40		0.06-2.0	------
Puves – Pd	-----	D	0-8	Stony Clay	0.06-0.20	0.11-0.20
			8-12		0.06-0.6	0.08-0.18
			12-14		0.06-0.6	0.04-0.07
			14-24		0.06-2.0	------
Dugout		D	0-8	Gravelly Clay	0.20-0.6	0.06-0.15
			8-18	Loam	0.20-0.6	0.07-0.16
			18-24		0.06-2.0	------
Maloterre		D	0-8	Gravelly Clay	0.6-2.0	0.06-0.11
			8-18	Loam	.001-0.06	------
Windthorst – WoB2	1-5	C	0-3	Fine Sandy	2.0-6.0	0.10-0.17
			3-28	Loam	0.20-0.6	0.10-0.20
Wise – BcC2	3-5	C	0-5	Clay Loam	0.6-2.0	0.15-0.20
			5-11		0.6-2.0	0.15-0.24

Denton – DeB	1-3	C	0-13 13-19 19-36	Silty clay	0.06-0.20 0.06-0.6 0.20-2.0	0.10-0.18 0.10-0.18 0.10-0.14
Gowen – Go	-----	B	0-30	Clay Loam	0.6-2.0	0.15-0.20
Hassee – WkA	0-2	D	0-18 18-55	Fine Sandy Loam	0.6-2.0 .001-0.06	0.11-0.17 0.12-0.18
Windthorst – WoB	1-3	C	0-10 10-38	Very Fine Sandy Loam	2.0-6.0 0.20-0.6	0.10-0.17 0.10-0.20
Nimrod – NdC	0-5	A	0-4 4-27	Fine Sand	6.0-20 6.0-20	0.09-0.13 0.08-0.12
Selden – SdC	1-5	C	0-10 10-24	Fine Sand	2.0-6.0 0.20-0.6	0.05-0.09 0.12-0.17
Windthorst – WnC	1-5	C	0-10 10-38	Loamy Fine Sand	6.0-20 0.20-0.6	0.06-0.13 0.10-0.20
Blanket – BaA	0-1	C	0-18 18-32	Clay Loam	0.6-2.0 0.06-0.6	0.15-0.20 0.12-0.20
Blanket – BaB	1-3	C	0-14 14-40	Clay Loam	0.6-2.0 0.06-0.6	0.15-0.20 0.12-0.20
Bunyan – Bu	-----	B	0-10 10-46	Fine Sandy Loam	2.0-6.0 0.6-2.0	0.11-0.15 0.15-0.19
Granbury – GrB2	1-5	C	0-7 7-23	Very Fine Sandy Loam	2.0-6.0 0.20-0.6	0.10-0.17 0.10-0.20
May – MfB	1-3	B	0-16 16-42	Fine Sandy Loam	2.0-6.0 0.6-2.0	0.11-0.15 0.12-0.20
Hassee – WaB	1-3	D	0-12 12-50	Fine Sandy Loam	0.6-2.0 0.001-0.06	0.11-0.17 0.12-0.18

The major soil series within each LMU are identified in Table 5.2. All soils at the site that have been identified by NRCS as being at high risk for various limitations are presented in Table 5.3. Associated best management practices will be implemented, as appropriate, based on physical and economic conditions.

Table 5.2: Major Soil Types

LMU ID	Major Soil Type
1, 2,	Hico-Windthorst (HwD3)
F1, C1, C2, C3, C4, TW1, TW2	Slidell (HoB)
F2	Purves (PcB)
F3, F4	Granbury (GrB)
W1	
DC	Granbury (GrB2)
W2	Bolar-Denton (BdC)
WN1	Fairy-Hico (FhC2)
WN2	Windthorst (WoB2)

Table 5.3: Potential Soil Limitations for Land Application

Soil Series	Potential Soil Limitations	Best Management Practices
NdC	Filtering Capacity Seepage	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
SdC	Depth to Saturated Zone	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
WkA, WaB	Slow Water Movement Depth to Saturated Zone	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
BdC, CrB	Slow Water Movement Depth to Hard Bedrock	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils. – Land Application will be based upon the AWC (refer to NMP) of the soil and will not exceed agronomic rates for nutrients.
DIC, WnC	Filtering Capacity	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
FriA, Go, Bu	Flooding	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
PcB, PcC	Depth to Bedrock Droughty Slow Water Movement	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils. – Land Application will be based upon the AWC (refer to NMP) of the soil and will not exceed agronomic rates for nutrients.
Ma	Depth to Bedrock Droughty	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
CtB	Slow Water Movement Depth to Saturated Zone Droughty	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils. – Land Application will be based upon the AWC (refer to NMP) of the soil and will not exceed agronomic rates for nutrients.
FhC2	Slow Water Movement Seepage	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
HwD3, BcC2	Depth to Soft Bedrock	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.

Soil Series	Potential Soil Limitations	Best Management Practices
GrB, GrB2	Depth to Hard Bedrock	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
Pd	Droughty Depth to Bedrock Slow Water Movement Large Surface Stones	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
HoB, DeB	Slow Water Movement	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.
MfB	Seepage	– Land Application not to exceed agronomic rates for nutrients and soil hydraulic rates (refer to NMP). - No land application to inundated soils.

5.7.3 Erosion

Figures 5.2a-f shows the onsite soils classified by NRCS as Highly Erodible Land (HEL), including Purves (PcB and PcC), Selden (SdC) and Nimrod (NdC). LMUs will be protected with typical conservation farming practices within the standards of the NRCS. The following methods will be used to control/prevent erosion of exposed soils in the production area:

- Seeding/sprigging exposed areas with forage or cover crops,
- Constructing terraces or berms (shortening the length and steepness of slopes),
- Covering erosive areas with road surfacing materials,
- Implementing reduced tillage practices,
- Maintaining a cover of plants or crop residue.

Map Generated 9/8/2022

LEGEND:

Denotes Production Area

For specifics on soils, refer to Table 5.1

N
W E
S

300' 0 300' 600'

SCALE AS SHOWN

Source: USDA–NRCS Soil Survey, Soil Survey Geographic Database for (Erath County, TX). Available at: http://soildatamart.nrcs.usda.gov. Accessed November 2017.

Kuiper Cows Stephenville, Texas Erath County	NRCS Soils Map Figure 5.2a Page 43	ENVIRO–AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

Map Generated 9/8/2022

For specifics on soils, refer to Table 5.1

N
W E
S

600' 0 600' 1200'

SCALE AS SHOWN

Source: USDA–NRCS Soil Survey, Soil Survey Geographic Database for (Erath County, TX). Available at: http://soildatamart.nrcs.usda.gov. Accessed November 2017.

Kuiper Cows Stephenville, Texas Erath County	NRCS Soils Map Figure 5.2b Page 44	ENVIRO–AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

Map Generated 9/8/2022

For specifics on soils, refer to Table 5.1

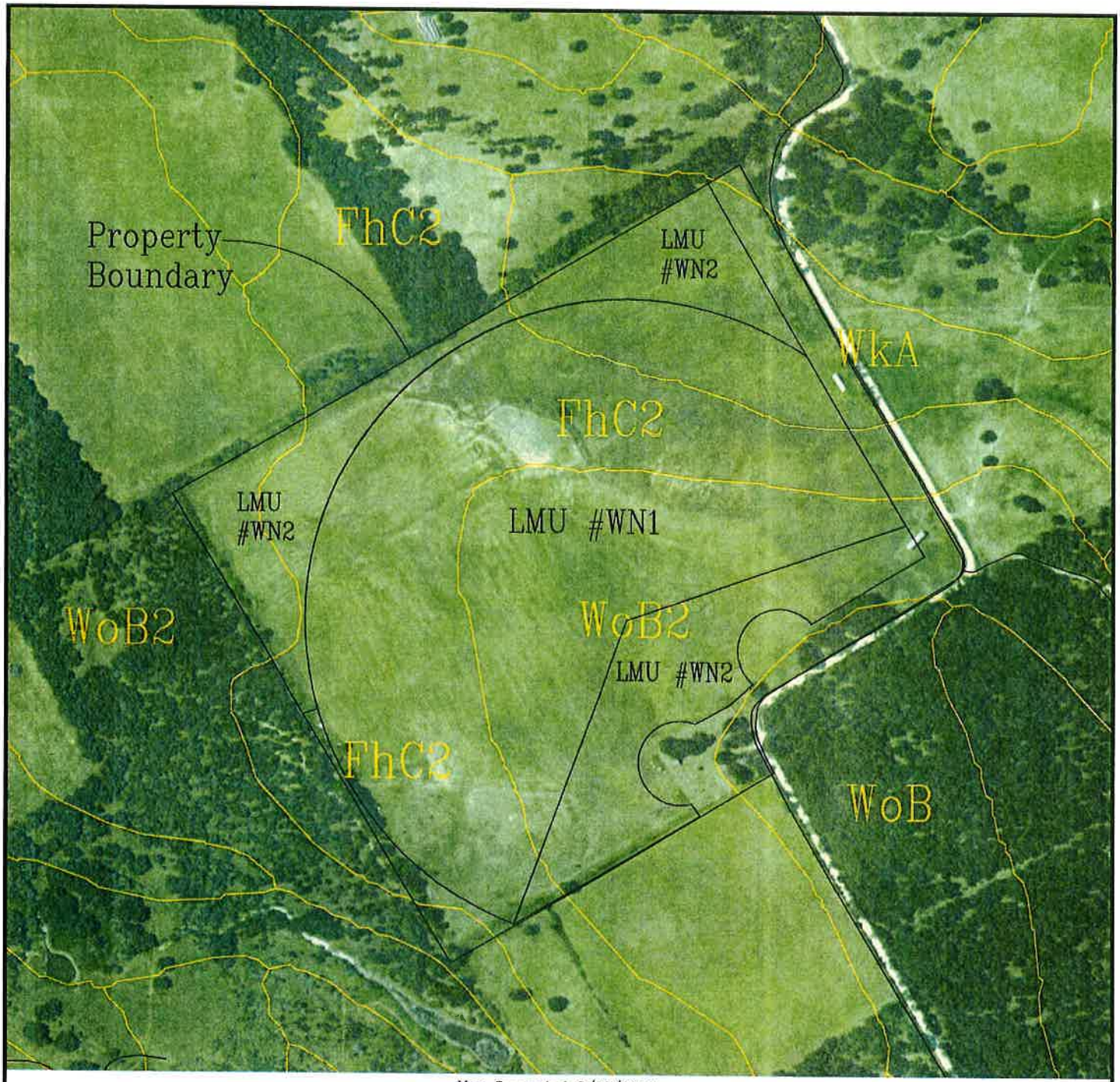
N
W E
S

600' 0 600' 1200'

SCALE AS SHOWN

Source: USDA-NRCS Soil Survey, Soil Survey Geographic Database for (Erath County, TX). Available at: http://soildatamart.nrcs.usda.gov. Accessed November 2017.

Kuiper Cows Stephenville, Texas Erath County	NRCS Soils Map Figure 5.2c Page 45	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 3/23/2020

For specifics on soils, refer to Table 5.1

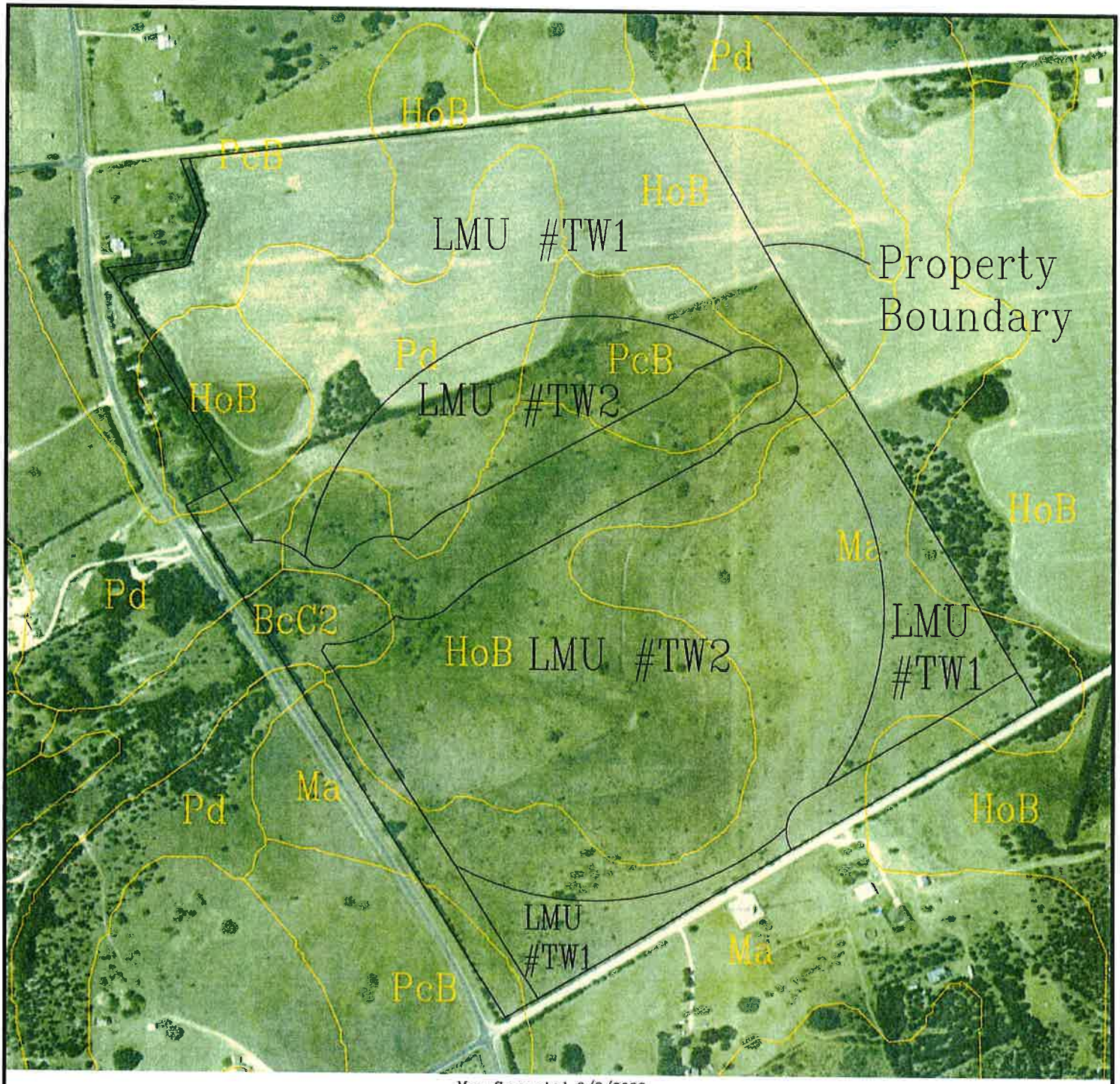
N
W E
S

250' 0 250' 500'

SCALE AS SHOWN

Source: USDA–NRCS Soil Survey, Soil Survey Geographic Database for (Erath County, TX). Available at: http://soildatamart.nrcs.usda.gov. Accessed November 2017.

Kuiper Cows Stephenville, Texas Erath County	NRCS Soils Map Figure 5.2d Page 46	ENVIRO–AG EAE ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 9/8/2022

For specifics on soils, refer to Table 5.1

N
W E
S

250' 0 250' 500'

SCALE AS SHOWN

Source: USDA–NRCS Soil Survey, Soil Survey Geographic Database for (Erath County, TX). Available at: http://soildatamart.nrcs.usda.gov. Accessed November 2017.

Kuiper Cows Stephenville, Texas Erath County	NRCS Soils Map Figure 5.2e Page 47	ENVIRO–AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

Map Generated 5/13/2024

For specifics on soils, refer to Table 5.1

N
W E
S

300' 0 300' 600'

SCALE AS SHOWN

Source: USDA-NRCS Soil Survey, Soil Survey Geographic Database for (Erath County, TX). Available at: http://soildatamart.nrcs.usda.gov. Accessed November 2017.

Kuiper Cows Stephenville, Texas Erath County	NRCS Soils Map Figure 5.2f Page 48	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

ARTIFICIAL FEATURES

5.8 Railroad Commission Records

A search of the online RRC map viewer was conducted. No proposed locations or existing penetrations for oil and gas were identified on the subject property. Railroad Commission database information is included as an attachment to this document.

5.9 Ground Water Conservation District Records

The Middle Trinity Groundwater Conservation District (GCD) online database was reviewed for artificial penetrations. Should an abandoned penetration be encountered anywhere on the subject property at any time, the penetration will be marked, inspected and properly sealed to prevent a potential impact to the underlying aquifer. Appropriate well plugging reports shall be submitted as required to the Texas Department of Licensing and Regulation (TDLR) and will be maintained in the onsite PPP.

5.10 GeoSearch

GeoSearch was not utilized in this report.

5.11 Texas Water Development Board Water Data Interactive (WDI)

The TWDB WDI online database was reviewed for artificial penetrations. The database revealed water wells registered with the TWDB as being located on the subject property. The wells that could be correlated with onsite wells are shown on Table 5.4.

5.12 Natural Resource Conservation Service

The historical NRCS Soil Survey of Erath County (1973) was reviewed for locations of potential recharge features.

5.13 Other Artificial Features

Numerous features, such as a borrow pit and stock ponds, exist on the subject property and are shown to be buffered on Figures 5.3a-f. These areas shall be buffered during land application events or backfilled prior to the first land application event.

5.14 Previous/Current Landowner

Mr. Clemens Kuiper was contacted regarding then presence of any potential recharge features on the property. Mr. Kuiper is considered the most knowledgeable about the property. The previous landowner could not be located. Mr. Kuiper confirmed the locations of all active water wells.

5.15 Onsite Inspection

The property has been inspected both on the ground and by historical mapping. All active water wells were documented on the property during the onsite inspection and are shown on Figures 5.3a-f. The BMPs for all wells are listed in Table 5.4. Should any open

well or test hole be encountered, it will be marked, reported to the Engineer, included on Figures 5.3a-f and properly plugged (30 TAC §321.34(f)(3)(B)). Well plugging reports shall be submitted as required to the Texas Department of Licensing and Registration (Well Drillers Board) and will be maintained in the onsite PPP.

All well data listed in Table 5.4 is based on information received from the water district, TCEQ and TWDB files, onsite inspection, and interviews of persons knowledgeable of the property. The map number corresponds to the location shown in Figures 5.3a-f. The well identification number corresponds to the database number or drilling report number used by the water district, TCEQ or TWDB Commission.

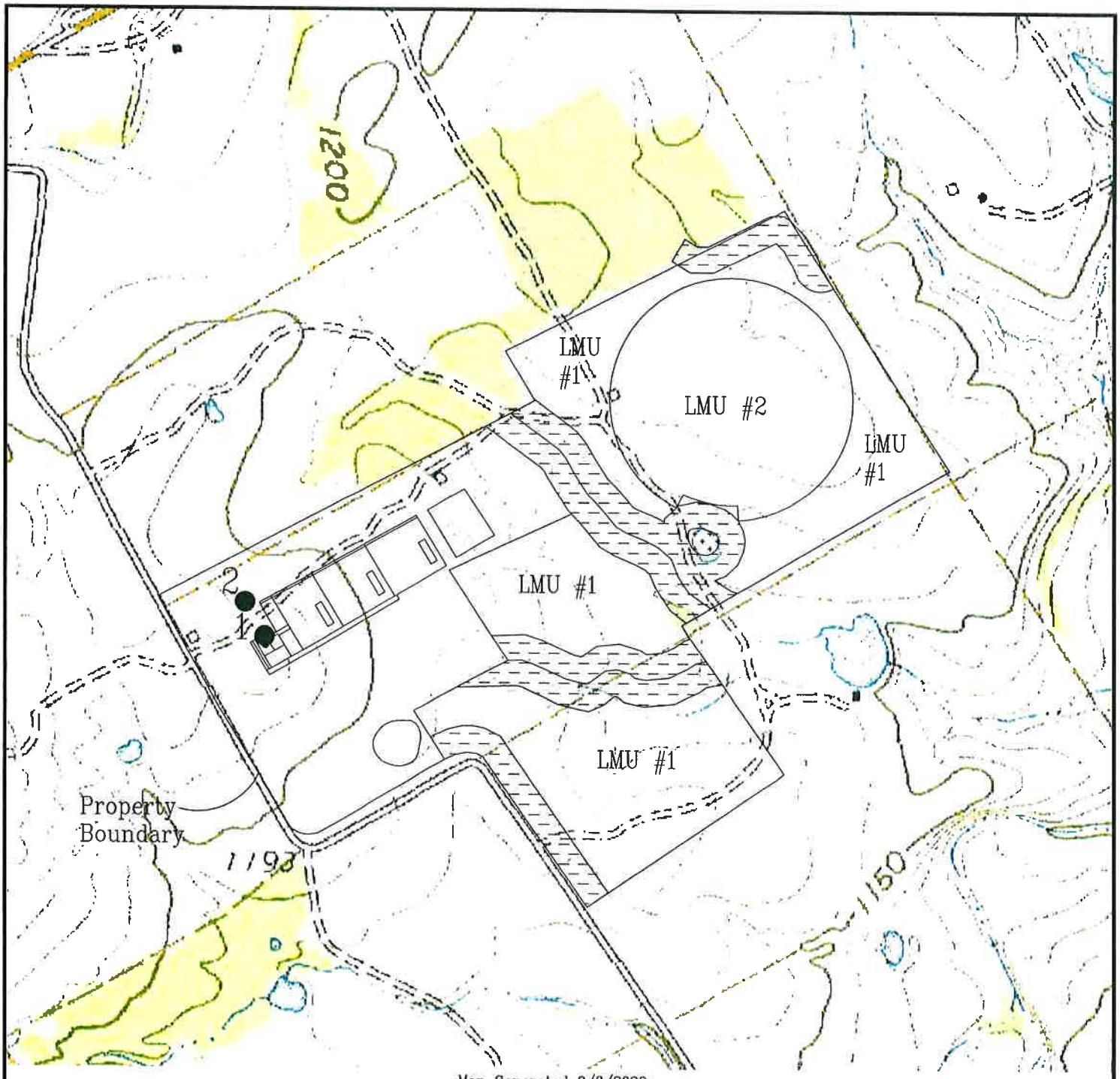
Table 5.4: Well Information

Map No.	Well ID	Best Management Practices
1	Unknown	• See approved well buffer exception.
2	Unknown	• See approved well buffer exception.
3	17240	• Maintain 150-ft buffer.
4	6310	• Maintain 150-ft buffer.
5	28670	• Maintain 100-ft buffer.
6	190867	• See attached plugging report.
7	190866	• See attached plugging report.
8	28671	• Maintain 100-ft buffer.
9	28672	• Maintain 100-ft buffer.
10	190865	• See attached plugging report.
11	126165	• Maintain 100-ft buffer.
12	126164	• Maintain 100-ft buffer.
13	Unknown	• Maintain 150-ft buffer.
14	Unknown	• Maintain 150-ft buffer.
15	26910	• Maintain 100-ft buffer.
16	26934	• Maintain 100-ft buffer.
17	26931	• Maintain 100-ft buffer.
18	26929	• Maintain 100-ft buffer.
19	12648	• See attached plugging report.
20	27944	• Maintain 100-ft buffer.
21	94281	• See attached plugging report.
22	27945	• Maintain 100-ft buffer.
23	23159	• Maintain 100-ft buffer.
24	23160	• Maintain 150-ft buffer.
25	41054	• See attached plugging report.
26	317336	• See attached plugging report.
27	Unknown	• Maintain 100-ft buffer.
28	Unknown	• Maintain 100-ft buffer.
29	17375	• Maintain 100-ft buffer.
30	3164604	• Maintain 100-ft buffer.

