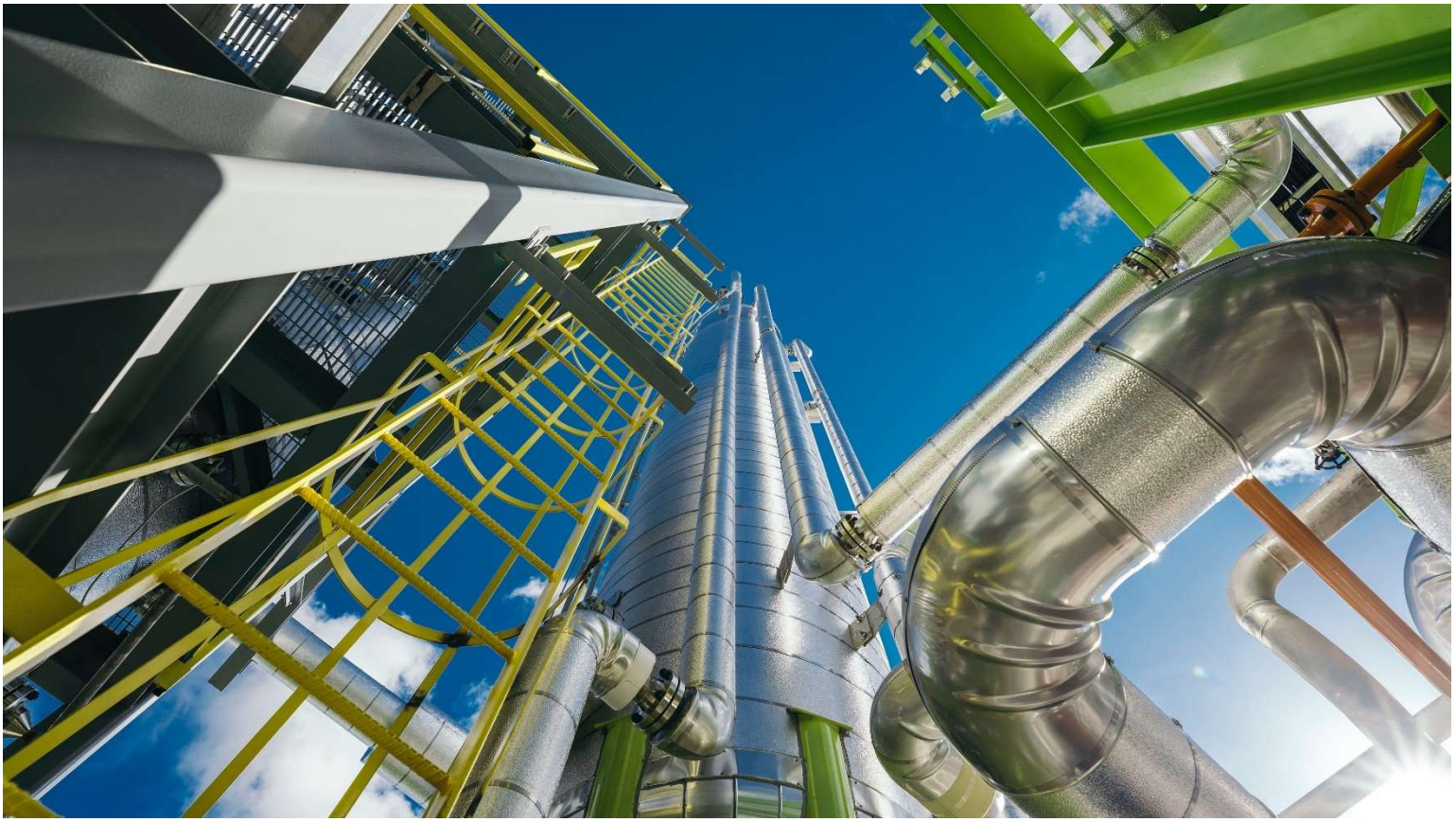

Environmental Assessment

Solugen, Inc. – Bioforge™ Marshall Project,
Marshall, Minnesota

Environmental Assessment and
Finding of No Significant Impact

Department of Energy, Loan Programs Office

DOE/EA-2246

March 2024

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Acronyms and Abbreviations

ADM	Archer Daniels Midland
APE	area of potential effect
BMPs	best management practices
BNSF	Burlington Northern Santa Fe
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO_2	carbon dioxide
DOE	U.S. Department of Energy
EA	Environmental Assessment
EHS	environment, health, and safety
EIS	environmental impact statement
EJ	environmental justice
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 2005
FONSI	Finding of No Significant Impact
FTE	full-time equivalent
GHG	greenhouse gas
HAPs	hazardous air pollutants
HFCs	hydrofluorocarbons
HSE	health, safety, environment
HUC	Hydrologic Unit Code
IPaC	Information, Planning, and Consultation
IPCC	Intergovernmental Panel on Climate Change
kg	kilograms
kta	kilotonnes per annum
LPO	Loan Programs Office
MDNR	Minnesota Department of Natural Resources
MMU	Marshall Municipal Utilities
MNDOT	Minnesota Department of Transportation
MOC	management of change
MPCA	Minnesota Pollution Control Agency
MVR	mechanical vapor recompression
MWCO	molecular weight cut off
NAAQS	National Ambient Air Quality Standards
NATA	National-Scale Air Toxics Assessment
NEPA	National Environmental Policy Act
NETL	National Energy Technology Laboratory
NO_X	nitrogen oxides
PFCs	perfluorocarbons
PM10	particulate matter with diameters 10 microns and smaller
PM2.5	particulate matter with diameters 2.5 microns and smaller
POTW	Publicly Owned Treatment Works
Project	Bioforge™ Marshall Project

PTE	potential to emit
RCA	root-cause analysis
SF_6	sulphur hexafluoride
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
Solugen or the Applicant	Solugen, Inc.
SWPPP	Stormwater Pollution Prevention Plan
THPO	Tribal Historic Preservation Office
tpy	tonnes per year
U.S.	United States
USFWS	U.S. Fish and Wildlife Service
VOCs	volatile organic compounds

1. PURPOSE AND NEED

1.1 Introduction

Title XVII of the Energy Policy Act of 2005 (EPAct) established a federal guarantee program for certain projects that employ innovative technologies. EPAct authorizes the Secretary of Energy to make loan guarantees available for those projects. Specifically, Title XVII identifies the projects as those that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases (GHGs) and employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued."

Solugen, Inc. (Solugen or the Applicant), has applied for a loan guarantee pursuant to the U.S. Department of Energy (DOE) Title XVII Clean Energy Financing Program, as authorized by the EPAct, as amended. The primary goal of the Clean Energy Financing Program is to finance projects and facilities in the United States (U.S.) that employ innovative and renewable or efficient energy technologies that avoid, reduce, or sequester anthropogenic emissions of GHGs.

1.2 Purpose and Need for Agency Action

The purpose and need for agency action is to comply with DOE's mandate under the EPAct by selecting eligible projects that meet the goals of the act. The DOE Loan Programs Office (LPO) has determined that the Bioforge™ Marshall Project (Project), as proposed by Solugen, is eligible pursuant to Section 1703 of the EPAct and that it complies with DOE's mandate, as defined in the act. DOE is using the National Environmental Policy Act (NEPA) process to assist in determining whether to issue a loan guarantee to the Applicant in support of the Project.

The Applicant is proposing to construct and operate a bio-feedstock-based facility (called a Bioforge™) for the production of chemicals (gluconic acid) using a unique chemienzymatic process. The proposed Solugen Bioforge™ in Marshall, Lyon County, Minnesota (Bioforge™ Marshall), would use a dextrose sugar feedstock to manufacture bio-based organic acids (gluconic acids) for use in food, beverages, and pharmaceuticals as well as the building and construction industry. The production of gluconic acid at Solugen's proposed Bioforge™ Marshall facility would avoid the emission of approximately 5,424,341 to 17,876,018 kilograms (kg) of carbon dioxide (CO_2) (~5.4K to 17.8K tonnes of CO_2) per year compared to the base case of petrochemically and fermentation-produced iron ion chelation agents, thereby reducing overall national emissions of air pollutants and human-caused GHGs.

1.3 Scope of Environmental Assessment

This Environmental Assessment (EA) presents information on the potential impacts associated with DOE guaranteeing a loan to the Applicant and covers the construction and operation of the completed Project. DOE has prepared this EA to comply with the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500−1508) and DOE NEPA Implementing Regulations (10 CFR Part 1021). If no significant impacts are identified during preparation of this EA, DOE will issue a Finding of No Significant Impact (FONSI). If potentially significant impacts are identified, DOE will prepare an Environmental Impact Statement (EIS).

The Bioforge™ Marshall Facility would be developed on 34.48-acre parcel of land in Marshall, Minnesota. The Project would require construction permits from the City of Marshall and air quality and stormwater discharge permits from the Minnesota Pollution Control Agency (MPCA). Appendix B provides a list of permits and approvals required for the Project. The Project would be constructed in four phases, as described in Table 1-1; the phases are ordered chronologically by construction time. All four phases of the Project would be funded or partially funded through LPO loan activities.

Table 1-1. Project Construction Phases

Phase	Description	Project Features
Phase 1	Initial base plant, with production capacity of 25 kta of product	Enzyme reaction section, oxidation reaction section, product concentration, utilities, control room, electrical infrastructure, product tankage and truck loadout, raw material supply
Phase 4	Solids production, with capacity of 16 kta of product	Crystallizer section, additional utilities, railcar loading area, maintenance shop, office space, and additional parking and laydown yard
Phase 2	Additional 25 kta of production (for a total capacity of 50kta)	Second-unit enzyme reaction section, oxidation reaction section, product concentration, additional utilities
Phase 3	Additional 25 kta of production (for a total capacity of 75kta)	Third-unit enzyme reaction section, oxidation reaction section, product concentration, additional utilities

kta = kilotonnes per annum

Based on LPO's review of the scope of the Proposed Action, potential impacts on multiple resource areas due to construction and operation of Bioforge™ Marshall, existing site conditions, and the permit status, the scope of issues analyzed in the EA includes:

- Cultural resources, including Native American interests
- Water resources, including wetlands, groundwater, and surface water
- Air quality
- Noise
- Transportation
- Biological resources, including threatened and endangered species
- Socioeconomics and environmental justice
- Health and safety
- Waste management
- Cumulative impacts

These resource areas were identified as potentially being affected by the Project, and each was assessed to determine the nature, extent, and significance of those impacts (see Section 3). The assessment combined desktop research and analysis of existing available information with select field studies, including site assessments related to the presence/absence of wetlands, water bodies, cultural resources, threatened and endangered species' habitat, and raptor nests.

Resources not included in this EA are land use, recreation, aesthetic and visual resources, soils and prime farmland, and terrestrial vegetation. Because of the Project's location on a property with industrial zoning that has been previously disturbed, impacts on these resources are not anticipated. The terrestrial vegetation on the site has been previously disturbed from development of a sewage disposal pond; the area is now used as a hayfield. Therefore, removal of the existing hayland would not affect native terrestrial vegetation. In addition, the surrounding land use is zoned primarily for industrial uses, with no adjacent commercial or residential property. The Project would conform with the designated land use for this property and would not affect the aesthetic or visual resources within the surrounding areas. In addition, recreational and farming uses are not intended uses for a parcel with industrial zoning. Therefore, these resource topics are not included in the scope of this EA.

DOE LPO representatives visited the site on November 7, 2023, and performed a detailed walkthrough of the site, including areas planned for construction, other site elements, utilities, and a utility corridor. Representatives also visited the Archer Daniels Midland (ADM) facility and the site for a planned pipeline connection to the Solugen site. DOE LPO representatives confirmed the potential impacts discussed in this EA during the site visit.

2. DESCRIPTION OF THE PROPOSED ACTION

Project activities in Marshall will involve constructing a new manufacturing plant and associated infrastructure. The new plant will consist of a processing facility located within the 34.48-acre area identified in Figure 1. The entire 34.48-acre Project site was previously disturbed and used for a sewage disposal pond or agricultural land over various periods of time. Most recently, the Project site was planted with alfalfa, which was harvested for hay. The processing facility will be broken up into process areas, consisting of an enzyme reaction section, oxidation reaction section, product concentration section, and a crystallizer section, as described in Section 2.2.2, along with a utility section. Attendant structures will include parking areas, access roads, a stormwater retention pond, railcar loading area, maintenance shop, office space, additional parking, and a laydown yard (Figure 2). Construction of the Project will disturb up to 34.48 acres, including the following:

- A 3.7-acre area for new processing facility components (i.e., enzyme reaction section, oxidation reaction section, crystallizer section, product concentration section, a tankage farm)
- A 1.1-acre stormwater retention pond
- 1.5 acres for new asphalt roads
- A 0.9-acre parking lot
- A 1.1-acre railcar loading are
- A 0.1-acre area for a maintenance shop with office space
- A 0.1-acre area for offices and an operations building
- A 2.3-acre utility corridor

The remaining 26.28 acres on the Project site will be used for soil stockpiling areas, laydown areas, and temporary parking areas, along with an area for siting a construction operations center.

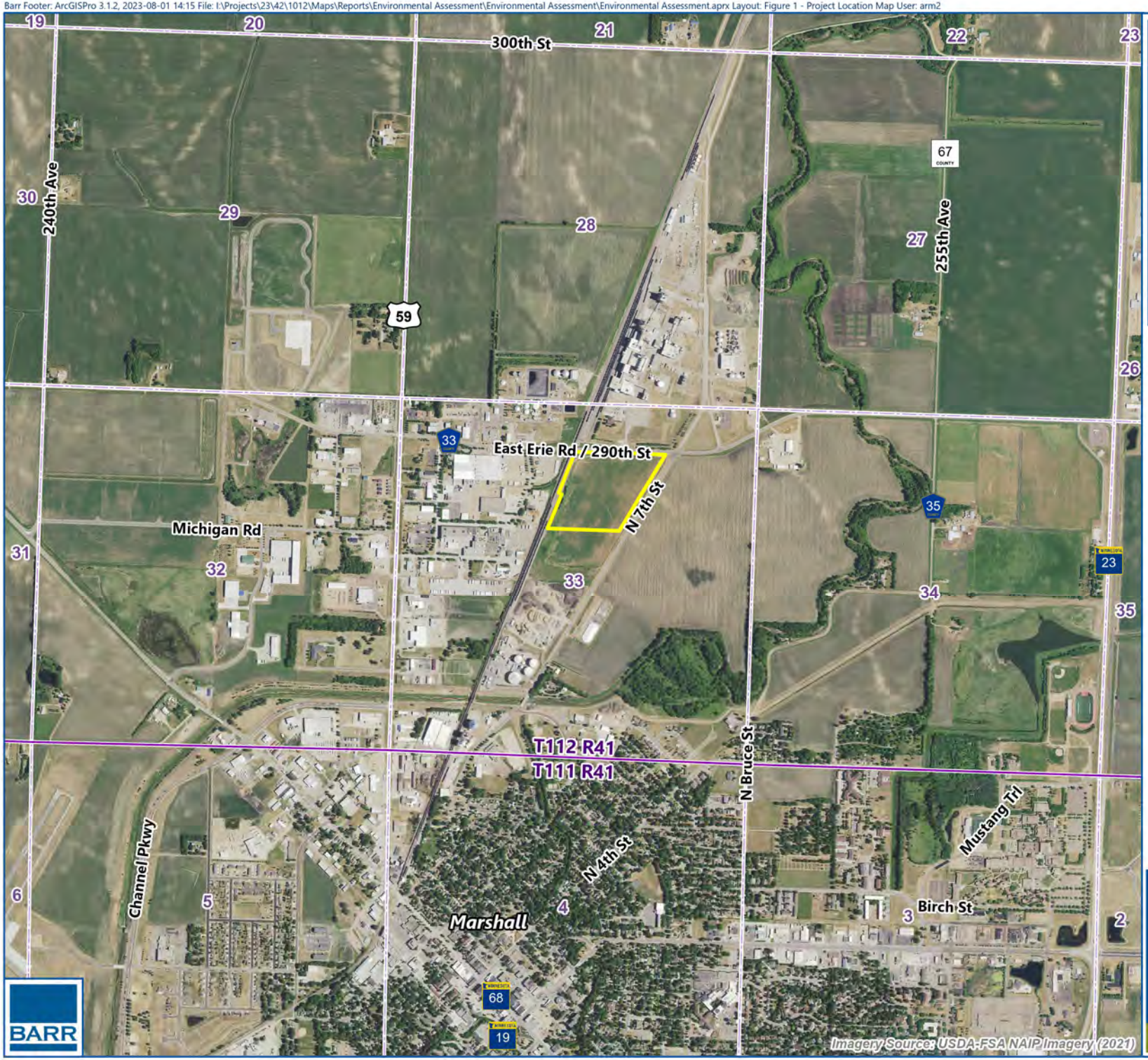
Upon completion of the construction activities, Project elements will occupy 8.2 acres, including approximately 3.7 acres for the proposed processing facility and associated structures; 1.1 acres for the railcar loading area; 2.4 acres for roads, sidewalks, and parking; and 1.1 acres for stormwater retention basins. The 26.28 acres that will be temporarily affected because of general construction activities will be graded, landscaped, revegetated, and maintained throughout facility operations. The facility is planned to operate for at least 30 years.

2.1 Construction

The Project will be constructed in phases, as described below. Initial site preparation (i.e., clearing, grading, foundation work) will accommodate subsequent construction phases of the Project (i.e., Phases 2, 3, 4); therefore, the installation of additional production trains will not require additional site preparation activities. The following section discusses the construction schedule, including the schedule for construction of processing facility elements, attendant structures, utility infrastructure, and the dextrose pipeline.

2.1.1 Project Schedule

Table 2-1 provides an overview of the anticipated construction schedule, from delivery of the facility equipment to commissioning. Additional phases will be constructed as described in Section 1.3.



Project Boundary

Public Land Survey Section

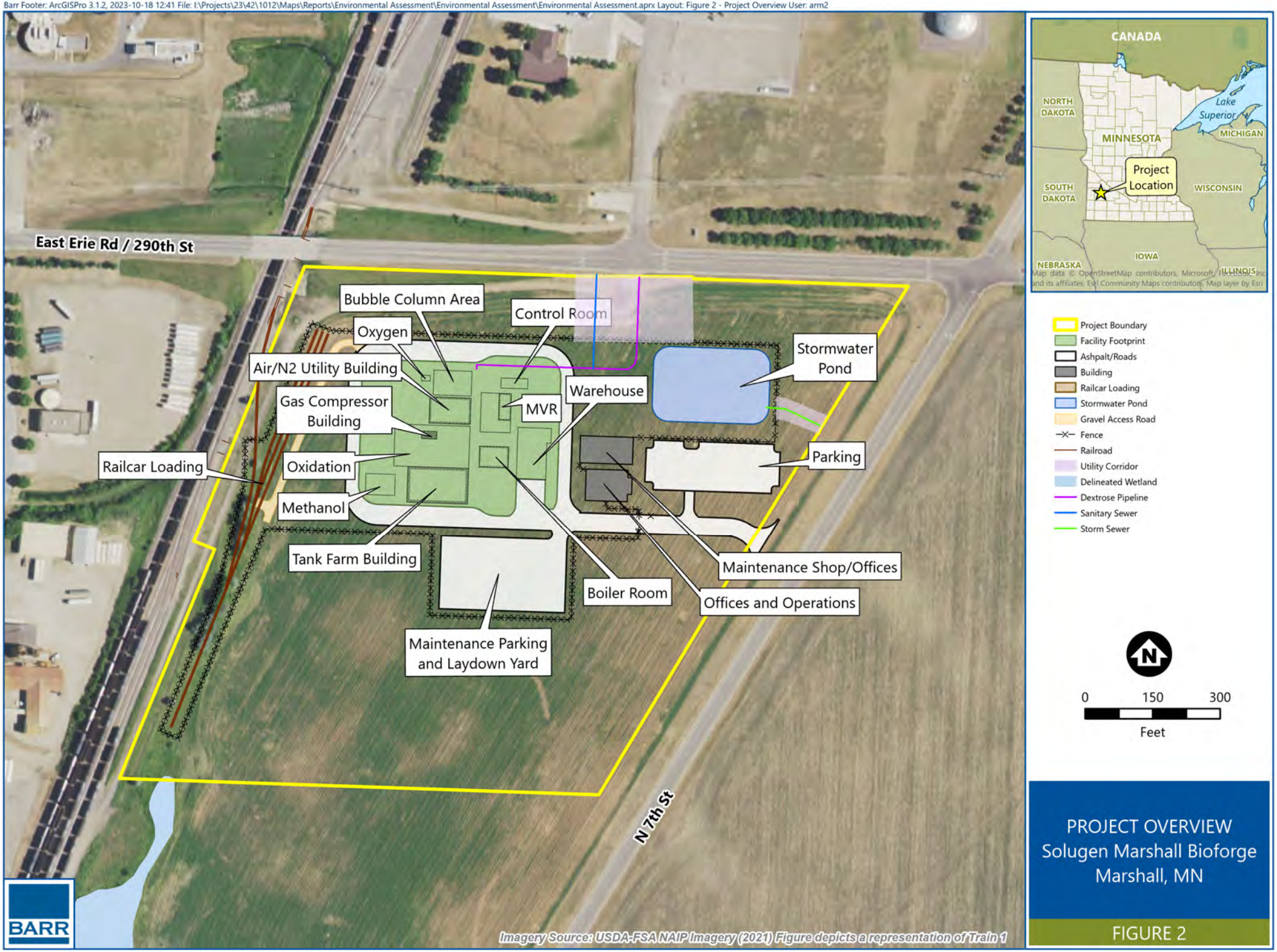
Public Land Survey Township

0 1,000 2,000

Feet

PROJECT LOCATION
Solugen Marshall Bioforge
Marshall, MN

FIGURE 1



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PROJECT OVERVIEW
Solugen Marshall Bioforge
Marshall, MN

FIGURE 2

Table 2-1. Project Schedule

Phase	Activity	Construction Employment[a]	Anticipated Start Date	Anticipated End Date
Phase 1	Permits	200	Q4 2023	Q2 2024 (Appendix B)
	Delivery of equipment		Q3 2023	Q4 2024
	Site preparation		Q2 2024	Q2 2024
	Field construction		Q2 2024	Q3 2025
	Mechanical equipment installation		Q3 2024	Q3 2025
	Commissioning		Q1 2025	Q4 2025
Phase 4	Solids production, with capacity equal to the entire 25 kta of product	50	Q2 2025	Q2 2027
Phase 2	Additional 25 kta of production (for a total capacity of 50 kta)	200	Q2 2025	Q2 2027
Phase 3	Additional 25 kta of production (for a total capacity of 75 kta).	200	Q4 2026	Q4 2028

a. Estimated peak construction employment during each phase. Employment will vary, depending on construction activities.

2.1.2 Processing Facility

Project construction will occur through the following successive phases:

- Installation of sedimentation and erosion control measures
- Rough grading and clearing
- Building pad preparation and construction, including major equipment foundations, a dextrose pipeline, and utility installations
- Final grading
- Site stabilization and landscaping
- Equipment installation, including modular skids
- Testing and validation

Temporary erosion and sediment control devices will be installed after clearing but prior to grubbing and grading. General site clearing and grading will occur within the 34.48-acre limits of disturbance. Clearing may be accomplished with mowers, chainsaws, and/or hydraulic tree-cutting equipment. Once the vegetation has been cleared from the construction limits, the site will be graded to the desired contour. Grading will be completed with bulldozers and/or excavators. Following vegetation clearing and site grading, the contractor will install the foundations for processing facility components and other proposed permanent features. Following slab/foundation construction, the skeletal steel structure of each building will be assembled.

The final phase of construction will include installation of the equipment needed to support the manufacturing process, including, but not limited to, vessels, heat exchangers, pumps, and compressors. After completion, areas not associated with subsequent construction phases will be landscaped, with consideration for aesthetic views from surrounding land uses and facilities. Landscaping will include managed turf grass, which will surround the facility.

2.1.3 Attendant Structures

The proposed parking lot will be located outside of the facility fence line east of the proposed processing facility. The parking lot will have an asphalt surface and 110 parking spaces. The proposed stormwater retention basin will be constructed north of the parking lot. The basin will cover approximately 1.1 acres, which will accommodate stormwater runoff from the additional impervious surface created as part of the Project. The stormwater pond will have graded side slopes and an outfall control structure on the southeast corner of the pond. The outlet will connect to the City of Marshall's 24-inch storm sewer pipe along North 7th Street. Solugen will obtain a stormwater connection permit from the City of Marshall prior to construction (Appendix B).

