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September 12, 2022

Thomas Buell
Division Administrator, Monitoring and Remediation Division
Department of Environment and Energy
P.O. Box 98922
Lincoln, NE 68922

SUBJECT: Submittal of the Remedial Action Plan,
AltEn Facility Response Group VCP Project, Mead, Nebraska
FACILITY ID: 84069
PROGRAM ID: PCS/RAP 36-336-4975

Dear Mr. Buell:

On behalf of the AltEn Facility Response Group, enclosed is the *Remedial Action Plan, Voluntary Cleanup Program, Remedial Media 1 – Lagoon Water, AltEn Site, Mead, Nebraska*, under the Nebraska Voluntary Cleanup Program. In addition, this document has been posted on the Project ShareFile Site and provided on the enclosed thumb drive.

Please let me know if you have any questions regarding this submittal.

Sincerely,

Donald Gunster
AltEn Facility Response Project Coordinator

cc: AltEn Facility Response Group

Remedial Action Plan
Voluntary Cleanup Program

Remedial Media 1 – Lagoon Water

AltEn Site, Mead, Nebraska

Facility IIS number: 115: 84069
Project identifier: NE0137634

Engineer in Responsible Charge
9/12/22
Randall W. Grachek

September 2022

Prepared for:
AltEn Facility Response Group

Submitted to:
Nebraska Department of Environment and Energy
PO Box 98922
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Executive Summary

This Remedial Action Plan for Remedial Media 1 – Lagoon Water (Water RAP) is submitted by the AltEn Facility Response Group (FRG) in furtherance of its ongoing work at the AltEn Ethanol Facility located at 1344 County Road 10, Mead, Nebraska (Site). Submission of this Water RAP completes a significant element of the FRG's voluntary commitments at the Site under the Nebraska Voluntary Cleanup Plan (VCP) pursuant to the Memorandum of Agreement (MOA) with the Nebraska Department of Environment and Energy (NDEE) dated June 30, 2021. Under the MOA, the FRG agreed to undertake significant interim measures at the Site, which are discussed in detail in the Progress Report submitted to NDEE on July 29, 2022, and to prepare a remedial action plan under NDEE oversight that recommends approaches that are protective of human health and the environment. At the request of NDEE, the FRG developed this partial RAP to focus on the lagoon water remedy and will continue working to evaluate remedial approaches for other media going forward. This Water RAP recommends treating the untreated water and the stormwater that accumulates within the lagoons and pond during the remedial action period and managing the treated water through land application. The proposed remedial action for Remedial Media 1 contained in this RAP includes a summary of alternatives that were considered, the proposed remedial action, potential pre-design investigations, and the anticipated schedule.

The AltEn Facility Response Group

The FRG is a group of companies that formerly supplied corn seed to AltEn. It was formed after the NDEE sought assistance with the agency's efforts to address environmental issues at the AltEn Site. The companies joined together to address unsafe conditions created by AltEn's mismanagement of solids and water generated by the ethanol production process and are participating in the VCP pursuant to the MOA. The FRG members do not own the Site, have never operated the ethanol facility, and played no role in AltEn's management of its facility. The Site owner, AltEn, is the permitted entity at the site and is not a member of the FRG and is not contributing to the voluntary measures being implemented by the FRG.

History of AltEn's Operations at the Site

In 2011, AltEn began engaging with the Nebraska Department of Environmental Quality (NDEQ) to obtain modifications to the environmental permits held by the prior owner of the Site. After NDEQ issued the modified permits, AltEn opened an ethanol plant in 2015 at the Site and began soliciting corn seed from multiple sources as a feedstock for the ethanol manufacturing process. Byproducts of the ethanol fermentation process included process water and "distiller's grain" a/k/a wet cake. During the period of AltEn's operations, NDEE (and formerly NDEQ) issued and renewed air, compost, and water permits to AltEn, including permits for land application of process water. The Nebraska Department of Agriculture (NDA) also registered AltEn's wet cake as a soil conditioner. State officials subsequently conducted

inspections of the Site and received numerous citizen complaints about AltEn, including in public comments and public hearings regarding modifications to AltEn's permits.

In May 2019, the NDA issued an order prohibiting AltEn from the continued sale and use of the wet cake as a soil conditioner. NDEQ followed that Order by informing AltEn via letter dated June 26, 2019, that wet cake could no longer be land applied and would require disposal at a permitted solid waste disposal landfill. Thereafter, on September 13, 2019, NDEE issued a Notice of Violation (NOV), requiring the immediate cessation of land application of process water from the lagoons. A subsequent NOV issued by NDEE on September 23, 2019, prohibited AltEn from stockpiling the wet cake on-site and required disposal of the wet cake at a permitted solid waste management facility. However, the production of ethanol and associated byproducts did not cease at that time; instead, AltEn submitted multiple communications to NDEE disagreeing with the NOVs' findings and rejecting their requirements. Operations and the accumulation of wet cake and process wastewater continued at the Site until February 8, 2021, a few days after NDEE ordered AltEn to cease discharging process water into the lagoons on February 4, 2021.

Just four days after AltEn shut down operations, on February 12, 2021, a digester at the Site failed due to the shut off of heating capacity to the digester and released approximately four million gallons of thin stillage and manure. The manure was a by-product from the adjacent Mead Cattle Company property. On February 20, 2021, NDEE issued another emergency order prohibiting AltEn from resuming operations until the digester discharge was sufficiently remediated. After AltEn failed to comply with that order, the State of Nebraska filed suit against AltEn in the District Court of Saunders County. The lawsuit against AltEn remains pending while the FRG has been handling the substantial work necessary to mitigate and stabilize the Site. On February 23, 2022, NDEE entered into an administrative consent order with AltEn that supersedes the emergency orders issued in February 2021. However, despite the Order, AltEn and its affiliated companies (and their management) continue to evade their obligations to finance or otherwise substantively address the environmental conditions at the Site.

Site Status Encountered by the FRG

The Site conditions encountered by the FRG were challenging due to the presence of more than 180 million gallons of untreated process wastewater held in lagoons that risked overtopping and in two anaerobic digesters and other tanks that presented risks of failure. There was also 145,000 cubic yards (CY) of wet cake piled in separate areas across the Site that was not being properly managed. Process materials and chemicals were stored at the facility and remained in tanks and piping. Specifically, the following conditions required immediate management and stabilization:

- Approximately 145,000 CY of uncovered wet cake with physical and chemical characteristics that pose considerable management challenges:
    - Chemical content that restricts land application

  - High moisture content, poor dewatering properties, and low shear strengths that limit stockpiling and landfilling
  - Material distributed over 27 acres in three separate areas.
- Overgrown vegetation which prevented required inspections and potentially compromised dike wall integrity.
- Four impoundments (three lagoons and the Emergency Pond) covering approximately 38 acres and containing approximately 175 million gallons of process wastewater including unknown volume of entrained sludge and gases:
  - Three impoundments had reached or exceeded the design freeboard
  - Three impoundments had compromised liners
  - At least one impoundment contained a mixture of digester solids and fats
  - Ongoing accumulation of water from direct rainfall and contact water from the overall Site is pumped into impoundments.
- Two digesters containing 7.9 million gallons of liquid, stored in potentially unsafe conditions.
- A processing plant/facility with tanks and piping containing process liquids, stored in unsafe conditions, and unknown process safety hazards.

Overview of Interim Actions and Emergency Response Measures

The Site conditions left by AltEn necessitated substantial stabilization and containment actions. To date, the interim actions and ERMs taken by the FRG include:

- Construction of temporary storage capacity to allow draw down from the three lagoons to decrease the risk of overtopping and to bring them into compliance with design freeboard conditions
- Removal and treatment of lagoon water to ensure lagoons are maintained at or below design freeboard levels and reduce the risk that rainwater would cause an overflow event
- Deflation of gas-filled bubbles underneath the liner of the Northeast Lagoon to protect the integrity of the lagoon
- Refurbishing the emergency pond to provide additional storage capacity and allow for the digesters to be safely drained
- Construction of two permitted supplemental lined cells, collectively termed the Treated Water Pond System, with a capacity to store 52 million gallons of treated water
- Construction or reconstruction of berm structures to contain contact stormwater and prevent it from leaving the Site
- Collection of contact stormwater for treatment and storage

- Consolidation and cover of wet cake with a Posi-Shell® to minimize the potential for stormwater contact and reduce odors
- Winterization of process areas of the plant, including the consolidation of chemicals and other materials, draining of the digesters and process lines, and providing heating for specific process areas
- Characterization of process materials and chemicals abandoned at the Site by AltEn for management at appropriate off-Site facilities
- Treatment of approximately 33.3 million gallons of water (as of September 1, 2022) for land application of nutrient-rich water to crops (in accordance with the AltEn NDPES permit NE0137634 and 2022 NDEE-approved Land Application Approach and Best Management Practices (BMP) Plan).

In addition to dedicating substantial resources to undertake these measures, and consistent with the scope of commitment in the MOA, the FRG prepared this Water RAP for the Site.

Overview of the Water RAP

This Water RAP contains a Site Investigation Report and a Remedial Action Work Plan that together comprise a comprehensive strategy to treat and land apply the remaining lagoon water at the AltEn Site. The Site Investigation Report provides descriptions of the investigations conducted by NDEE and the FRG that were used to characterize the lagoon waters and relied on to develop the proposed remedial action. Consistent with the FRG's scope of commitment under the VCP MOA, the Remedial Action Work Plan presents a proposed long-term management solution for the AltEn lagoon water.

The proposed remedial action for the lagoon water includes:

- Optimizing the water treatment system through potential modifications to the current treatment system operation and configuration
- Treating the water to meet the land application discharge requirements
- Storing treated water in the Treated Water Storage Ponds (West and East Cells) until land application can be performed
- Discharging the treated water via land application on agricultural fields in the surrounding area as approved by the property owners and NDEE
- Dewatering and temporary storage of sludge from the water treatment system in the former Emergency Lagoon until it can be consolidated with other on-site solids for management.

As required by Nebraska law, this Water RAP will undergo a public notice and participation process to gather feedback from the public on the proposed remedial action.

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1.0 INTRODUCTION

This Remedial Action Plan for Remedial Media 1 – Lagoon Water (Water RAP) is submitted by the AltEn Facility Response Group (FRG) in furtherance of its ongoing work at the AltEn Ethanol Facility located at 1344 County Road 10, Mead, Nebraska in Saunders County (Site) (Figure 1). The FRG is a group of companies that formerly supplied corn seed to AltEn. It was formed after the Nebraska Department of Environment and Energy (NDEE) sought assistance with the agency's efforts to address environmental issues at the AltEn Site. The companies joined together to address unsafe conditions created by AltEn's mismanagement of solids and water generated by the ethanol production process and are participating in the Nebraska Voluntary Cleanup Program (VCP) pursuant to a Memorandum of Agreement (MOA) dated June 30, 2021. The FRG members do not own the Site, have never operated the ethanol facility, and played no role in AltEn's management of its facility. The Site owner, AltEn, is not a member of the FRG and is not participating in the voluntary measures being implemented by the FRG.

The FRG has made great efforts to understand AltEn's operations, which were complex and intertwined with several related companies, including Mead Cattle Company. AltEn maintains its status as permittee and waste generator, but neither AltEn or any of the AltEn-related companies are funding or participating in the voluntary response activities at the Site. The statements about AltEn's operations contained in this Water RAP are based on the FRG's understanding at this time after reasonable diligence but should not be construed as the FRG having primary knowledge. The FRG may learn new or different information than what is contained herein and will continue to share that information with NDEE.

The VCP Point of Contact (POC):

AltEn Facility Response Group
c/o Donald Gunster
NewFields
300 Ledgewood Place
Suite 305
Rockland, MA 02370

At the time AltEn ceased operation and maintenance of the Site in February 2021, extensive emergency work was necessary to prevent the threat of environmental damage from Site facilities that had been poorly maintained, including 35 acres of lagoons in danger of overtopping, an Emergency Pond with no remaining capacity, more than 145,000 cubic yards (CY) of wet cake and other solids distributed in various locations over the Site,

inadequate stormwater controls, and process materials and chemicals stored on the facility and remaining in tanks and/or piping. The NDEE conducted a preliminary investigation of the Site and determined that there was and is evidence of "land pollution," as defined by Neb. Rev. Stat. § 81-15,182(1), and "water pollution," as defined by Neb. Rev. Stat. § 81-15,182(2).

The FRG has agreed to conduct activities at the Site under the VCP in accordance with the MOA with NDEE. As part of the VCP, the FRG has conducted several interim actions to stabilize the Site's processing wastes such that the Site will not pose a threat to human health or the environment.[1] This RAP for AltEn Site Remedial Media 1 – Lagoon Water was prepared by NewFields on behalf of the FRG to provide proposed remedial actions for final disposition of the Site's lagoon water[2] (Remedial Media 1). Site solids, including but not limited to wet cake and lagoon sludges (Remedial Media 2), will be addressed in a subsequent RAP.

1.1 Site Conditions

The AltEn facility is not currently producing ethanol or generating additional process materials (wet cake or process wastewater). Based on aerial photography, wet cake and process wastewaters and potentially impacted stormwater began to accumulate at the Site beginning in 2016. AltEn had authorizations from the Nebraska regulators that allowed for both the land application of treated process wastewater and wet cake as a soil conditioner. In May 2019, the State of Nebraska issued emergency stop orders for the sale and use of the distiller's grain (wet cake) as a soil conditioner based on the presence of pesticides in the material (NDA 2019-05-17). NDEE issued a notice of violation on September 13, 2019, requiring the immediate cessation of land application of process wastewater from the lagoons (NDEE 2021-02-04), and NDEE issued another notice of violation on September 23, 2019, prohibiting AltEn from stockpiling the wet cake on-site and requiring disposal of the wet cake at a permitted solid waste management facility (State of Nebraska, NDEQ vs AltEn, LLC 2021-03-01). Operations and creation of new waste materials continued until AltEn was ordered to cease operations in February 2021 (NDEE 2021-02-04), resulting in continued and accelerated accumulation of wet cake and process wastewater at the Site. The failure to maintain adequate precautions during the shutdown process in subzero weather conditions resulted in a digester tank piping seal rupture that discharged several million gallons of digester liquids containing pesticides as well as high concentrations of total suspended solids (TSS), biological oxygen demand (BOD), ammonia, and other nutrients into downgradient ditches and channels (NDEE 2021-02-12).

AltEn has also been cited and sued for operating a solid waste management facility without a permit (State of Nebraska, NDEQ vs AltEn, LLC 2021-03-01) and is the

[1] These interim actions are summarized below and in detail in the July 29, 2022, Progress Report (NewFields 2022-07-29).
[2] Includes other Site waters which have been consolidated into the lagoons for treatment, e.g., digester water and contact stormwater.

defendant in a lawsuit filed by the State of Nebraska alleging many violations of multiple environmental laws (State of Nebraska v. AltEn, LLC, Case No. D06Cl210000036).

As part of the VCP, the FRG has voluntarily undertaken emergency remedial measures (ERMs) or interim actions to stabilize the abandoned wet cake and process wastewater lagoons at the Site. These activities have reduced the potential for uncontrolled releases. These ERMs are listed in Section 3.1 and are described in the *Progress Report, Voluntary Cleanup Program, Interim Site and Material Management* (NewFields 2022-07-29).

Figure 2 presents the location of facilities and areas of the Site including:

- Northwest (NW) Wet Cake Pile (former)/Consolidated Wet Cake Pile (current)
- (Former) East Wet Cake Pile
- Central Area (with changes through time)
    - Central Wet Cake Area
    - Temporary water storage tanks
    - Treated Water Pond (West and East Cells)
- Northwest Lagoon
- Northeast Lagoon
- Southeast Lagoon
- Emergency Pond
- North Digester
- South Digester
- Water Treatment Facility
- Contractor staging area
- Other AltEn or nearby facilities:
    - Hoop buildings (North and South)
    - AltEn office building
    - Grain receiving/unloading area
    - Former grain receiving/unloading area
    - Former WDG (wet distiller's grain) Loadout pad
    - Former Biochar Unit (owned and operated by Green Disposal Mead, LLC).

1.2 DEFINITIONS

The following definitions are provided to clarify the terminology used in this RAP. Definitions related to stormwater (e.g., contact water, non-contact water, process wastewater, etc.) are provided in this section for clarity in this RAP and do not replace definitions in state or federal regulations and statutes. Additionally, some facilities or materials at the Site have been referred to by multiple names in past documents and this list will relate those names to the name used in this document. The location of features described in this section are presented in Figure 2.

Consolidated Wet Cake Pile: formerly called the NW Wet Cake Pile; this description is used to identify the feature for the consolidated wet cake and associated Site solids after the completion of the consolidation of Site solids from the Central Wet Cake Area, the former East Wet Cake Pile, and the Emergency Pond into the NW Wet Cake Pile in November 2021.

Contact water: water that has been in direct contact with the Site Remedial Media (lagoon water or solids) and/or is water, such as stormwater, that falls in/on Remedial Media or runs across areas where these materials are located.

Emergency Pond: also called the Emergency Lagoon within some Site documents.

Impoundments: body of water confined within an enclosure; the term “pond” is used for impoundments that have liners with confirmed integrity (the refurbished Emergency Pond and the two new Treated Water Pond cells) and the term “lagoon” is used for the existing impoundments with liners of unknown condition (i.e., the original three AltEn lagoons – Northwest, Northeast, Southeast).

Lagoons: the original three AltEn water lagoons: Northwest, Northeast, and Southeast Lagoons.

Non-contact water: water that has not come in contact with the Site Remedial Media (lagoon water or solids). These waters would typically be stormwater that has been directed away from the remedial media materials, such as rain that falls on an engineered cover or other portions of the Site not associated with Site Remedial Media. Such areas include access roads and adjacent swales, the outside edge of the embankments, the areas between embankments and Site boundaries, the covered Consolidated Wet Cake Pile, and the former East Wet Cake Pile area.

Northwest Lagoon: also called the West Lagoon and in some documents may have been referred to as a pond. In some reports, particularly NDEE inspection reports, it is referred to as Lagoon #3.

Northeast Lagoon: also called the North Lagoon and in some documents may have been referred to as a pond. In some reports, particularly NDEE inspection reports, it is referred to as Lagoon #2.

Pesticides: collective term for the analysis of four classes of compounds: herbicides, insecticides, fungicides, and nematicides. These contemporary pesticides have current United States Environmental Protection Agency (USEPA) approved uses.

Process water: water utilized in the AltEn plant/facility process. The AltEn process is no longer in operation; therefore, all water that may have originally been considered process water is process wastewater and has been combined into the Site’s lagoons and is part of Remedial Media 1.

Process wastewater: water including the pre-2021 AltEn treatment system effluent and process waste streams including the liquids from the plant's anaerobic digesters and other waters from the process that may have been generated. It is the FRG's understanding that prior to approximately December 2020, these waters were treated with the AltEn water treatment system consisting of equalization, chemical addition, and clarification with no carbon treatment.

Remedial Media 1: collective term for Site wastewaters which require remediation and is also considered "untreated water" defined below. Remedial Media 1 consists of the ethanol plant process water and wastewaters stored in the lagoons, digester waters, contact water, and other Site-derived waters (e.g., purge water from groundwater sampling) that have been transferred into the lagoons. As waters that would classify as Remedial Media 1 are combined into the AltEn lagoon system, these waters would be remediated by treatment in current or future Site water treatment systems.

Remedial Media 2: collective term for Site solids which may potentially require remediation. Remedial Media 2 consists of wet cake, lagoon sludges, water treatment sludges, and associated solids, including soils.

Southeast Lagoon: also called the South Lagoon and in some documents may have been referred to as a pond. In some reports, particularly NDEE inspection reports, it is referred to as Lagoon #1.

Stillage or whole stillage: the remaining slurry from the distiller. The FRG's understanding is that stillage was separated by the distillers into thin stillage (liquid) and wet cake (solids).

Thin Stillage: the liquid from the distillers that was sent to the anaerobic digester. During digester upset, the FRG understands that this liquid (with or without the mixed-in manure) would be directed to the AltEn lagoon system.

Treated water: water that has been treated using the FRG water treatment system

Untreated water (water requiring treatment): untreated water (i.e., Remedial Media 1) at the Site includes AltEn process wastewater, contact water, and waters within the lagoons.

Wet cake: also called wet distiller's grain (WDG). Wet cake is the solids from the distilling operations/ethanol plant. The wet cake became mixed with soil in the storage and material handling on this Site. The term "wet cake" as used in this document refers to the mixed solid mass of material stockpiled on the Site.

2.0 SITE INVESTIGATION REPORT

2.1 COMPILATION AND ANALYSIS OF BACKGROUND INFORMATION

2.1.1 Physical Setting

2.1.1.1 Location and Surface Features

The Site is located on Saunders County Road 10, approximately two miles south of Mead, Nebraska in the S ½ of the NW ¼, N ½ of SW ¼, and N ½ of SE ¼ of Section 12, T14N, R8E. The Site can be accessed from Omaha, Nebraska (from the east) via State Highway 92 to Mead, Nebraska and then south on County Road 10 or from Lincoln, Nebraska (from the south) via US Highway 77 to State Highway 66 and then north on County Road 10 (see Figure 1). A map showing the location of the Site on the corresponding USGS 7.5-minute quadrangle (Mead, Nebraska) is provided in Appendix A-1. The Site is in the Lower Platte North Natural Resource District (LPNNRD). Figure 3 presents the Site and the surrounding lands. Agricultural lands of row crop grains and/or silage production surround the Site to the north, west, and east.

The Site was originally cleared of vegetation (cropland) for roads and plant facilities and operations. Currently, the ethanol plant is not operating and AltEn is not maintaining the facility. Weeds and natural vegetation have returned at the Site and the FRG is taking steps to manage this vegetation by mowing.

Directly south of the ethanol plant, the property is owned by another AltEn-affiliated entity, Green Disposal Mead, LLC, and formerly contained a biochar operation.

The Site is bounded on the south by the feed lot formerly owned and operated by an AltEn-affiliated entity, the Mead Cattle Company, LLC. Manure and other materials from Mead Cattle were accepted by the AltEn operation. The feed lot was sold to Champion Feeders in 2021. The ethanol plant, former biochar operation, and the feed lot share internal roads and infrastructure and the boundaries between the three facilities are not clear.

2.1.1.2 Climate and Meteorology

The climate varies widely from extremely cold with frequent snowfalls during the winter to hot and humid with widespread thunderstorms during the summer (see Table 1). The average monthly temperatures range from lows of 12°F in January to highs of 86.6°F in July (see Figure 4). On average, 29.4 days of the year will have temperatures over 90°F, typically in July or August, and 149.2 days will have temperatures below freezing (32°F), generally beginning in October and extending through April (NOAA NWS 2021).

Based on the 30-year average (1991-2020) for the Mead 6S NE station, the Site annually receives on average 30.1 inches of precipitation which includes the water equivalent of 20.3 inches of snow (NOAA NWS 2021). Most of the precipitation occurs between April and September, with heaviest rainfall during the months of May and June (see Figure 5). Heavy snowfall occurs in December through February (see Figure 6). Evapotranspiration occurs throughout the year with the highest rates occurring during the warm months with lower, but not insignificant, rates during the winter months in southeastern Nebraska (University of Nebraska 2021).

The predominant wind direction in the area is from the north-northwest (over 10 percent) and the second dominant wind direction is from the south-southeast (see Figure 7). Winds are predominantly from the north-northwest beginning in October through May with the strongest winds in April. The winds from the south and south-southeast are generally most common in the summer months, though the strongest winds from this direction are in May. The monthly wind roses are provided in Figure 8.

2.1.1.3 Topography and Hydrology

The Site is located within the Todd Valley physiographic province. The Todd Valley is higher in elevation than the adjacent Platte Valley but is evident as a valley in the landscape. The Todd Valley is about six to eight miles wide and cuts through the Rolling Hills physiographic province of eastern Nebraska for about 30 miles (Devine 2015).

The Todd Valley is nearly level with very gentle slopes to south to south-southeast. Similarly, the Site's local natural elevations are measured at 1195 to 1180 feet above mean sea level (feet amsl), with the highest elevations found in the northwestern corner of the Site and the lowest to the south and southeast. Site drainage is controlled by Site surface features including roads, berms, and drainage ditches (Figure 9). Topography in the Central Area of the Site was modified during the Site's interim actions to route stormwater around the new Treated Water Pond System.

Drainage in the Todd Valley portion of Saunders County is primarily southeastward through Wahoo Creek and its principal tributaries (Devine 2015). The Site naturally drains to the southeast to Clear Creek via an unnamed tributary, as shown in Figure 10. The Site's stormwater permit indicated that Silver Creek, located west of the Site, may receive some runoff from the southwestern portion of the plant area via the roadside ditches, but review of the unnamed tributary's drainage basin indicates this drainage is low to non-existent.

2.1.1.4 Soils and Geology

The Todd Valley, a former channel of the Platte River, is filled with unconsolidated Quaternary deposits of fluvial sediments overlain by Peoria Loess and modern soils. The valley fill deposits are underlain by the consolidated Cretaceous Dakota Group, composed of sandstone, siltstone, mudstone, shale, sand, and gravel (Divine 2015). Based on

driller's logs of the two water supply wells and seven monitoring wells on-site, the Peoria loess, described as a clay, is 15 to 20 feet thick[3] and the underlying fluvial sediments composed of sands and gravels are 112 to 130 feet thick beneath the Site. The Dakota Group sandstones and shales are found around 130 to 150 feet below ground surface. Appendix A-2 provides the lithology logs from Site wells and regional and local lithological cross-sections.

The soils at the Site are the Yutan silty clay loam, Filbert silt loam, and Tomek silt loam derived from the Peoria Loess. The Yutan and Tomek soils are well drained with permeabilities that are moderately low to moderately high. The Filbert soil is somewhat poorly drained with permeabilities that are very low to moderately low (USDA NRCS 2004, 2021). Appendix A-3 provides a map of the soil types and a summary table of the soil physical characteristics of Site and surrounding area soils.

2.1.1.5 Hydrogeology

In the Todd Valley, the primary aquifer is the Quaternary fluvial sediments, which are generally unconfined, though may be locally semi-confined to confined. Groundwater flow in the valley appears to be consistently toward the southeast with a head decline of approximately 10 feet per mile. Devine (2015) estimates the groundwater flow velocity at 2.5 feet/day. Depth to water is less than 50 feet and the saturated thickness is approximately 100 feet for the Quaternary aquifers in the Todd Valley in the vicinity of the Site, during non-irrigation months (excludes summer months). Transmissivity of the Todd Valley Quaternary fluvial aquifers are generally high (greater than 50,000 gallons per day per foot; Devine 2015).

The registered wells on-site as well as within one mile of the Site boundary are presented in Figure 11. In 2006, the original plant owners, Nebraska BioClean-Mead LLC, drilled two commercial/industrial water supply wells (G-136421 and G-136279) that were used exclusively for the Site (NBC 2006-01-13). The former Mead Cattle Co n/k/a Champion Feeders has one registered water supply well directly west-southwest of the Site and an irrigation well near the southeast corner of the feed lot property (NDNR. 2021). Based on the static water levels reported in the Nebraska Department of Natural Resources (NDNR) data for registered wells shown in Figure 11 and the on-site monitoring wells, the local depth to water ranges from approximately 25 to 35 feet below natural ground surface[4] in the Site and the Champion Feeders wells. The saturated thickness of the Quaternary fluvial aquifer at the Site ranges from 90 to 120 feet thick (NDNR. 2021). These elevations and thickness are consistent with Devine (2015) data.

The Site has seven shallow groundwater monitoring wells (33.5 to 52.5 feet below ground surface[5]). One well is located at the northwest corner of the lagoons ("upgradient" of the lagoons), one is located at the southeast corner of the current Consolidated Wet Cake

[3] Site monitoring wells on the lagoon berms have greater thickness of material described as clay.
[4] Deeper depths to water are recorded for Site monitoring wells located on the lagoon berms.
[5] Deeper wells are located on the lagoon berm, approximately 10-12 feet above the natural grade or ground surface.

Pile, and the other five are located directly south and southeast of the AltEn lagoons. As shown in Figure 12, the groundwater flow direction beneath the lagoons is generally toward the southeast with low hydraulic gradients of approximately 0.0017 to 0.0020 foot/foot (consistent with regional gradients reported by Devine (2015)).

No registered domestic wells were identified downgradient of the Site for over four miles (NDNR. 2021). The Former Nebraska Ordnance Plant Superfund Site that is listed on the National Priorities List is located between the Site and the closest domestic well. NDEE informed the FRG that a public water supply well is located just over one mile south of the Site in the University of Nebraska's Eastern Nebraska Research and Extension Center. This well is within "a few hundred feet" of the unnamed tributary to Clear Creek (NDEE 2021-12-22).

2.1.2 Historical Operations

A review of historical aerials (see Appendix B) indicates the plant portion of the Site was part of the Mead Cattle Company facility and the north portion of the Site was farmland prior to 2006. By July of 2006, the plant infrastructure was in place and clearing for the construction of the North and South Lagoons (currently called Northeast and Southeast Lagoons, respectively) and construction of the Emergency Pond was in progress.

Based on information and belief (including NDEE filings), the AltEn facility was a dry mill process ethanol plant with a capacity of 24.1 million gallons per year of denatured ethanol and 111,325 tons per year of wet cake (NDEQ 2005-01-27). Ethanol plants mill, mash, and cook corn, and then allow it to ferment (beer). During the distillation process, the fermented beer is separated into ethanol and the remaining materials is called stillage. The stillage is separated further into "wet cake" (solid) and thin stillage (liquid). Byproducts of the ethanol fermentation process included process wastewater and "distiller's grain" a/k/a wet cake.

The original plant owner was Nebraska BioClean-Mead, LLC. (Coranco Great Plains 2004-02-12). The owner's name changed in January 2006 to E3 BioFuels-Mead, LLC. (NDEQ 2007-01-25). The plant began operation in January 2007 under E3 BioFuels, LLC (E3 BioFuels LLC 2007-01-04). After a boiler explosion at startup, E3 BioFuels-Mead, LLC filed for bankruptcy in November 2007 and "mothballed" (deactivation and preservation of equipment and facility) the plant (Ethanol Producer Magazine 2010-11-15; NDEQ 2010-02-03). A related entity AltEn, LLC purchased the facility at auction in 2009 (NDEQ 2010-02-03).

In 2011, AltEn began engaging with the Nebraska Department of Environmental Quality (NDEQ) to obtain modifications to the environmental permits held by the prior owner of the Site. After NDEQ issued the modified permits, AltEn opened an ethanol plant in 2015 at the Site (State of Nebraska, NDEQ vs AltEn, LLC 2021-03-01) and began soliciting corn seed from multiple sources as a feedstock for the ethanol manufacturing process. During the period of AltEn's operations, NDEE (and formerly NDEQ) issued and renewed air, compost, and water permits to AltEn, including permits for land application of process

water. The Nebraska Department of Agriculture (NDA) also registered AltEn's wet cake as a soil conditioner in 2018. AltEn stored wet cake in piles on-site. State officials subsequently conducted inspections of the Site and received numerous citizen complaints about AltEn, including in public comments and public hearings regarding modifications to AltEn's permits.

The boilers at the plant were to operate on a combination of biogas from the anaerobic digester and natural gas (NDEQ 2005-01-27). The anaerobic digester generated biogas from a combination of thin stillage from the plant's distillers and manure from the adjacent Mead Cattle feedlot (Settje Agri-Services and Engineering, Inc. 2007-01-08). The Emergency Pond was constructed in 2006 to provide an emergency overflow for the anaerobic digester system. The pond was constructed with a high-density polyethylene (HDPE) liner and earthen secondary-containment liner (Settje Agri-Services and Engineering, Inc. 2006-04-12). The FRG understands that AltEn's success with the biogas generation was limited, and thin stillage was sent to the Site's lagoons during digester non-operational conditions.

AltEn contended that the plant's process wastewaters were a byproduct from the plant and, as such, they could be, and were, used as irrigation water (State of Nebraska, NDEQ vs AltEn, LLC 2021-03-01). Two of the plant's three large process wastewater lagoons were constructed for the E3 BioFuels 2007 plant (see aerial photos Figure B-1 2006 and Figure B-2 2009 in Appendix B for the construction sequence of the Southeast Lagoon and the Northeast Lagoon, respectively). The third lagoon (Northwest Lagoon) was constructed by AltEn in 2018 (see Figure B-3 in Appendix B). Two of the three lagoons (Northwest and Northeast) have liners that have partially separated from the earthen base and are floating and lifted above the water surface. Review of publicly available historical aerials (GoogleEarth 2022) indicated that lifted liner can be observed in the Northeast Lagoon by May 2017 and in the Northwest Lagoon by March 2020.

The plant was authorized to discharge industrial wastewater under National Pollutant Discharge Elimination System (NPDES) permit NE0137634 (Consent Order, Case No 3483, FID#84069). The discharges were described in the permit (NDEQ 2011-11-14) as follows:

- Single-pass, non-contact cooling water derived from untreated groundwater wells discharges to an unnamed, intermittent tributary to Clear Creek. The cooling water could also supplement irrigation water when feasible. Discharge rate is estimated to be 1.3 million gallons per day (MGD) for nine months of the year.
- Treated process and non-process wastewater will be discharged at an estimated rate of 0.468 MGD into a lined holding lagoon for land application sites. Water from the lagoon will be discharged to land application sites.

NPDES permit NE0137634 authorized AltEn to land apply treated process wastewater from the Site subject to the terms and requirements contained in the permit. AltEn submitted annual reports to NDEQ (now NDEE) detailing AltEn's land application of treated process wastewater in 2018, 2019, and 2020. In October 2020, NPDES permit

NE0137634 was modified to require groundwater monitoring on a quarterly basis, starting in the fall of 2020 (State of Nebraska, NDEQ vs AltEn, LLC 2021-03-01). Based on the FRG's review of NDEE records to date, AltEn began sampling four on-site monitoring wells (AltEn-MW1 through AltEn-MW4) in October 2020 and has continued to sample the four wells quarterly.

Based on NDEE's records, the Site was authorized to discharge stormwater under an industrial activity general permit (NE00000000), pursuant to authorization number NER910444 (Consent Order, Case No 3483, FID#84069). The permit indicates the northern portion of the plant drains to the southeast to Clear Creek, located six miles away and that a portion of the area around the plant entrance may drain periodically south to Silver Creek located four miles away (see Figure 13 for the location of the two stormwater outfalls).

In May 2019, the NDA issued an order prohibiting AltEn from the continued sale and use of the wet cake as a soil conditioner. NDEQ followed that Order by informing AltEn via letter dated June 26, 2019, that wet cake could no longer be land applied and would require disposal at a permitted solid waste disposal landfill. Thereafter, on September 13, 2019, NDEE issued a Notice of Violation (NOV), requiring the immediate cessation of land application of process water from the lagoons. A subsequent NOV issued by NDEE on September 23, 2019, prohibited AltEn from stockpiling the wet cake on-site and required disposal of the wet cake at a permitted solid waste management facility. However, the production of ethanol and associated byproducts did not cease at that time; instead, AltEn submitted multiple communications to NDEE disagreeing with the NOVs' findings and rejecting their requirements. Operations and the accumulation of wet cake and process wastewater continued at the Site until February 8, 2021, a few days after NDEE ordered AltEn to cease discharging process water into the lagoons on February 4, 2021.

Just four days after AltEn shut down operations, on February 12, 2021, a digester at the Site failed due to the shut off of heating capacity to the digester and released approximately four million gallons of thin stillage and manure. The manure was a by-product from the adjacent Mead Cattle Company property. On February 20, 2021, NDEE issued another emergency order prohibiting AltEn from resuming operations until the digester discharge was sufficiently remediated. After AltEn failed to comply with that order, the State of Nebraska filed suit against AltEn in the District Court of Saunders County. The lawsuit against AltEn remains pending while the FRG has been handling the substantial work necessary to mitigate and stabilize the Site. On February 23, 2022, NDEE entered into an administrative consent order with AltEn that supersedes the emergency orders issued in February 2021. AltEn and its affiliated companies (and their management) have not met their obligations under the Order to finance or otherwise substantively address the environmental conditions at the Site.

2.1.3 Current Operations and Site Conditions

The AltEn facility is not currently producing ethanol or generating additional wet cake or process wastewater. The Site conditions encountered by the FRG in 2021 were challenging due to the presence of more than 180 million gallons[6] of untreated wastewater held in lagoons that risked overtopping and in two anaerobic digesters and other tanks and piping that presented risks of failure. There was also 145,000 CY of wet cake piled in separate areas across the Site that was not being properly managed. Process materials and chemicals were stored at the facility and remained in tanks and piping. Specifically, the following conditions required immediate management and stabilization:

- Approximately 145,000 CY[7] of uncovered wet cake with physical and chemical characteristics that pose considerable management challenges:
    - Chemical content that restricts land application
    - High moisture content, poor dewatering properties, and low shear strengths that limit stockpiling and landfilling
    - Material distributed over 27 acres in three separate areas.
- Overgrown vegetation which prevented required inspections and potentially compromised dike wall integrity.
- Four impoundments (three lagoons and the Emergency Pond) covering approximately 38 acres and containing approximately 175 million gallons of process wastewater[8] including unknown volume of entrained sludge and gases:
    - Three impoundments had reached or exceeded the design freeboard
    - Three impoundments had compromised liners
    - At least one impoundment contained a mixture of digester solids and fats
    - Ongoing accumulation of water from direct rainfall and contact water from the overall Site is pumped into impoundments.
- Two digesters containing 7.9 million gallons of liquid, stored in potentially unsafe conditions.
- A processing plant/facility with tanks and piping containing process liquids, stored in unsafe conditions, and unknown process safety hazards.

[6] Estimated collective volume of lagoon waters and other process wastewater in plant pipes and tankage (175 million gallons) and digester tanks (7.9 million gallons) as of April 2021.
[7] Based on volume of the Consolidated Wet Cake Pile from April 2022 imagery.
[8] The water volume is estimated lagoon volumes based on the water levels observed in April 2021 and the volume of water within the storage vessels of the treatment water plant at that time. All waters contain entrained solids. Water volumes within the Northeast and Northwest Lagoons also include unknown and fluctuating volumes of gas trapped below the liners.

The Site conditions left by AltEn necessitated substantial stabilization and containment actions. The status of the Site features, shown in Figure 2, are as follows:

- Consolidated Wet Cake Pile (former NW Wet Cake Pile) – temporary storage of consolidated wet cake and associated solids with a cement/clay/polyester rainwater control (Posi-Shell®) cover and seepage collection system
- Northwest Lagoon – storage for untreated water, currently being drained
- Northeast Lagoon – storage for untreated water
- Southeast Lagoon – storage for untreated water
- Treated Water Pond (West and East Cells) – storage for treated water
- Water Treatment Facility – operating as needed
- North Digester – liquids removed in 2021
- South Digester – liquids removed in 2021
- Emergency Pond – liner replaced in 2021, supplemental storage for untreated water and sludge management
- Former East Wet Cake Pile Area – all wet cake and approximately 1 foot of subsoil removed: currently a stockpile area for excess soil removed during construction of the Treated Water Pond System.

Current AltEn permits:

- Air Quality Class II Operating Permit OP16S2-001
- NPDES stormwater authorization NER910444 under General Permit NER910000
- NPDES permit NE0137634 (noncontact cooling water and land application of treated water; required groundwater monitoring), effective date June 30, 2022.
- Title 123 Permit for construction of new Treated Water Pond System (NO.2021-0183)
- Stormwater Permit for construction of new Treated Water Pond System (CSW-202105946)
- NDNR Dam Permit (P-20847)
- Village of Mead Building Permit
- Title 123 Permit for operation of the pilot water treatment system, application submitted June 24, 2022, and is currently under review.

2.1.4 Previously Reported Investigations

The operation of the facility and compliance with applicable environmental regulations has been an issue since AltEn began ethanol production in January 2015. This section provides descriptions of investigations that were conducted prior to the FRG involvement that were used to characterize the lagoon waters relied on for the preparation of the remedial action proposed in this Water RAP.

Following complaints about odors and other concerns, samples of wastewater from the lagoons were collected for laboratory analysis in 2019 (NDEE 2021-02-04). The Northeast

Lagoon wastewater was sampled on April 8, 2019, and the results indicated the presence of the pesticides azoxystrobin (33.9 ug/L), clothianidin (58,400 ug/L), glyphosate (124 ug/L), thiabendazole (8,450 ug/L), and thiamethoxam (35,400 ug/L).

Additionally, on April 8, 2019, NDEQ collected a sample of wastewater from the Emergency Pond. The highest concentrations in the Emergency Pond sample were azoxystrobin, glyphosate, tebuconazole and thiabendazole.

The Southeast Lagoon wastewater was sampled by NDEQ on November 12, 2019, and the results indicated the presence of azoxystrobin (99.3 ug/L), clothianidin (7,070 ug/L), glyphosate (206 ug/L), thiabendazole (2,450 ug/L), and thiamethoxam (2,400 ug/L). The Northwest Lagoon wastewater was also sampled on November 12, 2019, and azoxystrobin (111 ug/L), clothianidin (31,000 ug/L), glyphosate (116 ug/L), thiabendazole (2,160 ug/L), and thiamethoxam (24,000 ug/L) were detected. The NDEQ issued a Notice of Violation which included a citation for the failure of the Best Management Practices plan to include these detected pesticides in order to ensure the short- and long-term protection of surface water and groundwater (NDEQ 2019-09-13). The February 2021 Emergency Order indicated that the pesticide concentrations detected in the lagoon wastewater samples from April 8, 2019, and November 12, 2019, exceed the registered application rates for which USEPA has conducted safety assessments for pesticide products (NDEE 2021-02-04).

Analytical results of the lagoon from these investigations are included in Appendix C and are discussed further in the nature and extent assessment presented in Section 2.2.

2.1.5 Preliminary Chemicals of Potential Concern

The list of targeted contemporary pesticides analyzed in environmental media samples has changed over the course of the FRG investigations as more information has become available and the laboratories have refined their analytical methods. The current FRG analyte list consists of 54 contemporary pesticides. A pesticide detected in either of the Remedial Media is considered to be a chemical of potential concern (COPC). The list of targeted contemporary pesticides and identified COPCs is provided in Table 2. All of the COPCs have been detected in Remedial Media 1, lagoon water (see Section 2.2).

2.1.6 Risk-Based Remediation Goals

The Remedial Media 1 would be treated and discharged via an NPDES permit. Therefore, the remediation goals are based on the permit requirements for the approved discharge (land application). The land application remediation goals are based on USEPA risk-based application rates for the pesticides and are included in the Land Application Approach (Appendix D).

2.2 NATURE AND EXTENT OF SITE LAGOON WATER (REMEDIAL MEDIA 1) AND DATA GAPS

The Site lagoons (Northwest, Northeast, and Southeast Lagoons), Emergency Pond, digesters and other plant tanks were estimated to contain more than 180 million gallons of untreated water[9] when the FRG began their ERMs in April 2021. For perspective, the total volume of untreated water requiring management was equivalent to more than 275 Olympic-sized swimming pools or more than 30,000 tanker trucks.[10]

The FRG ERMs have included both water handling and water treatment. Observations made during these actions indicate that the lagoon volume estimates include not only water but also entrained solids (sludges) and gases trapped beneath the lifted lagoon liners. The lagoons currently contain a combination of former process wastewater, water drained from the digesters, seepage or contact water from the consolidated solids pile, contact stormwater from former wet cake areas, and direct precipitation into the lagoons. The ERMs conducted by the FRG consolidated the untreated water in the Site lagoons and used a combination of water removal with treatment and natural evaporation to maintain the lagoon water levels within the freeboard requirements. Without treatment and discharge, the quantity of water on the Site will continue to increase annually via collected contact stormwater and precipitation falling directly onto the lagoons.

As discussed in Section 2.1.4, NDEE collected grab samples of the lagoon waters in 2019 to assess chemical content. Lagoon water samples were also collected on May 17, 2021, by the FRG to assess chemical (including pesticides) variability for treatment. One sample each was collected from the Northwest, Northeast and Southeast Lagoons. Lagoon water samples were sent to Pacific Agricultural Laboratory (PAL), a subcontractor to PACE Analytical, for pesticide analysis. Several pesticides were detected in these samples including abamectin, clothianidin, fluoxastrobin, glyphosate, ipconazole, tebuconazole, thiabendazole, thiamethoxam, and trifloxystrobin.

In April 2022, NDEE collected two composite samples from each of the three lagoons (Northwest, Northeast, and Southeast Lagoons) to assess pesticide concentrations with depth within each lagoon. The shallow composite sample was composed of equal aliquots collected at a water depth of 18 inches (1.5 feet), and the target water depth for deep composite sample aliquots was 72 inches (6 feet) below the lagoon's water surface. Actual depths of the deep sample aliquots varied but were generally from 72 inches (6 feet) in the Northeast and Southeast Lagoons and ranged from 36 to 72 inches (3 to 6 feet) in the Northwest Lagoon due to water depth being lower (less than 6 feet) above the lifted liner and/or potentially the solids content of the deeper water. NDEE sampled only water with

[9] The water volume is estimated lagoon volumes based on the water levels observed in April 2021 and the volume of water within the storage vessels of the water treatment plant at that time (175 million gallons) and the digester tanks containing an additional 7.9 million gallons in April 2021.All waters contain entrained solids. Water volumes within the Northeast and Northwest Lagoons also include unknown and fluctuating volumes of gas trapped below the liners.
[10] Tanker truck volume is assumed to be 6,000 gallons.

low solids content[11] as the sample collection tube would clog with solids when lowered into the suspended sludge layer. Comparison of shallow and deep samples, using relative percent difference (RPD), in Table 3 shows concentrations are generally within the water sampling precision threshold of 30% RPD. For a few compounds, the Northwest Lagoon has higher RPD, indicating increasing concentrations with depth. Based on field observation of the samples, this variation is suspected to be due to the water having a higher solids content with depth rather than variation within the water matrix.

In July 2022, large composite samples were collected from each of the Site lagoons for treatability testing as part of the Water Treatment Pilot Program, discussed in Section 2.3.

Analytical results for samples from the Site lagoons and the treatment facility influent (collected in 2021 through July 19, 2022) are available to assess the nature of the untreated waters. The results of individual samples are presented in Appendix C. The untreated water in the lagoons contains pesticides derived from AltEn's ethanol production's feedstock. In addition, some herbicides are found in the water, potentially as a result of AltEn vegetation control efforts around the Site. The lagoon water also contains high nutrient levels.

Summary statistics of the concentrations of COPCs and other analytes of interest in the lagoon samples as well as the location and date of sample collection of the maximum concentration are presented on Table 4. Fifty percent (50%) or 27 of the 54 targeted contemporary pesticides have been detected in lagoon water samples. The FRG understands that the Northwest Lagoon and Emergency Pond (prior to refurbishment) received thin stillage and manure from the plant's digesters under upset conditions at some time during AltEn operations and therefore potentially contain higher volume of solids than the other lagoons.

The water treatment facility influent is derived from the Southeast Lagoon and summary statistics of these influent samples have been included in Table 4 as a separate entry. Influent concentrations may be reflective of changes in the influent system's collection and sampling location and may not reflect the overall Southeast Lagoon. As shown on the table, six of the lagoon water COPCs have not been detected in the influent. Maximum concentrations reported for the influent samples are generally less than or the same as the maximum concentrations measured in the lagoon water samples.