Note: A copy of the well logs for onsite wells are attached.

No public water supply wells are located within 500 feet of the property boundary. All off-site wells within the required buffer distances required by this authorization are shown (on the Site Map) with their appropriate buffers. Wells outside the required buffer distances are shown for reference only.

All irrigation systems or water distribution systems into which any type of chemical or foreign substance, such as wastewater, is distributed into the water pumped from the well are required by 16 TAC §76 to install an in-line, automatic quick-closing check valve capable of preventing pollution of groundwater.



Map Generated 9/8/2022

LEGEND:

- Denotes Well
- Denotes 130-ft Buffer
- Denotes Fresh Water Pond

N
W E
S

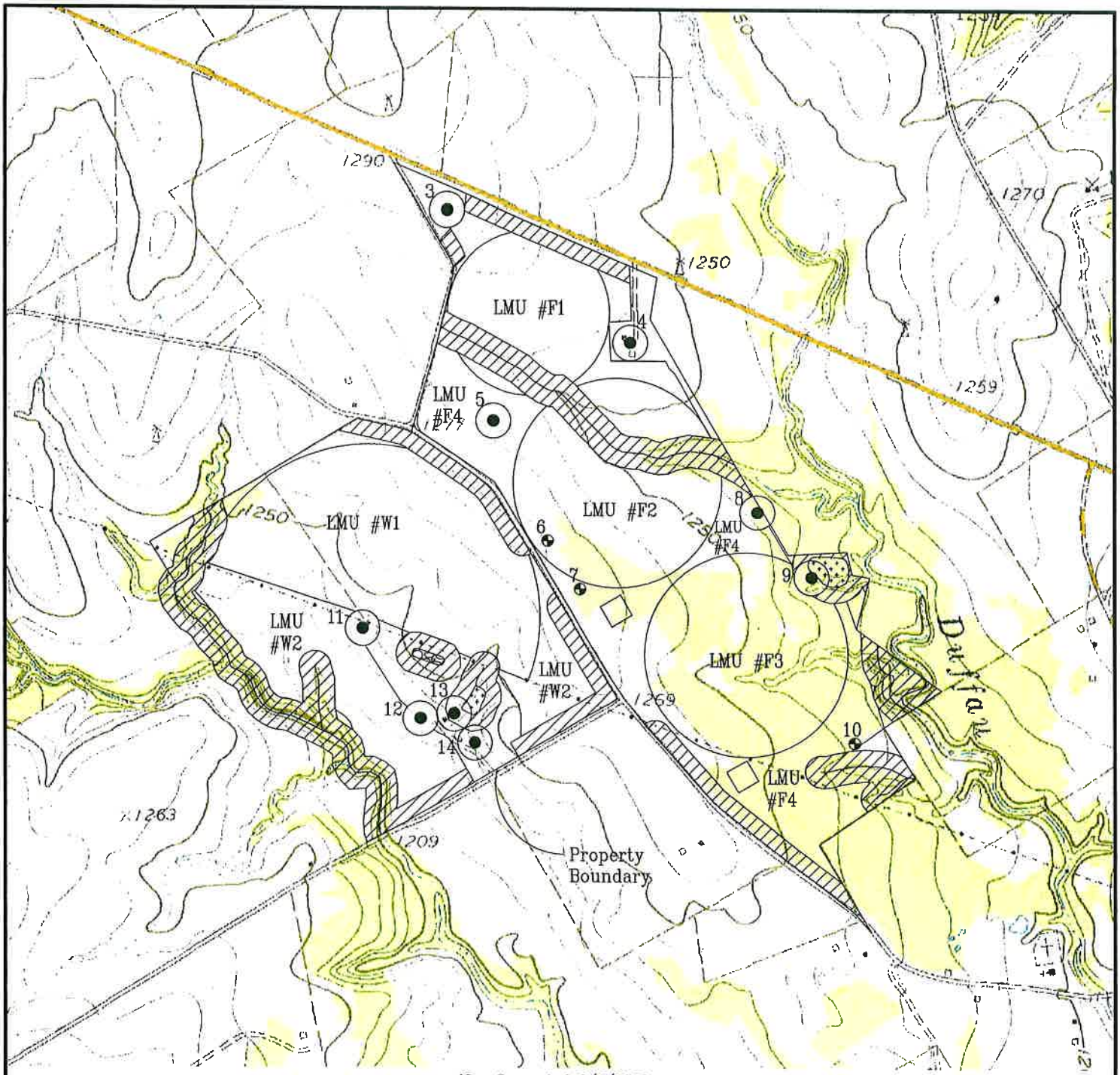
350' 0 350' 700'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS - Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Recharge Feature Map Figure 5.3a Page 52	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 9/8/2022

LEGEND:

- Denotes Plugged Well
- Denotes Well w/Buffer
- Denotes 136-ft Buffer
- Denotes Fresh Water Pond
- Denotes Borrow Area

N
W E
S

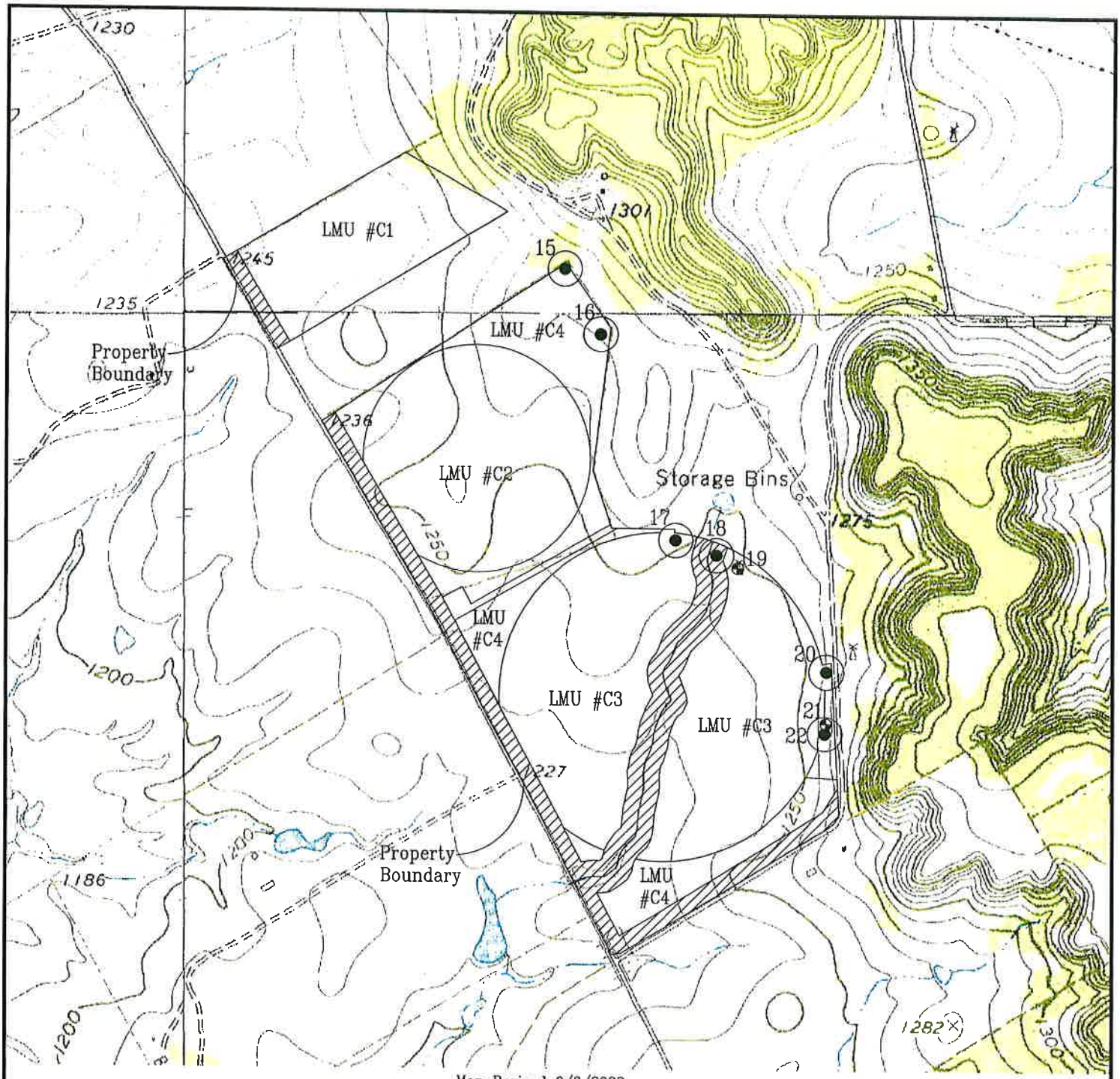
600' 0 600' 1200'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS – Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Recharge Feature Map Figure 5.3b Page 53	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Revised 9/8/2022

LEGEND:

- Denotes Plugged Water Well
- Denotes Well w/Buffer
- Denotes 136-ft Buffer

N
W E
S

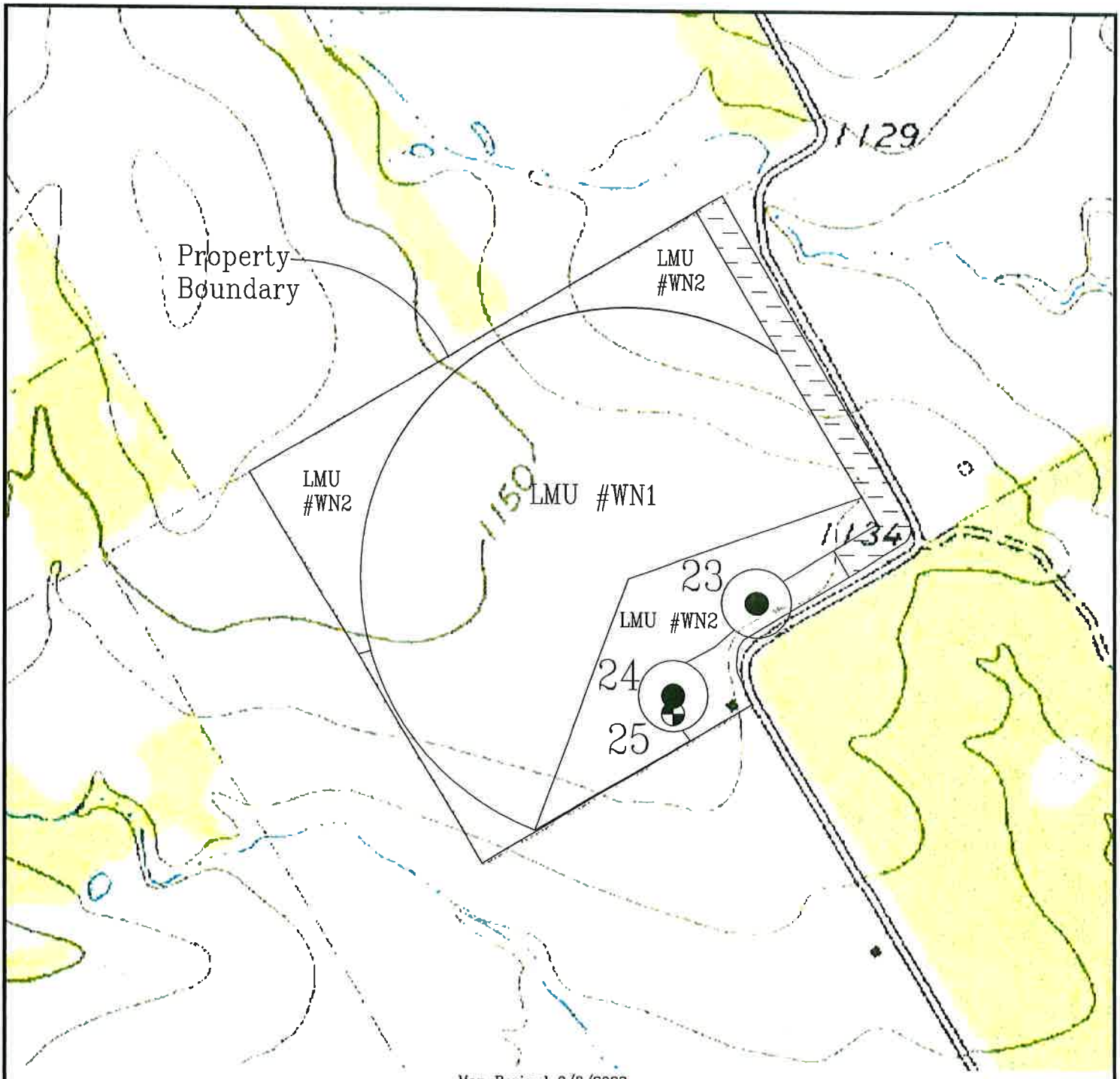
600' 0 600' 1200'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS - Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Recharge Feature Map Figure 5.3c Page 54	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Revised 9/8/2022

LEGEND:

- Denotes Plugged Well
- Denotes Well w/Buffer
- Denotes 130-ft Buffer

N
W E
S

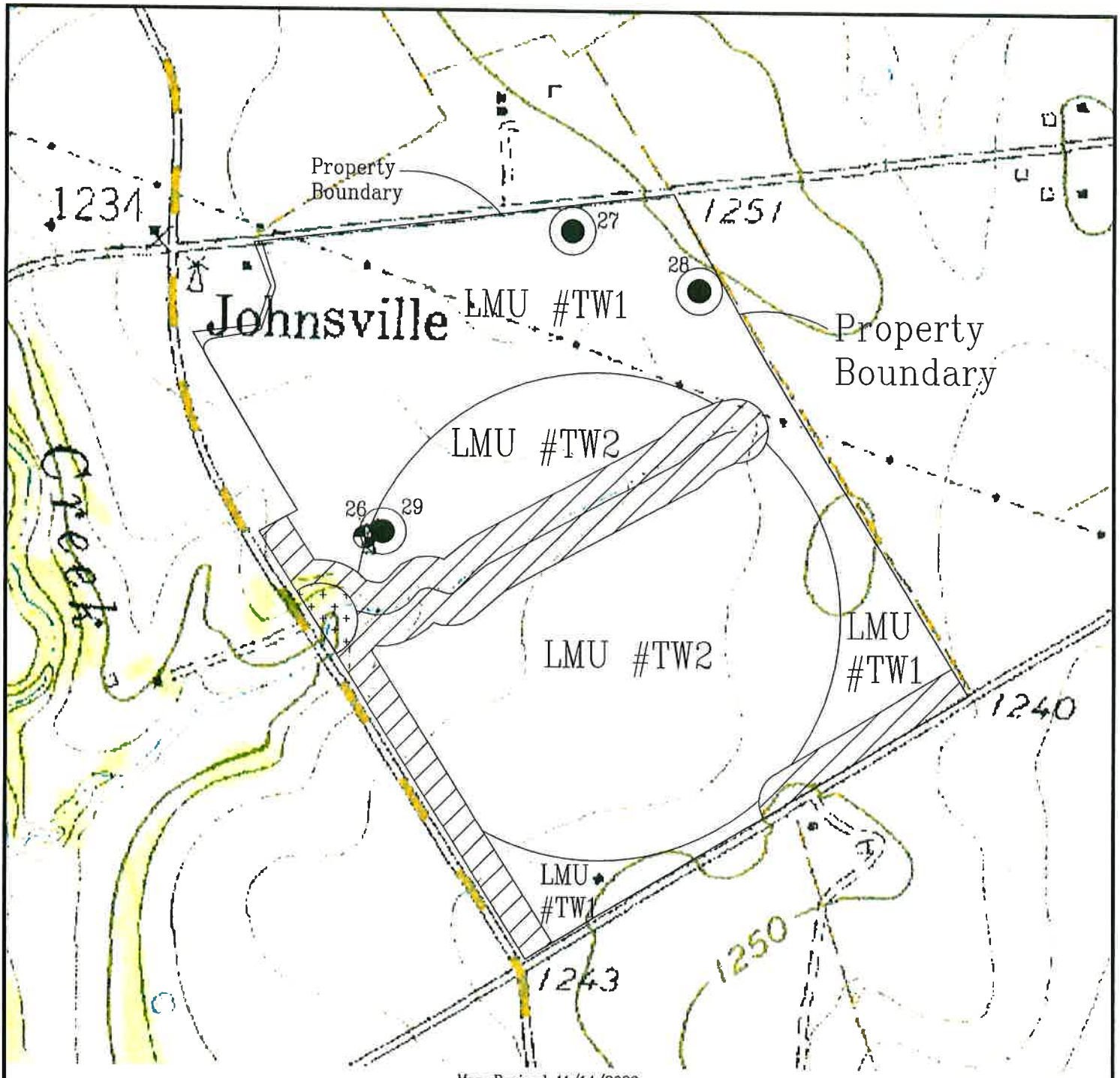
300' 0 300' 600'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS – Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Recharge Feature Map Figure 5.3d Page 55	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Revised 11/14/2022

LEGEND:

- Denotes Plugged Well
- Denotes Well w/Buffer
- Denotes 136-ft Buffer
- Denotes Fresh Water Pond

N
W E
S

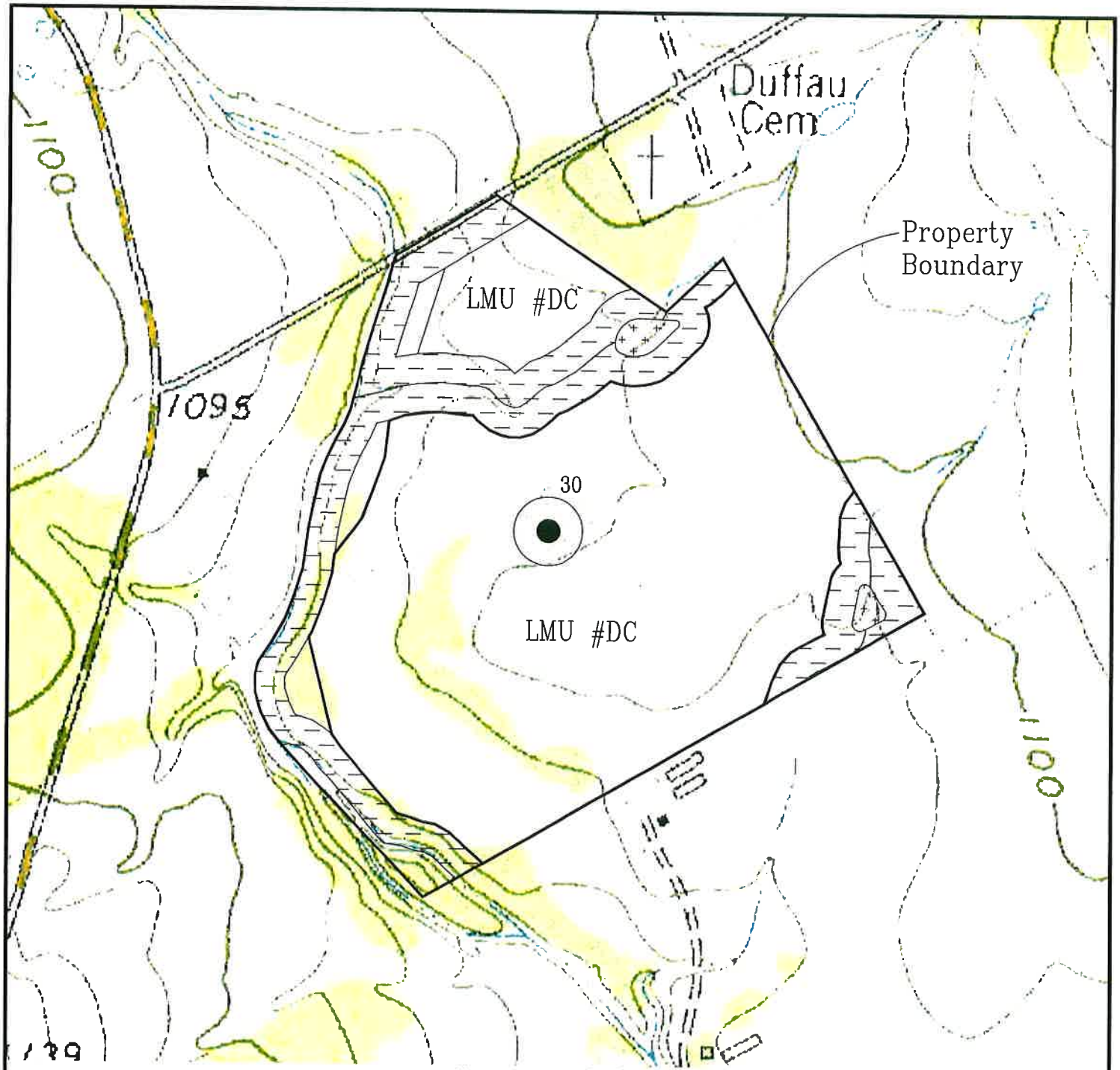
300' 0 300' 600'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS - Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Recharge Feature Map Figure 5.3e Page 56	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 5/13/2024

LEGEND:

- Denotes Well w/Buffer
- Denotes 130-ft Buffer
- Denotes Fresh Water Pond

N
W E
S

300' 0 300' 600'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS - Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Recharge Feature Map Figure 5.3f Page 57	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

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Supporting Documentation

USDA Soil Descriptions & Limitations

Texas Railroad Commission Map

Water District Well Location Map (if available)

Onsite Well Logs (if available)

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Report—Physical Soil Properties