The maintenance shop, office space, railcar loading area, parking lot, and laydown yard will be constructed in subsequent phases, as discussed in Section 0. The locations for these facilities will be graded during construction of the processing facility and stabilized with a native seed mix. Construction of the additional office space, maintenance shop, additional parking, and laydown area is anticipated to start in 2025.

The railcar loading and unloading area will tie into an ADM-owned rail spur from the Burlington Northern Santa Fe (BNSF) railway on the west side of the Project site. The railcar loading area will include three additional spur tracks and be capable of storing 18 railcars. The loading area will be accessed from a 15-foot-wide gravel access road that will extend from the northwest corner of the processing facility.

2.1.4 Utility Installation

The 300-foot-long Project utility corridor will be approximately 100 feet wide and include a 10-inch water line and a 6-inch sanitary sewer pipeline (as well as the dextrose pipeline discussed in Section 2.1.5, below). The water line and sanitary sewer pipeline will run from the north end of the processing facility to the existing lift station located north of East Erie Road (Figure 2). The water line and sanitary sewer pipeline will be installed by boring under East Erie Road to avoid a disturbance on the roadway and traffic disruptions. It is estimated that the facility, once fully operational, will use 30 gallons per minute (gpm) of water, drawing from Marshall Municipal Utilities (MMU) during normal operation.

The natural gas, electricity, and data-fiber utility lines will be installed by the local utility companies in the northeast corner of the Solugen property. The natural gas, electricity, and data-fiber tie in is on Solugen property approximately 300 feet northeast of the facility (Figure 2). The proposed facility will also tie into the existing MMU electric grid on the northeast corner of the Project site. Natural gas will be provided by either Great Plains Natural Gas Company or Northern Plains Natural Gas Company. The entirety of the utility corridor will extend north of the processing facility to a point where it will cross the public road right of way and connect to ADM-owned property.

2.1.5 Dextrose Pipeline

The Project includes the installation of two dextrose pipelines, one incoming pipeline and one returning pipeline. These will be constructed between the ADM facility and the proposed processing facility. The pipelines will be constructed within the utility corridor and connect to the north end of the processing facility. The incoming dextrose pipeline will be a 6-inch-diameter pipeline installed through an open trench and bored under East Erie Road. The return dextrose pipeline will be a 3-inch diameter pipeline that will

parallel the incoming line. This return line will allow Solugen to send dextrose back to ADM for storage. Prior to installation of the pipeline the topsoil within the pipeline right of way would be stripped and stockpiled adjacent to the open trench. Topsoil will be stripped to a minimum depth of 12 inches. After the topsoil has been removed, the pipeline trench will be excavated using a backhoe or a rotary wheel ditching machine. The excavated material will be stockpiled within the approved construction right of way separate from the topsoil. Once the pipeline has been set in place, the excavated area will be backfilled, the subsoil will be replaced, and the topsoil will be spread uniformly over the area from which it was removed. The disturbed area will be reseeded using an approved native seed mix.

2.2 Operation

Operation of the Bioforge™ Marshall facility will involve raw material receiving; chemical manufacturing processes, requiring use of a series of oxidation vessels, evaporators, and separation columns; and other processes, with ancillary equipment such as a steam generating boiler and cooling tower. Final product storage and shipping areas will support facility operations.

The sections that follow discuss operations at the fully completed Bioforge™ Marshall facility.

2.2.1 Raw Material Receiving

Dextrose will be the primary feedstock for the Bioforge™ Marshall facility. The dextrose will be sourced from the ADM plant located north of the proposed facility. A pipeline will be installed from the adjacent ADM plant to transport dextrose sugar feedstock directly to the Project site. At full production, the Solugen facility will use approximately 141 million pounds of dextrose annually.

Incoming raw materials (e.g., sodium hydroxide) will require fewer than 10 truck trips per week. Miscellaneous processing chemicals and catalysts will be shipped to the facility in drums and totes by truck. With miscellaneous shipments occurring fewer than five times per week, the total number of truck trips per week is estimated to be 15.

2.2.2 Manufacturing Process Summary

The Bioforge™ Marshall facility will include three modular trains, or production lines. Each train will be capable of manufacturing any of Solugen's different gluconic acids (e.g., GO50, LG60, SG100) and glucaric acid products in varying capacities. Appendix C includes a process flow diagram for GO50, LG60 and SG100. The processing facility will be broken up into four primary areas, including an enzyme reaction section, an oxidation section, a crystallizer section, and a product concentration section, as described below.

2.2.2.1 Enzyme Reaction Section

The enzyme reaction section will include a bubble column system that will produce sodium gluconate from dextrose feedstock. The bubble column section will include the feed systems for the bubble column (enzyme, antifoam, phosphoric acid, trace metals); the column system; the recirculation loop, including coolers; and the molecular weight cut-off (MWCO) system. The enzyme reaction section will produce sodium gluconate with an approximately 25 percent concentration. This is concentrated in the evaporation section to a 60-weight percent solution (LG60).

Based on market demands, dextrose can also be reacted in the enzyme reactor section with air and a combination of enzymes to make an intermediate product, glucodialdose, which can be further reacted in the oxidation reactor section to produce glucaric acid at about a 25-weight percent concentration. This is concentrated in the evaporator section to a 50-weight percent solution (GA50).

2.2.2.2 Oxidation Section

The oxidation section will include an oxidation feed system, two oxidation reactors, gas sampling systems, product separators, and a vent scrubber. This section is designed to take dextrose feedstock and allow it to react with air over a supported metal catalyst to produce gluconic acid at an approximately 25 percent concentration. This is a high-efficiency conversion process and concentrated in the evaporation section to a 50-weight percent solution (GO50). It can also take partially processed products from the bubble column area and produce glucaric acid solution.

2.2.2.3 Crystallizer Section

The crystallizer section will solidify sodium gluconate to a powder form. This section includes a crystallizer, dryer, centrifuge, and bagging system. The crystallizer unit comprises four main pieces of equipment that are designed to transform LG60 into crystals and produce a dry product. The final piece of equipment, known as the supersack filler, will gather the dry product and accurately measures it to a predetermined weight through its integrated load cell. The produced LG60 will be crystalized to produce a solid sodium gluconate product (SG100), which will be shipped out in bulk super sacks.

2.2.2.4 Production Concentration Section

The production concentration section will include a mechanical vapor recompression (MVR) system to concentrate the product from the bubble column or oxidation sections with water from evaporation. The feed of sodium gluconate, gluconic acid, or glucaric acid will be concentrated to final specification. The MVR section will include two trains, each with a feed stripper, a vendor recompression package, and a sump. In the production concentration section, Solugen will use hydrogen peroxide and ozone to decolorize the products after production. This decolorization process will not produce any waste or byproduct.

After the products have been concentrated to their final specifications, some of the products will be decolorized again through a carbon filtration system. This second decolorization process would be completed for only specific customers, depending on their needs. A Bioforge™ production campaign will focus on generating one of these materials at a time. For certain products, production tanks and transfer pumps will be used to blend products at different grades.

The tankage section will include three 20,000-gallon tanks for holding a 50 percent hydroxide solution and eighteen 20,000-gallon tanks to store final products.

2.2.2.5 Methanol

During the cold months, methanol would be added to the final products prior to shipment for winterization purposes. This blending will be done as the product trucks are loaded for the customers, based on the individual customer's requirements and time of the year. The methanol will be procured as needed and handled in shipping containers, which are expected to be frac tanks. These frac tanks will be marshalled in a contained paved area near the truck loading station but outside of the main processing area. The inventory of frac tanks will be minimized, based on product handling, and strictly seasonal. Methanol will be added to the loaded trucks prior to leaving the site.

2.2.3 Staffing and Operational Timeframe

It is anticipated that a construction work force of approximately 110 full-time-equivalent (FTE) employees will be required throughout Train 1, 2 and 3, with 30 FTE needed for the crystallizer. Up to 200 construction workers will be on-site during peak construction activities. This includes, but is not

limited to, electricians, engineers, and general contractors. Once construction is complete, Bioforge™ Marshall will operate 24 hours a day, with two shifts per day, 7 days a week. Upon initial operation, the total staff will be made up of approximately 38 employees, with another nine employees for each additional train brought online. At full operating capacity, the Bioforge™ Marshall facility will employ approximately 56 full-time employees.

2.2.4 Production Levels and Shipping

At full operating capacity, the Bioforge™ Marshall facility will produce 75 kilotonnes per annum (kta) of product (e.g., GO50, LG60, SG100). The quantity of each product will vary, depending on market conditions.

Outgoing product will require approximately 50 weekly shipments. These will be shipped in drums and totes by truck, tanker truck, or railcar. At full capacity, the Project will generate approximately 30 railcar shipments of product per week and approximately 50 truck shipments.

2.2.5 Hazardous Materials and Waste Management

The primary hazardous material used at the Bioforge™ Marshall facility will be a sodium hydroxide solution, which is classified as corrosive. Some of the products (e.g., organic acids) will have a PH of less than 2 and therefore also be considered corrosive. Other potentially hazardous chemicals will be used for the equipment associated with the steam boiler system, cooling water system, and reverse osmosis system. See Section 3.8 for an additional discussion of the hazardous materials used on-site. All waste generated at the facility will be collected, categorized, and disposed of and/or recycled in accordance with all applicable federal, state, and local environmental regulations. Wastewater will be discharged to the City of Marshall Publicly Owned Treatment Works (POTW).

The manufacturing processes at the Bioforge™ Marshall facility will not generate solid or liquid hazardous waste. However, periodic maintenance of the manufacturing systems will generate small quantities of hazardous waste, such as lab packs and maintenance fluids. The hazardous waste will be disposed of at MPCA-approved disposal locations. Non-hazardous solid waste will be generated from routine building operations and maintenance. Please refer to Section 3.9 for a discussion of waste generation and disposal.

3. ENVIRONMENTAL CONSEQUENCES

In the following sections, a specific resource area is addressed using both qualitative and, where applicable, quantitative information to concisely describe the nature and characteristics of the resource that may be affected by the Project as well as the potential impacts on that resource from the Project, given Project controls. A conclusion regarding the significance of impacts is provided for each resource area. The impacts presented below are based on full build-out of the Bioforge™ Marshall facility.

Section 3.10 provides a review of present and reasonably foreseeable federal and nonfederal actions that may contribute to a cumulative impact when added to the impacts of the Proposed Action. The impacts of past actions were reviewed and included as part of the affected environment to establish the current condition of the resource (the baseline condition) that may be affected by the Proposed Action.

3.1 Cultural Resources

A Phase 1a cultural resources literature review was completed for the Project in September 2023. The literature review identified no previously recorded archaeological or architectural sites within the archaeological or architectural area of potential effect (APE). The archaeological APE encompasses a larger 60-acre Project parcel; the architectural APE encompasses the 60-acre Project parcel plus a 0.25-mile buffer around the parcel. The entire 34.48-acre facility is located within the APE. No other cultural resources or Native American interests have been identified in nearby areas. The literature review documented that the 60-acre parcel where Project activities would occur consisted entirely of a sewage disposal pond that was in use from the 1960s through the 1970s but subsequently filled in. As a result of this prior use and ground disturbance, there is no potential for archaeological resources to be present in the archaeological APE.

The architectural APE is located primarily in an industrial setting. Historic aerial imagery indicates that the industrial properties on the west and south sides of the APE were largely constructed sometime between 1971 and 1979, while the industrial properties on the north side of the APE were constructed after 1984. This timeline indicates that the industrial properties are between 44 and 52 years old on the south and west sides of the APE, respectively, and less than 39 years old on the north side of the APE. Given the age of the properties within the architectural APE and lack of documented historic architectural resources, no eligible historic architectural properties are located within the APE, and no effects on historic properties would occur as a result of the Project.

DOE consulted with the State Historic Preservation Office (SHPO) on November 29, 2023, and received concurrence with the conclusion of the Phase 1a cultural resources literature review that no historic properties would be affected (see Appendix A).

If cultural resources, such as human remains, lithics, pottery, or remnants of older construction, are discovered during Project activities, work would cease in the vicinity of the discovery, and the SHPO, Office of the State Archaeologist, and all tribes with vested interest in the area would be notified. A qualified archaeologist or a designated representative of the Office of the State Archaeologist, or SHPO or Tribal Historic Preservation Office (THPO), would evaluate any such discovery and, in consultation with the SHPO, implement the appropriate measures before construction activities would resume.

Because of the absence of adverse impacts on cultural resources within and surrounding the Project site, as well as the controls that are in place to address an unanticipated discovery of such resources, the impact on cultural resources as a result of the Project would not be significant.

3.1.1 Native American Interests

In conjunction with this EA and the National Historic Preservation Act Section 106 historic and archaeological review process, on August 25, 2023, DOE sent a request to the following federally recognized tribes and councils for information on nearby cultural resources as well as any comments or concerns regarding the potential for the resources to be affected by construction of the facility at the Project site (an example letter is included in Appendix A):

- Apache Tribe of Oklahoma
- Cheyenne and Arapaho Tribes, Oklahoma
- Flandreau Santee Sioux Tribe of South Dakota
- Fort Belknap Indian Community of the Fort Belknap Reservation of Montana
- Iowa Tribe of Kansas and Nebraska
- Lower Sioux Indian Community in the State of Minnesota
- Menominee Indian Tribe of Wisconsin
- Prairie Island Indian Community in the State of Minnesota
- Santee Sioux Nation, Nebraska
- Sisseton-Wahpeton Oyate of the Lake Traverse Reservation, South Dakota
- Spirit Lake Tribe, North Dakota
- Upper Sioux Community, Minnesota

Following the submission of the letter, each tribe was contacted by telephone to ensure receipt of the letter and respond to any immediate questions or concerns. A written response to the letter from LPO was received from the Flandreau Santee Sioux Tribe of South Dakota, indicating that they had no issues with the Project; however, they requested that work stop and that they be notified immediately if any human remains and/or cultural materials are uncovered (Appendix A). A voicemail was received by DOE on October 17, 2023, from the Sisseton-Wahpeton Oyate of the Lake Traverse Reservation THPO. Return phone calls were made by DOE and messages were left with the THPO office on October 19 and November 3, 2023. The THPO was invited to meet with DOE during the November 6, 2023, site visit. No return call was received by DOE.

Because of the absence of adverse impacts on Native American interests within and surrounding the Project site, as well as the controls that are in place to address an unanticipated discovery of such materials, impacts on Native American interests resulting from the Project would not be significant.

3.2 Water Resources

3.2.1 Wetlands

A field wetland delineation was completed on June 29, 2023, to support potential permitting activities in conjunction with this EA. The wetland delineation did not identify any wetlands within the proposed boundary of the facility, and there are no Minnesota Department of Natural Resources (MDNR) public waters within the Project area. One wetland was identified more than 100 feet south of the Project area. It was classified as a shallow marsh/fresh (wet) meadow wetland (PEM/C/A, Type 2/3) (Appendix D; Figure 6). This wetland would not be affected by the Project.

As provided in Appendix B, Solugen would obtain a Construction Stormwater Permit from the Minnesota Pollution Control Agency and prepare a Stormwater Pollution Prevention Plan (SWPPP) to minimize off-site erosion and sedimentation. Typical controls that would be implemented to minimize impacts include installing a silt fence around the perimeter of the area that would be disturbed by the Project.

Because of the lack of wetlands within the Project area, as well as the controls that would be part of the SWPPP to minimize impacts on off-site wetlands, impacts on wetlands resulting from the Project would not be significant.

3.2.2 Groundwater and Surface Water

Water for construction and operation of the proposed facility would be obtained from MMU, which uses 17 wells, ranging from 69 to 255 feet deep, to draw water from the Marshall, Dudley, and Sandnes artesian aquifers (MMU 2023). Once the processing facility is fully operational, it would use approximately 30 gpm from MMU during its normal operation. MMU has adequate capacity to serve the Project's anticipated potable water needs. The proposed facility would not use groundwater pumped from the Project area or include any discharges that could adversely affect groundwater.

The Project's potable wastewater would be discharged to the City of Marshall POTW. In addition, the City of Marshall's wastewater facility would be able to treat any additional wastewater generated by the Project. The existing facility is designed to treat a peak flow of 8.6 million gallons of wastewater a day; it is currently treating an average of 2.8 million gallons a day (City of Marshall 2023).

The Project area is located within the Minnesota River Basin and Redwood River subwatershed (Hydrologic Unit Code [HUC] 12). Previously, the Project area was a sewage disposal site from approximately 1957 to 1975. There are no lakes or streams within the Project area (Appendix D). The nearest water body is the Redwood River, which is approximately 1,500 feet southeast of the Project area at its nearest point. In addition, no Federal Emergency Management Agency regulatory floodways are located within the Project area. The Project area is within Zone X, which indicates the annual flood risk is between 0.2 and 1 percent.

Project construction would be performed under the terms of a National Pollutant Discharge Elimination System permit for construction stormwater discharges. As part of the permitting process, Solugen would develop a SWPPP to minimize off-site erosion and sedimentation during Project construction. The controls that would be implemented include installation of a silt fence around the perimeter of the area that would be disturbed by the Project.

The Project would cause an additional 8.2 acres of the Project area to be covered by impervious surfaces, including a new building, and paved parking areas, and access roads. Currently, there are no impervious surfaces within the Project area. The effect on stormwater infiltration in the vicinity of the site would not be significant because the proposed stormwater retention pond would be sized to accommodate the proposed new facility. In addition, the facility would maintain a SWPPP, which would describe the nonstructural and structural controls implemented on-site to eliminate unauthorized non-stormwater discharges.

During operations, Solugen would protect surface water by managing all hazardous liquids, either inside the facility, in tanks, or in closed containers stored within secondary containment structures.

Because of the current plans for municipal water use, the absence of identified floodplains, anticipated stormwater control during construction and operation, and the control of on-site hazardous liquids, impacts on groundwater or surface water as a result of the Project would not be significant.

3.3 Air Quality

The Project is located in Lyon County, Minnesota, which has no regulated pollutants that do not meet state and National Ambient Air Quality Standards (NAAQS); therefore, the Nonattainment New Source Review program is not applicable. Conformity with the U.S. Environmental Protection Agency– (EPA-) approved Minnesota State Implementation Plan (SIP) is demonstrated if Project emissions fall below the

threshold value for *de minimis* emissions (EPA 2009). The threshold values, as set by the SIP for the attainment area, is 100 tonnes per year (tpy) for ozone-precursor nitrogen oxides (NO_X) or 100 tpy for ozone-precursor volatile organic compounds (VOCs) (40 CFR 93 Section 153). The Project's estimated annual NO_X emissions would be about 22.0 tpy, and estimated annual emissions of VOCs would be about 3.4 tpy, both less than the threshold *de minimis* values for these pollutants (Table 3-1). As a result, the Project would be in conformity with the SIP. In addition, the Project would generate hazardous air pollutants (HAPs) from natural gas boilers and diesel generators, along with a small amount of methanol emissions from winterization uses. However, HAP emissions are estimated to amount to less than 1 tpy and therefore would be negligible.

The Project would not have the potential to emit pollutants at levels that would be above any of the thresholds for major sources. Furthermore, the Project is not considered a major source of air pollutants that would be subject to federal Title V requirements. Likewise, the Project would not be a major source under Part 18, Prevention of Significant Deterioration of Air Quality. Solugen evaluated the potential to emit (PTE) for the complete Project; based on the evaluation, Solugen would not be required to obtain a federal or state air permit from the MPCA.

The table that follows presents anticipated air emissions from operation of the facility.

Table 3-1. Project Potential to Emit during Operations

Pollutant	Current Facility		Project Emissions		Total	
	Pounds per Year	tpy	Pounds per Year	tpy	Pounds per Year	tpy
SO_2	0	0	1,972	0.99	1,972	0.99
NO_X	0	0	44,000	22.00	44,000	22.00
VOC	0	0	6,734	3.37	6,734	3.37
PM10	0	0	22,645	11.32	22,645	11.32
PM2.5	0	0	7,273	3.64	7,273	3.64
CO	0	0	86,112	34.06	86,112	34.06

CO = carbon monoxide; NO_X = nitrogen oxides; PM10 = particulate matter with diameters 10 microns and smaller; PM2.5 = particulate matter with diameters 2.5 microns and smaller; SO_2 = sulfur dioxide; tpy = tonnes per year; VOC = volatile organic compound

The controls that would be implemented during Project operation to minimize potential air quality impacts include dust collectors on crystallization equipment. The dust collectors would have a removal efficiency of up to approximately 93 percent for emissions of particulate matter with diameters 10 microns and smaller (PM10) and particulate matter with diameters 2.5 microns and smaller (PM2.5).

Fugitive dust emissions during Project construction may temporarily affect air quality in the Project area and the surrounding area; however, these impacts would be minor and temporary. Controls would be implemented to minimize fugitive dust emissions during construction, such as watering, as needed, and using temporary construction entrances.

CO_2, which is considered a GHG, is not regulated in the same manner as the criteria pollutants shown in Table 3-1. Only major sources of CO_2 (i.e., with emissions greater than 100,000 tpy) are regulated in Minnesota. The Project would result in 51,187 tpy of CO_2 emissions, which is well below the threshold for a major source.

The Project would also generate GHG emissions from the transport of materials to and from the proposed facility. It is anticipated that approximately 15 incoming truck trips, 50 outgoing truck trips, and 30 outgoing rail tanker shipments would occur weekly. GHG emissions associated with the transport of feedstock to the facility would be minimized by collocating the facility adjacent to ADM. Emissions from trucking and rail activities would vary, depending on customers' locations and the sources of incoming material, which are not currently known. However, it is anticipated that emissions generated by the transport of feedstock and products would be similar to those generated by existing chemical manufacturing facilities. Overall, the Project would result in a net decrease in GHG emissions.

Because of the location of the Project area and existing air quality conditions, the level of anticipated air emissions, conformance with the SIP, and the controls that would be implemented during Project construction and operation, impacts on air quality as a result of the proposed Project would not be significant.

3.4 Noise

The Project area is zoned industrial, and substantial industrial development is present in the surrounding area. Neighboring properties are host to a trucking company, a railroad, various light industrial businesses, agricultural operations, and a few residences. Residential housing is approximately 0.65 mile south of the proposed facility. There are no residences within the immediate Project vicinity (i.e., less than 0.25 mile). Existing sources of noise in the Project area include vehicular traffic, railroad operations, farm machinery, and manufacturing activity at surrounding industries and ADM. The Project would generate temporary noise during construction from the use of heavy machinery, such as bulldozers, graders, excavators, dump trucks, and cement trucks, along with smaller tools such as jack hammers and nail guns. Noise and sound levels would be typical of new construction activities; they would also be intermittent and temporary. Solugen would manage noise using best management practices (BMPs), such as limiting outdoor construction activities to daylight working hours (approximately 7:00 a.m. to 8:00 p.m.) and complying with the City of Marshall noise regulations.

Facility operations would result in no adverse long-term noise impacts, other than those from increased vehicular traffic from commuting workers and trucks receiving and shipping materials. Industrial processes performed at the facility would not add to ambient noise levels because the Project would be within an existing industrial park and all manufacturing processes would be conducted within enclosed buildings.

Because of the controls that would be implemented during construction and the nature of the area surrounding the Project site (i.e., an existing industrial park adjacent to an existing manufacturing facility), impacts from noise as a result of the Project would not be significant.

3.5 Transportation

3.5.1 Existing Conditions

The Project would be located in an industrial setting that is accustomed to and equipped to accommodate truck and vehicle traffic associated with industrial facilities. There are currently no roadways within the Project area. North 7th Street and East Erie Road (County Road 33) border the northern and eastern boundary of the Project area (Figure 1). These roadways intersect northeast of the Project area and connect to Highway 23, located approximately 1.2 miles east of the Project area. In addition, a BNSF railroad line is located along the western border of the Project area. This railroad is currently used to transport materials to and from the existing ADM plant.

3.5.2 Project Construction

During construction, site access traffic would occur primarily off East Erie Road, with additional access off North 7th Street (Figure 1). Construction would not require the closure of East Erie Road or North 7th Street and is not anticipated to affect emergency routes to the local hospital, fire department, or police department. Traffic flows along East Erie Road may be temporarily affected by increased traffic from the delivery of construction materials and equipment as well as the arrival/departure of construction workers. Truck deliveries for construction are estimated to generate 135 daily trips throughout the construction period. This consists of 110 trips made by construction workers and 25 trips made by delivery vehicles.

As described in Section 2, construction would occur in phases, starting with the processing facility and attendant structures, including parking areas (110 spaces) and access roads. The railcar loading area and additional parking spaces would be constructed during Phase 4, as described in Table 1-1. The railcar loading area would tie into an ADM-owned rail spur from the BNSF railway located on the west side of the Project area and include three spur tracks that would be capable of storing 18 railcars.