The Northwest, Northeast, and Southeast Lagoons contain untreated water and an unknown quantity of sludge. The sludge does not appear as a distinct uniform layer but rather as an increase in solids content with depth in the lagoon to the point where, near the base of the lagoon, the mixture may be more semi-solid than liquid. Separate characterization of the lagoon solids has not been completed to date. Lagoon water COPC

[11] NDEE 2022 lagoon water samples were collected using a made-for-purpose floating sampling device using 3/16-inch low-density polypropylene tubing and a peristaltic pump. Solids would plug the tubing and therefore when high solid content was encountered at the targeted sample depth, the depth had to be adjusted.

concentrations are above potential discharge criteria (land application) and require treatment prior to any discharge.

Lagoon and influent samples contain ammonia at high concentrations, but almost no nitrates were detected. The lagoon water also contains high concentrations of BOD, TSS, and other nutrients. The current treatment system is effective in removing the pesticides, but it does not treat for ammonia or BOD and other nutrients. Ammonia in the treated water is a desirable nutrient for land application to farm fields.[12]

Construction of the Treated Water Pond's West and East Cells provided 52 million gallons of storage capacity for treated water. The two-cell system allows for flexibility in the water treatment program. Approximately 9 million gallons of treated water have been land applied (Spring 2022), and the East Cell, as of the end of August 2022, contains approximately 19.3 million gallons of treated water awaiting fall 2022 land application.

2.3 TREATABILITY STUDIES FOR REMEDIAL MEDIA 1 (LAGOON WATER)

The FRG commenced treatment of wastewater in April 2021 as an Emergency Response Measure, as detailed in the July 2022 Progress Report. A Water Treatment Pilot Program, as presented to NDEE in correspondence dated April 11, 2022, (Appendix E), commenced in May 2022 to evaluate modifications that can be made to the water treatment process that will improve water treatment efficiency and cost-effectiveness while also providing a means to maintain the required freeboard for the lagoons. The program consists of the following:

- Characterizing lagoon water from the three lagoons to identify potential variability between the three lagoons that could affect treatment
- Treating 10 million gallons of lagoon water and collecting samples and operating data at various flow rates (up to 210 gallons per minute [gpm] or 0.302 MGD) to evaluate performance and identify opportunities for improvement (see Figure 14)
- Performing bench-scale jar testing to identify coagulants and/or polymers that improve solids removal and settling rates
- Performing laboratory treatability studies to evaluate treatment processes for BOD and ammonia in the lagoon water.

The Water Treatment Pilot Program and treatability laboratory testing are ongoing with the initial field treatment portion of the program completed in June 2022. The program was extended to include the treatment of an additional 10 million gallons (for a total of 20 million gallons).[13] The results and conclusions of this study are not yet available for inclusion in this

[12] Evaluation of the treated water for land application as conducted as part of the Land Application Approach for the AltEn NDPES permit and the application rates are field-specific and governed by the Best Management Practices Plan.
[13] The FRG has agreed to treat another 15 million gallons during 2022; however, the Water Treatment Pilot Study will conclude after 20 million gallons.

Water RAP. Preliminary results indicate that the existing solids removal system is inefficient and may need to be modified or replaced. Efforts are underway to evaluate options for improving solids removal including engaging water treatment contractors and vendors.

2.4 SUMMARY AND CONCLUSIONS

In April 2021 extensive emergency work was initiated to address the threat of environmental damage from poorly maintained Site facilities. The FRG's ERMs and interim remedial actions consisted of drawing down and maintaining the lagoons' water levels; managing wet cake and other solid materials on-site through consolidation, containment, covering, and stormwater management; draining digester tanks; treating Site wastewater; and providing storage for treated water. These activities were necessary as ERMs while permanent solutions were being identified for the large volume of solids (wet cake and lagoon sludges) and the waters stored in lagoons as well as additional water that continues to accumulate on the Site from rainfall.

As of the end of August 2022, approximately 115 million gallons of untreated water and an unknown quantity of sludge are estimated to be present in the Northwest, Northeast, and Southeast Lagoons. The concentrations of pesticides in the untreated water are above potential discharge requirements for land application, and this water will require treatment prior to land applying or discharge. The current water treatment system is capable of reducing pesticide concentrations to levels acceptable for land application.[14] The nutrients that remain in the treated water are desirable to farm field property owners/growers. A Water Treatment Pilot Program is ongoing to evaluate whether the existing treatment system can be improved.

Solids present in the lagoons will be produced as sludge during the treatment of the lagoon water or final lagoon draining and will be managed with other Site solids. These sludges be addressed in the RAP for Remedial Media 2.

3.0 REMEDIAL ACTION WORK PLAN

3.1 EMERGENCY RESPONSE MEASURES AND INTERIM REMEDIAL ACTIONS

The FRG began conducting interim remedial actions as ERMs during the second quarter of 2021. The objective of the ERMs was near-term management of solids and water on-site to mitigate the potential that they would pose a threat to human health or the environment.

[14] Evaluation of the treated water for land application as conducted as part of the Land Application Approach for the AltEn NDPES permit and the application rates are field specific and governed by Best Management Practices Plan.

To date, the ERMs and interim measures and taken by the FRG include:

- Construction of temporary storage capacity to allow draw down from the three lagoons to decrease the risk of overtopping and to bring them into compliance with design freeboard conditions
- Removal and treatment of lagoon water to ensure lagoons are maintained at or below design freeboard levels and reduce the risk that rainwater would cause an overflow event
- Deflation of a gas-filled bubbles underneath the liner of the Northeast Lagoon to protect the integrity of the lagoon
- Refurbishing the Emergency Pond to provide additional storage capacity and allow for the digesters to be safely drained
- Construction of two supplemental lined cells, collectively termed the Treated Water Pond System, with a capacity to store 52 million gallons of treated water
- Construction or reconstruction of berm structures to contain contact stormwater and prevent it from leaving the Site
- Collection of contact stormwater for treatment and storage
- Consolidation and covering of wet cake with Posi-Shell® to minimize the potential for stormwater contact and reduce odors
- Winterization of process areas of the plant, including the consolidation of chemicals and other materials, draining of the digesters and process lines, and providing heating for specific process areas
- Characterization of process materials and chemicals abandoned at the Site by AltEn for management at approved off-site facilities
- Treatment of approximately 33.3 million gallons of water (as of September 1, 2022) for land application of nutrient-rich water to crops (in accordance with the AltEn NDPES permit NE0137634 and 2022 NDEE-approved Land Application Approach and Best Management Practices (BMP) Plan).

In 2021 and 2022, the FRG prepared and NDEE approved land application guidance documents[15] allowing discharge of treated water via land application in accordance with the AltEn NPDES permit NE0137634. In spring 2022, the FRG applied 8.6 million gallons of treated water to 318 acres of agricultural land across four participating fields in accordance with the AltEn permit and the land application guidance documents.

A complete discussion of the FRG's ERMs and interim remedial actions conducted in 2021 and the first half of 2022 is provided in the *Progress Report, Voluntary Cleanup Program, Interim Site and Material Management* (NewFields 2022-07-29).

[15] Land Application Approach (NewFields 2022-01) and Best Management Practices (BMP) Plan (Nutrient Advisors 2022-02).

3.2 Remedial Action Objectives

The remedial action objectives (RAOs) are:

- Remove treated Remedial Media 1 (lagoon water) from the Site by land application. Land application would be conducted in accordance with an AltEn NPDES permit and NDEE-approved plan and subject to the permit limitations in the approved plan, as amended (remediation goals).
- Maintain interim Site controls until remedial action is completed and the project transitions to long-term management, including the following:
    - Interim management of treated and untreated water. Manage storage capacity within the three lagoons, two Treated Water Pond System cells, and Emergency Pond and perform inspections of the impoundments to verify embankment stability. As an interim action, remove treated impoundment water from Site by land application. Land application would be carried out in accordance with an AltEn NPDES permit and NDEE-approved plan and subject to the permit limits in the Land Application Approach (Appendix D).
    - Interim management of Site stormwater runoff. Minimize rainwater contact with Remedial Media 2 and wastewater treatment materials storage areas. Maintain and augment existing stormwater and erosion sediment control best management practices (BMPs) including the Posi-Shell® cover and drainage network, as needed, to prevent comingling of stormwater runoff with water from contact areas. Manage non-contact stormwater in compliance with the current AltEn stormwater discharge permit.
    - Worker safety. Manage the safety of on-site workers by completing air monitoring during the active management of Remedial Media 1 and 2; controlling odor and dust during construction and consolidation activities; managing vegetation on-site to allow visual inspection of the embankment conditions and access to the impoundments and pumping equipment; performing on-site activities in accordance with the site-specific health and safety plan; and informing visitors of potential Site hazards.

3.3 Proposed Remedial Action for Remedial Media 1 (Water)

As of the end of August 2022, the untreated water stored within the Northwest, Northeast, and Southeast Lagoons is estimated to be approximately 115 million gallons. This Water RAP proposes to treat this lagoon water plus stormwater that accumulates within the lagoons and Emergency Pond during the remedial action period and manage the treated water through land application. The primary constituents of concern in Remedial Media 1 (lagoon/untreated water) that require treatment for land application include pesticides. The proposed remedial action for Remedial Media 1 is summarized in this section and includes a summary of alternatives that were considered, the proposed remedial action, potential pre-design investigations, and the anticipated schedule.

3.3.1 Preliminary Evaluation of Remedial Action

The existing water treatment system includes the AltEn treatment system and supplemental equipment added by the FRG or its members.[16] Treatment consists of adding coagulant and polymer to aid solids removal, removing coagulated solids through clarification, removing solids in water carried over from the clarifier through filtration, and granular activated carbon (GAC) adsorption to remove pesticides. Multiple GAC and filtration processes are currently used for the purpose of removing pesticides from the untreated water to levels acceptable for land application. The solids removal steps are used in the process to improve the effectiveness and decrease the change-out frequency of the GAC adsorbers. A process flow diagram of the existing water treatment system is provided as Figure 14.

The current water treatment system was implemented as an ERM and has been effective in reducing pesticide concentrations to levels that meet discharge requirements for land application. An engineering analysis is currently underway to determine whether the current system can be improved or a separate new system is appropriate for treating the remaining untreated water to achieve discharge requirements for land application in a more efficient and cost-effective manner.

A Water Treatment Pilot Program, as described in Section 2.3, commenced in May 2022 and is ongoing to evaluate design parameters that are required to make recommendations regarding treatment operations. At this time, water treatment is being performed using the existing treatment system with supplemental treatment systems added. Treatment beyond the Pilot Program could be conducted using a continuation of the current system (with any improvements) or a new system that would be brought to the Site to replace the existing water treatment system.

Preliminary findings from the Water Treatment Pilot Program indicate that the solids removal processes in the current water treatment system are inefficient and may need to be modified or replaced to improve its performance as well as the performance of downstream treatment processes. GAC treatment is an effective treatment technology for pesticides, and its performance would be improved with modifications to the solids removal process.

In December 2021, NDEE provided the FRG projected discharge limitations for two direct discharge locations, on-site Outfall 003 and off-site Outfall 004 (NDEE 2021-12-22). Outfall 004 would discharge into Johnson Creek immediately below the Johnson Creek Reservoir. The FRG evaluated this off-site outfall and found that discharge to Outfall 004 would require the design and construction of a force main pipeline, approximately 5 miles long, through multiple private properties, including the Department of Defense. For these reasons, the FRG concluded that Outfall 004 was impractical and logistically infeasible.

[16] The supplemental treatment system was first mobilized by one of the FRG members to the Site in response to the February 2021 spill, and the FRG has continued to operate this treatment system.

The discharge of treated water directly to surface water through the on-site Outfall 003 was also assessed. NDEE had expressed concern regarding the on-site direct discharge location specific to the hydraulic capacity of the receiving ditch and stream and the potential for increased erosion and sediment creation. Site hydraulic modeling indicates that, with operational discharge controls during heavy storm events, the receiving stream would not be impacted by this discharge. Direct discharge through Outfall 003 is considered a technically feasible alternative for the Site. The current GAC treatment is effective in achieving the pesticide discharge limits required for direct discharge; however, additional treatment would be required to meet surface water discharge limits for BOD and ammonia. Ammonia in the discharge water is a desirable nutrient for land application to farm fields. The proposed alternative, land application, can be implemented using the current water treatment; therefore, the on-site direct discharge alternative was not considered further.

Deep well injection was considered as a disposal candidate but was dismissed from further consideration due to regulatory and technical challenges. A primary requirement for this option was to identify a receiving geologic formation underlying the Site with a total dissolved solids (TDS) content of greater than 10,000 mg/L; this requirement could not be met.

3.3.2 Remediation Goals

Remediation goals are discharge limitations for the treated water. Treated water from the Site can be used to provide or supplement crop nutrients that would otherwise be supplied from fertilizer. The rate of land application must be managed to balance the desire to provide nutrients with risks of salt accumulation, nutrient leaching, and runoff. Rates of pesticide addition to farmland by land application of water must be monitored and remain within thresholds accepted by NDEE. Land application is regulated by NDEE under AltEn NPDES permit NE0137634 and the facility-specific Land Application Approach (NewFields 2022-01, which is Appendix D to this Water RAP). Prior to land application, the NPDES permit requires submittal and NDEE review of a BMP Plan at least annually, and BMP Plans must evaluate each field proposed to receive water. The most-recent BMP Plan (Nutrient Advisors 2022-02) was submitted in February 2022 and was approved by NDEE in March 2022. The three types of guiding documents for land application (NPDES permit, Land Application Approach, and BMP Plans) describe appropriate thresholds for nutrients, salts, and contemporary pesticides, and specify monitoring requirements.

In these guiding documents, thresholds for nutrients are field-specific based on residual nutrients in the soil and the general ability of the soil to retain nutrients. Per the NPDES permit, the nutrient evaluation must be performed by a certified agronomist or crop advisor. As listed in the most-recent BMP Plan (Nutrient Advisors 2022), the salt threshold for land application is that the water must be within the Sodium Adsorption Ratio (SAR, unitless) range from 6 to 12. For pesticides, the Land Application Approach (NewFields 2022-01) serves as a framework for controlled application of treated water to land so that contemporary pesticide loading to farm fields, in grams per acre, would be consistent with

or lower than rates from registered uses of pesticides. Allowable application rate, in gallons of treated water per acre of farmland for each application and annually, would be determined based on treated water sample results and pesticide thresholds identified in Table 1 of the Land Application Approach. For these evaluations, treated water samples and farm field soil samples would be collected in accordance with standard operating procedures from the NDEE-approved Land Application Approach.

During land application, visual inspections must be performed as required by the NPDES permit and Land Application Approach. For example, pumps, hose, connectors, and other equipment must be visually inspected prior to land application and at the start of pumping into each field to check for leaks. If leaks are observed, land application would cease until the identified leaks are repaired. Fields must be visually inspected at least once per day to check that no ponding or runoff is occurring. If ponding occurs, land application would cease in that field until the ponded water infiltrates. Additional requirements for land application, such as setbacks from sensitive features, are specified in the NPDES permit, Land Application Approach, and annual BMP Plans. Future land application would meet the requirements of these guiding documents approved by NDEE, or subsequent NDEE-approved documents.

3.3.3 Proposed Remedial Action

In general, the proposed remedial action would include the following:

- Optimize the water treatment system through potential modifications to the current treatment system operation and configuration
- Treating the water to meet the land application discharge requirements as described above in Section 3.3.2
- Storing treated water in the Treated Water Storage Ponds (West and East Cells) until land application can be performed
- Discharging the treated water via land application on agricultural fields in the surrounding area as approved by the property owners and NDEE (see Section 3.3.2)
- Dewatering and temporary storage of sludge from the water treatment system in the former Emergency Lagoon until it can be consolidated with other on-site solids for management.

The Water Treatment Pilot Program is ongoing, and the results, conclusions, and recommendations are not available for inclusion in this Water RAP. An additional 10 million gallons of lagoon water is being treated as part of the Water Treatment Pilot Program while treatment system improvement actions are continuing to be developed. In addition, the FRG has authorized an additional 15 million gallons of treatment after completion of the Pilot Program. The treated water is expected to be land applied in the fall of 2022 or early spring of 2023 per the NPDES permit and land application guidance

documents. The required approvals would be obtained from the agricultural property owners/growers and NDEE prior to land application of treated water.

An updated Title 123 permit application for the current pilot water treatment system was submitted to NDEE on June 24, 2022, for review and approval, and NDEE comments on the permit application have been received by the FRG and are being addressed.

In parallel with the Water Treatment Pilot Program, proposals are being solicited from water treatment vendors. Each vendor was provided the initial data from the Water Treatment Pilot Program and data from the individual lagoons. The vendors were also provided samples of water from the Northwest, Northeast, and Southeast Lagoons for use in performing their own treatability tests in preparation of their proposals. The outcome of this solicitation would allow for the comparison of alternative proposals for treatment with the existing treatment system, and the selection of the most efficient and cost-effective approach for water treatment for the remainder of the lagoon water (Remedial Media 1). The recommended rate of water treatment for the treatment system resulting from the Water Treatment Pilot Program and associated engineering evaluation will depend on several factors including the expected demand from agricultural property owners/growers for land application of water, treated water storage availability, equipment availability, and cost. The preliminary estimates of the water treatment rate are within the range of 150 to 250 gpm (0.216 to 0.360 MGD) based on information available at this time. The final water treatment rates would be established during the remedial design based on technical treatment factors and the factors identified above.

3.3.4 Remedial Action Implementation

In general, the following steps would be required to implement the proposed remedial action:

- Complete the Water Treatment Pilot Program
- Complete the water treatment vendor solicitation process and select a vendor for the remainder of water treatment at the Site, including the possibility of maintaining operation of the existing treatment system
- Obtain a Title 123 permit amendment from NDEE for the modified water treatment system
- Construct water treatment system modifications as needed per the permit issued by NDEE
- Commission the modified water treatment system to verify performance and operating parameters
- Continue lagoon water pumping, treatment, and land application until no lagoon water remains to be treated.

As indicated in previous sections, following completion of the Water Treatment Pilot Program, an additional 15 million gallons of lagoon water will be treated using the existing

water treatment system. Land application of approximately 18 to 24 million gallons is expected to occur during the fall of 2022 in accordance with the requirements described above in Section 3.3.2.

3.3.5 Pre-Design Investigations

As summarized above in Sections 2.3 and 3.3.1, a Water Treatment Pilot Program is currently underway, and the results are not available for inclusion in this Water RAP. Results from this program may indicate that additional treatability studies and/or pilot tests are warranted to refine the treatment process improvements and/or confirm performance. Prior to land application, treated water and farm field soil would be sampled in accordance with the Land Application Approach (Appendix D). NDEE would be notified in the event additional studies are performed.

3.3.6 Schedule

The proposed schedule for Remedial Media 1 (lagoon water) should consider the factors and contingencies beyond the FRG's control that have the potential to significantly impact the timing of next steps. Such factors may include the following:

- NDEE review and approval of the Water RAP and permits, and other approvals that may be needed from NDEE and/or other regulatory agencies
- Public participation process for the Water RAP that is required under Nebraska law
- Property owner/grower demand and schedule regarding the volume of land application water needed and agronomic timing of application
- Water Treatment Pilot Program results and recommendations
- Contractor/vendor proposals, recommendations, and proposed schedule
- Equipment availability and delivery schedule
- Unexpected delays due to other parties and/or events beyond the FRG's control and potential extreme weather conditions to limit the ability to perform the work.

In light of the above factors, the schedule for Remedial Media 1 (lagoon water) remains contingent aside from the work that is already underway or being conducted as a significant interim measure under the MOA with NDEE. The preliminary schedule for Remedial Media 1 (lagoon water) treatment and land application is summarized as follows:

General Task	Preliminary Schedule
Water Treatment Pilot Program	May through August 2022
Additional 15 million gallons treated	September through November 2022
Land Application of 18 to 24 million gallons	October through November 2022 (and Spring 2023, if required)

General Task	Preliminary Schedule
Contractor/Vendor Proposal Review & Selection	To be determined (TBD), subject to contingencies above
Design/Contracting and Permitting	TBD, subject to contingencies above
Installation and Commissioning (as needed)	TBD, subject to contingencies above
Lagoon Water Treatment and Land Application	TBD, subject to contingencies above

The above schedule is subject to change and will continue to be refined as the project moves forward and new information becomes available.

Schedule changes would be communicated to NDEE for their review and approval, as necessary.

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TABLES

Table 1 Summary of Climate Data

Month	Total Precipitation Normal (inches)	Mean Max Temperature Normal (°F)	Mean Min Temperature Normal (°F)	Mean Avg Temperature Normal (°F)	Total Snowfall Normal (inches)
January	0.62	32.7	12.0	22.4	4.7
February	0.78	37.4	15.9	26.6	6.0
March	1.53	50.5	26.6	38.6	2.6
April	2.92	62.7	37.2	49.9	0.8
May	4.72	72.6	49.3	60.9	0.1
June	4.9	82.8	59.9	71.3	0
July	3.08	86.6	63.7	75.1	0
August	3.77	84.5	61.3	72.9	0
September	3.15	78.4	51.8	65.1	0
October	2.18	65.4	39.2	52.3	0.5
November	1.33	50.0	26.3	38.2	1.2
December	1.12	37.0	16.9	27.0	4.4
Annual	**30.1**	**61.7**	**38.3**	**50.0**	

Source: National Oceanic and Atmospheric Administration, National Weather Service (NOAA NWS), 2021. Summary of Monthly Normals for Mead 6S NE station, data set 1991-2020. https://www.weather.gov/wrh/Climate?wfo=oax

Table 2 Target Contemporary Pesticides and Site Chemicals of Potential Concern

Sample Analyte List	CAS RN	Pesticide Category	Chemical of Potential Concern	Sample Analyte List	CAS RN	Pesticide Category	Chemical of Potential Concern
Abamectin	71751-41-2	Insecticide	X	Glyphosate	1071-83-6	Herbicide	X
Acetamiprid	135410-20-7	Insecticide		Imidacloprid	138261-41-3	Insecticide	X
AMPA	77521-29-0	Herbicide	X	Ipconazole	125225-28-7	Fungicide	X
Azoxystrobin	131860-33-8	Fungicide	X	Isavuconazole	241479-67-4	Fungicide	
Baythroid	68359-37-5	Insecticide		Itraconazole	84625-61-6	Fungicide	
Biphenthrin	82657-04-3	Insecticide		Metalaxyl/Mefenoxam	70630-17-0	Fungicide	X
Brassinazole	224047-41-0	Fungicide		Metconazole	125116-23-6	Fungicide	X
Captan	133-06-2	Fungicide		Nitenpyram	150824-47-8	Insecticide	
Carbendazim	10605-21-7	Fungicide		Orysastrobin	248593-16-0	Fungicide	
Carboxin	5234-68-4	Fungicide	X	Permethrin	52645-53-1	Insecticide	X
Chlorantraniliprole	500008-45-7	Insecticide	X	Picoxystrobin	117428-22-5	Fungicide	
Chlorpyrifos	2921-88-2	Insecticide	X	Posaconazole	171228-49-2	Fungicide	
Chlorpyrifos-methyl	5598-13-0	Insecticide		Propiconazole	60207-90-1	Fungicide	X
Clothianidin	210880-92-5	Insecticide	X	Prothioconazole	178928-70-6	Fungicide	X
Cyantraniliprole	736994-63-1	Insecticide	X	Pyraclostrobin	175013-18-0	Fungicide	X
Cyhalothrin/Karate	91465-08-6	Insecticide		Ravuconazole	182760-06-1	Fungicide	
Cypermethrin	52315-07-8	Insecticide		Sedaxane	874967-67-6	Fungicide	X
Cyproconazole	94361-06-5	Fungicide		Tebuconazole	107534-96-3	Fungicide	X
Deltamethrin	52918-63-5	Insecticide		Tetraconazole	112281-77-3	Fungicide	X
Difenoconazole	119446-68-3	Fungicide	X	Thiabendazole	148-79-8	Fungicide	X
Dimoxystrobin	149961-52-4	Fungicide		Thiacloprid	111988-49-9	Insecticide	
Dinotefuran	165252-70-0	Insecticide		Thiamethoxam	153719-23-4	Insecticide	X
Epoxiconazole	133855-98-8	Fungicide		Thiophanate-methyl	23564-05-8	Fungicide	
Fluconazole	86386-73-4	Fungicide		Tioxazafen	330459-31-9	Nematicide	X
Fludioxonil	131341-86-1	Fungicide	X	Trifloxystrobin	141517-21-7	Fungicide	X
Fluoxastrobin	361377-29-9	Fungicide	X	Uniconazole	83657-22-1	Fungicide	
Glufosinate	51276-47-2	Herbicide	X	Voriconazole	137234-62-9	Fungicide	

Chemical of Potential Concern (COPC) is defined as having been detected in either Remedial Media, identification as a COPC does <u>not</u> imply that concentrations are above human health or ecological risk-based criteria

Table 3 Comparison of Site Lagoon Water Chemicals of Potential Concern with Depth

Chemical of Potential Concern [1] or Analyte of Interest		NW Lagoon				NE Lagoon			SE Lagoon		
		Shallow		Deep	RPD	Shallow	Deep	RPD	Shallow	Deep	RPD
		NW-18	NW-96*	NW-72		NE-18	NE-72		SE-18	SE-72	
Abamectin	ug/L	120	110	500	**-123%**	1,400	1,800	-25%	74	74	0%
AMPA	ug/L	NA	NA			NA	NA		NA	NA	
Azoxystrobin	ug/L	88	84	95	-8%	0.87	0.89	-2%	1.5	1.5	0%
Carboxin	ug/L	ND	ND	ND		4.4	4.5	-2%	2.3	2.3	0%
Chlorantraniliprole	ug/L	760	710	790	-4%	780	760	3%	110	110	0%
Chlorpyrifos	ug/L	ND	ND	0.073	(--)	ND	0.16	(--)	ND	ND	
Clothianidin	ug/L	200	210	180	11%	ND	ND		ND	ND	
Cyantraniliprole	ug/L	2.3	2.3	2.4	-4%	ND	ND		ND	ND	
Difenoconazole	ug/L	1.3	1.2	1.4	-7%	46	62	-30%	2.5	2.4	4%
Fludioxonil	ug/L	26	24	48	**-59%**	220	280	-24%	29	30	-3%
Fluoxastrobin	ug/L	740	690	980	-28%	640	740	-14%	5.8	5.9	-2%
Glufosinate	ug/L	NA	NA			NA	NA		NA	NA	
Glyphosate	ug/L	NA	NA			NA	NA		NA	NA	
Imidacloprid	ug/L	2.0	1.9	1.8	11%	ND	ND		ND	ND	
Ipconazole	ug/L	14	13	44	**-103%**	210	260	-21%	7.7	7.7	0%
Metalaxyl/Mefenoxam	ug/L	3,700	4,200	3,300	11%	35	32	9%	8.8	8.9	-1%
Metconazole	ug/L	ND	ND	ND		3.7	4.3	-15%	2.3	2.3	0%
Permethrin	ug/L	ND	ND	ND		0.24	0.33	**-32%**	ND	ND	
Propiconazole	ug/L	ND	ND	ND		16	18	-12%	19	19	0%
Prothioconazole	ug/L	3.7	4.4	25	**-148%**	96	140	**-37%**	3.6	3.5	3%
Sedaxane	ug/L	75	74	89	-17%	160	170	-6%	56	60	-7%
Tebuconazole	ug/L	75	72	110	**-38%**	480	530	-10%	160	160	0%
Tetraconazole	ug/L	ND	ND	ND		0.36	0.44	-20%	0.51	0.51	0%
Thiabendazole	ug/L	990	930	1,100	-11%	1,500	1,700	-13%	500	490	2%
Thiamethoxam	ug/L	1,600	1,500	1,500	6%	1.4	1.3	7%	ND	ND	
Tioxazafen	ug/L	0.12	0.11	0.10	18%	0.11	0.12	-9%	ND	ND	
Trifloxystrobin	ug/L	5.0	4.7	19	**-117%**	10	14	**-33%**	ND	ND	
Ammonia (as N)	mg/L	838		753	11%	648	807	-22%	406	400	1%
Nitrate (as N)	mg/L	0.41		0.41	0%	ND	ND		ND	ND	
Nitrite (as N)	mg/L	ND		ND		0.02	<0.02		0.04	0.03	29%
Total Kjeldahl Nitrogen (TKN)	mg/L	1090		1460	-29%	887	1060	-18%	481	485	-1%

Table presents only Site water COPCs, Appendix D presents the complete analytical report (chemical analyzed but not detected)

Pesticide concentrations were analyzed by PAL for NDEE, herbicide COPCs were not analyzed

NA = not analyzed; ND = Not detected

* NW-96 is a field duplicated of NW-18; the primary sample's concentration was used in the RPD calculations

RPD [Relative Percent Difference] = (shallow-deep)/average; negative numbers indicate the deep concentration is higher than the shallow sample; (--) indicate the analyte was only detected in the deep sample

RPD in bold font >30%, water concentrations within 30% are typically considered within the measurement accuracy (field sampling water duplication)

RPD in bold font with gray cell highlighted >50% (sampling field duplication of solid materials) and indicate there exists a possibly the analyte might be stratified within the lagoon

Table 4 Summary of Chemicals of Potential Concern and other Analytes of Interest in Lagoon Waters and Treatment System Influent

Chemical of Potential Concern [1] or Analyte of Interest	CAS RN	Unit	Lagoon Water					Treatment System Influent			
			Number of Samples	Detection Frequency	Range of Concentrations		Location and Date of the Maximum Concentration	Number of Samples	Detection Frequency	Range of Concentrations	
					Minimum	Maximum				Minimum	Maximum
Abamectin	71751-41-2	ug/L	15	100%	74.	21,000.	Northeast Lagoon - 07/13/22	35	100%	3.9	430
AMPA	77521-29-0	ug/L	9	67%	ND	250.	Emergency Pond - 05/17/21	27	78%	ND	200
Azoxystrobin	131860-33-8	ug/L	20	100%	0.87	581.	Emergency Pond - 04/08/19	35	77%	ND	17
Carboxin	5234-68-4	ug/L	15	73%	ND	6.6	Southeast Lagoon - 05/17/21	27	93%	ND	7.2
Chlorantraniliprole	500008-45-7	ug/L	15	100%	58.	1,200.	Northeast Lagoon - 07/13/22	31	100%	48	470
Chlorpyrifos	2921-88-2	ug/L	16	13%	ND	0.16	Northeast Lagoon - 04/26/22	32	0%	ND	ND
Clothianidin	210880-92-5	ug/L	21	67%	ND	58,400.	Northwest Lagoon - 04/08/19	34	50%	ND	624
Cyantraniliprole	736994-63-1	ug/L	15	40%	ND	2.9	Northwest Lagoon - 05/17/21	27	4%	ND	1.3
Difenoconazole	119446-68-3	ug/L	19	100%	1.2	510.	Northeast Lagoon - 07/13/22	35	77%	ND	12
Fludioxonil	131341-86-1	ug/L	15	100%	18.	2,100.	Northeast Lagoon - 07/13/22	31	94%	ND	187
Fluoxastrobin	361377-29-9	ug/L	19	100%	1.9	2,500.	Northeast Lagoon - 07/13/22	35	89%	ND	200
Glufosinate	51276-47-2	ug/L	13	15%	ND	86.7	Emergency Pond - 04/08/19	35	11%	ND	34.1
Glyphosate	1071-83-6	ug/L	14	100%	64.	3,850.	Emergency Pond - 04/08/19	35	94%	ND	2060
Imidacloprid	138261-41-3	ug/L	21	43%	ND	312.	Northwest Lagoon - 11/12/19	34	0%	ND	ND
Ipconazole	125225-28-7	ug/L	19	100%	4.1	2,100.	Northeast Lagoon - 07/13/22	35	83%	ND	43
Metalaxyl/Mefenoxam	70630-17-0	ug/L	15	100%	2.3	4,200.	Northwest Lagoon - 04/27/22	31	97%	ND	470
Metconazole	125116-23-6	ug/L	20	45%	ND	20.	Northeast Lagoon - 07/13/22	35	69%	ND	6.86
Permethrin	52645-53-1	ug/L	16	13%	ND	0.33	Northeast Lagoon - 04/26/22	32	0%	ND	ND
Propiconazole	60207-90-1	ug/L	20	75%	ND	726.	Emergency Pond - 04/08/19	35	91%	ND	78.7
Prothioconazole	178928-70-6	ug/L	19	100%	3.5	150.	Northwest Lagoon - 11/12/19	35	83%	ND	69
Sedaxane	874967-67-6	ug/L	10	100%	56.	670.	Northeast Lagoon - 07/13/22	23	100%	17	164
Tebuconazole	107534-96-3	ug/L	21	100%	41.	2,600.	Northeast Lagoon - 07/13/22	35	100%	3.9	280
Tetraconazole	112281-77-3	ug/L	18	28%	ND	1.3	Emergency Pond - 05/17/21	35	0%	ND	ND
Thiabendazole	148-79-8	ug/L	21	100%	170.	39,700.	Emergency Pond - 04/08/19	35	100%	1	1500
Thiamethoxam	153719-23-4	ug/L	21	71%	ND	35,400.	Northwest Lagoon - 04/08/19	34	47%	ND	128
Tioxazafen	330459-31-9	ug/L	10	50%	ND	0.12	Northeast Lagoon - 04/26/22	19	0%	ND	ND
Trifloxystrobin	141517-21-7	ug/L	20	75%	ND	737.	Emergency Pond - 04/08/19	35	0%	ND	ND
Ammonia (as N)	NH3N	mg/L	17	100%	301.	877.	Northwest Lagoon - 07/12/22	18	100%	193	498
Nitrate (as N)	14797-55-8	mg/L	8	50%	ND	0.26	Emergency Pond - 05/17/21	18	22%	ND	0.6
Nitrite (as N)	14797-65-0	mg/L	14	29%	ND	0.04	Southeast Lagoon - 04/26/22	9	44%	ND	0.15
Total Kjeldahl Nitrogen (TKN)	TKN	mg/L	11	100%	481.	1,460.	Northwest Lagoon - 04/27/22	8	100%	519	1200
Total Nitrate/Nitrite	NO3/NO2-N	mg/L	11	55%	ND	0.41	Northwest Lagoon - 04/27/22	9	22%	ND	0.13
Biological Oxygen Demand (BOD)	BOD	mg/L	8	100%	477.	17,700.	Northeast Lagoon - 05/17/21	21	100%	367	1610
Phosphorus (as P)	7723-14-0	ug/L	5	100%	130,000.	554,000.	Northeast Lagoon - 05/17/21	8	100%	52500	74700
Iron	7439-89-6	ug/L	5	100%	6,640.	67,700.	Emergency Pond - 04/08/19	NA	NA	NA	NA
pH	PH	SU	14	100%	4.79	8.13	Min:Northwest Lagoon - 04/27/22 Max:Southeast Lagoon - 04/26/22	16	100%	4.2	8.07
Total Organic Carbon (TOC)	TOC	mg/L	5	100%	1,600.	7,570.	Northwest Lagoon - 05/17/21	8	100%	345	890
Total Suspended Solids (TSS)	TSS	mg/L	14	100%	48.	20,900.	Northeast Lagoon - 07/13/22	17	100%	52	4520

(1) List of analytes contain only those chemicals of potential concern that were detected in at least one lagoon sample

CAS RN - Chemical Abstracts Service Registry Number

ND = analyte not detected, see Appendix C for detection limit and complete sample results

NA = not analyzed in medium

FIGURES

NewFields

Figure 1

Site Location Map

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

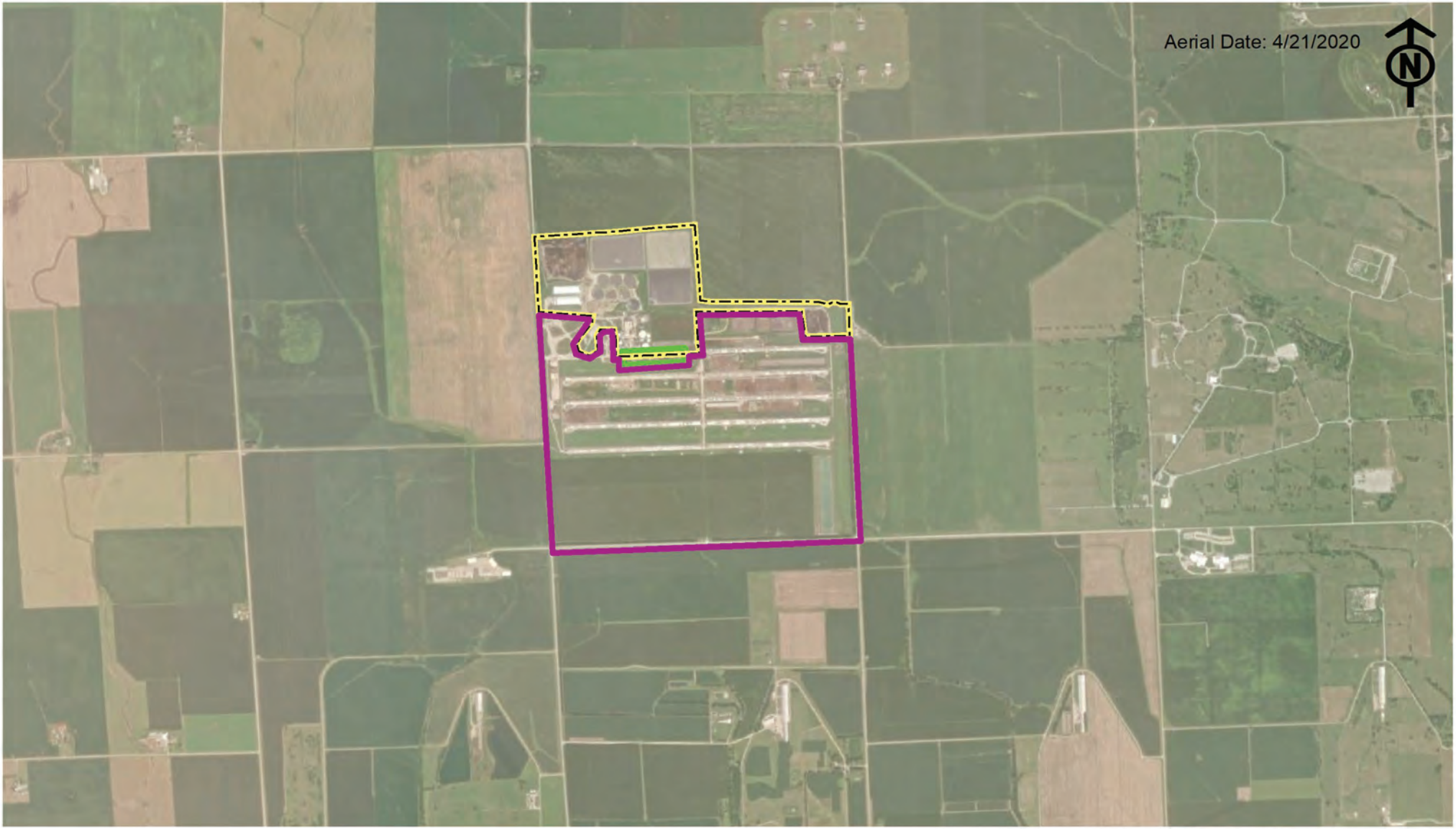
0 250 500 1,000 1,500 2,000 Feet

1. NW or Consolidated Wet Cake Pile
2. East Wet Cake Pile
3. Central Wet Cake Area
4. Northwest Lagoon
5. Northeast Lagoon
6. Southeast Lagoon
7. Emergency Pond
8. Treated Water Pond (West and East Cells)
9. Former temporary water storage tanks
10. North Digester
11. South Digester
12. Water Treatment Facility
13. Contractor staging area
14. Hoop buildings (North and South)
15. AltEn office building
16. Former grain receiving/unloading area
17. Former WDG loadout pad
18. Former biochar unit
19. Former composting pad

NewFields

Figure 2

AltEn Site Features



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 1,250 2,500 5,000 Feet

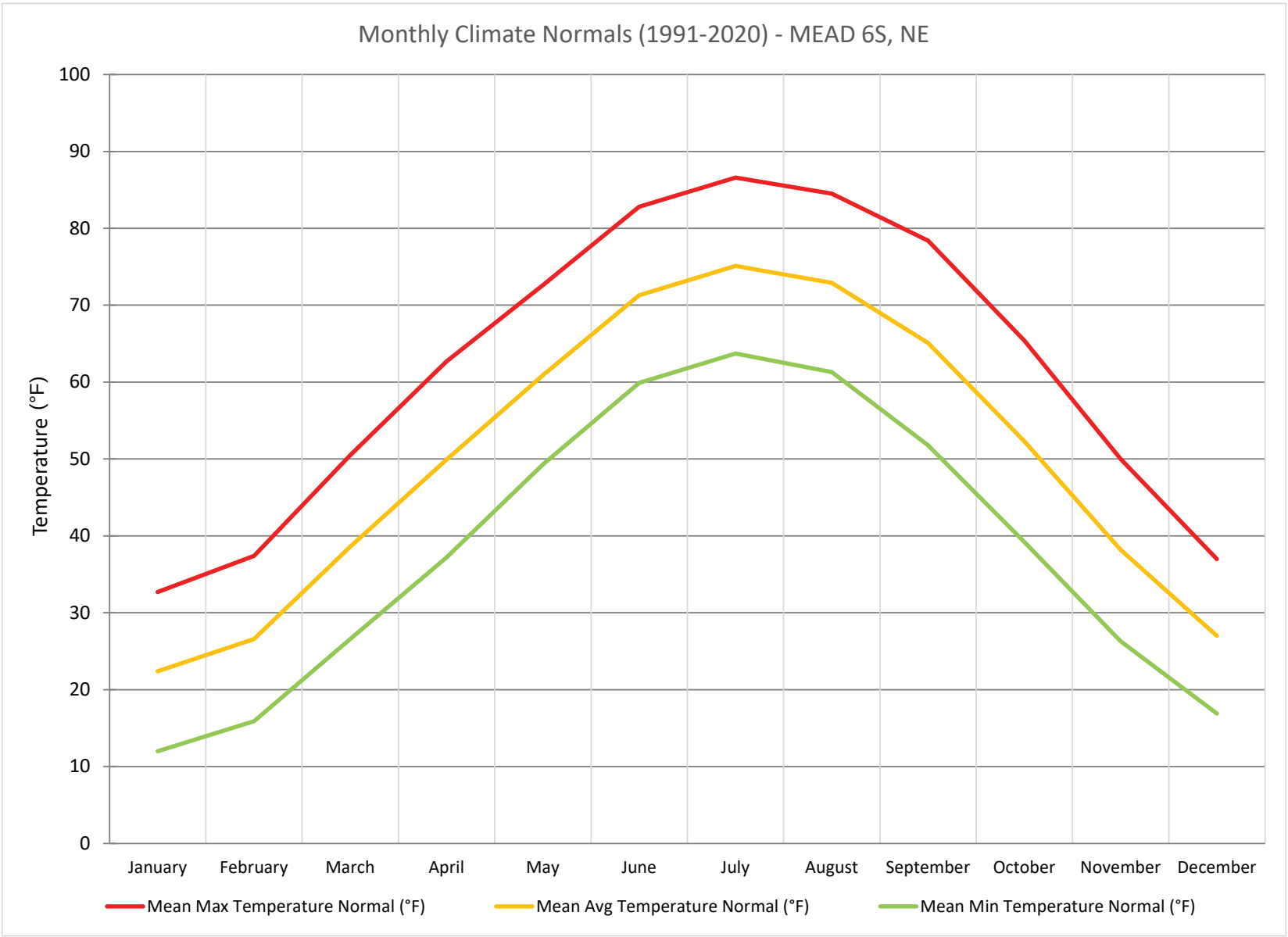
Legend

- AltEn Site
- Mead Cattle Company / Champion Feeders
- Green Disposal Mead LLC

NewFields

Figure 3

Site and Surrounding Areas

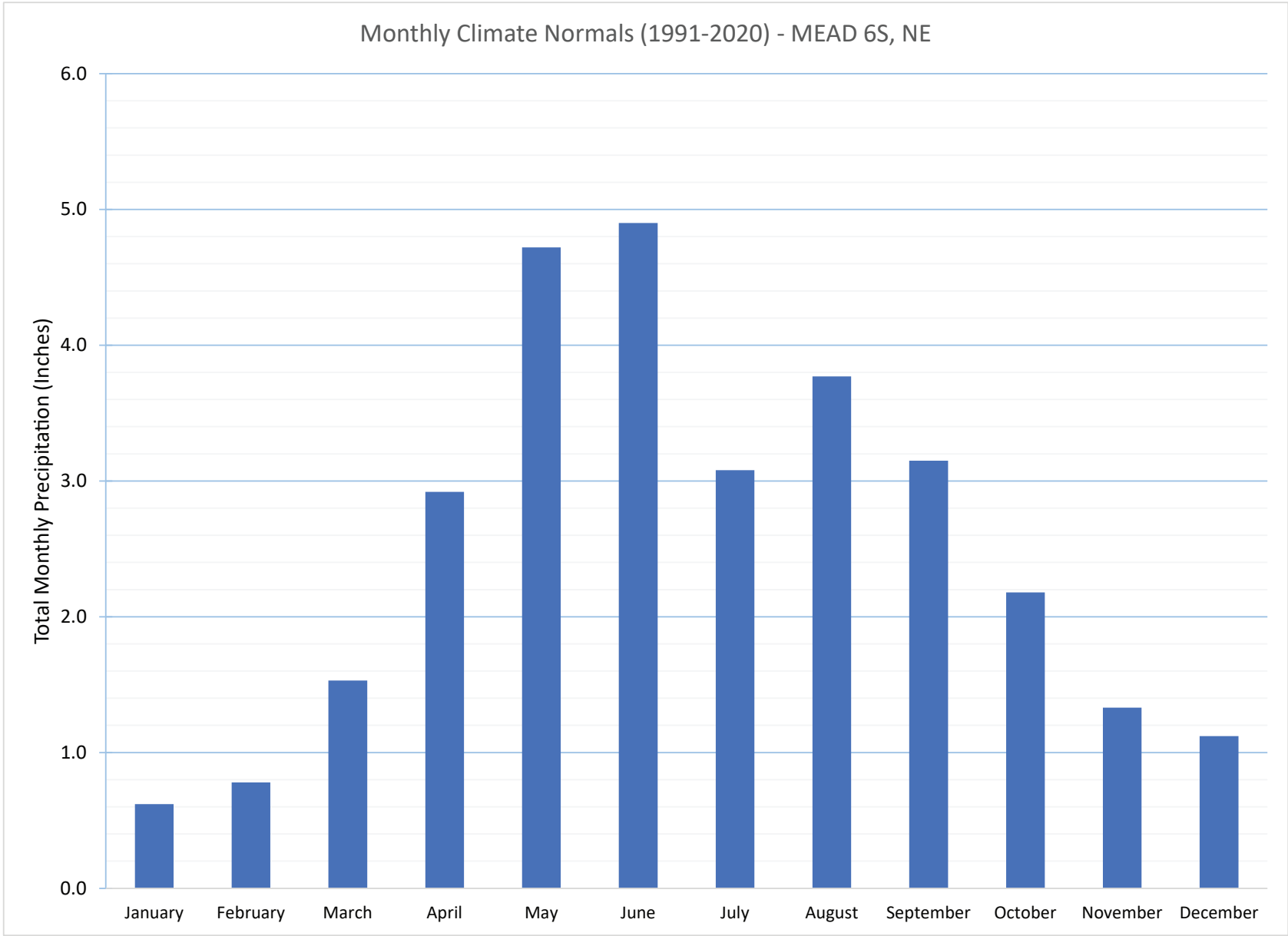


Source: National Oceanic and Atmospheric Administration, National Weather Service (NOAA NWS), 2021. Summary of Monthly Normals for Mead 6S NE station, data set 1991-2020. https://www.weather.gov/wrh/Climate?wfo=oax