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
CtB—Clairette-Hassee very fine sandy loams, 1 to 3 percent slopes														
Clairette, very fine sandy loam	0-4	52-68-80	2-21-42	5-11-18	1.42-1.49-1.60	14.00-28.00-42.00	0.10-0.15-0.17	0.2-0.8-1.5	0.5-1.3-2.0	.49	.49	5	3	86
	4-10	35-49-75	5-32-50	10-19-24	1.44-1.53-1.57	4.00-9.00-14.00	0.15-0.17-0.19	0.7-1.5-2.3	0.5-0.8-1.5	.37	.37			
	10-26	20-31-60	0-31-48	32-38-55	1.42-1.56-1.66	1.40-2.70-4.00	0.10-0.13-0.18	3.7-5.2-8.7	0.3-0.6-1.0	.28	.28			
	26-56	25-40-60	0-27-53	18-33-45	1.46-1.50-1.54	4.00-9.00-14.00	0.16-0.18-0.20	1.1-3.7-6.3	0.1-0.5-0.8	.24	.24			
	56-74	25-47-70	0-27-53	15-26-45	1.54-1.60-1.64	4.00-9.00-14.00	0.12-0.12-0.13	0.8-2.3-6.2	0.1-0.3-0.6	.28	.28			
	74-80	10-56-75	0-27-73	10-17-45	1.50-1.70-1.70	14.00-28.00-42.00	0.12-0.15-0.17	0.4-1.3-6.3	0.1-0.1-0.5	.32	.32			
Hassee, very fine sandy loam	0-5	52-68-80	0-19-38	10-13-20	1.54-1.57-1.58	4.00-9.00-14.00	0.10-0.11-0.14	0.4-1.0-2.4	0.5-0.7-1.5	.55	.55	5	3	86
	5-14	35-68-75	5-17-45	10-15-20	1.41-1.50-1.52	4.00-9.00-14.00	0.07-0.10-0.12	0.4-1.4-2.4	0.2-0.4-1.2	.55	.55			
	14-35	25-30-50	7-27-40	35-43-50	1.40-1.48-1.53	0.01-0.21-0.42	0.06-0.08-0.10	5.8-8.4-10.4	0.5-0.8-1.2	.32	.32			
	35-45	25-32-55	0-24-45	30-44-50	1.45-1.50-1.52	0.01-0.21-0.42	0.06-0.07-0.10	3.8-8.4-10.2	0.2-0.4-1.0	.28	.28			
	45-79	25-35-55	4-26-45	30-39-45	1.40-1.50-1.53	0.01-0.21-0.42	0.05-0.06-0.10	3.7-6.8-8.5	0.1-0.2-0.5	.32	.32			

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
FhC2—Fairy-Hico complex, 1 to 5 percent slopes, moderately eroded														
Fairy, moderately eroded	0-13	52-68-80	6-26-43	5-6-18	1.47-1.49-1.51	14.00-28.00-42.00	0.10-0.15-0.17	0.3-0.4-1.8	0.5-1.3-2.0	.55	.55	5	3	86
	13-45	30-55-75	0-21-52	17-24-34	1.40-1.51-1.60	4.00-9.00-14.00	0.05-0.11-0.17	1.3-2.5-4.6	0.3-0.8-1.3	.24	.24			
	45-68	40-45-90	0-33-56	4-22-31	1.50-1.58-1.66	4.00-28.00-42.00	0.05-0.10-0.17	0.0-0.0-2.8	0.1-0.3-0.5	.32	.32			
	68-80	5-15-75	0-43-53	5-42-45	1.60-1.68-1.76	0.42-0.91-42.00	0.12-0.13-0.18	0.0-4.8-6.1	0.0-0.3-0.5	.32	.32			
Hico, moderately eroded	0-12	55-65-80	6-24-39	6-11-18	1.46-1.49-1.51	14.00-28.00-42.00	0.10-0.12-0.15	0.4-1.0-2.0	0.5-1.0-2.0	.28	.28	5	3	86
	12-51	30-55-75	0-17-48	17-28-34	1.44-1.55-1.64	4.00-9.00-14.00	0.05-0.11-0.17	1.7-3.4-4.4	0.3-0.8-1.3	.20	.20			
	51-80	40-60-90	0-24-50	4-16-31	1.53-1.59-1.64	4.00-28.00-42.00	0.05-0.10-0.17	0.1-1.6-3.5	0.1-0.3-0.5	.28	.28			

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
HwD3—Hico and Windthorst sandy clay loams, 1 to 8 percent slopes, severely eroded														
Hico, severely eroded	0-7	59-64-70	10-11-18	20-25-30	1.46-1.53-1.60	4.00-14.00-42.00	0.11-0.12-0.13	2.1-3.0-3.8	0.4-1.2-2.0	.24	.24	4	5	56
	7-44	43-57-61	11-18-23	18-25-39	1.48-1.54-1.60	4.00-9.00-14.00	0.11-0.12-0.13	1.9-2.9-5.1	0.2-0.4-0.6	.32	.32			
	44-60	33-66-81	12-15-42	4-19-32	1.55-1.58-1.61	4.00-9.00-42.00	0.13-0.14-0.15	0.1-2.0-3.7	0.1-0.2-0.3	.37	.37			
	60-79	26-61-85	8-27-57	7-12-25	1.76-1.82-1.88	0.42-1.40-4.00	0.01-0.02-0.03	0.5-1.1-2.7	0.0-0.1-0.2	.64	.64			
Windthorst, severely eroded	0-6	46-62-66	14-15-27	20-23-34	1.47-1.52-1.56	1.40-4.00-14.00	0.11-0.13-0.14	0.7-3.4-5.3	0.5-0.7-1.0	.43	.43	4	5	56
	6-16	32-40-43	16-24-33	26-36-43	1.35-1.42-1.51	1.40-2.70-4.00	0.15-0.17-0.19	3.8-5.1-5.6	0.5-0.6-1.0	.37	.37			
	16-25	31-41-52	16-26-39	27-33-38	1.39-1.48-1.55	1.40-2.70-4.00	0.16-0.18-0.20	3.2-4.3-5.6	0.3-0.5-0.8	.37	.37			
	25-33	36-46-59	19-32-41	14-22-30	1.35-1.50-1.60	1.40-2.70-4.00	0.15-0.17-0.19	2.0-2.6-5.0	0.1-0.3-0.4	.55	.55			
	33-79	26-61-85	8-27-57	7-12-25	1.76-1.82-1.88	0.42-1.40-4.00	0.01-0.02-0.03	0.5-0.9-2.6	0.0-0.1-0.2	.64	.64			

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
NdC—Nimrod fine sand, 0 to 5 percent slopes														
Nimrod, fine sand	0-4	88-90-95	2-8-12	0-2-5	1.55-1.56-1.57	42.00-91.00-141.00	0.09-0.11-0.13	0.0-0.5-0.7	0.9-1.0-1.2	.10	.10	5	1	250
	4-27	85-95-97	2-4-10	0-1-10	1.58-1.60-1.61	42.00-91.00-141.00	0.08-0.10-0.12	0.0-0.0-0.9	0.1-0.1-0.2	.10	.10			
	27-40	62-65-72	2-6-18	20-29-35	1.61-1.66-1.68	1.40-2.70-4.00	0.11-0.13-0.20	1.5-2.5-3.2	0.2-0.3-0.6	.20	.20			
	40-68	62-67-72	2-6-20	17-27-35	1.62-1.64-1.66	1.40-2.70-4.00	0.09-0.10-0.18	1.3-2.5-3.8	0.0-0.1-0.2	.15	.15			
	68-80	52-85-87	2-4-20	9-11-29	1.53-1.61-1.63	14.00-28.00-42.00	0.08-0.10-0.12	0.7-1.0-3.5	0.0-0.1-0.2	.10	.10			
SdC—Selden fine sand, 1 to 5 percent slopes														
Selden, fine sand	0-10	85-92-95	0-2-10	3-6-10	1.54-1.56-1.57	14.00-28.00-42.00	0.05-0.07-0.09	0.1-0.4-0.9	0.9-1.0-1.2	.10	.10	5	1	250
	10-24	35-56-65	0-17-40	20-27-35	1.47-1.60-1.64	1.40-2.70-4.00	0.12-0.15-0.17	2.1-3.2-4.5	0.2-0.3-0.6	.24	.24			
	24-62	35-56-65	0-17-40	20-27-35	1.51-1.59-1.65	1.40-2.70-4.00	0.12-0.15-0.17	2.0-3.1-4.4	0.0-0.1-0.2	.24	.24			

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
WkA—Hassee fine sandy loam, thick surface, 0 to 2 percent slopes														
Hassee	0-18	-69-	-16-	10-15- 20	1.50-1.58 -1.65	4.00-9.00-14.00	0.11-0.14-0. 17	0.0- 1.5- 2.9	0.5- 1.3- 2.0	.32	.32	5	3	86
	18-55	-18-	-29-	45-53- 60	1.30-1.43 -1.55	0.01-0.21-0.42	0.12-0.15-0. 18	6.0- 7.5- 8.9	0.5- 0.8- 1.0	.24	.24			
	55-65	-24-	-29-	35-48- 60	1.30-1.43 -1.55	0.01-0.21-0.42	0.12-0.15-0. 18	6.0- 7.5- 8.9	0.0- 0.3- 0.5	.28	.28			
WnC—Windthorst loamy fine sand, 1 to 5 percent slopes														
Windthorst	0-10	73-82- 90	0-12- 24	3- 6- 15	1.40-1.52 -1.65	42.00-91.00-14 1.00	0.06-0.10-0. 13	0.2- 0.4- 1.2	0.5- 1.3- 2.0	.28	.28	5	2	134
	10-38	30-46- 60	5-16- 35	35-38- 50	1.43-1.51 -1.60	1.40-2.70-4.00	0.10-0.14-0. 20	3.7- 4.3- 6.5	0.2- 0.5- 1.0	.32	.32			
	38-50	30-46- 70	5-18- 35	25-36- 50	1.38-1.46 -1.60	1.40-2.70-14.00	0.10-0.14-0. 20	2.3- 4.0- 6.5	0.2- 0.5- 1.0	.37	.37			
	50-80	30-50- 75	5-25- 40	15-25- 45	1.43-1.52 -1.70	1.40-9.00-42.00	0.11-0.15-0. 18	1.0- 2.3- 5.5	0.0- 0.3- 0.5	.49	.49			

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
WoB2—Windthorst fine sandy loam, 1 to 5 percent slopes, moderately eroded														
Windthorst, moderately eroded	0-4	52-67- 80	5-21- 40	5-12- 18	1.42-1.50 -1.60	14.00-28.00-42. 00	0.10-0.15-0. 17	0.3- 0.9- 1.5	0.5- 1.3- 2.0	.28	.28	5	3	86
	4-33	30-46- 60	5-16- 35	35-38- 50	1.43-1.59 -1.60	1.40-2.70-4.00	0.10-0.14-0. 20	4.4- 5.2- 7.6	0.2- 0.5- 1.0	.28	.28			
	33-46	30-46- 70	5-18- 35	25-36- 50	1.38-1.49 -1.60	1.40-2.70-14.00	0.10-0.14-0. 20	2.4- 4.8- 7.6	0.2- 0.5- 1.0	.32	.32			
	46-80	30-65- 75	0-25- 53	5-10- 45	1.45-1.57 -1.70	1.40-9.00-42.00	0.11-0.15-0. 18	0.1- 0.7- 6.5	0.0- 0.3- 0.5	.55	.55			

Data Source Information

Soil Survey Area: Erath County, Texas
Survey Area Data: Version 20, Sep 5, 2023

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Report—Physical Soil Properties

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
BdC—Bolar-Denton complex 3 to 5 percent slopes														
Bolar	0-16	20-34-45	17-36-53	27-30-40	1.21-1.30-1.38	4.00-9.00-14.00	0.17-0.19-0.21	2.4-3.9-6.8	1.0-2.5-4.0	.20	.20	2	4L	86
	16-32	15-34-45	15-36-50	20-30-40	1.34-1.40-1.46	4.00-9.00-14.00	0.16-0.18-0.20	0.4-3.2-5.9	0.5-1.3-2.0	.28	.28			
	32-36	15-34-45	15-36-50	20-30-40	1.38-1.51-1.56	4.00-9.00-14.00	0.12-0.14-0.16	0.3-2.0-5.5	0.3-0.5-1.0	.17	.32			
	36-80	—	—	—	—	0.42-2.70-14.00	—	—	—					
Denton	0-10	3-6-15	40-48-57	40-46-57	1.16-1.25-1.34	0.42-0.91-1.40	0.11-0.13-0.15	5.0-7.9-11.1	1.0-2.5-4.0	.17	.17	2	4	86
	10-28	5-7-25	28-48-60	35-45-55	1.28-1.37-1.41	0.42-0.91-1.40	0.09-0.12-0.14	3.7-7.1-10.3	1.0-2.0-4.0	.20	.20			
	28-32	5-7-25	28-48-60	35-45-55	1.31-1.38-1.41	0.42-0.91-1.40	0.09-0.11-0.13	2.7-5.6-9.4	0.5-1.0-2.0	.32	.32			
	32-38	5-7-30	40-63-83	12-30-40	1.36-1.43-1.45	4.00-9.00-14.00	0.08-0.10-0.12	0.0-1.7-5.2	0.1-0.3-1.0	.43	.43			
	38-80	—	—	—	—	0.42-2.70-14.00	—	—	—					

Physical Soil Properties--Erath County, Texas														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
CrB—Crawford silty clay, 1 to 3 percent slopes														
Crawford	0-12	0- 7- 20	28-48- 60	40-45- 60	1.25-1.40 -1.50	0.42-0.91-1.40	0.12-0.15-0. 18	6.0-10.0-15.0	1.0- 2.5- 3.0	.32	.32	2	4	86
	12-21	0- 5- 30	20-45- 60	40-50- 60	1.30-1.37 -1.55	0.01-0.21-0.42	0.12-0.15-0. 18	9.0-11.0-15.0	1.0- 2.0- 3.0	.28	.28			
	21-28	0- 5- 30	20-45- 60	40-50- 60	1.30-1.35 -1.55	0.01-0.21-0.42	0.12-0.15-0. 18	9.0-12.0-15.0	1.0- 2.0- 3.0	.28	.28			
	28-60	—	—	—	1.85-2.00 -2.35	0.42-7.00-14.00	—	—	—					

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
CtB—Clairette-Hassee very fine sandy loams, 1 to 3 percent slopes														
Clairette, very fine sandy loam	0-4	52-68-80	2-21-42	5-11-18	1.42-1.49-1.60	14.00-28.00-42.00	0.10-0.15-0.17	0.2-0.8-1.5	0.5-1.3-2.0	.49	.49	5	3	86
	4-10	35-49-75	5-32-50	10-19-24	1.44-1.53-1.57	4.00-9.00-14.00	0.15-0.17-0.19	0.7-1.5-2.3	0.5-0.8-1.5	.37	.37			
	10-26	20-31-60	0-31-48	32-38-55	1.42-1.56-1.66	1.40-2.70-4.00	0.10-0.13-0.18	3.7-5.2-8.7	0.3-0.6-1.0	.28	.28			
	26-56	25-40-60	0-27-53	18-33-45	1.46-1.50-1.54	4.00-9.00-14.00	0.16-0.18-0.20	1.1-3.7-6.3	0.1-0.5-0.8	.24	.24			
	56-74	25-47-70	0-27-53	15-26-45	1.54-1.60-1.64	4.00-9.00-14.00	0.12-0.12-0.13	0.8-2.3-6.2	0.1-0.3-0.6	.28	.28			
	74-80	10-56-75	0-27-73	10-17-45	1.50-1.70-1.70	14.00-28.00-42.00	0.12-0.15-0.17	0.4-1.3-6.3	0.1-0.1-0.5	.32	.32			
Hassee, very fine sandy loam	0-5	52-68-80	0-19-38	10-13-20	1.54-1.57-1.58	4.00-9.00-14.00	0.10-0.11-0.14	0.4-1.0-2.4	0.5-0.7-1.5	.55	.55	5	3	86
	5-14	35-68-75	5-17-45	10-15-20	1.41-1.50-1.52	4.00-9.00-14.00	0.07-0.10-0.12	0.4-1.4-2.4	0.2-0.4-1.2	.55	.55			
	14-35	25-30-50	7-27-40	35-43-50	1.40-1.48-1.53	0.01-0.21-0.42	0.06-0.08-0.10	5.8-8.4-10.4	0.5-0.8-1.2	.32	.32			
	35-45	25-32-55	0-24-45	30-44-50	1.45-1.50-1.52	0.01-0.21-0.42	0.06-0.07-0.10	3.8-8.4-10.2	0.2-0.4-1.0	.28	.28			
	45-79	25-35-55	4-26-45	30-39-45	1.40-1.50-1.53	0.01-0.21-0.42	0.05-0.06-0.10	3.7-6.8-8.5	0.1-0.2-0.5	.32	.32			

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
DIC—Duffau loamy fine sand, 1 to 5 percent slopes														
Duffau	0-12	73-82-90	0-12-24	3-6-15	1.40-1.52-1.53	42.00-91.00-141.00	0.06-0.10-0.13	0.2-0.5-1.5	0.5-1.3-2.0	.20	.20	5	2	134
	12-64	30-57-75	5-17-50	20-26-35	1.42-1.52-1.61	4.00-9.00-14.00	0.05-0.11-0.17	1.9-2.8-4.1	0.0-0.8-1.3	.28	.28			
	64-80	45-67-80	5-21-35	8-12-35	1.49-1.58-1.66	4.00-28.00-42.00	0.05-0.10-0.15	0.6-2.1-3.9	0.0-0.3-0.5	.32	.32			
FriA—Frio silty clay, 0 to 1 percent slopes, occasionally flooded														
Frio, occasionally flooded	0-22	2-10-20	40-46-58	40-44-50	1.15-1.25-1.35	1.40-2.70-4.00	0.12-0.15-0.20	6.8-8.3-10.2	1.0-3.0-4.0	.20	.20	5	4	86
	22-40	2-15-40	18-47-68	30-38-50	1.30-1.50-1.55	1.40-2.70-4.00	0.08-0.12-0.16	3.6-6.5-10.0	1.0-1.5-2.0	.32	.32			
	40-80	2-9-40	18-47-68	30-44-50	1.30-1.46-1.55	1.40-2.70-4.00	0.08-0.13-0.16	3.2-7.7-9.7	0.1-0.8-1.0	.32	.32			

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
GrB—Granbury very fine sandy loam, 1 to 5 percent slopes														
Granbury, very fine sandy loam	0-7	52-70-80	5-21-40	5-9-18	1.42-1.52-1.60	14.00-28.00-42.00	0.10-0.15-0.17	0.2-0.6-1.5	0.5-1.3-2.0	.55	.55	2	3	86
	7-23	30-46-60	5-16-35	35-38-50	1.43-1.59-1.60	1.40-2.70-4.00	0.10-0.14-0.20	4.4-5.2-7.6	0.2-0.5-1.0	.28	.28			
	23-40	—	—	—	—	0.42-7.20-14.00	—	—	—					
HoB—Slidell clay, 1 to 3 percent slopes														
Slidell	0-19	0-22-35	20-28-40	40-50-60	1.10-1.20-1.45	0.01-0.22-0.42	0.10-0.15-0.18	7.0-10.0-16.0	1.0-2.5-4.0	.17	.17	5	4	86
	19-32	0-22-35	20-28-60	40-50-60	1.10-1.20-1.45	0.01-0.22-0.42	0.10-0.15-0.18	6.6-10.0-17.0	1.0-2.0-3.0	.24	.24			
	32-49	0-22-35	20-28-60	40-50-60	1.20-1.40-1.55	0.01-0.22-0.42	0.10-0.13-0.18	4.9-9.0-13.0	0.1-0.6-1.0	.24	.24			
	49-80	0-22-35	20-28-60	40-50-60	1.20-1.40-1.55	0.01-0.22-0.42	0.10-0.13-0.18	4.9-7.5-10.8	0.1-0.6-1.0	.24	.24			
Ma—Maloterre gravelly clay loam, 1 to 8 percent slopes														
Maloterre	0-5	20-31-45	20-35-45	30-34-40	1.37-1.38-1.39	4.00-9.00-14.00	0.14-0.15-0.16	2.6-3.7-5.6	0.5-0.8-1.0	.15	.28	1	5	56
	5-20	—	—	—	—	0.42-7.20-14.00	—	—	—					

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
PcB—Purves clay, 1 to 3 percent slopes														
Purves	0-8	8-25-40	7-28-40	40-48-55	1.15-1.25-1.45	0.42-0.91-1.40	0.12-0.15-0.20	5.4-8.4-10.9	1.0-3.0-5.0	.10	.10	1	4	86
	8-12	8-26-40	20-29-54	35-45-55	1.20-1.30-1.45	0.42-0.91-4.00	0.08-0.13-0.18	5.0-6.8-10.3	1.0-2.5-4.0	.15	.15			
	12-14	8-26-40	20-29-54	35-45-55	1.20-1.35-1.45	0.42-0.91-4.00	0.04-0.05-0.07	1.0-2.3-6.9	1.0-2.0-3.0	.05	.17			
	14-40	—	—	—	—	0.42-2.70-14.00	—	—	—					
PcC—Purves clay, 3 to 5 percent slopes														
Purves	0-7	8-25-40	7-28-40	40-48-55	1.15-1.25-1.45	0.42-0.91-1.40	0.12-0.15-0.20	5.4-8.4-10.9	1.0-3.0-5.0	.15	.15	1	4	86
	7-12	8-26-40	20-29-54	35-45-55	1.20-1.30-1.45	0.42-0.91-4.00	0.08-0.13-0.18	5.0-6.8-10.3	1.0-2.5-4.0	.17	.17			
	12-17	8-26-40	20-29-54	35-45-55	1.20-1.35-1.45	0.42-0.91-4.00	0.04-0.05-0.07	1.0-2.5-6.9	1.0-2.0-3.0	.05	.17			
	17-40	—	—	—	—	0.42-2.70-14.00	—	—	—					

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
Pd—Purves-Dugout-Maloterre complex, 1 to 20 percent slopes														
Purves, stony clay	0-8	8-25-40	7-28-40	40-48-55	1.16-1.26-1.35	0.42-0.91-1.40	0.11-0.15-0.20	4.1-6.8-9.3	1.0-3.0-5.0	.05	.10	1	5	56
	8-12	8-26-40	20-29-54	35-45-55	1.17-1.32-1.47	0.42-0.91-4.00	0.08-0.13-0.18	2.9-7.0-10.8	1.0-2.5-4.0	.15	.15			
	12-14	8-26-40	20-29-54	35-45-55	1.21-1.34-1.47	0.42-0.91-4.00	0.04-0.05-0.07	1.0-2.4-7.3	1.0-2.0-3.0	.05	.17			
	14-24	—	—	—	—	0.42-2.70-14.00	—	—	—					
Dugout, gravelly clay loam	0-8	22-30-42	28-42-51	27-28-35	1.31-1.44-1.47	1.40-2.70-4.00	0.06-0.11-0.15	1.9-3.1-5.4	1.0-1.2-2.0	.15	.28	1	5	56
	8-18	20-23-40	28-48-60	15-29-35	1.40-1.44-1.53	1.40-2.70-4.00	0.07-0.15-0.16	0.0-3.2-4.9	0.1-0.9-1.2	.28	.28			
	18-28	—	—	—	—	0.42-7.20-14.00	—	—	—					
Maloterre, gravelly clay loam	0-8	30-35-45	24-36-43	27-29-35	1.18-1.36-1.40	4.00-9.00-14.00	0.06-0.10-0.11	1.8-3.1-6.0	1.0-2.0-7.0	.15	.24	1	5	56
	8-18	—	—	—	—	0.01-0.21-0.42	—	—	—					