3.5.3 Project Operations

Bioforge™ Marshall anticipates operating 24 hours a day, 7 days a week, with up to 56 employees at full production. The facility is expected to reach full production in 2028, with two shifts per day. Therefore, worker traffic would be split between different times during the day and would not occur at one time. Overlapping traffic between shifts is not anticipated because all incoming workers would be at the facility before the shift hour begins and all outgoing workers would leave the facility after the shift hour ends.

During Project operations, incoming raw materials (e.g., sodium hydroxide, catalyst) would require fewer than 10 truck trips per week; outgoing product shipping would require approximately 50 weekly truck trips. Miscellaneous processing chemicals would be shipped to the facility by truck in drums and totes. Miscellaneous shipments are estimated to occur fewer than five times a week. Trucks would access the processing facility from either Highway 23, located 1.2 miles east of the Project area, or from Interstate 59, located 0.8 mile west of the Project area. In addition, products would be shipped by rail using the proposed railcar loading area. The railcar loading area would include three spur tracks that would be capable of storing 18 railcars. The railcar loading area would be accessed from a 15-foot-wide gravel access road that would extend from the northwest corner of the processing facility (Figure **2**). It is anticipated that the Project would generate approximately 30 rail shipments per week and have a negligible effect on local transportation because of the connection to the existing rail line. There would be no interruptions for existing rail traffic generated by ADM.

Given the construction schedule and relatively small increase in truck and vehicle traffic during operation, impacts on transportation as a result of the Project would not be significant.

3.6 Biological Resources and Threatened and Endangered Species

Available biological habitat is limited in the Project area. With the exception of a few eastern cottonwood (*Populus deltoides*) and Russian olive (*Elaeagnus angustifolia*) trees along the western edge of the site, as well as one wetland approximately 100 feet south of the proposed processing facility (Section 3.2.1), the Project area is industrial in nature. It was previously used as a sewage disposal site. Currently, the Project site is used as a hayfield and cultivated with alfalfa (*Medicago sativa*). Habitat adjacent to the Project site consists of industrial development and agricultural fields. There are no lakes or streams in the Project area. The nearest river is the Redwood River, which is approximately 0.3 mile east of the Project area. Any connection between the Project area and intact natural habitats is minimal.

An official list of federally listed species that could be present within the Project area was requested through the U.S. Fish and Wildlife Service (USFWS) Information, Planning, and Consultation (IPaC) online program on January 11, 2024 (Appendix A). IPaC identified two species as potentially present within the vicinity of the Project area, tri-colored bat (*Myotis septentrionalis*), which is federally proposed as endangered, and monarch butterfly (*Danaus plexippus*), a federal candidate species.

Tri-colored bats roost in deciduous trees during the active season; they hibernate in caves and mines over the winter (USFWS 2023). Suitable habitat for tri-colored bats is present in the trees along the western edge of the Project area. Note that no trees would be removed as part of the Project. Monarch butterflies, a federal candidate species, are found in areas with a high number of flowering plants, which are sources of nectar. Monarch butterflies rely exclusively on the presence of milkweed (*Asclepias* spp.) to complete the caterpillar life stage (MDNR 2023). Although the alfalfa growing across the Project area could provide a suitable nectar source for monarch butterflies, no milkweed plants were documented within the Project area. The Minnesota-Wisconsin Endangered Species Determination Key was completed in IPaC; an effect determination has not been made for tri-colored bat and monarch butterfly (Appendix A).

The MDNR Natural Heritage Information System (NHIS) database (Barr License Agreement LA-986) was reviewed in September 2023 to determine if any Minnesota state-listed species have been documented within the vicinity of the Project area. According to the NHIS database, no state endangered, threatened, or special concern species have been documented within 1 mile of the Project area.

Given the agricultural and industrial setting, lack of natural habitat, and lack of a connection to high-quality natural habitat, impacts on biological resources as a result of the Project would not be significant.

3.7 Socioeconomics and Environmental Justice

3.7.1 Socioeconomics

The Project site is located in the City of Marshall, Lyon County, Minnesota. It lies within an industrial property with existing industrial development to the west, north, and south and agricultural fields to the east. The nearest hospital is approximately 1 mile south of the Project area, and the nearest schools are approximately 1 mile south and southeast of the Project area.

Beneficial socioeconomic impacts would occur from increased employment opportunities, tax revenue generation, and direct and indirect spending in the local community. Development of the Project would generate up to 56 jobs during full operation. Furthermore, it is anticipated that up to 200 temporary workers would be required during construction. Efforts would be made to fill a share of these jobs from the regional workforce, contingent on finalization of the construction strategy.

Although Marshall expects increased growth in the community and projects a need for additional housing and day-care options, DOE believes that jobs at Solugen would be filled by existing residents of Marshall who were let go when a company in the region closed or the growing number of graduates from the community college and state university in the area.

Given the jobs that would be created during construction and operation of the Project, as well as the availability of housing and public services in the area, no significant adverse socioeconomic impacts are anticipated.

3.7.2 Environmental Justice

LPO's review of environmental justice (EJ) issues focuses on Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations; the National-Scale Air Toxics Assessment (NATA) cancer risk and respiratory hazard index, as defined in EPA's EJ screening tool; and site-specific population centers (e.g., schools, day-care centers) near the Project area.

Executive Order 12898 directs federal agencies to address environmental and human health conditions in minority and low-income communities. The evaluation of EJ is dependent on determining if high and adverse impacts from the Project would disproportionately affect minority or low-income populations in the affected community.

In accordance with EPA's EJ guidelines, minority populations should be identified when either 1) the minority population of the affected area exceeds 50 percent or 2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

The ethnic and racial composition of Lyon County and the state are presented in Table 3-2. Minority populations are less than 50 percent of the population in Lynn County and not meaningfully different from minority populations in the rest of the state. At the census block-group level where the Project is located, the people-of-color population is 6 percent (Table 3-3).

Table 3-2. Population, Ethnicity, and Poverty

	Lyon County	Minnesota	U.S.
Total Population	25,477	5,670,472	329,725,481
Race/Ethnicity			
White	84.3%	80.7%	74.5%
Black or African American	3.2%	6.6%	14.3%
American Indian and Alaska Native	0.2%	0.9%	1.9%
Asian	4.9%	5.0%	6.9%
Native Hawaiian and other Pacific Islander	0%	< 0.1%	0.2%
Hispanic or Latino	7.3%	5.6%	18.4%
Poverty	12.3%	9.3%	12.8%

Note: Population and ethnicity data gathered from the U.S. Census Bureau web page. Accessed: September 8, 2023.

Table 3-3. EPA's EJ Screening Report

	Value	State Average	Percentile in State	U.S. Average	Percentile in U.S.
NATA* cancer risk (lifetime risk per million)	20	22	12	25	< 50th
NATA* respiratory hazard index	0.2	0.26	7	0.31	< 50th
People-of-color population	6%	20%	26	39%	14
Low-income population	48%	23%	90	31%	78

Notes: Selected Variables – Block Group: 270833605001, Minnesota, EPA Region 5. Approximate Population: 942.
** More information on the NATA can be found at: https://www.epa.gov/national-air-toxics-assessment.*

The percentage of persons in poverty is 3 percent higher in Lyon County (12.3 percent) than in the rest of the state (9.3 percent; see Table 3-2). According to the EPA's EJ screening tool (Table 3-3), the low-income population is 48 percent in the census block-group level where the Project is located, which is in the 90th percentile for the state and the 78th percentile for the U.S. However, the percentage of the population below the poverty level is higher in Lyon County (12.3 percent) than the state of Minnesota (9.3 percent) but lower than the U.S. as a whole (12.8 percent) (Table 3-2).

The NATA cancer risk and respiratory hazard indices are a way to see how local residents compare to everyone else in the state and the entire U.S. For the NATA cancer risk index (lifetime risk per million), the Project is in an area that is in the 12th percentile relative to the state and below the 50th percentile relative to the U.S. For the NATA respiratory hazard index, the region is in the 7th percentile relative to the state and below the 50th percentile relative to the U.S.

Because of the jobs created during construction and the 56 full-time permanent jobs created, the Project would benefit the regional economy. There are no anticipated impacts that could give rise to disproportionate impacts on minority or low-income populations in the affected area; therefore, EJ impacts would not be significant.

3.8 Health and Safety

In general, the facility would generate three types of gluconic acid (GO50, LG50, and SG1000) and glucaric acid products. Dextrose, which would be sourced from the nearby ADM plant and delivered via a pipeline, would be the primary feedstock used to generate these products. The associated manufacturing processes are summarized in Section 2.2.2. Table 3-4 provides a summary of the types and amounts of the chemicals/products necessary to complete the manufacturing processes at full operation as well as maintain and operate the facility.

Table 3-4. Project Annual Chemical/Materials Usage

Chemical/Material	Anticipated Use (Annually)
Dextrose (pounds)	141 million
Sodium hydroxide (pounds)	12 million
Enzyme (pounds)	4,600
Methanol	as needed
Boiler Feed Water Treating Chemical (gallons)	2,700
Cooling Water Treating Chemical 1 (gallons)	29,700
Cooling Water Treating Chemical 2 (gallons)	2,700
Cooling Water Treating Chemical 3 (gallons)	1,350
Reverse Osmosis Water Treating (Antiscalant) (gallons)	45
Reverse Osmosis Water Treating (Chlorine Distruct) (gallons)	270
Antifoam (gallons)	620

Some chemicals/products would be held in storage tanks; these are summarized in Table 3-5.

Table 3-5. Project Storage Tanks

Number of Tanks	Tank Volume (gallons)	Contents
3	20,000	50% sodium hydroxide solution
18	20,000	product

With the exception of dextrose, the chemicals and other products used in the manufacturing processes and general operation/maintenance of the facility would be delivered to the facility by truck using a variety of packaging methods, including drums and totes. The facility would develop a Spill Prevention Pollution Plan as well as a Pollution Incident Prevention Plan that would cover chemical management, routes of possible spills, and spill prevention measures. The facility is not anticipated to generate solid or liquid hazardous waste; however, periodic maintenance activities may generate hazardous waste (Section 3.9).

Standard BMPs and applicable federal, state, and local regulations and standards for construction and operation of the facility would be implemented to ensure the safety of workers and the public. This would include compliance with federal Occupational Safety and Health Administration regulations (Part 1926 Safety and Health Regulations) and state rules under the Minnesota Occupational Safety and Health Act.

The local fire department would be informed of potential hazards associated with the facility, as well as facility construction and layout information for the Project, to ensure that first responders and the public would be protected from an exposure to potentially hazardous situations (e.g., toxic smoke or vapors) in the event of a fire or industrial accident.

Safety and health monitoring and training programs at the Bioforge™ Marshall facility would be managed through a platform known as Velocity EHS. Velocity EHS allows employees to promptly record near misses and potential hazards.

- Near misses in the workplace include situations that narrowly avoid potential incidents or injuries from happening.
- Hazards in the workplace include sharp edges on whiteboards, damaged chairs, or recurrent wet areas in walkways.
- Incidents in the workplace include any occurrence, condition, or situation that resulted in or could result in injury, illness, fatality, or damage to health or property.

Near misses and incidents would be followed by Root-Cause Analysis (RCA). Recommendations from the RCA would be implemented, and feedback on operating procedures would be reviewed. The three events outlined above (near misses, hazards, incidents) would be monitored and managed within the Velocity EHS system under the supervision of the Health, Safety, Environment (HSE) director.

All new employees would undertake mandatory safety training courses tailored to their respective positions. These training sessions would be refreshed in accordance with recommended frequencies. Operator and blending personnel would go through Solugen's training process, which would include weekly focuses. This training process would consist of classroom and hands-on sessions over a 4-week period. For routine operations, comprehensive training would be given to operators regarding the standard operation of equipment. Training would ensure that operators would be well versed in the safe operation of the equipment, including start-up and shutdown. To effectively manage and mitigate potential HSE risks arising from changes on-site, a management-of-change (MOC) system would be used. The MOC system would play a role in the risk management strategy by identifying change scenarios, conducting hazard assessments, and establishing risk control measures. Moreover, it would include a mechanism for developing follow-up actions, ensuring that the measures would remain effective with respect to maintaining HSE risks.

Because of the measures to address health and safety, including BMPs; compliance with federal, state, and local regulations and standards; and plans for preventing chemical spills and potential mishandling of hazardous materials; impacts on the health and safety of workers and the public from Project construction and operation would not be significant.

3.9 Waste Management

The facility's manufacturing process is not anticipated to generate a substantial amount of waste. The Project would take in dextrose from the adjacent ADM plant to produce the chemicals described in Section 2.2.2. The carbon that would be used for decolorization would be washed and dried as part of the process and handled as a non-hazardous solid for conventional non-hazmat landfill. The exact amount of carbon waste generated would be dependent on a specific customer's needs.

General waste from the facility, ranging from cafeteria food container waste to discarded personal protection equipment, would be recycled to the greatest extent practical. General waste generated by the facility would be shipped to a landfill or public works recycling center for proper disposal. Solid waste that cannot be recycled would be disposed of at the Lyon County Regional Landfill. The landfill is approximately 12 miles south of Marshall. Solugen would hire a contractor for proper disposal of hazardous waste.

Because of the limited amount of waste generated by the facility and plant, impacts from waste management activities would not be significant.

3.10 Cumulative Impacts

Cumulative impacts are potential effects on the environment from the incremental impact of the Project when added to other past, present, and reasonably foreseeable future actions undertaken by other agencies (federal or nonfederal) or persons (40 CFR Part 1508.1 [g]). Reasonably foreseeable future actions were identified through a review of active project lists and planning documents from the City of Marshall, Lyon County, and local news outlets. The review identified the current and reasonably foreseeable future projects listed below.

- **Channel Parkway**: The City of Marshall is proposing to replace the pavement along 1.6 miles of Channel Parkway.
- **Cotton River Wind Project**: Next Era Energy is proposing to construct a 200-megawatt windfarm in southern Lyon County.
- **Transmission Line Installation**: A 140-mile-long transmission line is to be installed from Becker Minnesota to Lyon County. The project includes construction of a new substation in Lyon County.
- **Highway 59**: The Minnesota Department of Transportation (MNDOT) is planning to resurface Highway 59 from A Street to H Steet and complete concrete repair south of Marshall.
- **Highway 68**: MNDOT is proposing to resurface Highway 68 from North Grant Street in Minneota to the intersection of Highway 59 in Marshall and make Americans with Disabilities Act improvements in the City of Marshall.

LPO reviewed the identified projects in the region to determine the resources that may be subject to a cumulative impact. The review focused on resources that would be affected by the Project and identified resources that could be affected by both the Project and other projects in the region. Based on this review, the following were evaluated for cumulative impacts:

- Air quality and climate change
- Greenhouse gas emissions and climate change
- Socioeconomics and EJ
- Transportation

The Project, when considered together with the identified projects in the region, would not have the potential to result in significant cumulative impacts on other resources because of the geographic location and separation of the projects, the disturbed nature of the Project area, and/or the lack of construction or operational overlap.

3.10.1 Air Quality and Climate Change

Air emissions from construction of the facility would be temporary and minimized through implementation of BMPs. Separate approval of an air permit related to construction activities would not be required. Operation of the facility, with its associated emissions, would have the potential to result in cumulative impacts on regional air quality. For further detail on Project emissions, refer to Section 3.3. The projects occurring within Lyon County would generate air emissions during construction but would not generate significant air emissions during operations. Because of the distance from the Project area, these projects would not be anticipated to have any localized cumulative impacts on air quality from construction activities. The cumulative impacts on air quality associated with Project operation and the additional projects within the surrounding area would not be significant.

3.10.2 Greenhouse Gas Emissions and Climate Change

The current Earth climate science now shows with 95 percent certainty that human activity is the dominant cause of observed global warming since the mid-twentieth century (Intergovernmental Panel on Climate Change [IPCC] 2013). Since the beginning of the industrial era, circa 1750, human activities have increased the concentration of GHGs (primarily CO_2, NO_X, methane, hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], and sulphur hexafluoride [SF_6]) in the atmosphere. Rising global temperatures have been accompanied by changes in weather and climate (e.g., changes in rainfall that result in more floods, droughts, or intense rain; rising sea levels; Arctic ice decline; more frequent and severe heat waves) (IPCC 2013). It is now well established that rising atmospheric GHG concentrations are significantly affecting the Earth's climate (CEQ 2016).

GHG emissions associated with construction of the Project would be expected to be minimal. Project operations would generate average annual GHG emissions of 51,187 tpy from natural gas combustion in boilers and diesel fuel combustion in emergency generators, as needed. As discussed in Section 2, *Description of the Proposed Action*, the new facility would be used to produce up to 75 kta of gluconic acid products. According to the National Energy Technology Laboratory (NETL), the Project would remove between 83 and 94 percent of carbon emissions compared to 'business as usual' cases that produce comparable chemicals from fermentation or petrochemically produced iron ion chelation agents. The reduction in global warming potential would be due to the biogenic uptake of carbon from the corn that makes the dextrose feedstock. The Project would avoid between 5,424,341 and 17,876,018 kg CO_2 (approximately 5.4K to 17.8K tonnes of CO_2) per year compared to a base case involving petrochemically and fermentation produced iron ion chelation agents. Because the Project would support GHG emissions reductions, impacts related to GHG emissions and climate change would be beneficial in the long term. As such, adverse cumulative impacts related to GHG emissions and climate change are not anticipated.

3.10.3 Socioeconomics and Environmental Justice

Construction and operation of the Project, along with construction and operation of the identified projects in the region, would result in an increase in the number of temporary construction workers as well as long-term employment. The increase in short-term and long-term jobs in the region would result in a beneficial socioeconomic impact. Because the Project and the other projects in the region would be subject to regional planning and coordination with the City of Marshall, Lyon County, the Public Utilities Commission, and MNDOT, significant cumulative impacts on existing infrastructure and services (e.g., roads, schools, fire departments, police departments) resulting from any population migration to the area are not anticipated. In addition, the facility would not produce significant air emissions that would threaten the health and safety of the surrounding communities; therefore, cumulative impacts would not disproportionally affect the EJ communities in the Project area.

3.10.4 Transportation

As discussed in Section 3.5, the Project is not anticipated to have a significant impact on local transportation. Although construction on Highways 59 and 68 would occur during construction of the Project, the Highway 59 project would be located southwest of the Project area. It would not be anticipated to affect construction access for the Project or generate additional traffic along the affected roadway. Construction along Highway 68 would be completed under existing traffic conditions and detours would not be required. The Project, in conjunction with the identified projects in the region, would lead to an incremental increase in overall traffic; however, no significant adverse cumulative effects on the region's overall transportation network are anticipated.

4. FINDING

Based on this EA, DOE has determined that providing a federal loan guarantee to Solugen to construct a new chemical manufacturing plant and associated infrastructure in Marshall, Minnesota, would not have a significant effect on the human environment. Preparation of an environmental impact statement is therefore not required, and DOE is issuing this Finding of No Significant Impact.

This Finding of No Significant Impact should not be construed as a final decision about issuance of a loan guarantee.

TODD STRIBLEY

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NEPA Compliance Officer
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6. REFERENCES

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APPENDIX A AGENCY AND TRIBAL CORRESPONDENCE

Appendix A: Agency and Tribal Correspondences

Organization	Contact Date	Summary of Contact
Minnesota Pollution Control Agency	8/21/2023	Intent to Prepare an Environmental Assessment
	2/2/2024	EA with the draft FONSI
Apache Tribe of Oklahoma*	8/25/2023	Notification of Federal Project per NHPA Section 106
	2/2/2024	EA with the draft FONSI
Cheyenne and Arapaho Tribes, Oklahoma*	8/25/2023	Notification of Federal Project per NHPA Section 106
	2/2/2024	EA with the draft FONSI
Flandreau Santee Sioux Tribe of South Dakota*	8/25/2023	Notification of Federal Project per NHPA Section 106
	2/2/2024	EA with the draft FONSI
Fort Belknap Indian Community of the Fort Belknap Reservation of Montana*	8/25/2023	Notification of Federal Project per NHPA Section 106
	2/2/2024	EA with the draft FONSI
Iowa Tribe of Kansas and Nebraska*	8/25/2023	Notification of Federal Project per NHPA Section 106
	2/2/2024	EA with the draft FONSI
Lower Sioux Indian Community in the State of Minnesota*	8/25/2023	Notification of Federal Project per NHPA Section 106
	2/2/2024	EA with the draft FONSI
Menominee Indian Tribe of Wisconsin*	8/25/2023	Notification of Federal Project per NHPA Section 106
	2/2/2024	EA with the draft FONSI
Prairie Island Indian Community of Minnesota*	8/25/2023	Notification of Federal Project per NHPA Section 106
	2/2/2024	EA with the draft FONSI
Santee Sioux Nation, Nebraska*	8/25/2023	Notification of Federal Project per NHPA Section 106
	2/2/2024	EA with the draft FONSI
Sisseton-Wahpeton Oyate of the Lake Traverse Reservation, South Dakota*	8/25/2023	Notification of Federal Project per NHPA Section 106
	2/2/2024	EA with the draft FONSI

Appendix A: Agency and Tribal Correspondences

Organization	Contact Date	Summary of Contact
Spirit Lake Tribe, North Dakota*	8/25/2023	Notification of Federal Project per NHPA Section 106
	2/2/2024	EA with the draft FONSI
Upper Sioux Community, Minnesota*	8/25/2023	Notification of Federal Project per NHPA Section 106
	2/2/2024	EA with the draft FONSI
Minnesota State Historic Preservation Office	10/3/2023	Section 106 Consultation
	11/29/2023	SHPO Concurrence with Determination of Eligibility and Finding of Fact
U.S. Department of Agriculture	11/16/2023	No FPPA forms required
U.S. Department of the Interior, Fish and Wildlife Service	8/30/2023	Consistency Letter for 'Solugen Bioforge Facility' for specified threatened and endangered species
	1/11/2024	List of threatened and endangered species
Southwest Regional Development Commission	2/8/2024	SRDC comment on the EA with the draft FONSI expressing support for the project
*An individual letter was submitted to each Tribe. To reduce the file size and the overall number of pages, the letter to the Flandreau Santee Sioux Tribe of South Dakota is included as an example, and all responses are included.		

From:	Hapka, Katrina (MPCA)
To:	Tyler A. Conley
Cc:	Michael Hamilton
Subject:	RE: Solugen Lyons County Project
Date:	Friday, August 11, 2023 7:20:25 AM
Attachments:	image002.jpg image003.png

CAUTION: This email originated from outside of your organization.

Tyler,

Thank you for completing the MPCA environmental review pre-screening form. Based on the information provided in the pre-screening form and the follow-up email, the Solugen Project in Lyons County does not require an EAW for the mandatory categories for which the MPCA is the RGU. This EAW Applicability Determination does not apply to any mandatory category where the MPCA is not the RGU. I recommend you review and determine the applicability of all other mandatory categories for which the MPCA is not the RGU. The MPCA Environmental Review (ER) Team is aware this project may change as it moves further along the technical design phase. If this does occur, the MPCA ER Team appreciates notification of the changes as it may change our determination.

Best,

Katrina Hapka | Project Manager
Minnesota Pollution Control Agency (MPCA)
RMAD | Environmental Review
651.757.2418
520 Lafayette Road | St. Paul, MN | 55155
katrina.hapka@state.mn.us | pca.state.mn.us

Our mission is to protect and improve the environment and human health.

From: Tyler A. Conley <TConley@barr.com>
Sent: Wednesday, August 9, 2023 4:57 PM
To: Hapka, Katrina (MPCA) <Katrina.Hapka@state.mn.us>
Cc: Michael Hamilton <michael.hamilton@solugentech.com>
Subject: RE: Solugen Lyons County Project

Katrina,

I spoke with the Solugen team, who confirmed that the description below describes the project as a

whole; however, the modular trains would be constructed in separate phases. So as a whole, the project would not exceed any of the mandatory EAW categories.

Michael also noted that their Houston, Texas facility is capable of processing 7,000 metric tons of bio-based chemicals per year instead of 70,000.

Thanks,

Tyler A. Conley

Environmental Scientist
Minneapolis, MN office: 952.842.3632
TConley@barr.com
www.barr.com

From: Hapka, Katrina (MPCA) <Katrina.Hapka@state.mn.us>
Sent: Wednesday, August 9, 2023 9:00 AM
To: Tyler A. Conley <TConley@barr.com>
Cc: Michael Hamilton <michael.hamilton@solugentech.com>
Subject: RE: Solugen Lyons County Project

Hi Tyler,

Under part D on the form, you checked 'yes' for planning an expansion or another phase of the project within the next 3 years and that the project is part of a larger project. Can you provide more information about the planned expansion/next phase and/or the larger project. Also, did you answer the questions on the form in regards to the current phase of the larger project or in regards to the larger project as a whole?