NewFields

Figure 4

Average Monthly Temperatures

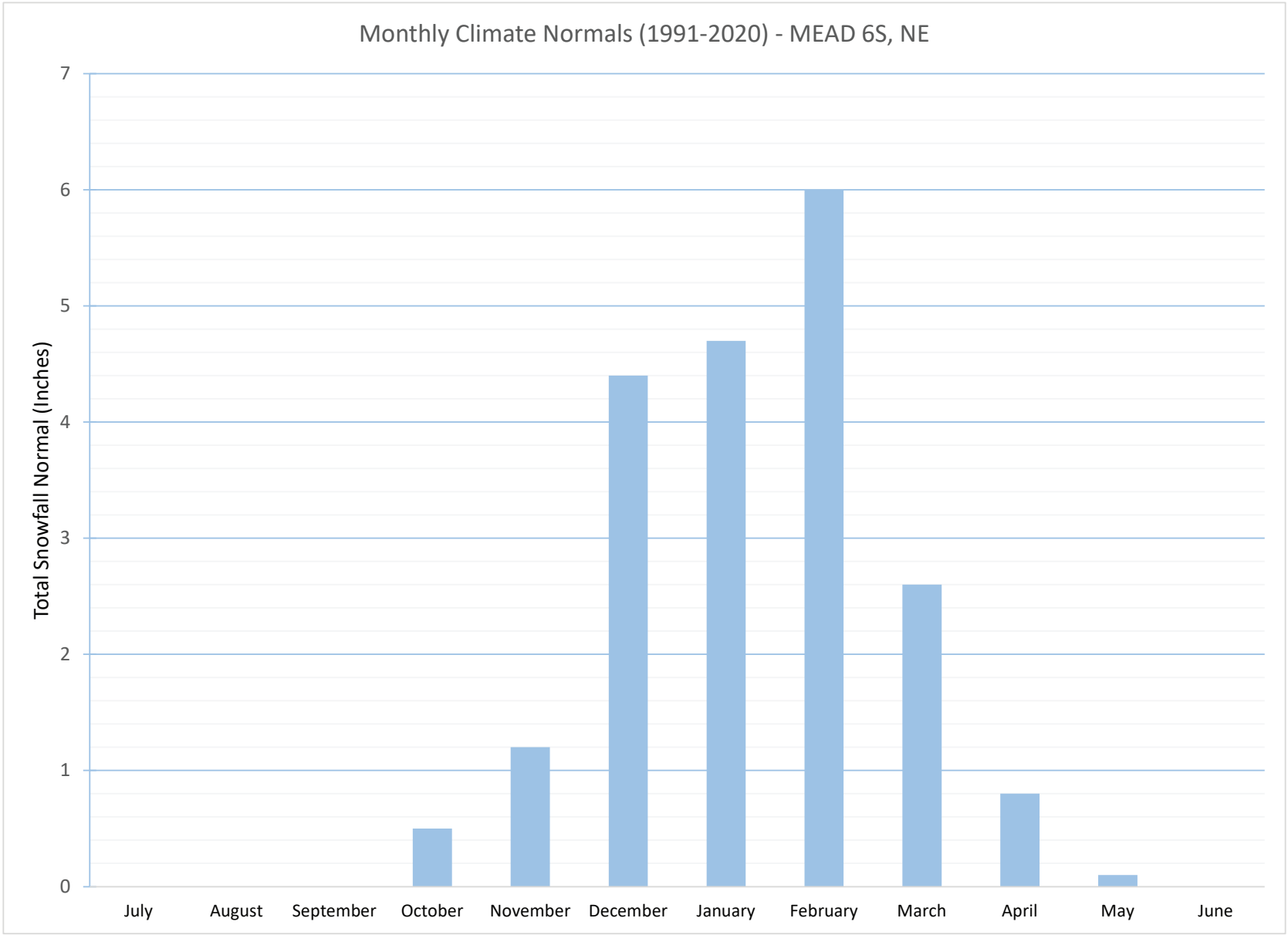


Source: National Oceanic and Atmospheric Administration, National Weather Service (NOAA NWS), 2021. Summary of Monthly Normals for Mead 6S NE station, data set 1991-2020. https://www.weather.gov/wrh/Climate?wfo=oax

NewFields

Figure 5

Average Monthly Precipitation



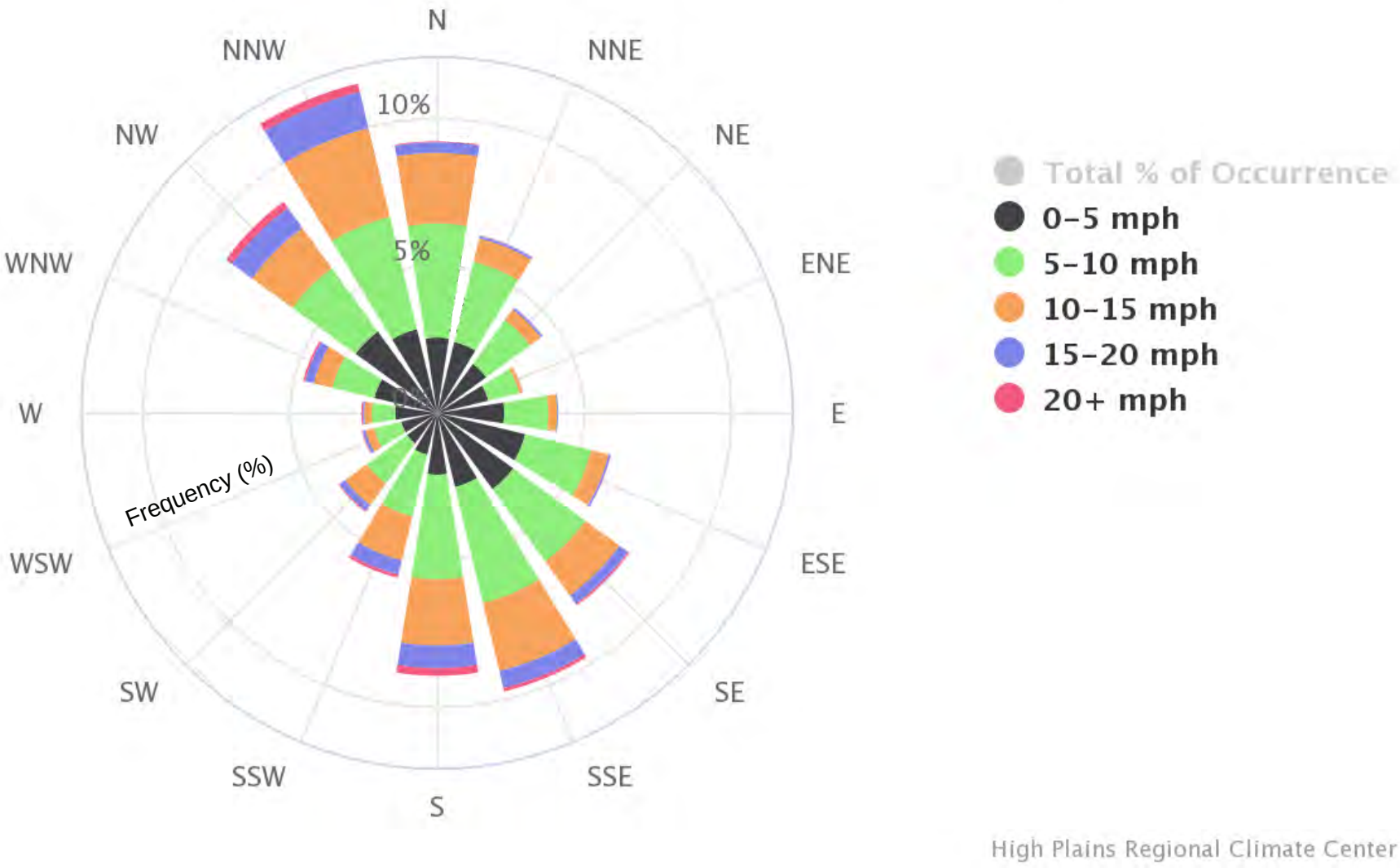
Source: National Oceanic and Atmospheric Administration, National Weather Service (NOAA NWS), 2021. Summary of Monthly Normals for Mead 6S NE station, data set 1991-2020. https://www.weather.gov/wrh/Climate?wfo=oax

NewFields

Figure 6

Average Monthly Snowfall

Wind rose for Mead 4s, NE Annual 1996-2012

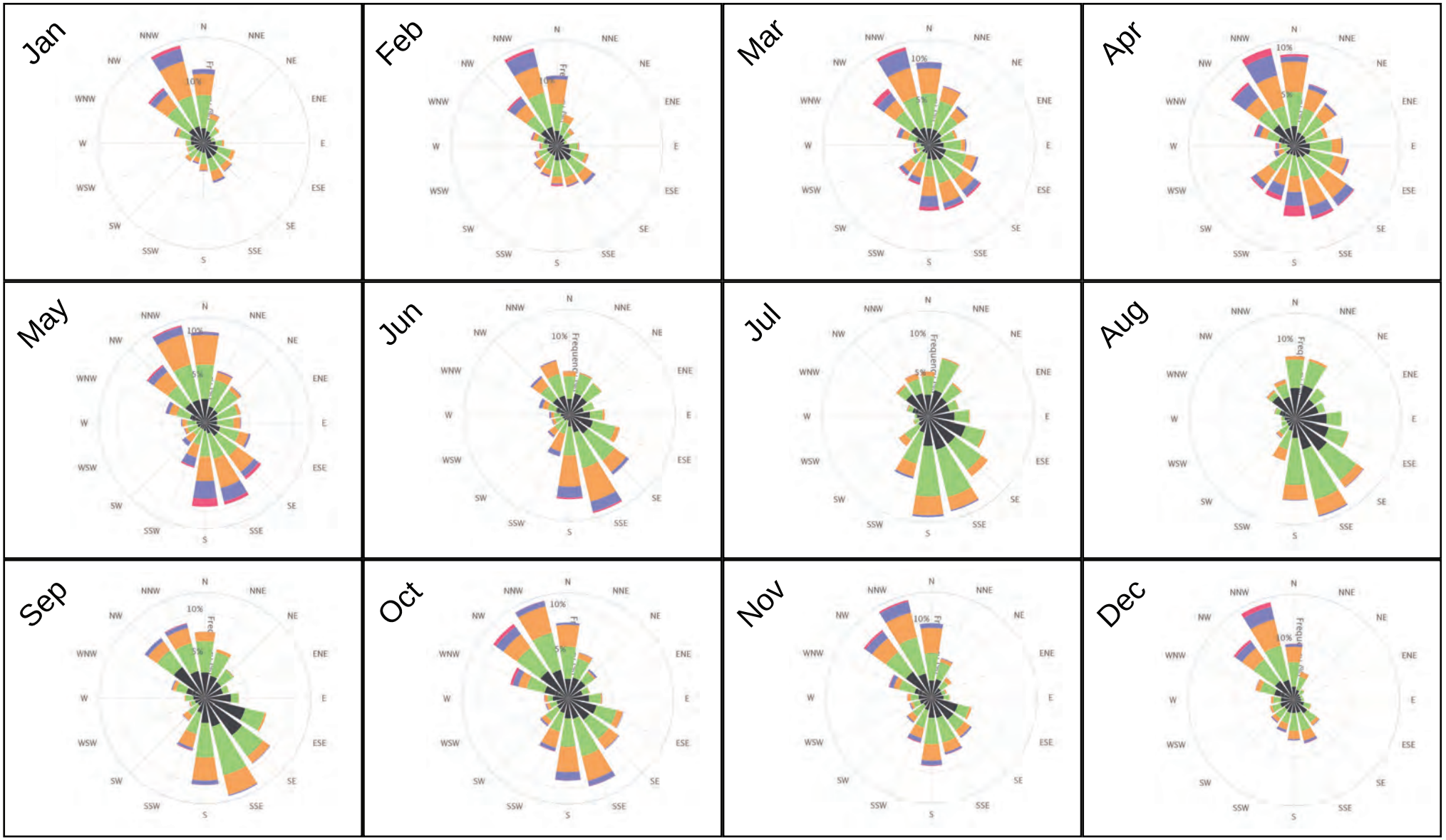


Source: High Plains Regional Climate Center (HPRCC), 2021: Automated Weather Data Network (AWDN), Nebraska Mesonet, Wind Station Mead 4s, NE, data set 1996-2012, https://hprcc.unl.edu/datasets.php?set=WindRose#.

NewFields

Figure 7

Annual Wind Direction & Speeds



Wind Roses for Mead 4s, NE, January - December, 1996-2012

- Total % of Occurrence
- 0–5 mph
- 5–10 mph
- 10–15 mph
- 15–20 mph
- 20+ mph

Source: High Plains Regional Climate Center (HPRCC), 2021: Automated Weather Data Network (AWDN), Nebraska Mesonet, Wind Station Mead 4s, NE, data set 1996-2012, https://hprcc.unl.edu/datasets.php?set=WindRose#.

NewFields

Figure 8

Monthly Wind Direction & Speeds

Source: Advanced Aerial Solutions

0 250 500 1,000 1,500 2,000 Feet

Legend

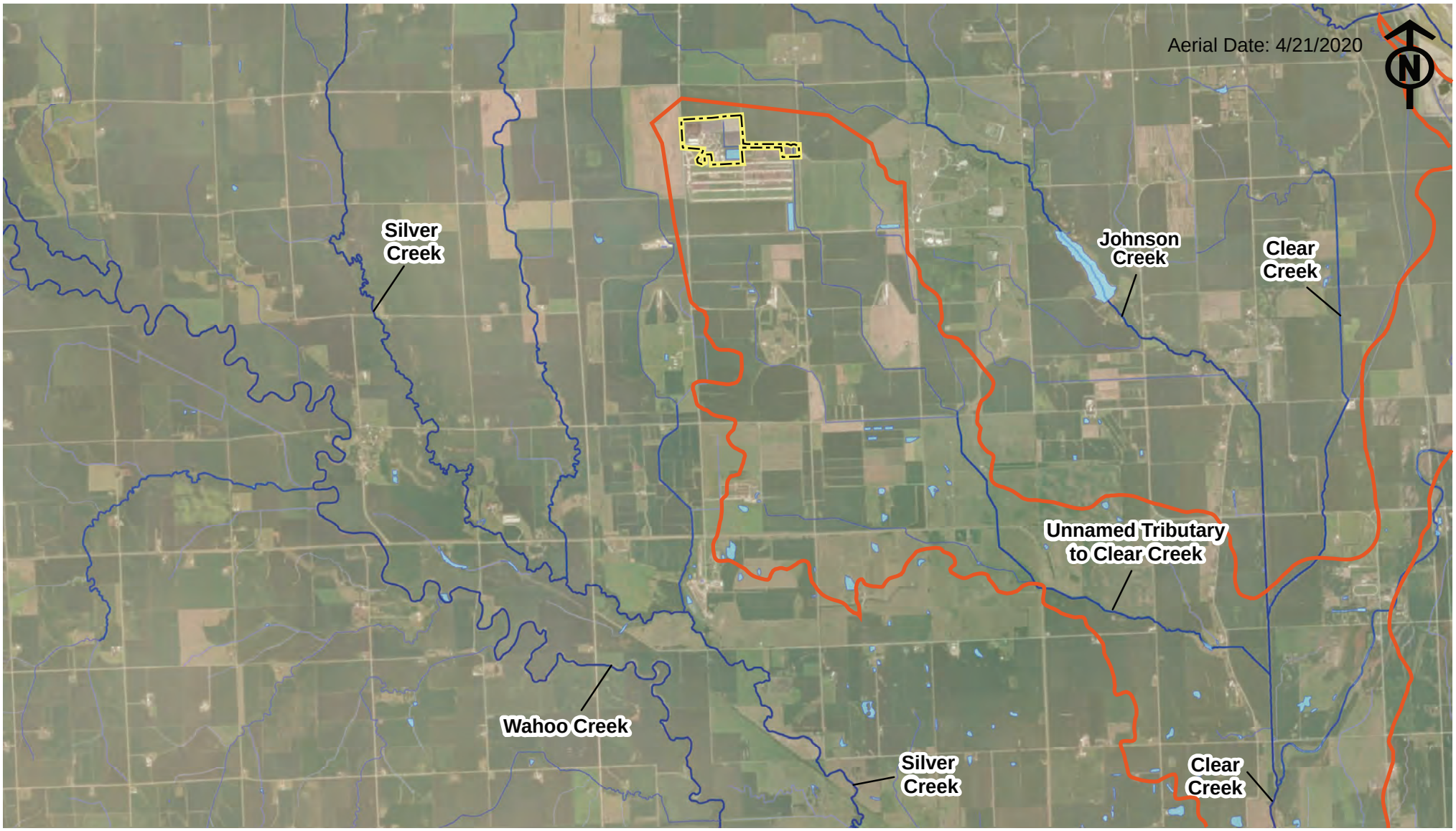
Elevation (ft amsl), 08/10/2022, contour interval = 1 foot

Site Boundary

NewFields

Figure 9

Site Surface Topography



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 1.25 2.5 5 Miles

Legend

- AltEn Site
- Clear Creek Watershed (USGS HUD 102002031004)
- Lakes and ponds
- Rivers and streams

NewFields

Figure 10

Surface Water Streams & Water Bodies

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 1,250 2,500 5,000 Feet

Legend

- Irrigation, Active/Inactive
- Irrigation, Decommissioned
- Commercial/Industrial, Active/Inactive
- Commercial/Industrial, Decommissioned
- Domestic, Active/Inactive
- Open/Closed Loop Heat Pump well, Active/Inactive
- Monitoring (GW Quality), Active
- Monitoring (GW Quality), Decommissioned
- Site boundary

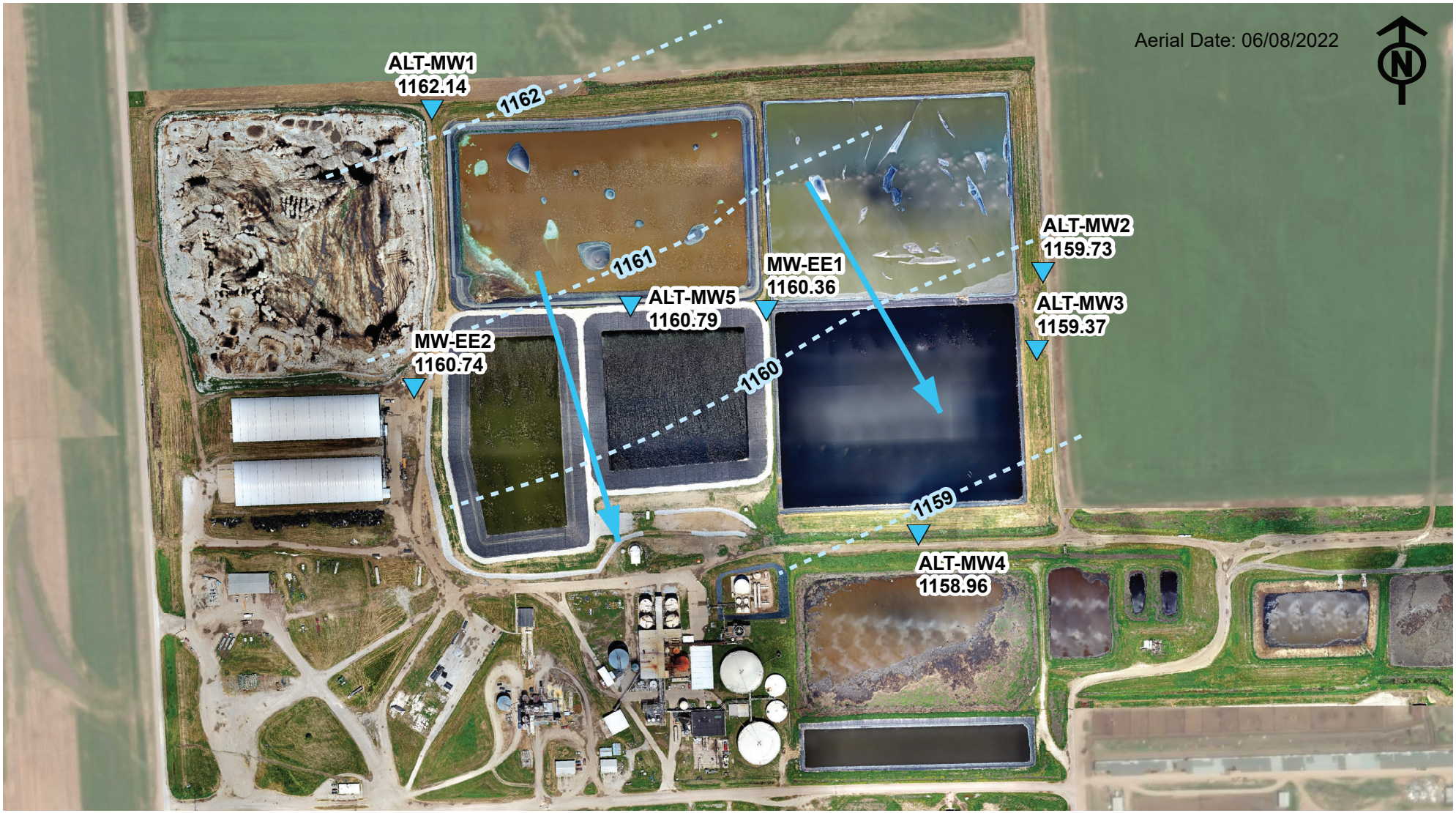
Source: Nebraska (NDNR) Registered Wells Inventory website (https://gis.ne.gov/portal/apps/webappviewer/index.html?id=7e332656859247c9874b02c7aa1f58e8)

*The depicted location has been modified from the NDNR location using aerial photography.

NewFields

Figure 11

Location of Site Wells & Surrounding Wells



Source: Advanced Aerial Solutions

0 250 500 1,000 1,500 2,000 Feet

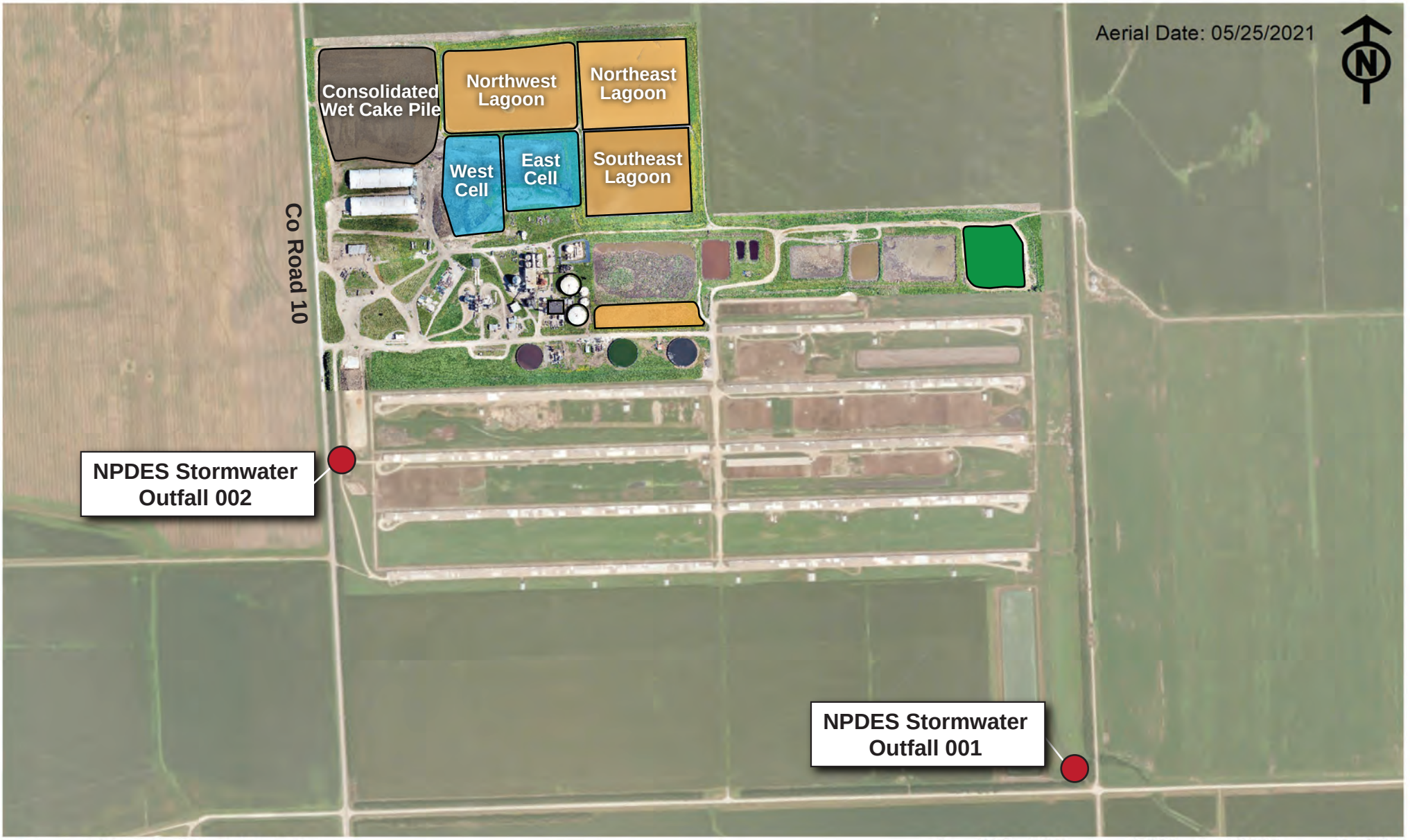
Legend

- Groundwater elevation (ft msl) 06/22
- Groundwater flow direction

NewFields

Figure 12

Site Groundwater Elevations, June 29-30, 2022

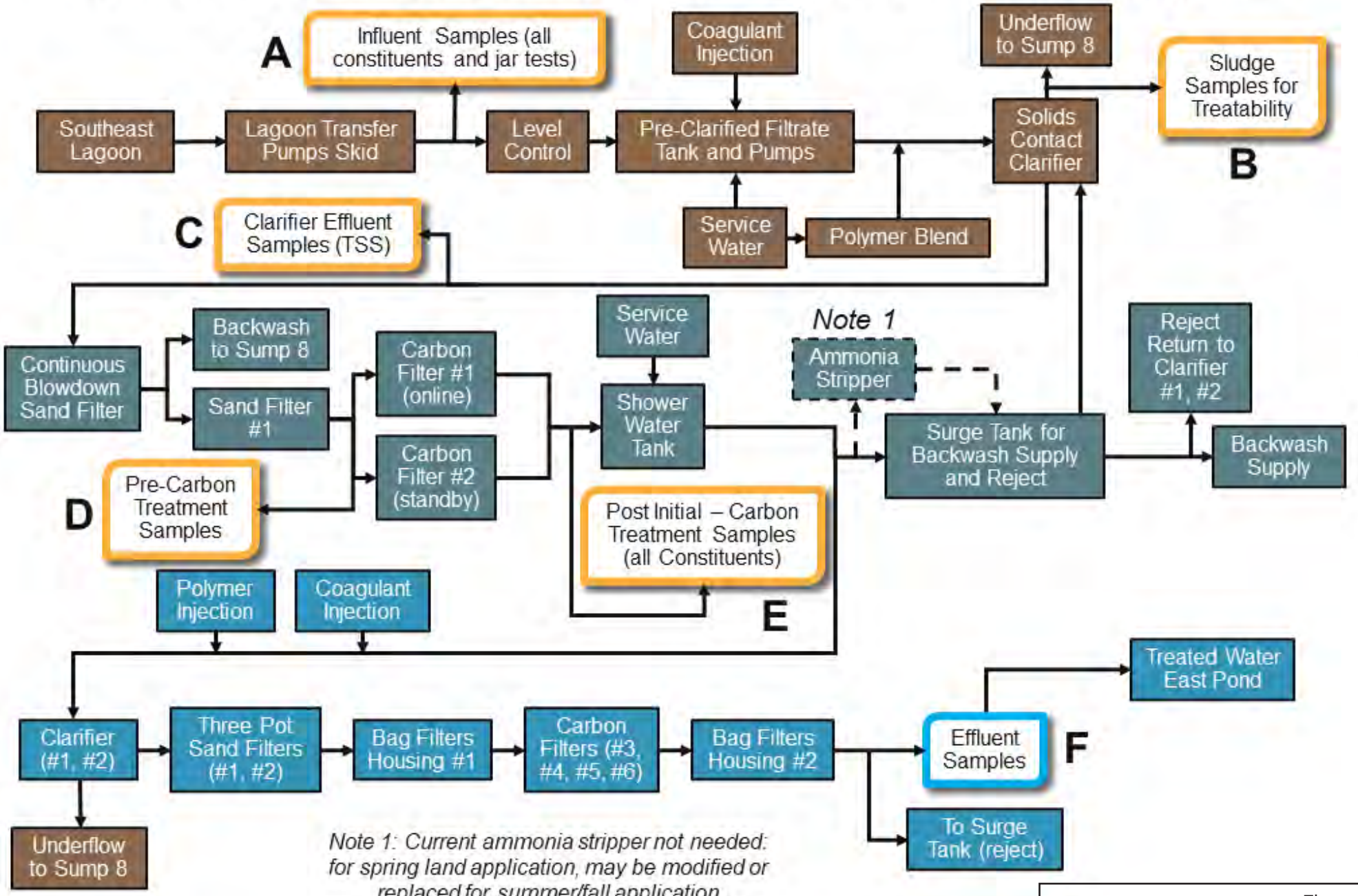


NewFields

Figure 13

Location of NPDES Stormwater Outfalls

Process Flow Block Diagram of the 2021-2022 Water Treatment System



Note 1: Current ammonia stripper not needed: for spring land application, may be modified or replaced for summer/fall application

NewFields

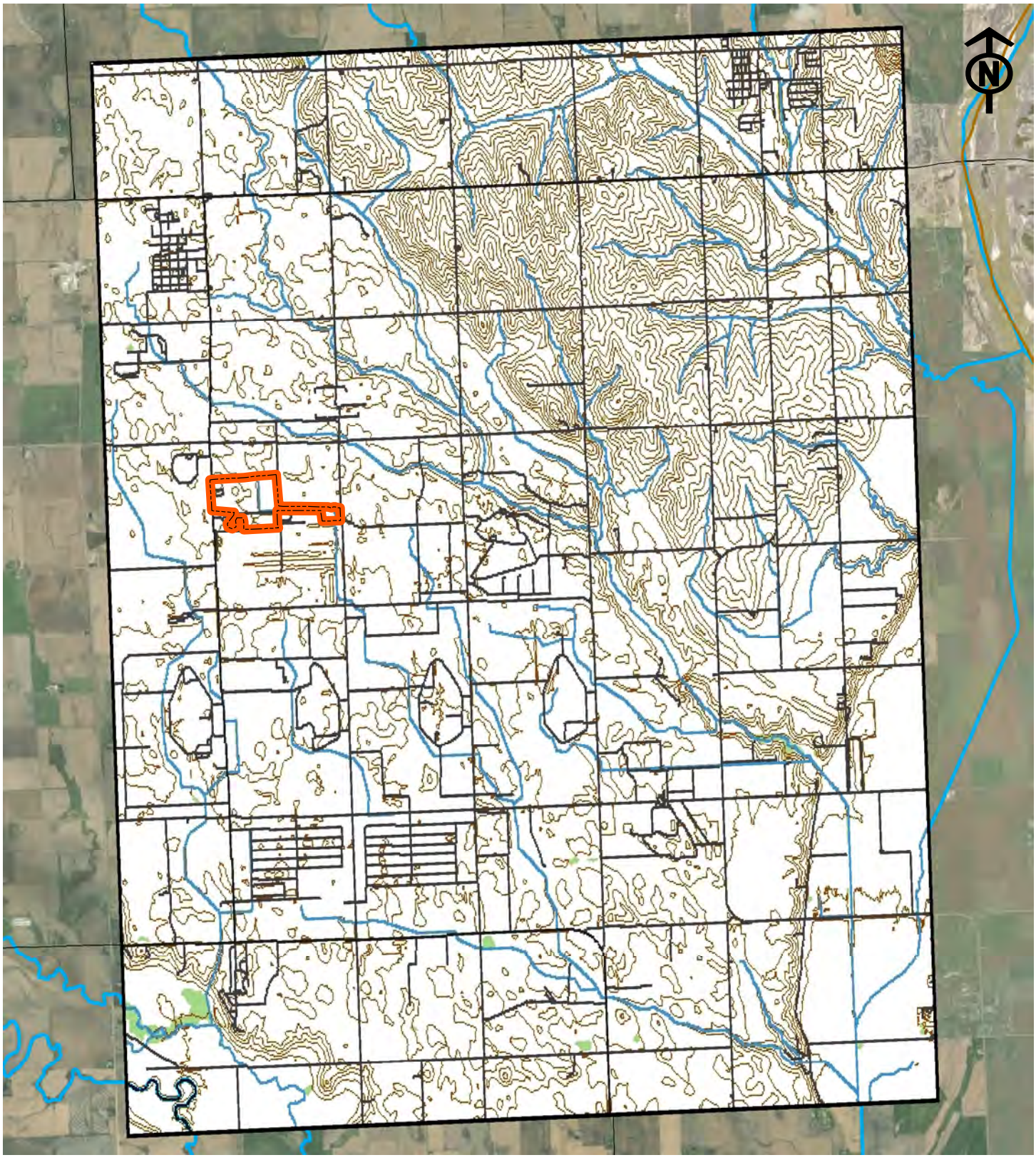
Figure 14

Process Flow Diagram of the 2021-2022 Water Treatment System

APPENDIX A

BACKGROUND INFORMATION

A-1 Additional Site Location Maps



Legend

AltEn Site

28549 Mead, Nebraska 7.5 Minute Quadrangle

Publication Date: 2021-07-15
Start Date: 1972-01-01
End Date: 2012-01-01

0 0.5 1 2 3 4 Miles

Source: U.S. Geological Survey, National Geospatial Technical Operations Center, 20210715, USGS Topo Map Vector Data (Vector) 28549 Mead, Nebraska 20210715 for 7.5 x 7.5 minute FileGDB 10.1: U.S. Geological Survey.

NewFields

Site Location on the USGS Mead, Nebraska 7.5 Minute Quadrangle

A-2 Regional and Local Lithology

REGIONAL GEOLOGY

Era	Period	Epoch	Group		Formation	Thickness (ft)	Lithology	Age (Ma)†
Cenozoic	Quaternary	Holocene				0 to 440+	Alluvium (silt, sand, gravel)	0.0117
		Pleistocene					Loess and glacial till (clay, silt, sand, gravel)	2.58
	Neogene					Absent		
	Paleogene							
Mesozoic	Cretaceous	Late	Colorado		Greenhorn	0 to 75+	Chalky limestone	
					Graneros		Gray shale	100.5
		Early	Dakota			0 to 700+	Sandstone and shale	
	Jurassic					Absent		
	Triassic					Absent		
Paleozoic	Permian	Cisuralian	Big Blue Series	Chase		Absent		299.0
				Council Grove				
				Admire				
	Pennsylvanian	Late	Virgil Series	Wabaunsee		0 to 250+	Shale, limestone, sandstone, coal	
				Shawnee			Limestone and shale	
				Douglas			Shale and limestone	
			Missouri Ser.	Lansing		<150 to 250	Limestone and shale	
				Kansas City				
				Pleasanton				307.0
		Middle	Des Moines Ser.	Marmaton		<150 to 300+	Shale, limestone, coal	
				Cherokee			Shale, sandstone, coal	
	Mississippian					0 to 75+		
	Devonian					<100 to 300+	Dolomite and limestone	
	Silurian					0 to 100+	Cherty dolomite	
	Ordovician					<600 to 650+	Dolomite, shale, and sandstone	
	Cambrian					0 to 300+	Dolomite and sandstone	
Precambrian							Metamorphic and sedimentary rocks	

The shaded rock units are at or near land surface. †Million years ago

Chart modified from R. R. Burchett (unpublished) using information from:
Burchett et al. (1975), Heckel and Watney (2002), Sawin et al. (2006), and Cohen et al. (2014).

Figure 2. Geologic time scale chart. Youngest deposits are shown at the top of the table, oldest at the bottom. The complete stratigraphic section is shown to provide context, although Permian and Pennsylvanian rocks are the oldest mentioned in this atlas.

Highlighted rock units have been observed in well logs at or near the Site.

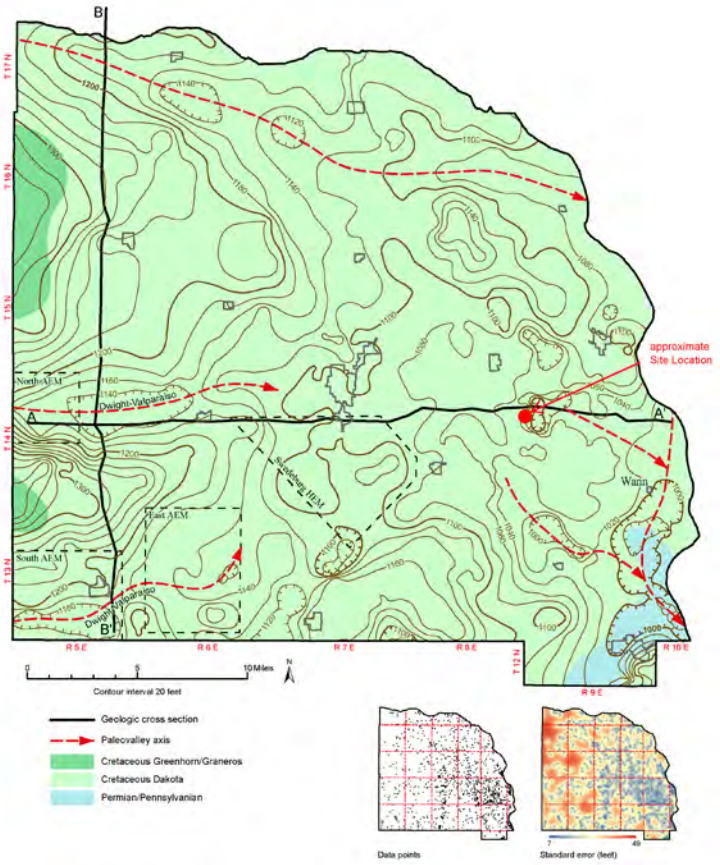


Figure 3. Elevation of top of bedrock. The bedrock surface consists of Pennsylvanian units (blue), Cretaceous Dakota Group (light green), and Cretaceous Greenhorn Graneros formations (dark green). Red dashed lines delineate paleovalley axes, and black dashed lines delineate airborne geophysical survey areas.

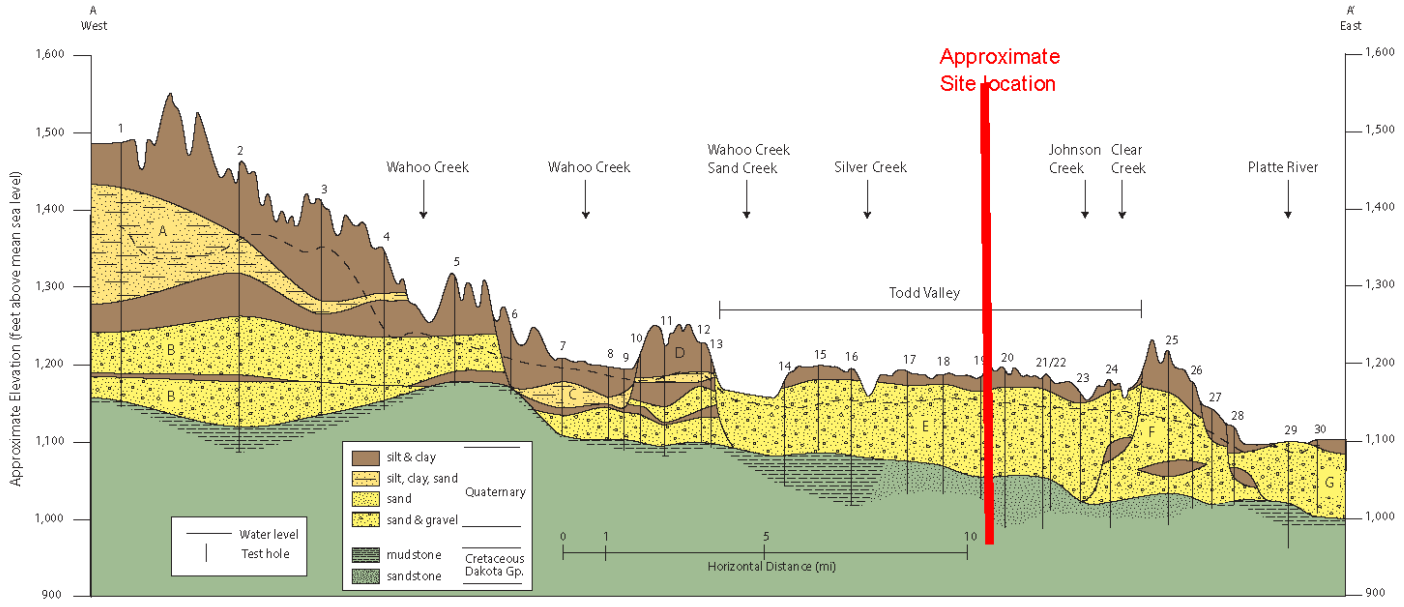
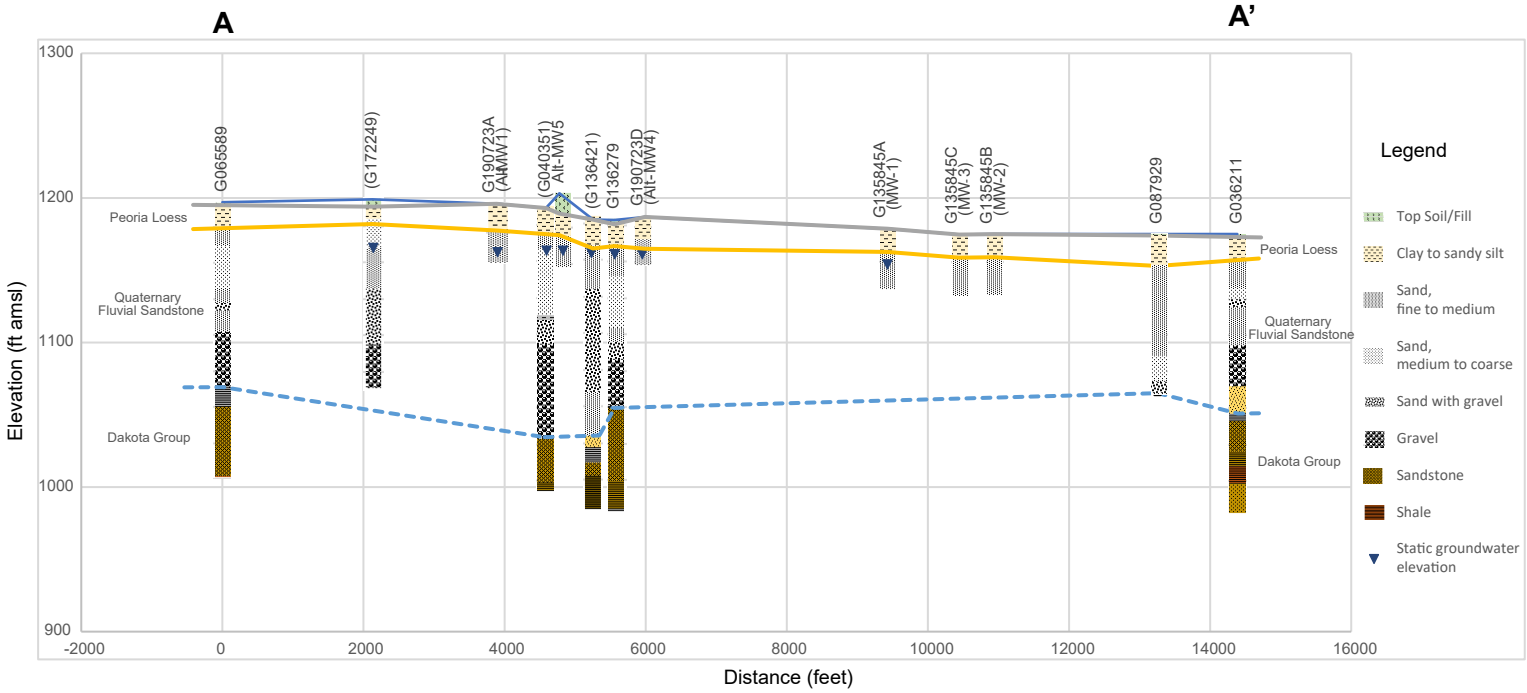


Figure 4. Interpretive geologic cross section A-A', West-East. The location of this cross section is shown on figure 3. The dashed horizontal line is an estimated water level elevation and the solid vertical lines represent the locations (Appendix A) of bore holes and registered well logs. Loess, till, silt, and clay deposits are not subdivided. A = upper sand unit of the Dwight-Valparaiso Ground Water Reservoir that overlies both the north and south paleovalleys and the divide between them, B = channel fill in the north Dwight-Valparaiso paleovalley, C = undefined sediments possibly associated with Wahoo Creek, D = uplands south of Wahoo, E = sand and gravel fill beneath the Todd Valley, F = uplands separating the Todd Valley from the Platte River valley, G = channel fill in the north-south paleovalley where it crosses under the Platte River.

Source: Divine, Dana. (2015). The Groundwater Atlas of Saunders County, Nebraska.