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
WoB2—Windthorst fine sandy loam, 1 to 5 percent slopes, moderately eroded														
Windthorst, moderately eroded	0-4	52-67-80	5-21-40	5-12-18	1.42-1.50-1.60	14.00-28.00-42.00	0.10-0.15-0.17	0.3-0.9-1.5	0.5-1.3-2.0	.28	.28	5	3	86
	4-33	30-46-60	5-16-35	35-38-50	1.43-1.59-1.60	1.40-2.70-4.00	0.10-0.14-0.20	4.4-5.2-7.6	0.2-0.5-1.0	.28	.28			
	33-46	30-46-70	5-18-35	25-36-50	1.38-1.49-1.60	1.40-2.70-14.00	0.10-0.14-0.20	2.4-4.8-7.6	0.2-0.5-1.0	.32	.32			
	46-80	30-65-75	0-25-53	5-10-45	1.45-1.57-1.70	1.40-9.00-42.00	0.11-0.15-0.18	0.1-0.7-6.5	0.0-0.3-0.5	.55	.55			

Data Source Information

Soil Survey Area: Erath County, Texas
Survey Area Data: Version 20, Sep 5, 2023

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Report—Physical Soil Properties

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
BdC—Bolar-Denton complex 3 to 5 percent slopes														
Bolar	0-16	20-34-45	17-36-53	27-30-40	1.21-1.30-1.38	4.00-9.00-14.00	0.17-0.19-0.21	2.4-3.9-6.8	1.0-2.5-4.0	.20	.20	2	4L	86
	16-32	15-34-45	15-36-50	20-30-40	1.34-1.40-1.46	4.00-9.00-14.00	0.16-0.18-0.20	0.4-3.2-5.9	0.5-1.3-2.0	.28	.28			
	32-36	15-34-45	15-36-50	20-30-40	1.38-1.51-1.56	4.00-9.00-14.00	0.12-0.14-0.16	0.3-2.0-5.5	0.3-0.5-1.0	.17	.32			
	36-80	—	—	—	—	0.42-2.70-14.00	—	—	—					
Denton	0-10	3-6-15	40-48-57	40-46-57	1.16-1.25-1.34	0.42-0.91-1.40	0.11-0.13-0.15	5.0-7.9-11.1	1.0-2.5-4.0	.17	.17	2	4	86
	10-28	5-7-25	28-48-60	35-45-55	1.28-1.37-1.41	0.42-0.91-1.40	0.09-0.12-0.14	3.7-7.1-10.3	1.0-2.0-4.0	.20	.20			
	28-32	5-7-25	28-48-60	35-45-55	1.31-1.38-1.41	0.42-0.91-1.40	0.09-0.11-0.13	2.7-5.6-9.4	0.5-1.0-2.0	.32	.32			
	32-38	5-7-30	40-63-83	12-30-40	1.36-1.43-1.45	4.00-9.00-14.00	0.08-0.10-0.12	0.0-1.7-5.2	0.1-0.3-1.0	.43	.43			
	38-80	—	—	—	—	0.42-2.70-14.00	—	—	—					

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
DeB—Denton silty clay, 1 to 3 percent slopes														
Denton	0-13	0- 6- 20	40-44- 60	40-50- 57	1.18-1.25 -1.32	0.42-0.91-1.40	0.10-0.15-0. 18	6.0-12.0-15.0	1.0- 2.5- 4.0	.20	.20	3	4	86
	13-19	0- 7- 20	40-43- 63	35-50- 55	1.28-1.39 -1.50	0.42-0.91-4.00	0.10-0.15-0. 18	6.0-10.0-12.0	1.0- 2.0- 3.0	.24	.24			
	19-36	5-15- 30	40-60- 75	20-25- 40	1.40-1.53 -1.65	1.40-9.00-14.00	0.10-0.13-0. 14	0.8- 3.0- 5.4	0.1- 0.8- 1.5	.43	.43			
	36-52	5-15- 30	40-60- 83	12-25- 40	1.40-1.53 -1.65	1.40-9.00-14.00	0.08-0.10-0. 12	0.1- 2.1- 5.1	0.1- 0.3- 1.0	.49	.49			
	52-80	—	—	—	—	0.42-2.70-14.00	—	—	—					
HoB—Slidell clay, 1 to 3 percent slopes														
Slidell	0-19	0-22- 35	20-28- 40	40-50- 60	1.10-1.20 -1.45	0.01-0.22-0.42	0.10-0.15-0. 18	7.0-10.0-16.0	1.0- 2.5- 4.0	.17	.17	5	4	86
	19-32	0-22- 35	20-28- 60	40-50- 60	1.10-1.20 -1.45	0.01-0.22-0.42	0.10-0.15-0. 18	6.6-10.0-17.0	1.0- 2.0- 3.0	.24	.24			
	32-49	0-22- 35	20-28- 60	40-50- 60	1.20-1.40 -1.55	0.01-0.22-0.42	0.10-0.13-0. 18	4.9- 9.0-13.0	0.1- 0.6- 1.0	.24	.24			
	49-80	0-22- 35	20-28- 60	40-50- 60	1.20-1.40 -1.55	0.01-0.22-0.42	0.10-0.13-0. 18	4.9- 7.5-10.8	0.1- 0.6- 1.0	.24	.24			

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
Ma—Maloterre gravelly clay loam, 1 to 8 percent slopes														
Maloterre	0-5	20-31- 45	20-35- 45	30-34- 40	1.37-1.38 -1.39	4.00-9.00-14.00	0.14-0.15-0. 16	2.6- 3.7- 5.6	0.5- 0.8- 1.0	.15	.28	1	5	56
	5-20	—	—	—	—	0.42-7.20-14.00	—	—	—					
PcB—Purves clay, 1 to 3 percent slopes														
Purves	0-8	8-25- 40	7-28- 40	40-48- 55	1.15-1.25 -1.45	0.42-0.91-1.40	0.12-0.15-0. 20	5.4- 8.4-10.9	1.0- 3.0- 5.0	.10	.10	1	4	86
	8-12	8-26- 40	20-29- 54	35-45- 55	1.20-1.30 -1.45	0.42-0.91-4.00	0.08-0.13-0. 18	5.0- 6.8-10.3	1.0- 2.5- 4.0	.15	.15			
	12-14	8-26- 40	20-29- 54	35-45- 55	1.20-1.35 -1.45	0.42-0.91-4.00	0.04-0.05-0. 07	1.0- 2.3- 6.9	1.0- 2.0- 3.0	.05	.17			
	14-40	—	—	—	—	0.42-2.70-14.00	—	—	—					
PcC—Purves clay, 3 to 5 percent slopes														
Purves	0-7	8-25- 40	7-28- 40	40-48- 55	1.15-1.25 -1.45	0.42-0.91-1.40	0.12-0.15-0. 20	5.4- 8.4-10.9	1.0- 3.0- 5.0	.15	.15	1	4	86
	7-12	8-26- 40	20-29- 54	35-45- 55	1.20-1.30 -1.45	0.42-0.91-4.00	0.08-0.13-0. 18	5.0- 6.8-10.3	1.0- 2.5- 4.0	.17	.17			
	12-17	8-26- 40	20-29- 54	35-45- 55	1.20-1.35 -1.45	0.42-0.91-4.00	0.04-0.05-0. 07	1.0- 2.5- 6.9	1.0- 2.0- 3.0	.05	.17			
	17-40	—	—	—	—	0.42-2.70-14.00	—	—	—					

Physical Soil Properties–Erath County, Texas															
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
Pd—Purves-Dugout-Maloterre complex, 1 to 20 percent slopes														
Purves, stony clay	0-8	8-25-40	7-28-40	40-48-55	1.16-1.26-1.35	0.42-0.91-1.40	0.11-0.15-0.20	4.1-6.8-9.3	1.0-3.0-5.0	.05	.10	1	5	56
	8-12	8-26-40	20-29-54	35-45-55	1.17-1.32-1.47	0.42-0.91-4.00	0.08-0.13-0.18	2.9-7.0-10.8	1.0-2.5-4.0	.15	.15			
	12-14	8-26-40	20-29-54	35-45-55	1.21-1.34-1.47	0.42-0.91-4.00	0.04-0.05-0.07	1.0-2.4-7.3	1.0-2.0-3.0	.05	.17			
	14-24	—	—	—	—	0.42-2.70-14.00	—	—	—					
Dugout, gravelly clay loam	0-8	22-30-42	28-42-51	27-28-35	1.31-1.44-1.47	1.40-2.70-4.00	0.06-0.11-0.15	1.9-3.1-5.4	1.0-1.2-2.0	.15	.28	1	5	56
	8-18	20-23-40	28-48-60	15-29-35	1.40-1.44-1.53	1.40-2.70-4.00	0.07-0.15-0.16	0.0-3.2-4.9	0.1-0.9-1.2	.28	.28			
	18-28	—	—	—	—	0.42-7.20-14.00	—	—	—					
Maloterre, gravelly clay loam	0-8	30-35-45	24-36-43	27-29-35	1.18-1.36-1.40	4.00-9.00-14.00	0.06-0.10-0.11	1.8-3.1-6.0	1.0-2.0-7.0	.15	.24	1	5	56
	8-18	—	—	—	—	0.01-0.21-0.42	—	—	—					

Data Source Information

Soil Survey Area: Erath County, Texas
Survey Area Data: Version 20, Sep 5, 2023

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Report—Physical Soil Properties

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties–Erath County, Texas

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
FhC2—Fairy-Hico complex, 1 to 5 percent slopes, moderately eroded														
Fairy, moderately eroded	0-13	52-68-80	6-26-43	5-6-18	1.47-1.49-1.51	14.00-28.00-42.00	0.10-0.15-0.17	0.3-0.4-1.8	0.5-1.3-2.0	.55	.55	5	3	86
	13-45	30-55-75	0-21-52	17-24-34	1.40-1.51-1.60	4.00-9.00-14.00	0.05-0.11-0.17	1.3-2.5-4.6	0.3-0.8-1.3	.24	.24			
	45-68	40-45-90	0-33-56	4-22-31	1.50-1.58-1.66	4.00-28.00-42.00	0.05-0.10-0.17	0.0-0.0-2.8	0.1-0.3-0.5	.32	.32			
	68-80	5-15-75	0-43-53	5-42-45	1.60-1.68-1.76	0.42-0.91-42.00	0.12-0.13-0.18	0.0-4.8-6.1	0.0-0.3-0.5	.32	.32			
Hico, moderately eroded	0-12	55-65-80	6-24-39	6-11-18	1.46-1.49-1.51	14.00-28.00-42.00	0.10-0.12-0.15	0.4-1.0-2.0	0.5-1.0-2.0	.28	.28	5	3	86
	12-51	30-55-75	0-17-48	17-28-34	1.44-1.55-1.64	4.00-9.00-14.00	0.05-0.11-0.17	1.7-3.4-4.4	0.3-0.8-1.3	.20	.20			
	51-80	40-60-90	0-24-50	4-16-31	1.53-1.59-1.64	4.00-28.00-42.00	0.05-0.10-0.17	0.1-1.6-3.5	0.1-0.3-0.5	.28	.28			

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
Go—Gowen clay loam, occasionally flooded														
Gowen	0-30	-34-	-37-	27-29- 30	1.35-1.43 -1.50	4.00-9.00-14.00	0.15-0.18-0. 20	3.0- 4.5- 5.9	1.0- 2.5- 4.0	.24	.24	5	6	48
	30-60	-35-	-38-	20-28- 35	1.40-1.50 -1.60	4.00-9.00-14.00	0.15-0.18-0. 20	3.0- 4.5- 5.9	0.2- 1.1- 2.0	.32	.32			
WkA—Hassee fine sandy loam, thick surface, 0 to 2 percent slopes														
Hassee	0-18	-69-	-16-	10-15- 20	1.50-1.58 -1.65	4.00-9.00-14.00	0.11-0.14-0. 17	0.0- 1.5- 2.9	0.5- 1.3- 2.0	.32	.32	5	3	86
	18-55	-18-	-29-	45-53- 60	1.30-1.43 -1.55	0.01-0.21-0.42	0.12-0.15-0. 18	6.0- 7.5- 8.9	0.5- 0.8- 1.0	.24	.24			
	55-65	-24-	-29-	35-48- 60	1.30-1.43 -1.55	0.01-0.21-0.42	0.12-0.15-0. 18	6.0- 7.5- 8.9	0.0- 0.3- 0.5	.28	.28			

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
WoB—Windthorst very fine sandy loam, 1 to 5 percent slopes														
Windthorst, very fine sandy loam	0-8	52-68- 80	5-21- 40	5-11- 18	1.42-1.49 -1.60	14.00-28.00-42. 00	0.10-0.15-0. 17	0.2- 0.8- 1.5	0.5- 1.3- 2.0	.43	.43	5	3	86
	8-33	30-46- 60	5-16- 35	35-38- 50	1.43-1.59 -1.60	1.40-2.70-4.00	0.10-0.14-0. 20	4.4- 5.2- 7.6	0.2- 0.5- 1.0	.28	.28			
	33-46	30-46- 70	5-18- 35	25-36- 50	1.38-1.49 -1.60	1.40-2.70-14.00	0.10-0.14-0. 20	2.4- 4.8- 7.6	0.2- 0.5- 1.0	.32	.32			
	46-80	30-65- 75	0-25- 53	5-10- 45	1.45-1.57 -1.70	1.40-9.00-42.00	0.11-0.15-0. 18	0.1- 0.7- 6.5	0.0- 0.3- 0.5	.55	.55			
WoB2—Windthorst fine sandy loam, 1 to 5 percent slopes, moderately eroded														
Windthorst, moderately eroded	0-4	52-67- 80	5-21- 40	5-12- 18	1.42-1.50 -1.60	14.00-28.00-42. 00	0.10-0.15-0. 17	0.3- 0.9- 1.5	0.5- 1.3- 2.0	.28	.28	5	3	86
	4-33	30-46- 60	5-16- 35	35-38- 50	1.43-1.59 -1.60	1.40-2.70-4.00	0.10-0.14-0. 20	4.4- 5.2- 7.6	0.2- 0.5- 1.0	.28	.28			
	33-46	30-46- 70	5-18- 35	25-36- 50	1.38-1.49 -1.60	1.40-2.70-14.00	0.10-0.14-0. 20	2.4- 4.8- 7.6	0.2- 0.5- 1.0	.32	.32			
	46-80	30-65- 75	0-25- 53	5-10- 45	1.45-1.57 -1.70	1.40-9.00-42.00	0.11-0.15-0. 18	0.1- 0.7- 6.5	0.0- 0.3- 0.5	.55	.55			

Data Source Information

Soil Survey Area: Erath County, Texas
Survey Area Data: Version 20, Sep 5, 2023

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Report—Physical Soil Properties

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties–Erath County, Texas

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
BcC2—Wise clay loam, 3 to 5 percent slopes, moderately eroded														
Wise, moderately eroded	0-5	20-29-45	26-43-53	27-28-35	1.30-1.38-1.46	4.00-9.00-14.00	0.15-0.18-0.20	3.0-3.3-4.3	0.5-1.3-2.0	.32	.32	3	4L	86
	5-11	15-32-50	15-40-68	15-28-35	1.41-1.44-1.46	4.00-9.00-14.00	0.15-0.19-0.24	1.3-3.0-3.8	0.5-0.8-1.0	.37	.37			
	11-26	15-32-50	15-40-68	15-28-35	1.36-1.47-1.58	4.00-9.00-14.00	0.15-0.20-0.24	1.3-3.0-3.7	0.2-0.3-0.5	.43	.43			
	26-80	15-30-80	5-50-83	2-20-35	1.66-1.70-1.75	1.40-4.00-14.00	0.01-0.04-0.14	0.0-2.1-4.3	0.1-0.2-0.5	.55	.55			
HoB—Slidell clay, 1 to 3 percent slopes														
Slidell	0-19	0-22-35	20-28-40	40-50-60	1.10-1.20-1.45	0.01-0.22-0.42	0.10-0.15-0.18	7.0-10.0-16.0	1.0-2.5-4.0	.17	.17	5	4	86
	19-32	0-22-35	20-28-60	40-50-60	1.10-1.20-1.45	0.01-0.22-0.42	0.10-0.15-0.18	6.6-10.0-17.0	1.0-2.0-3.0	.24	.24			
	32-49	0-22-35	20-28-60	40-50-60	1.20-1.40-1.55	0.01-0.22-0.42	0.10-0.13-0.18	4.9-9.0-13.0	0.1-0.6-1.0	.24	.24			
	49-80	0-22-35	20-28-60	40-50-60	1.20-1.40-1.55	0.01-0.22-0.42	0.10-0.13-0.18	4.9-7.5-10.8	0.1-0.6-1.0	.24	.24			

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
Ma—Maloterre gravelly clay loam, 1 to 8 percent slopes														
Maloterre	0-5	20-31-45	20-35-45	30-34-40	1.37-1.38-1.39	4.00-9.00-14.00	0.14-0.15-0.16	2.6-3.7-5.6	0.5-0.8-1.0	.15	.28	1	5	56
	5-20	—	—	—	—	0.42-7.20-14.00	—	—	—					
PcB—Purves clay, 1 to 3 percent slopes														
Purves	0-8	8-25-40	7-28-40	40-48-55	1.15-1.25-1.45	0.42-0.91-1.40	0.12-0.15-0.20	5.4-8.4-10.9	1.0-3.0-5.0	.10	.10	1	4	86
	8-12	8-26-40	20-29-54	35-45-55	1.20-1.30-1.45	0.42-0.91-4.00	0.08-0.13-0.18	5.0-6.8-10.3	1.0-2.5-4.0	.15	.15			
	12-14	8-26-40	20-29-54	35-45-55	1.20-1.35-1.45	0.42-0.91-4.00	0.04-0.05-0.07	1.0-2.3-6.9	1.0-2.0-3.0	.05	.17			
	14-40	—	—	—	—	0.42-2.70-14.00	—	—	—					

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
Pd—Purves-Dugout-Maloterre complex, 1 to 20 percent slopes														
Purves, stony clay	0-8	8-25-40	7-28-40	40-46-55	1.16-1.26-1.35	0.42-0.91-1.40	0.11-0.15-0.20	4.1-6.8-9.3	1.0-3.0-5.0	.05	.10	1	5	56
	8-12	8-26-40	20-29-54	35-45-55	1.17-1.32-1.47	0.42-0.91-4.00	0.08-0.13-0.18	2.9-7.0-10.8	1.0-2.5-4.0	.15	.15			
	12-14	8-26-40	20-29-54	35-45-55	1.21-1.34-1.47	0.42-0.91-4.00	0.04-0.05-0.07	1.0-2.4-7.3	1.0-2.0-3.0	.05	.17			
	14-24	—	—	—	—	0.42-2.70-14.00	—	—	—					
Dugout, gravelly clay loam	0-8	22-30-42	28-42-51	27-28-35	1.31-1.44-1.47	1.40-2.70-4.00	0.06-0.11-0.15	1.9-3.1-5.4	1.0-1.2-2.0	.15	.28	1	5	56
	8-18	20-23-40	28-48-60	15-29-35	1.40-1.44-1.53	1.40-2.70-4.00	0.07-0.15-0.16	0.0-3.2-4.9	0.1-0.9-1.2	.28	.28			
	18-28	—	—	—	—	0.42-7.20-14.00	—	—	—					
Maloterre, gravelly clay loam	0-8	30-35-45	24-36-43	27-29-35	1.18-1.36-1.40	4.00-9.00-14.00	0.06-0.10-0.11	1.8-3.1-6.0	1.0-2.0-7.0	.15	.24	1	5	56
	8-18	—	—	—	—	0.01-0.21-0.42	—	—	—					

Data Source Information

Soil Survey Area: Erath County, Texas
Survey Area Data: Version 20, Sep 5, 2023

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

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Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

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Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Report—Physical Soil Properties

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties–Erath County, Texas

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
BaA—Blanket clay loam, 0 to 1 percent slopes														
Blanket	0-18	20-25-45	28-44-53	27-31-35	1.30-1.47-1.50	4.00-9.00-14.00	0.15-0.18-0.20	3.4-4.5-5.3	1.0-2.0-3.0	.32	.32	5	6	48
	18-32	5-24-40	13-38-60	35-38-50	1.35-1.42-1.55	0.42-2.70-4.00	0.12-0.15-0.20	4.8-5.9-8.6	0.5-1.3-2.0	.32	.32			
	32-46	5-28-40	10-39-68	27-33-50	1.35-1.45-1.55	1.40-9.00-14.00	0.12-0.15-0.20	2.6-4.1-7.9	0.3-0.8-1.0	.37	.37			
	46-80	5-35-40	10-37-66	27-28-50	1.35-1.50-1.55	1.40-9.00-14.00	0.12-0.15-0.20	2.6-3.2-7.9	0.1-0.3-0.8	.43	.43			
BaB—Blanket clay loam, 1 to 3 percent slopes														
Blanket	0-14	20-25-45	28-44-53	27-31-35	1.30-1.47-1.50	4.00-9.00-14.00	0.15-0.18-0.20	3.4-4.5-5.3	1.0-2.0-3.0	.32	.32	5	6	48
	14-40	5-24-40	13-38-60	35-38-50	1.35-1.42-1.55	0.42-2.70-4.00	0.12-0.15-0.20	4.8-5.9-8.6	0.5-1.3-2.0	.32	.32			
	40-56	5-28-40	10-39-68	27-33-50	1.35-1.45-1.55	1.40-9.00-14.00	0.12-0.15-0.20	2.6-4.1-7.9	0.3-0.8-1.0	.37	.37			
	56-80	5-35-40	10-37-66	27-28-50	1.35-1.50-1.55	1.40-9.00-14.00	0.12-0.15-0.20	2.6-3.2-7.9	0.1-0.3-0.8	.43	.43			

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
Bu—Bunyan fine sandy loam, occasionally flooded														
Bunyan	0-10	-70-	-16-	8-14- 20	1.40-1.50 -1.60	14.00-28.00-42. 00	0.11-0.13-0. 15	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.28	.28	5	3	86
	10-46	-56-	-18-	18-27- 35	1.30-1.40 -1.50	4.00-9.00-14.00	0.15-0.17-0. 19	0.0- 1.5- 2.9	0.1- 0.6- 1.0	.20	.20			
	46-62	-35-	-38-	18-27- 35	1.40-1.50 -1.60	4.00-9.00-14.00	0.18-0.20-0. 22	0.0- 1.5- 2.9	0.1- 0.6- 1.0	.32	.32			