Thank you.

Katrina Hapka | Project Manager
Minnesota Pollution Control Agency (MPCA)
RMAD | Environmental Review
651.757.2418
520 Lafayette Road | St. Paul, MN | 55155
katrina.hapka@state.mn.us | pca.state.mn.us

Our mission is to protect and improve the environment and human health.

Department of Energy
Washington, DC 20585

August 21, 2023

Katrina Hapka
Project Manager
Minnesota Pollution Control Agency (MPCA)
RMAD | Environmental Review
520 Lafayette Road
St. Paul, Minnesota 55155

SUBJECT: The U.S. Department of Energy's (DOE's) intent to Prepare an Environmental Assessment (EA) for a Proposed Federal Loan Guarantee to Solugen, Inc. for the bio-feedstock facility in Marshall, Minnesota

Dear Ms. Hapka,

Title XVII of the Energy Policy Act of 2005 (EPAct) established a federal loan guarantee program for certain projects that employ innovative technologies and authorizes the Secretary of Energy to make loan guarantees available for those projects. Solugen, Inc. has applied for a loan guarantee pursuant to the U.S. DOE's Renewable Energy and Efficient Energy Projects Solicitation (Solicitation Number: DE-SOL-0007154) under Title XVII, Innovative Energy Loan Guarantee Program, authorized by EPAct, (REEE Projects). DOE is evaluating whether to provide a federal loan guarantee to Solugen, Inc. to support the proposed bio-feedstock facility in the City of Marshall, Lyons County, Minnesota. Solugen, Inc. intends to own and operate a bio-feedstock-based platform (called a "Bioforge™") (the Project) to produce chemicals in a more environmentally friendly manner than is achieved by traditional methods. The decision to prepare an EA for the Project was made in accordance with the requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508), and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021).

The purpose and need for agency action is to comply with the DOE mandate under Title XVII of the EPAct to select projects for loan guarantees that are consistent with the goals of the Act. The DOE Loan Program Office (LPO) has determined that the Project as proposed by Solugen, Inc. is eligible pursuant to Section 1703 of EPAct and that it complies with DOE's mandate as defined in the Act (DOE's purpose and need). DOE is using the NEPA process to assist in determining whether to issue a loan guarantee to Solugen, Inc. to support the development of the Project. A goal of DOE's financial assistance for REEE Projects is to support the construction and startup of projects and facilities located in the United States that employ innovative and renewable or efficient energy technologies that avoid, reduce, or sequester anthropogenic emission of greenhouse gases.

The Applicant proposes to construct, own, and operate a bio-feedstock-based platform to produce chemicals. This new Bioforge™ will be capable of manufacturing bio-based organic acids that, over time, with further research and development, will have the potential capability to produce bioplastic monomers. Solugen will sell its chemical products either directly, or as formulated products to customers for use in the agriculture, concrete, petroleum, and water treatment industries. The Project will be constructed modularly, consisting of three separate "trains," each capable of manufacturing at least 25,000 metric tons per year of product.

The Project will be co-located with the supplier of its feedstock (Dextrose from corn syrup) at 1401 N 7th St Marshall, Minnesota 56258 (see Figure 1). The new facility will encompass approximately 20 acres of an approximately 60-acre site (see Figure 2 for conceptual site layout).

The DOE NEPA regulations provide for the notification of host states of NEPA determinations and for the opportunity for host states to review EAs prior to DOE approval. This process is intended to improve coordination and to facilitate early and open communication.

If you or your staff would like to receive further information concerning this project or DOE's NEPA process, please me at 202-913-3477, or email at LPO_Environmental@hq.doe.gov.

Sincerely,

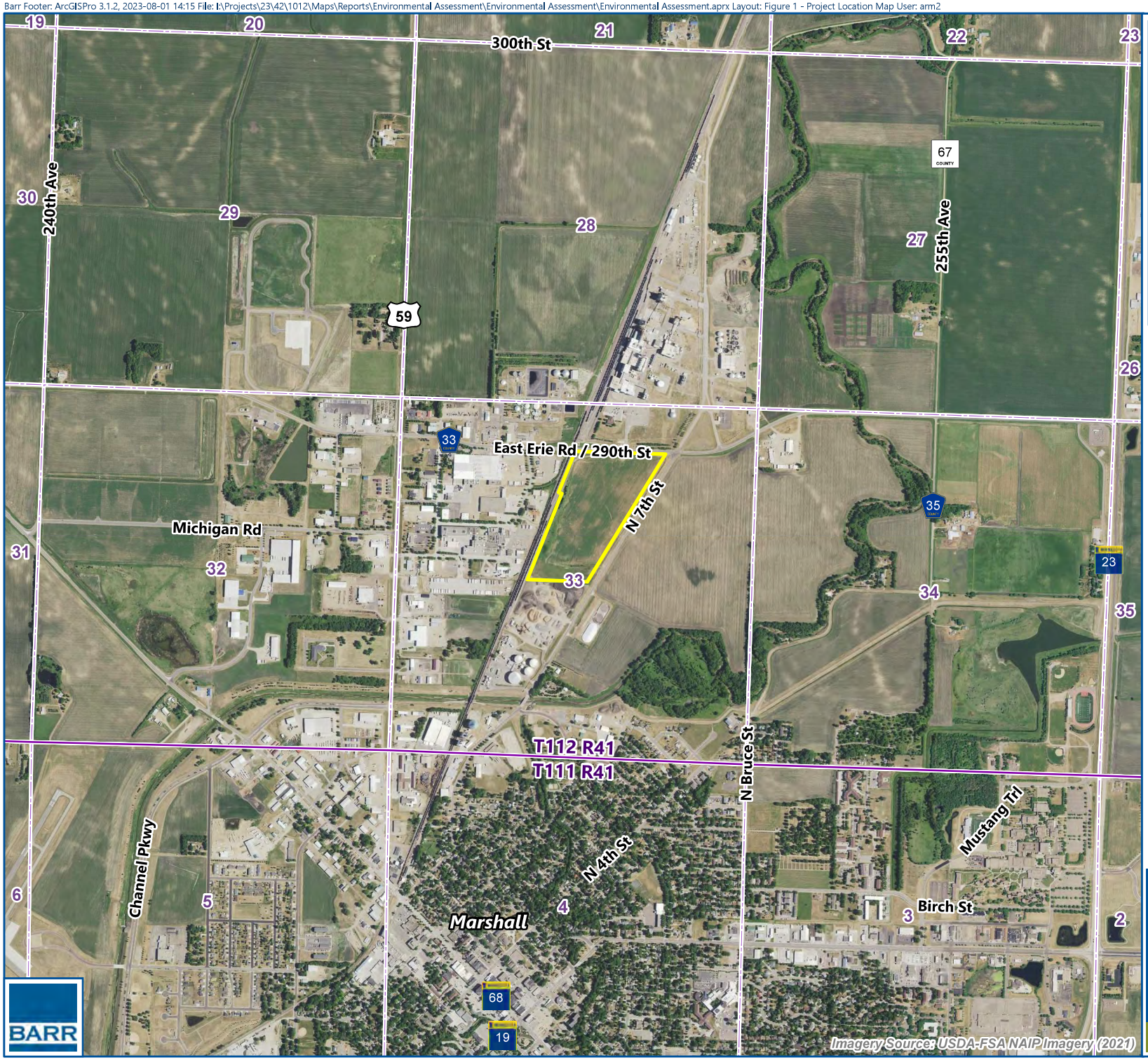
DONALD BROWN

Digitally signed by DONALD BROWN
Date: 2023.08.21 10:57:53 -04'00'

Don Brown
NEPA Document Manager
Loan Programs Office

Attachments:
Figure 1: Project Location
Figure 2: Conceptual Layout

Cc: Stephan Roos, Department of Agriculture
Ray Kirsch, Department of Commerce
Department of Health, Environmental Health Division
Jill Townley, Department of Natural Resources, Environmental Review Unit
Pam Foster, Pollution Control Agency, Environmental Review Unit
Melissa King, Board of Water and Soil Resources
Katherine Lind, Department of Transportation, Office of Environmental Stewardship
Amanda Gronhovd, Office of the State Archaeologist
Melissa Cerda, Indian Affairs Council
Sarah Beimers, Minnesota State Historic Preservation Office



Project Boundary

Public Land Survey Section

Public Land Survey Township

0 1,000 2,000

Feet

PROJECT LOCATION
Solugen Marshall Bioforge
Marshall, MN

FIGURE 1

Barr Footer: ArcGISPro 3.1.2, 2023-08-01 14:15 File: I:\Projects\23\42\1012\Maps\Reports\Environmental Assessment\Environmental Assessment\Environmental Assessment.aprx Layout: Figure 2 - Project Overview User: arm2

- Project Boundary
- Facility Footprint
- Building
- Railcar Loading
- Stormwater Pond
- Ashpalt/Roads

N

0 250 500

Feet

PROJECT OVERVIEW
Solugen Marshall Bioforge
Marshall, MN

FIGURE 2

Department of Energy
Washington, DC 20585

February 2, 2024

Katrina Hapka
Project Manager
Minnesota Pollution Control Agency (MPCA)
RMAD | Environmental Review
520 Lafayette Road
St. Paul, Minnesota 55155

SUBJECT: U.S. Department of Energy, Proposed Federal Loan Guarantee to Solugen, Inc. for the bio-feedstock facility in Marshall, Minnesota

Dear Ms. Hapka,

The U.S. Department of Energy (DOE), Loan Programs Office (LPO) prepared an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) to consider the environmental impacts of its decision whether or not to provide a Federal loan guarantee to Solugen, Inc. to support the proposed bio-feedstock facility in the City of Marshall, Lyons County, Minnesota. Solugen, Inc. intends to own and operate a bio-feedstock-based platform (called a "Bioforge™") (the Project) to produce chemicals in a more environmentally friendly manner than is achieved by traditional methods. The decision to prepare an EA was made in accordance with the requirements of NEPA, the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021).

LPO provides loans and loan guarantees under four programs – the Title 17 Clean Energy Financing Program (Title 17), the Advanced Transportation Financing Program, the Tribal Energy Financing Program, and the Carbon Dioxide Transportation Infrastructure Program. The loan under consideration to Solugen is under Title 17, which has a primary goal to finance projects and facilities in the United States (U.S.) that employ innovative and renewable or efficient energy technologies that avoid, reduce, or sequester anthropogenic emission of greenhouse gases (GHGs).

Solugen, Inc. (Solugen) is proposing to construct, own, and operate a bio-feedstock-based facility (called a Bioforge™) for the production of chemicals (gluconic acid) via a unique chemienzymatic process technology. The proposed Solugen Bioforge™ in Marshall, Minnesota (Bioforge™ Marshall), utilizes a dextrose sugar feedstock to manufacture bio-based organic acids (gluconic acids) for use in food, beverage, and pharmaceutical

industries, as well as the building and construction industry. The production of gluconic acid at Solugen's proposed Bioforge™ Marshall facility avoids the production of up to 17.8K tons per year of CO2, when compared to traditional gluconic acid production, thereby reducing overall national emissions of air pollutants and human-caused GHG emissions.

As an interested party and in accordance with DOE NEPA regulations, the EA with the draft Finding of No Significant Impact (FONSI) is included in the following link: https://www.energy.gov/lpo/environmental-assessments. If you have trouble accessing the link or need a copy, please contact LPO at LPO_Environmental@hq.doe.gov.

Please review and provide any comment you may have **by Monday, March 4, 2024 (comments must be received by this date):**

Email:
Please include "Solugen EA" in the subject line
LPO_Environmental@hq.doe.gov

Mail:
Solugen Environmental Assessment
Department of Energy –
Loan Programs Office
c/o ICF Consulting
1902 Reston Metro Plaza
Reston, VA 20190

Sincerely,

DONALD BROWN

Digitally signed by DONALD BROWN
Date: 2024.02.02 13:51:39 -05'00'

Donald Brown
NEPA Document Manager
Loan Programs Office

Cc: Stephan Roos, Department of Agriculture
Ray Kirsch, Department of Commerce
Department of Health, Environmental Health Division
Jill Townley, Department of Natural Resources, Environmental Review Unit
Pam Foster, Pollution Control Agency, Environmental Review Unit
Melissa King, Board of Water and Soil Resources
Katherine Lind, Department of Transportation, Office of Environmental Stewardship
Amanda Gronhovd, Office of the State Archaeologist
Melissa Cerda, Indian Affairs Council
Sarah Beimers, Minnesota State Historic Preservation Office
Southwest Regional Development Commission

Department of Energy
Washington, DC 20585

August 25, 2023

Anthony Reider, Chairperson
Flandreau Santee Sioux Tribe of South Dakota
603 West Broad Avenue
Flandreau, SD 57028

SUBJECT: U.S. Department of Energy Proposed Federal Loan Guarantee to Solugen, Inc. for the Bio-feedstock Facility in Marshall, Minnesota.

Dear Chairperson Reider,

The U.S. Department of Energy (DOE) is preparing an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) to assist in determining whether to provide Federal financial assistance (a loan guarantee) to Solugen, Inc. to support the construction and operation of a proposed bio-feedstock facility in the City of Marshall, Lyons County, Minnesota. Solugen, Inc. intends to own and operate a bio-feedstock-based platform (called a "Bioforge™") (the Project) to produce chemicals in a more environmentally friendly manner than is achieved by traditional methods. As part of the environmental review process, DOE is also conducting a historic resource review in compliance with Section 106 of the National Historic Preservation Act (NHPA).

The Applicant proposes to construct, own, and operate a the Bioforge™ to manufacture bio-based organic acids that, over time, with further research and development, will have the potential capability to produce bioplastic monomers. Solugen, Inc. will sell its chemical products either directly, or as formulated products to customers for use in the agriculture, concrete, petroleum, and water treatment industries. The Project will be constructed modularly, consisting of three separate "trains," each capable of manufacturing at least 25,000 metric tons per year of product.

The Project will be co-located with the supplier of its feedstock, Dextrose from corn syrup, at 1401 N 7th St Marshall, Minnesota 56258 (see Figure 1). The new facility will encompass approximately 20 acres of an approximately 60-acre site (see Figure 2 for conceptual layout).

This letter is intended to notify you of the proposed Federal project (a potential loan guarantee to Solugen, Inc.), identify if you have an interest in the proposed project site in Marshall, Minnesota, and provide you with the opportunity to comment and engage DOE in government-to-government consultation on the proposed project. Any comments or concerns you provide will help ensure that DOE considers Tribal interests and complies with its NEPA and NHPA Section 106 responsibilities. We want to give you the opportunity to raise any issues or concerns you may have regarding the Project site.

I would greatly appreciate notification if you do or do not have an interest in the project sites, as well as any comments or concerns you may have, within thirty (30) days of receipt of the letter (October 1, 2023). Should you have an interest in the project site, I will provide you with additional information pursuant to NEPA and the NHPA as it becomes available. Please provide your notification of interest and any comments or concerns by email at LPO_Environmental@hq.doe.gov or contact me by telephone at 202-913-3477.

Respectfully,

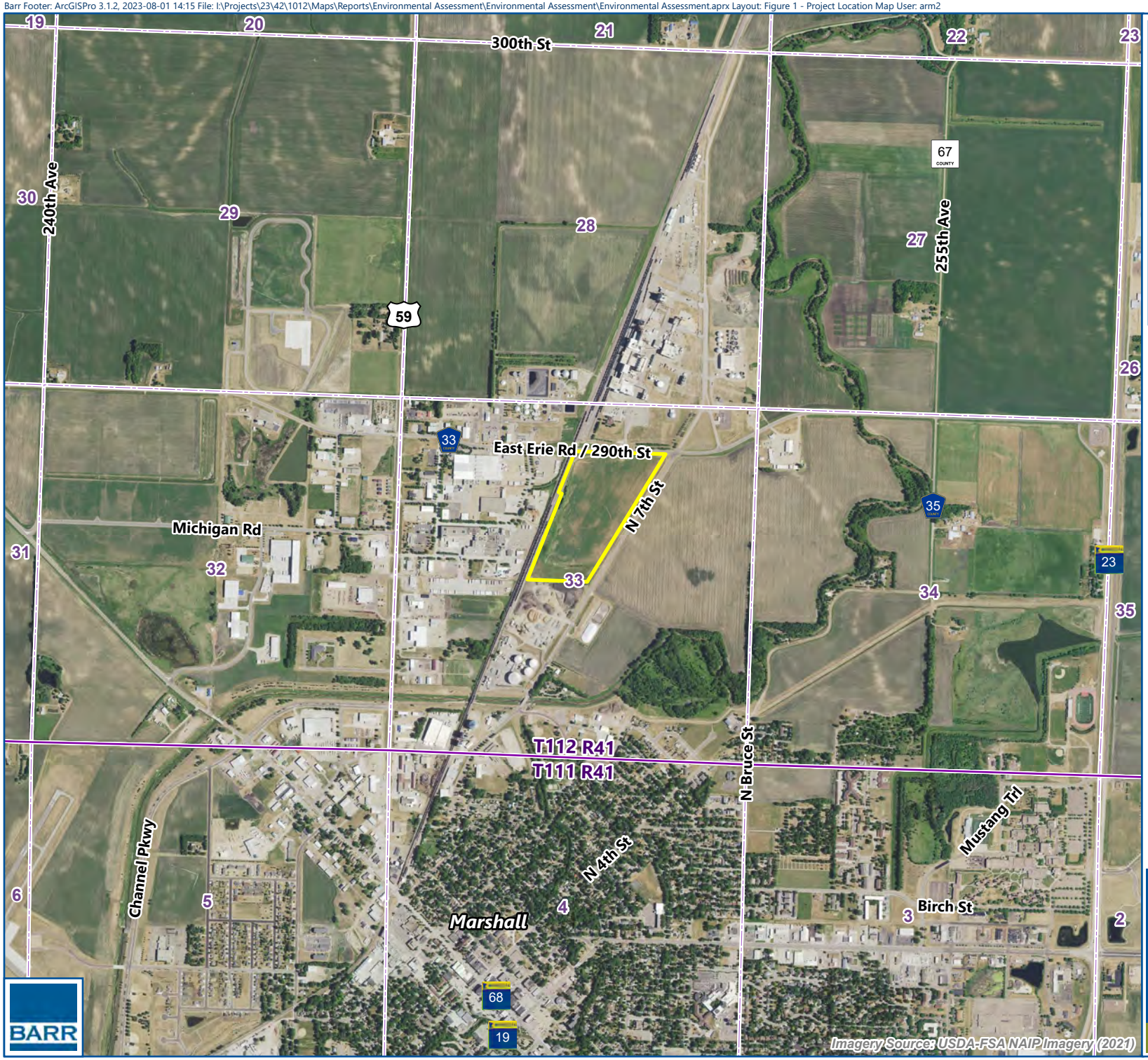
DONALD BROWN

Digitally signed by DONALD BROWN
Date: 2023.08.25 17:45:49 -04'00'

Don Brown
NEPA Document Manager
Loans Program Office

Attachments:
Figure 1: Project Location
Figure 2: Conceptual Layout

CC: Garrie Kills-A-Hundred, THPO



Project Boundary

Public Land Survey Section

Public Land Survey Township

N

0 1,000 2,000

Feet

PROJECT LOCATION
Solugen Marshall Bioforge
Marshall, MN

FIGURE 1

- Project Boundary
- Facility Footprint
- Building
- Railcar Loading
- Stormwater Pond
- Ashpalt/Roads

N

0 250 500

Feet

BARR

PROJECT OVERVIEW
Solugen Marshall Bioforge
Marshall, MN

FIGURE 2

From:	LPO_Environmental
To:	Sean Liu; Michael Hamilton
Subject:	FW: [EXT] U.S. Department of Energy Notice of Intent to Prepare Environmental Assessment
Date:	Tuesday, September 5, 2023 10:21:46 AM
Attachments:	image002.png FSST.Eagle_7e631301-0956-4d05-9826-77062457d69e.png image003.png DOE LPO_Solugen Inc Initiation Letter_Flandreau Santee Sioux Tribe of South Dakota.pdf

Hi Sean and Michael,

This is the only correspondence we have received so far from any of the 12 Tribes to whom we sent letters on August 28th. DOE's letter to the Tribes requested a response by October 1. We will send you any additional correspondence we receive from any of the Tribes.

Kind regards,

Don

Don Brown
Environmental Compliance
Loan Programs Office
U.S. Department of Energy
Donald.Brown@hq.doe.gov
Mobile: 202.913.3477

1000 Independence Ave. SW., Washington, DC 20585

From: Sara Childers <sara.childers@FSST.org>
Sent: Monday, August 28, 2023 4:45 PM
To: LPO_Environmental <lpo_environmental@hq.doe.gov>
Subject: [EXTERNAL] FW: [EXT] U.S. Department of Energy Notice of Intent to Prepare Environmental Assessment

Hello,

The Flandreau Santee Sioux Tribe has no issues with the proposed project site.

If any human remains and or cultural material is uncovered please stop and call us ASAP.

Thank you so much.

Sara Childers – THPO Assistant

Sara Childers
Tribal Historic Preservation Assistant
Flandreau Santee Sioux Tribe
603 W Broad Ave | Flandreau, SD 57028
p. 605.997.3891 x1226 | www.fsst-nsn.gov

From: Garrie Kills-A-Hundred <garrie.killsahundred@FSST.org>
Sent: Monday, August 28, 2023 12:39 PM
To: Sara Childers <sara.childers@FSST.org>
Subject: FW: [EXT] U.S. Department of Energy Notice of Intent to Prepare Environmental Assessment

Garrie Kills-A-Hundred
Tribal Historic Preservation Officer
Flandreau Santee Sioux Tribe
603 W Broad Ave | Flandreau, SD 57028
p. 605.997.3891 x1226 | www.fsst-nsn.gov

From: LPO_Environmental <lpo_environmental@hq.doe.gov>
Sent: Monday, August 28, 2023 8:41 AM
To: Tony Reider <tony.reider@fsst.org>
Cc: Garrie Kills-A-Hundred <garrie.killsahundred@FSST.org>
Subject: [EXT] U.S. Department of Energy Notice of Intent to Prepare Environmental Assessment

Good Afternoon,
Please see the attached notification letter of DOE's intent to prepare an environmental assessment and engage in Section 106 consultation for the Solugen Bioforge 2 Project in Marshall, Minnesota.
Kind regards,
Don

Don Brown
Environmental Compliance
Loan Programs Office
U.S. Department of Energy
Donald.Brown@hq.doe.gov
Mobile: 202.913.3477

1000 Independence Ave. SW., Washington, DC 20585

Department of Energy
Washington, DC 20585

February 2, 2024

Anthony Reider, Chairperson
Flandreau Santee Sioux Tribe of South Dakota
603 West Broad Avenue
Flandreau, SD 57028

SUBJECT: U.S. Department of Energy, Proposed Federal Loan Guarantee to Solugen, Inc. for the bio-feedstock facility in Marshall, Minnesota

Dear Chairperson Reider,

The U.S. Department of Energy (DOE), Loan Programs Office (LPO) prepared an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) to consider the environmental impacts of its decision whether or not to provide a Federal loan guarantee to Solugen, Inc. to support the proposed bio-feedstock facility in the City of Marshall, Lyons County, Minnesota. Solugen, Inc. intends to own and operate a bio-feedstock-based platform (called a "Bioforge™") (the Project) to produce chemicals in a more environmentally friendly manner than is achieved by traditional methods. The decision to prepare an EA was made in accordance with the requirements of NEPA, the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021).

LPO provides loans and loan guarantees under four programs – the Title 17 Clean Energy Financing Program (Title 17), the Advanced Transportation Financing Program, the Tribal Energy Financing Program, and the Carbon Dioxide Transportation Infrastructure Program. The loan under consideration to Solugen is under Title 17, which has a primary goal to finance projects and facilities in the United States (U.S.) that employ innovative and renewable or efficient energy technologies that avoid, reduce, or sequester anthropogenic emission of greenhouse gases (GHGs).

Solugen, Inc. (Solugen) is proposing to construct, own, and operate a bio-feedstock-based facility (called a Bioforge™) for the production of chemicals (gluconic acid) via a unique chemienzymatic process technology. The proposed Solugen Bioforge™ in Marshall, Minnesota (Bioforge™ Marshall), utilizes a dextrose sugar feedstock to manufacture bio-based organic acids (gluconic acids) for use in food, beverage, and pharmaceutical industries, as well as the building and construction industry. The production of gluconic acid at Solugen's proposed Bioforge™ Marshall facility avoids the production of up to

17.8K tons per year of CO2, when compared to traditional gluconic acid production, thereby reducing overall national emissions of air pollutants and human-caused GHG emissions.