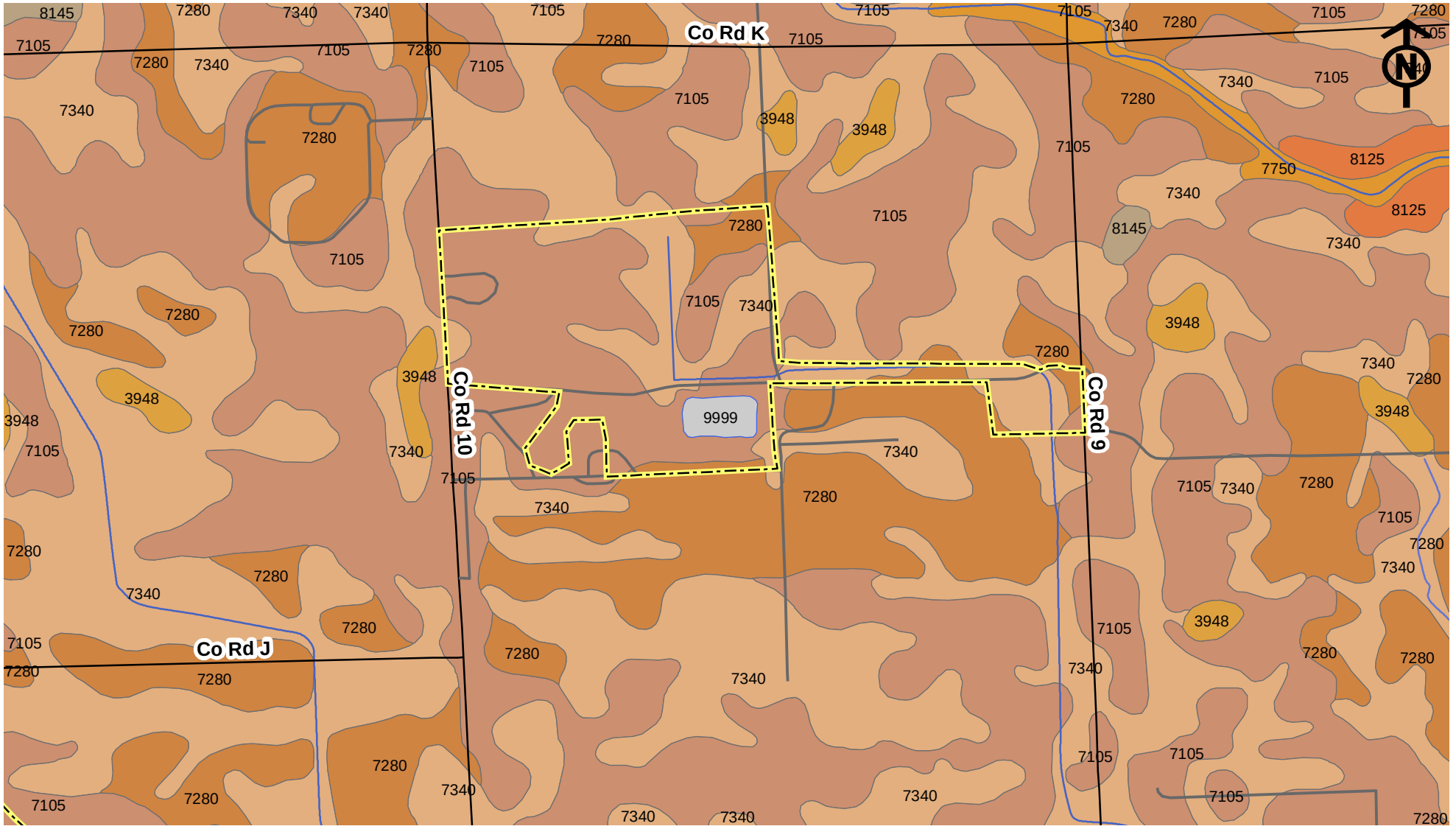
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



*The depicted location has been modified from the NDNR location using aerial photography.

Source: Nebraska (NDNR) Registered Wells Inventory website (https://gis.ne.gov/portal/apps/webappviewer/index.html?id=7e332656859247c9874b02c7aa1f58e8)

A-3 Site and Surrounding Area Soils



Legend

Soil Type

- 3948 Fillmore silt loam, terrace, occasionally ponded
- 7105 Yutan silty clay loam, terrace, 2 to 6 percent slopes, eroded
- 7280 Tomek silt loam, 0 to 2 percent slopes
- 7340 Filbert silt loam, 0 to 1 percent slopes
- 7750 Nodaway silt loam, occasionally flooded
- 8125 Pohocco silty clay loam, 6 to 11 percent slopes, eroded
- 8145 Pohocco-Pahuk complex, 6 to 11 percent slopes, eroded
- 9999 Water
- Site Boundary

0 500 1,000 2,000 Feet

Source: USDA NRCS. 2020. Soil Survey Geographic (SSURGO) database for Saunders County, Nebraska. Published June 10, 2020. Accessed September 3, 2021. https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

NewFields

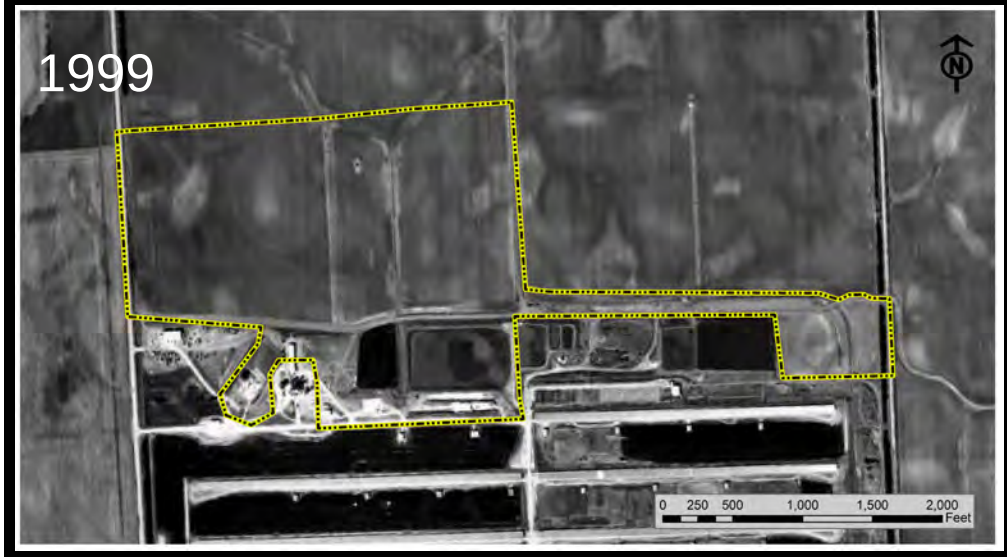
Site & Surrounding Area Soils

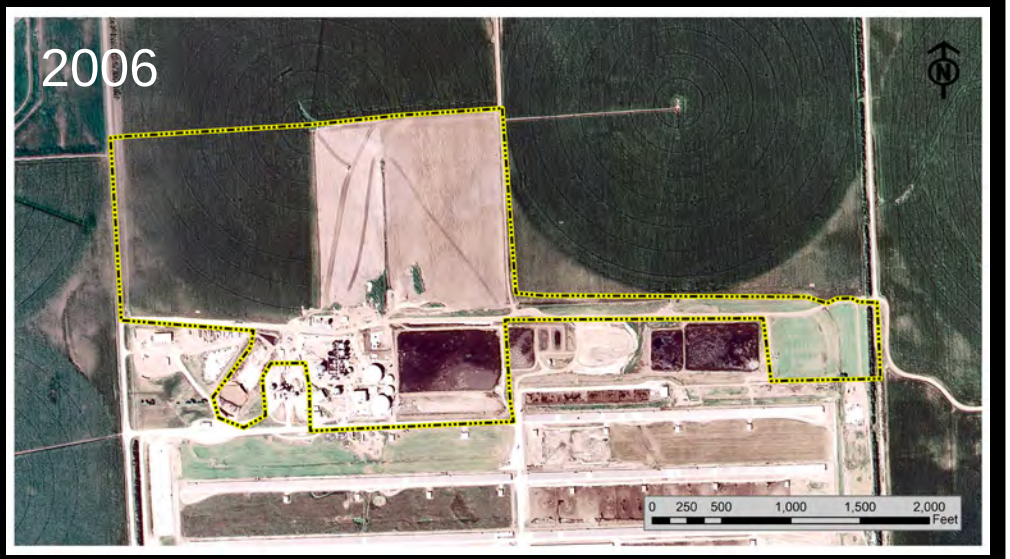
Properties and Qualities of Site Soils

Map Unit	Soil Class	Parent Material	Slope	Depth to restrictive feature	Drainage class	Runoff class	Capacity of the most limiting layer to transmit water (Ksat)	Depth to water table	Frequency of flooding	Frequency of ponding	Available water supply, 0 to 60 inches	Calcium carbonate, maximum content	Maximum salinity
3911	Scott silt loam, terrace, frequently ponded	Loess	0 to 1 percent	More than 80 inches	Poorly drained	Negligible	Low to moderately low (0.01 to 0.06 in/hr)	About 0 to 12 inches	None	Frequent	High (about 9.2 inches)		
3948	Fillmore silt loam, terrace, occasionally ponded	Loess	0 to 1 percent	More than 80 inches	Somewhat poorly drained	Negligible	Low to moderately low (0.01 to 0.06 in/hr)	About 0 to 24 inches	None	Occasional	High (about 10.0 inches)		
7105	Yutan silty clay loam, terrace, 2 to 6 percent slopes, eroded	Loess	2 to 6 percent	More than 80 inches	Well drained	Medium	Moderately low to moderately high (0.06 to 0.20 in/hr)	More than 80 inches	None	None	High (about 10.9 inches)	2 percent	Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
7280	Tomek silt loam, 0 to 2 percent slopes	Loess	0 to 2 percent	More than 80 inches	Well drained	Medium	Moderately low to moderately high (0.06 to 0.20 in/hr)	More than 80 inches	None	None	High (about 10.1 inches)	1 percent	Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
7340	Filbert silt loam, 0 to 1 percent slopes	Loess	0 to 1 percent	More than 80 inches	Somewhat poorly drained	Negligible	Very low to moderately low (0.00 to 0.06 in/hr)	About 6 to 18 inches	None	None	Moderate (about 8.8 inches)		
7750	Nodaway silt loam, occasionally flooded	Fine-silty alluvium	0 to 2 percent	More than 80 inches	Moderately well drained	Low	Moderately high (0.20 to 0.60 in/hr)	About 36 to 60 inches	Occasional	None	High (about 11.2 inches)		Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
8125	Pohocco silty clay loam, 6 to 11 percent slopes, eroded	Loess	5 to 11 percent	More than 80 inches	Well drained	High	Moderately high to high (0.60 to 2.00 in/hr)	More than 80 inches	None	None	Very high (about 12.4 inches)	10 percent	
8145	Pohocco-Pahuk complex, 6 to 11 percent slopes, eroded	Loess	5 to 11 percent	More than 80 inches	Well drained	High	Moderately high to high (0.60 to 2.00 in/hr)	More than 80 inches	None	None	Very high (about 12.4 inches)	10 percent	

APPENDIX B

HISTORICAL AERIAL PHOTOGRAPHS





Legend

Site Boundary

Source:
1999 - USGS Earth Explorer, imagery date: 4/3/1999

2003 - USGS Earth Explorer, imagery date: 12/31/2003

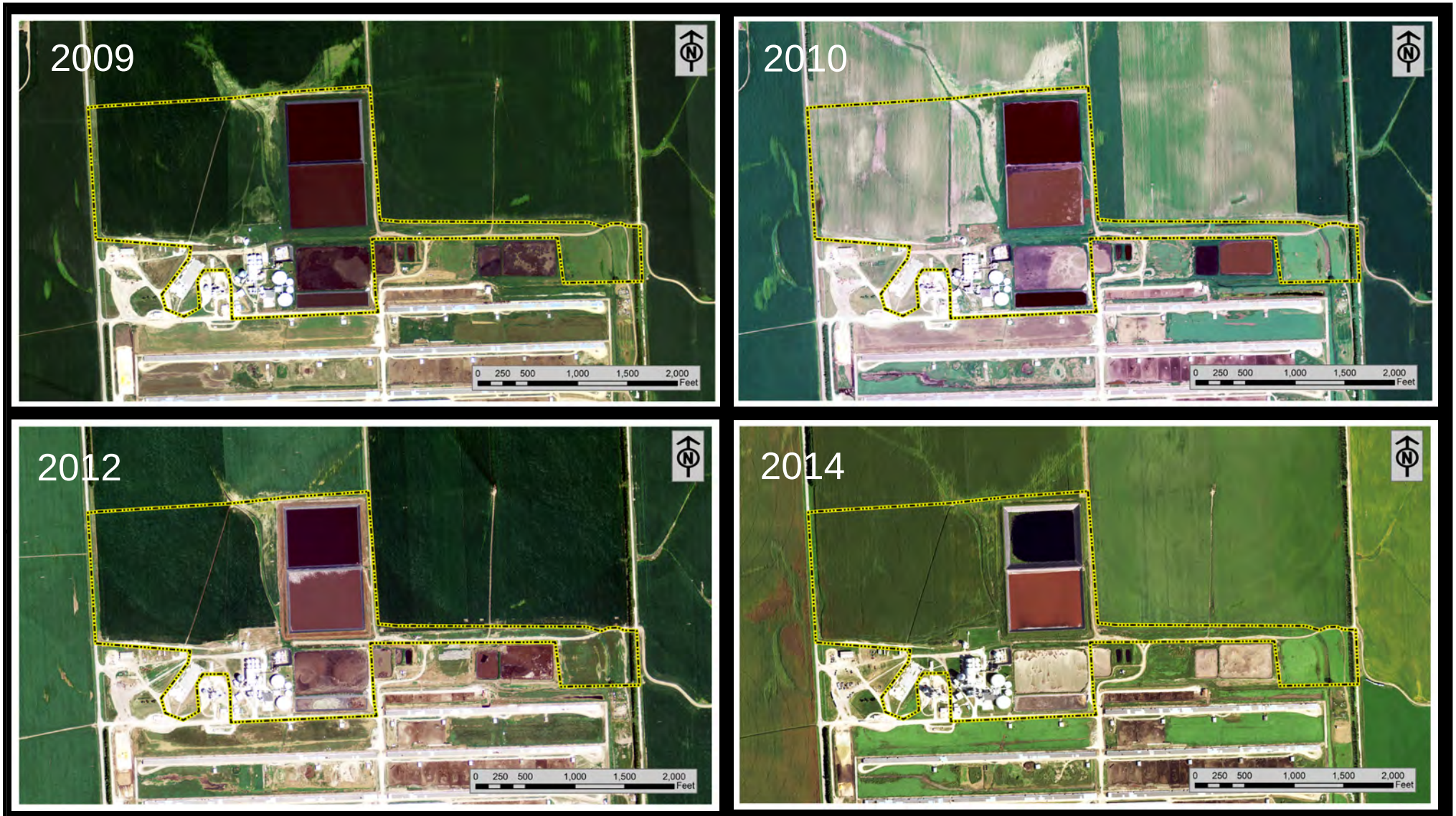
2005 - USDA Farm Service Agency via Google Earth, imagery date: 6/28/2005

2006 - USDA-FSA-APDO Aerial Photography Field Office, imagery date: 7/28/2006

NewFields

B-1

Pre-Plant to Plant Construction



Legend

Site Boundary

Source:
2009 - USDA-FSA-APFO Aerial Photography Field Office, imagery date: 7/15/2009

2010 - USDA-FSA-APFO Aerial Photography Field Office, imagery date: 7/27/2010

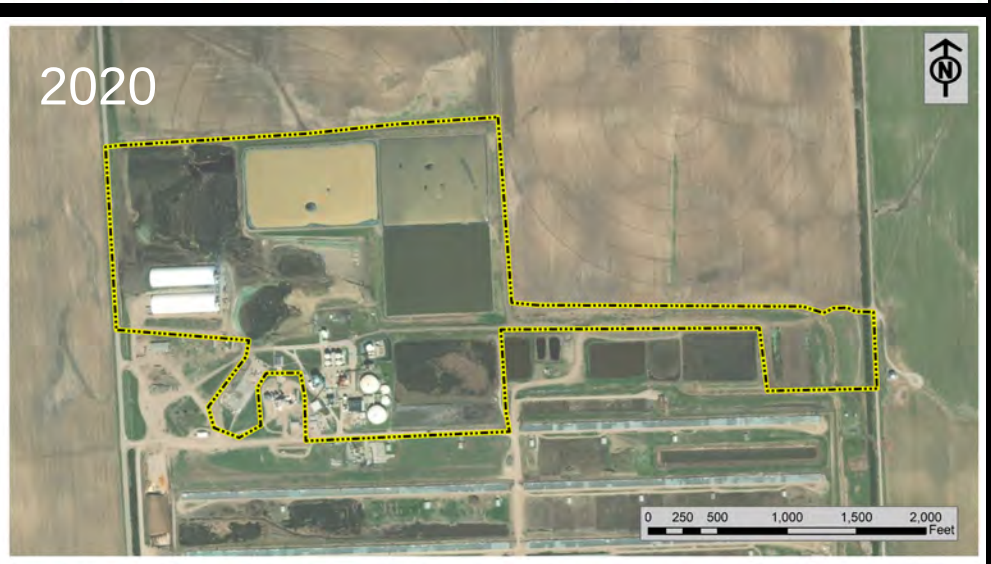
2012 - USDA-FSA-APFO Aerial Photography Field Office, imagery date: 6/26/2012

2014 - USDA-FSA-APDO Aerial Photography Field Office, imagery date: 9/16/2014

NewFields

B-2

Post E3 BioFuels Plant to
Pre AltEn Plant



Legend

Site Boundary

Source:

2016 - USDA-FSA-APFO Aerial Photography Field Office, imagery date: 7/20/2016

2018 - USDA-FSA-APFO Aerial Photography Field Office, imagery date: 7/2/2018

2020 - Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community; imagery date: 4/21/2020

2021 - ERM, imagery date: 4/23/2021

NewFields

B-3

AltEn Plant Operations

APPENDIX C

ANALYTICAL DATA OF REMEDIAL MEDIA

Table C-1 Lagoon Water Analytical Results (page 1)

Analyte Class	Analyte Name	location_name		Northeast Lagoon							Northwest Lagoon							
		sample_matrix_code		WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG
		sample_type_code		N	FD	N	N	N	N	N	N	N	N	N	N	FD	N	N
		sample_date		11/12/2019	11/12/2019	5/17/2021	4/26/2022	4/26/2022	7/12/2022	7/13/2022	4/8/2019	11/12/2019	5/17/2021	4/27/2022	4/27/2022	4/27/2022	7/12/2022	7/13/2022
		sample_name		North_Lagoon_11/12/2019_N	North_Lagoon_11/12/2019_FD	20210517-NL	NE18-LG-04262022	NE72-LG-04262022	Tank-2-20220712_AED	Tank-2-07132022_AED	West_Lagoon_4/8/2019_N	West_Lagoon_11/12/2019_N	20210517-WL	NW18-LG-04272022	NW72-LG-04272022	NW96-LG-04272022_FD	Tank-1-20220712_AED	Tank-1-07132022_AED
		CAS RN	Unit															
INST	Abamectin	71751-41-2	ug/L			300	1400	1800		21000			150	120	500	110		120
INST	Acetamiprid	135410-20-7	ug/L	5 U	5 U	1 U	0.6 U	0.6 U		3 U	U	5 U	1 U	0.6 U	0.6 U	0.6 U		0.6 U
HERB	AMPA	77521-29-0	ug/L			40 U				49			40 U					30
FUNG	Azoxystrobin	131860-33-8	ug/L	33.9	32.4	43	0.87	0.89		3.1	99.3	111	56	88	95	84		84
INST	Baythroid	68359-37-5	ug/L	5 U	5 U		0.3 U	0.3 U		15 U	U	5 U		0.3 U	0.3 U	0.3 U		3 U
INST	Biphenthrin	82657-04-3	ug/L	5 U	5 U		0.06 U	0.06 U		3 U	U	5 U		0.06 U	0.06 U	0.06 U		0.6 U
FUNG	Brassinazole	224047-41-0	ug/L	5 U	5 U	1 U	0.6 U	0.6 U		3 U	U	5 U	1 U	0.6 U	0.6 U	0.6 U		0.6 U
FUNG	Captan	133-06-2	ug/L				0.6 U	0.6 U		30 U				0.6 U	0.6 U	0.6 U		6 U
FUNG	Carbendazim	10605-21-7	ug/L			1 U	0.06 U	0.1 U		0.06 U H3			1 U	0.06 U	0.06 U	0.06 U		0.06 U H3
FUNG	Carboxin	5234-68-4	ug/L			4.5	4.4	4.5		5.1 H3			1 U	0.3 U	0.4 U	0.2 U		0.22 H3
INST	Chlorantraniliprole	500008-45-7	ug/L			890	780	760		1200			810	760	790	710		630
INST	Chlorpyrifos	2921-88-2	ug/L	5 U	5 U		0.2 U	0.16		3 U	U	5 U		0.06 U	0.073	0.06 U		0.6 U
INST	Chlorpyrifos-methyl	5598-13-0	ug/L	5 U	5 U		0.06 U	0.06 U		3 U	U	5 U		0.06 U	0.06 U	0.06 U		0.6 U
INST	Clothianidin	210880-92-5	ug/L	7070	5980	9400	0.06 U	0.1 U		0.06 U H3	58400	31000	6600	200	180	210		30 H3
INST	Cyantraniliprole	736994-63-1	ug/L			1.6	0.6 U	0.6 U		3 U			2.9	2.3	2.4	2.3		1.3
INST	Cyhalothrin/Karate	91465-08-6	ug/L	5 U	5 U		0.06 U	0.06 U		3 U	U	5 U		0.06 U	0.06 U	0.06 U		0.6 U
INST	Cypermethrin	52315-07-8	ug/L	5 U	5 U		0.3 U	0.3 U		15 U	U	5 U		0.3 U	0.3 U	0.3 U		3 U
FUNG	Cyproconazole	94361-06-5	ug/L	5 U	5 U	1 U	0.6 U	0.6 U		3 U	U	5 U	1 U	0.6 U	0.6 U	0.6 U		0.6 U
INST	Deltamethrin	52918-63-5	ug/L	5 U	5 U		0.3 U	0.3 U		15 U	5 U	5 U		0.3 U	0.3 U	0.3 U		3 U
FUNG	Difenoconazole	119446-68-3	ug/L	64.5	61.7	5	46	62		510		66.2	1.7	1.3	1.4	1.2		3.1
FUNG	Dimoxystrobin	149961-52-4	ug/L	5 U	5 U	1 U	0.6 U	0.6 U		3 U	U	5 U	1 U	0.6 U	0.6 U	0.6 U		0.6 U
INST	Dinotefuran	165252-70-0	ug/L	5 U	5 U	1 U	0.06 U	0.06 U		0.06 U H3		5 U	1 U	0.3 U	0.6 U	0.06 U		0.06 U H3
FUNG	Epoxiconazole	133855-98-8	ug/L	5 U	5 U	1 U	0.6 U	0.6 U		3 U	U	5 U	1 U	0.6 U	0.6 U	0.6 U		0.6 U
FUNG	Fluconazole	86386-73-4	ug/L	5 U	5 U	1 U	0.06 U	0.06 U		0.1 U H3	U	5 U	1 U	0.06 U	0.06 U	0.06 U		0.1 U H3
FUNG	Fludioxonil	131341-86-1	ug/L			47	220	280		2100			22	26	48	24		49
FUNG	Fluoxastrobin	361377-29-9	ug/L	312	312	480	640	740		2500		735	480	740	980	690		500
HERB	Glufosinate	51276-47-2	ug/L	10.3	10 U	10 U				10 U	U	10 U	10 U					10 U
HERB	Glyphosate	1071-83-6	ug/L	206	200	120				420	124	116	200					260
INST	Imidacloprid	138261-41-3	ug/L	40.8	40.8	21	0.6 U	0.6 U		3 U	108	312	29	2	1.8	1.9		0.6 U
FUNG	Ipconazole	125225-28-7	ug/L	181	166	31	210	260		2100		134	15	14	44	13		19
FUNG	Isavuconazole	241479-67-4	ug/L	5 U	5 U	1 U	0.6 U	0.6 U		3 U	U	5 U	1 U	0.6 U	0.6 U	0.6 U		0.6 U
FUNG	Itraconazole	84625-61-6	ug/L	5 U	5 U	1 U	0.1 U	0.1 U		0.06 U H3		5 U	1 U	0.1 U	0.1 U	0.1 U		0.06 U H3
FUNG	Metalaxyl/Mefenoxam	70630-17-0	ug/L			1600	35	32		15			2600	3700	3300	4200		3300
FUNG	Metconazole	125116-23-6	ug/L	5 U	5 U	1 U	3.7	4.3		20	U	5 U	1 U	0.6 U	0.6 U	0.6 U		0.6 U
INST	Nitenpyram	150824-47-8	ug/L	5 U	5 U	1 U	0.4 U	0.5 U		0.06 U H3		5 U	1 U	0.06 U	0.6 U	0.06 U		0.06 U H3
FUNG	Orysastrobin	248593-16-0	ug/L	5 U	5 U	1 U	0.6 U	0.6 U		3 U	U	5 U	1 U	0.6 U	0.06 U	0.6 U		0.6 U
INST	Permethrin	52645-53-1	ug/L	5 U	5 U		0.24	0.33		6 U	U	5 U		0.12 U	0.12 U	0.12 U		1.2 U
FUNG	Picoxystrobin	117428-22-5	ug/L	5 U	5 U	1 U	0.6 U	0.6 U		3 U		5 U	1 U	0.6 U	0.6 U	0.6 U		0.6 U
FUNG	Posaconazole	171228-49-2	ug/L	5 U	5 U	1 U	0.2 U	0.2 U		0.1 U H3	U	5 U	1 U	0.2 U	0.6 U	0.2 U		0.1 U H3
FUNG	Propiconazole	60207-90-1	ug/L	15.1	17	3.3	16	18		96	U	5 U	1.7	0.6 U	0.2 U	0.6 U		0.68
FUNG	Prothioconazole	178928-70-6	ug/L	149	141	43	96	140		74 H3		150	18	3.7	25	4.4		11 H3
FUNG	Pyraclostrobin	175013-18-0	ug/L	5 U	5 U	1 U	0.6 U	0.6 U		3 U	U	5 U	1 U	0.6 U	0.4 U	0.6 U		0.6 U
FUNG	Ravuconazole	182760-06-1	ug/L	5 U	5 U	1 U	0.6 U	0.6 U		3 U	U	5 U	1 U	0.6 U	0.6 U	0.6 U		0.6 U
FUNG	Sedaxane	874967-67-6	ug/L				160	170		670				75	89	74		71
FUNG	Tebuconazole	107534-96-3	ug/L	634	627	120	480	530		2600	213	216	65	75	110	72		65
FUNG	Tetraconazole	112281-77-3	ug/L	5 U	5 U	1 U	0.36	0.44		3 U		5 U	1 U	0.06 U	0.06 U	0.06 U		0.6 U
FUNG	Thiabendazole	148-79-8	ug/L	2450	2470	1200	1500	1700		5400	8450	2160	170	990	1100	930		790
INST	Thiacloprid	111988-49-9	ug/L	5 U	5 U	1 U	0.6 U	0.6 U		3 U	U	5 U	1 U	0.6 U	0.6 U	0.6 U		0.6 U
INST	Thiamethoxam	153719-23-4	ug/L	2400	2360	5400	1.4	1.3		3 U	35400	24000	3100	1600	1500	1500		1000
FUNG	Thiophanate-methyl	23564-05-8	ug/L			1 U	0.1 U	0.1 U		0.06 U H3			1 U	0.06 U	0.06 U	0.06 U		0.06 U H3
INST	Tioxazafen	330459-31-9	ug/L				0.11	0.12		3 U				0.12	0.1	0.11		0.6 U
FUNG	Trifloxystrobin	141517-21-7	ug/L	36	32.4	2.2	10	14		40	58.2	53.3	3.1	5	19	4.7		3.1
FUNG	Uniconazole	83657-22-1	ug/L	5 U	5 U	1 U	0.6 U	0.6 U		3 U	U	5 U	1 U	0.6 U	0.6 U	0.6 U		0.6 U
FUNG	Voriconazole	137234-62-9	ug/L	5 U	5 U	1 U	0.6 U	0.6 U		3 U	U	5 U	1 U	0.6 U	0.6 U	0.6 U		0.6 U
FUNG	Desthio-Prothioconazole	120983-64-4	ug/L	5 U	5 U							5 U						
FUNG	Sulfonic Acid Prothioconazole	178928-73-9	ug/L															

Analyte Class: FUNG=fungicide; HERB=herbicide; INST=insecticide; NUT=nutrient; INOR=inorganics; VOC=volatile organic; OTHER=miscellaneous parameters
sample_type_code: NM=primary sample; FD=field duplicate; SPL=split sample

Table C-1 Lagoon Water Analytical Results (page 2)

Analyte Class	Analyte Name	location_name		Northeast Lagoon							Northwest Lagoon							
		sample_matrix_code		WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG
		sample_type_code		N	FD	N	N	N	N	N	N	N	N	N	N	FD	N	N
		sample_date		11/12/2019	11/12/2019	5/17/2021	4/26/2022	4/26/2022	7/12/2022	7/13/2022	4/8/2019	11/12/2019	5/17/2021	4/27/2022	4/27/2022	4/27/2022	7/12/2022	7/13/2022
		sample_name		North_Lagoon_11/12/2019_N	North_Lagoon_11/12/2019_FD	20210517-NL	NE18-LG-04262022	NE72-LG-04262022	Tank-2-20220712_AED	Tank-2-07132022_AED	West_Lagoon_4/8/2019_N	West_Lagoon_11/12/2019_N	20210517-WL	NW18-LG-04272022	NW72-LG-04272022	NW96-LG-04272022_FD	Tank-1-20220712_AED	Tank-1-07132022_AED
		CAS RN	Unit															
NUT	Ammonia (as N)	NH3N	mg/L			473	648	807	684	643			522	838	753		877	823
NUT	Nitrate (as N)	14797-55-8	mg/L			0.26				0.2 U			0.26					0.2 U
NUT	Nitrite (as N)	14797-65-0	mg/L			0.1 U	0.02	0.02 U		0.02 U			0.1 U	0.02 U	0.02 U			0.02 U
NUT	Total Kjeldahl Nitrogen (TKN)	TKN	mg/L			724	887	1060					820	1090	1460			
NUT	Total Nitrate/Nitrite	NO3/NO2-N	mg/L			0.26	0.2 U	0.2 U					0.26	0.41	0.41			
NUT	Biological Oxygen Demand (BOD)	BOD	mg/L			17700 SC				7895			16900					1880
NUT	Phosphorus (as P)	7723-14-0	ug/L			554000							551000 SC					
INOR	Iron	7439-89-6	ug/L							23640	6640							7740
INOR	Selenium	7782-49-2	ug/L			42.5					50 U		41.3					
OTHER	pH	PH	SU			4.9 Ht	6.57	6.59		6.87			4.8 Ht	4.8	4.79			5.04
OTHER	Total Organic Carbon (TOC)	TOC	mg/L			5800							7570					
OTHER	Total Suspended Solids (TSS)	TSS	mg/L			264	1140	4520		20900			123	130	8080			124
VOC	Ethanol	64-17-5	ug/L															
	Additional Analyses										(a)							

(a) NDEQ (2019-10-08). Laboratory Report: metals, mycotoxins, and legacy pesticides

Analyte Class: FUNG=fungicide; HERB=herbicide; INST=insecticide; NUT=nutrient; INOR=inorganics; VOC=volatile organic; OTHER=miscellaneous parameters
sample_type_code: NM=primary sample; FD=field duplicate; SPL=split sample

Table C-1 Lagoon Water Analytical Results (page 3)

Analyte Class	Analyte Name	location_name		Southeast Lagoon						Emergency Pond (pre-refurishment)		
		sample_matrix_code		WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG
		sample_type_code		N	N	N	N	N	N	N	N	N
		sample_date		5/17/2021	7/6/2021	4/26/2022	4/26/2022	7/12/2022	7/13/2022	4/8/2019	3/4/2021	5/17/2021
		sample_name		20210517-SL	20210706PlantInf	SE18-LG-04262022	SE72-LG-04262022	Tank-3-20220712_AED	Tank-3-07132022_AED	EmergencyLagoon_4/8/2019_N	20210304SYSINF	20210517-EL
		CAS RN	Unit									
INST	Abamectin	71751-41-2	ug/L	260	160 H3	74	74		180			690
INST	Acetamiprid	135410-20-7	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U	U	1 U	1 U
HERB	AMPA	77521-29-0	ug/L	98	200 U				110		27	250
FUNG	Azoxystrobin	131860-33-8	ug/L	15	3.9 H3	1.5	1.5		2.4	581		1.8
INST	Baythroid	68359-37-5	ug/L		5 U	0.3 U	0.3 U		3 U	U		
INST	Biphenthrin	82657-04-3	ug/L		1 U	0.06 U	0.06 U		0.6 U	U		
FUNG	Brassinazole	224047-41-0	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U	U		1 U
FUNG	Captan	133-06-2	ug/L		1.7 U	0.6 U	0.6 U		6 U			
FUNG	Carbendazim	10605-21-7	ug/L	1 U	1 U,Ht	0.1 U	0.1 U		0.06 U H3			1 U
FUNG	Carboxin	5234-68-4	ug/L	6.6	3.4 H3	2.3	2.3		1.5 H3			1.1
INST	Chlorantraniliprole	500008-45-7	ug/L	450	210 H3	110	110		66			58
INST	Chlorpyrifos	2921-88-2	ug/L		1 U	0.06 U	0.06 U		0.6 U	U		
INST	Chlorpyrifos-methyl	5598-13-0	ug/L		1 U	0.06 U	0.06 U		0.6 U			
INST	Clothianidin	210880-92-5	ug/L	34	1 U,Ht	0.1 U	0.06 U		0.06 U H3	44.7	71	2.8
INST	Cyantraniliprole	736994-63-1	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U			1 U
INST	Cyhalothrin/Karate	91465-08-6	ug/L		1 U	0.06 U	0.06 U		0.6 U	5 U		
INST	Cypermethrin	52315-07-8	ug/L		5 U	0.3 U	0.3 U		3 U	U		
FUNG	Cyproconazole	94361-06-5	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U	U		1 U
INST	Deltamethrin	52918-63-5	ug/L		5 U	0.3 U	0.3 U		3 U	5 U		
FUNG	Difenoconazole	119446-68-3	ug/L	5.4	2.4 H3	2.5	2.4		10		3.4	18
FUNG	Dimoxystrobin	149961-52-4	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U	U		1 U
INST	Dinotefuran	165252-70-0	ug/L	1 U	1 U,Ht	0.06 U	0.06 U		0.06 U H3		1 U	1 U
FUNG	Epoxiconazole	133855-98-8	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U	U		1 U
FUNG	Fluconazole	86386-73-4	ug/L	1 U	1 U,Ht	0.06 U	0.06 U		0.1 U H3	U		1 U
FUNG	Fludioxonil	131341-86-1	ug/L	53	18 H3	29	30		75			110
FUNG	Fluoxastrobin	361377-29-9	ug/L	190	60 H3	5.8	5.9		10		1.9	18
HERB	Glufosinate	51276-47-2	ug/L	10 U	50 U				10 U	86.7		10 U
HERB	Glyphosate	1071-83-6	ug/L	260	310				64	3850	660	2800
INST	Imidacloprid	138261-41-3	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U	U	1 U	1 U
FUNG	Ipconazole	125225-28-7	ug/L	27	9.1 H3	7.7	7.7		35		4.1	17
FUNG	Isavuconazole	241479-67-4	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U	U		1 U
FUNG	Itraconazole	84625-61-6	ug/L	1 U	1 U,Ht	0.1 U	0.1 U		0.06 U H3			1 U
FUNG	Metalaxyl/Mefenoxam	70630-17-0	ug/L	470	13 H3	8.8	8.9		2.3			75
FUNG	Metconazole	125116-23-6	ug/L	2	1.2 H3	2.3	2.3		2.2	U		5.9
INST	Nitenpyram	150824-47-8	ug/L	1 U	1 U,Ht	0.06 U	0.06 U		0.06 U H3			1 U
FUNG	Orysastrobin	248593-16-0	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U	U		1 U
INST	Permethrin	52645-53-1	ug/L		2 U	0.12 U	0.12 U		1.2 U	U		
FUNG	Picoxystrobin	117428-22-5	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U			1 U
FUNG	Posaconazole	171228-49-2	ug/L	1 U	1 U,Ht	0.2 U	0.2 U		0.1 U H3	U		1 U
FUNG	Propiconazole	60207-90-1	ug/L	13	8.7 H3	19	19		16	726		50
FUNG	Prothioconazole	178928-70-6	ug/L	22	7.1 H3	3.6	3.5		36 H3		8.2	8.4
FUNG	Pyraclostrobin	175013-18-0	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U	U		1 U
FUNG	Ravuconazole	182760-06-1	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U	U		1 U
FUNG	Sedaxane	874967-67-6	ug/L			56	60		76			
FUNG	Tebuconazole	107534-96-3	ug/L	240	100 H3	160	160		260	2330	41	160
FUNG	Tetraconazole	112281-77-3	ug/L	1 U	1 U	0.51	0.51		0.6 U			1.3
FUNG	Thiabendazole	148-79-8	ug/L	1300	710 H3	500	490		790	39700	300	1600
INST	Thiacloprid	111988-49-9	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U	U	1 U	1 U
INST	Thiamethoxam	153719-23-4	ug/L	30	1 U,Ht	0.6 U	0.6 U		0.6 U	26	25	1 U
FUNG	Thiophanate-methyl	23564-05-8	ug/L	1 U	1 U,Ht	0.06 U	0.06 U		0.06 U H3			1 U
INST	Tioxazafen	330459-31-9	ug/L			0.06 U	0.06 U		0.6 U			
FUNG	Trifloxystrobin	141517-21-7	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U	737		2.3
FUNG	Uniconazole	83657-22-1	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U	U		1 U
FUNG	Voriconazole	137234-62-9	ug/L	1 U	1 U,Ht	0.6 U	0.6 U		0.6 U	U		1 U
FUNG	Desthio-Prothioconazole	120983-64-4	ug/L									
FUNG	Sulfonic Acid Prothioconazole	178928-73-9	ug/L									

Analyte Class: FUNG=fungicide; HERB=herbicide; INST=insecticide; NUT=nutrient; INOR=inorganics; VOC=volatile organic; OTHER=miscellaneous parameters
sample_type_code: NM=primary sample; FD=field duplicate; SPL=split sample

Table C-1 Lagoon Water Analytical Results (page 4)

Analyte Class	Analyte Name	location_name		Southeast Lagoon						Emergency Pond (pre-refurishment)		
		sample_matrix_code		WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG	WLG
		sample_type_code		N	N	N	N	N	N	N	N	N
			sample_date	5/17/2021	7/6/2021	4/26/2022	4/26/2022	7/12/2022	7/13/2022	4/8/2019	3/4/2021	5/17/2021
		sample_name		20210517-SL	20210706PlantInf	SE18-LG-04262022	SE72-LG-04262022	Tank-3-20220712_AED	Tank-3-07132022_AED	EmergencyLagoon_4/8/2019_N	20210304SYSINF	20210517-EL
		CAS RN	Unit									
NUT	Ammonia (as N)	NH3N	mg/L	552 SC	525	406	400	339	301			779
NUT	Nitrate (as N)	14797-55-8	mg/L	0.26	0.1 U				0.2 U			0.26
NUT	Nitrite (as N)	14797-65-0	mg/L	0.1 U	0.1 U	0.04	0.03		0.02			0.1 U
NUT	Total Kjeldahl Nitrogen (TKN)	TKN	mg/L	647	590	481	485					1090
NUT	Total Nitrate/Nitrite	NO3/NO2-N	mg/L	0.26	0.1 U	0.2 U	0.2 U					0.26
NUT	Biological Oxygen Demand (BOD)	BOD	mg/L	5520	5080 Ht				477			3000
NUT	Phosphorus (as P)	7723-14-0	ug/L	205000	342000							130000
INOR	Iron	7439-89-6	ug/L						7420	67700		
INOR	Selenium	7782-49-2	ug/L	27.7	27.3					50 U		15 U
OTHER	pH	PH	SU	6.3 Ht	6.6 Ht	8.13	8.08		7.9			7.1 Ht
OTHER	Total Organic Carbon (TOC)	TOC	mg/L	2690	2710							1600
OTHER	Total Suspended Solids (TSS)	TSS	mg/L	242	387	48	86		98			620
VOC	Ethanol	64-17-5	ug/L									
	Additional Analyses									(a)		

(a) NDEQ (2019-10-08). Laboratory Report: metals, mycotoxins, and legacy pesticides

Analyte Class: FUNG=fungicide; HERB=herbicide; INST=insecticide; NUT=nutrient; INOR=inorganics; VOC=volatile organic; OTHER=miscellaneous parameters
sample_type_code: NM=primary sample; FD=field duplicate; SPL=split sample

Table C-2 Untreated Water (Influent into the Treatment System) Analytical Results (page 1)

Analyte Class	Analyte Name	location_name		Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent
		sample_matrix_code		INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF
		sample_type_code		N	N	N	N	N	N	N	N	N	N	N	N	SPL	N	N	SPL
		sample_date		2/28/2021	2/28/2021	3/3/2021	4/11/2021	5/3/2021	5/6/2021	5/13/2021	5/14/2021	5/17/2021	6/21/2021	7/14/2021	8/5/2021	8/5/2021	8/10/2021	8/17/2021	8/17/2021
		sample_name		Influent_2/28/2021_N	Influent_2/28/2021_N_Filtered	Influent_3/3/2021_N	20210411INF	20210504INF-C	20210506INF	20210513INF	PL20210514INF	PL20211705INF	20210621INF	20210714PLANTINF	20210805PLINF	20210805PLINF_SPL	PL20210810INF	20210817PLINF	20210817PLINF_SPL
		CAS RN	Unit																
INST	Abamectin	71751-41-2	ug/L	377	247	204	37.1	5.5	110	3.9	230	240	11	430	300	91.4	110	150	57.5
INST	Acetamiprid	135410-20-7	ug/L	U	U	U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
HERB	AMPA	77521-29-0	ug/L					40 U	40 U	40 U	43	91	400 U	200 U	100		91	130	
FUNG	Azoxystrobin	131860-33-8	ug/L	U	U	U	1 U	3.2	17	1.1	15	15	6.5	3.3	1.4	1 U	1.6	1.5	1 U
INST	Baythroid	68359-37-5	ug/L	U	U	U				5 U,Ht	5 U,Ht	5 U,Ht	5 U	5 U,Ht	5 U	2 U	5 U	5 U	2 U
INST	Biphenthrin	82657-04-3	ug/L	U	U	U				1 U,Ht	1 U,Ht	1 U,Ht	1 U	1 U,Ht	1 U	2 U	1 U	1 U	2 U
FUNG	Brassinazole	224047-41-0	ug/L	U	U	U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	2 U
FUNG	Captan	133-06-2	ug/L							1.7 U,Ht	1.7 U,Ht	1.7 U,Ht	1.7 U	1.7 U,Ht	5 U		5 U	5 U	
FUNG	Carbendazim	10605-21-7	ug/L					1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U	
FUNG	Carboxin	5234-68-4	ug/L					1 U	1.3	1 U	6.9	6.9	2.3	7.2	4.4		7.2	6.3	
INST	Chlorantraniliprole	500008-45-7	ug/L					63	190	63	450	450	140	470	300	366	300	240	309
INST	Chlorpyrifos	2921-88-2	ug/L	U	U	U				1 U,Ht	1 U,Ht	1 U,Ht	1 U	1 U,Ht	1 U	2 U	1 U	1 U	2 U
INST	Chlorpyrifos-methyl	5598-13-0	ug/L	U	U	U				1 U,Ht	1 U,Ht	1 U,Ht	1 U	1 U,Ht	1 U	2 U	1 U	1 U	2 U
INST	Clothianidin	210880-92-5	ug/L	624	U	103		99	46	3.1	45	35	10	1 U	1 U	2.5 U	1 U	1 U	2.5 U
INST	Cyantraniliprole	736994-63-1	ug/L					1 U	1.3	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U	
INST	Cyhalothrin/Karate	91465-08-6	ug/L	U	U	U				1 U,Ht	1 U,Ht	1 U,Ht	1 U	1 U,Ht	1 U	2 U	1 U	1 U	2 U
INST	Cypermethrin	52315-07-8	ug/L	U	U	U				5 U,Ht	5 U,Ht	5 U,Ht	5 U	5 U,Ht	5 U	2 U	5 U	5 U	2 U
FUNG	Cyproconazole	94361-06-5	ug/L	U	U	U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	2 U
INST	Deltamethrin	52918-63-5	ug/L	U	U	U				5 U,Ht	5 U,Ht	5 U,Ht	5 U	5 U,Ht	5 U	2 U	5 U	5 U	2 U
FUNG	Difenoconazole	119446-68-3	ug/L	5 U	U	5 U	1.92	1 U	1 U	1 U	4.8	5.2	1 U	7.5	6	8.79	4.7	1.9	5.16
FUNG	Dimoxystrobin	149961-52-4	ug/L	U	U	U	3 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	3 U	1 U	1 U	3 U
INST	Dinotefuran	165252-70-0	ug/L	U	U	U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.2 U	1 U	1 U	1.2 U
FUNG	Epoxiconazole	133855-98-8	ug/L	U	U	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
FUNG	Fluconazole	86386-73-4	ug/L	U	U	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
FUNG	Fludioxonil	131341-86-1	ug/L					1.1	1.3	1 U	51	51	1.1	64	98	187	44	53	103
FUNG	Fluoxastrobin	361377-29-9	ug/L	5 U	U	5 U	1 U	66	59	7.1	190	200	92	120	52	42.8	52	35	26.4
HERB	Glufosinate	51276-47-2	ug/L	13.1	11.7	34.1	18.3	10 U	10 U	10 U	10 U	10 U	100 U	50 U	10 U	3 U	10 U	10 U	3 U
HERB	Glyphosate	1071-83-6	ug/L	1900	2060	786	1020	10 U	97	90	160	260	100 U	310	270	386	330	370	459
INST	Imidacloprid	138261-41-3	ug/L	U	U	U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.2 U	1 U	1 U	1.2 U
FUNG	Ipconazole	125225-28-7	ug/L	5.68	5 U	5 U	4.03	1 U	3.8	1 U	29	28	2.2	28	17	29.9	16	12	19.8
FUNG	Isavuconazole	241479-67-4	ug/L	U	U	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
FUNG	Itraconazole	84625-61-6	ug/L				3 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	3 U	1 U	1 U	3 U
FUNG	Metalaxyl/Mefenoxam	70630-17-0	ug/L					98	270	66	470	440	140	4.6	1.5	2.61	1.7	2.2	5.49
FUNG	Metconazole	125116-23-6	ug/L	5 U	U	U	2 U	1 U	1 U	1 U	1.9	2	1 U	2.7	3.5	6.86	3.5	3.6	5.36
INST	Nitenpyram	150824-47-8	ug/L	U	U	U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.5 U	1 U	1 U	2.5 U
FUNG	Orysastrobin	248593-16-0	ug/L	U	U	U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	2 U
INST	Permethrin	52645-53-1	ug/L	U	U	U				2 U,Ht	2 U,Ht	2 U,Ht	2 U	2 U,Ht	2 U	2 U	2 U	2 U	2 U
FUNG	Picoxystrobin	117428-22-5	ug/L	U	U	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
FUNG	Posaconazole	171228-49-2	ug/L				3 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	3 U	1 U	1 U	3 U
FUNG	Propiconazole	60207-90-1	ug/L	20.1	6.03	8.83	4.65	1 U	2.6	1 U	11	13	2.3	20	30	2 U	24	26	78.7
FUNG	Prothioconazole	178928-70-6	ug/L	U	U	U	2 U	1 U	3.3	2 U	18	23	1.8	27	26	33.6	21	19	30.3
FUNG	Pyraclostrobin	175013-18-0	ug/L	U	U	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
FUNG	Ravuconazole	182760-06-1	ug/L	U	U	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
FUNG	Sedaxane	874967-67-6	ug/L													138	61	71	136
FUNG	Tebuconazole	107534-96-3	ug/L	104	18.8	46.6	25.9	6.9	71	3.9	250	240	51	260	240	277	260	200	245
FUNG	Tetraconazole	112281-77-3	ug/L	U	U	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
FUNG	Thiabendazole	148-79-8	ug/L	1450	63	350	47.2	25	43	1	1300	1200	29	1500	970	1500	1500	1300	1280
INST	Thiacloprid	111988-49-9	ug/L	U	U	U		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	2 U
INST	Thiamethoxam	153719-23-4	ug/L	128	U	36.3		31	61	2.1	25	30	1.3	1 U	1 U	1 U	1 U	1 U	1 U
FUNG	Thiophanate-methyl	23564-05-8	ug/L					1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
INST	Tioxazafen	330459-31-9	ug/L														1 U	1 U	
FUNG	Trifloxystrobin	141517-21-7	ug/L	5 U	U	U	3 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
FUNG	Uniconazole	83657-22-1	ug/L	U	U	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
FUNG	Voriconazole	137234-62-9	ug/L	U	U	U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
FUNG	Desthio-Prothioconazole	120983-64-4	ug/L	U	U	U	3.7									46.1			43.4
FUNG	Sulfonic Acid Prothioconazole	178928-73-9	ug/L	U	U	5 U	3 U									7.87 J			8.01
INST	gamma-Cyhalothrin	76703-62-3	ug/L																