Physical Soil Properties–Erath County, Texas															
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
CtB—Clairette-Hassee very fine sandy loams, 1 to 3 percent slopes														
Clairette, very fine sandy loam	0-4	52-68-80	2-21-42	5-11-18	1.42-1.49-1.60	14.00-28.00-42.00	0.10-0.15-0.17	0.2-0.8-1.5	0.5-1.3-2.0	.49	.49	5	3	86
	4-10	35-49-75	5-32-50	10-19-24	1.44-1.53-1.57	4.00-9.00-14.00	0.15-0.17-0.19	0.7-1.5-2.3	0.5-0.8-1.5	.37	.37			
	10-26	20-31-60	0-31-48	32-38-55	1.42-1.56-1.66	1.40-2.70-4.00	0.10-0.13-0.18	3.7-5.2-8.7	0.3-0.6-1.0	.28	.28			
	26-56	25-40-60	0-27-53	18-33-45	1.46-1.50-1.54	4.00-9.00-14.00	0.16-0.18-0.20	1.1-3.7-6.3	0.1-0.5-0.8	.24	.24			
	56-74	25-47-70	0-27-53	15-26-45	1.54-1.60-1.64	4.00-9.00-14.00	0.12-0.12-0.13	0.8-2.3-6.2	0.1-0.3-0.6	.28	.28			
	74-80	10-56-75	0-27-73	10-17-45	1.50-1.70-1.70	14.00-28.00-42.00	0.12-0.15-0.17	0.4-1.3-6.3	0.1-0.1-0.5	.32	.32			
Hassee, very fine sandy loam	0-5	52-68-80	0-19-38	10-13-20	1.54-1.57-1.58	4.00-9.00-14.00	0.10-0.11-0.14	0.4-1.0-2.4	0.5-0.7-1.5	.55	.55	5	3	86
	5-14	35-68-75	5-17-45	10-15-20	1.41-1.50-1.52	4.00-9.00-14.00	0.07-0.10-0.12	0.4-1.4-2.4	0.2-0.4-1.2	.55	.55			
	14-35	25-30-50	7-27-40	35-43-50	1.40-1.48-1.53	0.01-0.21-0.42	0.06-0.08-0.10	5.8-8.4-10.4	0.5-0.8-1.2	.32	.32			
	35-45	25-32-55	0-24-45	30-44-50	1.45-1.50-1.52	0.01-0.21-0.42	0.06-0.07-0.10	3.8-8.4-10.2	0.2-0.4-1.0	.28	.28			
	45-79	25-35-55	4-26-45	30-39-45	1.40-1.50-1.53	0.01-0.21-0.42	0.05-0.06-0.10	3.7-6.8-8.5	0.1-0.2-0.5	.32	.32			

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
GrB—Granbury very fine sandy loam, 1 to 5 percent slopes														
Granbury, very fine sandy loam	0-7	52-70- 80	5-21- 40	5- 9- 18	1.42-1.52 -1.60	14.00-28.00-42. 00	0.10-0.15-0. 17	0.2- 0.6- 1.5	0.5- 1.3- 2.0	.55	.55	2	3	86
	7-23	30-46- 60	5-16- 35	35-38- 50	1.43-1.59 -1.60	1.40-2.70-4.00	0.10-0.14-0. 20	4.4- 5.2- 7.6	0.2- 0.5- 1.0	.28	.28			
	23-40	—	—	—	—	0.42-7.20-14.00	—	—	—					
GrB2—Granbury very fine sandy loam, 1 to 5 percent slopes, moderately eroded														
Granbury, moderately eroded	0-7	52-70- 80	5-21- 40	5- 9- 18	1.42-1.52 -1.60	14.00-28.00-42. 00	0.10-0.15-0. 17	0.2- 0.6- 1.5	0.5- 1.3- 2.0	.55	.55	2	3	86
	7-23	30-46- 60	5-16- 35	35-38- 50	1.43-1.59 -1.60	1.40-2.70-4.00	0.10-0.14-0. 20	4.4- 5.2- 7.6	0.2- 0.5- 1.0	.28	.28			
	23-40	—	—	—	—	0.42-7.20-14.00	—	—	—					

Physical Soil Properties–Erath County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
MfB—May fine sandy loam, 1 to 3 percent slopes														
May, fine sandy loam	0-16	55-70-80	2-17-34	8-13-18	1.35-1.50-1.60	14.00-28.00-42.00	0.11-0.13-0.15	0.7-1.2-2.2	0.5-1.0-2.0	.17	.17	5	3	86
	16-42	35-57-70	5-18-35	18-25-33	1.40-1.55-1.65	4.00-9.00-14.00	0.12-0.16-0.20	1.7-2.6-3.8	0.1-0.3-0.5	.24	.24			
	42-50	35-57-70	5-21-40	15-22-33	1.45-1.55-1.70	4.00-9.00-14.00	0.11-0.15-0.20	1.3-2.3-3.7	0.1-0.3-0.5	.28	.28			
	50-80	40-61-70	2-19-40	10-20-30	1.45-1.58-1.70	4.00-9.00-42.00	0.10-0.14-0.18	0.8-1.9-3.0	0.1-0.2-0.3	.28	.28			
WaB—Hassee fine sandy loam, 1 to 3 percent slopes														
Hassee	0-12	-69-	-16-	10-15-20	1.50-1.58-1.65	4.00-9.00-14.00	0.11-0.14-0.17	0.0-1.5-2.9	0.5-1.3-2.0	.32	.32	5	3	86
	12-50	-18-	-29-	45-53-60	1.30-1.43-1.55	0.01-0.21-0.42	0.12-0.15-0.18	6.0-7.5-8.9	0.5-0.8-1.0	.24	.24			
	50-60	-24-	-29-	35-48-60	1.30-1.43-1.55	0.01-0.21-0.42	0.12-0.15-0.18	6.0-7.5-8.9	0.0-0.3-0.5	.28	.28			

Data Source Information

Soil Survey Area: Erath County, Texas
Survey Area Data: Version 20, Sep 5, 2023

RUSLE2 Related Attributes

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Report—RUSLE2 Related Attributes

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RUSLE2 Related Attributes–Erath County, Texas

Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
CtB—Clairette-Hassee very fine sandy loams, 1 to 3 percent slopes								
Clairette, very fine sandy loam	50	200	C	.49	5	68.0	21.0	11.0
Hassee, very fine sandy loam	40	200	D	.55	5	68.0	19.0	13.0
FhC2—Fairy-Hico complex, 1 to 5 percent slopes, moderately eroded								
Fairy, moderately eroded	45	180	B	.55	5	68.0	26.0	6.0
Hico, moderately eroded	35	200	B	.28	5	65.0	24.0	11.0
HwD3—Hico and Windthorst sandy clay loams, 1 to 8 percent slopes, severely eroded								
Hico, severely eroded	50	180	B	.24	4	64.0	11.0	25.0
Windthorst, severely eroded	40	200	C	.43	4	62.0	15.0	23.0
NdC—Nimrod fine sand, 0 to 5 percent slopes								
Nimrod, fine sand	75	298	A	.10	5	90.0	8.0	2.0
SdC—Selden fine sand, 1 to 5 percent slopes								
Selden, fine sand	85	298	C	.10	5	92.0	2.0	6.0
WkA—Hassee fine sandy loam, thick surface, 0 to 2 percent slopes								
Hassee	80	200	D	.32	5	68.8	16.2	15.0

RUSLE2 Related Attributes–Erath County, Texas								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
WnC—Windthorst loamy fine sand, 1 to 5 percent slopes								
Windthorst	90	200	C	.28	5	82.0	12.0	6.0
WoB2—Windthorst fine sandy loam, 1 to 5 percent slopes, moderately eroded								
Windthorst, moderately eroded	85	298	C	.28	5	67.0	21.0	12.0

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Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
BdC—Bolar-Denton complex 3 to 5 percent slopes								
Bolar	55	180	C	.20	2	34.0	36.0	30.0
Denton	35	200	D	.17	2	6.0	48.0	46.0
CrB—Crawford silty clay, 1 to 3 percent slopes								
Crawford	85	298	D	.32	2	7.2	47.8	45.0
CtB—Clairette-Hassee very fine sandy loams, 1 to 3 percent slopes								
Clairette, very fine sandy loam	50	200	C	.49	5	68.0	21.0	11.0
Hassee, very fine sandy loam	40	200	D	.55	5	68.0	19.0	13.0
DlC—Duffau loamy fine sand, 1 to 5 percent slopes								
Duffau	85	200	B	.20	5	82.0	12.0	6.0
FriA—Frio silty clay, 0 to 1 percent slopes, occasionally flooded								
Frio, occasionally flooded	85	98	C	.20	5	10.0	46.0	44.0
GrB—Granbury very fine sandy loam, 1 to 5 percent slopes								
Granbury, very fine sandy loam	85	298	C	.55	2	70.0	21.0	9.0
HoB—Slidell clay, 1 to 3 percent slopes								
Slidell	85	298	D	.17	5	22.0	28.0	50.0

RUSLE2 Related Attributes–Erath County, Texas								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
Ma—Maloterre gravelly clay loam, 1 to 8 percent slopes								
Maloterre	80	161	D	.28	1	31.0	35.0	34.0
PcB—Purves clay, 1 to 3 percent slopes								
Purves	89	298	D	.10	1	25.0	27.5	47.5
PcC—Purves clay, 3 to 5 percent slopes								
Purves	89	180	D	.15	1	25.0	27.5	47.5
Pd—Purves-Dugout-Maloterre complex, 1 to 20 percent slopes								
Purves, stony clay	37	200	D	.10	1	25.0	27.5	47.5
Dugout, gravelly clay loam	25	161	D	.28	1	30.0	42.0	28.0
Maloterre, gravelly clay loam	22	180	D	.24	1	35.0	36.0	29.0
WoB2—Windthorst fine sandy loam, 1 to 5 percent slopes, moderately eroded								
Windthorst, moderately eroded	85	298	C	.28	5	67.0	21.0	12.0

Data Source Information

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RUSLE2 Related Attributes–Erath County, Texas

Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
BdC—Bolar-Denton complex 3 to 5 percent slopes								
Bolar	55	180	C	.20	2	34.0	36.0	30.0
Denton	35	200	D	.17	2	6.0	48.0	46.0
DeB—Denton silty clay, 1 to 3 percent slopes								
Denton	85	298	C	.20	3	6.0	44.0	50.0
HoB—Slidell clay, 1 to 3 percent slopes								
Slidell	85	298	D	.17	5	22.0	28.0	50.0
Ma—Maloterre gravelly clay loam, 1 to 8 percent slopes								
Maloterre	80	161	D	.28	1	31.0	35.0	34.0
PcB—Purves clay, 1 to 3 percent slopes								
Purves	89	298	D	.10	1	25.0	27.5	47.5
PcC—Purves clay, 3 to 5 percent slopes								
Purves	89	180	D	.15	1	25.0	27.5	47.5
Pd—Purves-Dugout-Maloterre complex, 1 to 20 percent slopes								
Purves, stony clay	37	200	D	.10	1	25.0	27.5	47.5
Dugout, gravelly clay loam	25	161	D	.28	1	30.0	42.0	28.0
Maloterre, gravelly clay loam	22	180	D	.24	1	35.0	36.0	29.0

Data Source Information

Soil Survey Area: Erath County, Texas
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RUSLE2 Related Attributes–Erath County, Texas

Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
FhC2—Fairy-Hico complex, 1 to 5 percent slopes, moderately eroded								
Fairy, moderately eroded	45	180	B	.55	5	68.0	26.0	6.0
Hico, moderately eroded	35	200	B	.28	5	65.0	24.0	11.0
Go—Gowen clay loam, occasionally flooded								
Gowen	90	98	B	.24	5	34.2	37.3	28.5
WkA—Hassee fine sandy loam, thick surface, 0 to 2 percent slopes								
Hassee	80	200	D	.32	5	68.8	16.2	15.0
WoB—Windthorst very fine sandy loam, 1 to 5 percent slopes								
Windthorst, very fine sandy loam	85	298	C	.43	5	68.0	21.0	11.0
WoB2—Windthorst fine sandy loam, 1 to 5 percent slopes, moderately eroded								
Windthorst, moderately eroded	85	298	C	.28	5	67.0	21.0	12.0

Data Source Information

Soil Survey Area: Erath County, Texas
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RUSLE2 Related Attributes–Erath County, Texas

Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
BcC2—Wise clay loam, 3 to 5 percent slopes, moderately eroded								
Wise, moderately eroded	85	151	C	.32	3	29.0	43.0	28.0
HoB—Slidell clay, 1 to 3 percent slopes								
Slidell	85	298	D	.17	5	22.0	28.0	50.0
Ma—Maloterre gravelly clay loam, 1 to 8 percent slopes								
Maloterre	80	161	D	.28	1	31.0	35.0	34.0
PcB—Purves clay, 1 to 3 percent slopes								
Purves	89	298	D	.10	1	25.0	27.5	47.5
Pd—Purves-Dugout-Maloterre complex, 1 to 20 percent slopes								
Purves, stony clay	37	200	D	.10	1	25.0	27.5	47.5
Dugout, gravelly clay loam	25	161	D	.28	1	30.0	42.0	28.0
Maloterre, gravelly clay loam	22	180	D	.24	1	35.0	36.0	29.0

Data Source Information

Soil Survey Area: Erath County, Texas
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RUSLE2 Related Attributes–Erath County, Texas

Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
BaA—Blanket clay loam, 0 to 1 percent slopes								
Blanket	90	98	C	.32	5	25.0	44.0	31.0
BaB—Blanket clay loam, 1 to 3 percent slopes								
Blanket	90	298	C	.32	5	25.0	44.0	31.0
Bu—Bunyan fine sandy loam, occasionally flooded								
Bunyan	80	98	B	.28	5	69.6	16.4	14.0
CtB—Clairette-Hassee very fine sandy loams, 1 to 3 percent slopes								
Clairette, very fine sandy loam	50	200	C	.49	5	68.0	21.0	11.0
Hassee, very fine sandy loam	40	200	D	.55	5	68.0	19.0	13.0
GrB—Granbury very fine sandy loam, 1 to 5 percent slopes								
Granbury, very fine sandy loam	85	298	C	.55	2	70.0	21.0	9.0
GrB2—Granbury very fine sandy loam, 1 to 5 percent slopes, moderately eroded								
Granbury, moderately eroded	85	298	C	.55	2	70.0	21.0	9.0
MfB—May fine sandy loam, 1 to 3 percent slopes								
May, fine sandy loam	90	200	B	.17	5	70.0	17.0	13.0

RUSLE2 Related Attributes–Erath County, Texas								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
WaB—Hassee fine sandy loam, 1 to 3 percent slopes								
Hassee	100	200	D	.32	5	68.8	16.2	15.0

Data Source Information

Soil Survey Area: Erath County, Texas
Survey Area Data: Version 20, Sep 5, 2023

Selected Soil Interpretations

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Report—Selected Soil Interpretations

Selected Soil Interpretations–Erath County, Texas							
Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CtB—Clairette-Hassee very fine sandy loams, 1 to 3 percent slopes							
Clairette, very fine sandy loam	50	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.37	Slow water movement	0.37	Seepage	0.50
		Too acid	0.08	Too acid	0.08		
Hassee, very fine sandy loam	40	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	0.50
		Droughty	0.01	Droughty	0.01		

Selected Soil Interpretations–Erath County, Texas							
Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
FhC2—Fairy-Hico complex, 1 to 5 percent slopes, moderately eroded							
Fairy, moderately eroded	45	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Seepage	1.00
		Seepage, porous bedrock	0.50			Slope	0.32
		Too steep for surface application	0.08				
Hico, moderately eroded	35	Not limited		Not limited		Very limited	
						Seepage	1.00
						Slope	0.08
HwD3—Hico and Windthorst sandy clay loams, 1 to 8 percent slopes, severely eroded							
Hico, severely eroded	50	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.96	Slow water movement	0.96	Seepage	0.50
		Too steep for surface application	0.08			Slope	0.32
Windthorst, severely eroded	40	Somewhat limited		Somewhat limited		Very limited	
		Slow water movement	0.96	Slow water movement	0.96	Depth to soft bedrock	1.00
		Depth to bedrock	0.18	Depth to bedrock	0.18	Slope	0.08
		Too acid	0.08	Shallow to densic materials	0.18		
		Droughty	0.03	Too acid	0.08		
				Droughty	0.03		
NdC—Nimrod fine sand, 0 to 5 percent slopes							
Nimrod, fine sand	75	Very limited		Very limited		Very limited	
		Filtering capacity	1.00	Filtering capacity	1.00	Seepage	1.00
		Depth to saturated zone	0.95	Depth to saturated zone	0.95	Depth to saturated zone	0.44
		Slow water movement	0.37	Slow water movement	0.37		

Selected Soil Interpretations–Erath County, Texas							
Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SdC—Selden fine sand, 1 to 5 percent slopes							
Selden, fine sand	85	Somewhat limited		Somewhat limited		Very limited	
		Depth to saturated zone	0.99	Depth to saturated zone	0.99	Depth to saturated zone	1.00
		Slow water movement	0.37	Slow water movement	0.37		
WkA—Hassee fine sandy loam, thick surface, 0 to 2 percent slopes							
Hassee	80	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	0.50
WnC—Windthorst loamy fine sand, 1 to 5 percent slopes							
Windthorst	90	Very limited		Very limited		Somewhat limited	
		Filtering capacity	1.00	Filtering capacity	1.00	Seepage	0.50
		Slow water movement	0.37	Slow water movement	0.37	Slope	0.08
		Too acid	0.08	Too acid	0.08		
WoB2—Windthorst fine sandy loam, 1 to 5 percent slopes, moderately eroded							
Windthorst, moderately eroded	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.37	Slow water movement	0.37	Depth to soft bedrock	0.77
		Too acid	0.08	Too acid	0.08	Seepage	0.50

Data Source Information

Soil Survey Area: Erath County, Texas
Survey Area Data: Version 20, Sep 5, 2023

Selected Soil Interpretations

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Report—Selected Soil Interpretations

Selected Soil Interpretations–Erath County, Texas							
Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BdC—Bolar-Denton complex 3 to 5 percent slopes							
Bolar	55	Somewhat limited		Somewhat limited		Very limited	
		Seepage, porous bedrock	0.50	Slow water movement	0.37	Depth to hard bedrock	1.00
		Slow water movement	0.37	Depth to bedrock	0.07	Seepage	0.50
		Too steep for surface application	0.08			Slope	0.32
		Depth to bedrock	0.07				
Denton	35	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Depth to hard bedrock	1.00
		Droughty	0.44	Droughty	0.44	Seepage	0.50
		Depth to bedrock	0.01	Depth to bedrock	0.01	Slope	0.08
CrB—Crawford silty clay, 1 to 3 percent slopes							
Crawford	85	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	0.65	Depth to bedrock	0.65	Seepage	0.18
		Droughty	0.65	Droughty	0.65		
		Seepage, porous bedrock	0.50				

Selected Soil Interpretations–Erath County, Texas							
Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CtB—Clairette-Hassee very fine sandy loams, 1 to 3 percent slopes							
Clairette, very fine sandy loam	50	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.37	Slow water movement	0.37	Seepage	0.50
		Too acid	0.08	Too acid	0.08		
Hassee, very fine sandy loam	40	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	0.50
		Droughty	0.01	Droughty	0.01		
DIC—Duffau loamy fine sand, 1 to 5 percent slopes							
Duffau	85	Very limited		Very limited		Somewhat limited	
		Filtering capacity	1.00	Filtering capacity	1.00	Seepage	0.50
						Slope	0.08
FriA—Frio silty clay, 0 to 1 percent slopes, occasionally flooded							
Frio, occasionally flooded	85	Somewhat limited		Very limited		Very limited	
		Flooding	0.60	Flooding	1.00	Flooding	1.00
		Slow water movement	0.37	Slow water movement	0.37		
		Seepage, porous bedrock	0.30				
GrB—Granbury very fine sandy loam, 1 to 5 percent slopes							
Granbury, very fine sandy loam	85	Somewhat limited		Somewhat limited		Very limited	
		Droughty	0.97	Droughty	0.97	Depth to hard bedrock	1.00
		Depth to bedrock	0.94	Depth to bedrock	0.94	Seepage	0.21
		Slow water movement	0.37	Slow water movement	0.37		
		Too acid	0.21	Too acid	0.21		

Selected Soil Interpretations–Erath County, Texas							
Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
HoB—Slidell clay, 1 to 3 percent slopes							
Slidell	85	Very limited		Very limited		Not limited	
		Slow water movement	1.00	Slow water movement	1.00		
Ma—Maloterre gravelly clay loam, 1 to 8 percent slopes							
Maloterre	80	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Droughty	1.00	Droughty	1.00	Slope	0.68
		Seepage, porous bedrock	0.50			Seepage	0.21
		Too steep for surface application	0.32				
PcB—Purves clay, 1 to 3 percent slopes							
Purves	89	Very limited		Very limited		Very limited	
		Droughty	1.00	Droughty	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00		
		Slow water movement	1.00	Slow water movement	1.00		
		Seepage, porous bedrock	0.50				
PcC—Purves clay, 3 to 5 percent slopes							
Purves	89	Very limited		Very limited		Very limited	
		Droughty	1.00	Droughty	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	0.32
		Slow water movement	1.00	Slow water movement	1.00		
		Seepage, porous bedrock	0.50				
		Too steep for surface application	0.08				

Selected Soil Interpretations–Erath County, Texas							
Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Pd—Purves-Dugout-Maloterre complex, 1 to 20 percent slopes							
Purves, stony clay	37	Very limited		Very limited		Very limited	
		Droughty	1.00	Droughty	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	0.08
		Slow water movement	1.00	Slow water movement	1.00		
		Large stones on the surface	1.00	Large stones on the surface	1.00		
		Seepage, porous bedrock	0.50				
Dugout, gravelly clay loam	25	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Droughty	1.00	Droughty	1.00	Slope	0.68
		Seepage, porous bedrock	0.50	Slow water movement	0.37	Seepage	0.21
		Slow water movement	0.37				
		Too steep for surface application	0.32				
Maloterre, gravelly clay loam	22	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	0.32
		Droughty	1.00	Droughty	1.00		
		Seepage, porous bedrock	0.50				
		Too steep for surface application	0.08				
WoB2—Windthorst fine sandy loam, 1 to 5 percent slopes, moderately eroded							
Windthorst, moderately eroded	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.37	Slow water movement	0.37	Depth to soft bedrock	0.77
		Too acid	0.08	Too acid	0.08	Seepage	0.50

Data Source Information

Soil Survey Area: Erath County, Texas
Survey Area Data: Version 20, Sep 5, 2023

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Report—Selected Soil Interpretations

Selected Soil Interpretations–Erath County, Texas

Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BdC—Bolar-Denton complex 3 to 5 percent slopes							
Bolar	55	Somewhat limited		Somewhat limited		Very limited	
		Seepage, porous bedrock	0.50	Slow water movement	0.37	Depth to hard bedrock	1.00
		Slow water movement	0.37	Depth to bedrock	0.07	Seepage	0.50
		Too steep for surface application	0.08			Slope	0.32
		Depth to bedrock	0.07				
Denton	35	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Depth to hard bedrock	1.00
		Droughty	0.44	Droughty	0.44	Seepage	0.50
		Depth to bedrock	0.01	Depth to bedrock	0.01	Slope	0.08
DeB—Denton silty clay, 1 to 3 percent slopes							
Denton	85	Very limited		Very limited		Somewhat limited	
		Slow water movement	1.00	Slow water movement	1.00	Seepage	0.50
		Seepage, porous bedrock	0.50			Depth to hard bedrock	0.26
HoB—Slidell clay, 1 to 3 percent slopes							
Slidell	85	Very limited		Very limited		Not limited	
		Slow water movement	1.00	Slow water movement	1.00		