As an interested party and in accordance with DOE NEPA regulations, the EA with the draft Finding of No Significant Impact (FONSI) is included in the following link: https://www.energy.gov/lpo/environmental-assessments. If you have trouble accessing the link or need a copy, please contact LPO at LPO_Environmental@hq.doe.gov.

Please review and provide any comment you may have **by Monday, March 4, 2024 (comments must be received by this date):**

Email:
Please include "Solugen EA" in the subject line
LPO_Environmental@hq.doe.gov

Mail:
Solugen Environmental Assessment
Department of Energy –
Loan Programs Office
c/o ICF Consulting
1902 Reston Metro Plaza
Reston, VA 20190

Sincerely,

DONALD BROWN Digitally signed by DONALD BROWN
Date: 2024.02.02 12:13:49 -05'00'

Donald Brown
NEPA Document Manager
Loan Programs Office

CC: Garrie Kills-A-Hundred, THPO

Department of Energy
Washington, DC 20585

October 3, 2022

Sarah Beimers
Minnesota State Historic Preservation Office
50 Sherburne Avenue, Suite 203
St. Paul, MN 55155

SUBJECT: U.S. Department of Energy, Solugen Bio-Feedstock Facility; Section 106 Initiation

Dear Ms. Beimers:

Pursuant to its authority under Title XVII of the Energy Policy Act of 2005 (EPAct) which established a federal loan guarantee program for certain projects that employ innovative technologies and authorizes the Secretary of Energy to make loan guarantees available for those projects, the U.S. Department of Energy (DOE), Loan Programs Office (LPO) is evaluating whether to provide a Federal loan to Solugen, Inc. to support the proposed bio-feedstock facility in the City of Marshall, Lyons County, Minnesota (DOE's proposed action and undertaking). The purpose of this letter is to consult with the Minnesota State Historic Preservation Office under Section 106 of the National Historic Preservation Act and its implementing regulations, 36 CFR part 800, present the DOE undertaking, present the archaeological and architectural areas of potential effects (APE), and seek your concurrence with these APEs.

DOE Undertaking and APE

The Applicant proposes to construct, own, and operate a bio-feedstock-based platform to produce chemicals. This new Bioforge™ will be capable of manufacturing bio-based organic acids that, over time, with further research and development, will have the potential capability to produce bioplastic monomers. Solugen will sell its chemical products either directly, or as formulated products to customers for use in the agriculture, concrete, petroleum, and water treatment industries. The Project will be constructed modularly, consisting of three separate "trains," each capable of manufacturing at least 25,000 metric tons per year of product.

The Project will be co-located with the supplier of its feedstock (Dextrose from corn syrup) at 1401 N 7th St Marshall, Minnesota 56258 (see Figure 1). The new facility will encompass approximately 20 acres of an approximately 60-acre site (see Figure 2 for conceptual site layout). The area of potential effects (APE) for the project is defined as a one quarter mile bugger surrounding the 60-acre parcel in which project activities will occur (see Figure 3).

DOE Finding

In accordance with Section 106 to identify historic properties and assess adverse effects, DOE has reviewed the *Phase Ia Cultural Resources Literature Review for the Marshal Bioforge Project in Marshall, Minnesota*, dated September 2023 (attached with this letter).

Background research conducted in July 2023 found no previously documented archaeological resources in or adjacent to the Project area. The literature review also determined that the Project area consisted entirely of a sewage disposal pond in the 1960s and 1970s that was subsequently filled in with disturbed soils. As the Project area consists entirely of disturbed soils, there is no potential to impact archaeological resources during Project activities.

The literature review also found that no previously documented historic architectural resources are located within the APE. In addition, the Project is located primarily in an industrial setting. Historic aerial imagery indicates that the industrial properties on the west and south sides of the APE were largely constructed sometime between 1971 and 1979, while the industrial properties on the north side of the APE were constructed after 1984. This timeline indicates that the industrial properties are between 44 and 52 years old on the west and south sides of the APE, and less than 39 years old on the north side of the APE. Given the age of the properties within the APE and a lack of documented historic architectural resources, no historic architectural properties will be impacted by the Project.

The report concluded that no historic architectural structures, historic areas, or archaeological sites are present within the project area, and DOE concurs that no historic properties archaeological sites, architectural structures, or historic areas) are affected. DOE is requesting the SHPO's concurrence on the APE and its no historic properties affected determination for both historic architectural resources and archaeological resources.

We look forward to SHPO's concurrence on the APE and on DOE's no historic properties affected determination. If you have any questions or would like to discuss this project further, please contact me at 202-913-3477, or email at lpo_environmental@hq.doe.gov.

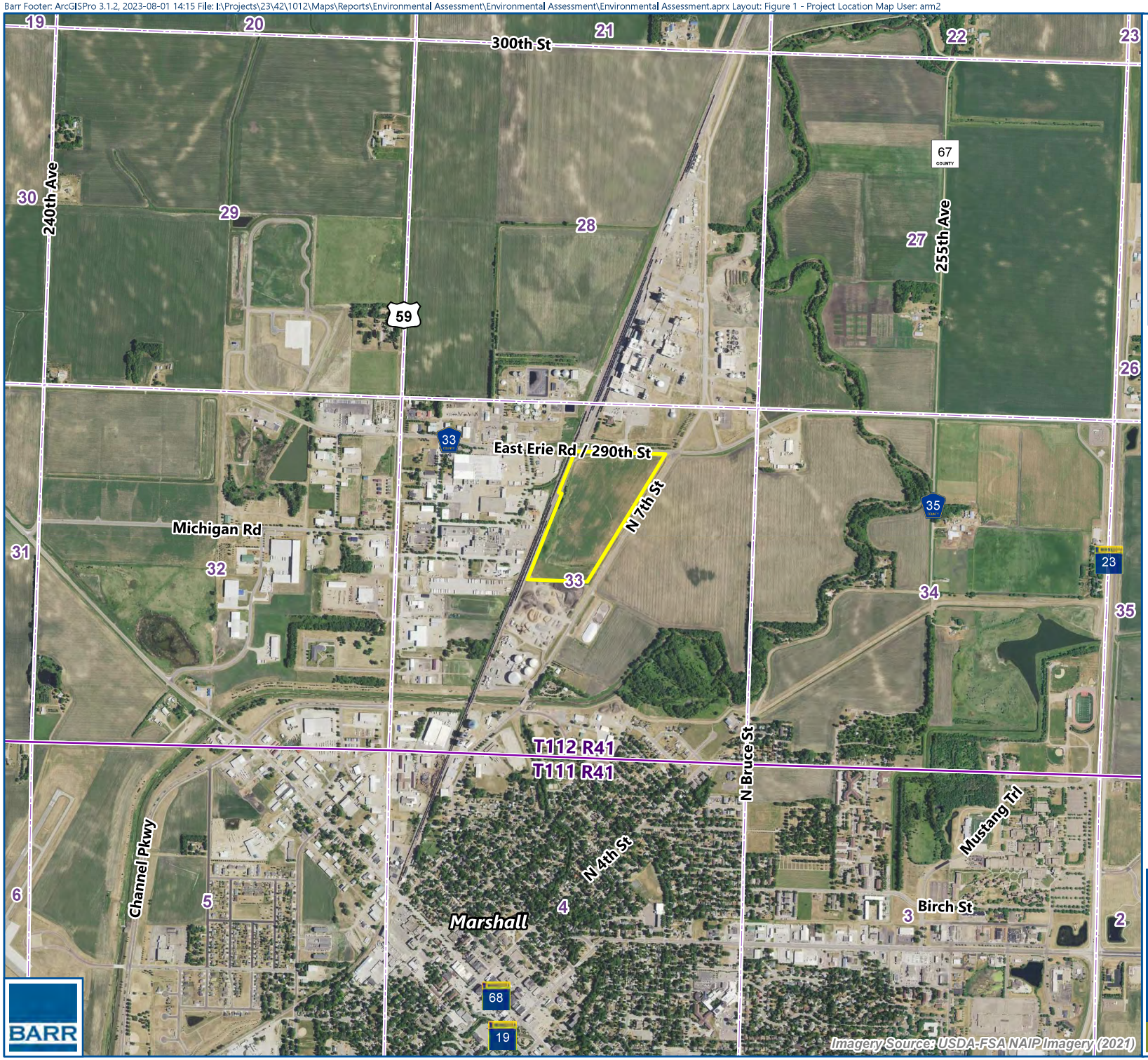
Respectfully,

DONALD BROWN Digitally signed by DONALD BROWN
Date: 2023.10.03 11:25:27 -04'00'

Don Brown
NEPA Document Manager
Loan Programs Office

Attachments:
Figure 1: Project Location
Figure 2: Conceptual Layout
Figure 3: Area of Potential Effects

Cc: Amanda Gronhovd, Office of the State Archaeologist



Project Boundary

Public Land Survey Section

Public Land Survey Township

0 1,000 2,000

Feet

PROJECT LOCATION
Solugen Marshall Bioforge
Marshall, MN

FIGURE 1

Barr Footer: ArcGISPro 3.1.2, 2023-09-20 11:52 File: I:\Projects\23\42\1012\Maps\Reports\Environmental Assessment\Environmental Assessment\Environmental Assessment.aprx Layout: Figure 2 - Project Overview User: arm2

- Project Boundary
- Facility Footprint
- Ashpalt/Roads
- Building
- Railcar Loading
- Stormwater Pond
- Gravel Access Road
- Dextrose Line
- Fence
- Railroad

N

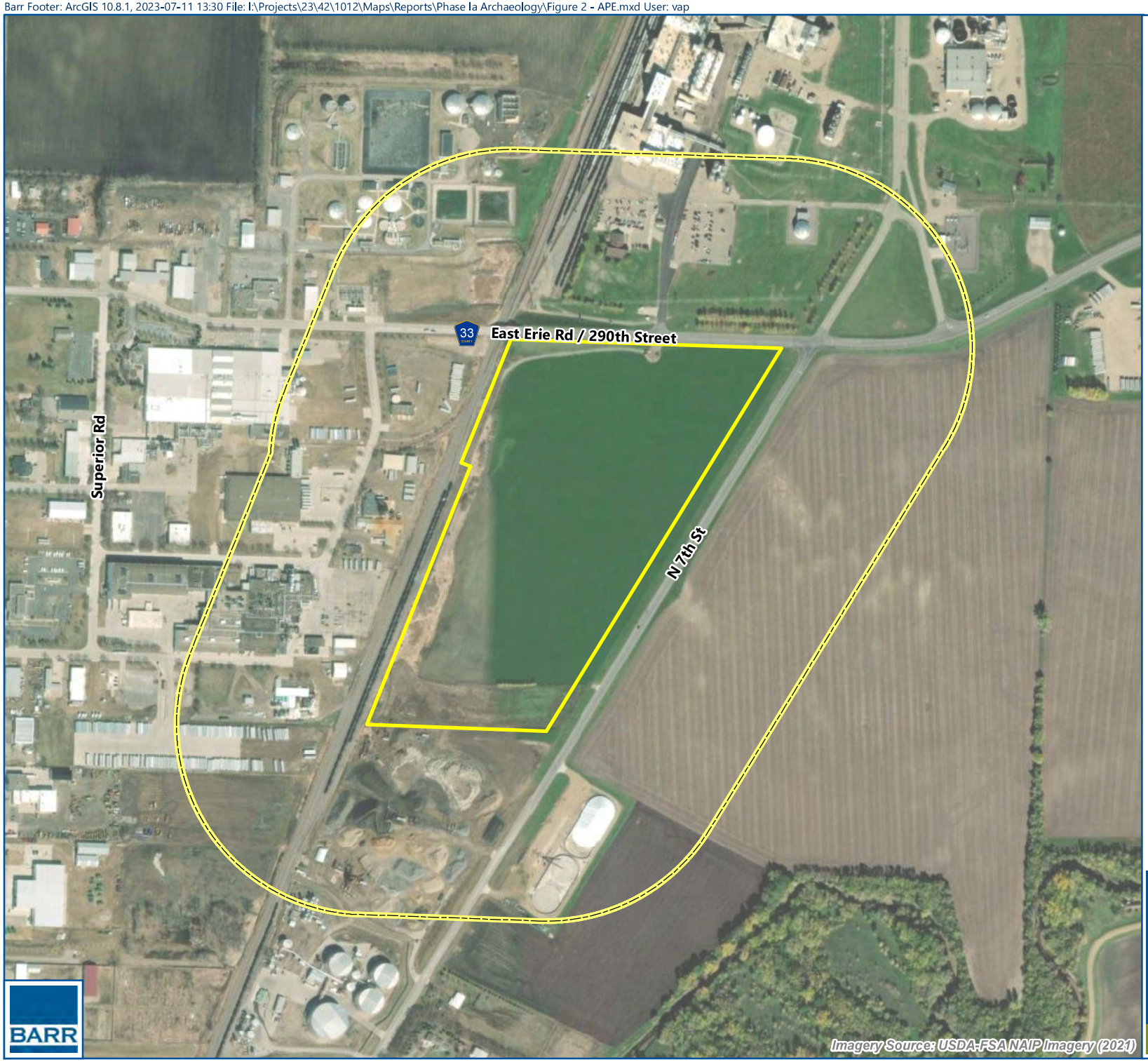
0 250 500

Feet

PROJECT OVERVIEW
Solugen Marshall Bioforge
Marshall, MN

FIGURE 2

Barr Footer: ArcGIS 10.8.1, 2023-07-11 13:30 File: I:\Projects\23\42\1012\Maps\Reports\Phase Ia Archaeology\Figure 2 - APE.mxd User: vap



Project Boundary

APE

N

0 1,000

Feet

AREA OF
POTENTIAL EFFECTS
Solugen Marshall Bioforge
Marshall, MN

FIGURE 3

BARR

November 29, 2023 *VIA E-MAIL ONLY*

Donald Brown
NEPA Document Manager
Department of Energy
Washington DC 20585

RE: Proposed Federal Loan Guarantee to Solugen, Inc. for Bio-Feedstock Facility
1401 North 7th Street
Marshall, Lyon County
SHPO Number: 2023-2609

Dear Mr. Brown,

Thank you for the opportunity to review and comment on the above-referenced project. Information received in our office on October 3, 2023 has been reviewed by the State Historic Preservation office pursuant to Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108) and its implementing federal regulations, "Protection of Historic Properties" (36 CFR Part 800).

We last wrote to your agency on October 4, 2023 providing initial comments in response to your agency's environmental assessment under the National Environmental Policy Act (NEPA). At the time of this response, we did not realize that your agency had concurrently submitted a letter and documentation in support of your agency's determinations and findings under Section 106.

We have now completed a review of your letter dated October 3, 2023, a submission which included the following documentation in support of your agency's No Historic Properties Affected finding:

- Figure 1: Project Location Map;
- Figure 2: Project/Site Overview Map;
- Figure 3: Area of Potential Effects Map;
- Report titled *Phase Ia Cultural Resources Literature Review, Marshall Bioforge* (Marshall, Lyon County, Minnesota) dated September 2023 as prepared by Barr Engineering for Solugen, Inc.

Define Federal Undertaking and Area of Potential Effect
We understand by your October 3rd letter that your agency proposes to issue a federal loan to Solugen, Inc. for the construction of a bio-feedstock facility on a vacant parcel adjacent to an existing industrial area in Marshall, MN.

Based upon our understanding of the scope and nature of the proposed federal undertaking, we agree that the Area of Potential Effect (APE) boundary, as described in your October 3rd letter and documented on Figure 3, is generally appropriate to take into account the potential direct and indirect effects of the proposed undertaking.

Identification of Historic Properties
Archaeology
We agree with the agency conclusion, as supported by the literature review report, that there are no recorded archaeological sites and that the likelihood of intact archaeological sites is low due to the extent of previous ground disturbance associated with the sewage disposal pond within the APE. Further, we agree that additional archaeological field survey is not warranted for the undertaking as it is currently proposed.

Historic/Architectural

Except for the property listed below, our records confirm the results of the literature review that there are no previously documented historic/architectural properties within the APE. The following property was recently added to our historic inventory and is located within the APE:

- [LY-MSC-00135] Bridge 42539 on CSAH 33 over BNSF RR (constructed in 1983) – was surveyed and evaluated in early 2023 as part of a statewide bridge survey and was determined to be **ineligible** for listing in the National Register of Historic Places.

Additionally, we understand by both your October 3rd letter and the Phase Ia report that there are several properties 45 years old or older within the APE and these are primarily industrial properties to the west and south of the project site. As you are aware, review of a federal undertaking under Section 106 must take into consideration any properties within the APE that are either listed or *potentially eligible* for listing in the National Register of Historic Places (NRHP). While our office's historic inventory data includes NRHP listed, previously determined NRHP eligible/ineligible properties, and properties warranting further survey and evaluation as noted in the Phase Ia report, the inventory is not considered comprehensive and typically additional field survey is needed within APEs that have not been subject to previous survey.

Per our current state survey guidelines and best practices for historic property identification for federal undertakings of this type, the agency would complete, at a minimum, reconnaissance level survey for any properties 45 years or older within the APE. From our perspective, the Phase Ia survey report and your agency letter do not provide sufficient property documentation in support of a determination of "no historic architectural properties" within the APE. However, we assume that your agency finds that the level of effort to identify historic properties within the APE is reasonable and has been carried out in good faith in accordance with the nature and scope of the proposed undertaking [36 CFR 800.4(b)].

Since property address listing, year of construction, current property photographs for "of age" properties in the APE were not provided to our office, we have utilized historic aerials included in the Phase Ia report along with Google Street View and information available on the Lyon County website for those within the APE. Based upon the minimal level of information available to our office and including consideration of the location and extent of the federally funded new construction, it is our opinion that further survey and evaluation of properties within the APE constructed prior to 1977 is not warranted.

Finding of Effect
Based upon information provided to our office by your agency, we agree that **no historic properties** will be affected by the federal undertaking, as it is currently proposed.

Consulting Party/Public Engagement
We assume that your agency has notified any interested parties, including Native American tribes, and also the public, of the federal undertaking and provided them with an opportunity to review and comment on the undertaking and its effects on historic properties as required under 36 CFR 800.4(d)(1). Please notify our office if your agency has received, or receives after we issue this comment letter, from a consulting party or the public any written disagreements with your agency's Section 106 findings and determinations.

If you have any questions regarding our review of this project, please contact me at 651-201-3290 or sarah.beimers@state.mn.us.

Sincerely,

Sarah J. Beimers
Environmental Review Program Manager

United States Department of Agriculture

Donald Brown
Environmental Compliance
Loan Programs Office
U.S. Department of Energy
1000 Independence Ave. SW,
Washington, DC 20585

Dear Donald,

The purpose of the Farmland Protection Policy Act (FPPA) is to minimize the extent that federal programs contribute to the unnecessary and irreversible conversion of prime and important farmland to non-agricultural uses. The FPPA requires federal agencies involved in projects that may convert farmland to determine whether the proposed conversion is consistent with the FPPA.

Upon review of the **Bio-feedstock Facility Project,** I have determined that **neither a CPA-106 nor an AD-1006 FPPA form is required** for the following reason;

- Lands identified as "urbanized area" (UA) on Census Bureau maps are NOT covered by the act. This exclusion is listed in The Farmland Protection Policy Act of 1981; 440-V-CPM – Amend. 12 – August 2012; Part 523.10.B(ii).

Other agencies may have federal, state, or local wetland, cultural resources, water quality or threatened and endangered species jurisdiction in the proposed project and should be consulted.

If you should have any questions or need further assistance, please feel free to contact me.

Sincerely,

Jordan Welp
Soil Scientist
Natural Resources Conservation Service
800 E Main Street, Suite 400
Marshall, MN 56258
Phone: (507) 591-4265
Email: jordan.welp@usda.gov

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793 Fax: (952) 646-2873

In Reply Refer To: August 30, 2023
Project code: 2023-0123521
Project Name: Solugen Bioforge Facility

Subject: Consistency letter for 'Solugen Bioforge Facility' for specified threatened and endangered species that may occur in your proposed project location consistent with the Minnesota-Wisconsin Endangered Species Determination Key (Minnesota-Wisconsin DKey).

Dear Tyler Conley:

The U.S. Fish and Wildlife Service (Service) received on **August 30, 2023** your effect determination(s) for the 'Solugen Bioforge Facility' (Action) using the Minnesota-Wisconsin DKey within the Information for Planning and Consultation (IPaC) system. You have submitted this key to satisfy requirements under Section 7(a)(2). The Service developed this system in accordance of with the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 et seq.).

Based on your answers and the assistance of the Service's Minnesota-Wisconsin DKey, you made the following effect determination(s) for the proposed Action:

Species	Listing Status	Determination
Monarch Butterfly (*Danaus plexippus*)	Candidate	No effect
Tricolored Bat (*Perimyotis subflavus*)	Proposed Endangered	No effect

Determination Information

Thank you for informing the Service of your "No Effect" determination(s). Your agency has met consultation requirements and no further consultation is required for the species you determined will not be affected by the Action.

Additional Information

Sufficient project details: Please provide sufficient project details on your project homepage in IPaC (Define Project, Project Description) to support your conclusions. Failure to disclose important aspects of your project that would influence the outcome of your effects determinations may negate your determinations and invalidate this letter. If you have site-specific information that leads you to believe a different determination is more appropriate for your

project than what the Dkey concludes, you can and should proceed based on the best available information.

Future project changes: The Service recommends that you contact the Minnesota-Wisconsin Ecological Services Field Office or re-evaluate the project in IPaC if: 1) the scope or location of the proposed Action is changed; 2) new information reveals that the action may affect listed species or designated critical habitat in a manner or to an extent not previously considered; 3) the Action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. If any of the above conditions occurs, additional consultation with the Service should take place before project changes are final or resources committed.

For non-Federal representatives: Please note that when a project requires consultation under section 7 of the Act, the Service must consult directly with the Federal action agency unless that agency formally designates a non-Federal representative (50 CFR 402.08). Non-Federal representatives may prepare analyses or conduct informal consultations; however, the ultimate responsibility for section 7 compliance under the Act remains with the Federal agency. Please include the Federal action agency in additional correspondence regarding this project.

Species-specific information

Bald and Golden Eagles: Bald eagles, golden eagles, and their nests are protected under the Bald and Golden Eagle Protection Act (54 Stat. 250, as amended, 16 U.S.C. 668a-d) (Eagle Act). The Eagle Act prohibits, except when authorized by an Eagle Act permit, the "taking" of bald and golden eagles and defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The Eagle Act's implementing regulations define disturb as "… to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

If you observe a bald eagle nest in the vicinity of your proposed project, you should follow the National Bald Eagle Management Guidelines (May 2007). For more information on eagles and conducting activities in the vicinity of an eagle nest, please visit our regional eagle website or contact Margaret at Margaret_Rheude@fws.gov. **If the Action may affect bald or golden eagles, additional coordination with the Service under the Eagle Act may be required.**

Coordination with the Service is not complete if additional coordination is advised above for any species.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Solugen Bioforge Facility

2. Description

The following description was provided for the project 'Solugen Bioforge Facility':

> Solugen is proposing to construct a chemical manufacturing facility in Marshall, Minnesota.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@44.46773385,-95.78550756345734,14z

QUALIFICATION INTERVIEW

1. This determination key is intended to assist the user in evaluating the effects of their actions on Federally listed species in Minnesota and Wisconsin. It does not cover other prohibited activities under the Endangered Species Act (e.g., for wildlife: import/export, Interstate or foreign commerce, possession of illegally taken wildlife, etc.; for plants: import/export, reduce to possession, malicious destruction on Federal lands, commercial sale, etc.) or other statutes. Additionally, this key DOES NOT cover wind development, purposeful take (e.g., for research or surveys), communication towers that have guy wires or are over 450 feet in height, aerial or other large-scale application of any chemical (such as insecticide or herbicide), and approval of long-term permits or plans (e.g., FERC licenses, HCP's).

   Click **YES** to acknowledge that you must consider other prohibitions of the ESA or other statutes outside of this determination key.

   Yes
2. Is the action being funded, authorized, or carried out by a Federal agency?

   Yes
3. Are you the Federal agency or designated non-federal representative?

   No
4. Does the action involve the installation or operation of wind turbines?

   No
5. Does the action involve purposeful take of a listed animal?

   No
6. Does the action involve a new communications tower?

   No
7. Does the activity involve aerial or other large-scale application of ANY chemical, including pesticides (insecticide, herbicide, fungicide, rodenticide, etc)?