Analyte Class: FUNG=fungicide; HERB=herbicide; INST=insecticide; NUT=nutrient; INOR=inorganics; VOC=volatile organic; OTHER=miscellaneous parameters
sample_type_code: NM=primary sample; FD=field duplicate; SPL=split sample

Table C-2 Untreated Water (Influent into the Treatment System) Analytical Results (page 2)

Analyte Class	Analyte Name			location_name	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent
				sample_matrix_code	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF
				sample_type_code	N	N	N	N	N	N	N	N	N	N	N	N	SPL	N	N	SPL
				sample_date	2/28/2021	2/28/2021	3/3/2021	4/11/2021	5/3/2021	5/6/2021	5/13/2021	5/14/2021	5/17/2021	6/21/2021	7/14/2021	8/5/2021	8/5/2021	8/10/2021	8/17/2021	8/17/2021
				sample_name	Influent_2/28/2021_N	Influent_2/28/2021_N_Filtered	Influent_3/3/2021_N	20210411INF	20210504INF-C	20210506INF	20210513INF	PL20210514INF	PL20211705INF	20210621INF	20210714PLANTINF	20210805PLINF	20210805PLINF_SPL	PL20210810INF	20210817PLINF	20210817PLINF_SPL
		CAS RN	Unit																	
NUT	Ammonia (as N)	NH3N	mg/L				193						454		498		478	487		
NUT	Nitrate (as N)	14797-55-8	mg/L				0.1 U						0.1 U		0.1 U		0.1 U	0.1 U		
NUT	Nitrite (as N)	14797-65-0	mg/L				0.1 U						0.1 U		0.1 U		0.1 U	0.15		
NUT	Total Kjeldahl Nitrogen (TKN)	TKN	mg/L										1200		756		522	562		
NUT	Total Nitrate/Nitrite	NO3/NO2-N	mg/L				0.1 U						0.1 U		0.1 U		0.1 U	0.13		
NUT	Biological Oxygen Demand (BOD)	BOD	mg/L				367 J-						652		1470		1610	1590		
NUT	Phosphorus (as P)	7723-14-0	ug/L										71200 SC		56900		74700	70000		
INOR	Selenium	7782-49-2	ug/L										17.6		23.2		15 U	15.2		
OTHER	pH	PH	SU										4.2 Ht		7.6		7.7	7.7		
OTHER	Total Organic Carbon (TOC)	TOC	mg/L										345		890		890	810		
OTHER	Total Suspended Solids (TSS)	TSS	mg/L										848		4520		129	141		
VOC	Ethanol	64-17-5	ug/L																	
	Additional Analyses							(a)												

(a) additional herbicides, see attached analytical report

Analyte Class: FUNG=fungicide; HERB=herbicide; INST=insecticide; NUT=nutrient; INOR=inorganics; VOC=volatile organic; OTHER=miscellaneous parameters
sample_type_code: NM=primary sample; FD=field duplicate; SPL=split sample

Table C-2 Untreated Water (Influent into the Treatment System) Analytical Results (page 3)

Analyte Class	Analyte Name	location_name		Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent
		sample_matrix_code		INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF
		sample_type_code		N	SPL	N	N	SPL	N	N	N	FD	N	FD	N	FD	N	N	FD
		sample_date		8/26/2021	8/26/2021	9/2/2021	9/14/2021	9/14/2021	10/5/2021	5/18/2022	5/26/2022	5/26/2022	6/1/2022	6/1/2022	6/8/2022	6/8/2022	6/14/2022	6/22/2022	6/22/2022
		sample_name		PL20210826INF	PL20210826INF_SPL	PL20210902INF	PL20210914INF	PL20210914INF_SPL	PL20211005INF	PI-INF-05182022_AED	PI-INF-05262022_AED	PI-INF-05262022_AED_DUP	PI-INF-06012022_AED	PI-INF-06012022_AED_DUP	PI-INF-06082022_AED	PI-INF-06082022_AED_DUP	PI-INF-06142022_AED	PI-INF-06222022_AED	PI-INF-06222022_AED_DUP
		CAS RN	Unit																
INST	Abamectin	71751-41-2	ug/L	120	42.3	91	9.9	50.4	140	47	99		74	67	72		34	68	
INST	Acetamiprid	135410-20-7	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
HERB	AMPA	77521-29-0	ug/L	95		140	40 U		120	140	180		200	180	89		99	120	
FUNG	Azoxystrobin	131860-33-8	ug/L	1.5	1 U	1.5	1.2	1 U	2.1	1.9	3.3		2.9	2.7	2.8		2.9	2.9	
INST	Baythroid	68359-37-5	ug/L	5 U	2 U	5 U	5 U	2 U	5 U	3 U	3 U		3 U	3 U	3 U		3 U	3 U	
INST	Biphenthrin	82657-04-3	ug/L	1 U	2 U	1 U	1 U	2 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
FUNG	Brassinazole	224047-41-0	ug/L	1 U	2 U	3 U	1 U	2 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
FUNG	Captan	133-06-2	ug/L	5 U		5 U	5 U		5 U	6 U	6 U		6 U	6 U	6 U		6 U	6 U	
FUNG	Carbendazim	10605-21-7	ug/L	1 U		1 U	1 U		1 U	0.06 U	0.06 U		0.12 U	0.12 U	0.15 U		0.1 U	0.12 U	
FUNG	Carboxin	5234-68-4	ug/L	6		6.2	1.6		5.6	1.9	1.7		1.9	2	1.8		1.8	1.9	
INST	Chlorantraniliprole	500008-45-7	ug/L	220	274	190	150	198	160	83	97		86	81	86		85	72	
INST	Chlorpyrifos	2921-88-2	ug/L	1 U	2 U	1 U	1 U	2 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
INST	Chlorpyrifos-methyl	5598-13-0	ug/L	1 U	2 U	1 U	1 U	2 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
INST	Clothianidin	210880-92-5	ug/L	1 U	2.5 U	3	1 U	2.5 U	1 U	0.67	1		0.67	0.71	0.72		0.3	0.06 U	
INST	Cyantraniliprole	736994-63-1	ug/L	1 U		1 U	1 U		1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
INST	Cyhalothrin/Karate	91465-08-6	ug/L	1 U	2 U	1 U	1 U	2 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
INST	Cypermethrin	52315-07-8	ug/L	5 U	2 U	5 U	5 U	2 U	5 U	3 U	3 U		3 U	3 U	3 U		3 U	3 U	
FUNG	Cyproconazole	94361-06-5	ug/L	1 U	2 U	1 U	1 U	2 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
INST	Deltamethrin	52918-63-5	ug/L	5 U	2 U	5 U	5 U	2 U	5 U	3 U	3 U		3 U	3 U	3 U		3 U	3 U	
FUNG	Difenoconazole	119446-68-3	ug/L	4.5	5.15	4.9	1 U	3.6 J	3.8	3.4	4.7		4.7	4.5	4.4		6.5	3.9	
FUNG	Dimoxystrobin	149961-52-4	ug/L	1 U	3 U	1 U	1 U	3 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
INST	Dinotefuran	165252-70-0	ug/L	1 U	1.2 U	1 U	1 U	1.2 U	1 U	0.06 U	0.06 U		0.06 U	0.06 U	0.2 U		0.06 U	0.06 U	
FUNG	Epoxiconazole	133855-98-8	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
FUNG	Fluconazole	86386-73-4	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	0.06 U	0.06 U		0.06 U	0.06 U	0.06 U		0.06 U	0.06 U	
FUNG	Fludioxonil	131341-86-1	ug/L	33	73.9	50	1 U	31.5	44	22	68		44	45	36		37	37	
FUNG	Fluoxastrobin	361377-29-9	ug/L	32	8.9	24	16	22.1	16	8.9	17		14	14	12		12	11	
HERB	Glufosinate	51276-47-2	ug/L	10 U	3 U	10 U	10 U	3 U	10 U	10 U	10 U		10 U	10 U	10 U		10 U	10 U	
HERB	Glyphosate	1071-83-6	ug/L	340	382	380	31	218	220	32	66		49	53	71		50	38	
INST	Imidacloprid	138261-41-3	ug/L	1 U	1.2 U	1 U	1 U	1.2 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
FUNG	Ipconazole	125225-28-7	ug/L	12	2 U	13	1 U	12.3	9.9	8.6	16		15	14	13		18	13	
FUNG	Isavuconazole	241479-67-4	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
FUNG	Itraconazole	84625-61-6	ug/L	1 U	3 U	1 U	1 U	3 U	1 U	0.06 U	0.06 U		0.06 U	0.06 U	0.06 U		0.06 U	0.06 U	
FUNG	Metalaxyl/Mefenoxam	70630-17-0	ug/L	1.6	4.01	2.5	3	0.5 U	7.7	22	110		81	76	68		64	16	
FUNG	Metconazole	125116-23-6	ug/L	3.3	2 U	3.5	1 U	2 U	3.6	2.3	2.3		2.2	2.1	2.3		2.5	2.2	
INST	Nitenpyram	150824-47-8	ug/L	1 U	2.5 U	1 U	1 U	3 U	1 U	0.06 U	0.06 U		0.06 U	0.06 U	0.06 U		0.06 U	0.06 U	
FUNG	Orysastrobin	248593-16-0	ug/L	1 U	2 U	1 U	1 U	2 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
INST	Permethrin	52645-53-1	ug/L	2 U	2 U	2 U	2 U	2 U	2 U	1.2 U	1.2 U		1.2 U	1.2 U	1.2 U		1.2 U	1.2 U	
FUNG	Picoxystrobin	117428-22-5	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
FUNG	Posaconazole	171228-49-2	ug/L	1 U	3 U	1 U	1 U	3 U	1 U	0.1 U	0.1 U		0.1 U	0.1 U	0.1 U		0.1 U	0.1 U	
FUNG	Propiconazole	60207-90-1	ug/L	29	62.6	28	7.6	24.9	25	17	16		16	16	14		18	16	
FUNG	Prothioconazole	178928-70-6	ug/L	22	45.6	19	5.3	39.8	19	3.6	18		13	13	12		9.8	16	
FUNG	Pyraclostrobin	175013-18-0	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
FUNG	Ravuconazole	182760-06-1	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
FUNG	Sedaxane	874967-67-6	ug/L	46	164	62	17	74.4	64	45	100		63	59	60		57	58	
FUNG	Tebuconazole	107534-96-3	ug/L	210	254	250	49	215	200	120	170		150	130	150		160	150	
FUNG	Tetraconazole	112281-77-3	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
FUNG	Thiabendazole	148-79-8	ug/L	1100	1390	1300	9.6	1180	1100	300	500		410	380	380		390	350	
INST	Thiacloprid	111988-49-9	ug/L	1 U	2 U	1 U	1 U	2 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
INST	Thiamethoxam	153719-23-4	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	7.4	21		14	13	6.3		1.2	0.6 U	
FUNG	Thiophanate-methyl	23564-05-8	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	0.06 U	0.06 U		0.06 U	0.06 U	0.06 U		0.06 U	0.06 U	
INST	Tioxazafen	330459-31-9	ug/L	1 U		1 U	1 U		1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
FUNG	Trifloxystrobin	141517-21-7	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
FUNG	Uniconazole	83657-22-1	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
FUNG	Voriconazole	137234-62-9	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	0.6 U	0.6 U		0.6 U	0.6 U	0.6 U		0.6 U	0.6 U	
FUNG	Desthio-Prothioconazole	120983-64-4	ug/L		64.3			2 U											
FUNG	Sulfonic Acid Prothioconazole	178928-73-9	ug/L		11.7			3 U											
INST	gamma-Cyhalothrin	76703-62-3	ug/L		2 U			2 U											

Analyte Class: FUNG=fungicide; HERB=herbicide; INST=insecticide; NUT=nutrient; INOR=inorganics; VOC=volatile organic; OTHER=miscellaneous parameters
sample_type_code: NM=primary sample; FD=field duplicate; SPL=split sample

Table C-2 Untreated Water (Influent into the Treatment System) Analytical Results (page 4)

Analyte Class	Analyte Name			location_name	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Influent
				sample_matrix_code	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF	INF
				sample_type_code	N	SPL	N	N	SPL	N	N	N	FD	N	FD	N	FD	N	N	FD
				sample_date	8/26/2021	8/26/2021	9/2/2021	9/14/2021	9/14/2021	10/5/2021	5/18/2022	5/26/2022	5/26/2022	6/1/2022	6/1/2022	6/8/2022	6/8/2022	6/14/2022	6/22/2022	6/22/2022
				sample_name	PL20210826INF	PL20210826INF_SPL	PL20210902INF	PL20210914INF	PL20210914INF_SPL	PL20211005INF	PI-INF-05182022_AED	PI-INF-05262022_AED	PI-INF-05262022_AED_DUP	PI-INF-06012022_AED	PI-INF-06012022_AED_DUP	PI-INF-06082022_AED	PI-INF-06082022_AED_DUP	PI-INF-06142022_AED	PI-INF-06222022_AED	PI-INF-06222022_AED_DUP
		CAS RN	Unit																	
NUT	Ammonia (as N)	NH3N	mg/L	497		476	433		445	381	437		371	364	367		346	320	
NUT	Nitrate (as N)	14797-55-8	mg/L	0.1 U		0.1 U	0.1 U		0.1 U	0.3	0.6		0.2 U	0.2 U	0.2 U		0.2 U	0.2 U	
NUT	Nitrite (as N)	14797-65-0	mg/L	0.1 U		0.13	0.13		0.13										
NUT	Total Kjeldahl Nitrogen (TKN)	TKN	mg/L	585		616	522		519										
NUT	Total Nitrate/Nitrite	NO3/NO2-N	mg/L	0.1 U		0.1 U	0.1		0.1 U										
NUT	Biological Oxygen Demand (BOD)	BOD	mg/L	1030		929	825		701	532	557	799	591	579	639	564	651	610	
NUT	Phosphorus (as P)	7723-14-0	ug/L	66200		52500	59500		53300										
INOR	Selenium	7782-49-2	ug/L	75 U		19.5	15 U		15 U										
OTHER	pH	PH	SU	7.8			7.8		7.8	7.97	7.84		8.03	7.92	8.07		7.98	7.96	
OTHER	Total Organic Carbon (TOC)	TOC	mg/L	702		644	632		598										
OTHER	Total Suspended Solids (TSS)	TSS	mg/L	70.4		166	86		84.5	54	72		96	52	92		64	52	
VOC	Ethanol	64-17-5	ug/L							1880 U	9400 U		1880 U	1880 U	1880 U	1880 U	1880 U	1880 U	1880 U
	Additional Analyses																			

Analyte Class: FUNG=fungicide; HERB=herbicide; INST=insecticide; NUT=nutrient; INOR=inorganics; VOC=volatile organic; OTHER=miscellaneous parameters
sample_type_code: NM=primary sample; FD=field duplicate; SPL=split sample

Table C-2 Untreated Water (Influent into the Treatment System) Analytical Results (page 5)

Analyte Class	Analyte Name	location_name		Influent	Influent	Influent	Influent
		sample_matrix_code		INF	INF	INF	INF
		sample_type_code		N	FD	N	FD
		sample_date		7/6/2022	7/13/2022	7/19/2022	7/19/2022
		sample_name		PI-INF-07062022_AED	PI-INF-07132022_AED	PI-INF-07192022_AED	PI-INF-07192022_AED_DUP
		CAS RN	Unit				
INST	Abamectin	71751-41-2	ug/L	190	190	170	190
INST	Acetamiprid	135410-20-7	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
HERB	AMPA	77521-29-0	ug/L	120	110	120	120
FUNG	Azoxystrobin	131860-33-8	ug/L	2.4	2.4	2.3	2.2
INST	Baythroid	68359-37-5	ug/L	3 U	3 U	3 U	3 U
INST	Biphenthrin	82657-04-3	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
FUNG	Brassinazole	224047-41-0	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
FUNG	Captan	133-06-2	ug/L	6 U	6 U	6 U	6 U
FUNG	Carbendazim	10605-21-7	ug/L	0.088	0.06 U H3	0.06 U	0.06 U
FUNG	Carboxin	5234-68-4	ug/L	1.2	1.4 H3	1	1.1
INST	Chlorantraniliprole	500008-45-7	ug/L	64	59	48	56
INST	Chlorpyrifos	2921-88-2	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
INST	Chlorpyrifos-methyl	5598-13-0	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
INST	Clothianidin	210880-92-5	ug/L	0.06 U	0.06 U H3	0.06 U	0.06 U
INST	Cyantraniliprole	736994-63-1	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
INST	Cyhalothrin/Karate	91465-08-6	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
INST	Cypermethrin	52315-07-8	ug/L	3 U	3 U	3 U	3 U
FUNG	Cyproconazole	94361-06-5	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
INST	Deltamethrin	52918-63-5	ug/L	3 U	3 U	3 U	3 U
FUNG	Difenoconazole	119446-68-3	ug/L	12	11	10	10
FUNG	Dimoxystrobin	149961-52-4	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
INST	Dinotefuran	165252-70-0	ug/L	0.06 U	0.06 U H3	0.06 U	0.06 U
FUNG	Epoxiconazole	133855-98-8	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
FUNG	Fluconazole	86386-73-4	ug/L	0.06 U	0.1 U H3	0.06 U	0.06 U
FUNG	Fludioxonil	131341-86-1	ug/L	82	70	69	69
FUNG	Fluoxastrobin	361377-29-9	ug/L	9	7.8	6.8	6.8
HERB	Glufosinate	51276-47-2	ug/L	10 U	10 U	10 U	10 U
HERB	Glyphosate	1071-83-6	ug/L	110	51	57	55
INST	Imidacloprid	138261-41-3	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
FUNG	Ipconazole	125225-28-7	ug/L	43	36	30	34
FUNG	Isavuconazole	241479-67-4	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
FUNG	Itraconazole	84625-61-6	ug/L	0.06 U	0.06 U H3	0.4 U	0.4 U
FUNG	Metalaxyl/Mefenoxam	70630-17-0	ug/L	2.1	1.3	1.2	2.3
FUNG	Metconazole	125116-23-6	ug/L	2.2	2.1	1.9	1.9
INST	Nitenpyram	150824-47-8	ug/L	0.06 U	0.06 U H3	0.06 U	0.06 U
FUNG	Orysastrobin	248593-16-0	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
INST	Permethrin	52645-53-1	ug/L	1.2 U	1.2 U	1.2 U	1.2 U
FUNG	Picoxystrobin	117428-22-5	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
FUNG	Posaconazole	171228-49-2	ug/L	0.1 U	0.1 U H3	0.2 U RL1	0.2 U RL1
FUNG	Propiconazole	60207-90-1	ug/L	15	16	15	15
FUNG	Prothioconazole	178928-70-6	ug/L	69	38 H3	30	31
FUNG	Pyraclostrobin	175013-18-0	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
FUNG	Ravuconazole	182760-06-1	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
FUNG	Sedaxane	874967-67-6	ug/L	73	68	68	70
FUNG	Tebuconazole	107534-96-3	ug/L	280	260	220	250
FUNG	Tetraconazole	112281-77-3	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
FUNG	Thiabendazole	148-79-8	ug/L	940	750	620	700
INST	Thiacloprid	111988-49-9	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
INST	Thiamethoxam	153719-23-4	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
FUNG	Thiophanate-methyl	23564-05-8	ug/L	0.06 U	0.06 U H3	0.06 U	0.06 U
INST	Tioxazafen	330459-31-9	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
FUNG	Trifloxystrobin	141517-21-7	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
FUNG	Uniconazole	83657-22-1	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
FUNG	Voriconazole	137234-62-9	ug/L	0.6 U	0.6 U	0.6 U	0.6 U
FUNG	Desthio-Prothioconazole	120983-64-4	ug/L				
FUNG	Sulfonic Acid Prothioconazole	178928-73-9	ug/L				
INST	gamma-Cyhalothrin	76703-62-3	ug/L				

Analyte Class: FUNG=fungicide; HERB=herbicide; INST=insecticide; NUT=nutrient; INOR=inorganics; VOC=volatile organic; OTHER=miscellaneous parameters
sample_type_code: NM=primary sample; FD=field duplicate; SPL=split sample

Table C-2 Untreated Water (Influent into the Treatment System) Analytical Results (page 6)

Analyte Class	Analyte Name		location_name	Influent	Influent	Influent	Influent
			sample_matrix_code	INF	INF	INF	INF
			sample_type_code	N	FD	N	FD
			sample_date	7/6/2022	7/13/2022	7/19/2022	7/19/2022
			sample_name	PI-INF-07062022_AED	PI-INF-07132022_AED	PI-INF-07192022_AED	PI-INF-07192022_AED_DUP
		CAS RN	Unit				
NUT	Ammonia (as N)	NH3N	mg/L				
NUT	Nitrate (as N)	14797-55-8	mg/L				
NUT	Nitrite (as N)	14797-65-0	mg/L				
NUT	Total Kjeldahl Nitrogen (TKN)	TKN	mg/L				
NUT	Total Nitrate/Nitrite	NO3/NO2-N	mg/L				
NUT	Biological Oxygen Demand (BOD)	BOD	mg/L				
NUT	Phosphorus (as P)	7723-14-0	ug/L				
INOR	Selenium	7782-49-2	ug/L				
OTHER	pH	PH	SU				
OTHER	Total Organic Carbon (TOC)	TOC	mg/L				
OTHER	Total Suspended Solids (TSS)	TSS	mg/L				
VOC	Ethanol	64-17-5	ug/L				
	Additional Analyses						

Analyte Class: FUNG=fungicide; HERB=herbicide; INST=insecticide; NUT=nutrient; INOR=inorganics; VOC=volatile organic; OTHER=miscellaneous parameters
sample_type_code: NM=primary sample; FD=field duplicate; SPL=split sample

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

April 30, 2021

Richard Peck
Clean Harbors Environmental Services
4030 Columbus Dr NE
PO Box 968
Kalkaska, MI 49646

RE: Project: 20210411 INF/EFF
Pace Project No.: 60366431

Dear Richard Peck:

Enclosed are the analytical results for sample(s) received by the laboratory on April 13, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses were subcontracted outside of the Pace Network. The test report from the external subcontractor is attached to this report in its entirety.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Nolie Wood
nolie.wood@pacelabs.com
1(913)563-1401
Project Manager

Enclosures

cc: Bill Dixie, Clean Harbors Environmental Services
Tony Fisher, Clean Harbors Environmental Services
Guy Morton, Clean Harbors Environmental Services
Accounts Payable, Clean Harbors Environmental Services

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: 20210411 INF/EFF
Pace Project No.: 60366431

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60366431001	**20210411 INF**	Water	04/12/21 10:30	04/13/21 15:59
60366431002	**20210411 EFF**	Water	04/12/21 10:30	04/13/21 15:59

South Dakota Agricultural Laboratories
Brookings Biospace
1006 32nd Avenue Suite 105
Brookings, SD 57006-4728
PH 605-692-7325
Fax 605-692-7326
www.sdaglabs.com

Sample Arrival Notification

Arrival Date: 2021-04-13

Bayer-AltEn, LLC
1332 County Rd 10
Mead, NE 68041
402-624-2000

Greetings! I wanted to let you know that we have received the following sample/s safely.

SD Ag Lab No.	Sample Description	Customer Sample ID	Analysis Requested	Method*
21PE002725	Water	20210411INF	2,4,5-T	GC-MS/MS
21PE002725	Water	20210411INF	2,4,5-TP	GC-MS/MS
21PE002725	Water	20210411INF	2,4-d	GC-MS/MS
21PE002725	Water	20210411INF	2,4-DB	GC-MS/MS
21PE002725	Water	20210411INF	2,4-DP	GC-MS/MS
21PE002725	Water	20210411INF	Abamectin	LC-MS/MS
21PE002725	Water	20210411INF	Acetochlor	LC-MS/MS
21PE002725	Water	20210411INF	Acifluorfen	GC-MS/MS
21PE002725	Water	20210411INF	Alachlor	LC-MS/MS
21PE002725	Water	20210411INF	Atrazine	LC-MS/MS
21PE002725	Water	20210411INF	Azoxystrobin	LC-MS/MS
21PE002725	Water	20210411INF	Bentazon	GC-MS/MS
21PE002725	Water	20210411INF	Brassinazole	LC-MS/MS
21PE002725	Water	20210411INF	Bromoxynil	GC-MS/MS
21PE002725	Water	20210411INF	Clopyralid	GC-MS/MS
21PE002725	Water	20210411INF	Cyproconazole	LC-MS/MS
21PE002725	Water	20210411INF	Desthio-Prothioconazole	LC-MS/MS
21PE002725	Water	20210411INF	Dicamba	GC-MS/MS
21PE002725	Water	20210411INF	Difenoconazole	LC-MS/MS
21PE002725	Water	20210411INF	Dimethenamid	LC-MS/MS

21PE002725	Water	20210411INF	Dimoxystrobin	LC-MS/MS
21PE002725	Water	20210411INF	Epoxiconazole	LC-MS/MS
21PE002725	Water	20210411INF	Fluconazole	LC-MS/MS
21PE002725	Water	20210411INF	Fluoxastrobin	LC-MS/MS
21PE002725	Water	20210411INF	Fluroxypyr	GC-MS/MS
21PE002725	Water	20210411INF	Glufosinate	LC-MS/MS
21PE002725	Water	20210411INF	Glyphosate	LC-MS/MS
21PE002725	Water	20210411INF	Ipconazole	LC-MS/MS
21PE002725	Water	20210411INF	Isavuconazole	LC-MS/MS
21PE002725	Water	20210411INF	Itraconazole	LC-MS/MS
21PE002725	Water	20210411INF	MCPA	GC-MS/MS
21PE002725	Water	20210411INF	MCPP	GC-MS/MS
21PE002725	Water	20210411INF	Metconazole	LC-MS/MS
21PE002725	Water	20210411INF	Metolachlor	LC-MS/MS
21PE002725	Water	20210411INF	Metribuzin	LC-MS/MS
21PE002725	Water	20210411INF	Orysastrobin	LC-MS/MS
21PE002725	Water	20210411INF	Pendimethalin	LC-MS/MS
21PE002725	Water	20210411INF	Picloram	GC-MS/MS
21PE002725	Water	20210411INF	Picoxystrobin	LC-MS/MS
21PE002725	Water	20210411INF	Posaconazole	LC-MS/MS
21PE002725	Water	20210411INF	Prometon	LC-MS/MS
21PE002725	Water	20210411INF	Propiconazole	LC-MS/MS
21PE002725	Water	20210411INF	Prothioconazole	LC-MS/MS
21PE002725	Water	20210411INF	Pyraclostrobin	LC-MS/MS
21PE002725	Water	20210411INF	Pyrasulfotole	GC-MS/MS
21PE002725	Water	20210411INF	Quinclorac	GC-MS/MS
21PE002725	Water	20210411INF	Ravuconazole	LC-MS/MS
21PE002725	Water	20210411INF	Simazine	LC-MS/MS
21PE002725	Water	20210411INF	Sulfonic Acid Prothioconazole	LC-MS/MS
21PE002725	Water	20210411INF	Tebuconazole	LC-MS/MS
21PE002725	Water	20210411INF	Tetraconazole	LC-MS/MS
21PE002725	Water	20210411INF	Thiabendazole	LC-MS/MS
21PE002725	Water	20210411INF	Triclopyr	GC-MS/MS
21PE002725	Water	20210411INF	Trifloxystrobin	LC-MS/MS

21PE002725	Water	20210411INF	Uniconazole	LC-MS/MS
21PE002725	Water	20210411INF	Voriconazole	LC-MS/MS
21PE002726	Water	20210411EFF	2,4,5-T	GC-MS/MS
21PE002726	Water	20210411EFF	2,4,5-TP	GC-MS/MS
21PE002726	Water	20210411EFF	2,4-d	GC-MS/MS
21PE002726	Water	20210411EFF	2,4-DB	GC-MS/MS
21PE002726	Water	20210411EFF	2,4-DP	GC-MS/MS
21PE002726	Water	20210411EFF	Abamectin	LC-MS/MS
21PE002726	Water	20210411EFF	Acetochlor	LC-MS/MS
21PE002726	Water	20210411EFF	Acifluorfen	GC-MS/MS
21PE002726	Water	20210411EFF	Alachlor	LC-MS/MS
21PE002726	Water	20210411EFF	Atrazine	LC-MS/MS
21PE002726	Water	20210411EFF	Azoxystrobin	LC-MS/MS
21PE002726	Water	20210411EFF	Bentazon	GC-MS/MS
21PE002726	Water	20210411EFF	Brassinazole	LC-MS/MS
21PE002726	Water	20210411EFF	Bromoxynil	GC-MS/MS
21PE002726	Water	20210411EFF	Clopyralid	GC-MS/MS
21PE002726	Water	20210411EFF	Cyproconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Desthio-Prothioconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Dicamba	GC-MS/MS
21PE002726	Water	20210411EFF	Difenoconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Dimethenamid	LC-MS/MS
21PE002726	Water	20210411EFF	Dimoxystrobin	LC-MS/MS
21PE002726	Water	20210411EFF	Epoxiconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Fluconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Fluoxastrobin	LC-MS/MS
21PE002726	Water	20210411EFF	Fluroxypyr	GC-MS/MS
21PE002726	Water	20210411EFF	Glufosinate	LC-MS/MS
21PE002726	Water	20210411EFF	Glyphosate	LC-MS/MS
21PE002726	Water	20210411EFF	Ipconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Isavuconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Itraconazole	LC-MS/MS
21PE002726	Water	20210411EFF	MCPA	GC-MS/MS
21PE002726	Water	20210411EFF	MCPP	GC-MS/MS
21PE002726	Water	20210411EFF	Metconazole	LC-MS/MS

21PE002726	Water	20210411EFF	Metolachlor	LC-MS/MS
21PE002726	Water	20210411EFF	Metribuzin	LC-MS/MS
21PE002726	Water	20210411EFF	Orysastrobin	LC-MS/MS
21PE002726	Water	20210411EFF	Pendimethalin	LC-MS/MS
21PE002726	Water	20210411EFF	Picloram	GC-MS/MS
21PE002726	Water	20210411EFF	Picoxystrobin	LC-MS/MS
21PE002726	Water	20210411EFF	Posaconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Prometon	LC-MS/MS
21PE002726	Water	20210411EFF	Propiconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Prothioconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Pyraclostrobin	LC-MS/MS
21PE002726	Water	20210411EFF	Pyrasulfotole	GC-MS/MS
21PE002726	Water	20210411EFF	Quinclorac	GC-MS/MS
21PE002726	Water	20210411EFF	Ravuconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Simazine	LC-MS/MS
21PE002726	Water	20210411EFF	Sulfonic Acid Prothioconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Tebuconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Tetraconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Thiabendazole	LC-MS/MS
21PE002726	Water	20210411EFF	Triclopyr	GC-MS/MS
21PE002726	Water	20210411EFF	Trifloxystrobin	LC-MS/MS
21PE002726	Water	20210411EFF	Uniconazole	LC-MS/MS
21PE002726	Water	20210411EFF	Voriconazole	LC-MS/MS

We appreciate your support and confidence in SD Ag Labs.

If there are any questions, please email. We are here to help.

Thank you!

Kind regards,

Regina Wixon - Director, Ph.D.

South Dakota Agricultural Laboratories
1006 32nd Avenue Suite 105
Brookings, SD 57006-4728

PH 605-692-7325
Fax 605-692-7326
For questions please email regina.wixon@sdaglabs.com

*Please understand the methods may be modified to accommodate the sample matrix and requested reporting limits.

Submitted by the customer:

~~All~~ Strobins, Azdos, PGR, Neutral, OP, Abamectin

20210413-004
21PE002725-2726

20210413-004
21PE002725-002726
Agricultural and Analytical Testing

Pesticide Residue Sample Submission Form

ISO/IEC 17025:2017 ACCREDITED

South Dakota Agricultural Laboratories
1335 Western Avenue
Brookings, SD. 57006
(605) 692-7325

Name: Bayer Alt En, LLC *Sample ID: 20210411INF 20210411EFF

Address: 1332 County RD 10 City: Mead State: NE

Zip: 68041 Phone: ( ) - **Email:

*Sample ID must be marked clearly on the sample you submit. **Results will be emailed to the provided email address.

Billing Information: ☐ Check box if billing is the same as customer information.

Name: Pace Analytical Services LLC Address: 9608 Loiret BLVD

City: Lenexa State: KS Zip: 66219

Phone: (913) 599 - 1759 Email: bruce.schletter@pacelabs.com

Individual tests are $150 each, unless otherwise marked. Scans are $200 and include all of the compounds in a particular category. Acceptable samples include Vegetation or Soil. Call to confirm other substrates.

Thank you for choosing South Dakota Agricultural Labs! We do add analytes to our testing regiment throughout the year. If a chemical of interest is not listed, please call us:
(605) 692-7325.

How much sample should you send?

Please send 30g of vegetation or 100g of soil to run an individual test. What does this look like? For vegetation, it would be about a quart sized bag packed full. If more than one test is required, please fill a gallon sized bag. For soil samples, please send 2 cups, if more than one test is required send 4 cups. A $12.00 sample prep fee is charged to all samples

Analyses offered

Please turn page over to view the current pesticide analyses.

If you are interested in a screen of active ingredients, please check the box next to the **bold-faced** heading. This will include all active ingredients within the PGR screen for $212.

Example: PGR Screen ☑

If you are interested in single analyses, please circle the active ingredients. The cost of each individual analyte is $150 unless otherwise marked.

Example: (Mesotrione)

Sample(s) Received at SD Ag Labs
Date 2021 04 13
Received by
Emilie Rodengen

Analyzed By:
South Dakota Agricultural Laboratories
1335 Western Avenue
Brookings,South Dakota 57006
Phone: 605-692-7325
E-Mail: regina.wixon@sdaglabs.com

Collected By:
Bayer-AltEn, LLC
1332 County Rd 10
Mead, NE 68041
Phone: 402-624-2000
E-Mail: bruce.schlatter@pacelabs.com

Report Date: 2021-04-26 **Final Report**

Report Of Analysis

Date Received : 2021-04-13
Package Id : 20210413-004

21PE002725 **Description: Water** **Date Collected: 2021-04-11**

20210411INF

Analyte	Result
2,4,5-T	ND ppb
2,4,5-TP	ND ppb
2,4-d	2.75 ppb
2,4-DB	ND ppb
2,4-DP	ND ppb
Abamectin	37.1 ppb
Acetochlor	ND ppb
Acifluorfen	ND ppb
Alachlor	ND ppb
Atrazine	ND ppb
Azoxystrobin	ND ppb
Bentazon	<5 ppb
Brassinazole	ND ppb
Bromoxynil	<5 ppb
Clopyralid	13.4 ppb
Cyproconazole	ND ppb
Desthio-Prothioconazole	<5 ppb
Dicamba	<1 ppb
Difenoconazole	<4 ppb
Dimethenamid	ND ppb
Dimoxystrobin	ND ppb
Epoxiconazole	ND ppb
Fluconazole	ND ppb
Fluoxastrobin	ND ppb
Fluroxypyr	<5 ppb
Glufosinate	18.3 ppb
Glyphosate	1020 ppb
Ipconazole	<6 ppb
Isavuconazole	ND ppb
Itraconazole	ND ppb
MCPA	ND ppb
MCPP	ND ppb
Metconazole	ND ppb
Metolachlor	ND ppb
Metribuzin	ND ppb
Orysastrobin	ND ppb
Pendimethalin	ND ppb
Picloram	<5 ppb
Picoxystrobin	ND ppb
Posaconazole	ND ppb
Prometon	<5 ppb
Propiconazole	<5 ppb
Prothioconazole	ND ppb
Pyraclostrobin	ND ppb
Pyrasulfotole	<5 ppb
Quinclorac	ND ppb

Ravuconazole	ND ppb
Simazine	ND ppb
Sulfonic Acid Prothioconazole	ND ppb
Tebuconazole	25.9 ppb
Tetraconazole	ND ppb
Thiabendazole	47.2 ppb
Triclopyr	ND ppb
Trifloxystrobin	ND ppb
Uniconazole	ND ppb
Voriconazole	ND ppb

APPENDIX D

LAND APPLICATION APPROACH

January 7, 2022

Tom Buell
Monitoring and Remediation Division Administrator
Nebraska Department of Environment and Energy
PO Box 98922
Lincoln, NE 68509-8922

Subject: **Land Application Proposal**
AltEn Facility
Saunders County, Nebraska

Dear Mr. Buell:

On behalf of the AltEn Facility Response Group, please find attached the revised land application proposal providing background, proposed procedures and requirements for applying filtered water from the Facility onto farmland.

Sincerely,

Donald Gunster
Partner/Senior Scientist

Enclosure

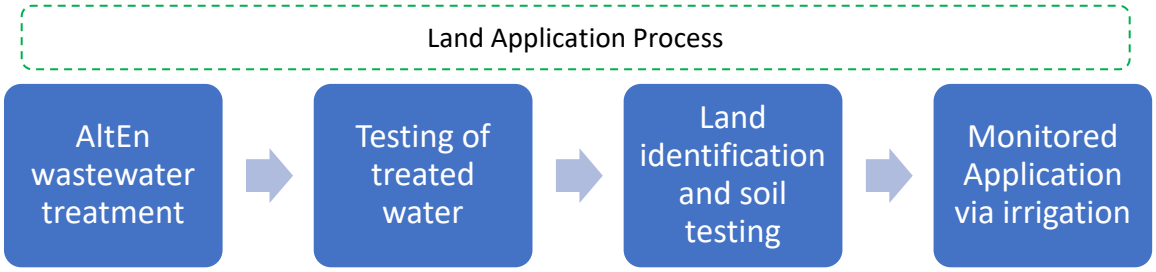
Proposed Land Application Approach for Management of Water from AltEn Site

Executive Summary:

A primary goal of current efforts at the AltEn site is to effectively manage water contained in the site's lagoons. The Facility Response Group's proposed plan to meet this goal is to filter the AltEn water and then land apply it at nearby agricultural fields. The plan utilizes a treatment process to significantly reduce pesticide residues and organic material present in AltEn water. The treated AltEn water is proposed to be used as agricultural irrigation water, similar to past practices in the area as well as throughout the state. The approach would place any trace pesticide residues into an agricultural system where the pesticide active ingredients are potentially already used or have registrations for comparable uses, and allow uptake of the nutrients present in the treated AltEn water by crops present.

The proposed thresholds for pesticides residues remaining in the water would be 10% or less of typical US EPA approved uses of the individual active ingredients that can be applied to a crop and would be consistent with those that can result from typical conventional farming practices. Application of the treated water would be intended to have no adverse consequences for crops, the soil, and the subsequent agricultural crop other than as a source of water and nutrients and would allow harvest and utilization of the crop as would normally occur. This approach is protective of the crop, agricultural lands, the environment, and people, as it accounts for approved uses and is based on US EPA scientific assessments of the safety of the individual active ingredients.

The figure below describes the high-level steps proposed as part of the interim action, with more detail included in the document's latter section.



Background on pesticides found at AltEn's site:

Each pesticide product undergoes thorough evaluation at the federal and state level prior to use, driven by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA; a brief overview of FIRFA and pesticide registration is provided in Appendix A). Federal and state regulators conduct thorough evaluations of the environmental fate and degradation profiles, toxicology and ecotoxicology studies for each compound to determine uses and application rates that pose acceptable risk to humans and the environment. Regulatory data and decision documents were used as part of our analysis as we compiled the proposal herein.

We have reviewed treated water analytical data and the associated seed treatments used on seed by member companies in the relevant time period and have identified the active ingredients listed on Table 1 as the focus for the assessment. In addition, several pesticides which are not used as seed treatments (e.g., herbicides) have been detected in water at the AltEn site and will be considered for inclusion in the focused analyte panel.

The focused analyte panel is intended to be utilized for design of land application. We propose that land application compliance will be based on the focused analyte panel in treated water. The focused analyte panel targets analytes that present the greatest potential presence in treated water or implications for pesticide environmental loading in agricultural systems. Analytes that are part of the focused analyte panel are those that have been detected in treated water plus others that could be expected to be present. Factors that raise the expectation that an analyte could be present are:

- Consistent and high (i.e., greater than 75% frequency of detection and greater than 1000 parts per billion [ppb] average detection) levels of detection in baseline testing of untreated material on site.
- Analytes which are consistently present (greater than 75% frequency of detection) in baseline testing of treated water, particularly if near or above threshold levels proposed.
- Analytes which have increased persistence in the environment.
- In addition to the above considerations, we expanded the panel to include analytes which may have unique or specific considerations when used in agricultural systems, in an effort to be conservative and protective of human health and the environment. This may include:
    - Greater potential for risk to non-target organisms
    - Unique exposure reduction or handling requirements (e.g., greater than standard PPE, gloves, long sleeves/pants, closed footwear)
    - The analytes are also reflective of current seed treatment and seed treatment practices, and those probable to be present at the AltEn site (i.e., those analytes used within the past 5 years and representing more than 95% of the corn seed present on the AltEn site).

Data used to inform this final list are summarized in Appendix B.

Table 1: Overview of information and sample labels related to the active ingredients used as seed treatments on corn or identified at the AltEn site

Pesticide	Pesticide Group (e.g., FRAC, IRAC, HRAC)	Link to US EPA and IUPAC[a] review summaries	Detected at AltEn?	Registered use on corn?	*Sample Seed Treatment Uses*				*Sample Foliar/Other Uses*							*Sample Label Information*			Proposed threshold for single application (grams/acre)	Proposed threshold for total annual in-crop application (grams/acre)
					Example reference label	Example trade name	Corn use on label?	Single Application Seed Treatment (grams/acre)[b]	Example reference label	Example trade name	Corn use on label?	Chemigation use on label?	Other relevant uses on label (see Appendix C for crops relevant to Nebraska)	Max single application (grams/acre)	Max annual application (grams/acre)	Acceptable Crop Rotations after application	Grazing Restrictions	Re-entry interval following application		
Abamectin CAS number 71751-41-2	6-I	Abamectin EPA Summary	Yes	Yes	100-1399	Avicta Complete	Yes	5.5	100-1351	Agri-Mek SC	No	Yes	Soybean, Potato, Sweet Corn	8.6	17.3	Corn, Soybean, Cereals, Potato, Alfalfa	Do not graze treated crop	12 hours	1.1	2.2
Azoxystrobin CAS number 131860-33-8	11	Azoxystrobin EPA summary Azoxystrobin IUPAC summary	Yes	Yes	100-1399	Avicta Complete	Yes	0.1	100-1098	Quadris/Quilt	Yes	Yes	Soybean, Cereals, Potato, Alfalfa, Sweet Corn	113.4	908.0	Corn, Soybean, Cereals, Potato, Alfalfa	0 – 14 days after application on relevant crops	4 hours	11.30	22.6
Chlorantraniliprole CAS number 500008-45-7	28-I	Chlorantraniliprole EPA summary Chlorantraniliprole IUPAC summary	Yes	Yes	352-841	Lumivia	Yes	18.8	352-729	Coragen	Yes	Yes	Soybean, Cereals, Potato, Alfalfa, Sweet Corn	44.5	90.8	Corn, Soybean, Cereals, Alfalfa, Potato	14 days PHI, grazing not specifically defined	4 hours	4.45	8.9
Clothianidin CAS number 210880-92-5	4A-I	Clothianidin EPA summary Clothianidin IUPAC summary	Yes	Yes	7969-458	Poncho 600	Yes	12.5	59639-150	Belay	No	Yes	Soybeans, Potatoes	45.4	90.8	Corn, Soybean, Cereals, Potato, Alfalfa	Do not graze treated crop	12 hours	2.5	5.0
Fluoxastrobin CAS number 361377-29-9	11	Fluoxastrobin EPA summary Fluoxastrobin IUPAC summary	Yes	Yes	264-1169	Acceleron D-281	Yes	4.1	66330-64	Evito 480 SC	Yes	Yes	Soybeans, Potatoes, Wheat, Sweet Corn	81.7	163.4	Corn, Soybean, Cereals, Potato, Alfalfa	Up to 23 days after application (sweet corn)	12 hours	8.17	16.3
Imidacloprid CAS number 138261-41-3	4A	Imidacloprid EPA Summary Imidacloprid IUPAC Summary	Yes	Yes	264-968	Gaucho 600 Flowable	Yes	33.5	264-827	Admire Pro	No	Yes	Soybeans, Potatoes	21.2	227.0	Corn, Soybean, Cereals, Potato, Alfalfa	21 days PHI, grazing not specifically defined	12 hours	6.7	13.4
Glyphosate CAS number 1071-83-6	9-H	Glyphosate EPA summary Glyphosate IUPAC summary	Yes	Yes	N/A	N/A	N/A	N/A	524-537	Roundup PowerMAX II	Yes	No	Soybeans, Alfalfa, Sweet Corn, Wheat	624.3	3308.5	Corn, Soybean, Cereals, Potato, Alfalfa	7 days after application	4 hours	62.43	124.9
Metalaxyl/Mefenoxam CAS numbers 57837-19-1 and 70630-17-0	4	Metalaxyl EPA Summary Metalaxyl IUPAC Summary Mefenoxam EPA Summary Mefenoxam IUPAC Summary	Yes	Yes	100-1399	Avicta Complete	Yes	0.1	100-1202	RidomilGold SL	No	Yes	Soybean, Potato, Alfalfa	283.8	283.8	Corn, Soybean, Cereals, Potato, Alfalfa	60 days after application (alfalfa)	48 hours	14.2[c]	28.4
Prothioconazole CAS number 178928-70-6	3	Prothioconazole EPA summary Prothioconazole IUPAC summary	Yes	Yes	264-825	Proline480 SC	Yes	8.1	264-1093	Stratego YLD	Yes	Yes	Soybean, Wheat, Potato, Sweet Corn	18.6	37.2	Corn, Soybean, Cereals, Potato, Alfalfa	No restriction for corn, 30 days for barley/ wheat	12 hours	1.86	3.7
Sedaxane[d] CAS number 874967-67-6	7	Sedaxane EPA Summary Sedaxane IUPAC Summary	Not on original panel	Yes	100-1374	Vibrance	Yes	2.5	N/A	N/A	N/A	N/A	No foliar crops	0.0	12.0	Corn, Soybean, Cereals, Potato,	No restrictions on ST label	12 hours	0.51	1.0

															Alfalfa (based on ST)				
Tebuconazole CAS number 107534-96-3	3	Tebuconazole EPA summary Tebuconazole IUPAC summary	Yes	Yes	42750-130	TebuStar 250 ST	Yes	1.0	264-849	Absolute MAXX	Yes	Yes	Wheat, Sweet Corn	46.4	92.8	Corn, Soybean, Wheat, Alfalfa, Potato	30 days (wheat)	12 hours	4.64	9.3
Thiabendazole CAS number 148-79-8	3	Thiabendazole EPA summary Thiabendazole IUPAC summary	Yes	Yes	100-1399	Avicta Complete	Yes	1.3	N/A	N/A	N/A	N/A	Post-harvest uses on carrot, citrus, potato, pome fruit, and ornamental bulbs and corn[e]	0.0	68.0	Corn, Soybean, Cereals, Potato, Alfalfa	No Restriction	12 hours	0.26	0.52
Thiamethoxam CAS number 153719-23-4	4A-I	Thiamethoxam EPA summary Thiamethoxam IUPAC summary	Yes	Yes	100-1399	Avicta Complete	Yes	12.5	100-938	Actara	No	Yes	Potatoes	28.4	56.8	Corn, Wheat, Potato, Soybeans, Alfalfa	No grazing of cover crops	12 hours	2.5	5.0

[a] IUPAC summary reference: Lewis, K.A., Tzilivakis, J., Warner, D. and Green, A. (2016) An international database for pesticide risk assessments and management. Human and Ecological Risk Assessment: An International Journal, 22(4), 1050-1064. DOI: 10.1080/10807039.2015.1133242

[b] Based on 25,000 seeds planted per acre, and 1680 corn seed per pound, following recent US EPA seed treatment product risk assessments.