Selected Soil Interpretations–Erath County, Texas							
Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ma—Maloterre gravelly clay loam, 1 to 8 percent slopes							
Maloterre	80	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Droughty	1.00	Droughty	1.00	Slope	0.68
		Seepage, porous bedrock	0.50			Seepage	0.21
		Too steep for surface application	0.32				
PcB—Purves clay, 1 to 3 percent slopes							
Purves	89	Very limited		Very limited		Very limited	
		Droughty	1.00	Droughty	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00		
		Slow water movement	1.00	Slow water movement	1.00		
		Seepage, porous bedrock	0.50				
PcC—Purves clay, 3 to 5 percent slopes							
Purves	89	Very limited		Very limited		Very limited	
		Droughty	1.00	Droughty	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	0.32
		Slow water movement	1.00	Slow water movement	1.00		
		Seepage, porous bedrock	0.50				
		Too steep for surface application	0.08				

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Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Pd—Purves-Dugout-Maloterre complex, 1 to 20 percent slopes							
Purves, stony clay	37	Very limited		Very limited		Very limited	
		Droughty	1.00	Droughty	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	0.08
		Slow water movement	1.00	Slow water movement	1.00		
		Large stones on the surface	1.00	Large stones on the surface	1.00		
		Seepage, porous bedrock	0.50				
Dugout, gravelly clay loam	25	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Droughty	1.00	Droughty	1.00	Slope	0.68
		Seepage, porous bedrock	0.50	Slow water movement	0.37	Seepage	0.21
		Slow water movement	0.37				
		Too steep for surface application	0.32				
Maloterre, gravelly clay loam	22	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	0.32
		Droughty	1.00	Droughty	1.00		
		Seepage, porous bedrock	0.50				
		Too steep for surface application	0.08				

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Report—Selected Soil Interpretations

Selected Soil Interpretations–Erath County, Texas							
Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
FhC2—Fairy-Hico complex, 1 to 5 percent slopes, moderately eroded							
Fairy, moderately eroded	45	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Seepage	1.00
		Seepage, porous bedrock	0.50			Slope	0.32
		Too steep for surface application	0.08				
Hico, moderately eroded	35	Not limited		Not limited		Very limited	
						Seepage	1.00
						Slope	0.08
Go—Gowen clay loam, occasionally flooded							
Gowen	90	Somewhat limited		Very limited		Very limited	
		Flooding	0.60	Flooding	1.00	Flooding	1.00
						Seepage	0.50

Selected Soil Interpretations--Erath County, Texas							
Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
WkA—Hassee fine sandy loam, thick surface, 0 to 2 percent slopes							
Hassee	80	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	0.50
WoB—Windthorst very fine sandy loam, 1 to 5 percent slopes							
Windthorst, very fine sandy loam	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.37	Slow water movement	0.37	Depth to soft bedrock	0.77
		Too acid	0.08	Too acid	0.08	Seepage	0.50
WoB2—Windthorst fine sandy loam, 1 to 5 percent slopes, moderately eroded							
Windthorst, moderately eroded	85	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.37	Slow water movement	0.37	Depth to soft bedrock	0.77
		Too acid	0.08	Too acid	0.08	Seepage	0.50

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		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BcC2—Wise clay loam, 3 to 5 percent slopes, moderately eroded							
Wise, moderately eroded	85	Somewhat limited		Somewhat limited		Very limited	
		Depth to bedrock	0.80	Depth to bedrock	0.80	Depth to soft bedrock	1.00
		Droughty	0.17	Shallow to densic materials	0.79	Seepage	0.50
		Too steep for surface application	0.08	Droughty	0.17	Slope	0.32
HoB—Slidell clay, 1 to 3 percent slopes							
Slidell	85	Very limited		Very limited		Not limited	
		Slow water movement	1.00	Slow water movement	1.00		
Ma—Maloterre gravelly clay loam, 1 to 8 percent slopes							
Maloterre	80	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Droughty	1.00	Droughty	1.00	Slope	0.68
		Seepage, porous bedrock	0.50			Seepage	0.21
		Too steep for surface application	0.32				

Selected Soil Interpretations–Erath County, Texas							
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		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
PcB—Purves clay, 1 to 3 percent slopes							
Purves	89	Very limited		Very limited		Very limited	
		Droughty	1.00	Droughty	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00		
		Slow water movement	1.00	Slow water movement	1.00		
		Seepage, porous bedrock	0.50				
Pd—Purves-Dugout-Maloterre complex, 1 to 20 percent slopes							
Purves, stony clay	37	Very limited		Very limited		Very limited	
		Droughty	1.00	Droughty	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	0.08
		Slow water movement	1.00	Slow water movement	1.00		
		Large stones on the surface	1.00	Large stones on the surface	1.00		
		Seepage, porous bedrock	0.50				
Dugout, gravelly clay loam	25	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Droughty	1.00	Droughty	1.00	Slope	0.68
		Seepage, porous bedrock	0.50	Slow water movement	0.37	Seepage	0.21
		Slow water movement	0.37				
		Too steep for surface application	0.32				
Maloterre, gravelly clay loam	22	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	0.32
		Droughty	1.00	Droughty	1.00		
		Seepage, porous bedrock	0.50				
		Too steep for surface application	0.08				

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Report—Selected Soil Interpretations

Selected Soil Interpretations–Erath County, Texas							
Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BaA—Blanket clay loam, 0 to 1 percent slopes							
Blanket	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.37	Slow water movement	0.37	Seepage	0.50
BaB—Blanket clay loam, 1 to 3 percent slopes							
Blanket	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.37	Slow water movement	0.37	Seepage	0.50
Bu—Bunyan fine sandy loam, occasionally flooded							
Bunyan	80	Somewhat limited		Very limited		Very limited	
		Flooding	0.60	Flooding	1.00	Flooding	1.00
						Seepage	0.50

Selected Soil Interpretations–Erath County, Texas							
Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CtB—Clairette-Hassee very fine sandy loams, 1 to 3 percent slopes							
Clairette, very fine sandy loam	50	Somewhat limited		Somewhat limited		Somewhat limited	
		Slow water movement	0.37	Slow water movement	0.37	Seepage	0.50
		Too acid	0.08	Too acid	0.08		
Hassee, very fine sandy loam	40	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Seepage	0.50
		Droughty	0.01	Droughty	0.01		
GrB—Granbury very fine sandy loam, 1 to 5 percent slopes							
Granbury, very fine sandy loam	85	Somewhat limited		Somewhat limited		Very limited	
		Droughty	0.97	Droughty	0.97	Depth to hard bedrock	1.00
		Depth to bedrock	0.94	Depth to bedrock	0.94	Seepage	0.21
		Slow water movement	0.37	Slow water movement	0.37		
		Too acid	0.21	Too acid	0.21		
GrB2—Granbury very fine sandy loam, 1 to 5 percent slopes, moderately eroded							
Granbury, moderately eroded	85	Somewhat limited		Somewhat limited		Very limited	
		Droughty	0.97	Droughty	0.97	Depth to hard bedrock	1.00
		Depth to bedrock	0.94	Depth to bedrock	0.94	Seepage	0.21
		Slow water movement	0.37	Slow water movement	0.37		
		Too acid	0.21	Too acid	0.21		
MfB—May fine sandy loam, 1 to 3 percent slopes							
May, fine sandy loam	90	Not limited		Not limited		Very limited	
						Seepage	1.00

Selected Soil Interpretations–Erath County, Texas							
Map symbol and soil name	Pct. of map unit	AWM - Irrigation Disposal of Wastewater		AWM - Land Application of Municipal Sewage Sludge		ENG - Sewage Lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
WaB—Hassee fine sandy loam, 1 to 3 percent slopes							
Hassee	100	Very limited		Very limited		Very limited	
		Slow water movement	1.00	Slow water movement	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00		

Data Source Information

Soil Survey Area: Erath County, Texas
Survey Area Data: Version 20, Sep 5, 2023

May 15, 2024

1:9,028

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

Maxar

May 15, 2024

1:18,056

0 0.13 0.25 0.5 mi

0 0.2 0.4 0.8 km

Maxar

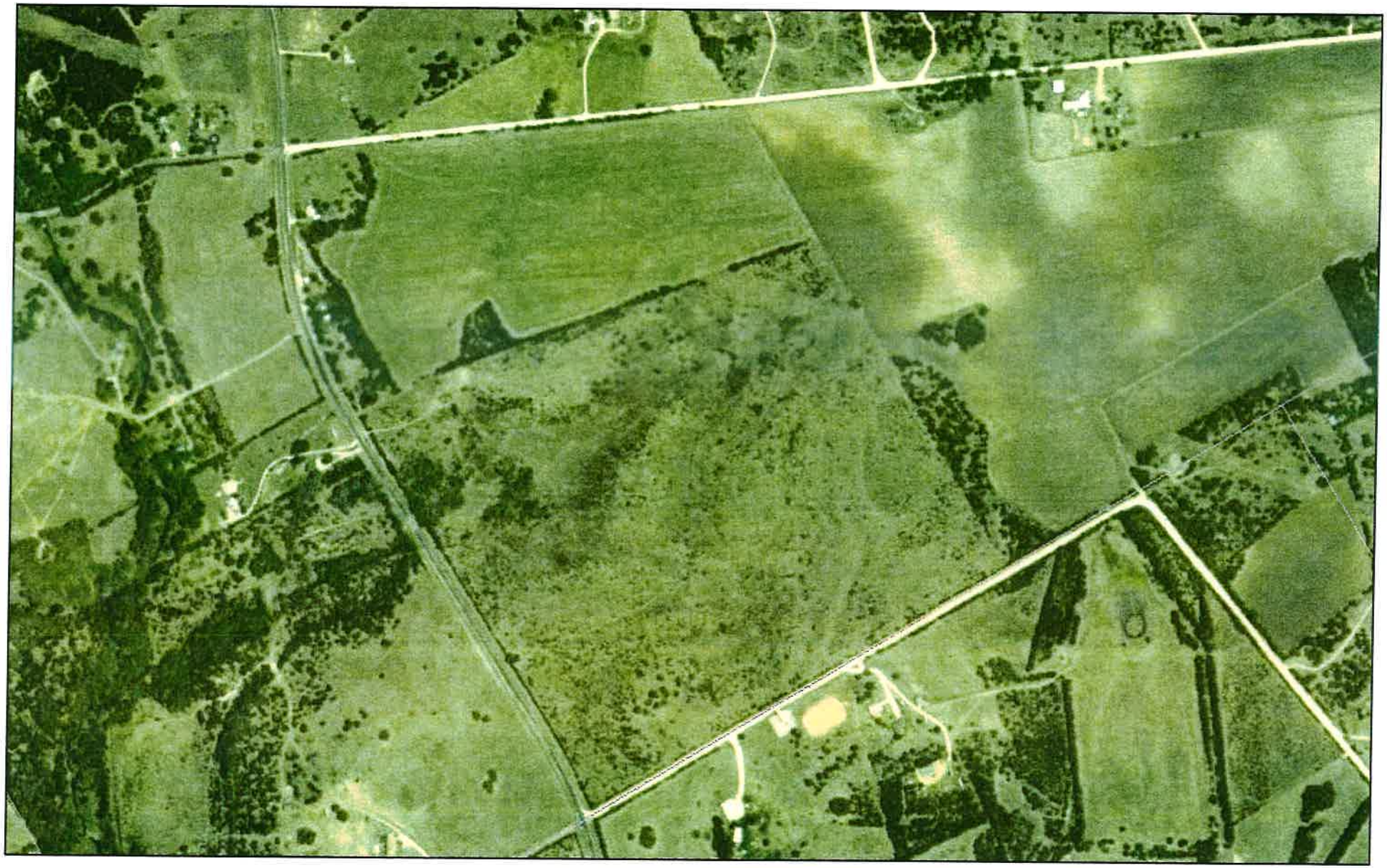
May 15, 2024

1:18,056

0 0.13 0.25 0.5 mi

0 0.2 0.4 0.8 km

Maxar



May 15, 2024

1:9,028

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

Maxar

May 15, 2024

1:9,028

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

Maxar

May 15, 2024

1:9,028

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

Maxar

Kuiper Cows -1

Texas Water
Development Board

May 15, 2024

0 0.075 0.15 0.3 mi
0 0.1 0.2 0.4 km
1:9,028

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Kuiper Cows -2

Texas Water Development Board

May 15, 2024

Plugging Reports
Well Reports
TWDB Groundwater

0 0.15 0.3 0.6 mi
0 0.25 0.5 1 km
1:18,056

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Kuiper Cows -3

Texas Water Development Board

May 15, 2024

Plugging Reports

Well Reports

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

1:18,056

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Kuiper Cows -4

Texas Water Development Board

May 15, 2024

Plugging Reports
TWDB Groundwater
Well Reports

0 0.075 0.15 0.3 mi
0 0.1 0.2 0.4 km
1:9,028

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Kuiper Cows -5

Texas Water Development Board

May 15, 2024

Plugging Reports

Well Reports

0 0.075 0.15 0.3 mi

0 0.1 0.2 0.4 km

1:9,028

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 23, 2009

91 7108 2133 3935 2159 9355

CERTIFIED MAIL

Kuiper #2 Dairy LLC
1865 Private Road 1233
Hico, Texas 76457-3537

Re: Well Buffer Exception Request, for Permit No. TXG921135, Kuiper#2 Dairy LLC, Erath County (CN 603187493; RN 102313244)

Dear Sir/Madame:

The Water Quality Assessment (WQA) Team has reviewed a well buffer exception request submitted on your behalf by Mr. Norman Mullin, PE (Enviro-Ag Engineering, Inc.) for two (2) onsite wells identified as Well #1 and Well #2, both installed in 1990. The request was signed and sealed by Mr. Mullin, PE. Mr. Mullen indicates in the request that the two wells do not have the required buffer zones maintained from the pens onsite. Protective measures identified by Mr. Mullin include: For Well #1, a 20-foot annular seal, the well is elevated relative to the surrounding area, and the well is covered by protective structure to prevent contact between the wellhead and waste/wastewater; for Well #2, the well has a 20-foot annular seal and is upgradient of the confinement pens.

The WQA Team approves the well buffer exception request for Well #1 and Well #2 provided all additional protective measures are maintained. Regular inspections around the wells shall be made in order to ensure that no runoff or wastes are encroaching upon the well head.

This approval letter and all supporting documentation must be kept on-site and made available to Texas Commission on Environmental Quality (TCEQ) personnel upon request. If you have any questions, please contact Mr. Andrew Gorton by phone at (512) 239-4686 or e-mail at agorton@tceq.state.tx.us.

Sincerely,

James M. Moore

James M. Moore, P.E., Section Manager
Water Quality Assessment Section; CAFO Permitting
Water Quality Division

JMM/AG/gv

cc: Mr. Norman Mullin, PE, Enviro-Ag Engineering, 3404 Airway Blvd., Amarillo, Texas 79118

Well 6

STATE OF TEXAS PLUGGING REPORT for Tracking #190867

Owner:	CLEMENS KUIPER	Owner Well #:	No Data
Address:	1865 PR 1233 HICO, TX 76457	Grid #:	31-56-8
Well Location:	CR 208 STEPHENVILLE, TX 76401	Latitude:	32° 09' 18.45" N
		Longitude:	098° 02' 38.84" W
Well County:	Erath	Elevation:	No Data
Well Type:	Withdrawal of Water		

Drilling Information

Company:	UNKNOWN	Date Drilled:	No Data
Driller:	No Data	License Number:	N/A

	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
Borehole:	4	0	460

Plugging Information

Date Plugged: 8/26/2019 Plugger: OWNER

Plug Method: Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet

Casing Left in Well:

Dia (in.)	Top (ft.)	Bottom (ft.)
4	3	460

Plug(s) Placed in Well:

Top (ft.)	Bottom (ft.)	Description (number of sacks & material)
4	10	Cement 1 Bags/Sacks
10	460	Bentonite 60 Bags/Sacks

Certification Data: The driller certified that the driller plugged this well (or the well was plugged 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 reports(s) being returned for completion and resubmittal.

Company Information: Landowner Plugged
1865 PR 1233
HICO, TX 76457

Driller Name: CLEMENS KUIPER License Number: N/A

Comments: DISINFECTED WELL WITH CHLORINE

Well 7

STATE OF TEXAS PLUGGING REPORT for Tracking #190866

Owner:	CLEMENS KUIPER	Owner Well #:	No Data
Address:	1865 PR 1233 HICO, TX 76457	Grid #:	31-56-8
Well Location:	CR 208 STEPHENVILLE, TX 76401	Latitude:	32° 09' 17.01" N
		Longitude:	098° 02' 37.9" W
Well County:	Erath	Elevation:	No Data
Well Type:	Withdrawal of Water		

Drilling Information

Company:	UNKNOWN	Date Drilled:	No Data
Driller:	No Data	License Number:	N/A

	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
Borehole:	4	0	90

Plugging Information

Date Plugged: 8/26/2019 Plugger: OWNER

Plug Method: Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet

Casing Left in Well:

Dia (in.)	Top (ft.)	Bottom (ft.)
4	4	90

Plug(s) Placed in Well:

Top (ft.)	Bottom (ft.)	Description (number of sacks & material)
4	10	Cement 1 Bags/Sacks
10	90	Bentonite 11 Bags/Sacks

Certification Data: The driller certified that the driller plugged this well (or the well was plugged 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 reports(s) being returned for completion and resubmittal.

Company Information: Landowner Plugged
1865 PR 1233
HICO, TX 76457

Driller Name: CLEMENS KUIPER License Number: N/A

Comments: DISINFECTED WELL WITH CHLORINE

Well 10

STATE OF TEXAS PLUGGING REPORT for Tracking #190865

Owner:	CLEMENS KUIPER	Owner Well #:	No Data
Address:	1865 PR 1233 HICO, TX 76457	Grid #:	31-56-9
Well Location:	CR 208 STEPHENVILLE, TX 76401	Latitude:	32° 09' 04.26" N
		Longitude:	098° 02' 11.44" W
Well County:	Erath	Elevation:	No Data

Well Type: **Withdrawal of Water**

Drilling Information

Company:	UNKNOWN	Date Drilled:	No Data
Driller:	No Data	License Number:	N/A

	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
Borehole:	4	0	65

Plugging Information

Date Plugged: 8/26/2019 Plugger: CLEMENS KUIPER

Plug Method: Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet

Casing Left in Well:

Dia (in.)	Top (ft.)	Bottom (ft.)
4	4	65

Plug(s) Placed in Well:

Top (ft.)	Bottom (ft.)	Description (number of sacks & material)
4	10	Cement 1 Bags/Sacks
10	65	Bentonite 8 Bags/Sacks

Certification Data: The driller certified that the driller plugged this well (or the well was plugged 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 reports(s) being returned for completion and resubmittal.

Company Information: **Landowner Plugged**
1865 PR 1233
HICO, TX 76457

Driller Name: CLEMENS KUIPER License Number: N/A

Comments: DISINFECTED WELL WITH CHLORINE

Well 15

STATE OF TEXAS WELL REPORT for Tracking #448995

Owner:	Kuiper Dairy	Owner Well #:	CM #6
Address:	1865 PR 1233 Hico, TX 76457	Grid #:	32-49-7
Well Location:	CR 539 Hico, TX 76457	Latitude:	32° 07' 34.1" N
		Longitude:	097° 59' 23.04" W
Well County:	Erath	Elevation:	No Data
Type of Work:	New Well	Proposed Use:	Irrigation

Drilling Start Date: **7/12/2016** Drilling End Date: **7/13/2016**

Borehole:	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
	14	0	5
	11	5	708

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:	Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
	250	708	Gravel	1/8

Annular Seal Data: **No Data**

Seal Method: **Pumped**

Sealed By: **Driller**

Distance to Property Line (ft.): **75**

Distance to Septic Field or other concentrated contamination (ft.): **n/a**

Distance to Septic Tank (ft.): **n/a**

Method of Verification: **Customer verified**

Surface Completion: **Surface Sleeve Installed** **Surface Completion by Driller**

Water Level: **500 ft.** below land surface on **2016-07-13**

Packers: **No Data**

Type of Pump: **Submersible** Pump Depth (ft.): **680**

Well Tests: **Jetted** **Yield: 70+ GPM after 1 hours, no drawdown specified**

	Strata Depth (ft.)	Water Type
Water Quality:	385 - 695	Second Trinity

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: **Associated Well Services, Inc.**

PO Box 16
Stephenville, TX 76401

Driller Name: **Russell Langford** License Number: **56062**

Comments: **~DG 05/15/2017**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	5	Brown Clay
5	25	Wet Caliche
25	110	Gray Clay, Shale & Limestone
110	195	Gray Sandy Clay & Limestone
195	385	Gray Clay, Shale & Limestone
385	455	Blue Sandy Clay & Sand
455	465	Red & Blue Clay
465	568	Sand, Sandstone & Gravel
568	587	Red Clay
587	625	Sand & Gravel
625	637	Red Clay
637	680	Sand & Gravel
680	708	Yellow Clay & Shale

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
6	Blank	New Plastic (PVC)	SDR 17	0	508
6	Screen	New Plastic (PVC)	SDR 17 0.032	508	708

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

Well 16

STATE OF TEXAS WELL REPORT for Tracking #448993

Owner:	Kuiper Dairy	Owner Well #:	No Data
Address:	1865 PR 1233 Hico, TX 76457	Grid #:	32-57-1
Well Location:	CR 539 - CM #5 Hico, TX 76457	Latitude:	32° 07' 29" N
		Longitude:	097° 59' 19" W
Well County:	Erath	Elevation:	No Data
Type of Work:	New Well	Proposed Use:	Irrigation

Drilling Start Date: **7/14/2016** Drilling End Date: **7/15/2016**

	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
Borehole:	14	0	8
	11	8	692

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
Filter Pack Intervals:	240	692	Gravel	1/8

	Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
Annular Seal Data:	0	10	Cement 10 Bags/Sacks
	10	240	Bentonite 21 Bags/Sacks

Seal Method: **Pumped**

Sealed By: **Driller**

Distance to Property Line (ft.): **70**

Distance to Septic Field or other concentrated contamination (ft.): **n/a**

Distance to Septic Tank (ft.): **n/a**

Method of Verification: **Customer verified**

Surface Completion: **Surface Sleeve Installed** **Surface Completion by Driller**

Water Level: **500 ft.** below land surface on **2016-07-15**

Packers: **No Data**

Type of Pump: **Submersible**

Pump Depth (ft.): **670**

Well Tests: **Jetted** **Yield: 70+ GPM after 1 hours, no drawdown specified**

	Strata Depth (ft)	Water Type
Water Quality:	385 - 677	**Second Trinity**

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: **Associated Well Services, Inc.**

PO Box 16
Stephenville, TX 76401

Driller Name: **Russell Langford** License Number: **56062**

Comments: **~DG 05/15/2017**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	5	Brown Clay
5	25	Caliche
25	110	Gray Clay, Shale & Limestone
110	195	Gray Clay & Limestone
195	385	Gray Clay, Shale & Limestone
385	455	Blue Sandy Clay & Sand
455	465	Red & Blue Clay
465	565	Sand, Sandstone & Gravel
565	587	Red Clay
587	625	Sand & Gravel
625	637	Red Clay
637	677	Sand & Gravel
677	692	Yellow Clay & Shale

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
6	Blank	New Plastic (PVC)	SDR 17	0	492
6	Screen	New Plastic (PVC)	SDR 17 0.032	492	692

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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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

Well 17

STATE OF TEXAS WELL REPORT for Tracking #459405

Owner:	Kuiper Dairy	Owner Well #:	No Data
Address:	1865 PR 1233 Hico, TX 76457	Grid #:	32-57-1
Well Location:	CR 539- CM#4 Hico, TX 76457	Latitude:	32° 07' 12" N
		Longitude:	097° 59' 12" W
Well County:	Erath	Elevation:	No Data
Type of Work:	New Well	Proposed Use:	Irrigation

Drilling Start Date: **7/18/2016** Drilling End Date: **7/19/2016**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	14	0	5
	11	5	672

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	260	672	Gravel	12/201/8

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	0	10	Cement 10 Bags/Sacks

Seal Method: **Pumped**

Sealed By: **Driller**

Distance to Property Line (ft.): **75**

Distance to Septic Field or other concentrated contamination (ft.): **No Data**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Customer Verified**

Surface Completion: **Surface Sleeve Installed**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **Submersible**

Pump Depth (ft.): **650**

Well Tests: **jetted/estimate** **Yield: 70+ GPM after 1 hours, no drawdown specified**

	Strata Depth (ft.)	Water Type
Water Quality:	395 - 655	Second Trinity

Chemical Analysis Made: No

Did the driller knowingly penetrate any strata which contained injurious constituents?: No

The driller did certify that while drilling, deepening or otherwise altering the above described well, injurious water or constituents was encountered and the landowner or person having the well drilled was informed that such well must be completed or plugged in such a manner as to avoid injury or pollution.