   No
8. Does the action occur near a bald eagle nest?

   Note: Contact the Minnesota or Wisconsin Department of Natural Resources for an up-to-date list of known bald eagle nests.

   No
9. Will your action permanently affect local hydrology?

   No
10. Will your action temporarily affect local hydrology?

    No

11. Will your project have any direct impacts to a stream or river (e.g., Horizontal Directional Drilling (HDD), hydrostatic testing, stream/road crossings, new stormwater outfall discharge, dams, other in-stream work, etc.)?

    No

12. Does your project have the potential to impact the riparian zone or indirectly impact a stream/river (e.g., cut and fill; horizontal directional drilling; construction; vegetation removal; pesticide or fertilizer application; discharge; runoff of sediment or pollutants; increase in erosion, etc.)?

    Note: Consider all potential effects of the action, including those that may happen later in time and outside and downstream of the immediate area involved in the action.

    Endangered Species Act regulation defines "effects of the action" to include all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (50 CFR 402.02).

    No

13. Will your action disturb the ground or existing vegetation?

    Note: This includes any off-road vehicle access, soil compaction (enough to collapse a rodent burrow), digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or prescribed fire), cultivation, development, etc.

    Yes

14. Will your action include spraying insecticides?

    No

15. Does your action area occur entirely within an already developed area?

    Note: Already developed areas are already paved, covered by existing structures, manicured lawns, industrial sites, or cultivated cropland, AND do not contain trees that could be roosting habitat. Be aware that listed species may occur in areas with natural, or semi-natural, vegetation immediately adjacent to existing utilities (e.g. roadways, railways) or within utility rights-of-way such as overhead transmission line corridors, and can utilize suitable trees, bridges, or culverts for roosting even in urban dominated landscapes (so these are not considered "already developed areas" for the purposes of this question). If unsure, select NO..

    Yes

16. Does the action have potential indirect effects to listed species or the habitats they depend on (e.g., water discharge into adjacent habitat or waterbody, changes in groundwater elevation, introduction of an exotic plant species)?

    No

17. [Hidden Semantic] Does the action area intersect the monarch butterfly species list area?

    Automatically answered

    Yes

18. [Hidden semantic] Does the action intersect the Tricolored bat species list area?

    Automatically answered

    Yes

IPAC USER CONTACT INFORMATION

Agency: Barr Engineering
Name: Tyler Conley
Address: 4300 MarketPointe Drive Suite 200
City: Minneapolis
State: MN
Zip: 55435
Email tconley@barr.com
Phone: 9528423638

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Department of Energy

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793 Fax: (952) 646-2873

In Reply Refer To:
Project Code: 2023-0123521
Project Name: Solugen Bioforge Facility

January 11, 2024

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq.*).

Threatened and Endangered Species
The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance
Please refer to refer to our Section 7 website for guidance and technical assistance, including step-by-step instructions for making effects determinations for each species that might be present and for specific guidance on the following types of projects: projects in developed areas, HUD, CDBG, EDA, USDA Rural Development projects, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

We recommend running the project (if it qualifies) through our **Minnesota-Wisconsin Federal Endangered Species Determination Key (Minnesota-Wisconsin ("D-key"))**. A demonstration video showing how-to access and use the determination key is available. Please note that the Minnesota-Wisconsin D-key is the third option of 3 available d-keys. D-keys are tools to help Federal agencies and other project proponents determine if their proposed action has the potential to adversely affect federally listed species and designated critical habitat. The Minnesota-Wisconsin D-key includes a structured set of questions that assists a project proponent in determining whether a proposed project qualifies for a certain predetermined consultation outcome for all federally listed species found in Minnesota and Wisconsin (except for the northern long-eared bat- see below), which includes determinations of “no effect” or “may affect, not likely to adversely affect." In each case, the Service has compiled and analyzed the best available information on the species’ biology and the impacts of certain activities to support these determinations.

If your completed d-key output letter shows a "No Effect" (NE) determination for all listed species, print your IPaC output letter for your files to document your compliance with the Endangered Species Act.

For Federal projects with a “Not Likely to Adversely Affect” (NLAA) determination, our concurrence becomes valid if you do not hear otherwise from us after a 30-day review period, as indicated in your letter.

If your d-key output letter indicates additional coordination with the Minnesota-Wisconsin Ecological Services Field Office is necessary (i.e., you get a “May Affect” determination), you will be provided additional guidance on contacting the Service to continue ESA coordination outside of the key; ESA compliance cannot be concluded using the key for “May Affect” determinations unless otherwise indicated in your output letter.

Note: Once you obtain your official species list, you are not required to continue in IPaC with d-keys, although in most cases these tools should expedite your review. If you choose to make an effects determination on your own, you may do so. If the project is a Federal Action, you may want to review our section 7 step-by-step instructions before making your determinations.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of “There are no listed species found within the vicinity of the project,” then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **no effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.
2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see below) – then project proponents must determine if proposed activities will have **no effect** on or **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain Life History Information for Listed and Candidate Species on our office website. If no impacts will occur to a species on the IPaC species list (e.g., there is no habitat present in the project area), the appropriate determination is **no effect**. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.

3. Should you determine that project activities **may affect** any federally listed, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

Northern Long-Eared Bats
Northern long-eared bats occur throughout Minnesota and Wisconsin and the information below may help in determining if your project may affect these species.

This species hibernates in caves or mines only during the winter. In Minnesota and Wisconsin, the hibernation season is considered to be November 1 to March 31. During the active season (April 1 to October 31) they roost in forest and woodland habitats. Suitable summer habitat for northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches dbh for northern long-eared bat that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, northern long-eared bats could be affected.

Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas,
- Trees found in highly developed urban areas (e.g., street trees, downtown areas),
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees, and
- A monoculture stand of shrubby vegetation with no potential roost trees.

If IPaC returns a result that northern long-eared bats are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** this species **IF** one or more of the following activities are proposed:

- Clearing or disturbing suitable roosting habitat, as defined above, at any time of year,
- Any activity in or near the entrance to a cave or mine,
- Mining, deep excavation, or underground work within 0.25 miles of a cave or mine,
- Construction of one or more wind turbines, or
- Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on the northern long-eared bat. Concurrence from the Service is not required for **No**

Effect determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.

If any of the above activities are proposed, and the northern long-eared bat appears on the user's species list, the federal project user will be directed to either the range-wide northern long-eared bat D-key or the Federal Highways Administration, Federal Railways Administration, and Federal Transit Administration Indiana bat/ Northern long-eared bat D-key, depending on the type of project and federal agency involvement. Similar to the Minnesota-Wisconsin D-key, these d-keys helps to determine if prohibited take might occur and, if not, will generate an automated verification letter.

Please note: On November 30, 2022, the Service published a proposal final rule to reclassify the northern long-eared bat as endangered under the Endangered Species Act. On January 26, 2023, the Service published a 60-day extension for the final reclassification rule in the Federal Register, moving the effective listing date from January 30, 2023, to March 31, 2023. This extension will provide stakeholders and the public time to preview interim guidance and consultation tools before the rule becomes effective. When available, the tools will be available on the Service's northern long-eared bat website (https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis). Once the final rule goes into effect on March 31, 2023, the 4(d) D-key will no longer be available (4(d) rules are not available for federally endangered species) and will be replaced with a new Range-wide NLEB D-key (range-wide d-key). For projects not completed by March 31, 2023, that were previously reviewed under the 4(d) d-key, there may be a need for reinitiation of consultation. For these ongoing projects previously reviewed under the 4(d) d-key that may result in incidental take of the northern long-eared bat, we recommend you review your project using the new range-wide d-key once available. If your project does not comply with the range-wide d-key, it may be eligible for use of the Interim (formal) Consultation framework (framework). The framework is intended to facilitate the transition from the 4(d) rule to typical Section 7 consultation procedures for federally endangered species and will be available only until spring 2024. Again, when available, these tools (new range-wide d-key and framework) will be available on the Service's northern long-eared bat website.

Whooping Crane
Whooping crane is designated as a non-essential experimental population in Wisconsin and consultation under Section 7(a)(2) of the Endangered Species Act is only required if project activities will occur within a National Wildlife Refuge or National Park. If project activities are proposed on lands outside of a National Wildlife Refuge or National Park, then you are not required to consult. For additional information on this designation and consultation requirements, please review "Establishment of a Nonessential Experimental Population of Whooping Cranes in the Eastern United States."

Other Trust Resources and Activities
Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. Should bald or golden eagles occur within or near the project area please contact our office for further coordination. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the

mortality of migratory birds whenever possible and we encourage implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed voluntary guidelines for minimizing impacts.

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to guidelines developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's Wind Energy Guidelines. In addition, please refer to the Service's Eagle Conservation Plan Guidance, which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

State Department of Natural Resources Coordination
While it is not required for your Federal section 7 consultation, please note that additional state endangered or threatened species may also have the potential to be impacted. Please contact the Minnesota or Wisconsin Department of Natural Resources for information on state listed species that may be present in your proposed project area.

Minnesota
Minnesota Department of Natural Resources - Endangered Resources Review Homepage
Email: Review.NHIS@state.mn.us

Wisconsin
Wisconsin Department of Natural Resources - Endangered Resources Review Homepage
Email: DNRERReview@wi.gov

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
(952) 858-0793

PROJECT SUMMARY

Project Code: 2023-0123521
Project Name: Solugen Bioforge Facility
Project Type: Commercial Development
Project Description: Solugen is proposing to construct a chemical manufacturing facility in Marshall, Minnesota.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@44.467721049999994,-95.78551548916816,14z

Counties: Lyon County, Minnesota

ENDANGERED SPECIES ACT SPECIES

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

---

1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

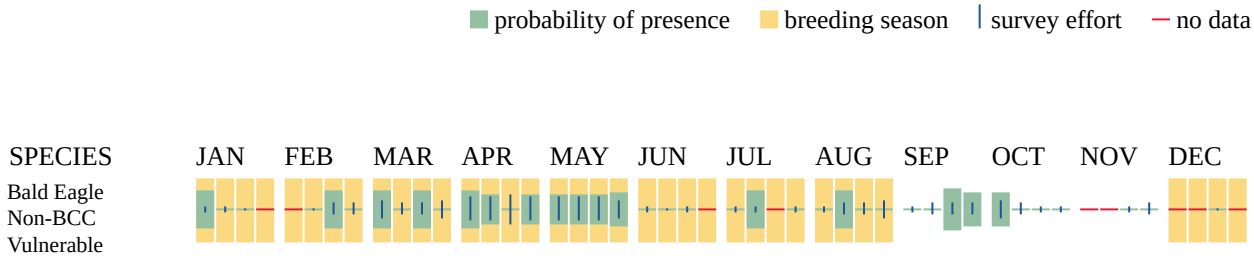
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Golden-plover *Pluvialis dominica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10561	Breeds elsewhere
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Franklin's Gull *Leucophaeus pipixcan* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10567	Breeds May 1 to Jul 31
Golden-winged Warbler *Vermivora chrysoptera* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20

NAME	BREEDING SEASON
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Pectoral Sandpiper *Calidris melanotos* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9561	Breeds elsewhere
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

■ probability of presence ■ breeding season | survey effort – no data

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER EMERGENT WETLAND

- PEM1C

IPAC USER CONTACT INFORMATION

Agency: Barr Engineering
Name: Tyler Conley
Address: 4300 MarketPointe Drive Suite 200
City: Minneapolis
State: MN
Zip: 55435
Email tconley@barr.com
Phone: 9528423638

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Department of Energy

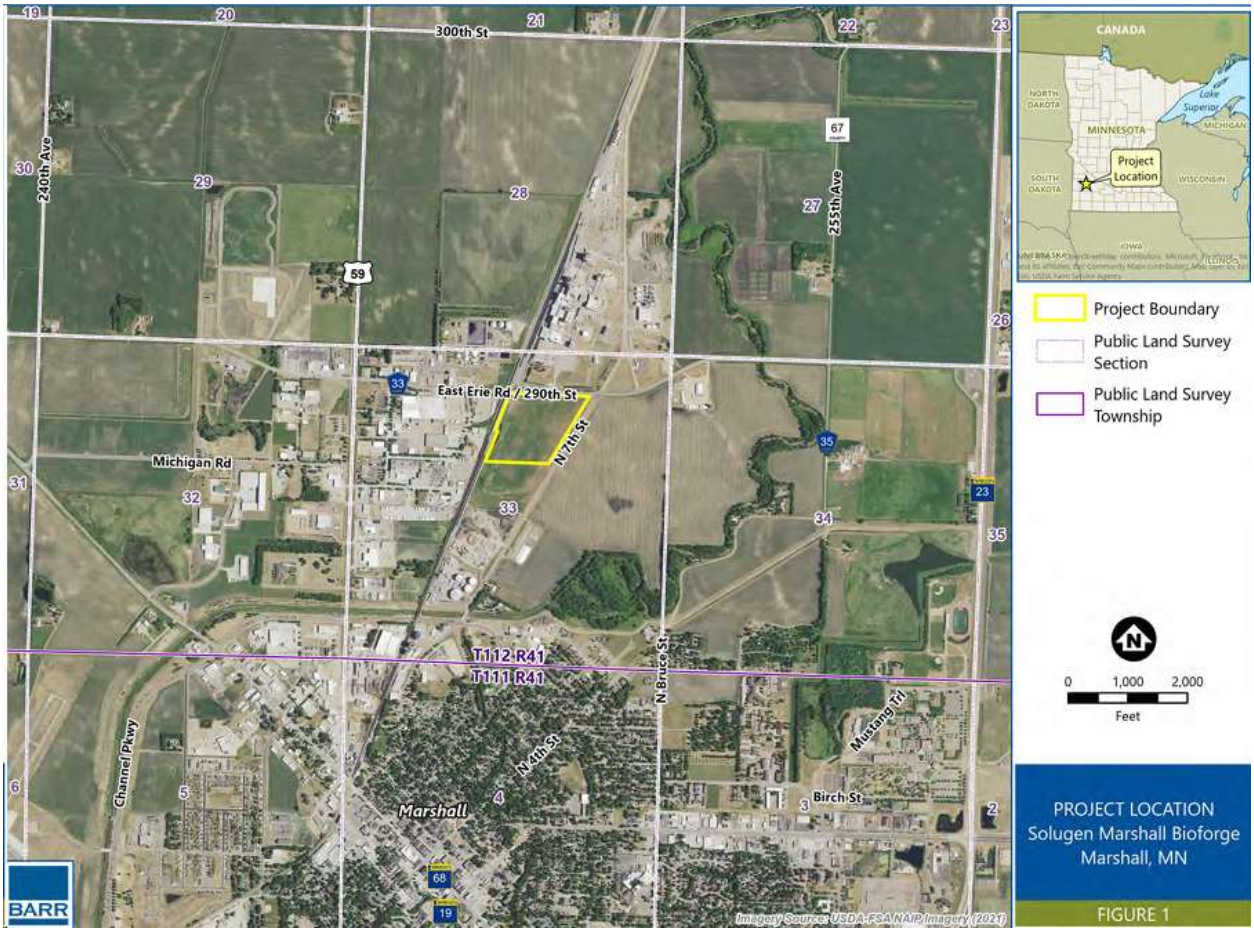
Southwest Regional Development Commission Project Review

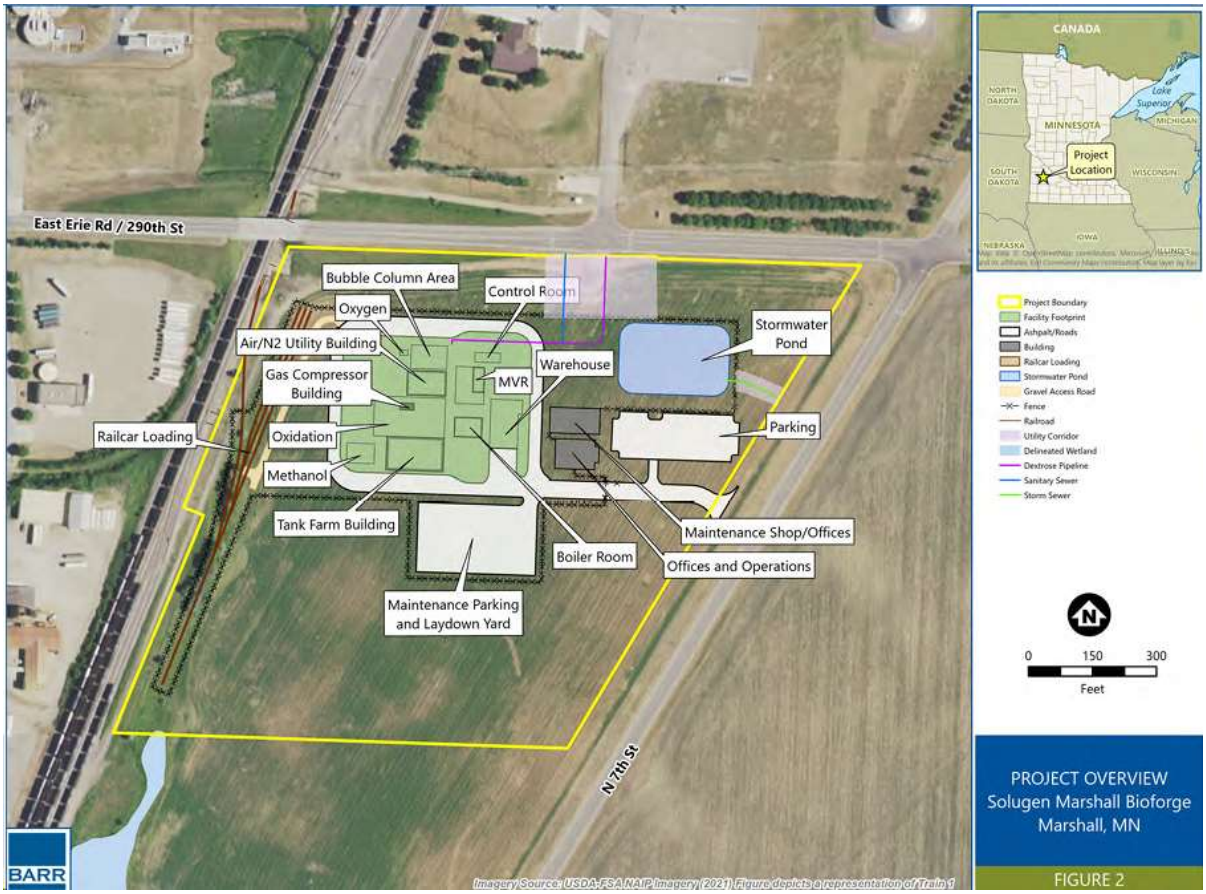
Agenda Item: **Meeting Date:** February 8, 2024

Project Name: Environmental Assessment for Proposed Federal Loan Guarantee to Solugen, Inc. for the bio-feedstock facility in Marshall, MN

Project Description

The proposed Solugen Bioforge™ in Marshall, Minnesota utilizes a dextrose sugar feedstock to manufacture biobased organic acids (gluconic acids) for use in food, beverage, and pharmaceutical industries, as well as the building and construction industry. Their unique process avoids the production of up to 17.8K tons per year of CO2, when compared to traditional gluconic acid production, thereby reducing overall national emissions of air pollutants and human-caused GHG emissions.





Staff Comments:

1. The Department of Energy determined that this project would not have a significant impact on the human environment.
2. As this site is in an industrial park, it will be able to easily handle the increase in traffic and loads.
3. Estimated construction employment will be 110 workers. Upon initial operation (Q4 2025 or Q1 2026) Bioforge will have 38 employees and could ramp up to 56 FTE. They project all 4 phases of construction to be completed by Q4 2028.
4. Staff spoke with Bob Byrnes, Mayor of Marshall and he said he was excited about this project that has been in the works for about three years. He described it as a green industry that will pipe dextrose from nearby ADM and use it to make chemical products in a more environmentally friendly way. He said the company has already purchased land and is planning a groundbreaking in April 2024. This project also helps ADM diversify its product line since they have reached the capacity of the region for corn supply (~200,000 bushels of corn per day). Bioforge would take about ½ the dextrose ADM produces. To date, Solugen has not asked for a subsidy from the city of Marshall.

Project Review Time: 1 hour
Income to the SRDC as a result of this review: $0
Reviewer: Jason Walker, Community Development Director

APPENDIX B PERMITS AND APPROVALS

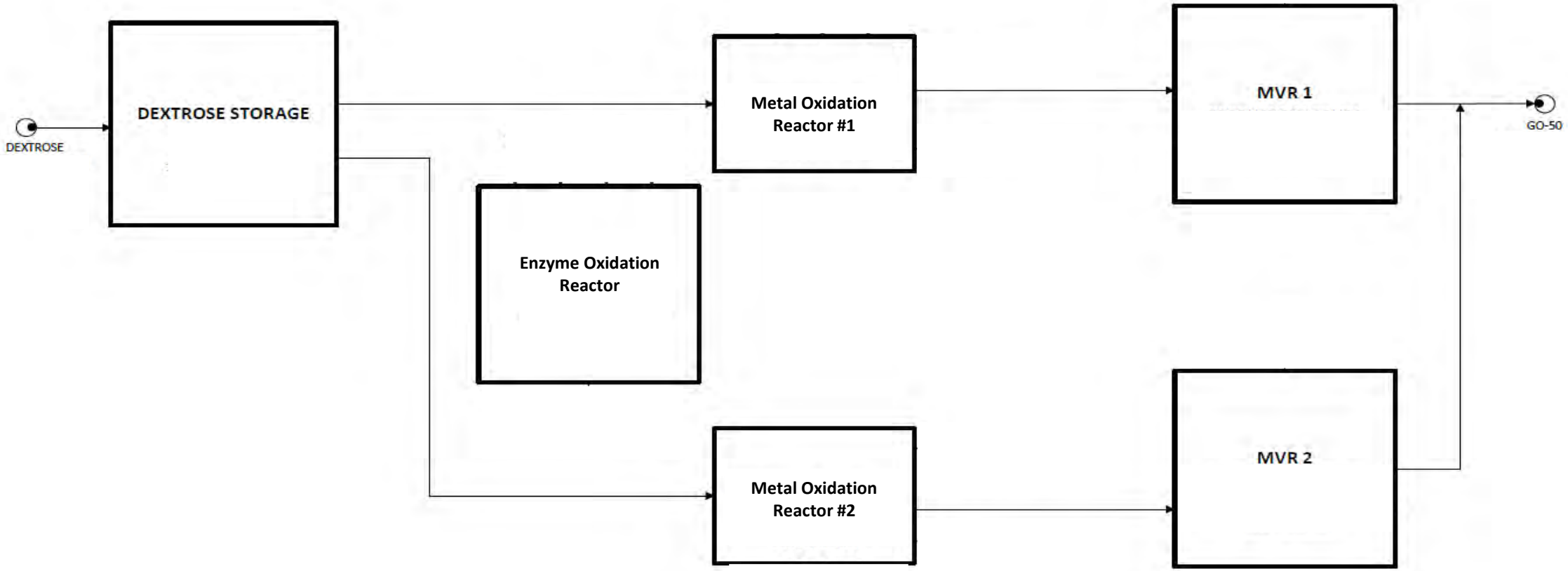
Appendix B: Permits and Approvals

Permit/Approval	Agency or Office	Expected Date of Receipt*
Federal		
Section 7 Endangered Species Act Consultation	USFWS	Completed (Q3 2023)
Section 106 National Historic Preservation Act Clearance	SHPO	Approved (Q3 2023)
SPCC	EPA	Not required
State		
NPDES/SWPPP Construction Permit	MPCA	Approved (Q4 2023)
Air Permit	MPCA	Not required
NPDES/SWPPP Industrial Permit	MPCA	Q2 2024
Local Permits		
Building Permits	City of Marshall	Q2 2024
Land Disturbance	City of Marshall	Approved (Q4 2023)
Sewer	City of Marshall	Q2 2024
Stormwater	City of Marshall	Q2 2024
Plumbing	City of Marshall	Q2 2024
Driveway	City of Marshall	Approved (Q4 2023)
Utility Permit on County Highway Right of Way	Lyon County	Approved (Q1 2024)

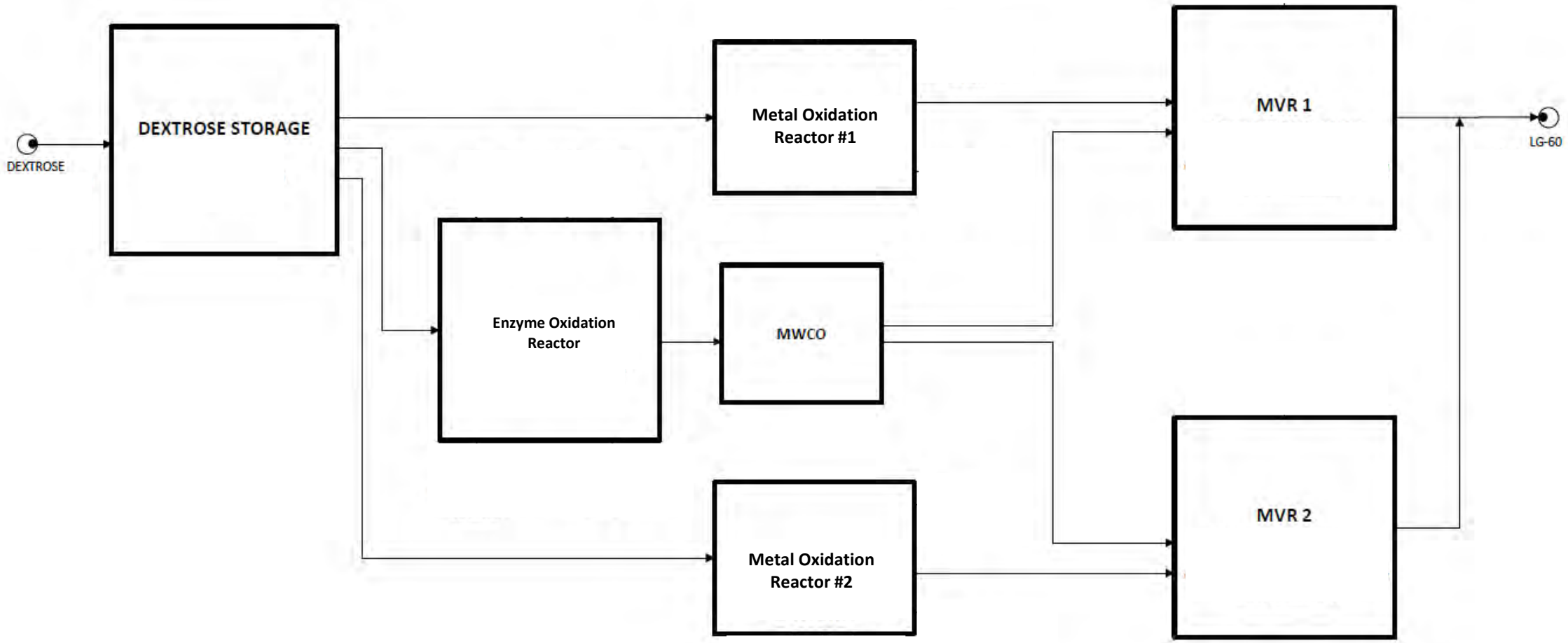
* Dates are subject to change during the final site engineering phase and coordination with the general contractor.