[c] Single application limit set based on 5% of foliar rate vs 20% seed treatment rate due to very wide variance between foliar application rates and seed treatment rates for Metalaxyl/mefenoxam

[d] Within the Syngenta portfolio, multiple SDHI pesticides have been developed that offer complementary benefits and disease control. Although the safety profile for sedaxane could support foliar uses, this active ingredient was determined to be better positioned as a seed treatment. In addition, while plans to test for sedaxane in the analyte panel are being developed, finding analytical labs with this testing capability has proven difficult.

[e] When thiabendazole was registered by Merck, there were foliar applications on the label (e.g., sugar beet, soybean, wheat, rice, and dry beans). After the acquisition of Merck, Novartis (then Syngenta) had developed and were developing many new and highly effective fungicides (strobilurins, triazoles, SDHIs) that were better suited than thiabendazole for foliar uses. Although the safety profile for thiabendazole could support foliar uses, since 1998, the thiabendazole uses have been focused on the seed treatment and post-harvest markets.

Proposed Land Application Approach for Management of Water from AltEn Site

Explanatory description of Table 1:

Table 1 provides an overview of sample labels for pesticide active ingredients that are on the focused analyte panel. This table is intended to provide examples of characteristics or considerations from the sample labels associated with formulated products which have undergone rigorous regulatory scientific reviews by U.S. EPA. Information included such as maximum use rates, or restriction from product labels are specifically for the products' use as a pesticide at the labeled rate and following label instructions and mitigations as applicable. Labeled rates reflect the amount of product a pesticide applicator would apply for the purposes of managing pests or disease on a farmer's field or a homeowner's lawn and which are many times higher than the trace amounts that may be present following treatment of the water at the AltEn site. The overview table is intended to provide context for land application guidance of treated lagoon water, which may have unique mixtures of trace levels of pesticides, but not restricted by them as the land application is not a labelled pesticide application. We propose the following mitigations following treated water application which consider representative pesticide labels and are protective of human health and the environment:

1. Re-entry interval following treated water application – 12 hours
2. Grazing restrictions – no grazing for 14 days on land that has received treated water; follow applicable label restrictions if in-season pesticide applications are made
3. Acceptable crop rotations – corn, wheat, potato, soybeans, alfalfa

Proposed Land Application Approach for Management of Water from AltEn Site

Background on AltEn site: Water utilized in AltEn ethanol production processes and surface storm water is currently held in storage lagoons and tanks on the AltEn site. This water contains pesticide residues derived from treated seed used in AltEn's ethanol production. In addition, there are some herbicide residues in the water, potentially as a result of vegetation control around the water storage lagoons. The water also contains high nutrient levels due to the presence of manure at the AltEn site. The addition of expired beverages (alcohol and soda) and industrial/food grade starch have unknown contribution to the byproduct material or residues present.

The total untreated water volume currently held on the AltEn site (three primary lined lagoons and the emergency lagoon) exceeds 150 million gallons. The water has accumulated over multiple years of AltEn operations; additional water has been added from on-site storm water collection and recent equipment cleaning by AltEn. Additionally, the leakage of up to 4 million gallons of thin stillage/manure from a digester unit in the late winter of 2021 and the subsequent collection of this water and affected ice have added to the volume held on site.

Although there is likely some ongoing natural degradation of the pesticide components in the stored lagoon water from exposure to sunlight (photolysis), microbial activity (biodegradation), and interaction with water (hydrolysis), these processes are not sufficient to clear the water of the components in a reasonable timeframe. Filtration units have been used to assist in the removal of the pesticides and organic material. Initial site stabilization efforts have treated a substantial volume of water to date, which is currently held in temporary tanks pending construction of a pond for winter storage. The water treatment units have been highly effective in removing pesticides.

Historically, AltEn obtained permits from NDEE to enable the discharge of water from the plant operation. The historical permit and best management plans provide insight on previous permit requirements.

The following is a proposal for the disposition of the treated water to facilitate lagoon stabilization in advance of further site response activities.

Proposed Disposition of Treated Water:

Use as irrigation water is currently the only known disposition for treated water from the AltEn lagoons containing nutrients and potentially trace pesticide residues. Treated irrigation water would be applied by irrigation systems to field corn production, fallow, or post-harvest fields on land in relative proximity to the AltEn site, using an existing irrigation water distribution system or temporary transfer piping. The utilization of the treated water in these situations would allow uptake of the nutrients present in the water by the corn or other vegetation, while placing any pesticide residues into an agricultural system where the pesticide active ingredients have registrations for comparable uses. The proposed application of the treated water would be intended to have no consequences for the corn crop other than as a source of water and nutrients and would allow harvest and utilization of the crop as would normally occur.

Based on treated water testing for pesticide active ingredients, as well as evaluation of approved uses, any pesticide residue introduced to the agricultural system through land application of treated water would be consistent with application rates that can result from typical current farming practices utilizing labelled pesticide applications. Specifically, concentrations of the focused analyte panel in treated water

samples collected in accordance with SOP-4 (Standard Operating Procedures; Appendix E) will be multiplied by the volume of water applied and divided by the area receiving the water to determine grams per acre of active ingredient. Design to ensure Table 1 thresholds are not exceeded will be performed prior to application, and verification of volumes and grams per acre applied will be performed at least monthly. These evaluations will be performed on a field-by-field basis.

Analyte Target Filtration Level: Raw water held in the AltEn storage lagoons will be treated on-site to remove pesticide residues to the lowest practical levels (based on analyte-specific detection limits) for pesticides identified in Table 1. The Facility Response Group will sample treated water to support land application as described above. Lagoon sampling may be performed for other purposes, but no future sampling of untreated lagoons is proposed to support land application.

- **Focused Analyte List** - The list of analytes for design of land application is primarily based on those present in treated water, and the seed treatment active ingredients identified as being applied to seed delivered to AltEn by feedstock suppliers. Other pesticides identified in initial screening analytical suites utilized to assess material connected to the AltEn site were also considered. Analytes were grouped into families or modes of action to consider cumulative environmental impacts. Degradants or metabolites of concern for a pesticide compound, as determined by US EPA, were considered during development of the analytical suite. The focused analyte list is focused on key analytes identified as having high initial levels of detection in on-site material, increased potential for presence in treated water or greater implications for pesticide environmental loading/impact/persistence in agricultural systems. The utilization of a focused analyte suite enables more efficient testing processes while assessing analytes that have the greatest potential to be present or have a potential impact in the environment. Level of detection for each analyte listed in Table 1 will be communicated to NDEE and will be based on the validated relevant analytical methods and associated detection and quantification limits relevant for the filtered/treated water and threshold context. Total pesticide concentration is defined as dissolved plus sorbed pesticide residues from treated water.

- **Analyte Thresholds** - For each chemical in the focused analyte list, a proposed threshold level was determined to allow use as irrigation water in field corn production or application to post harvest agricultural land. To be further protective of human health and the environment, threshold targets are proposed for each active ingredient that are a fraction of the US EPA-approved application rates for the pesticides and reflect a margin of safety of at least 10X based on US EPA scientific reviews. The threshold targets for an active ingredient will be proposed for a single irrigation application and cumulative total amounts for a crop production cycle. Single irrigation application thresholds will be based on US EPA-approved application rates for corn that represent 10% of foliar rates (20% of seed treatment rates if no foliar rate for corn is established for the active ingredient). Individual active ingredient thresholds may be set at higher rates than guidance above where the maximum allowable annual usage is significantly higher than 10% of foliar rate or 20% of the seed treatment rate, as is the case with metalaxyl. However, the higher rates will not exceed 50% of the foliar rate. Additionally, the combined total of a family grouping (mode of action) will not exceed 200% of the cumulative thresholds. For example, if a family grouping has 3 active ingredients and 2 are detected at their established thresholds, the third active ingredient could not be detected (e.g., 100% + 100% + 0% = 200%).

This approach will ensure that cumulative applications of active ingredients belonging to a family grouping will remain below levels that are protective of human health and the environment. A second threshold will be set for the total active ingredient that can be applied in irrigation water in a crop production cycle and will be based on 2X the single application threshold. Appendix D describes an example lookup table for allowable pesticide active ingredient concentrations per application of each acre-inch of water (102,736 liters). Thresholds for degradates or metabolites for a pesticide identified as potentially presenting increased risk are included in the analytical suite and do not exceed the threshold for the pesticide from which it was derived. Ensuring that application rates of focused analytes in treated water are a fraction of US EPA approved application rates provides assurance that this proposal is protective of human health and the environment.

- **Threshold Equivalence** - The comparison to US EPA registered labels is intended to assess existing application methodology, rates, or use patterns to ensure the proposed irrigation application of treated water is within the scope of scientific assessments conducted as part of US EPA reviews for registration for agricultural use. The comparison to US EPA registered labels is not intended to suggest applications would be for any pest control purposes as any residues remaining in the treated water would not reflect a specific registered product or provide such benefit. The equivalence-based method will ensure that where analytes are present at very low levels, they have already been assessed for safety and environmental impact in corn production or presence in agricultural environments. The proposed threshold rates were derived to ensure that any remaining residues in water do not represent a significant addition to the environmental loading or potential crop residues allowed through approved corn pesticide use. The proposed thresholds for individual analytes are intended to accommodate variability in filtration system processes, inconsistent residue levels in untreated water, analytical variability, and to enable expedited reduction in the overall pesticide residues present at the AltEn site while minimizing environmental risks through use of the treated water in an agricultural system where the pesticides would already potentially be present from approved uses.

Nutrient and Water Quality Target Level: Raw water held in the AltEn storage lagoons will be treated on site to remove organic and other materials (in solid or flocculated form) resulting in some reduction in total nutrient composition. The filtration process is not expected to remove all nutrients or affect general water quality parameters that need to be considered in establishing land application guidelines. To address these aspects and to ensure adequate soil and surface water protection (as specified by NDEE) for non-pesticide components in the treated water, the analytical suite will also include the following parameters:

BOD5 (parts per million, ppm)	Nitrite (ppm)	Total Kjedahl Nitrogen (TKN)
Nitrates (ppm)	Phosphorus	Total Organic Carbon (TOC)
Ammonia (ppm)	Selenium	Total Suspended Solids (TSS)
pH	Sodium Adsorption Ratio (SAR) and Electrical Conductivity (EC)	Total Dissolved Solids (TDS)

Treated water application rates will be developed in consultation with crop nutrient and irrigation experts (certified agronomists) to ensure individual land applications are made in consideration of land/soil type, existing nutrient/soil profiles, crop production practice, irrigation systems and any other factors that may be deemed critical to minimize environment or crop impacts and meet Nebraska irrigation water requirements.

Field Irrigation Requirements: Fields identified to receive treated water applications from the AltEn site will be assessed for suitability for water holding and nutrient management as per the revised AltEn, LLC - Best Management Practices Plan prepared in draft form by Nutrient Advisors of West Point, NE. The Facility Response Group is negotiating with landowners in the vicinity of AltEn lagoons and will update the Best Management Practices (BMP) Plan when landowners have completed participation agreements. Participation agreements will require disclosure of historical applications of material from AltEn by landowner/operator. The extent of land being considered for potential outreach and negotiations is within three miles of the center of the AltEn lagoons (Figure 1), as more-distant fields would be cost prohibitive for the large volume of water.

The BMP Plan focuses on nutrient requirements and avoiding sodium impacts, while staying within the maximum annual applied grams per acre for each analyte listed in Table 1. The table reflects labeled uses and summarizes plant back restrictions. The BMP Plan will be finalized and implemented by professional agronomists in collaboration with the landowners. The BMP Plan for each field will describe history of receiving material from the AltEn facility (lagoon water or wetcake, for example), general description of in-season pesticide use, and data as well as box-and-whisker plots from pre-application soil sampling.

BMP Plans must be submitted to NDEE for review and approval prior to land application to that field. Any cover crops for the post-harvest land application period will have low attractiveness rating to pollinators.

During land application, the Facility Response Group will work with agronomists and crop advisors to monitor the rate of land application (acre inches per management unit), moisture status of the soil, and crop response. Rates of land application will depend on the infiltration and percolation rate, weather, nutrient demands and sodium loading limits, and will not exceed the annual pesticide loading rates listed in Table 1. Implementation of the BMP Plan will include appropriate record keeping and annual reporting to applicable agencies.

Land suitable for application of treated water by irrigation

- **Agricultural land in annual crop production:** This would include any land currently producing an annual crop which is actively growing, utilizing water and nutrients. Field corn is the preferred crop for application of the treated water due to a large percentage of acreage in the area and the high utilization rate of water and nutrients. In addition, pesticide residues which may potentially be present in the treated water are primarily derived from corn seed treatment uses, therefore are already assessed for use in this crop. The application of the treated water in field corn production will efficiently allow nutrients present in the water to be utilized by the corn, extracting a valuable resource, while limiting the potential for movement off-field and will place any trace pesticide residues into an agricultural system where the products are already present or potentially used. The proposed application of the treated water would be intended to have

no consequences for the corn crop in production other than as a source of water and nutrients and would allow harvest and utilization of the crop as would normally occur. Any pesticide residue introduced to the agricultural system on the land would be consistent with those that occur in typical current farm practices utilizing labelled pesticide applications. Typical timing of pest management is at planting via treated seed, early season application for weed management or insect pest management, and later season for disease or insect management as needed and based on agronomics of the crop. Trace levels of pesticides that may be present in the treated water would be a fraction of a labeled application rate and will not provide any pest control value nor effect planned rotational crops (see Table 1 for crop rotation information). Other annual crops could be utilized for irrigation for the treated water once adjusted for the typically lower nutrient utilization and assessment for labelled use of pesticides detected in the treated water.

- **Agricultural land in post-harvest status from annual crop production:** This category includes any land where an annual crop has been harvested and the land is being prepared for the next planting of a crop. The application of treated water to the land would be intended to prepare the next crop with soil moisture and nutrients. Applications rates of treated water would be determined by the water holding capacity of the soil and nutrient needs of the planned crop. The preferred crop for planned planting should be consistent with those typically following field corn (see Table 1 for crop rotation information), as any trace pesticide residue present in the treated water would be a fraction of labeled rate typically used in conventional annual field corn crop agricultural systems and would present no consequences for a typical rotational planted crop or to human health and the environment. Overall, the trace levels of pesticide residues potentially present in treated water would be a fraction of labelled rates typically used in agricultural systems and the cumulative contribution to pesticide residues present in a typical field would not have any impact on human health or the environment.
- Land considered for application falls within Lower Platte North Natural Resource District (NRD). Soil conditions, mapped setbacks for surface water and other features, and crop nutrient demands will be described in the final BMP Plan when landowner participation agreements are finalized. Timing for application will align to NRD requirements, balancing factors such as benefits of cover crops, soil temperature, and general weather (i.e., freezing temperatures).

The following are proposed requirements for target application fields to receive treated water from the AltEn site:

- **Land Management and Selection –** The pesticidal active ingredients found in the wastewater at AltEn have been registered for use in the US and on crops in the state of Nebraska since the early 2000s. These products have been used in Nebraska since that time, and therefore may be present at low levels in soil and surface water. Land selection and management must ensure:
    a. Areas that may be prone to overland water movement have tillage, berms, or other features to prevent any excess irrigation water from flowing off the application area. In no instance shall slopes exceed 12 degrees.
        - For fields that have tile drainage systems installed, the irrigation applications rates must ensure water holding capacity is not exceeded during irrigation which may allow drainage from the tile system. Treated water will not be applied to fields with

tile drains that do not have an actively growing crop or cover crops, unless other protections are present.

a. Fields must not have seasonal or permanent bodies of water located within the treated water application area.
b. Fields must have an analysis of soil quality, texture and structure for assessment of water holding capacity and potential for leaching and impacts of any water quality aspects (e.g., salt) of the treated water. Standardized multi-aliquot, composite soil sampling protocols will be followed to account for variability across a field.
c. Fields will have analysis of nutrient levels post-harvest to facilitate nutrient loading assessment and planning. Soil sampling procedures to determine nutrient and salt content are described in SOP-2 (Appendix E). The Facility Response Group will comply with the Lower Platte North NRD requirements for nutrient management, and may repeat soil nutrient sampling in spring to verify nutrients were retained over winter, if requested by NDEE on a field-by-field basis.
d. Land owners/managers will be required to disclose if the land being considered for selection has previously had water or wetcake from the AltEn site applied.
e. Soil samples will be collected from fields proposed for land application, and the samples will be analyzed for pesticide residues in candidate fields. Soil sampling procedures to determine pesticide content are described in SOP-3 (Appendix E). Soil pesticide analysis limitations and proposed use of soil data are presented below.

Limitations of Testing for Soil Pesticide Residues

The land in typical conventional agricultural systems would be expected to have detections of pesticide residues, but detections of specific pesticides and levels are anticipated to be variable and dependent on a number of factors.

Different conditions or practices in the field can influence potential pesticide soil residues and have a significant impact on the variability of individual sample test results. These factors include, but are not limited to:

- Temporal and spatial variability in the levels of a pesticide applied to individual fields based on management practices.
- The extraction efficiencies and matrix interferences can be very complex for soil, contributing to an increased level of variability in pesticide detections in soil.
    - Testing methods for treated water are less complex and prospective sources of variability (i.e., extraction efficiencies, matrix interferences) are far fewer than those required for soil matrices, reducing variability and increasing the precision and accuracy of results.
- Management practices implemented by the grower that influence degradation of pesticides present, which can include tillage practices, crop rotational practices, soil amendments, irrigation practices.
- Pest management practices during crop production that will introduce pesticides to the agricultural environment present in the soil. The type, rate and timing of the pesticide application will all have an influence on levels potentially detected in soil residue testing at a given time. For example, pest management practices that occurred at higher rates and/or just prior to sampling would be anticipated to result in higher detection levels

compared to sampling conducted weeks or months after the application. Additionally, if a grower tends to utilize a specific pest control product more frequently, this could contribute to higher detection levels compared to other products. As pest management practices can occur at various points in the crop protection season, residue levels will vary accordingly over the year as pesticides are introduced and degradation occurs.

- Each pesticide product will have different degradation timeframes and environmental fates which can be influenced by the soil types and environmental factors.
- Environmental conditions present in the field during the year will influence the rate of residue degradation. This can include variables like amount of rainfall, temperature, micro-biome, and ground cover present.
- Soil types will vary significantly from field to field and within a field. The soil types present can influence the rate of residue degradation, adsorption/desorption and detection[1].
- Organic matter typically controls the degree that pesticides adsorb to soil[2]. Organic matter is highly variable laterally and vertically[3] as well as seasonally[4] in a field. Soil testing for pesticides tends to document organic matter variability and related pesticide sorption, rather than accurately measure pesticide

Concentrations of pesticide residues in soil are a function of the application rate, soil type, microbial activity, weather, and the physiochemical properties of the pesticide. In general, soil pesticide levels will increase following applications and decline over time. If a pesticide is used every growing season, it may be present at detectable levels in subsequent seasons. For example, a 2015 study with clothianidin demonstrated that soil levels of this pesticide reach a plateau after several years of use. Additionally, clothianidin became less bioavailable over time, meaning it was sorbed to the soil and not available for plant uptake[5].

Proposed Use of Soil Data

Pesticide results for soil samples collected in accordance with SOP-3 (Appendix E) will be inspected as an application screen for participating fields. For each new proposed field, the Facility Response Group will evaluate results for each chemical in the focused analyte panel by comparing box-and-whisker plots

[1] U.S. EPA. Undated. Technical Overview of Ecological Risk Assessment. Analysis Phase: Exposure Characterization. https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/technical-overview-ecological-risk-assessment-1 [Accessed September 27, 2021]

[2] U.S. Department of Agriculture – Natural Resources Conservation Service, January 1998. Soil Quality Concerns: Pesticides. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052821.pdf [Accessed September 27, 2021]

[3] VandenBygaart, A.J. et al. 2007. Assessment of the lateral and vertical variability of soil organic carbon. Canadian Journal of Soil Science. https://cdnsciencepub.com/doi/pdf/10.4141/CJSS06025

[4] Wuest, S. 2014. Seasonal Variation in Soil Organic Carbon. Soil Science Society of America Journal. https://www.ars.usda.gov/ARSUserFiles/6233/seasonalVariationInSoilOrganic.pdf

[5] Xu, T. et al. 2015. Clothianidin in agricultural soils and uptake into corn pollen and canola nectar after multiyear seed treatment applications. Environmental Toxicology and Chemistry. https://setac.onlinelibrary.wiley.com/doi/10.1002/etc.3281

showing distribution of results for the 15 discrete soil samples from the new field to such plots for data from all previously reviewed fields, and visually inspecting for consistency. For each chemical, box-and-whisker plots will show the following features of the distribution of results for the 15 discrete soil samples from an individual field under consideration: mean, 1st quartile, 3rd quartile, minimum, maximum. Should visual inspection indicate a distribution of any focused analyte that is likely to be higher than for previously-reviewed fields, statistical techniques will be used to confirm or deny the apparent difference. Statistical technique will be t-test or Mann-Whitney u test. Should this type of evaluation be necessary, the Facility Response Group will propose statistical acceptance criteria to NDEE. NDEE will receive laboratory reports and box plots of all data for soil samples collected in the application screen process, and will receive statistical analysis information, where used. Fields that do not have apparent higher concentrations of any of chemicals from the focused analyte panel will be admitted into the land application program.

- **Treated Water Testing -** Treated water will be tested by an accredited laboratory for the 53 pesticides listed in Appendix B. Testing will also include nutrient and water quality parameters. Results from this testing will be utilized to determine volumes of treated water that can be applied without exceeding agronomic rates (for example calculations based on analytes, refer to Appendix D). Tests shall be completed for each contained storage unit of treated water (~3,000,000 gallons). Each tank is mixed continuously at approximately 1,000 gallons per minute, which is near the physical threshold for safe use of the tanks without creating a whirlpool-like circulation pattern. Field personnel collect a vertical composite sample of the circulating, mixed water from the one safe sampling location on each tank, which is at the permanent access stairs. These stairs are on the northwestern part of Tank 1, the southern part of Tank 2, and the southwestern part of Tank 3. The vertical composite sample is collected using a clean decontaminated 3/4-inch diameter, 10-feet-long polyethylene water core sampler (commonly referred to as a Sludge Judge) to ensure coverage of the entire water column in the circulated tank. From each location, field personnel collected one unfiltered sample and one sample passed through a 0.5-micron filter, then repeated the sampling technique to provide sufficient volume for split analysis at a second laboratory. The response group proposes to use data from samples collected August 5, 2021 to support land application in 2021. Additional composite sampling would be performed from the proposed treated water pond to support land application in 2022.
- **Irrigation Systems -** Treated water from the AltEn site will be contained during delivery to the target field based on the following requirements:
    a. If applicable, delivery systems will have control systems to prevent backflow into municipal/public water systems or ground water.
    b. If the delivery pipeline has branch lines, these will be isolated by control valves that have locks or access controls that prevent the valves from being changed.
    c. Irrigation water delivery systems will be monitored for leaks during any irrigation with treated water.
- **Crop Production –** Treated water from the AltEn site will be applied only to fields that have been assessed to ensure the active ingredient residues detected will not impact existing crops/vegetation cover or existing biodiversity. Preferred options are field corn due to high water/nutrient utilization and corn seed being the primary source of pesticide residues, or post-

harvest fields in preparation for annual crop production. To be protective of human health and the environment, all fields will be assessed against the following requirements:

a. Crops or plants in production/growing should have traits that provide tolerance to glyphosate and glufosinate.
b. Annual crops can have standard seed treatment packages, but may not have high-rate application (e.g., corn @ 1250 rate) of neonicotinoid seed treatments.
c. Applications of fungicide or insecticides will be documented and reported to ensure these are factored into overall pesticide load within the field. In fields that do not have a crop present during water application, analytical data for the applied water will be used to inform management decisions for future crops to ensure protection of human health and the environment.
d. Fertilizer applications (i.e., applications prior to or during planting, or prior to field soil testing conducted in advance of application of the treated water) will be disclosed and factored into the nutrient loading that will result from application of treated water. Total nutrient loading or individual applications during the growing season must not exceed agronomic and Nebraska defined requirements.
e. Flowering weeds in treated water application area must be controlled to prevent flowering prior to and during the growing season.
f. No honey bee hives or other managed pollinators should be located in immediate proximity (closer than 200 feet) of the field irrigated with treated water.
g. No applications of treated water should occur within 30 days prior to harvest.
h. Growers will follow all state environmental protection standards applicable to crop production.
i. Contracts will be in place with each grower outlining any applicable requirements and provide a transparent disclosure of the treated water quality.
j. When post-harvest land in annual crop production is receiving treated water, fall cover crops may be planted. Cover crops must not include flowering plants which could attract pollinators. However, it is important to note that pollinator activity is reduced in October and after a hard frost will be negligible due to a lack of viable flowering plants in the landscape, therefore it is unlikely pollinators will be present in post-harvest or cover crop situations. In addition, the trace levels of pesticides which might be present in treated water will not be translocated into plant tissue at levels that would result in potential risk to pollinators that might be present.

- **Irrigation Management** – Treated water may not be applied in volumes exceeding the soil water holding capacity and safeguards must be in place to prevent applied water from moving off the production field. Water applications will consider crop growth stage, previous precipitation, and agronomic conditions, based on expert advice from certified crop advisors.
    a. No individual application of treated water can exceed 1 inch during a 1-week period. This will equate to approximately 27,143 gallons of treated water applied per acre irrigated.
    b. A maximum application of up to 2 inches of treated water can be made during the crop production season. This will equate to approximately 54,286 gallons of treated water applied per acre irrigated. Additional treated water can be applied post-harvest, but

cannot exceed soil water holding capacities or professional agronomist recommended nutrient levels.

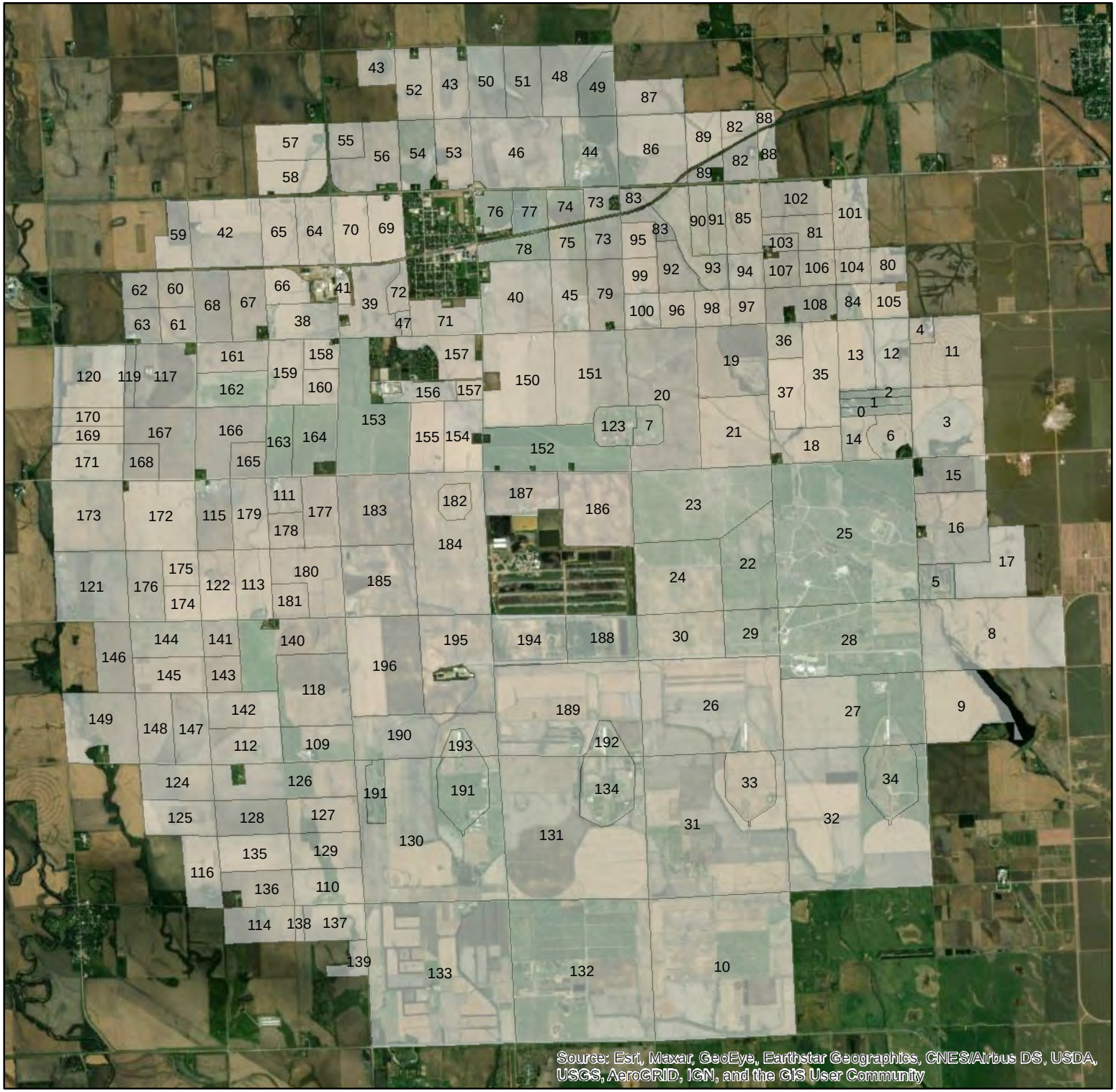
c. Planned irrigation applications must consider rain events to prevent exceeding the soil water holding capacity and leading to potential surface runoff or ponding.
d. Water application should be at volumes/rates that allow for rapid infiltration and prevent the potential for ponding in the field. If ponding is observed, application in that area of the field would cease and rates of application adjusted to prevent ponding in adjacent areas.
e. End guns and/or sprinklers must not allow treated water to be applied outside the boundaries of the field or areas not planted for field corn production.
f. Treated water application areas require the following setbacks:
    i. 30-foot vegetative buffer strip to any public right-of-way;
    ii. 300-foot separation from inhabited dwelling;
    iii. 300-foot separation from potable water supply well;
    iv. 1000-foot separation from a community public water supply;
    v. 200-foot separation from waters of the State.
g. Application of treated water may occur for field corn, or post-harvest as applicable, based on advice from certified crop advisors. Application timing will be determined by nutrient levels.

US EPA considers numerous factors impacting a pesticide's environmental fate, including those listed above, in order to ensure approved uses are protective of human health and the environment.

Deviations from BMP for Management of Water from AltEn Site

Deviations from the best management practices for management of water from AltEn site will be reported to the applicable agencies, as required. Although not expected, should actual application rates exceed designed treated water application rates, sampling of the crop will potentially be required to determine compliance with U.S. EPA approved tolerances (e.g., Appendix F).

Summary: The proposed land application is intended to be equivalent and consistent with existing agricultural system practices for land in field corn production in the Midwest. The proposed plan is protective of human health and the environment, and would create minimal disruption in normal agricultural practices. The proposed application of treated water is not expected to cause changes in the plant-soil health characteristics or degrade the long-term use of the application area. The primary goal of current efforts at the AltEn site is to effectively manage water (primarily from the site's lagoons), and the proposed plan herein is a critical step toward achieving that goal. This approach is protective of the crop, agricultural lands, the environment, and people, as it accounts for approved uses and is based on US EPA scientific assessments of the safety of the active ingredients.



Legend

Parcel within 3-mile radius

0 0.5 1 2 mi.

Title	**Parcels within Three Miles of AltEn Site**
Project	**AltEn Site** **Mead, Nebraska**

NewFields
Two Midtown Plaza
1349 W. Peachtree St, #1950
Atlanta, Georgia 30309
Tel: 404-347-9050

Date	Fig. No.	Rev. No.
09/20/2021	1	0

Proposed Land Application Approach for Management of Water from AltEn Site

Appendix A – Background on pesticide and treated seed regulation in the US

The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requires registration of pesticides with US EPA. Under FIFRA, a pesticide cannot "cause unreasonable adverse effects on the environment," which is defined as "any unreasonable risk to man or the environment taking into account economic, social and environmental costs and benefits of the use of any pesticide."

Criteria for pesticide registration include:

- the chemical's composition to warrant the proposed claims for it;
- the chemical's labeling and other material required to be submitted to comply with requirements of the act;
- when used in accordance with widespread and commonly recognized practice, it will not generally cause unreasonable effects on the environment.

Manufacturers must provide test data to the US EPA upon which registration is based, following testing guidelines, which US EPA publishes specifying the kinds of data needed.

Seed treatment products are highly regulated under FIFRA, as are sprayed and soil-applied pesticides. They undergo thorough evaluation by the US EPA, and applicable state agencies, prior to commercialization and periodically thereafter. Only after a seed treatment product is approved by the relevant federal and state agencies, can the product be used per the conditions set by US EPA.

US EPA assesses any potential risks for use of seed treatment products from applying the product and planting the seed (i.e., environmental fate, ecotoxicology, and operator exposures) to the consumption of the harvested commodity by the consumer. US EPA's associated science-based evaluation also considers the application rates, analysis of the quantity "planted per day", typical seeding/planting rates per acre, etc. All pesticides are subject to review every 15 years to ensure that, as the science advances and/or policies and pesticide use practices change over time, all registered products continue to meet the statutory standard of "no unreasonable adverse effects" on health, safety or the environment.

Under US EPA regulations, 40 CFR §152.25(a), the seeds treated with pesticides are considered "treated articles" if, and only if:

a. the article contains or is treated with a pesticide;

b. the pesticide is intended to protect the article itself; and

c. the pesticide itself is registered for this use by US EPA.

Without this 'Treated Article Exemption' designation by US EPA for seed, there would be costly duplication of regulatory effort without any additional benefit to health, safety, or the environment, given US EPA's thorough review of the seed treatment product and its uses.

The Federal Seed Act regulates the labeling, sale, and movement of seed in the U.S., and seed companies must abide by its provisions. The tag on a package of treated seed must include identification of what the seed has been treated with, guidance for safe handling, and other applicable labeling requirements.

Appendix B. Summary of Laboratory Results for Lagoon Water and Treated Water

1. Summary of Detections in Lagoon and Treated Water
2. Lagoon Water Laboratory Summary Statistics
3. May 24, 2021, Treated Water Laboratory Summary Statistics
4. August 5, 2021, Treated Water Laboratory Summary Statistics (Total)
5. August 5, 2021, Treated Water Laboratory Summary Statistics (Dissolved)

AltEn Site in Saunders County, Nebraska

Summary of Detections in Lagoon and Treated Water

CAS	Chemical Name	Chemical Classification	Pesticide Group (e.g., FRAC, IRAC, HRAC)	In Focused Analyte List	Detected in Lagoon Water	Detected in Treated Water, May 24th	Detected in Treated Water, Aug 5th (Total)	Detected in Treated Water, Aug 5th (Dissolved)
131860-33-8	Azoxystrobin	Fungicide	11-F	Yes	Yes	Yes	No	No
361377-29-9	Fluoxastrobin	Fungicide	11-F	Yes	Yes	Yes	Yes	Yes
57837-19-1	Metalaxyl	Fungicide	4-F	Yes	Yes	Yes	Yes	Yes
178928-70-6	Prothioconazole	Fungicide	3-F	Yes	Yes	No	No	No
107534-96-3	Tebuconazole	Fungicide	3-F	Yes	Yes	Yes	Yes	Yes
148-79-8	Thiabendazole	Fungicide	3-F	Yes	Yes	Yes	Yes	Yes
1071-83-6	Glyphosate	Herbicide	9-H	Yes	Yes	Yes	Yes	Yes
71751-41-2	Abamectin	Insecticide	6-I	Yes	Yes	Yes	Yes	Yes
500008-45-7	Chlorantraniliprole	Insecticide	28-I	Yes	Yes	Yes	Yes	Yes
210880-92-5	Clothianidin	Insecticide	4A-I	Yes	Yes	Yes	No	No
138261-41-3	Imidacloprid	Insecticide	4A-I	Yes	Yes	No	No	No
153719-23-4	Thiamethoxam	Insecticide	4A-I	Yes	Yes	Yes	No	No
133-06-2	Captan	Fungicide	M4-F	No	No	Not tested	No	No
10605-21-7	Carbendazim	Fungicide	1-F	No	No	No	No	No
5234-68-4	Carboxin	Fungicide	7-F	No	Yes	No	No	No
94361-06-5	Cyproconazole	Fungicide	3-F	No	No	No	No	No
119446-68-3	Difenoconazole	Fungicide	3-F	No	Yes	No	No	No
149961-52-4	Dimoxystrobin	Fungicide	11-F	No	No	No	No	No
135319-73-2	Epoxiconazole	Fungicide	3-F	No	No	No	No	No
86386-73-4	Fluconazole	Fungicide	3-F	No	No	No	No	No
131341-86-1	Fludioxonil	Fungicide	12-F	No	Yes	No	Yes	No
125225-28-7	Ipconazole	Fungicide	3-F	No	Yes	No	No	No
241479-67-4	Isavuconazole	Fungicide	3-F	No	No	No	No	No
84625-61-6	Itraconazole	Fungicide	3-F	No	No	No	No	No
125116-23-6	Metconazole	Fungicide	3-F	No	Yes	No	No	No
248593-16-0	Orysastrobin	Fungicide	11-F	No	No	No	No	No
117428-22-5	Picoxystrobin	Fungicide	11-F	No	No	No	No	No
171228-49-2	Posaconazole	Fungicide	3-F	No	No	No	No	No
60207-90-1	Propiconazole	Fungicide	3-F	No	Yes	Yes	Yes	Yes
175013-18-0	Pyraclostrobin	Fungicide	11-F	No	No	No	No	No
182760-06-1	Ravuconazole	Fungicide	3-F	No	No	No	No	No
112281-77-3	Tetraconazole	Fungicide	3-F	No	Yes	No	No	No
23564-05-8	Thiophanate-methyl	Fungicide	1-F	No	No	No	No	No
141517-21-7	Trifloxystrobin	Fungicide	11-F	No	Yes	No	No	No
83657-22-1	Uniconazole	Fungicide	3-F	No	No	No	No	No
137234-62-9	Voriconazole	Fungicide	3-F	No	No	No	No	No
51276-47-2	Glufosinate	Herbicide	10-H	No	Yes	No	No	No
7782-49-2	Selenium	Inorganic		No	Yes	No	No	Not tested
135410-20-7	Acetamiprid	Insecticide	4A-I	No	No	No	No	No

AltEn Site in Saunders County, Nebraska

Summary of Detections in Lagoon and Treated Water

CAS	Chemical Name	Chemical Classification	Pesticide Group (e.g., FRAC, IRAC, HRAC)	In Focused Analyte List	Detected in Lagoon Water	Detected in Treated Water, May 24th	Detected in Treated Water, Aug 5th (Total)	Detected in Treated Water, Aug 5th (Dissolved)
68359-37-5	Baythroid	Insecticide	3A-I	No	No	No	No	No
82657-04-3	Biphenthrin	Insecticide	3A-I	No	No	No	No	No
2921-88-2	Chlorpyrifos	Insecticide	1B-I	No	No	No	No	No
5598-13-0	Chlorpyrifos-methyl	Insecticide	1B-I	No	No	No	No	No
736994-63-1	Cyantraniliprole	Insecticide	28-I	No	Yes	No	No	No
68085-85-8	Cyhalothrin/Karate	Insecticide	3A-I	No	No	No	No	No
52315-07-8	Cypermethrin	Insecticide	3A-I	No	No	No	No	No
52918-63-5	Deltamethrin	Insecticide	3-I	No	No	No	No	No
165252-70-0	Dinotefuran	Insecticide	4A-I	No	No	No	No	No
150824-47-8	Nitenpyram	Insecticide	4A-I	No	No	No	No	No
52645-53-1	Permethrin	Insecticide	3A-I	No	No	No	No	No
111988-49-9	Thiacloprid	Insecticide	4A-I	No	No	No	No	No
7664-41-7	Ammonia	Nutrient		No	Yes	Yes	No	Not tested
BOD	Biological Oxygen Demand	Nutrient		No	Yes	Yes	No	Not tested
14797-55-8	Nitrate (as N)	Nutrient		No	Yes	No	No	Not tested
14797-65-0	Nitrite (as N)	Nutrient		No	No	No	No	Not tested
7727-37-9	Total Kjeldahl Nitrogen (TKN)	Nutrient		No	Yes	Yes	No	Not tested
7723-14-0	Phosphorus (as P)	Nutrient		No	Yes	Yes	No	Not tested
NO3/NO2-N	Total Nitrate/Nitrite	Nutrient		No	Yes	No	No	Not tested
224047-41-0	Brassinazole	Other		No	No	No	No	No
120983-64-4	Desthio-Prothioconazole	Other		No	No	Not tested	Not tested	Not tested
PH	pH	Other		No	Yes	Yes	No	Not tested
TOC	Total Organic Carbon (TOC)	Other		No	Yes	Yes	No	Not tested
TSS	Total Suspended Solids (TSS)	Other		No	Yes	Yes	No	Not tested

AltEn Site in Saunders County, Nebraska

Lagoon Water Laboratory Summary Statistics

CAS	Chemical Name	Chemical Classification	Pesticide Group (e.g., FRAC, IRAC, HRAC)	In Focused Analyte List	Number of Times Tested	Number of Detections	Percent Detected	Units	Min. Detection	Max. Detection	Average Detection[1]	Average Result (1/2 RL for NDs)[2]	Min. Reporting Limit	Avg. Reporting Limit	Max. Reporting Limit	Min. Sample Date	Max. Sample Date
178928-70-6	Azoxystrobin	Fungicide	11-F	Yes	10	10	100%	ug/L	1.80	581.00	97.73	97.73	1.00	2.50	5	08-Apr-19	06-Jul-21
241479-67-4	Fluoxastrobin	Fungicide	11-F	Yes	9	9	100%	ug/L	1.90	735.00	287.66	287.66	1.00	13.22	50	12-Nov-19	06-Jul-21
125116-23-6	Metalaxyl	Fungicide	4-F	Yes	5	5	100%	ug/L	13.00	2600.00	951.60	951.60	1.00	30.40	50	17-May-21	06-Jul-21
149961-52-4	Prothioconazole	Fungicide	3-F	Yes	9	9	100%	ug/L	7.10	150.00	60.74	60.74	1.00	2.89	5	12-Nov-19	06-Jul-21
131860-33-8	Tebuconazole	Fungicide	3-F	Yes	11	11	100%	ug/L	41.00	2330.00	431.45	431.45	1.00	7.78	50	08-Apr-19	06-Jul-21
10605-21-7	Thiabendazole	Fungicide	3-F	Yes	11	11	100%	ug/L	170.00	39700.00	5500.91	5500.91	1.00	22.33	50	08-Apr-19	06-Jul-21
182760-06-1	Glyphosate	Herbicide	9-H	Yes	11	11	100%	ug/L	116.00	3850.00	804.18	804.18	10.00	18.89	50	08-Apr-19	06-Jul-21
150824-47-8	Abamectin	Insecticide	6-I	Yes	5	5	100%	ug/L	150.00	690.00	312.00	312.00	1.00	35.20	50	17-May-21	06-Jul-21
2921-88-2	Chlorantraniliprole	Insecticide	28-I	Yes	5	5	100%	ug/L	58.00	890.00	483.60	483.60	1.00	35.20	50	17-May-21	06-Jul-21
68359-37-5	Clothianidin	Insecticide	4A-I	Yes	11	10	91%	ug/L	2.80	58400.00	11860.25	10782.09	1.00	13.22	50	08-Apr-19	06-Jul-21
137234-62-9	Imidacloprid	Insecticide	4A-I	Yes	11	6	55%	ug/L	21.00	312.00	91.93	55.36	1.00	2.33	5	08-Apr-19	06-Jul-21
7782-49-2	Thiamethoxam	Insecticide	4A-I	Yes	11	9	82%	ug/L	25.00	35400.00	8082.33	6612.91	1.00	13.22	50	08-Apr-19	06-Jul-21
107534-96-3	Captan	Fungicide	M4-F	No	1	0	0%	ug/L				0.85	1.70	1.70	1.7	06-Jul-21	06-Jul-21
71751-41-2	Carbendazim	Fungicide	1-F	No	5	0	0%	ug/L				0.50	1.00	1.00	1	17-May-21	06-Jul-21
84625-61-6	Carboxin	Fungicide	7-F	No	5	4	80%	ug/L	1.10	6.60	3.90	3.22	1.00	1.00	1	17-May-21	06-Jul-21
175013-18-0	Cyproconazole	Fungicide	3-F	No	10	0	0%	ug/L				1.25	1.00	2.50	5	08-Apr-19	06-Jul-21
361377-29-9	Difenoconazole	Fungicide	3-F	No	9	9	100%	ug/L	1.70	66.20	25.37	25.37	1.00	2.33	5	12-Nov-19	06-Jul-21
5234-68-4	Dimoxystrobin	Fungicide	11-F	No	10	0	0%	ug/L				1.25	1.00	2.50	5	08-Apr-19	06-Jul-21
148-79-8	Epoxiconazole	Fungicide	3-F	No	10	0	0%	ug/L				1.25	1.00	2.50	5	08-Apr-19	06-Jul-21
60207-90-1	Fluconazole	Fungicide	3-F	No	10	0	0%	ug/L				1.25	1.00	2.50	5	08-Apr-19	06-Jul-21
57837-19-1	Fludioxonil	Fungicide	12-F	No	5	5	100%	ug/L	18.00	110.00	50.00	50.00	1.00	1.00	1	17-May-21	06-Jul-21
138261-41-3	Ipconazole	Fungicide	3-F	No	9	9	100%	ug/L	4.10	181.00	64.91	64.91	1.00	2.33	5	12-Nov-19	06-Jul-21
131341-86-1	Isavuconazole	Fungicide	3-F	No	10	0	0%	ug/L				1.25	1.00	2.50	5	08-Apr-19	06-Jul-21
171228-49-2	Itraconazole	Fungicide	3-F	No	8	0	0%	ug/L				1.25	1.00	2.50	5	12-Nov-19	06-Jul-21
1071-83-6	Metconazole	Fungicide	3-F	No	10	3	30%	ug/L	1.20	5.90	3.03	2.20	1.00	2.50	5	08-Apr-19	06-Jul-21
125225-28-7	Orysastrobin	Fungicide	11-F	No	10	0	0%	ug/L				1.25	1.00	2.50	5	08-Apr-19	06-Jul-21
210880-92-5	Picoxystrobin	Fungicide	11-F	No	8	0	0%	ug/L				1.25	1.00	2.50	5	12-Nov-19	06-Jul-21
94361-06-5	Posaconazole	Fungicide	3-F	No	10	0	0%	ug/L				1.25	1.00	2.50	5	08-Apr-19	06-Jul-21
248593-16-0	Propiconazole	Fungicide	3-F	No	10	8	80%	ug/L	1.70	726.00	104.35	93.03	1.00	2.50	5	08-Apr-19	06-Jul-21
119446-68-3	Pyraclostrobin	Fungicide	11-F	No	10	0	0%	ug/L				1.25	1.00	2.50	5	08-Apr-19	06-Jul-21
135319-73-2	Ravuconazole	Fungicide	3-F	No	10	0	0%	ug/L				1.25	1.00	2.50	5	08-Apr-19	06-Jul-21
500008-45-7	Tetraconazole	Fungicide	3-F	No	9	1	11%	ug/L	1.30	1.30	1.30	1.26	1.00	2.33	5	12-Nov-19	06-Jul-21
86386-73-4	Thiophanate-methyl	Fungicide	1-F	No	5	0	0%	ug/L				0.50	1.00	1.00	1	17-May-21	06-Jul-21
133-06-2	Trifloxystrobin	Fungicide	11-F	No	10	8	80%	ug/L	2.20	737.00	115.56	92.55	1.00	2.50	5	08-Apr-19	06-Jul-21
117428-22-5	Uniconazole	Fungicide	3-F	No	10	0	0%	ug/L				1.25	1.00	2.50	5	08-Apr-19	06-Jul-21
153719-23-4	Voriconazole	Fungicide	3-F	No	10	0	0%	ug/L				1.25	1.00	2.50	5	08-Apr-19	06-Jul-21
112281-77-3	Glufosinate	Herbicide		No	10	2	20%	ug/L	10.30	86.70	48.50	16.89	10.00	15.00	50	08-Apr-19	06-Jul-21
23564-05-8	Selenium	Inorganic		No	5	4	80%	ug/L	27.30	42.50	34.70	29.26	15.00	15.00	15	17-May-21	06-Jul-21
83657-22-1	Acetamiprid	Insecticide	4A-I	No	11	0	0%	ug/L				1.17	1.00	2.33	5	08-Apr-19	06-Jul-21
165252-70-0	Baythroid	Insecticide	3A-I	No	6	0	0%	ug/L				2.50	5.00	5.00	5	08-Apr-19	06-Jul-21
111988-49-9	Biphenthrin	Insecticide	3A-I	No	6	0	0%	ug/L				2.00	1.00	4.00	5	08-Apr-19	06-Jul-21
82657-04-3	Chlorpyrifos	Insecticide	1B-I	No	6	0	0%	ug/L				2.00	1.00	4.00	5	08-Apr-19	06-Jul-21
52315-07-8	Chlorpyrifos-methyl	Insecticide	1B-I	No	5	0	0%	ug/L				2.00	1.00	4.00	5	08-Apr-19	06-Jul-21
52645-53-1	Cyantraniliprole	Insecticide	28-I	No	5	2	40%	ug/L	1.60	2.90	2.25	1.20	1.00	1.00	1	17-May-21	06-Jul-21
52918-63-5	Cyhalothrin/Karate	Insecticide	3A-I	No	6	0	0%	ug/L				2.10	1.00	4.20	5	08-Apr-19	06-Jul-21
5598-13-0	Cypermethrin	Insecticide	3A-I	No	6	0	0%	ug/L				2.50	5.00	5.00	5	08-Apr-19	06-Jul-21
68085-85-8	Deltamethrin	Insecticide	3-I	No	6	0	0%	ug/L				2.50	5.00	5.00	5	08-Apr-19	06-Jul-21
135410-20-7	Dinotefuran	Insecticide	4A-I	No	9	0	0%	ug/L				1.17	1.00	2.33	5	12-Nov-19	06-Jul-21
51276-47-2	Nitenpyram	Insecticide	4A-I	No	8	0	0%	ug/L				1.25	1.00	2.50	5	12-Nov-19	06-Jul-21
736994-63-1	Permethrin	Insecticide	3A-I	No	6	0	0%	ug/L				2.13	2.00	4.25	5	08-Apr-19	06-Jul-21
141517-21-7	Thiacloprid	Insecticide	4A-I	No	11	0	0%	ug/L				1.17	1.00	2.33	5	08-Apr-19	06-Jul-21