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: **Associated Well Services, Inc.**

PO Box 16
Stephenville, TX 76401

Driller Name: **Russell Langford** License Number: **56062**

Comments: **Drawdown for water test is "unknown"**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	5	Brown Clay
5	22	Tan Clay, Shale, and Limestone
22	110	Grey Clay, Shale, and Limestone
110	205	Grey Sandy Clay and Sand
205	395	Grey Clay, Shale, and Limestone
395	525	Blue Sandy Clay, Sand, and Gravel
525	552	Blue and Red Clay
552	585	Shale, Gravel, and Sandstone
585	593	Red Clay
593	655	Sand, Gravel, and Sandstone
655	672	Yellow Clay

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
6	Blank	New Plastic (PVC)	40	0	472
6	Screen	New Plastic (PVC)	40	472	672

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

Well 13

STATE OF TEXAS WELL REPORT for Tracking #459732

Owner:	Kuiper Dairy	Owner Well #:	No Data
Address:	1865 PR 1233 Hico, TX 76457	Grid #:	32-57-1
Well Location:	CR 539-CM#3 Hico, TX 76457	Latitude:	32° 07' 10" N
		Longitude:	097° 59' 06" W
Well County:	Erath	Elevation:	No Data
Type of Work:	New Well	Proposed Use:	Irrigation

Drilling Start Date: **7/20/2016** Drilling End Date: **7/21/2016**

Borehole:	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
	14	0	5
	11	5	668

Drilling Method: **Air Rotary**

Borehole Completion: **Gravel Packed**

Filter Pack Intervals:	Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
	260	668	Gravel	1/8

Annular Seal Data:	Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
	0	10	Benseal Bags/Sacks
	10	260	Benseal Bags/Sacks

Seal Method: **Pumped**

Sealed By: **Driller**

Distance to Property Line (ft.): **100**

Distance to Septic Field or other concentrated contamination (ft.): **N/A**

Distance to Septic Tank (ft.): **N/A**

Method of Verification: **Customer Verified**

Surface Completion: **Surface Sleeve Installed** **Surface Completion by Driller**

Water Level: **470 ft.** below land surface on **2016-07-21**

Packers: **No Data**

Type of Pump: **Submersible** Pump Depth (ft.): **650**

Well Tests: **Jetted** **Yield: 70+ GPM with Unknow ft. drawdown after 1 hours**

	Strata Depth (ft.)	Water Type
Water Quality:	365 - 655	Second Trinity

Chemical Analysis Made: No

Did the driller knowingly penetrate any strata which contained injurious constituents?: No

The driller did certify that while drilling, deepening or otherwise altering the above described well, injurious water or constituents was encountered and the landowner or person having the well drilled was informed that such well must be completed or plugged in such a manner as to avoid injury or pollution.

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: **Associated Well Services, Inc.**

PO Box 16
Stephenville, TX 76401

Driller Name: **Russell Langford** License Number: **56062**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	2	Topsoil
2	17	Tan Clay, Shale, and Limestone
17	102	Grey Clay, Shale, and Linestone
102	195	Grey Sandy Clay, and Sand
195	365	Grey Sandy Clay, Shale and Linestone
365	455	Blue Sandy Clay, Sand, And Gravel
455	465	Red Clay
465	545	Blue Sandy Clay, Sand, and Gravel
545	562	Red Clay
562	655	Sand and Gravel
655	668	Yellow Clay

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
6	Blank	New Plastic (PVC)	40	0	468
6	Screen	New Plastic (PVC)	40	468	668

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

Well 19

STATE OF TEXAS PLUGGING REPORT for Tracking #158104

Owner:	CLEMENS KUIPER	Owner Well #:	No Data
Address:	165 PR 1233 HICO, TX 76457	Grid #:	32-57-1
Well Location:	CR 539 HICO, TX 76457	Latitude:	32° 07' 08.76" N
		Longitude:	097° 59' 04.74" W
Well County:	Erath	Elevation:	No Data

Well Type: **Withdrawal of Water**

Drilling Information

Company:	No Data	Date Drilled:	No Data
Driller:	No Data	License Number:	UNKNOWN

	Diameter (in)	Top Depth (ft.)	Bottom Depth (ft.)
Borehole:	4	0	20

Plugging Information

Date Plugged: **3/2/2016** Plugger: **LAND OWNER**

Plug Method: **Pour In 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

Dia (in.)	Top (ft)	Bottom (ft.)
4	0	20

Plug(s) Placed in Well:

Top (ft.)	Bottom (ft.)	Description (number of sacks & material)
5	20	Bentonite 1.5 Bags/Sacks

Certification Data: The driller certified that the driller plugged this well (or the well was plugged 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 reports(s) being returned for completion and resubmittal.

Company Information: **Landowner Plugged**
165 PR 1233
HICO, TX 76457

Driller Name: **CLEMENS KUIPER** License Number: **N/A**

Comments: **Old windmill. Well casing collapsed at 20'. No water present.**

Well 20

STATE OF TEXAS WELL REPORT for Tracking #361566

Owner:	**Kupier Dairy**	Owner Well #:	**Well Log 3084**
Address:	**1865 PR 1233 Hico, TX 76457**	Grid #:	**32-57-1**
Well Location:	**CR 203 Well #2 Chalk Mountain, TX 76649**	Latitude:	**32° 07' 00" N**
		Longitude:	**097° 58' 57" W**
Well County:	**Erath**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Irrigation**

Drilling Start Date: **3/19/2014** Drilling End Date: **3/21/2014**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	11	0	675

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
Filter Pack Intervals:	320	675	Gravel	1/4

	Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
Annular Seal Data:	0	15	7 Portland
	15	320	33 Benseal

Seal Method: **Pumped**

Sealed By: **Driller**

Distance to Property Line (ft.): **50**

Distance to Septic Field or other concentrated contamination (ft.): **>100**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Customer Verified**

Surface Completion: **Surface Sleeve Installed**

Water Level: **450 ft.** below land surface on **2014-03-21** Measurement Method: **Unknown**

Packers: **None**

Type of Pump: **Submersible** Pump Depth (ft.): **640**

Well Tests: **Jetted** **Yield: 60+ GPM after 2 hours, no drawdown specified**

	Strata Depth (ft.)	Water Type
Water Quality:	382-668	2nd Trinity

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: Associated Well Services, Inc

PO Box 16
Stephenville, TX 76401

Driller Name: Colton Aardal License Number: 55034

Comments: ^EAD

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	3	topsoil
3	25	caliche
25	110	limestone, gray shale, and gray clay
110	180	sand and sandy clay
180	382	limestone, gray shale, and gray clay
382	404	sandy gray clay and gray shale w/limestone streaks
404	470	sand, sandy blue clay, and gray shale layers
470	480	blue and gray clay w/steaks of red clay
480	510	sandy blue clay, sand and streaks of red clay
510	539	sand and gravel
539	580	red clay w/sandy blue clay layers
580	610	red and blue clay w/streaks of sandy stone
610	635	sandy blue clay, sandstone, and sand layers
635	655	sand and gravel

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
6"	New	Blank PVC	0'-495' SDR 17
6"	New	0.032" PVC Screen	495'-555' SDR 17
6"	New	Blank PVC	555'-575' SDR 17
6"	New	0.032" PVC Screen	575'-675' SDR 17

655	668	sandy blue clay and sandstone
668	675	yellow shale

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

Well 21

STATE OF TEXAS PLUGGING REPORT for Tracking #94281

Owner:	**Clements Kuiper**	Owner Well #:	1
Address:	**1865 PR 1233 Hico, TX 76457**	Grid #:	**32-57-1**
Well Location:	**CR 203 Well 1 Chalk Mountain, TX 76649**	Latitude:	**32° 06' 55" N**
		Longitude:	**097° 58' 57" W**
Well County:	**Erath**	Elevation:	**No Data**

Well Type: **Withdrawal of Water**

Drilling Information

Company:	**No Data**	Date Drilled:	**3/19/2014**
Driller:	**Colton Aardal**	License Number:	**55304**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**11**		**690**

Plugging Information

Date Plugged: **4/22/2014** Plugger: **Paul Taylor**

Plug Method: **Tremmie pipe bentonite from bottom to 2 feet from surface, cement top 2 feet**

Casing Left in Well:

Dia (in.)	*Top (ft.)*	*Bottom (ft.)*
4	**2**	**200**

Plug(s) Placed in Well:

Top (ft.)	*Bottom (ft.)*	*Description (number of sacks & material)*
0	**2**	**1**
2	**200**	**6**

Certification Data: The driller certified that the driller plugged this well (or the well was plugged 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 reports(s) being returned for completion and resubmittal.

Company Information: **Associated Well Services, Inc**

PO Box 16
Stephenville, TX 76401

Driller Name: **Paul Taylor** License Number: **59026**

Comments: **^EAD**

Well 22

STATE OF TEXAS WELL REPORT for Tracking #361568

Owner:	Kupier Dairy	Owner Well #:	Well Log 3083
Address:	1865 PR 1233 Hico, TX 76457	Grid #:	32-57-1
Well Location:	CR 203 Well #1 Chalk Mountain, TX 76649	Latitude:	32° 06' 54" N
		Longitude:	097° 58' 56" W
Well County:	Erath	Elevation:	No Data
Type of Work:	New Well	Proposed Use:	Irrigation

Drilling Start Date: **3/18/2014** Drilling End Date: **3/19/2014**

	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
Borehole:	11	0	690

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
Filter Pack Intervals:	330	690	Gravel	1/4"

	Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
Annular Seal Data:	0	15	6 Portland
	15	330	34 Benseal

Seal Method: **Pumped**

Sealed By: **Driller**

Distance to Property Line (ft.): **40**

Distance to Septic Field or other concentrated contamination (ft.): **>100**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Customer Verified**

Surface Completion: **Surface Sleeve Installed**

Water Level: **440 ft.** below land surface on **2014-03-19** Measurement Method: **Unknown**

Packers: **None**

Type of Pump: **Submersible** Pump Depth (ft.): **640**

Well Tests: **Jetted** **Yield: 60+ GPM after 2 hours, no drawdown specified**

	Strata Depth (ft.)	Water Type
Water Quality:	390-675	2nd Trinity

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: Associated Well Services, Inc

PO Box 16
Stephenville, TX 76401

Driller Name: Colton Aardal License Number: 55034

Comments: ^EAD

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	2	topsoil
2	19	caliche
19	110	gray shale, limestone, and gray clay
110	215	sand and sandy gray clay
215	390	limestone, gray shale, and gray clay
390	460	sandy gray clay and gray shale w/sand streaks
460	500	sandy blue clay and sand w/steaks of red clay
500	545	sand gravel
545	595	red clay and blue sandy clay
595	630	sandy blue clay and sand
630	675	sand, gravel, sandstone, and sandy blue clay layers
675	690	yellow shale

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
6"	New	Blank PVC	0'-490' SDR 17
6"	New	0.032" PVC Screen	490'-550' SDR 17
6"	New	Blank PVC	550'-590' SDR 17
6"	New	0.032" PVC Screen	590'-690' SDR 17

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

Well 25

STATE OF TEXAS PLUGGING REPORT for Tracking #41054

Owner:	Gary Watson	Owner Well #:	No Data
Address:	11937 FM 3025 Stphenville, TX 76401	Grid #:	31-64-5
Well Location:	2278 CR 236 Hico, TX	Latitude:	32° 03' 37" N
		Longitude:	098° 02' 37" W
Well County:	Erath	Elevation:	No Data

Well Type: **Withdrawal of Water**

Drilling Information

Company:	No Data	Date Drilled:	No Data
Driller:	No Data	License Number:	No Data

	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
Borehole:	6.75		400

Plugging Information

Date Plugged: **7/25/2007** Plugger: **Russell Langford**

Plug Method: **Tremmie pipe bentonite from bottom to 2 feet from surface, cement top 2 feet**

Casing Left in Well:

Dia (in.)	Top (ft.)	Bottom (ft.)
4	0	400

Plug(s) Placed in Well:

Top (ft.)	Bottom (ft.)	Description (number of sacks & material)
0	2	Cement
2	400	14 EZ Seal

Certification Data: The driller certified that the driller plugged this well (or the well was plugged 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 reports(s) being returned for completion and resubmittal.

Company Information: **Associated Well Services**

PO Box 16
Stephenville, TX 76401

Driller Name: **Rullell Langford** License Number: **56062**

Comments: **No Data**

STATE OF TEXAS WELL REPORT for Tracking #317336

Owner:	**Billie Little**	Owner Well #:	**1**
Address:	**132 Partridge Way Odessa, TX 79761**	Grid #:	**31-56-9**
Well Location:	**Off CR 2481 Stephenville, TX 76401**	Latitude:	**32° 08' 34" N**
		Longitude:	**098° 01' 24" W**
Well County:	**Erath**	Elevation:	**No Data**
Type of Work:	**Replacement**	Proposed Use:	**Stock**

Drilling Start Date: **4/18/2013** Drilling End Date: **4/18/2013**

Borehole:

Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
7.875	0	20
7	20	120

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
50	120	Gravel	Torpedo

Annular Seal Data:

Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
0	50	6-Portland

Seal Method: **Mixed**

Sealed By: **Joe Rileyand Justin Borchardt**

Distance to Property Line (ft.): **500+**

Distance to Septic Field or other concentrated contamination (ft.): **None**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Sight**

Surface Completion: **Surface Sleeve Installed**

Water Level: **55 ft.** below land surface on **2013-04-18** Measurement Method: **Unknown**

Packers: **No Data**

Type of Pump: **Submersible** Pump Depth (ft.): **105**

Well Tests: **Bailer** **Yield: 25 GPM with 10 ft. drawdown after 1 hours**

Water Quality:	Strata Depth (ft.)	Water Type
	No Data	Prarie

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: **Riley Drilling**
961 Mockingbird
Stephenville, TX 76401

Driller Name: **Joe Riley** License Number: **2196**

Apprentice Name: **Justin Borchardt** Apprentice Number: **57762**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	4	Black Clay
4	29	Caliche and Rock Layers
29	58	Blue Sandy Shale
58	80	Water Sand
80	84	Hard Rock
84	113	water sand
113	120	Limestone

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4-N-PVC-SCH-40 0-60 Blank			
4-N-PVC-SCH-40 MFG Screen-60--100.-.035			
4-N-PVC-SCH-40-Blank-100-120			

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

Well #30

TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Aquifer KTP Field No. _____ State Well No. 31-64-604

Owner's Well No. _____ County ERATH

1. Location: ____ 1/4, ____ 1/4 Sec. _____, Block _____ Survey _____
2 miles S. of Duffau, Texas

2. Owner: Bob ELLIS Address: Duffau, Texas

Tenant: _____ Address: _____

Driller: Hester Drilling Co. Address: 604 N. Camden, Dublin, Tex.

3. Elevation of _____ is 1090 ft. above msl, determined by Topo

4. Drilled: 8-25 19 72; Dug, Cable Tool (Rotary)

5. Depth: Rept. 470 ft. Meas. _____ ft.

6. Completion: Open Hole, (Straight Wall), Underreamed, Gravel Packed

7. Pump: Mfgr. RANDOLPH Type Turbine

No. Stages ____, Bowls Diam. ____ in., Setting ____ ft.

Column Diam. _____ in., Length Tailpipe _____ ft.

8. Motor: Fuel Butane Make & Model _____ HP. 100

9. Yield: Flow ____ gpm, Pump ____ gpm, Meas., Rept., Est.

10. Performance Test: Date 8-25-72 Length of Test 72 hrs. Made by Driller

Static Level 300 ft. Pumping Level 300 ft. Drawdown 0 ft.

Production 1000 gpm Specific Capacity _____ gpm/ft.

11. Water Level: 300.0 ft. (Rept.) meas. 8-25 19 72 (below) 450 By Driller which is ____ ft. above below surface.

UTM ft. rept. meas. 8-24 19 73 above below which is ____ ft. above below surface.

_____ ft. rept. meas. _____ 19 ___ above below which is ____ ft. above below surface.

_____ ft. rept. meas. _____ 19 ___ above below which is ____ ft. above below surface.

12. Use: Dom., Stock, Public Supply, Ind. (Irr.), Waterflooding, Observation, Not Used, _____

13. Quality: (Remarks on taste, odor, color, etc.) _____

Temp. ___ °F, Date sampled for analysis _____ Laboratory _____

Temp. ___ °F, Date sampled for analysis _____ Laboratory _____

Temp. ___ °F, Date sampled for analysis _____ Laboratory _____

14. Other data available as circled: (Electric) Driller's Log, Radioactivity Log, Electric Log,

Formation Samples, Pumping Test, _____

15. Record by: GENE DAVIS Date 7-24 19 73

Source of Data DL, WWR & OBS.

16. Remarks: _____

CASING & BLANK PIPE

Cemented From ____ ft. to ____ ft.

Diam. (in.)	Type	Setting, ft. from	to
12¼	Steel	0	470

WELL SCREEN

Screen Openings Slotted

Diam. (in.)	Type	Setting, ft. from	to
12½	Steel	300	470

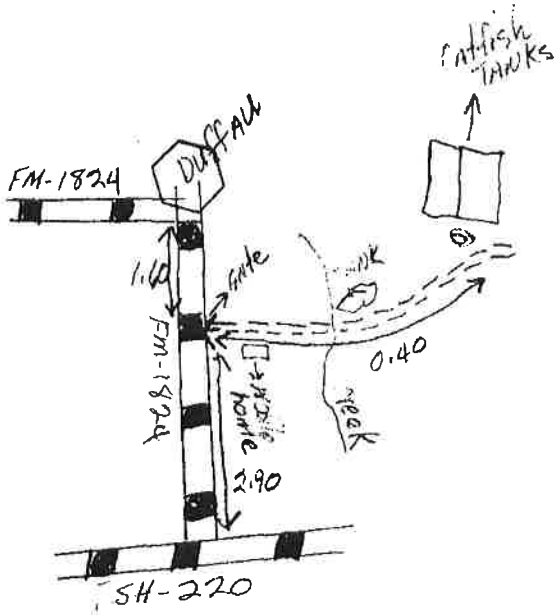
(Sketch)

TWDBE-WD-2

31-64-604

Drillers' Log

0-5- Top Soil
5-10- Caliche
10-32- yellow Clay and Rock
32-56- Blue Clay
56-235- Blue Shale
235-252- Blue Clay
252-280- Sand
280-292- Red and Blue Clay
292-360- Sand and Gravel
360-420- Lime Stone
420-468- Sand and Gravel
468-470- Red Bed



Send original copy by certified mail to the Texas Water Development Board
P. O. Box 12386
Austin, Texas 78711

State of Texas

WATER WELL REPORT

For TWDB use only
Well No.
Located on map NE
Received: 9-27-72

1) OWNER:
Person having well drilled Bob Ellis (Name) Address Duffau (Street or RFD) (City) Texas (State)

Landowner Bob Ellis (Name) Address (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Erath, 2 miles in S (N.E., S.W., etc.) direction from Duffau (Town)

Locate by sketch map showing landmarks, roads, creeks, hiway number, etc.* (Use reverse side if necessary)

North ↑

or Give legal location with distances and directions from adjacent sections or survey lines.

Labor _____ League _____
Block _____ Survey _____
Abstract No. _____
(NW¼ NE¼ SW¼ SE¼) of Section _____

3) TYPE OF WORK (Check):
New Well | Deepening | Reconditioning | Plugging

4) PROPOSED USE (Check):
Domestic | Industrial | Municipal | Irrigation | Test Well | Other

5) TYPE OF WELL (Check):
Rotary | Driven | Dug | Cable | Jetted | Bored

6) WELL LOG:
Diameter of hole 12¼ in. Depth drilled _____ ft. Depth of completed well _____ ft. Date drilled _____
All measurements made from _____ ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
0	5	TOP SOIL
5	10	Clay
10	32	yellow clay + Rock
32	56	Blue Clay
56	235	Blue SHALE
235	252	Blue clay
252	280	Pumping sand +
280	292	Red + Blue Clay
292	360	TOP Trinity sand + Gravel
360	420	Pennsylvania STONE
420	468	Trinity sand + Gravel
468	470	Red Rock

(Use reverse side if necessary)

9) Casing:
Type: Old | New ✓ | Steel | Plastic | Other
Cemented from _____ ft. to _____ ft.

Diameter (inches)	Setting From (ft.)	To (ft.)	Gage
12¼	0	470	¼

10) SCREEN:
Type _____
Perforated | Slotted

Diameter (inches)	Setting From (ft.)	To (ft.)	Slot Size
12¼	300	470	¼

7) COMPLETION (Check):
Straight wall ✓ | Gravel packed | Other
Under reamed | Open Hole

8) WATER LEVEL:
Static level 300 ft. below land surface Date 8-25-72
Artesian pressure _____ lbs. per square inch Date _____
Depth to pump bowls, cylindor, jet, etc., _____ ft. below land surface.

11) WELL TESTS:
Was a pump test made? Yes | No. If yes, by whom? HESTER Drilling Co
Yield: 400 gpm with 70 ft. drawdown after 72 hrs.
Bailer test _____ gpm with _____ ft. drawdown after _____ hrs.
Artesian flow _____ gpm
Temperature of water 64

12) WATER QUALITY:
Was a chemical analysis made? Yes | No
Did any strata contain undesirable water? Yes | No
Type of water? Trinity depth of strata 300 - 470

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME W. L. HESTER (Type or Print) Water Well Drillers Registration No. 669

ADDRESS 604 N Camden (Street or RFD) Dublin (City) Texas (State)

(Signed) W. L. Hester (Water Well Driller) HESTER Drilling Co (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available. JP31-64-604

*Additional instructions on reverse side.