APPENDIX C PROCESS FLOW DIAGRAM

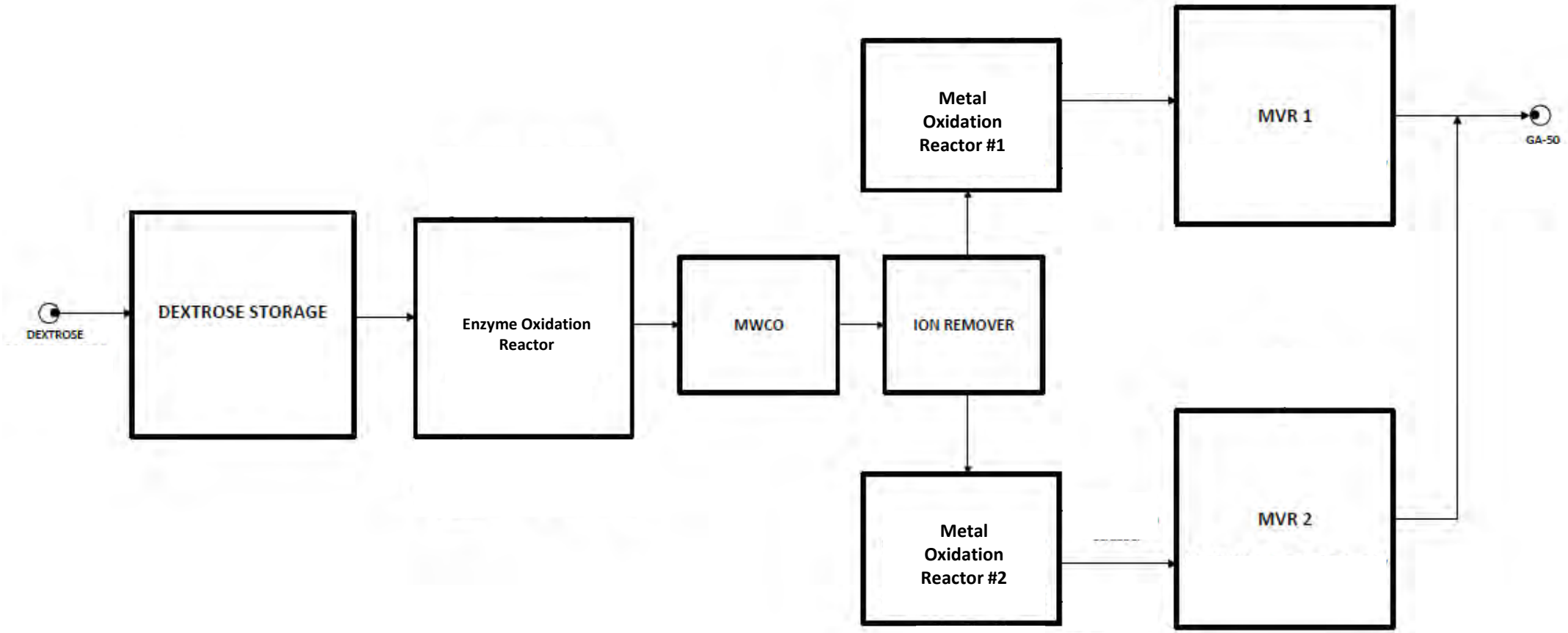
GO 50 Production



LG 60 Production



GA 50 Production



APPENDIX D WETLAND DELINEATION REPORT

Wetland Delineation Report

Marshall Bioforge

Prepared for

Solugen Inc.

July 2023

Wetland Delineation Report

Marshall Bioforge

Prepared for

Solugen Inc.

July 2023

4300 MarketPointe Drive, Suite 200
Minneapolis, MN 55435
952.832.2600
www.barr.com

Wetland Delineation Report

July 2023

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1.0 Introduction

Barr Engineering Co. (Barr) has prepared this wetland delineation report on behalf of Solugen Inc. in support of the proposed Bioforge biochemicals plant (Project). The Project includes construction of a green chemicals plant that will use dextrose from the adjacent Archer Daniels Midland (ADM) Marshall plant and produce a variety of low-volatility, carbon free, or carbon negative chemicals. The Project area is in the City of Marshall, Lyon County, Minnesota, Section 33, Township 112 North, Range 41 West (**Figure 1**). Barr conducted a field wetland delineation for the Project on June 29, 2023.

2.0 General Environmental Setting

2.1 Site Description

The Project area includes agricultural land located adjacent to industrial development within the urban setting of the City of Marshall (**Figure 1**). Currently, the Project area is primarily used as a hay field and is cultivated with alfalfa. The western boundary of the Project area is bordered by a railroad that connects to the ADM Company located directly north of the Project area. The majority of the topography within the Project area is flat with gentle side slopes around the margins of the Project area (**Figure 2**). The southern boundary of the Project area has been significantly disturbed from earth moving activities and has undulating topography.

2.2 Water Resources

The Project area is located within the Minnesota River Basin and the Redwood River sub watershed (HUC 12). There are no lakes or streams located within the Project area. The Redwood River is the nearest river and located 0.28 miles east of the Project area. There are no Minnesota Department of Natural Resources Public Waters located within the Project area. The National Wetlands Inventory (NWI), developed by the United States Fish and Wildlife Service (USFWS) identifies approximately 0.34 acres of wetland within the southwestern corner of the Project area. The NWI wetland is mapped as a freshwater emergent wetland (PEM1C) (**Figure 3**).

2.3 Soil Resources

Soil information for the Project area was obtained from the U.S. Department of Agriculture – Natural Resources Conservation Service's (USDA-NRCS) Soil Survey Geographic (SSURGO) Database (USDA-NRCS, 2023). The primary soil series mapped within the Project area is Udorthents, a non-hydric soil (**Figure 4**). Udorthents soils indicate that the Project area has been previously disturbed.

2.4 Precipitation

Precipitation data was compared to the statistical climatic WETS table data developed by the NRCS specifically for evaluating climatic normalcy in conducting wetland delineations. The WETS method establishes a normal range of monthly and annual precipitation based on the long-term precipitation record. Normal conditions are defined as conditions that are present 40 percent of the time. Precipitation data were obtained from the Minnesota Climatology Working Group, Wetland Delineation Precipitation Data Retrieval from a Gridded Database (Minnesota Climatology Office, 2023) for Lyon County, Township 112 North, Range 41 West, Section 33. According to the data the annual averages for 2020 and 2021were within the normal ranges (**Table 2-1**).Whereas the annual averages for 2022 was below the normal range.

The wetland delineation was conducted on June 29, 2023. According to the three-month analysis of antecedent precipitation, the amount of precipitation before the wetland delineation was within the normal range (**Table 2-2**). Indicating that wetlands would be identifiable at the time of the delineation.

Table 2-1 Precipitation in comparison to WETS data

	Average (Inches)	30% chance		2020	2021	2022
		Less than	more than			
January	0.65	0.41	0.86	**1.12**	**1.20**	**1.01**
February	0.79	0.35	0.90	*0.32*	0.84	0.85
March	1.51	0.89	1.95	1.55	**2.47**	**2.06**
April	2.71	2.11	3.12	**3.17**	**3.13**	*1.42*
May	3.58	2.71	4.34	**7.55**	*2.01*	2.97
June	4.24	2.80	4.33	*1.43*	*1.24*	3.02
July	3.68	2.75	4.63	*2.07*	*1.39*	4.20
August	3.51	2.66	4.06	*2.41*	3.34	2.90
September	3.12	1.61	3.37	*1.14*	**3.42**	*1.59*
October	2.30	1.25	3.12	*0.40*	**3.59**	1.33
November	1.28	0.64	1.49	1.42	*0.60*	1.24
December	0.96	0.42	1.41	**2.34**	**2.17**	0.61
Warm Season	18.13	14.46	19.54	14.60	*11.40*	14.68
Annual	28.34	24.00	29.00	24.92	25.40	*23.20*
Water Year	28.33	23.67	29.31	27.12	*22.22*	27.50

WETS = Natural Resources Conservation Service statistical method for determining the normal range of monthly precipitation for making wetland determinations.

1991-2020 Normal Period, Location: Richfield, MN, T28N, R24W, Section 13

Bold = precipitation above the normal range

Italics = precipitation below the normal range

Table 2-2 Antecedent Moisture Conditions Prior to June 29, 2023, Site Visit

	first prior month: May 2023[1]	**second prior month: April 2023[1]**	**third prior month: March 2023[1]**
estimated precipitation total for this location:	3.77	2.86	1.09
there is a 30% chance this location will have less than:	2.71	2.11	0.89
there is a 30% chance this location will have more than:	4.34	3.12	1.95
type of month: *dry,* normal, **wet**	normal	normal	normal
monthly score	3 * 2 = 6	2 * 2 = 4	1 * 2 = 2
multi-month score:	12 (Normal)		
6 to 9 (*dry*) 10 to 14 (normal) 15 to 18 (**wet**)			

[1] Values are in inches.

3.0 Wetland Delineation

3.1 Wetland Delineation and Classification Methods

This wetland delineation has been completed in accordance with the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual ("1987 Manual", USACE, 1987), the Regional Supplement to the USACE Wetland Delineation Manual: Midwest (USACE, 2010) and the requirements of the Minnesota Wetland Conservation Act (WCA) of 1991. A Trimble GeoXH 6000 Global Positioning System (GPS) unit with sub-foot horizontal accuracy was used to delineate wetland resource boundaries.

During the delineation, soil borings were collected at sample points in and around wetlands, to a depth of at least 24 inches below the ground surface or until auger refusal by coarse fragments. Representative soil samples from each boring were examined for the presence of hydric soil indicators using the NRCS hydric soil indicators (USDA-NRCS 2018; Version 8.2). Soil colors (e.g., 7.5YR 4/2, etc.) were determined using a Munsell® soil color chart.

Plant species at each sample site were identified, and the percent aerial cover was estimated. Dominant species were determined using the 50/20 rule[1], and the corresponding wetland indicator status of each plant species was recorded using the current National Wetland Plant List (USACE, 2020). Hydrologic conditions were evaluated at each location. Representative photographs of the Project area were taken at the time of the site visit and are provided in **Appendix C**..

3.2 Offsite Hydrology Wetland Determination

Barr completed an offsite hydrology wetland determination review as part of the delineation to identify wetlands located within the agricultural fields. The review was completed in accordance with the Minnesota Board of Water and Soil Resources (BWSR) and St. Paul District Corps of Engineers Guidance for Offsite Hydrology/Wetland Determinations. The review was completed by comparing observed field conditions to historical aerial photographs to confirm the wetland boundaries within agricultural fields and determine if any additional wetlands are located within the Project area.

The review evaluated eight years of aerial imagery; 2003, 2008, 2010, 2013, 2015, 2017, 2019, and 2021. According to precipitation data, the timeframe from six of these images received normal levels of precipitation in the 3 months prior to the date the imagery was captured (2003, 2008, 2010, 2017, 2019, and 2021) indicating that wetlands that may be located within the Project area should be visible from the aerial imagery The remaining two years received more than average levels of precipitation (2013 and 2015) making the potential wetland areas more visible from a desktop perspective. Precipitation data is provided in **Appendix A.**

[1] The "50/20 rule" is used to determine dominant species in a wetland area Dominant species are the most abundant plant species that individually or together account for more than 50 percent of the total coverage of vegetation in the stratum, plus any additional species that, by itself, comprises at least 20 percent of the total.

3.3 Wetland Delineation Results

Barr evaluated six potential wetland areas for the offsite hydrology wetland determination (**Figure 5a-h**). Potential wetland area 3 is a wetland as it contained wetland hydrology indicators for each of the reviewed years (**Appendix B**). Potential wetland areas 1 and 2 were verified to be soil stockpiles during the field wetland investigation. In addition, potential wetland areas 4, 5, and 6 had wetland hydrology indicators for 33 percent of the reviewed years indicating that field verification would be required to determine if these locations are wetlands. During the field investigation no other signs of hydrology were observed at these locations and therefore they are not considered wetlands.

In total, Barr delineated one wetland (Wetland 1) in the southwest corner of the Project area (**Figure 6**). This wetland was classified as a shallow marsh/fresh(wet) meadow (PEM/C/A; Type 2/3) wetland (Photograph 4 Appendix C). The wetland is located adjacent to the railroad and appears to receive hydrology from the railroad ditch. Two sample points were collected along the eastern edge of the wetland. Soils within the wetland had a clay loam soil texture and contained prominent redox concentrations throughout the soil sample. The soils met the depleted matrix hydric soil indicator (F3). Please refer to the wetland determination data form for additional information (**Appendix D**).

The center of the of the wetland is dominated by cattails (*Typha spp*; OBL). The area around the cattails was dominated by reed canary grass (*Phalaris arundinacea*; FACW), Kentucky bluegrass (*Poa pratensis*; FAC), and foxtail barley (*Hordeum jubatum*; FAC). The banks of the creek were dominated by reed canary grass, barnyard grass (*Echinochloa crus-galli*; FAC), nodding bur-marigold (*Bidens cernua*; OBL), panicled aster (*Symphyotrichum lanceolatum*; FACW), and cocklebur (*Xanthium strumarium*; FAC). These species are characteristic of wet meadow wetlands that have been disturbed from agricultural activities.

The transition to upland is defined by a change in topography and vegetation. The upland portions of the Project area include a hayfield to the east planted with alfalfa (*Poa pratensis*; FACU). The area south of the wetland has been previously disturbed by earth moving activities and was dominated by a mix of introduced upland species such as; ragweed (*Ambrosia spp.;*FACU), smooth brome (*Bromus inermis*; FACU), Kentucky bluegrass (*Poa pratensis*; FACU), Canada thistle (*Circium arvense*; FACU), foxtail barley (*Hordeum jubatum*; FAC), and field bindweed (*Convolvulus arvensis*; UPL).

4.0 Regulatory Overview

The USACE regulates the dredge or placement of fill materials into wetlands that are located adjacent to or are hydrologically connected to interstate or navigable waters under the authority of Section 404 of the Clean Water Act (CWA). The USACE may have jurisdiction over Wetland 1 and may also review impacts to the wetland under the authority of the CWA and the National Environmental Policy Act. If Solugen plans to disturb Wetland 1, coordination with the USACE would be required to determine if the wetland would be regulated under the jurisdiction of the USACE. If the wetland is found jurisdictional the disturbance would require authorization under the CWA.

The USACE is not issuing approved jurisdictional determinations due to the Sackett V. EPA ruling. This ruling requires the USACE to reevaluate the definition of jurisdictional waters of the United States (WOTUS). The USACE is expected to develop revised guidance outlining the process for determining whether a wetland is jurisdictional in the fall of 2023. If the wetland area will be impacted by the project, it is recommended to wait and coordinate with the USACE until the revised guidance is finalized.

Filling, excavating, and draining wetlands are also regulated by the Minnesota Wetland Conservation Act (WCA). WCA is administered by Lyon County Soil and Water Conservation District (SWCD). The SWCD and the USACE should be contacted before altering any aquatic resources in the Project area. Delineated wetland boundaries may be reviewed, if needed, by the USACE and a WCA Technical Evaluation Panel (TEP) consisting of representatives from the Minnesota Board of Water and Soil Resources, SCWD, and Minnesota Department of Natural Resources.

5.0 References

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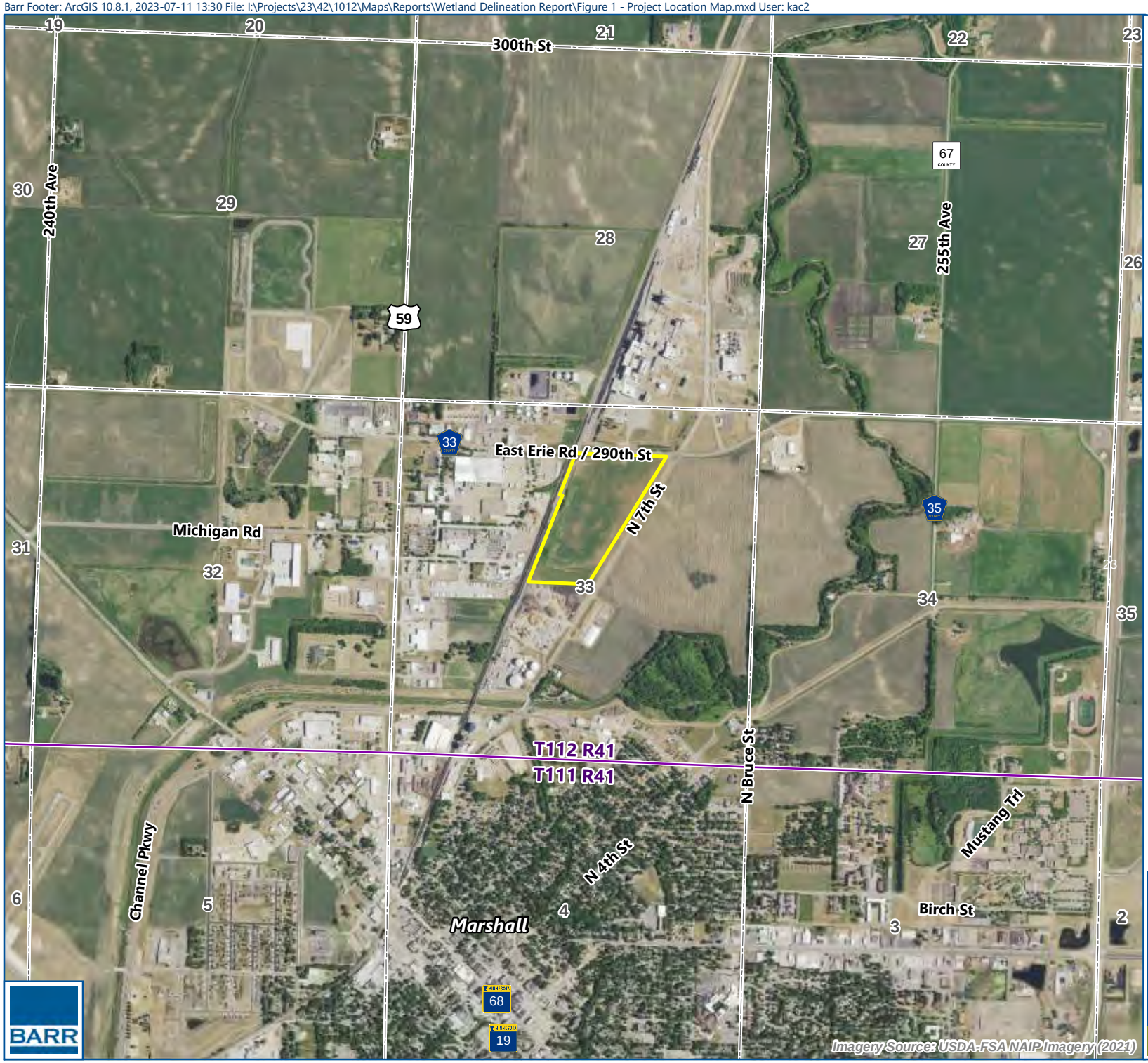
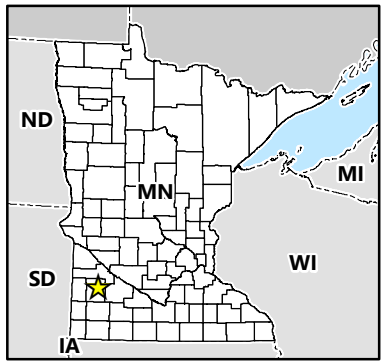
U.S. Army Corps of Engineers. 1987. *1987 U.S. Army Corps of Engineers Wetland Delineation Manual*. Wetlands Research Program Technical Report Y-87-1 (on-line edition). Waterways Experiment Station, Vicksburg, Mississippi.

U.S. Fish and Wildlife Service. 1956. *Wetlands of the United States Circular 39*. U.S. Government Printing Office, Washington, D.C.