AltEn Site in Saunders County, Nebraska

Lagoon Water Laboratory Summary Statistics

CAS	Chemical Name	Chemical Classification	Pesticide Group (e.g., FRAC, IRAC, HRAC)	In Focused Analyte List	Number of Times Tested	Number of Detections	Percent Detected	Units	Min. Detection	Max. Detection	Average Detection[1]	Average Result (1/2 RL for NDs)[2]	Min. Reporting Limit	Avg. Reporting Limit	Max. Reporting Limit	Min. Sample Date	Max. Sample Date
14797-55-8	Ammonia	Nutrient		No	5	5	100%	mg/L	473.00	779.00	570.20	570.20	5.00	5.20	6	17-May-21	06-Jul-21
7723-14-0	Biological Oxygen Demand (BOD)	Nutrient		No	5	5	100%	mg/L	3000.00	17700.00	9640.00	9640.00	2.00	2.00	2	17-May-21	06-Jul-21
7664-41-7	Nitrate (as N)	Nutrient		No	5	4	80%	mg/L	0.26	0.26	0.26	0.22	0.10	0.10	0.1	17-May-21	06-Jul-21
BOD	Nitrite (as N)	Nutrient		No	5	0	0%	mg/L				0.05	0.10	0.10	0.1	17-May-21	06-Jul-21
14797-65-0	Phosphorus (as P)	Nutrient		No	5	5	100%	mg/L	130.00	554.00	356.40	356.40	5.00	12.00	20	17-May-21	06-Jul-21
7727-37-9	Total Kjeldahl Nitrogen (TKN)	Nutrient		No	5	5	100%	mg/L	590.00	1090.00	774.20	774.20	20.00	29.00	50	17-May-21	06-Jul-21
NO3/NO2-N	Total Nitrate/Nitrite	Nutrient		No	5	4	80%	mg/L	0.26	0.26	0.26	0.22	0.10	0.10	0.1	17-May-21	06-Jul-21
120983-64-4	Brassinazole	Other		No	10	0	0%	ug/L				1.25	1.00	2.50	5	08-Apr-19	06-Jul-21
224047-41-0	Desthio-Prothioconazole	Other		No	3	0	0%	ug/L				2.50	5.00	5.00	5	12-Nov-19	12-Nov-19
PH	pH	Other		No	5	5	100%	SU	4.80	7.10	5.94	5.94	0.10	0.10	0.1	17-May-21	06-Jul-21
TOC	Total Organic Carbon (TOC)	Other		No	5	5	100%	mg/L	1600.00	7570.00	4074.00	4074.00	500.00	900.00	2000	17-May-21	06-Jul-21
TSS	Total Suspended Solids (TSS)	Other		No	5	5	100%	mg/L	123.00	620.00	327.20	327.20	28.60	97.92	200	17-May-21	06-Jul-21

Notes:

1. Samples where this analyte was not detected are *not* included in this average.
2. Samples where this analyte was not detected *are* included in this average. For those samples, the value used to calculate the average is half the reporting limit.

AltEn Site in Saunders County, Nebraska

May 24, 2021, Treated Water Laboratory Summary Statistics

CAS	Chemical Name	Chemical Classification	Pesticide Group (e.g., FRAC, IRAC, HRAC)	In Focused Analyte List	Number of Times Tested	Number of Detections	Percent Detected	Units	Min. Detection	Max. Detection	Average Detection[1]	Average Result (1/2 RL for NDs)[2]	Min. Reporting Limit	Avg. Reporting Limit	Max. Reporting Limit	Sample Date
131860-33-8	Azoxystrobin	Fungicide	11-F	Yes	3	1	33%	ug/L	1.50	1.50	1.50	0.83	1.00	1.00	1	5/24/2021
361377-29-9	Fluoxastrobin	Fungicide	11-F	Yes	3	3	100%	ug/L	1.00	8.60	3.67	3.67	1.00	1.00	1	5/24/2021
57837-19-1	Metalaxyl	Fungicide	4-F	Yes	3	3	100%	ug/L	24.00	120.00	64.67	64.67	1.00	1.00	1	5/24/2021
178928-70-6	Prothioconazole	Fungicide	3-F	Yes	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
107534-96-3	Tebuconazole	Fungicide	3-F	Yes	3	3	100%	ug/L	1.80	8.40	5.50	5.50	1.00	1.00	1	5/24/2021
148-79-8	Thiabendazole	Fungicide	3-F	Yes	3	3	100%	ug/L	4.40	14.00	7.63	7.63	1.00	1.00	1	5/24/2021
1071-83-6	Glyphosate	Herbicide	9-H	Yes	3	3	100%	ug/L	160.00	270.00	213.33	213.33	10.00	10.00	10	5/24/2021
71751-41-2	Abamectin	Insecticide	6-I	Yes	3	3	100%	ug/L	2.80	9.80	6.93	6.93	1.00	1.00	1	5/24/2021
500008-45-7	Chlorantraniliprole	Insecticide	28-I	Yes	3	3	100%	ug/L	4.60	78.00	33.20	33.20	1.00	1.00	1	5/24/2021
210880-92-5	Clothianidin	Insecticide	4A-I	Yes	3	2	67%	ug/L	1.20	2.70	1.95	1.47	1.00	1.00	1	5/24/2021
138261-41-3	Imidacloprid	Insecticide	4A-I	Yes	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
153719-23-4	Thiamethoxam	Insecticide	4A-I	Yes	3	2	67%	ug/L	1.80	2.20	2.00	1.50	1.00	1.00	1	5/24/2021
10605-21-7	Carbendazim	Fungicide	1-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
5234-68-4	Carboxin	Fungicide	7-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
94361-06-5	Cyproconazole	Fungicide	3-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
119446-68-3	Difenoconazole	Fungicide	3-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
149961-52-4	Dimoxystrobin	Fungicide	11-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
135319-73-2	Epoxiconazole	Fungicide	3-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
86386-73-4	Fluconazole	Fungicide	3-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
131341-86-1	Fludioxonil	Fungicide	12-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
125225-28-7	Ipconazole	Fungicide	3-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
241479-67-4	Isavuconazole	Fungicide	3-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
84625-61-6	Itraconazole	Fungicide	3-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
125116-23-6	Metconazole	Fungicide	3-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
248593-16-0	Orysastrobin	Fungicide	11-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
117428-22-5	Picoxystrobin	Fungicide	11-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
171228-49-2	Posaconazole	Fungicide	3-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
60207-90-1	Propiconazole	Fungicide	3-F	No	3	1	33%	ug/L	1.60	1.60	1.60	0.87	1.00	1.00	1	5/24/2021
175013-18-0	Pyraclostrobin	Fungicide	11-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
182760-06-1	Ravuconazole	Fungicide	3-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
112281-77-3	Tetraconazole	Fungicide	3-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
23564-05-8	Thiophanate-methyl	Fungicide	1-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
141517-21-7	Trifloxystrobin	Fungicide	11-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
83657-22-1	Uniconazole	Fungicide	3-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
137234-62-9	Voriconazole	Fungicide	3-F	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
51276-47-2	Glufosinate	Herbicide	10-H	No	3	0	0%	ug/L				5.00	10.00	10.00	10	5/24/2021
7782-49-2	Selenium	Inorganic		No	3	0	0%	ug/L				7.50	15.00	15.00	15	5/24/2021
135410-20-7	Acetamiprid	Insecticide	4A-I	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
68359-37-5	Baythroid	Insecticide	3A-I	No	3	0	0%	ug/L				2.50	5.00	5.00	5	5/24/2021
82657-04-3	Biphenthrin	Insecticide	3A-I	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
2921-88-2	Chlorpyrifos	Insecticide	1B-I	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
5598-13-0	Chlorpyrifos-methyl	Insecticide	1B-I	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
736994-63-1	Cyantraniliprole	Insecticide	28-I	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
68085-85-8	Cyhalothrin/Karate	Insecticide	3A-I	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
52315-07-8	Cypermethrin	Insecticide	3A-I	No	3	0	0%	ug/L				2.50	5.00	5.00	5	5/24/2021
52918-63-5	Deltamethrin	Insecticide	3-I	No	3	0	0%	ug/L				2.50	5.00	5.00	5	5/24/2021

AltEn Site in Saunders County, Nebraska

May 24, 2021, Treated Water Laboratory Summary Statistics

CAS	Chemical Name	Chemical Classification	Pesticide Group (e.g., FRAC, IRAC, HRAC)	In Focused Analyte List	Number of Times Tested	Number of Detections	Percent Detected	Units	Min. Detection	Max. Detection	Average Detection[1]	Average Result (1/2 RL for NDs)[2]	Min. Reporting Limit	Avg. Reporting Limit	Max. Reporting Limit	Sample Date
165252-70-0	Dinotefuran	Insecticide	4A-I	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
150824-47-8	Nitenpyram	Insecticide	4A-I	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
52645-53-1	Permethrin	Insecticide	3A-I	No	3	0	0%	ug/L				1.00	2.00	2.00	2	5/24/2021
111988-49-9	Thiacloprid	Insecticide	4A-I	No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
7664-41-7	Ammonia	Nutrient		No	3	3	100%	mg/L	347.00	496.00	439.67	439.67	5.00	5.00	5	5/24/2021
BOD	Biological Oxygen Demand (BOD)	Nutrient		No	3	3	100%	mg/L	1240.00	3080.00	2206.67	2206.67	2.00	2.00	2	5/24/2021
14797-55-8	Nitrate (as N)	Nutrient		No	3	0	0%	mg/L				0.05	0.10	0.10	0.1	5/24/2021
14797-65-0	Nitrite (as N)	Nutrient		No	3	0	0%	mg/L				0.05	0.10	0.10	0.1	5/24/2021
7723-14-0	Phosphorus (as P)	Nutrient		No	3	3	100%	mg/L	39.70	140.00	90.83	90.83	1.00	5.33	10	5/24/2021
7727-37-9	Total Kjeldahl Nitrogen (TKN)	Nutrient		No	3	3	100%	mg/L	353.00	581.00	487.00	487.00	12.50	20.83	25	5/24/2021
NO3/NO2-N	Total Nitrate/Nitrite	Nutrient		No	3	0	0%	mg/L				0.05	0.10	0.10	0.1	5/24/2021
224047-41-0	Brassinazole	Other		No	3	0	0%	ug/L				0.50	1.00	1.00	1	5/24/2021
PH	pH	Other		No	3	3	100%	SU	6.70	7.50	7.13	7.13	0.10	0.10	0.1	5/24/2021
TOC	Total Organic Carbon (TOC)	Other		No	3	3	100%	mg/L	855.00	2130.00	1505.00	1505.00	500.00	500.00	500	5/24/2021
TSS	Total Suspended Solids (TSS)	Other		No	3	3	100%	mg/L	52.30	97.30	74.33	74.33	14.30	20.63	33.3	5/24/2021

Notes:

1. Samples where this analyte was not detected are *not* included in this average.

2. Samples where this analyte was not detected *are* included in this average. For those samples, the value used to calculate the average is half the reporting limit.

AltEn Site in Saunders County, Nebraska

August 5, 2021, Treated Water Laboratory Summary Statistics (Total)

CAS	Chemical Name	Total or Dissolved	Chemical Classification	Pesticide Group (e.g., FRAC, IRAC, HRAC)	In Focused Analyte List	Number of Times Tested	Number of Detections	Percent Detected	Units	Min. Detection	Max. Detection	Average Detection[1]	Average Result (1/2 RL for NDs)[2]	Min. Reporting Limit	Avg. Reporting Limit	Max. Reporting Limit	Sample Date
131860-33-8	Azoxystrobin	T	Fungicide	11-F	Yes	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
361377-29-9	Fluoxastrobin	T	Fungicide	11-F	Yes	4	1	25%	ug/L	3.30	3.30	3.30	1.20	1.00	1.00	1	05-Aug-21
57837-19-1	Metalaxyl	T	Fungicide	4-F	Yes	4	2	50%	ug/L	2.00	5.30	3.65	2.08	1.00	1.00	1	05-Aug-21
178928-70-6	Prothioconazole	T	Fungicide	3-F	Yes	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
107534-96-3	Tebuconazole	T	Fungicide	3-F	Yes	4	3	75%	ug/L	2.10	9.50	5.77	4.45	1.00	1.00	1	05-Aug-21
1071-83-6	Glyphosate	T	Herbicide	9-H	Yes	4	4	100%	ug/L	11.00	93.00	65.50	65.50	10.00	10.00	10	05-Aug-21
71751-41-2	Abamectin	T	Insecticide	6-I	Yes	4	3	75%	ug/L	1.50	3.50	2.23	1.80	1.00	1.00	1	05-Aug-21
500008-45-7	Chlorantraniliprole	T	Insecticide	28-I	Yes	4	4	100%	ug/L	2.30	100.00	29.75	29.75	1.00	1.00	1	05-Aug-21
210880-92-5	Clothianidin	T	Insecticide	4A-I	Yes	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
138261-41-3	Imidacloprid	T	Insecticide	4A-I	Yes	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
133-06-2	Captan	T	Fungicide	M4-F	No	4	0	0%	ug/L				2.50	5.00	5.00	5	05-Aug-21
10605-21-7	Carbendazim	T	Fungicide	1-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
5234-68-4	Carboxin	T	Fungicide	7-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
94361-06-5	Cyproconazole	T	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
119446-68-3	Difenoconazole	T	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
149961-52-4	Dimoxystrobin	T	Fungicide	11-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
135319-73-2	Epoxiconazole	T	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
86386-73-4	Fluconazole	T	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
131341-86-1	Fludioxonil	T	Fungicide	12-F	No	4	1	25%	ug/L	1.00	1.00	1.00	0.63	1.00	1.00	1	05-Aug-21
125225-28-7	Ipconazole	T	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
241479-67-4	Isavuconazole	T	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
84625-61-6	Itraconazole	T	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
125116-23-6	Metconazole	T	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
248593-16-0	Orysastrobin	T	Fungicide	11-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
117428-22-5	Picoxystrobin	T	Fungicide	11-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
171228-49-2	Posaconazole	T	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
60207-90-1	Propiconazole	T	Fungicide	3-F	No	4	1	25%	ug/L	1.70	1.70	1.70	0.80	1.00	1.00	1	05-Aug-21
175013-18-0	Pyraclostrobin	T	Fungicide	11-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
182760-06-1	Ravuconazole	T	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
112281-77-3	Tetraconazole	T	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
51276-47-2	Glufosinate	T	Herbicide	10-H	No	4	0	0%	ug/L				5.00	10.00	10.00	10	05-Aug-21
7782-49-2	Selenium	T	Inorganic		No	4	0	0%	ug/L					15.00	15.00	15	05-Aug-21
135410-20-7	Acetamiprid	T	Insecticide	4A-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
68359-37-5	Baythroid	T	Insecticide	3A-I	No	4	0	0%	ug/L				2.50	5.00	5.00	5	05-Aug-21
82657-04-3	Biphenthrin	T	Insecticide	3A-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
2921-88-2	Chlorpyrifos	T	Insecticide	1B-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
5598-13-0	Chlorpyrifos-methyl	T	Insecticide	1B-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
736994-63-1	Cyantraniliprole	T	Insecticide	28-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
68085-85-8	Cyhalothrin/Karate	T	Insecticide	3A-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
52315-07-8	Cypermethrin	T	Insecticide	3A-I	No	4	0	0%	ug/L				2.50	5.00	5.00	5	05-Aug-21
52918-63-5	Deltamethrin	T	Insecticide	3-I	No	4	0	0%	ug/L				2.50	5.00	5.00	5	05-Aug-21
165252-70-0	Dinotefuran	T	Insecticide	4A-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
150824-47-8	Nitenpyram	T	Insecticide	4A-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
52645-53-1	Permethrin	T	Insecticide	3A-I	No	4	0	0%	ug/L				1.00	2.00	2.00	2	05-Aug-21
7664-41-7	Ammonia	T	Nutrient		No	4	0	0%	mg/L				341.50	2.00	2.50	4	05-Aug-21
BOD	Biological Oxygen Demand (BOD)	T	Nutrient		No	4	0	0%	mg/L				2024.50	2.00	2.00	2	05-Aug-21
14797-55-8	Nitrate (as N)	T	Nutrient		No	4	0	0%	mg/L					0.10	0.10	0.1	05-Aug-21
14797-65-0	Nitrite (as N)	T	Nutrient		No	4	0	0%	mg/L					0.10	0.10	0.1	05-Aug-21
7723-14-0	Phosphorus (as P)	T	Nutrient		No	4	0	0%	mg/L				45.58	1.00	4.00	5	05-Aug-21
224047-41-0	Brassinazole	T	Other		No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
PH	pH	T	Other		No	4	0	0%	SU				7.45	0.10	0.10	0.1	05-Aug-21

AltEn Site in Saunders County, Nebraska

August 5, 2021, Treated Water Laboratory Summary Statistics (Total)

CAS	Chemical Name	Total or Dissolved	Chemical Classification	Pesticide Group (e.g., FRAC, IRAC, HRAC)	In Focused Analyte List	Number of Times Tested	Number of Detections	Percent Detected	Units	Min. Detection	Max. Detection	Average Detection[1]	Average Result (1/2 RL for NDs)[2]	Min. Reporting Limit	Avg. Reporting Limit	Max. Reporting Limit	Sample Date
148-79-8	Thiabendazole	T	Fungicide	3-F		4	3	75%	ug/L	2.70	6.20	4.07	3.18	1.00	1.00	1	05-Aug-21
23564-05-8	Thiophanate-methyl	T	Fungicide	1-F		4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
141517-21-7	Trifloxystrobin	T	Fungicide	11-F		4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
83657-22-1	Uniconazole	T	Fungicide	3-F		4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
137234-62-9	Voriconazole	T	Fungicide	3-F		4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
111988-49-9	Thiacloprid	T	Insecticide	4A-I		4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
153719-23-4	Thiamethoxam	T	Insecticide	4A-I		4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
7727-37-9	Total Kjeldahl Nitrogen (TKN)	T	Nutrient			4	0	0%	mg/L				410.00	20.00	20.00	20	05-Aug-21
NO3/NO2-N	Total Nitrate/Nitrite	T	Nutrient			4	0	0%	mg/L					0.10	0.10	0.1	05-Aug-21
TOC	Total Organic Carbon (TOC)	T	Other			4	0	0%	mg/L				945.75	100.00	100.00	100	05-Aug-21
TSS	Total Suspended Solids (TSS)	T	Other			4	0	0%	mg/L				200.33	9.10	67.85	100	05-Aug-21

Notes:

1. Samples where this analyte was not detected are *not* included in this average.
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AltEn Site in Saunders County, Nebraska

August 5, 2021, Treated Water Laboratory Summary Statistics (Dissolved)

CAS	Chemical Name	Total or Dissolved	Chemical Classification	Pesticide Group (e.g., FRAC, IRAC, HRAC)	In Focused Analyte List	Number of Times Tested	Number of Detections	Percent Detected	Units	Min. Detection	Max. Detection	Average Detection[1]	Average Result (1/2 RL for NDs)[2]	Min. Reporting Limit	Avg. Reporting Limit	Max. Reporting Limit	Sample Date
131860-33-8	Azoxystrobin	D	Fungicide	11-F	Yes	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
361377-29-9	Fluoxastrobin	D	Fungicide	11-F	Yes	4	1	25%	ug/L	3.40	3.40	3.40	1.23	1.00	1.00	1	05-Aug-21
57837-19-1	Metalaxyl	D	Fungicide	4-F	Yes	4	2	50%	ug/L	2.20	4.50	3.35	1.93	1.00	1.00	1	05-Aug-21
178928-70-6	Prothioconazole	D	Fungicide	3-F	Yes	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
107534-96-3	Tebuconazole	D	Fungicide	3-F	Yes	4	3	75%	ug/L	2.40	9.80	5.73	4.43	1.00	1.00	1	05-Aug-21
148-79-8	Thiabendazole	D	Fungicide	3-F	Yes	4	3	75%	ug/L	2.50	5.00	3.50	2.75	1.00	1.00	1	05-Aug-21
1071-83-6	Glyphosate	D	Herbicide	9-H	Yes	4	4	100%	ug/L	14.00	89.00	64.75	64.75	10.00	10.00	10	05-Aug-21
71751-41-2	Abamectin	D	Insecticide	6-I	Yes	4	3	75%	ug/L	2.00	3.60	2.97	2.35	1.00	1.00	1	05-Aug-21
500008-45-7	Chlorantraniliprole	D	Insecticide	28-I	Yes	4	4	100%	ug/L	3.20	110.00	33.63	33.63	1.00	1.00	1	05-Aug-21
210880-92-5	Clothianidin	D	Insecticide	4A-I	Yes	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
138261-41-3	Imidacloprid	D	Insecticide	4A-I	Yes	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
153719-23-4	Thiamethoxam	D	Insecticide	4A-I	Yes	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
133-06-2	Captan	D	Fungicide	M4-F	No	4	0	0%	ug/L				2.50	5.00	5.00	5	05-Aug-21
10605-21-7	Carbendazim	D	Fungicide	1-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
5234-68-4	Carboxin	D	Fungicide	7-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
94361-06-5	Cyproconazole	D	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
119446-68-3	Difenoconazole	D	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
149961-52-4	Dimoxystrobin	D	Fungicide	11-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
135319-73-2	Epoxiconazole	D	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
86386-73-4	Fluconazole	D	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
131341-86-1	Fludioxonil	D	Fungicide	12-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
125225-28-7	Ipconazole	D	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
241479-67-4	Isavuconazole	D	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
84625-61-6	Itraconazole	D	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
125116-23-6	Metconazole	D	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
248593-16-0	Orysastrobin	D	Fungicide	11-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
117428-22-5	Picoxystrobin	D	Fungicide		No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
171228-49-2	Posaconazole	D	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
60207-90-1	Propiconazole	D	Fungicide	3-F	No	4	1	25%	ug/L	1.20	1.20	1.20	0.68	1.00	1.00	1	05-Aug-21
175013-18-0	Pyraclostrobin	D	Fungicide	11-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
182760-06-1	Ravuconazole	D	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
112281-77-3	Tetraconazole	D	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
23564-05-8	Thiophanate-methyl	D	Fungicide	1-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
141517-21-7	Trifloxystrobin	D	Fungicide	11-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
83657-22-1	Uniconazole	D	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
137234-62-9	Voriconazole	D	Fungicide	3-F	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
51276-47-2	Glufosinate	D	Herbicide	10-H	No	4	0	0%	ug/L				5.00	10.00	10.00	10	05-Aug-21
135410-20-7	Acetamiprid	D	Insecticide	4A-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
68359-37-5	Baythroid	D	Insecticide	3A-I	No	4	0	0%	ug/L				2.50	5.00	5.00	5	05-Aug-21
82657-04-3	Biphenthrin	D	Insecticide	3A-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
2921-88-2	Chlorpyrifos	D	Insecticide	1B-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
5598-13-0	Chlorpyrifos-methyl	D	Insecticide	1B-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
736994-63-1	Cyantraniliprole	D	Insecticide	28-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
68085-85-8	Cyhalothrin/Karate	D	Insecticide	3A-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
52315-07-8	Cypermethrin	D	Insecticide	3A-I	No	4	0	0%	ug/L				2.50	5.00	5.00	5	05-Aug-21
52918-63-5	Deltamethrin	D	Insecticide	3-I	No	4	0	0%	ug/L				2.50	5.00	5.00	5	05-Aug-21
165252-70-0	Dinotefuran	D	Insecticide	4A-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21

AltEn Site in Saunders County, Nebraska

August 5, 2021, Treated Water Laboratory Summary Statistics (Dissolved)

CAS	Chemical Name	Total or Dissolved	Chemical Classification	Pesticide Group (e.g., FRAC, IRAC, HRAC)	In Focused Analyte List	Number of Times Tested	Number of Detections	Percent Detected	Units	Min. Detection	Max. Detection	Average Detection[1]	Average Result (1/2 RL for NDs)[2]	Min. Reporting Limit	Avg. Reporting Limit	Max. Reporting Limit	Sample Date
150824-47-8	Nitenpyram	D	Insecticide	4A-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
52645-53-1	Permethrin	D	Insecticide	3A-I	No	4	0	0%	ug/L				1.00	2.00	2.00	2	05-Aug-21
111988-49-9	Thiacloprid	D	Insecticide	4A-I	No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21
224047-41-0	Brassinazole	D	Other		No	4	0	0%	ug/L				0.50	1.00	1.00	1	05-Aug-21

Notes:

1. Samples where this analyte was not detected are *not* included in this average.
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Proposed Land Application Approach for Management of Water from AltEn Site

Appendix C. Registered foliar or soil (non-seed treatment) uses of the focused analytes on crops commonly grown in Nebraska*

Focused analyte	Corn	Soybeans	Hay & Haylage	Wheat	Potatoes	Sorghum	Millet	Sunflower	Oats	Beans	Sugarbeets	Peas
Abamectin		✓			✓					✓		✓
Azoxystrobin	✓											
Chlorantraniliprole	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Clothianidin		✓			✓							
Fluoxastrobin	✓	✓		✓	✓	✓						
Glyphosate**	✓	✓	✓	✓					✓		✓	
Imidacloprid										✓	✓	✓
Mefenoxam		✓	✓		✓					✓	✓	✓
Prothioconazole	✓	✓		✓								✓
Sedaxane												
Tebuconazole	✓			✓								
Thiabendazole												
Thiamethoxam					✓							

*From https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=NEBRASKA

**Glyphosate, as a pre-plant or post-harvest herbicide, has registrations for uses with nearly all crops

Proposed Land Application Approach for Management of Water from AltEn Site

Appendix D. Lookup table for allowable pesticide active ingredient concentrations per application of each acre-inch of water (102,736 liters)

Pesticide	Proposed threshold for single application (grams/acre)*	Corresponding concentration in water (µg/L, parts per billion in one acre-inch)**
Abamectin CAS number 71751-41-2	1.1	10.7
Azoxystrobin CAS number 131860-33-8	11.30	110.0
Chlorantraniliprole CAS number 500008-45-7	4.45	43.3
Clothianidin CAS number 210880-92-5	3.0	29.2
Fluoxastrobin CAS number 361377-29-9	8.17	79.5
Imidacloprid CAS number 138261-41-3	6.7	65.2
Glyphosate CAS number 1071-83-6	62.43	607.7
Metalaxyl/Mefenoxam CAS numbers 57837-19-1 and 70630-17-0	14.2	138.2
Prothioconazole CAS number 178928-70-6	1.86	18.1
Sedaxane CAS number 874967-67-6	0.51	5.0

Proposed Land Application Approach for Management of Water from AltEn Site

Pesticide	Proposed threshold for single application (grams/acre)*	Corresponding concentration in water (µg/L, parts per billion in one acre-inch)**
Tebuconazole CAS number 107534-96-3	4.64	45.2
Thiabendazole CAS number 148-79-8	0.26	2.5
Thiamethoxam CAS number 153719-23-4	2.5	24.3

*From Table 1

**To determine the target volume of treated water for an individual application, use the equation:
Allowable volume (acre-inch) = ((Threshold value in g/ac × 1,000,000 µg/g) / (analyte concentration in ppb or µg/L) / 102,736 L/acre.

Appendix E. Standard Operating Procedures

1. Equipment Decontamination
2. Soil Sampling, Agronomic Parameters
3. Soil Sampling, Pesticides
4. Treated Water Sampling

SOP-1

EQUIPMENT DECONTAMINATION

ALTEN FACILITY, SAUNDERS COUNTY, NEBRASKA

Decontamination of field equipment is necessary to prevent cross-contamination between sites and sampling locations. Decontamination should be performed on all non-dedicated and non-disposable sampling equipment that may contact potentially contaminated media. Field personnel must wear disposable gloves while decontaminating equipment to prevent cross-contamination.

The following should be done to decontaminate field equipment:

- Set-up a decontamination area, preferably upwind and upgradient from the sampling area.
- Prior to initiating decontamination, visually inspect sampling equipment for evidence of contamination; use stiff brush to remove visible material.
- Once rough brushing is complete, decontaminate each piece of equipment following a sequential process of washing with Liquinox or an equivalent degreasing detergent; rinsing with deionized or laboratory grade distilled water; rinsing with 10% dilute methanol; and finally rinsing with distilled water three times. Best procedure is to set up multiple wash tubs for each of the above processes.
- Decontaminated equipment that is used for sampling organics should be wrapped in aluminum foil or another inert material if not used immediately.

Field equipment can be decontaminated by steam cleaning as an alternative. If equipment is steam cleaned, it should still be rinsed with 10% dilute methanol and distilled water.

All disposable items (e.g., paper towels, Nitrile gloves) should be deposited into a garbage bag and disposed in a proper manner. Handling and disposal procedures for the rinse and wash water will depend on the likely presence and type of contaminant in the wash water.

A list of equipment for decontamination is provided in the green box to the right. The amount of deionized/distilled water needed on site will depend on the number of samples to be collected and the sampling methods.

Purpose

Describe general decontamination procedures for field equipment

Goal and Objective

To sufficiently clean field equipment to prevent cross-contamination between sites and sample locations

Equipment Needs

5-gallon Plastic Tubs (minimum of four tubs)

Distilled/Deionized Water

1-gallon Container of 10% Nitric Acid

Spray Bottle(s) of 10% Methanol

Liquinox or equivalent

Hard Bristle Brush

Garbage Bags

Disposable Nitrile Gloves

Paper Towels

55-gallon Drums (optional depending on need to containerize wash water)

SOP-2

SOIL SAMPLING, AGRONOMIC PARAMETERS

ALTEN FACILITY, SAUNDERS COUNTY, NEBRASKA

Soil sampling procedures to determine nutrient and salt concentrations will be as listed below. This proposed procedure is based on the University of Nebraska-Lincoln publication G1740 Guidelines for Soil Sampling, with additional ASTM specifications to prevent cross-contamination and ensure representative mixing and subsampling.

SAMPLING FREQUENCY

Twelve soil cores will be collected in a maximum of 40 acres. For practical use on fields near the AltEn facility, this will translate to one set of 12 soil cores for one quarter of a pivot-irrigated area (approximately 32 acres for typical configuration).

DEPTHS OF SAMPLING

Per publication G1740 guidelines for nutrient testing, the 0 to 8 inch depth range will be tested for all applicable nutrients and salts, and 8 to 24 inch depth will be tested for nitrate only.

HOMOGENIZING AND CONTAINERIZING COMPOSITE SAMPLES

Soil sampling personnel will use the following procedure, which is generally consistent with ASTM Standard D 6051-15. The field crew will place all subsamples for one area and depth range into a decontaminated stainless steel or glass mixing dish. The material will be mixed in alternating clockwise and counterclockwise directions with a decontaminated stainless-steel trowel for at least 2 minutes. After mixing, extraneous material greater than 0.5 inches in size will be removed by sieve from the composited sample, and the field crew will fill laboratory-provided containers using multiple evenly spaced swaths of a small decontaminated stainless-steel scoop or trowel across the shallow pile. After filling each container, at least 30 seconds of re-mixing will occur.

PARAMETERS

Soil samples will be analyzed for the agronomic parameters listed below.

- Organic Matter (percent)
- Phosphorus (Week Bray and Strong Bray)
- Ammonium Acetate exchangeable ions (K, Mg, Ca, Na)
- pH
- Cation Exchange Capacity (CEC), Percent Base Saturation for K, Mg, Ca, H, and Na
- Nitrate-nitrogen
- Total Sulfur and Total Zinc
- DTPA-extractable Manganese, Iron, Copper, Boron
- Soluble salts, Chloride
- Sodium Adsorption Ratio (calculated)

SOP-3

SOIL SAMPLING, PESTICIDE RESIDUES

ALTEN FACILITY, SAUNDERS COUNTY, NEBRASKA

Field personnel will use the soil sampling procedures listed below to determine concentrations of pesticide residues prior to land application of treated water from the AltEn facility. The procedure uses discrete sampling. Resulting data will illustrate the distribution and average concentration of each pesticide analyte.

NUMBER OF SAMPLES PER MANAGEMENT UNIT

Using estimates of range and mean (see section titled Statistical Basis for Sampling Rate) for the Focused Analyte List in Table 1, the Facility Response Group proposes 15 discrete samples per management unit as the rate of sampling. Management units would be defined as an area with the same landowner and same rate of water applied, which would typically be one center pivot irrigation system per management unit.

COLLECTING AND CONTAINERIZING COMPOSITE SAMPLES

Sampling for pesticide residues will be from the 0- to 8-inch depth range. Soil sampling will be performed under the oversight of a certified professional soil scientist or crop advisor. Prior to mobilization, the sampling crew will identify targeted sampling points by selecting random nodes on a grid overlaying the irrigated acres of the field. Sampling personnel will identify the targeted location using GPS accurate to within 3 meters. At the sampling site, the field crew will use a decontaminated soil probe or hand auger to obtain each sample. The soil sample will only contact the decontaminated probe or auger, and new nitrile glove at each sampling point, and will be transferred directly into laboratory-provided sampling container. The samples will be placed in a cooler with ice and shipped under Chain of Custody procedures to the laboratory.

SAMPLE CONTAINERS AND PRESERVATION

Soil sample containers, preservatives, and hold times are described in the table below.

Method Number	Container	Preservation	Holding Time
EPA 8270D / 8321B	8 oz. glass	Cool to 4°C	14 days to extraction

STATISTICAL BASIS FOR SAMPLING RATE

The number of samples required to adequately characterize each chemical from the Focused Analyte List in soil prior to the application of treated water was determined based on the formula below[1]. The formula assumes that the constituent concentrations within the fields follow a normal distribution.

$$n = \left[\frac{t_{1-\alpha,df} S_{total}}{d}\right]^2$$

where

- n – recommended sample size
- S_{total} – estimated standard deviation
- α – maximum acceptable probability that the true mean will not lie in the confidence interval
- d – width of confidence interval
- $t_{1-\alpha,df}$ – value of Student t distribution with df=n-1 degrees of freedom such that the proportion of the distribution less than $t_{1-\alpha}$ is 1-α

The parameters required to apply the equation were derived by using the estimated Incremental Increase for Residue in Soil as the maximum soil concentration for each analyte. The value of d, width of the confidence interval, for each constituent was assumed equal to 10% of the average concentration of the constituent. The average concentration was determined as the arithmetic mean of the maximum soil concentration listed above and an assumed minimum of either 0 or a soil loading rate expected from a single application. The standard deviation (S_{total}) was derived from the following equation[2]:

$$S_{total} = \frac{expected\ maximum\ soil\ concentration - expected\ minium\ soil\ concentration}{6}$$

The number of samples determined by the equation is independent of the size of the unit to be sampled. In general, if the unit to be sampled is homogeneous then the samples size can be applied to the entire unit without compromising information on the variability and representative average concentration of the constituents being investigated. In this analysis the assumption is that application of chemicals as trace constituents of treated water will be done uniformly within each management area and that each management area, regardless of its size, is a homogenous unit.

Based on the applications of these equations to each constituent, the maximum number of samples required to characterize a field is 47 samples. The minimum number of samples based on the equation is 5 samples. The mean number of required samples across the Focused Analyte List would be 13 samples per management unit. To ensure that an adequate number of samples is available for statistical analysis we propose a minimum sample size of 15 samples per management unit.

[1] Visual Sample Plan Version 7.0 PNNL-23211, March 2014. Pacific Northwest National Laboratory (PNNL) Prepared for US Department of Energy. Section 3.2.3.4

[2] Guidance on Choosing a Sampling Design for Environmental Data Collection for Use in Developing a Quality Assurance Project Plan. EPA QA/G-5S, December 2002. USEPA Section 5.5.1

SOP-4

TREATED WATER SAMPLING

ALTEN FACILITY, SAUNDERS COUNTY, NEBRASKA

Procedures are listed below for sampling treated water from the subject facility. Results of this testing will be used to determine appropriate land application rates of the treated water. Combined with volume monitoring data, treated water results will also be used to calculate mass of nutrients, salts, and pesticides added to soil by land application.

SAMPLING PROCEDURE

Temporary Tanks in 2021: Each tank is mixed continuously at approximately 1,000 gallons per minute, which is near the physical threshold for safe use of the tanks without creating a whirlpool-like circulation pattern. Field personnel collect a vertical composite sample of the circulating water from the safe sampling location on each tank (permanent access stairs). These stairs are on the northwestern part of Tank 1, southern part of Tank 2, and southwestern part of Tank 3. Before sampling, any reusable equipment that may contact lagoon water is decontaminated in accordance with SOP-1. The vertical composite sample is collected using a decontaminated 3/4-inch diameter, 10-feet-long polyethlylene water core sampler (Sludge Judge) to ensure coverage of the entire water column. From each tank, field personnel collect one unfiltered sample and one sample passed through a 0.5-micron filter, then repeat the sampling technique to provide sufficient volume for split analysis at a second laboratory.

Treated Water Ponds after 2021: Sampling procedure will be consistent with the description above, except circulation of the ponds will be driven by flow of incoming treated water, and there will be more accessible sampling locations to ensure lateral coverage of the ponds. To form the composite sample, 10-feet-long water core subsamples will be collected and placed in a bucket that has been decontaminated in accordance with SOP-1. The subsamples will be collected from the middle of each side of the pond. The composited volume will be transferred into laboratory-provided containers, with one unfiltered and one filtered set for each laboratory, per description above.

LABORATORY PARAMETERS

Treated water samples will be analyzed for the agronomic parameters listed below.

- Biological Oxygen Demand, 5-day
- pH
- Ammonia
- Total Kjeldahl Nitrogen
- Total Phosporus
- Nitrate/Nitrite
- Total Organic Carbon
- Total Suspended Solids
- Total Dissolved Solids
- Selenium
- Electrical Conductivity
- Sodium Adsorption Ratio

Treated water samples will be analyzed for the 53 pesticides listed in the summary statistics appendix provided with the land application proposal.

Appendix F. US EPA approved tolerances for focused analytes on corn grain from 40 CFR 180

Focused analyte	Tolerance in corn (parts per million, ppm)
Abamectin	0.4
Azoxystrobin	0.05
Chlorantraniliprole	0.04
Clothianidin	0.01
Fluoxastrobin	0.02
Glyphosate*	5.0
Imidacloprid	0.05
Mefenoxam**	0.1
Prothioconazole	0.35
Sedaxane	0.01
Tebuconazole	0.05
Thiabendazole	0.01
Thiamethoxam	0.02

*Tolerance accounts for the metabolite, AMPA

**As metalaxyl

NEBRASKA

Good Life. Great Resources.

DEPT. OF ENVIRONMENT AND ENERGY

Pete Ricketts, Governor

Tanner Shaw
AltEn, LLC
Capital Corporate Services, Inc.
1125 S 103rd Street, Suite 800
Omaha, NE 68124

RE: AltEn, LLC Land Application Approach Approval
NDEE ID: 84069
PROGRAM ID: NE0137634

Dear Mr. Shaw:

The Department received the latest version of the *Proposed Land Application Approach for Management of Water from AltEn Site* on January 7, 2022. This plan submitted by the AltEn Facility Response Group (AFRG) is the most recent version of a land application approach that has been revised in response to multiple comments from NDEE.

The requirements for the land application of effluent are set forth in Part II of NPDES Permit NE0137634. The permit, last modified on October 28, 2020, has requirements for the land application of treated wastewater. These requirements including reporting, setbacks, prohibitions, and sampling. Most importantly, the permit requires that land application of effluent may not cause degradation to the plant-soil characteristics nor degrade the long-term beneficial uses of groundwater. Also, it may not be applied in a method that would negatively impact waters of the State.

The AFRG drafted a land application plan that was first submitted to the Department on July 16, 2021. The Department provided comments, and the plan went through reviews and changes until the Department received the *Proposed Land Application Approach for Management of Water from AltEn Site* on January 7, 2022, which is the current land application of treated effluent plan.

The Department has reviewed the setbacks, management practices, planned application maximums for pesticides and has found that if followed, the *Proposed Land Application Approach for Management of Water from AltEn Site* meets all permit requirements. The plan is approved for use for land application at the site. When treated wastewater is applied at the prescribed rates, meets setbacks, and follows the *Approach,* then the Department does not anticipate negative impact from pesticides. The treated effluent must meet the proposed thresholds for application of pesticides and also meet the nutrient and soil condition requirements of each application site.

In addition to meeting the methodology set forth in the *Proposed Land Application Approach for Management of Water from AltEn Site*, treated wastewater must be applied according to the requirements of permit NE0137634. The AltEn Facility Response Group or site operator must land apply treated wastewater according to the requirements of an approved Best Management Practices (BMP) Plan. This plan, required in Part II.B of permit NE0137634, has requirements that must be submitted to the Department for approval prior to land application. The plan must be prepared in consultation with a professional agronomist or certified crop specialist.

Sites must be reviewed and approved by NDEE prior to land application of treated effluent. In order for sites to be approved, they must follow the requirements of the BMP Plan and Part II of Permit NE0137634. These sites

Department of Environment and Energy
P.O. Box 98922
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Jim Macy, Director
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ndee.moreinfo@nebraska.gov

must be submitted for review along with the BMP Plan. Any land application sites that are proposed after the approval of the BMP plan must meet permit requirements and be approved by the Department.

Land application of treated effluent may not run off of the site and may not negatively impact waters of the State. If the application of treated effluent is found to degrade site conditions, negatively impact water quality, or violates the permit requirements, site approval for land application will be withdrawn.

Please contact the Department if you have any questions or comments. Thank you.

Sincerely,

Shelley Schneider
Permits and Engineering Division Administrator

SS/pwd

ecc:
Scott Tingelhoff, Vice President, AltEn, LLC
Don Gunster, M.E.M., NewFields

APPENDIX E

WATER TREATMENT PILOT PROGRAM

NewFields

AltEn Facility
Mead Nebraska
Sampling, Analysis, and Treatability Plan – Water Treatment
April 2022

Table of Contents

1.0 INTRODUCTION

1.1 PURPOSE

NewFields recommends restarting the current Water Treatment Plant (WTP) at the AltEn ethanol facility in Mead, Nebraska on a pilot basis to produce 10 million gallons (MG) of treated water from the lagoon system while collecting operational data to improve the efficiency and cost-effectiveness of water treatment and inform the selection of the final water treatment and disposal approach.

The 10 MG will be made up of water from the Southeast (SE) Lagoon and Emergency Pond. A total of 6.2 MG of water will be pumped from the Emergency Pond into the SE Lagoon and approximately 13.5 MG will be pumped from the SE Lagoon for treatment as part of the pilot testing program, with approximately 3.5 MG returned to the SE Lagoon as backwash water and clarifier underflow. The pumping of the Emergency Pond will be performed simultaneously with removal of an equal amount from the SE Lagoon.

This will result in 10 MG of treated water produced (the basis of payment) and a net reduction of approximately 3.8 MG in the NW Lagoon. Water will be withdrawn from the lined Emergency Pond so that it can be used as a staging or final storage area for future management of sludge generated by the WTP. The net volume of water withdrawn from the SE Lagoon will provide a total of approximately 2 years of rainfall storage capacity below the freeboard limit.

The sampling and analyses presented in this workplan, to be conducted during treatment of the 10 MG, is designed to quantify the existing treatment system and to develop the engineering design data for the following improvements:

- Solids handling and granular activated carbon (GAC) vessel configuration.
- Treatment processes necessary for achieving direct discharge requirements for pesticides, ammonia, nitrate, and biochemical oxygen demand (BOD).
- Preliminary capital cost for improvements.
- Preliminary operational unit cost and cost contingencies.
- Lagoon water treatment and disposal strategy based on cost, technical challenges, potential consequences, and schedule.

- Contracting strategy that provides the ability to obtain competitive pricing, operational efficiency, and less uncertainty regarding cost and schedule.

1.2 BACKGROUND

Approximately 14 MG of water from Northwest (NW), Northeast (NE) and SE Lagoons at the closed AltEn ethanol facility in Mead, Nebraska were treated on an emergency basis from April to September 2021. Treatment was implemented as a component of the removal of water from the lagoons to maintain freeboard in accordance with Nebraska Department of Energy and Environment (NDEE) requirements. The treated water was originally stored in above ground temporary tanks and then was subsequently relocated to the West Cell of the New Treated Water Ponds in March 2022. Approximately 9 MG of this treated water was land applied in April 2022.

The 2021 water treatment utilized the AltEn WTP, supplemented by a temporary skid-mounted solids filtration and GAC system provided by Clean Harbors Environmental Services (CHES). The primary treatment was the removal of pesticides with GAC to allow land application of treated water. To reduce solids impact on GAC effectiveness, solids removal was incorporated through a combination of chemical addition, clarifiers, and filters.

Two alternatives exist for disposing of wastewater at the site[1]. The first is the land application of treated wastewater on farm fields near the site, providing water and nutrients (e.g., ammonia) to these fields. The second is the direct discharge of treated water to an NPDES permitted outfall. Preliminary discharge requirements provided by NDEE include BOD, total suspended solids (TSS), ammonia, nitrate as nitrogen and pesticides. The preliminary permit limits also include requirements for monitoring pH and periodic whole effluent toxicity (WET) testing.

[1] Deep well injection was investigated as a potential alternative for disposal of water. The possible advantage was thought to be the elimination of treatment cost. NewFields has recommended that this alternative not be pursued further. There are no data indicating that subsurface conditions are suitable for injection of untreated or treated water, either in the sedimentary layers or in the Precambrian basement. The evidence that does exist is universally unfavorable. Further pursuit of this alternative would require the investment of $2.5 to $5.0 million in investigative borings to depths well in excess of 2,000 feet with no evidence that the results would be favorable.

The existing treatment process removes pesticides sufficient for land application. However, operational experience during the 2021 treatment period revealed opportunities to improve efficiency and reduce cost. The opportunities for improvement are summarized as follows:

- Solids removal is inefficient and requires both considerable underflow blowdown from the clarifier and significant backwash volume of clean water through filters.
- Underflow blowdown is discharged into the SE Lagoon, resulting in recycling of solids and a steady increase in the solid content of lagoon water.
- Excessive solids accumulation in the GAC beds reduces treatment efficiency, which translates to a higher GAC change-out frequency.
- Organic carbon (measured as total organic carbon or TOC), which is expected to consist mainly of ethanol, may be preferentially adsorbing to and consuming GAC at a high rate and warrant treatment to reduce organic carbon concentrations prior to GAC if cost-effective to do so.
- The capability of GAC to remove the pesticides to concentrations required for direct discharge is unknown, as treated water testing results obtained during the emergency treatment period had detection limits for the pesticides greater than the preliminary direct discharge limits provided by NDEE.

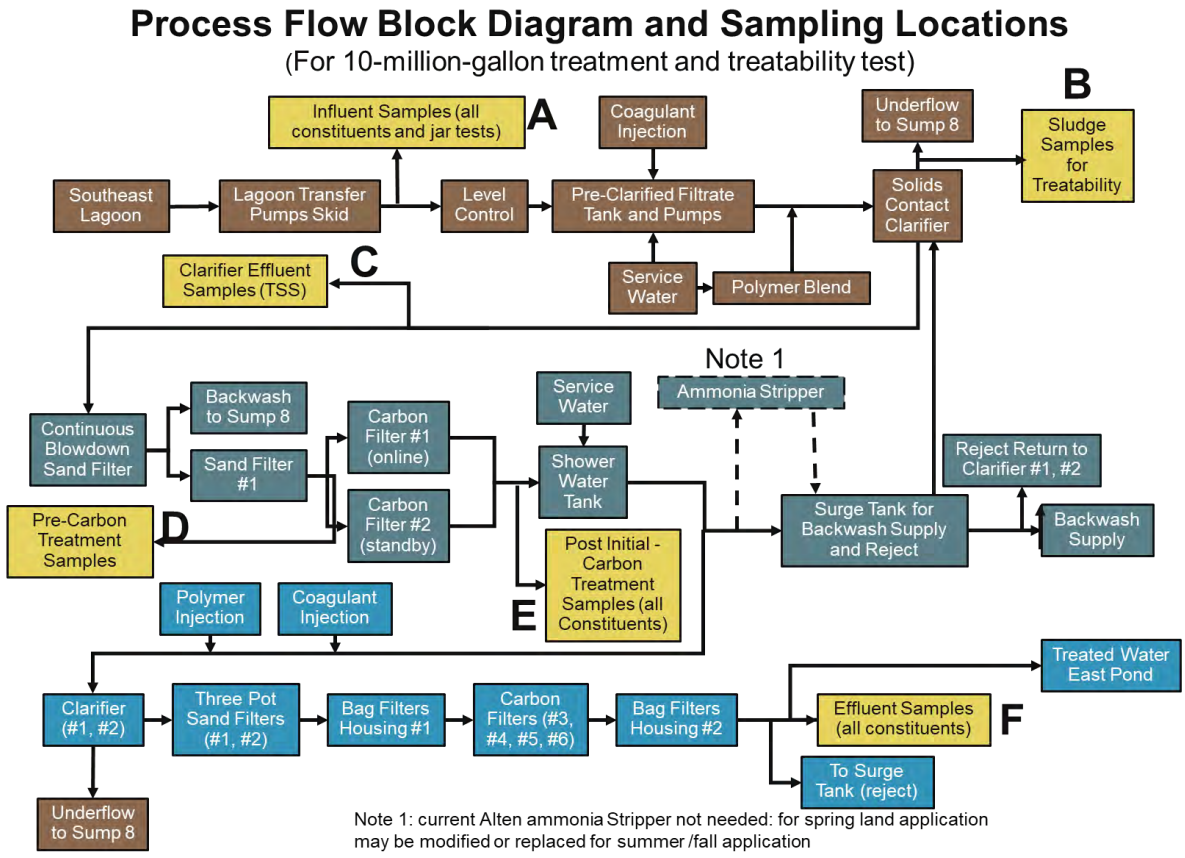
Data acquired during this study will provide information to specify treatment facility modifications and evaluate costs for treatment to land application and to direct discharge performance limits. This information in turn will provide the basis for FRG selection of a cost-effective combination of disposal, timing of implementation, and water treatment contracting approach. Additionally, the data collected will provide information for BACT discussions with the NDEE. Disposal will likely be either all land application or a combination of land application and direct discharge. Additional treatment systems will likely be required for direct discharge to comply with discharge limits for BOD and ammonia.

To reduce costly investments in new equipment or upgrades to the current WTP, the original AltEn water treatment equipment will be utilized to the extent practical and cost-effective.

1.3 TESTING OVERVIEW

A general process flow diagram (PFD) of the current WTP, including the CHES skid-mounted system, is provided below as Figure 1. Sampling locations for characterization and/or treatability testing are shown in yellow for future reference in this workplan.

Figure 1 – Process Flow Block Diagram and Sampling Locations



Color code: Brown- Alten primary solids removal; Gray-Alten pesticide and ammonia system; Blue-CHES skid-mounted system; Yellow – sampling locations

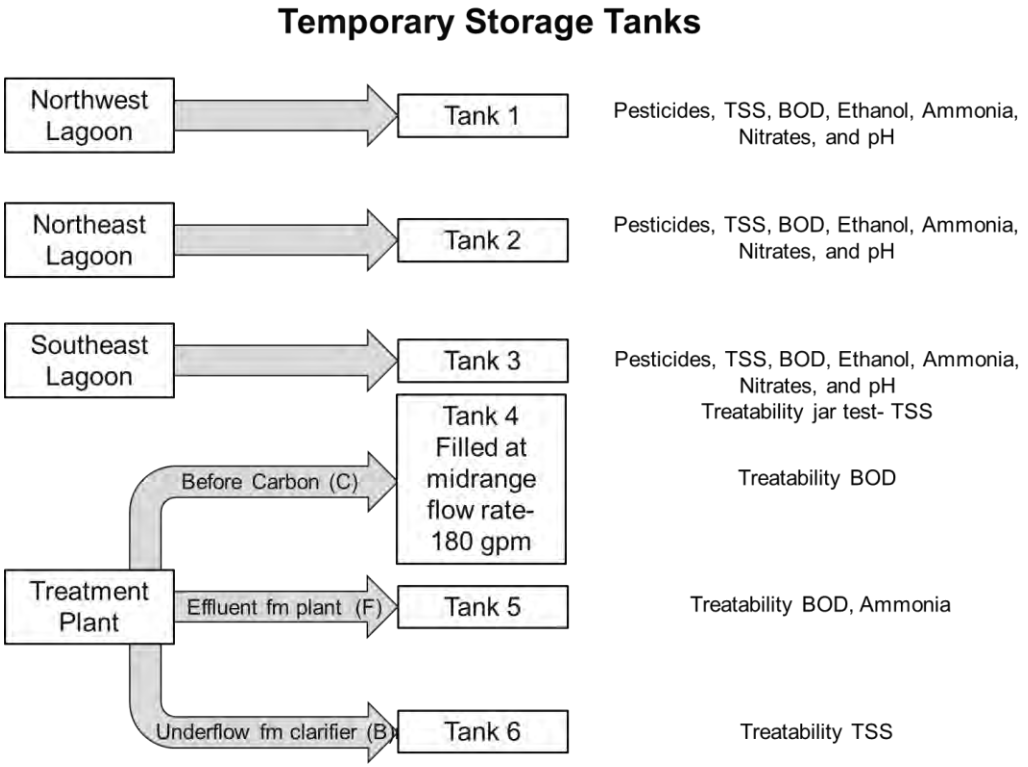
Land application is a viable disposal method and the existing WTP has been proven to be able to achieve the required discharge limits for this method. Direct discharge of treated water may also be needed, which will require additional treatment for BOD and ammonia. As such, treatability studies will also be performed as part of the pilot program to refine the recently completed Ammonia Treatability Study and evaluate whether aerobic biodegradation can reduce BOD concentrations to the direct discharge limits.

The Water Treatment Pilot Program will evaluate the WTP performance at three different effluent production flow rates, which include 150, 180, and 210 gallons per minute (gpm). The range of flow rates was selected based on CHES' operating experience during 2021 to capture the potential upper and lower operating flow range. The upper range is limited by The WTP's hydraulic capacity.

Samples of lagoon water will also be collected from each of the three lagoons as part of the pilot program. Each sample will be placed into dedicated 1,000-gallon tanks for characterizing water within the three lagoons. A summary of the three (3) tanks, their contents and what parameters will be analyzed for are presented below on Figure 2. Treatability testing will also be performed for settling (Jar Tests) from water in Tank 3 (SE Lagoon).

Additional samples will be collected from three locations within the WTP at the mid-flow rate of 180 gpm, and each sample will be placed into its own dedicated 1000-gallon tank. These samples will be collected before and after carbon treatment for BOD treatability testing, after carbon treatment for supplemental ammonia treatability testing, and from Sump 8 for clarifier underflow dewatering treatability testing (see Figure 2).

Figure 2- Temporary storage tanks for composite samples



2.0 DATA ACQUISITION OBJECTIVES

As indicated previously, the existing WTP can treat water for land application where ammonia content is desirable and BOD content is not relevant. Currently, whether the current treatment plant can treat water to the proposed NDEE preliminary direct discharge limits for pesticides, TSS, and pH is unknown. However, it is known that the existing WTP cannot treat wastewater for BOD, ammonia, nitrates, and ethanol.

The objectives for the pilot study analysis are broken down into the following elements, which are further summarized in this section:

- Pesticides Removal,
- Solids Removal and Management,
- BOD Removal,
- Ethanol Removal,
- Ammonia Removal,
- Nitrates Removal, and
- pH Compliance.

2.1 PESTICIDES REMOVAL

Currently, a robust treatment system for pesticides removal is part of the current WTP in the form of the current GAC system. Many technologies can effectively remove pesticides from water[2] and include the following:

- **Biological** – extended aeration, anaerobic processes, RBCs, batch reactors, trickling filters.
- **Physical** – adsorption, distillation, filtration, steam stripping, sedimentation, membrane technologies.

[2] Removal of pesticides from water and wastewater: Chemical, physical and biological treatment approaches, 2020, Iman A.Saleh, Nabil Zouari, Mohammad A. Al-Ghouti.

- **Chemical** – oxidation, precipitation, coagulation, flocculation, hydrolysis, neutralization, dissolved air flotation (DAF), electrochemical, solvent extraction, ion exchange.

Any of the above technologies for pesticides removal would require extensive testing in the context of the other operations needed for other constituents. Carbon adsorption has already been proven to be effective in removing pesticides from the lagoon water, is widely recognized in the industry as being effective for removing pesticides from water, and is less operationally intensive than most other potentially applicable technologies. For these reasons, optimization of the current GAC system is the recommended option to be pursued and evaluated as part of this pilot program.

The intent of data acquisition for GAC is to assess the effectiveness of both stages of the current system under three operational flow rates, with the intent of developing the range of treatment achieved for varying the hydraulic loading rates to the GAC vessels and carbon contact time. Data on pesticide concentrations in the lagoon water will be obtained for a) the plant influent, b) after the 1st GAC treatment step, and c) for the plant effluent (after the 2nd GAC treatment step). This data will be used to assess the level of treatment from both GAC steps to determine: 1) whether the carbon treatment system can be scaled back while still meeting potential discharge or land application limits, and 2) whether the current full process is deficient in treating pesticides to the preliminary NDEE discharge standards, leading to approaching the NDEE for alternative treatment standards based on what is achievable by carbon adsorption.

2.2 SOLIDS REMOVAL AND MANAGEMENT

For solids management, the current treatment system is comprised of two (2) clarifier steps and a series of sand and bag filters (see Figure 1). These filters were implemented in an ad-hoc manner principally to protect the two (2) GAC systems from excessive TSS loading. The current system has specific operational difficulties, including the use of a pumping system from the initial chemical addition step to the clarifier which may break down the floc, the inability to effectively manage the production of coagulated floc, the removal of the solids, and the removal of fine suspended solids after clarification. The underflow from the clarifier systems is in the 1% to 4% solids range. The actual capability of chemical flocculation and the clarifier has not been characterized with sufficient data. In addition, the characteristics of the solid content relative to additional thickening and dewatering

options, such as a Geotube® or mechanical dewatering is unknown. These unknowns coupled with the current practice of returning the underflow to the SE Lagoon results in inefficient continual recycling of the solids.

The purpose of the analysis for solids is to provide an assessment of the existing solids contact clarifier and the effectiveness of the subsequent filters and clarifiers, which can be compared to a replacement system involving a new chemical mixing system, a lamella clarifier, and a multi-media filtration system. Clarifier underflow samples will be collected for bench-scale testing using Geotubes and mechanical dewatering to evaluate their ability to dewater the sludge so that it can be managed more cost-effectively than how it is currently managed by returning it to the SE Lagoon.

During this study, the following assessments will be made:

- TSS removal efficiency in the solids contact clarifier under three different operational flow rates (i.e., 150, 180, and 210 gpm).
- TSS removal efficiency in operational units prior to the first GAC system.
- Overall TSS removal efficiency in the WTP effluent.
- Solids concentrations in the clarifier underflow, used for solids treatability.
- Treatability tests on coagulants and polymer effectiveness (jar tests).
- Geotube® and mechanical dewatering treatability tests on clarifier underflow.

The data obtained can then be compared to removal efficiency data provided by vendors for new mixing, clarifier, and filter systems and an assessment can be made whether replacing the current system with a new system is warranted from a removal efficiency, cost, and timeliness perspective. Treatability studies for clarification and filtration by vendors of new equipment may be considered. Also, the data will be used for attempting to provide minor modifications that could be made while leaving the existing WTP in operation. Sludge dewatering will require additional investment considering there is no equipment currently in place to manage the sludge.

The evaluation will be based on a comparison of the technical merits of the current system verses a new system, the cost comparison based on current operational costs verses

operational costs and capital costs for an upgraded process, and the lead times for obtaining equipment (currently 12 months in some cases).

2.3 BOD AND ETHANOL REMOVAL

The existing WTP currently has no means to treat the water for BOD or ethanol. An assessment of BOD/ethanol concentrations at different points in the current process is necessary to understand the extent BOD or ethanol varies through the individual processes, as BOD is a component of the NDEE preliminary direct discharge standards and ethanol may be a significant component of BOD. Aerobic biological treatment is the most common and likely feasible option for treatment of these constituents.

For this pilot program, an assessment of the effects of the current system on BOD and ethanol will be made with sampling at three (3) operational flow rates (i.e., 150, 180 and 210 gpm) at two locations in the WTP existing plant (see Figure 1): **B** – after the initial TSS removal systems but before the first GAC treatment step; and **F** – the final WTP effluent. Treatability testing will be performed on both the pre-carbon adsorption and effluent water at the midrange flow rate (180 gpm) to assess the effectiveness of aerobic biological treatment via aeration for BOD and ethanol before and after pesticides removal. This is proposed to assess whether the presence of pesticides in the water is detrimental to biological BOD treatment.

This treatability testing will be used to evaluate whether treatment for BOD and ethanol is technically possible using biological means and in supporting decisions on moving towards more extensive analysis or rather moving to approaching the NDEE for a waiver of requirements for BOD and ethanol.

2.4 AMMONIA REMOVAL

Like BOD and ethanol, the existing WTP currently has no means to treat the water for ammonia. However, an assessment of the effects of the current WTP is needed for the purposes of developing loading information for subsequent treatment. Air stripping was determined during bench-scale testing conducted in the Fall of 2021 to be a feasible option for treatment of ammonia to levels below the preliminary NPDES performance criteria.

However, the testing was completed using water that contained algae which likely affected the accuracy of the results (probably in a negative way).

Supplemental treatability testing will be performed using water that does not contain algae so that the treatment process can be refined and provide data for the potential design if ammonia treatment is required for direct discharge or land application. While this is ongoing, the fate of ammonia within the existing WTP will also be evaluated as part of the pilot program. For this study, an assessment of the effects of the current system on ammonia will be made at the three (3) operational flow rates with sampling from three locations (Figure 1**) A-** plant influent; **E-** after the first carbon treatment step; and **F**-in the plant effluent. These tests are a refinement of initial tests performed on treated tank water that contained gross algae.

2.5 NITRATE REMOVAL

Nitrates are part of the NDEE NPDES preliminary discharge limits; however, nitrates have not been detected in previous lagoon water samples at concentrations approaching the discharge limits. Nitrate analysis is necessary nonetheless to assess whether there are potential discharge issues with this constituent.

2.6 PH COMPLIANCE

The pH of each sample collected will be measured for operational parameters and compliance.

3.0 ANALYTICAL AND TREATABILITY PROGRAM OVERVIEW

3.1 TREATMENT PERFORMANCE STANDARDS AND DETECTION LIMITS

Land Application Performance Standards

Water quantity limits for land application have been based on acceptable mass loading on a yearly basis. The limits were established by the FRG and approved by NDEE based on the loading allowed for representative seed varieties. The FRG chose in the Fall of 2021 to reduce the loading limits associated with treated water by applying an additional factor of safety. Except for one compound, thiabendazole, the current water treatment capability would be sufficient to eliminate water quality as a limiting factor for land application.

Hydraulic loading rates are more restrictive than constituent loading rates for all but a few parameters. The one exception, thiabendazole, is an FRG-imposed limitation, as this compound would not be a limiting factor if the safety factor more closely aligned with approved coated seed application rates. BOD and nitrate are not limiting factors for land application even with no treatment. Ammonia could become a limiting factor for summer or fall land application and possibly crop type.

Direct Discharge Performance Standards

Pesticides, ammonia, and BOD are limiting factors that must be addressed with enhanced treatment for direct discharge. NDEE has proposed discharge limits for specific constituents for direct discharge to local surface waters. The proposed NDEE NPDES discharge limits for Outfall 003 (at the boundary of the AltEn facility) for a flow of 0.5 MGD, which are the closest standards provided to the anticipated discharge of 0.25 MGD, and corresponding analytical limits of quantification (LOQ) are presented below in Table 1. These LQOs are the detection limits for which analytical testing will be performed for data collection and treatability work under this plan.

Table 1 – NDEE NPDES Limits

Constituent	Proposed NPDES Limit	Analytical LOQ
Ammonia	3.55 mg/l	0.075 mg/l
Abamectin	0.090 µg/l	0.06 µg/l
Azoxystrobin	26.00 µg/l	0.06 µg/l
Chlorantraniliprole	4.405 µg/l	0.60 µg/l
Clothianidin	0.139 µg/l	0.06 µg/l
Fludioxonil	38.881 µg/l	0.06 µg/l
Fluoxastrobin	31.840 µg/l	0.06 µg/l
Glyphosate	1,944.1 µg/l	10 µg/l
Imidacloprid	0.0278 µg/l	0.06 µg/l
Ipconazole	0.500 µg/l	0.06 µg/l
Mefenoxam	3,332.7 µg/l	0.06 µg/l
Propiconazole	11.144 µg/l	0.06 µg/l
Prothioconazole	2.813 µg/l	0.10 µg/l
Sedaxane[3]	Per Lab Recommendations	0.06 µg/l
Tebuconazole	30.55 µg/l	0.06 µg/l
Thiabendazole	82.25 µg/l	0.06 µg/l
Thiamethoxam	2.055 µg/l	0.06 µg/l
Nitrate as Nitrogen	10.00 mg/l	0.10 mg/l
BOD	30.00 mg/l	2 mg/l
TSS	46.00 mg/l	5 mg/l
pH (no detection limit)	6-9 standard units	Not Applicable

As indicated on Table 1, one analyte, imidacloprid, has a standard below its corresponding LOQ, although current instrumentation can read down to this limit.

In parallel to the analytical and treatability program described herein, NewFields will engage with NDEE to identify potential flexibility in preliminary discharge limits based on the specific situation at AltEn. For example, NewFields will pursue more reasonable and attainable (while still being protective) limits since this is not a long-term discharge and would be a material investment of cost and time to achieve more challenging discharge limits for direct discharge. In the case of imidacloprid, NewFields will address this with NDEE to obtain an appropriate standard. (i.e., that the limit of quantification would represent an acceptable discharge criteria).

[3] Requires Report Only

3.2 SAMPLING PROGRAM

The sampling program is summarized in Tables 2 and 3. Sampling locations within the process are shown on the PFD in Figure 1, and the six temporary, dedicated tanks for lagoon water and treatability testing are shown on Figure 2.

NewFields

Table 2 – Process Analytical

LOCATION	DESCRIPTION	PURPOSE	PARAMETERS	NUMBER OF SAMPLES/FREQUENCY	EVALUATION/DECISION CRITERIA
A	WTP Influent	Characterize influent to support the performance evaluation and improvement	Pesticides, TSS, BOD, Ethanol, Ammonia, Nitrates, pH	6 samples (2 sample/flow rate)	Baseline influent information
B	Clarifier Underflow	Characterize clarifier underflow as necessary to evaluate clarifier performance and alternatives for sludge dewatering and management	TSS	6 samples (2 sample/flow rate)	Higher TSS in underflow indicates better performance
C	Clarifier Effluent	Measure TSS in Clarifier effluent to evaluate clarifier performance and whether changes are warranted to improve performance	TSS	6 samples (2 sample/flow rate)	Lower TSS in Clarifier effluent indicates better performance
D	Pre-Carbon Treatment	Measure TSS concentrations after pre-carbon treatment to evaluate performance of solids filters and whether they are necessary and/or changes are warranted to improve performance, and measure pesticides and BOD to evaluate whether concentration reductions occurred as a result of solids reduction so that the carbon treatment removal efficiency can be more accurately evaluated	TSS, Pesticides, BOD	6 samples (2 sample/flow rate)	Performance of solids filters based on achieving the highest TSS reduction, so the lowest TSS in this sample indicates the best performance. No or little reduction in solids between Clarifier effluent and Pre-Carbon Treatment indicates the solids filters are not effective and can either be removed or be replaced with different solids filters if necessary to improve carbon treatment. A reduction in Pesticides and BOD concentrations indicates that some reduction of these parameters was achieved by solids removal.
E	Post-Initial Carbon Treatment	Measure Pesticides in effluent to evaluate carbon treatment performance at varying flow rates considering the impact of hydraulic loading on performance, and measure the other parameters in the effluent to evaluate whether they were affected by carbon treatment and can serve as influent data for subsequent treatment steps if determined to be necessary.	Pesticides, TSS, BOD, Ethanol, Ammonia, Nitrates, pH	6 samples (2 sample/flow rate)	Primary treatment criteria are driven by land application (allowable application rates per the permit) and preliminary direct discharge limits proposed by NDEE. Achieving the direct discharge limits may not be possible, so the results may be able to support proposing discharge limits based on what this technology can actually achieve using the results from this testing program. No or little reduction in the discharge parameters between the Inital Carbon Treatment effluent and secondary treatment processes indicates the secondary treatment processes are not effective for the parameters they are designed to remove and can be removed, reconfigured or replaced to improve performance.
F	WTP Effluent	Measure parameters in effluent following secondary clarifiers, sand filters, carbon treatment vessels, and bag filters to evaluate the overall WTP performance, evaluate whether changes are warranted to improve performance and/or cost-effectiveness, and provide baseline data in the event additional treatment is required to meet the applicable discharge limits for parameters such as BOD and ammonia	Pesticides, TSS, BOD, Ethanol, Ammonia, Nitrates, pH	6 samples (2 sample/flow rate)	Primary treatment criteria are driven by land application (allowable application rates per the permit)and preliminary direct discharge limits proposed by NDEE. Achieving the direct discharge limits may not be possible, so the results may be able to support proposing discharge limits based on what this technology can actually achieve using the results from this testing program. No or little reduction in the discharge parameters between the Inital Carbon Treatment effluent and secondary treatment processes indicates the secondary treatment processes are not effective for the parameters they are designed to remove and can be removed, reconfigured or replaced to improve performance.

Table 3 – Treatability

LOCATION	DESCRIPTION	PURPOSE	PARAMETERS	NUMBER OF SAMPLES/FREQUENCY	EVALUATION/DECISION CRITERIA
Tank 1	Northwest Lagoon Sample	Characterize lagoon water to evaluate potential variability between the three lagoons and whether the variability has the potential to affect the WTP performance and warrants changes to achieve the discharge requirements	Pesticides, TSS, BOD, Ethanol, Ammonia, Nitrates, pH	1,000-gallon sample in on-site tank; 1 sample collected from tank for analysis	Characterization only
Tank 2	Northeast Lagoon Sample	Characterize lagoon water to evaluate potential variability between the three lagoons and whether the variability has the potential to affect the WTP performance and warrants changes to achieve the discharge requirements	Pesticides, TSS, BOD, Ethanol, Ammonia, Nitrates, pH	1,000-gallon sample in on-site tank; 1 sample collected from tank for analysis	Characterization only
Tank 3	Southeast Lagoon Sample - SE Lagoon will be used as the influent source for the treatment plant	Characterize lagoon water to evaluate potential variability between the three lagoons and whether the variability has the potential to affect the WTP performance and warrants changes to achieve the discharge requirements	Pesticides, TSS, BOD, Ethanol, Ammonia, Nitrates, pH	1,000-gallon sample in on-site tank; 1 sample collected from tank for analysis	Coagulant/polymer and settling studies (jar testing) and characterization
Tank 4	Pre-Carbon Treatment (D above)	BOD treatability testing before carbon treatment to evaluate affect of pesticides on BOD treatment efficiency with additional volume in the event supplemental testing is needed. Evaluate the effects of BOD treatment on ammonia and nitrate levels.	Treatability for BOD - multiple Tests	1,000-gallon sample in on-site tank collected at 180-gpm flow rate; samples collected from tank for each treatability test (volume to be determined in coordination with testing facility)	BOD treatability prior to pesticide removal to determine the effect of pesticides on BOD removal. Note that BOD removal would only be required for direct discharge of treated effluent, so the primary criterion is the preliminary direct discharge limit proposed by NDEE
Tank 5	WTP Plant Effluent (F above)	BOD treatability testing of final WTP effluent to evaluate whether treatment is more effective with pesticides removed with additional volume in the event supplemental testing is needed. Evaluate the effects of BOD treatment on ammonia and nitrate levels. Ammonia treatability testing	Treatability for BOD, Ammonia - multiple Tests	1,000-gallon sample in on-site tank collected at 180-gpm flow rate; samples collected from tank for each treatability test (volume to be determined in coordination with testing facility)	BOD treatability after pesticide removal to determine the effect of pesticides on BOD removal. Note that BOD removal would only be required for direct discharge of treated effluent, so the primary criterion is the preliminary direct discharge limit proposed by NDEE
Tank 6	Clarifier Underflow	Sludge dewatering bench-scale testing to evaluate sludge management alternatives with additional volume in the event supplmental testing is needed	Total Solids, Sludge processing and management treatability tests, and geotechnical properties for on-site consolidation - multiple tests	1,000-gallon sample in on-site tank collected from sump; samples collected from tank for dewatering bench-scale testing (Geotube, mechanical dewatering; volume to be determined in coordination with testing facility)	Dewatering performance based on total solids content achieved by the dewatering technology balanced with geotechnical properties (as needed for on-site consolidation) and cost. Water from the tank will be used for the solids dewatering testing being conducted under Task 18. The clarifier solids removal and solids dewatering are interconnected. The higher the solids removal the more efficient dewatering

3.3 TREATABILITY TESTING

Treatability tests will be conducted for assessing TSS, BOD, and ammonia removal.

3.3.1 Jar Tests

Jar tests will be conducted on influent water to evaluate the settleability of solids in the water matrix under both natural conditions and when coagulants and polymers are added

to the matrix. The number of tests is unknown at this time and will depend on the initial analytical results for the untreated water. The number of tests is currently assumed that it will not exceed 20. These tests will be conducted with raw wastewater and with addition of known amounts of coagulants/flocculants to the wastewater. Each 500 mL sample will be stirred and settling velocities estimated using Imhoff cones.

3.3.2 BOD Treatability Tests

Six (6) treatability tests will be conducted for biological treatment of the water for BOD from samples at the 180-gpm flow rate. Three (3) tests will be conducted with water from the existing treatment process prior to pesticides removal via carbon treatment. The other three (3) tests will be conducted after pesticides treatment with carbon from the existing treatment process. These tests will employ simple BOD_5 measurements made before and after samples have been aerated by stirring and induction of compressed air.

Influent and effluent from these treatability tests will be analyzed for BOD as well as other constituents on Table 3 to assess the effectiveness of conventional aerated biological treatment of the water before and after carbon treatment of pesticides and to assess the effects of aeration on ammonia and nitrate concentrations.

3.3.3 Ammonia Stripping Tests

Additional ammonia stripping tests will be conducted on the existing plant effluent to supplement tests already conducted. This is necessary to provide data for ammonia stripping without the loading of algae that was contained in the samples provided for testing in 2021, as well as at pH levels at approximately 12. This testing will include at least two (2) test runs at pH 11 and 12 through at least eight (8) hours to determine the best conditions for ammonia stripping. The same procedure reported on previous tests will be used. Influent (current plant effluent) and effluent to the stripper test will be analyzed for ammonia.

4.0 FIELD TEAM PERSONEL AND SAFETY

Samples will be collected by NewFields personnel supported by the existing site contractor in the field. NewFields will be responsible for the overall implementation of sampling and treatability program. NewFields' field staff will be responsible for overseeing daily field activities and Site personnel during the work.

NewFields' and site contractors' staff will adhere to the requirements of their respective health and safety plans during the conductance of the work under this plan.

5.0 ANALYTICAL TESTING

5.1 TESTING PARAMETERS

For treatability and other analysis, testing will be for the following:

- Pesticides,
- Total Suspended Solids (TSS),
- BOD,
- Ethanol,
- Ammonia,
- Nitrate (as Nitrogen), and
- pH.

Pesticide analysis will be performed at Pacific Agricultural Laboratory in Sherwood, Oregon. Pesticides analysis will be conducted using modifications to EPA Method 8321B, Solvent Extractable Non-Volatile Compounds by LC/MS and EPA method 8270D, Semi-Volatile Organic Compounds by GC/MS.

BOD, TSS, ammonia, and nitrate (as nitrogen) analyses will be performed at Alpha Analytical in Mansfield, Massachusetts according to standard methods SM5210B, SM2540D and SM4500. Ethanol analysis will also be performed at Alpha Analytical using a modification to EPA Method 8015D by GC/FID. Analytical data will be generated to comply with the data quality objectives outlined in the AltEn Analytical Quality Assurance Plan.

5.2 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

As the data collected under this plan is to be used for engineering and preparation of a competitive request for proposal for improvements to the current WTP, and not for site delineation or assessment, the collection of typical QA/QC samples is not necessary. However, as a verification measure and to assess the analytical variability of the influent, duplicate samples will be collected and analyzed for the influent to the existing treatment system and the influent treatability samples. Other duplicate samples, equipment blanks, trip blanks, and matrix spike/matrix spike duplicates will not be collected.

6.0 SAMPLE HANDLING

6.1 PRELIMINARY ACTIVITIES

Prior to a sampling event, the following steps will be taken by personnel responsible for sampling:

- Review all sampling locations.
- Assemble and check field equipment necessary for sample collection and verify that equipment is clean and in proper working order.
- Note and replace items that are in short supply or that are showing indications of wear; maintain an adequate supply of spare parts for all sampling equipment.
- Calibrate equipment to manufacturer's specifications.
- Examine sample bottles and contact laboratory immediately if any problems are found.
- Confirm sample delivery time and method of sample shipment with the laboratory.
- Establish a sampling team consisting of a sufficient number of properly trained personnel to perform the planned sampling event efficiently and without undue haste.
- Establish a sampling schedule for the activities of the day.

The laboratory will be fully responsible for preparing the sample containers so that they comply with the applicable container preparation methods and quality assurance procedures.

6.1.1 Sampling Methodology

The chain of custody form is provided as Attachment 1. All samples will be grab samples using existing sampling ports.

6.1.2 Sample Designation

Each sample collected during the project will be assigned a unique designation code number. The first nine (9) alphanumeric characters are of fixed length.

The first part of the sample designation consists of three (3) letters that will designate the Site and the activity being performed. The following letters will be used:

AED = AltEn Design
AET = AltEn Treatability

The sample designations will be sed in field logbooks, chain-of-custody forms, and laboratory results and reports generated as part of the RD. Each sample will be labeled using waterproof ink immediately after it is collected. Labels will be filled out at the time of collection. Sample identifications will be entered into the sample logbooks as described below in this section.

6.1.3 Sample Containers, Preservation, and Holding Times

Sample containers, preservation, and holding times for each of the laboratory analyses to be performed are presented in Attachment 1 and summarized below on Table 4.

Table 4 – Sample Containers, Preservation, and Holding Times

Analysis	Sample Volume Required	Container Type	Preservative	Holding Time
Water Samples				
BOD Analysis	1 L	1 L plastic	0-6° C	48 Hours
BOD Treatability	1 L	1 L plastic	0-6° C	48 Hours
TSS Analysis	1 L	1 L plastic	0-6° C	7 Days
TSS Treatability	1 L	1 L plastic	0-6° C	7 Days
Ammonia Analysis	250 mL	250 mL plastic	0-6° C , H_2S0_4	28 Days
Ammonia Treatability	250 mL	250 mL plastic	0-6° C , H_2S0_4	28 Days
Nitrate Analysis	250 mL	250 Plastic	0-6° C	48 Hours
Nitrate Treatability	250 mL	250 Plastic	0-6° C	48 Hours
Pesticides Analysis	1 L	1 L Amber Round	0-6° C	7 Days
Pesticides Treatability	1 L	1 L Amber Round	0-6° C	7 Days
Ethanol Analysis	3x40 mil	VOA	0-6° C	7 Days
Ethanol Treatability	3x40 mil	VOA	0-6° C	7 Days

The laboratory will provide the necessary sample containers to meet the sampling requirements as prescribed in the QAP. Sample containers will be pre-cleaned and contaminant free. The laboratory will verify the cleanliness of the containers prior to container use. The laboratory will add necessary preservation solutions to the sample containers prior to shipment.

6.1.4 Sample Packaging

Samples will be packaged and shipped in accordance with procedures in USEPA's SOPQAM (November 2001). The analytical and/or treatability laboratory will be contacted the day of each sample shipment and provided with the following information:

- Sample shipping date.
- Sample types.
- Number of samples.

A confirmation call by the laboratory will be made to acknowledge receipt of samples by the laboratory.

6.1.5 Chain-of-Custody.

To document sample possession from the time of collection until the laboratory's sample custodian receives the sample, a chain-of-custody record will be completed by field personnel and will accompany every sample shipment. While in the field, the care and custody of the samples are the field sampler's personal responsibility until they are transferred or properly dispatched. These chain-of-custody procedures will be followed during the sample collection activities. Attachment 1 contains an example chain-of-custody form.

To provide proper identification in the field and proper tracking in the laboratory, samples will be labeled in a clear and consistent fashion. Sample labels will be waterproof and have a pre-assigned unique number. Field personnel will maintain a permanently bound field notebook. This notebook must be water resistant with sequentially numbered pages. Field activities will be recorded with a waterproof permanent marker. The notebook, along with the chain-of-custody record must contain sufficient information to allow reconstruction of the sample collection and handling procedures later.

Each sample will have a corresponding notebook entry, which includes the following:

- A unique sample ID name or number.
- Date and time of collection.
- Sample type (composite or grab).
- Analyses for which sample was collected.
- Method of preservation.
- Sampler's name.
- Additional comments as necessary.

Each sample will have a corresponding entry on a Chain-of-Custody Form (Attachment 1). The form will include the following:

- Site name.
- The unique sample ID name or number.
- Sample type.
- Date and time of collection.
- Number of containers.
- Parameters for which analyses are requested.
- Signature of sampler(s).
- Signature of sampler(s).
- Signature of persons involved in the chain-of-custody and inclusive dates and times of possession.
- Condition of samples upon arrival at the laboratory.

The chain-of-custody record for a given sample will be completed by the sampling team collecting the sample before sampling is initiated. In cases where samples leave the immediate control of the sampling team (e.g., shipment via a common carrier), the shipping container will be sealed with custody tape.

6.2 FIELD DOCUMENTATION

6.2.1 Field Logbook

Information pertinent to the pilot test will be recorded in field logbook(s). These will be bound books, with consecutively numbered pages. Each page will be dated and signed by the person recording information. Blank spaces in the books will be crossed through. Words, sketches, or phrases that are recorded but deemed incorrect will be marked through in such a way as to still be legible, yet obviously struck from the text. Mark-throughs will be initialed and dated by the person striking the item.

Each person heading a sampling team or performing a distinct task will be issued a field logbook by the Task Manager. That person will be responsible for maintaining the logbook. At the conclusion of the various phases of the Site characterization activities, the field logbooks will be collected and reviewed by the Task Manager.

6.2.2 Field Sampling

The sampling team will record the following information at each sampling location, as appropriate:

- Day/Date/Time/Weather conditions;

- Approximate air temperature;
- Sampling team members;
- Type of sampling equipment used;
- Physical properties of the sample including color, odor, PID readings and presence of debris. These properties may be indicated on a drilling log in lieu of the field book, if appropriate;
- Types of sample jars and preservative used; and
- Decontamination and cleaning procedures for equipment used at more than one (1) location.

6.2.3 Decontamination Procedures

Specific decontamination procedures for field equipment are presented in Attachment 1.

6.3 Investigation Derived Waste (IDW)

IDW is not expected to be generated during the conductance of work under this plan. Remaining samples will be returned to the lagoons.

7.0 ANALYTICAL SUMMARY

Table 5 provides a summary of the analytical to be performed. Table 6 provides a summary of the treatability tests to be performed.

Table 5 – Analytical Summary (Estimate)

	A	B	C	D	E	F	BOD Treatability	Ammonia Treatability	QC	TOTAL
BOD	6	0	0	6	6	6	12	0	7	**43**
TSS	6	6	6	6	6	6	0	0	7	**43**
Ammonia	6	0	0	0	6	6	12	6	7	**43**
Pesticides	6	0	0	6	6	24	0	0	8	**50**
pH	6	0	0	0	6	6	12	6	7	**43**
Ethanol	6	0	0	0	6	6	12	0	6	**36**
Nitrates	6	0	0	0	6	6	12	0	6	**36**

Assume 20% for QC and other additional samples

Table 6 – Treatability Summary (Estimate)

	Number
Treatability Test	
BOD Treatability	**6**
Ammonia Treatability	**3**
Jar Tests	**20**

Attachment 1 - COC

NewFields

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME/LOCATION	SAMPLERS (SIGN)
PROJECT LEADER	REMARKS/AIR BILL	

LAB USE ONLY	STATION ID	SAMPLE ID	MEDIA	DATE	TIME	COMP OR GRAB	REMARKS	NO. OF CONTAINERS	VOCs	SVOCs	CHL. PEST.	VERNOLATE	METALS	OTHER (SPECIFY)	COMMENTS

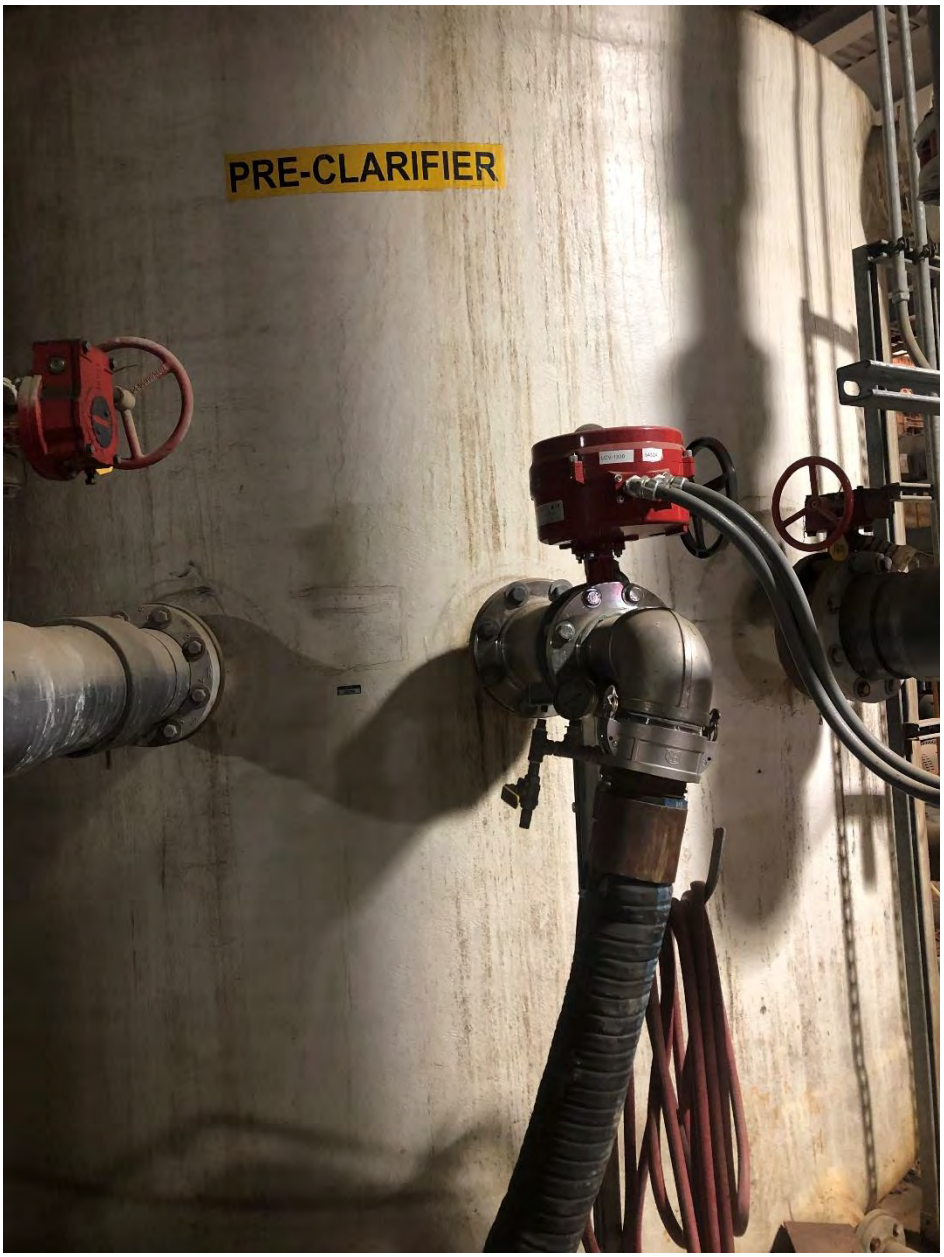
RELINQUISHED BY: (PRINT) DATE:	RECEIVED BY: (PRINT) DATE:	RELINQUISHED BY: (PRINT) DATE:	RECEIVED BY: (PRINT) DATE:
(SIGN) TIME:	(SIGN) TIME:	(SIGN) TIME:	(SIGN) TIME:

DISTRIBUTION: White and Pink copies accompany sample shipment to laboratory. Pink copy retained by laboratory.
White copy returned to samplers; Yellow copy retained by samplers

Attachment 2 – Plant Sampling Locations

ALTEN WASTEWATER TREATMENT PLANT SAMPLING LOCATIONS

A - INFLUENT: The lagoon transfer pumps transfer water from the South Lagoon (or others as necessary as the pumps are relatively equidistant from the three cells). This influent water runs to the NR Building and the level control valve for the preclarified filtration tank. Prior to the level control valve there are two sample taps. One is direct and the other has a hose where an influent sample can be collected.



B and C - CLARIFIER EFFLUENT: The preclarified filtrate tank pumps send the influent with coagulant to a pipeline where polymer blend skid injects a cationic polymer. There is a flow control valve that sets the flow to the clarifier. The Claricone Clarifier overflows through a radial trough and the clarified water passes to the Parkson Sand filter. There is a sample point prior to the continuous backwash sand filter. The overflow from the sand filter goes to the tank tagged Filtered Effluent. There is a variable speed drive pump that holds a level and boosts through the Sand Filter #1, then Carbon filter #1. At this pump there is a sample connection where a clarified water sample can be collected.

D - SAND FILTER 1 EFFLUENT (PRE-CARBON SAMPLE): At the base of the sand filter there is a sample port for collection of a sample prior to initial carbon treatment.

E - CARBON FILTER 1 AND/OR 2 EFFLUENT: There are similar sample ports at the exit of both carbon filters. There is a pipeline that leads to the shower water tank. That tank provides a buffer and suction to a variable speed pump that sends the midstream flow to the large tent and second stage treatment (the CH system). At the discharge of the pump there is a sample port where we can acquire a sample that representative of the water leaving the AltEn system.

F - CARBON FILTER #6 EFFLUENT: This is the final 20K carbon tank for the CH system, there are four sample ports at varying heights in the carbon bed. Each of the 4-20K filters (CF3-CF6) have these sample ports. Sampling can be conducted at any of these ports. The final lowest port would be the final effluent from the system before metering and transfer to the treated water ponds.