TWDBE-GW-53

2) LOCATION OF WELL:

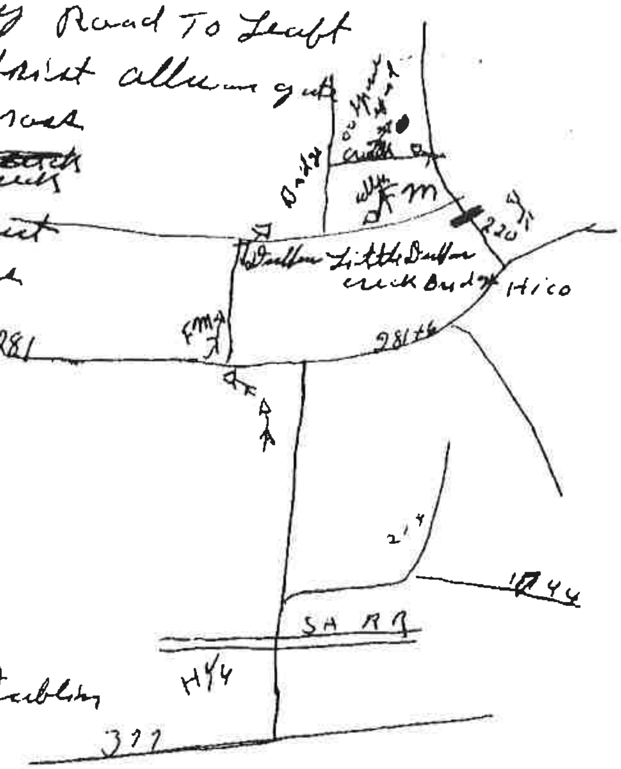
The sketch showing the well location must be as accurate as possible, showing landmarks, in sufficient detail so that the well may be plotted on a General Highway Map of the county in which the well is located.

Reference points from which distances are measured and directions given should be of a permanent nature (e.g. highway intersections, center of towns, river and creek bridges, railroad crossings). The distance and direction from the nearest town should always be indicated.

When giving a legal description include a sketch showing location of the well within the described area. e.g. survey abstract.

Information furnished in Section 2) of the TWDBE-GW-53 is very important. Unless the well can be accurately located on a map the value of the other data contained in the Report is greatly reduced.

Go To Duffau off 281 FM Road
When you get To Duffau
Turn Right Past
Two county Road To Leaft
Turn in front allum gate
To Leaft cross
Duffau ~~creek~~ creek
Well is about
600 FT across
creek



3

6.0 SURFACE WATER & TMDL ASSESSMENT

6.1 Surface Water Assessment

Figures 6.1a-f, Aerial Photograph, shows the existing land features, production area, Land Management Unit boundaries, and areas designated as "water in the state," as defined by 30 TAC §321.32(63). Buffer zones between waters in the state and LMUs will be maintained as required in 30 TAC §321.40(h) plus additional filter strips specified by NRCS Code 393, as required in 30 TAC §321.42(w)(2). Based on NRCS Code 393, Appendix 3, Table 1, and LMU slope and soil types, the buffer zones shown in the attached map will be maintained. According to NRCS, Codes 601 (applied to severely eroded areas) and 332 (applied to cropland) are not currently applicable to the LMUs at this facility. Should field conditions or cropping systems change, Codes 601 and 332 will be implemented as necessary.

The "water in the state" designation is based on Enviro-Ag Engineering, Inc., site inspections, the permittee's knowledge of the property and the USDA-FSA aerial photograph (2017). The buffer zones and LMU boundaries in Figures 6.1a-f are submitted with this application for TCEQ approval.

6.2 TMDL Assessment

Kuiper Cows is located in Segments 1229, Paluxy River and 1226, Upper North Bosque River, Brazos River Basin, which is a 303(d)-listed watershed. To demonstrate that Kuiper Cows, LLC is designed and will be constructed and operated in a manner that is consistent with the Phosphorus Total Maximum Daily Load (TMDL) and Implementation Plan approved in 2001 and to address the other listed impairments for this segment, the following practices have been or will be implemented:

1. Implement a Nutrient Utilization Plan that limits P application to crop requirement and incorporates a P reduction component on fields over 200 ppm P.
2. Limit maximum P level in soils to 200 ppm.
3. Perform annual soil sampling in accordance with the provisions of 30 TAC §321.42(k)-(m) and with Texas Cooperative Extension guidelines for composite sampling.
4. Implement a certified Comprehensive Nutrient Management Plan that meets the NRCS requirements for a whole-farm Resource Management System.
5. Maintain contracts with owners of third-party fields in accordance with 30 TAC §321.42(j)(1)-(4) and with applicable requirements of 30 TAC §321.36 and §321.40.
6. Operate the facility in accordance with 30 TAC §321.42 with additional Best Management Practices as follows:
    a. Reduce the potential for soil erosion and downgradient sediment deposition by maintaining permanent pastures and additional filter strips adjacent to waters in the state, as described above in Section 6.1

Map Generated 9/8/2022

LEGEND:

- Denotes Well
- Denotes 130-ft Buffer
- Denotes Fresh Water Pond

N
W E
S

350' 0 350' 700'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS – Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Aerial Photograph Figure 6.1a Page 61	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

Map Generated 9/8/2022

LEGEND:

- Denotes Plugged Well
- Denotes Well w/Buffer
- Denotes 136-ft Buffer
- Denotes Fresh Water Pond
- Denotes Borrow Area

N
W E
S

600' 0 600' 1200'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS – Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Aerial Photograph Figure 6.1b Page 62	ENVIRO-AG EAE ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

Map Revised 9/8/2022

LEGEND:

- Denotes Plugged Water Well
- Denotes Well w/Buffer
- Denotes 136-ft Buffer

N
W E
S

600' 0 600' 1200'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS - Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Aerial Photograph Figure 6.1c Page 63	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-5123 FAX (806) 353-4132

Map Revised 9/8/2022

LEGEND:

- Denotes Plugged Well
- Denotes Well w/Buffer
- Denotes 130-ft Buffer

N
W E
S

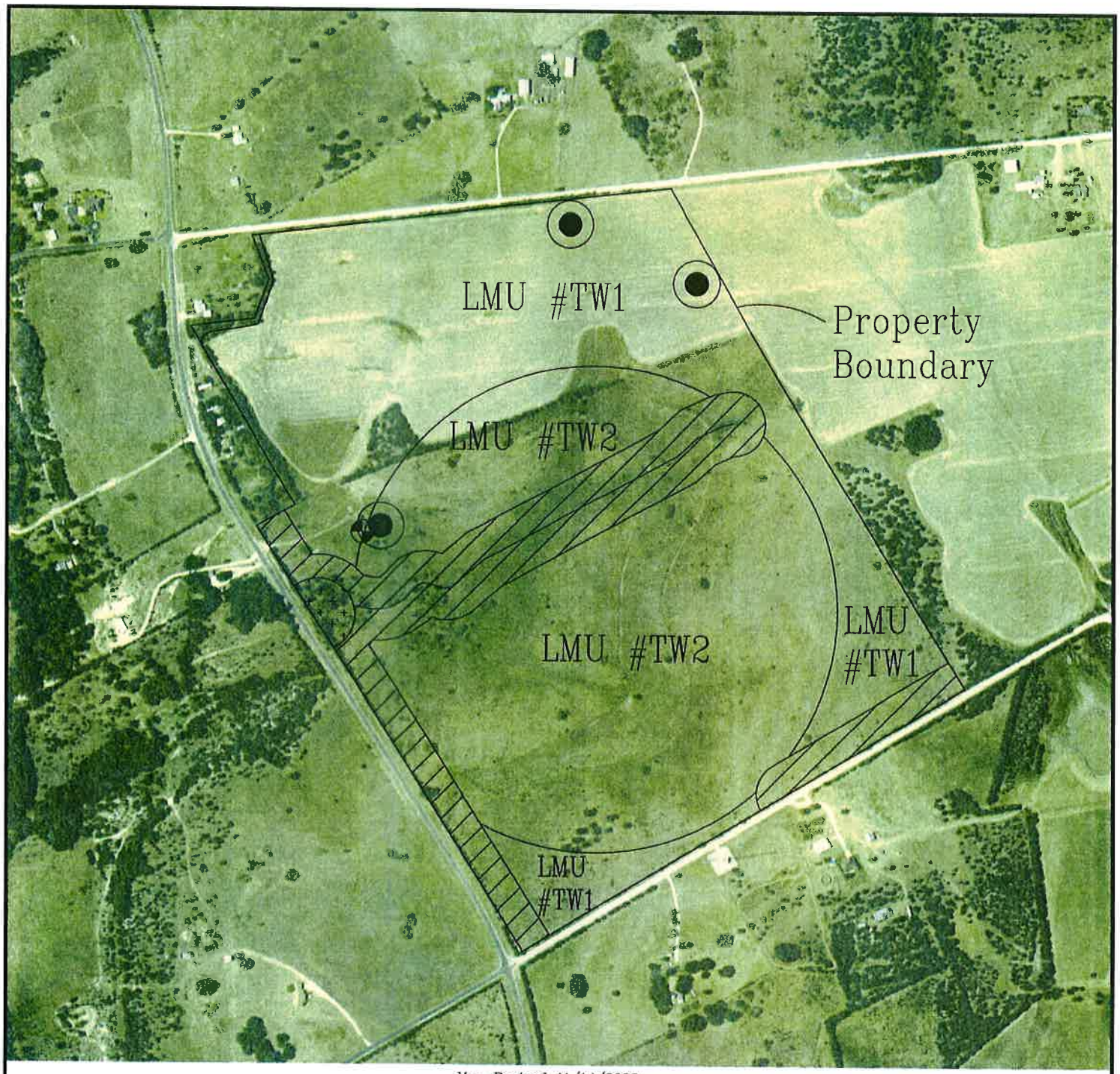
300' 0 300' 600'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS - Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Aerial Photograph Figure 6.1d Page 64	ENVIRO-AG EAE ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Revised 11/14/2022

LEGEND:

- Denotes Plugged Well
- Denotes Well w/Buffer
- Denotes 136-ft Buffer
- Denotes Fresh Water Pond

N
W E
S

300' 0 300' 600'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS – Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Aerial Photograph Figure 6.1e Page 65	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

Map Generated 5/13/2024

LEGEND:

- Denotes Well w/Buffer
- Denotes 130-ft Buffer
- Denotes Fresh Water Pond

N
W E
S

300' 0 300' 600'

SCALE AS SHOWN

Source: USDA-NRCS. Geospatial Data Gateway. Available at: http://datagateway.nrcs.usda.gov/. Digital Raster Graphic County Mosaic by NRCS - Accessed December 2017.

- Refer to Figure 1.4 for an overall facility map.

Kuiper Cows Stephenville, Texas Erath County	Aerial Photograph Figure 6.1f Page 66	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

7.0 AIR STANDARD PERMIT REQUIREMENTS

7.1 Permit Requirements

Due to the headcount, the CAFO meets the TCEQ Air Quality Permit–By-Rule (PBR) authorization in 30 TAC §106.161 for facilities that confine less than 1000 head of cattle. See attached PBR Checklist; therefore an odor control plan is not required. The following is a list of Best Management Practices that may be implemented at the facility to decrease odors.

- Pen surfaces will be maintained to reduce ponding.
- The manure in the confinement pens will be removed on a regular basis (at least once annually) to prevent the manure from building up in the pens.
- Removal of manure and pond solids will be done in favorable wind conditions carrying odors away from nearby receptors. The TCEQ must be notified prior to RCS cleanout.
- Land application shall only occur from one hour after sunrise until one hour before sunset, unless written consent is obtained from current occupants of all residences within ¼-mile of the LMU boundary that receives waste or wastewater.
- Dust will be controlled on facility roads with the use of a portable water truck on an as-needed basis to minimize fugitive dust emissions.
- Dead animals will be disposed of by a commercial rendering service within 72-hours or composted on-site.

ENVIRO-AG ENGINEERING, INC.
EAE
AMARILLO · STEPHENVILLE · ARTESIA

Corporate Office:
3404 Airway Blvd.
Amarillo TX 79118

Central Texas:
9855 FM 847
Dublin TX 76446

New Mexico:
203 East Main Street
Artesia NM 88210

July 10, 2024

TCEQ
Land Applications Team
Attn: Abesha Michael
Water Quality Assessment Section, MC-148
PO Box 13087
Austin, TX 78711-3087

Re: Requested Information, CAFO Individual Permit Application
WQ#5293 (RN102081056) Kuiper Cows – Erath County

Dear Ms. Michael,

This letter is in response to your July 3, 2024, email regarding the above-referenced facility. From your email specifically:

1. Section 10, Item B on page 7, this item is asking for the RN, which is provided. Section 10, Item C on page 8, this item is asking for either item 1 or item 2 to be provided and item 1 is provided.
2. Attached are Adjacent Landowners Map F and E.
3. The 4-sets of labels provided in this application are on Avery 5160 format.
4. The NORI has been reviewed and is correct as shown.
5. Attached is the Spanish NORI in a Word Document.

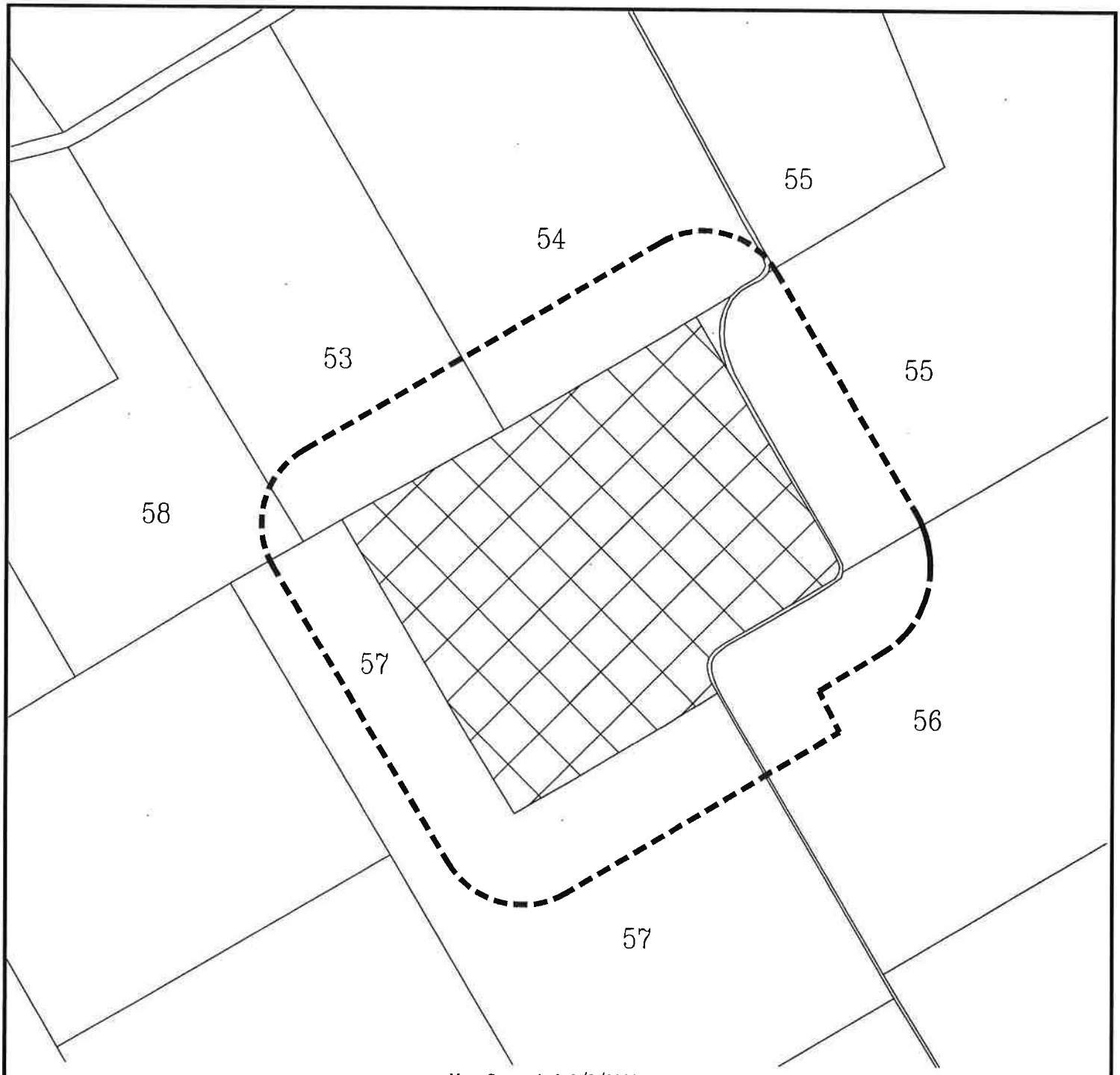
If you have any questions, please do not hesitate to contact our office.

Respectfully Submitted,

Jourdan Mullin

Enviro-Ag Engineering, Inc.

Cc: EAE file
Kuiper Cows



Map Generated 9/8/2022

LEGEND:

- Denotes Kuiper Cows Property
- Denotes Adjacent Landowner Boundary
- Denotes 500 Ft. Radius From Property Boundary

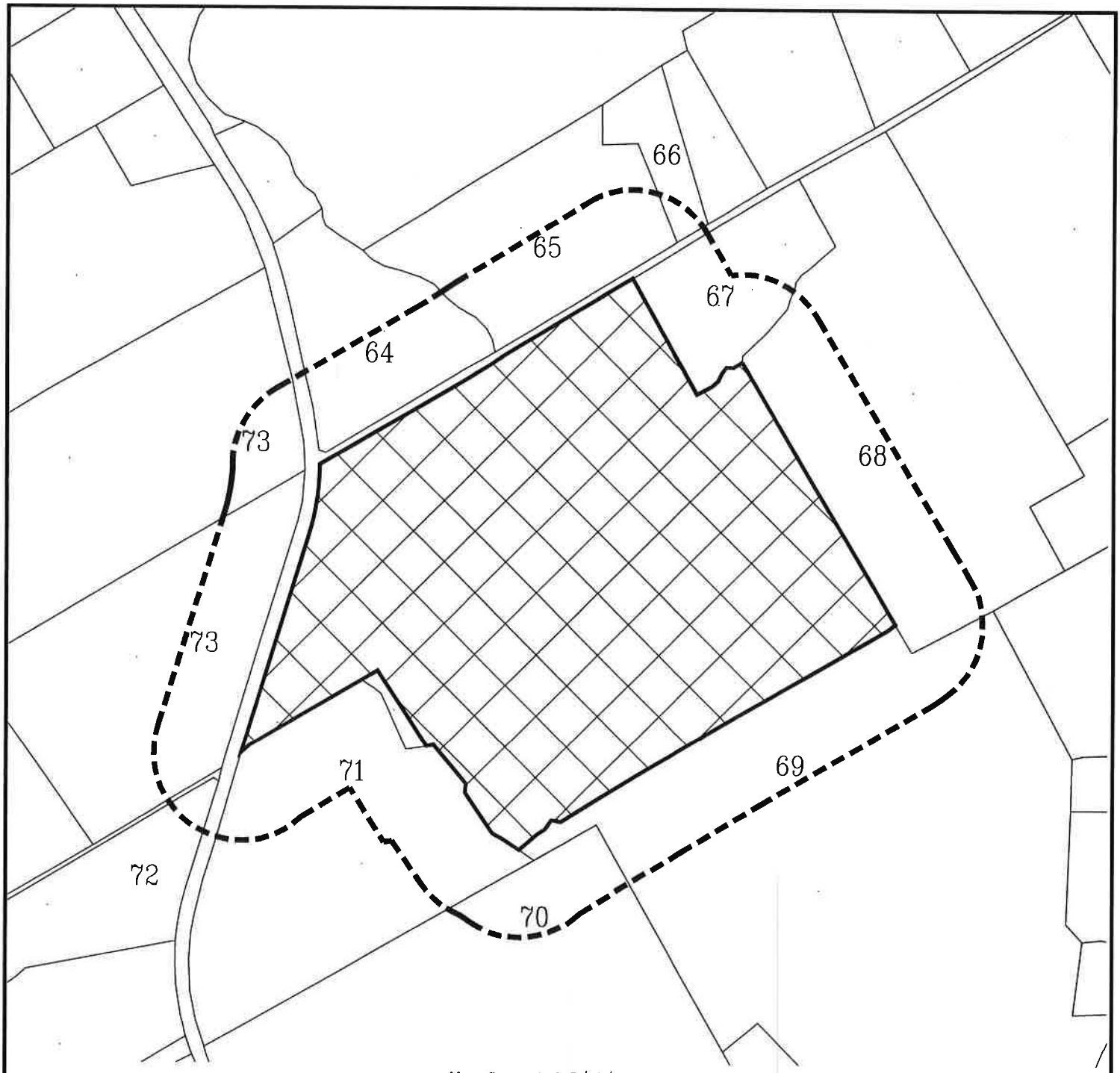
N
W E
S

400' 0 400' 800'

SCALED AS SHOWN

Source: Erath County Appraisal District

Kuiper Cows Stephenville, Texas Erath County	Adjacent Landowner Map E	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Map Generated 5/13/2024

LEGEND:

- Denotes Kuiper Cows Property
- Denotes Adjacent Landowner Boundary
- Denotes 500 Ft. Radius From Property Boundary

N
W E
S

400' 0 400' 600'

SCALED AS SHOWN

Source: Erath County Appraisal District

Kuiper Cows Stephenville, Texas Erath County	Adjacent Landowner Map F	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

SOLICITUD. Kuiper Cows, LLC, 1865 Private Road 1233, Hico, Texas 76457, ha solicitado a la Comisión de Calidad Ambiental de Texas (TCEQ) modificar el Permiso de Aguas Residuales No. WQ0005293000 para una Operación de Alimentación Concentrada para Animales (CAFO) para autorizar añadir la LMU #DC y el Pozo #30. La instalación está ubicada en 1261 County Road 188, Stephenville, en el Condado de Texas, Texas 76401. La TCEQ recibió esta solicitud el 25 de junio de 2024. La solicitud de permiso estará disponible para ver y copiar en la Oficina de Extensión del Condado de Erath, Palacio de Justicia del Condado de Erath, 100 Washington Street, Cuarto 206, Stephenville, Texas, antes de la fecha de publicación de este aviso en el periódico. La solicitud, incluidas las actualizaciones, y los avisos asociados están disponibles electrónicamente en la siguiente página web: https://www.tceq.texas.gov/permitting/wastewater/pending-permits/cafo-applications. Este enlace a un mapa electrónico de la ubicación general del sitio o de la instalación es proporcionado como una cortesía y no es parte de la solicitud o del aviso. Para la ubicación exacta, consulte la solicitud. https://gisweb.tceq.texas.gov/LocationMapper/?marker=-98.071666,32.229166&level=18.

También se puede obtener información adicional de Kuiper Cows, LLC a la dirección indicada arriba o llamando al Sr. Clemens Kuiper, Miembro, al 254-968-4018.