Figures





Project Boundary

Public Land Survey Section

Public Land Survey Township

N

0 1,000 2,000 3,000

Feet

PROJECT LOCATION
Solugen Marshall Bioforge
Marshall, MN

FIGURE 1

Project Boundary

10-Foot Contour

2-Foot Contour

N

0 175 350 525

Feet

TOPOGRAPHY
Solugen Marshall Bioforge
Marshall, MN

FIGURE 2

Barr Footer: ArcGIS 10.8.1, 2023-07-11 13:50 File: I:\Projects\23\42\1012\Maps\Reports\Wetland Delineation Report\Figure 3 - Aquatic Resources.mxd User: kac2

Project Boundary

Wetlands (USFWS NWI)

Freshwater Emergent Wetland

N

0 175 350 525

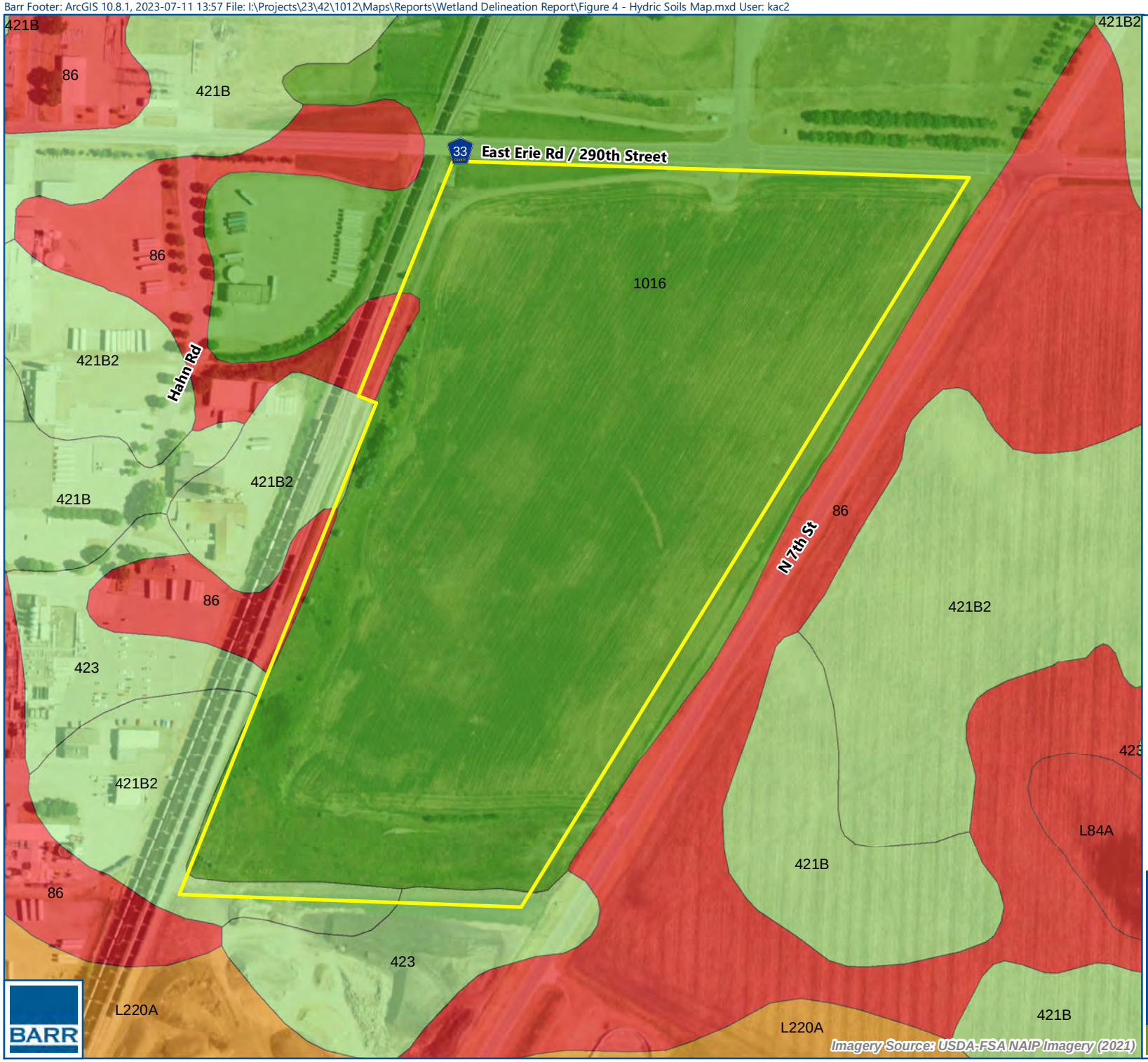
Feet

AQUATIC RESOURCES
Solugen Marshall Bioforge
Marshall, MN

FIGURE 3

BARR

Barr Footer: ArcGIS 10.8.1, 2023-07-11 13:57 File: I:\Projects\23\42\1012\Maps\Reports\Wetland Delineation Report\Figure 4 - Hydric Soils Map.mxd User: kac2



Project Boundary

Hydric Rating

- Hydric (100%)
- Predominantly Hydric (66 to 99%)
- Predominantly Non-hydric (1 to 32%)
- Not Hydric (0%)

N

0 175 350 525

Feet

BARR

HYDRIC SOILS
Solugen Marshall Bioforge
Marshall, MN

FIGURE 4

Project Boundary

Potential Wetland

N

0 175 350 525

Feet

HISTORICAL AERIAL IMAGERY (2003)
Solugen Marshall Bioforge
Marshall, MN

FIGURE 5a

BARR

Project Boundary

Potential Wetland

N

0 175 350 525

Feet

HISTORICAL AERIAL IMAGERY (2008)
Solugen Marshall Bioforge
Marshall, MN

FIGURE 5b

BARR

Barr Footer: ArcGIS 10.8.1, 2023-07-11 14:59 File: I:\Projects\23\42\1012\Maps\Reports\Wetland Delineation Report\Figure 5c - Historical Aerial Imagery (2010).mxd User: kac2

Project Boundary

Potential Wetland

N

0 175 350 525

Feet

HISTORICAL AERIAL IMAGERY (2010)
Solugen Marshall Bioforge
Marshall, MN

FIGURE 5c

BARR

Project Boundary

Potential Wetland

N

0 175 350 525

Feet

HISTORICAL AERIAL IMAGERY (2013)
Solugen Marshall Bioforge
Marshall, MN

FIGURE 5d

BARR

Barr Footer: ArcGIS 10.8.1, 2023-07-11 15:14 File: I:\Projects\23\42\1012\Maps\Reports\Wetland Delineation Report\Figure 5f - Historical Aerial Imagery (2015).mxd User: kac2

Project Boundary

Potential Wetland

N

0 175 350 525

Feet

HISTORICAL AERIAL IMAGERY (2015)
Solugen Marshall Bioforge
Marshall, MN

FIGURE 5f

Project Boundary

Potential Wetland

N

0 175 350 525

Feet

HISTORICAL AERIAL IMAGERY (2017)
Solugen Marshall Bioforge
Marshall, MN

FIGURE 5f

BARR

Barr Footer: ArcGIS 10.8.1, 2023-07-11 15:17 File: I:\Projects\23\42\1012\Maps\Reports\Wetland Delineation Report\Figure 5h - Historical Aerial Imagery (2019).mxd User: kac2

Project Boundary

Potential Wetland

N

0 175 350 525

Feet

HISTORICAL AERIAL IMAGERY (2019)
Solugen Marshall Bioforge
Marshall, MN

FIGURE 5g

BARR

Project Boundary

Potential Wetland

N

0 175 350 525

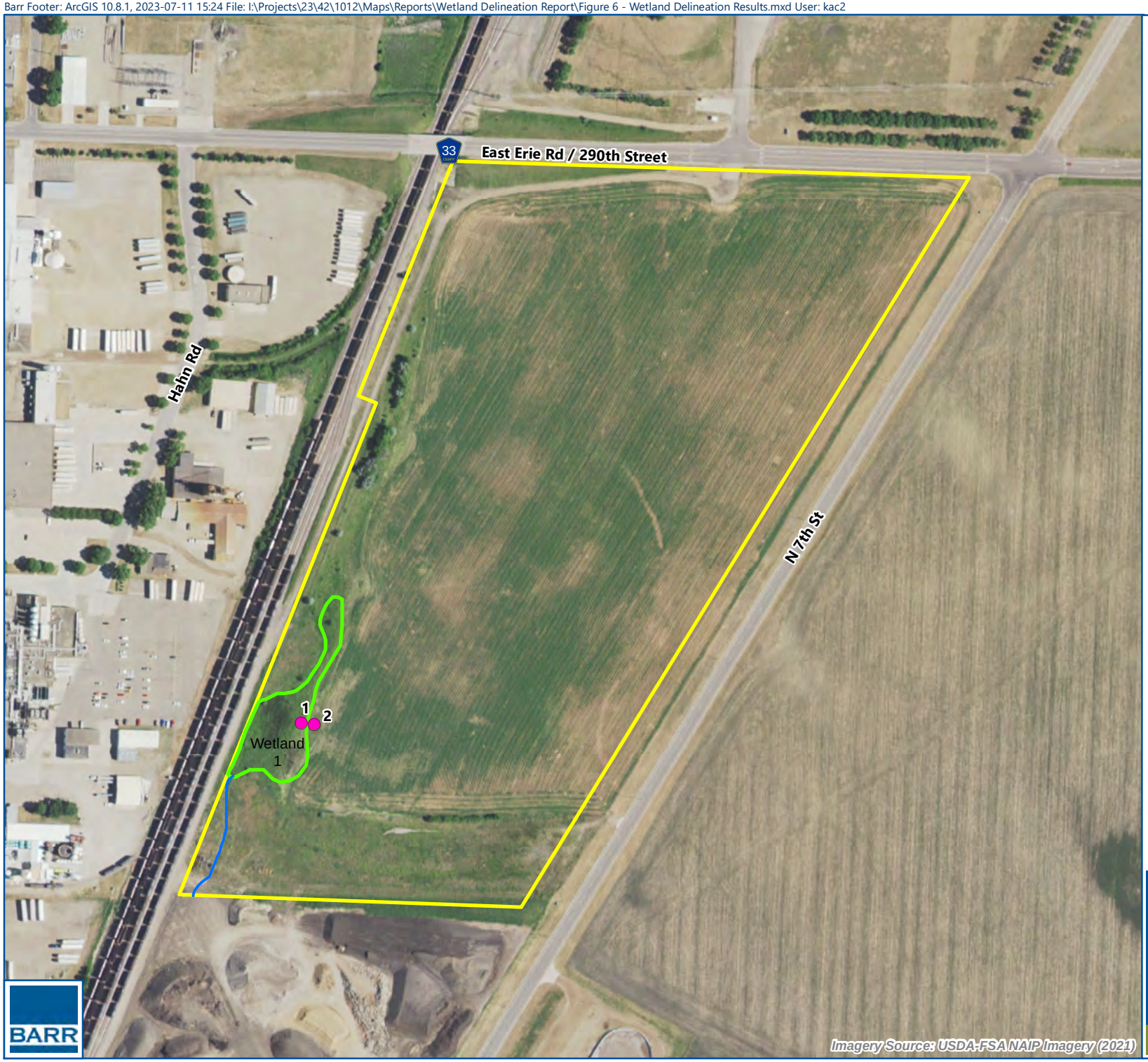
Feet

HISTORICAL AERIAL IMAGERY (2021)
Solugen Marshall Bioforge
Marshall, MN

FIGURE 5h

BARR

Barr Footer: ArcGIS 10.8.1, 2023-07-11 15:24 File: I:\Projects\23\42\1012\Maps\Reports\Wetland Delineation Report\Figure 6 - Wetland Delineation Results.mxd User: kac2



Project Boundary

Delineated Wetland

Drainage Channel

Sample Points

N

0 175 350 525

Feet

BARR

WETLAND DELINEATION RESULTS

Solugen Marshall Bioforge

Marshall, MN

FIGURE 6

Appendix A Historic Aerial Imagery Antecedent Precipitation

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:

county: **Lyon** township number: **112N**
township name: **Fairview** range number: **41W**
nearest community: **Marshall** section number: **33**

Aerial photograph or site visit date:
Monday, August 11, 2003

Score using 1991-2020 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: **July 2003**	second prior month: **June 2003**	third prior month: **May 2003**
estimated precipitation total for this location:	**3.11**	**3.00**	**3.23**
there is a 30% chance this location will have less than:	2.75	2.80	2.71
there is a 30% chance this location will have more than:	4.63	4.33	4.34
type of month: dry normal wet	**normal**	**normal**	**normal**
monthly score	**3 * 2 = 6**	**2 * 2 = 4**	**1 * 2 = 2**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**12 (Normal)**		

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- *Evaluating Antecedent Precipitation Conditions* (BWSR)

Minnesota State Climatology Office

State Climatology Office - DNR Division of Ecological and Water Resources

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:

county: **Lyon** township number: **112N**
township name: **Fairview** range number: **41W**
nearest community: **Marshall** section number: **33**

Aerial photograph or site visit date:
Sunday, July 13, 2008

Score using 1991-2020 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: **June 2008**	second prior month: **May 2008**	third prior month: **April 2008**
estimated precipitation total for this location:	**4.10**	**2.88**	**2.67**
there is a 30% chance this location will have less than:	2.80	2.71	2.11
there is a 30% chance this location will have more than:	4.33	4.34	3.12
type of month: dry normal wet	**normal**	**normal**	**normal**
monthly score	**3 * 2 = 6**	**2 * 2 = 4**	**1 * 2 = 2**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**12 (Normal)**		

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- *Evaluating Antecedent Precipitation Conditions* (BWSR)

Minnesota State Climatology Office

State Climatology Office - DNR Division of Ecological and Water Resources

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:

county: **Lyon** township number: **112N**
township name: **Fairview** range number: **41W**
nearest community: **Marshall** section number: **33**

Aerial photograph or site visit date:
Wednesday, June 16, 2010

Score using 1991-2020 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: **May 2010**	second prior month: **April 2010**	third prior month: **March 2010**
estimated precipitation total for this location:	**2.74**	**1.22**	**1.49**
there is a 30% chance this location will have less than:	2.71	2.11	0.89
there is a 30% chance this location will have more than:	4.34	3.12	1.95
type of month: dry normal wet	**normal**	**dry**	**normal**
monthly score	**3 * 2 = 6**	**2 * 1 = 2**	**1 * 2 = 2**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**10 (Normal)**		

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- *Evaluating Antecedent Precipitation Conditions* (BWSR)

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:

county: **Lyon** township number: **112N**
township name: **Fairview** range number: **41W**
nearest community: **Marshall** section number: **33**

Aerial photograph or site visit date:
Friday, July 12, 2013

Score using 1991-2020 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: **June 2013**	second prior month: **May 2013**	third prior month: **April 2013**
estimated precipitation total for this location:	**5.68**	**2.82**	**3.14**
there is a 30% chance this location will have less than:	2.80	2.71	2.11
there is a 30% chance this location will have more than:	4.33	4.34	3.12
type of month: dry normal wet	**wet**	**normal**	**wet**
monthly score	**3 * 3 = 9**	**2 * 2 = 4**	**1 * 3 = 3**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**16 (Wet)**		

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- *Evaluating Antecedent Precipitation Conditions* (BWSR)

Minnesota State Climatology Office

State Climatology Office - DNR Division of Ecological and Water Resources

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:

county: **Lyon** township number: **112N**
township name: **Fairview** range number: **41W**
nearest community: **Marshall** section number: **33**

Aerial photograph or site visit date:
Thursday, August 20, 2015

Score using 1991-2020 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: **July 2015**	second prior month: **June 2015**	third prior month: **May 2015**
estimated precipitation total for this location:	**2.99**	**4.34**	**4.51**
there is a 30% chance this location will have less than:	2.75	2.80	2.71
there is a 30% chance this location will have more than:	4.63	4.33	4.34
type of month: dry normal wet	**normal**	**wet**	**wet**
monthly score	**3 * 2 = 6**	**2 * 3 = 6**	**1 * 3 = 3**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**15 (Wet)**		

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- *Evaluating Antecedent Precipitation Conditions* (BWSR)

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:

county: **Lyon** township number: **112N**
township name: **Fairview** range number: **41W**
nearest community: **Marshall** section number: **33**

Aerial photograph or site visit date:
Saturday, July 8, 2017

Score using 1991-2020 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: **June 2017**	second prior month: **May 2017**	third prior month: **April 2017**
estimated precipitation total for this location:	**2.34**	**5.42**	**2.37**
there is a 30% chance this location will have less than:	2.80	2.71	2.11
there is a 30% chance this location will have more than:	4.33	4.34	3.12
type of month: dry normal wet	**dry**	**wet**	**normal**
monthly score	**3 * 1 = 3**	**2 * 3 = 6**	**1 * 2 = 2**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**11 (Normal)**		

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- *Evaluating Antecedent Precipitation Conditions* (BWSR)

Minnesota State Climatology Office

State Climatology Office - DNR Division of Ecological and Water Resources

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:

county: **Lyon** township number: **112N**
township name: **Fairview** range number: **41W**
nearest community: **Marshall** section number: **33**

Aerial photograph or site visit date:
Thursday, August 8, 2019

Score using 1991-2020 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: **July 2019**	second prior month: **June 2019**	third prior month: **May 2019**
estimated precipitation total for this location:	**7.01**	**2.80**	**6.21**
there is a 30% chance this location will have less than:	2.75	2.80	2.71
there is a 30% chance this location will have more than:	4.63	4.33	4.34
type of month: dry normal wet	**wet**	**dry**	**wet**
monthly score	**3 * 3 = 9**	**2 * 1 = 2**	**1 * 3 = 3**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**14 (Normal)**		

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- *Evaluating Antecedent Precipitation Conditions* (BWSR)

Minnesota State Climatology Office

State Climatology Office - DNR Division of Ecological and Water Resources

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:

county: **Lyon** township number: **112N**
township name: **Fairview** range number: **41W**
nearest community: **Marshall** section number: **33**

Aerial photograph or site visit date:
Saturday, June 19, 2021

Score using 1991-2020 normal period

values are in inches A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.	first prior month: **May 2021**	second prior month: **April 2021**	third prior month: **March 2021**
estimated precipitation total for this location:	**2.01**	**3.13**	**2.47**
there is a 30% chance this location will have less than:	2.71	2.11	0.89
there is a 30% chance this location will have more than:	4.34	3.12	1.95
type of month: dry normal wet	**dry**	**wet**	**wet**
monthly score	**3 * 1 = 3**	**2 * 3 = 6**	**1 * 3 = 3**
multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)	**12 (Normal)**		

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- *Evaluating Antecedent Precipitation Conditions* (BWSR)

Appendix B Offsite Hydrology Wetland Determination Forms

Exhibit 1

Wetland Hydrology from Aerial Imagery

Worksheet Set A

Project:	Marshall Bioforge	**County:**	Lyon
Applicant:	Solugen	**Date:**	7/20/2023
Investigator:	Tyler Conley		

TWP	RNG	Section
112	41	33

Adapted from St. Paul District USACE: Guidance for Offsite Hydrology/Wetland Determinations

Summary Table

Image Date	Image Source	Climate Condition[i]	Image Interpretation(s) *Enter area names in the red boxes below:*									
			1	**2**	**3**	**4**	**5**	**6**				
2003	NAIP	Normal	NV	NV	WS	NV	NV	NV				
2008	NAIP	Normal	NV	NV	WS	SS	NV	NV				
2010	NAIP	Normal	NV	NV	WS	SS	NV	SS				
2013	NAIP	Wet	NV	NV	WS	NV	NC	NC				
2015	NAIP	Wet	NV	NV	WS	NV	NV	NV				
2017	NAIP	Normal	NV	NV	WS	NSS	NSS	NSS				
2019	NAIP	Normal	NV	NV	WS	NSS	NSS	NSS				
2021	NAIP	Normal	NV	NV	WS	NV	NC	NV				
Climate Conditions			**1**	**2**	**3**	**4**	**5**	**6**		**-**	**-**	**-**
Number of Normal Years			6	6	6	6	6	6	6	6	6	6
Number with wet signatures			0	0	6	2	2	2	0	0	0	0
Percent with wet signatures			0%	0%	100%	33%	33%	33%	0%	0%	0%	0%

KEY			
WS - wetland signature	SS - soil wetness signature	CS - crop stress	PQ - poor aerial photo quality
NC - not cropped	AP - altered pattern	NV - normal vegetative cover	
DO - drowned out	SW - standing water	NSS – no soil wetness signature	

Other labels or comments:

• Use above key to label image interpretations. It is imperative that the reviewer read and understand the guidance associatedwith the use of these labels. If alternate labels are used, indicate in box above.

• If less than five (5) images taken during normal climate conditions are available, use an equal number of images taken during wet and dry climate conditions and use as many images as you have available. Describe the results using this methodology in your report.

[i] Use MN State Climatology website to determine climate condition when image was taken.

Exhibit 2

Wetland Delineation from Aerial Imagery

Worksheet Set A

Project:	**Devney Quarry Project**				**County:**	**Lyon**
Client:	**Bryan Rock Products, Inc.**				**Date:**	**7/20/2023**
Investigator:	**Tyler Conley**					
	Township:	**112**	**-**	**-**	**-**	**-**
	Range:	**41**	**-**	**-**	**-**	**-**
	Section:	**33**	**-**	**-**	**-**	**-**

Decision Matrix				
Hydric Soils Present[1]	**Identified on NWI or other wetland map[2]**	**Percent with wet signatures**	**Field verification required[3]**	**Wetland?**
Yes	Yes	>50%	No	Yes
Yes	Yes	30-50%	No	Yes
Yes	Yes	<30%	Yes	Yes, if other hydrology indicators present
Yes	No	>50%	No	Yes
Yes	No	30-50%	Yes	Yes, if other hydrology indicators present
Yes	No	<30%	No	No
No	Yes	>50%	No	Yes
No	Yes	30-50%	No	Yes
No	Yes	<30%	No	No
No	No	>50%	Yes	Yes, if other hydrology indicators present
No	No	30-50%	Yes	Yes, if other hydrology indicators present
No	No	<30%	No	No

[1] The presence of hydric soils can be determined from the "Hydric Rating by Map Unit Feature" under "Land Classifications" from the Web Soil Survey. "Not Hydric" is the only category considered to not have hydric soils. Field sampling for the presence/absence of hydric soil indicators can be used in lieu of the hydric rating if appropriately documented by providing completed field data sheets.

[2] At minimum, the most updated NWI data available for the area must be reviewed for this step. Any and all other local or regional wetland maps that are publically available should be reviewed.

[3] Area should be reviewed in the field for the presence/absence of wetland hydrology indicators per the applicable 87 Manual Regional Supplement, including the D2 indicator (geomorphic position).

Table 1.

Area	Field verified upland feature[1]	Hydric soils present	Identified on NWI or other wetland map	Percent with wet signatures	Field wetland verification required	Other hydrology indicators present[2]	Wetland?
1	Yes	No	No	0%	No	No	**No**
2	Yes	No	No	0%	No	No	**No**
3	N/A	No	Yes	100%	No	Yes	**Yes**
4	N/A	No	No	33%	Yes	No	**No**
5	N/A	No	No	33%	Yes	No	**No**
6	N/A	No	No	33%	Yes	No	**No**
-							
-							
-							
-							

[1] Select "N/A" unless field verification was completed for features that appear as wetlands on imagery but are upland features, such as mounds, excavations, cleared vegetation, rock piles, vegetated hillslopes, etc. If "Yes" is selected then select "N/A" for the Hydric Soil and NWI columns.

[2] Answer "N/A" if field verification is not required and was not conducted.

Comments: Area 1 and 2 were identified as soil stockpiles during the field surevey. No signes of hydrology was noted are

Appendix C Site Photographs

Appendix A – Photograph log
Solugen Marshall Bioforge Wetland Delineation
June 30, 2023

Photograph 1: Northern Project area showing hayfield, view south.

Photograph 2: Northwestern project area, view South

Photograph 3: Western boundary of the Project area along the railroad ROW, view South.

Photograph 4: Overview of Wetland 1, View North.

Photograph 5: Southern portion of the Project area view, Southeast

Photograph 6, Southeast corner of the Project area, view Northwest

Photograph 7: earthwork activities along the southern portion of the Project area, view West.

Photograph 8: Disturbed area in the southern portion of the Project area, view East.

Appendix D Wetland Determination Datasheets

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Marshall Minnesota City/County: Lyon County Sampling Date: 2023-06-29

Applicant/Owner: Solugen State: Minnesota Sampling Point: 1u

Investigator(s): Tyler Conley Section, Township, Range: sec 33 T112N R041W

Landform (hillslope, terrace, etc.): Other Local relief (concave, convex, none): None

Slope (%): 0-2 Lat: 44.466034 Long: -95.787928 Datum: WGS84

Soil Map Unit Name: Udorthents NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sample point was collected adjacent to Wetland 1.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5)			
1. *Poa pratensis*	35	Y	FAC
2. *Phalaris arundinacea*	30	Y	FACW
3. *Hordeum jubatum*	20	Y	FAC
4. *Medicago sativa*	10	N	FACU
5.			
6.			
7.			
8.			
9.			
10.			
	95.0	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0.00	x 1 =	0.00
FACW species	30.00	x 2 =	60.00
FAC species	55.00	x 3 =	165.00
FACU species	10.00	x 4 =	40.00
UPL species	0.00	x 5 =	0.00
Column Totals:	95.00 (A)		265.00 (B)

Prevalence Index = B/A = 2.79

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

Vegetation has been disturbed by agricultural activities.

SOIL

Sampling Point: 1u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	2.5Y 5/3	100						
8-24	2.5Y 5/4	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Marshall Minnesota City/County: Lyon County Sampling Date: 2023-06-29

Applicant/Owner: Solugen State: Minnesota Sampling Point: 1u

Investigator(s): Tyler Conley Section, Township, Range: sec 33 T112N R041W

Landform (hillslope, terrace, etc.): Other Local relief (concave, convex, none): None

Slope (%): 0-2 Lat: 44.466034 Long: -95.787928 Datum: WGS84

Soil Map Unit Name: Udorthents NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sample point was collected adjacent to Wetland 1.

VEGETATION – Use scientific names of plants.

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2.			
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10.			
	95.0	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
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2.			
	0	= Total Cover	

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✓ 3 - Prevalence Index is ≤3.0[1]

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___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: (Include photo numbers here or on a separate sheet.)

Vegetation has been disturbed by agricultural activities.

SOIL

Sampling Point: 1u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

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- ___ Sandy Mucky Mineral (S1)
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- ___ Stripped Matrix (S6)
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- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
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- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
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- ___ Crayfish Burrows (C8)
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Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** ✓ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: