Notice of Completion of Closure

Hoot Lake Plant Ash Landfill

Introduction

The purpose of this document is to comply with the notification and certification requirements for coal combustion residual (CCR) facility closure pursuant to 40 CFR Part 257.102(h) stating:

> *Within 30 days of completion of closure of the CCR unit, the owner or operator must prepare a notification of closure of a CCR unit. The notification must include the certification by a qualified professional engineer or the approval from the Participating State Director or the approval from EPA where EPA is the permitting authority as required by § 257.102(f)(3). The owner or operator has completed the notification when it has been placed in the facility's operating record as required by § 257.105(i)(8).*

Completion of Closure

During the summer of 2023, Otter Tail Power Company (Otter Tail) completed final closure of the CCR Ash Landfill located at Hoot Lake Plant at 1012 Water Plant Road in Fergus Falls, MN. Onsite construction activities were completed on September 20, 2023. A preliminary Notice of Completion of Closure was posted to the public website on October 16, 2023 while the Construction Documentation and Certification Report was under preparation and review.

The Construction Documentation and Certification Report, prepared by Carlson McCain, was submitted to the Minnesota Pollution Control Agency (MPCA) on November 20, 2023 and approved by the MPCA on January 25, 2024. The Construction Documentation and Certification Report is also attached to this notice.

Deed Notation § 257.102(i)

On January 10, 2024, Otter Tail recorded a notation on the property deed in accordance with § 257.102(i). The notation was also placed in the CCR operating record.

Commencement of Post Closure care Period § 257.104
In alignment with the MPCA's date for initiation of the state post-closure care period, the CCR 30-year post closure care period began on January 11, 2024.

Notifications
The following notifications and recordkeeping requirements required by the federal CCR Rule have been completed:

- § 257.102(h): Completion of a notification that the closure completion certification has been placed in the operating record.
- § 257.105(i)(8): Placement of the closure completion certification in the operating record.
- § 257.105(i)(9): Placement of the deed notation in the operating record.
- § 257.106(i)(8): Notification to the State Director that the closure completion report has been placed in the operating record.
- § 257.107(i)(8): Placement of the notification of closure completion certification on the CCR Rule Compliance Data and Information Website.

PE Certification § 257.102(f)(3)
I hereby certify that the final cover system of the Hoot Lake Plant CCR Landfill has been designed to meet the requirements of § 257.102(d)(3) and has been constructed in accordance with the written CCR Closure Plan. I certify that I am a duly licensed professional engineer under the laws of the State of Minnesota.

Paul M. Vukonich

January 30, 2024

Paul M. Vukonich, P.E.
License No. 50857
Owner: Otter Tail Power Company

Date

Daniel J. Riggs

January 30, 2024

Daniel J. Riggs, P.E.
License No. 49559
Consulting Engineer: Carlson McCain, Inc.

Date

215 South Cascade Street
PO Box 496
Fergus Falls, Minnesota 56538-0496
218 739-8200
www.otpco.com

Bc: MT/PV/JH/Env. File F.10.B
Webtop: solid waste/mgmt./construction/hoot lake/2023 landfill capping
Dan Riggs <pdf copy>

November 20, 2023

Submitted electronically via email to: joseph.p.miller@state.mn.us

Mr. Joseph P. Miller
Resource Management and Assistance Division
Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, MN 55155

Dear Mr. Miller:

SUBJECT: OTTER TAIL POWER COMPANY
ELECTRONIC CONSTRUCTION CERTIFICATION REPORT FOR
HOOT LAKE PLANT INDUSTRIAL SOLID WASTE LANDFILL SW-211

Accompanying this letter is a pdf file containing an electronic copy of the construction certification report for the 2023 Cell 2 Final Closure construction project at the Otter Tail Power Company Hoot Lake Plant facility in Fergus Falls, MN. This project closed the last remaining open area of the landfill, and the facility no longer accepts waste. The report is submitted for your review and approval.

Otter Tail expects that upon approval of this construction documentation report, the facility will commence its post-closure care period. Once MPCA approves the enclosed report, Otter Tail will proceed with recording a notation on the property deed to include the landfill feature.

A hard copy or electronic copy on CD can be mailed to your attention upon request.

If you have any questions concerning the report, please contact me at (218) 739-8349.

Sincerely,

Paul Vukonich
Manager, Environmental Services

Enclosure

CONSTRUCTION CERTIFICATION REPORT

Final Closure
Otter Tail Power Hoot Lake Ash Landfill
Fergus Falls, Minnesota
MPCA Solid Waste Permit No.: SW-211
Carlson McCain Project No.: 4946-05

Prepared for:

Otter Tail Power Company
1012 Water Plant Road
Fergus Falls, Minnesota, 56537

November 17, 2023

15650 36TH AVENUE N, SUITE 110
PLYMOUTH, MN 55446

TEL 952.346.3900
FAX 952.346.3901

CARLSONMCCAIN.COM

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TABLES

APPENDICES

CERTIFICATION
Final Closure Construction
MPCA Permit No. SW-211
Otter Tail Power

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Brannon L. Peterson, P.E.

Date: November 17, 2023 License No.: 58910

1.0 INTRODUCTION

This report presents the results of field observations and testing work performed during construction of the 2023 Final Closure Project (Project) at the Otter Tail Power (OTP) Hoot Lake Ash Landfill (Landfill). Approximately 3.75 acres of open area was capped on the Landfill over portions of the West Phase and Cell 2 to close the Landfill. The construction consisted of subgrade preparation, geomembrane liner installation, granular drainage material placement, borrow source excavation, rooting soil placement, topsoil placement, stormwater runoff control system construction, and turf establishment.

The following companies provided construction services to complete the Project:

Company	Activity or Products
Carlson McCain, Inc. (Carlson McCain)	Design, QA/QC
Veit & Company, Inc. (Veit)	Earthwork (Prime Contractor)
Global Containment Solutions, LLC. (GCS)	Geomembrane Installation (Subcontractor to Veit)
Skaps Industries, Inc. (Skaps)	Geomembrane Manufacturer
Soil Engineering Testing, Inc. (SET)	Soil Testing (Subcontractor to Carlson McCain)
Neaton Brothers Erosion, Inc. (Neaton Brothers)	Seeding and Turf Restoration (Subcontractor to Veit)

Final Cover construction began on June 26, 2023. Construction observation was performed by Carlson McCain during key activities of the project and consisted of observing and recording activities of the prime contractor and subcontractors, answering questions, and interpreting information contained in the Drawings and Specifications as requested by the contractor, and directing testing and quality control activities performed by independent testing firms and construction subcontractors. Full-time construction observation was performed for all final cover geomembrane installation.

Construction was performed in accordance with MPCA Permit No SW-211, and "Technical Specifications 2023 Final Cover Construction", prepared by Carlson McCain, Inc. dated January 2023. Deviations from the Technical Specifications and Drawings are noted on the enclosed Record Drawings and are described in the following sections of this report.

Notation of Final Closure of the Landfill will be made on the Deed for the property filed with Otter Tail County and will be submitted to the MPCA in an addendum to this report. Deed

Notation will include a Closure Record and construction documentation for the Landfill and carry the County Recorder's seal. The Closure Record shall detail an estimate of waste disposed in the Landfill, that the land has been used as a CCR unit, including other land use of the property, that land use is restricted under the post-closure care requirements as provided by Code of Federal Regulations § 254.104(d)(1)(iii), and a survey plat of the site prepared and certified by a land surveyor registered in Minnesota.

2.0 CONSTRUCTION MATERIALS AND METHODS

The following paragraphs provide general descriptions of materials and methods used during construction. Reference should be made to the Technical Specifications for more detailed information on the construction materials. Construction was completed as shown in the Construction Photographs in Appendix A and the Record Drawings in Appendix F.

2.1 Subgrade Preparation

To begin subgrade preparation for final cover construction, ash was excavated using an excavator and GPS dozer and was re-placed where fill was needed to achieve the permitted liner grades. Where ash was at liner grades, the ash was over-excavated at least 12 inches. Where additional fill was needed to reach liner grades, common fill was excavated from onsite borrow, hauled to the project area by off-road haul trucks, spread with a GPS dozer in 12-inch loose lifts, and compacted with a vibratory smooth drum roller. At least 12 inches of buffer soil was placed over all ash to protect the final cover geomembrane. At liner grades, rocks larger than 3 inches were removed by hand. The subgrade was then smoothed by back dragging with a skid-steer and rolled with a smooth-drum roller, providing a uniform surface prior to liner deployment.

An excavator exposed the edge of existing final cover geomembrane along the tie-in. A laborer worked with the excavator to remove the plywood markers used to protect and identify the edge of the existing geomembrane. The laborer hand-shoveled any remaining soils left on the existing geomembrane. The subgrade was then surveyed with GPS equipment to verify the subgrade was within tolerance of the permitted grades. The geomembrane installers inspected the subgrade prior to deployment of the geomembrane and confirmed the subgrade was acceptable by signing the Subgrade Acceptance Forms included in Appendix C. Subgrade preparation activities are shown in Photos 1 and 2 in Appendix A.

2.2 LLDPE Geomembrane Liner

Final cover liner was installed directly over the buffer layer and consisted of 40-mil textured linear-low density polyethylene (LLDPE) geomembrane. Geomembrane was manufactured by Skaps and was delivered to the site in 24-foot wide by 715-foot-long rolls. Manufacturer's quality control certificates for the geomembrane rolls are included in Appendix C. The rolls were inspected upon arrival to ensure the roll numbers matched the manufacturer's certifications and to verify they were not damaged.

Rolls were deployed using a skid-steer equipped with a spreader bar. The skid-steer either lifted the roll at the base of the Project Area then backed up to deploy the panels or sat on the top of the slope while the geomembrane was pulled downslope by hand by the liner crew. Laborers worked alongside the roll being deployed to align the panel, remove wrinkles, and secure the panels in-place with sandbags.

Deployment started on the south half of the project area, then progressed westward and then northward to cover all open area of the landfill. Adjacent LLDPE panels were seamed together

using a dual-wedge fusion welder whenever possible. Patches, seams, and boots that could not be wedge welded, were extrusion welded. One pipe penetration boot was installed on the final cover liner for the cleanout pipe located on the west side of the landfill.

The tie-in to existing final cover was wedge welded where practical. The final cover termination along the toe of the slope was extrusion welded to the existing primary 60-mil high density polyethylene (HDPE) base liner, as noted in the Record Drawings in Appendix F.

LLDPE geomembrane seam testing and quality control is discussed in Section 3.2. Panel orientation, panel number, seam, destruct, and repair locations are shown on the As-built Panel Layout Drawings in Appendix C. Geomembrane installation is shown in Photos 3 through 10 in the Construction Photo Log in Appendix A.

2.3 Granular Drainage Material

The drainage sand used for the final cover project was hauled in from offsite. Source and in-place material testing of the granular drainage material was conducted as described in Section 3.4 to confirm the material met project specifications. Testing showed the material had a few small, rounded rocks larger than 3/8-inch diameter. All granular drainage material passed the 1/2-inch sieve and greater than 99% of material passed the 3/8-inch sieve. Because this was a small deviation from specification, the rocks were rounded, and the final cover will not have additional pressure after construction, the material was approved for use by the Engineer.

Granular drainage material hauled to the site was stockpiled, then loaded into off-road trucks and dumped on the final cover area. Drainage material was placed in minimum 3-foot-thick lifts on haul roads utilized by trucks driving over the geomembrane. A dozer utilizing GPS equipment then spread the material over the geomembrane by rolling it off the edge of previously placed material in a single 1-foot-thick lift. Granular drainage material was spread upwards from the bottom of the final cover area to prevent wrinkling and damage to the geomembrane.

Granular drainage material thickness was verified using GPS survey equipment as described in Section 3.1. Additionally, thickness at random locations was checked by the spotter working alongside the dozer, who dug down to the geomembrane with a square-nosed shovel and measured the thickness of the placed layer. The drainage layer was fine-graded and verified to be within the specified thickness tolerance prior to placement of overlying layers.

To drain infiltrated stormwater over the final cover, 4-inch draintile with filter sock was also installed on top of the geomembrane along the toe of the stormwater berm and around the edges of final, as shown in the Record Drawings in Appendix F. Granular drainage layer placement is shown in Photos 11 and 12 in Appendix A.

2.4 Rooting Soil

After placement of the granular drainage material, rooting soil was placed on the final cover. Rooting soil was obtained from borrow on the southeast side of the Landfill and spread 1-foot thick by the dozer equipped with GPS. Rooting soil was placed thicker on the upper portion of

the cap to construct the stormwater berm, as shown in the Record Drawings in Appendix F. Thickness was verified as discussed in Section 3.1.

2.5 Site Restoration

Final cover topsoil was placed in a single lift following placement and thickness verification of the previous layers. There was not enough topsoil in stockpile onsite and in borrow to complete the project, so some topsoil was imported to the site. Imported topsoil was tested as described in Section 3.4.3. To place the topsoil for the final cover, material was pushed directly upslope or hauled onto the final cover with off-road tucks. After dumping the topsoil on the final cover area, a dozer utilizing GPS spread the material in a single 6-inch lift. Compaction of the topsoil layer was restricted to the least extent possible to place and grade the layer. Additional topsoil berms were placed on the north and south sides of the landfill to direct stormwater as shown in the Record Drawings in Appendix F. Final thickness verification was completed as described in Section 3.1.

Stabilization of all disturbed areas was completed by September 22, 2023. Site stabilization includes seeding with, dormant mixture, and fertilizer, dragging, and covering the soil with erosion control blanket or mulch according to the Specifications and Drawings. Erosion control blanket was installed on all slopes greater than 10% and was stapled in-place. Areas flatter than 10% grade were mulched. A stormwater ditch draining to the north and south of the landfill was covered with turfmat to prevent scouring. A road crossing as well as a rip rap plunge pool were placed on the south side of the stormwater ditch. The road crossing consisted of rock ballast from onsite rock sources, graded to drain across the landfill access road. The rip rap plunge pool consisted of MNDOT Class 3 rip rap underlain by 8-ounce non-woven geotextile and was installed at the base of the south ditch for energy dissipation.

Additionally, topsoil was placed over a depression on the top of the existing final cover to drain stormwater and additional area was seeded and blanketed on the north slope of the landfill where vegetation was sparse, as shown in the Record drawings in Appendix F. Information on seeding and stabilization measures is included in Appendix E. Topsoil placement and site restoration is shown in Photos 13 through 17 in Appendix A.

3.0 TESTING AND QUALITY CONTROL

Carlson McCain on-site personnel coordinated and observed testing and quality control activities performed by independent testing firms and subcontractor internal CQA technicians. Testing and quality control procedures and results are presented below.

3.1 Surveying and Material Thickness Verification

Calson McCain completed all survey and grade verification using GPS equipment. Earthwork verification surveying included survey shots at grade breaks and on a 100-foot grid on the liner subgrade, the top of granular drainage material layer, top of rooting soil layer, and at the finished grade (top of topsoil layer) within the Project area. Survey shots were repeated over the established grid points to verify material thicknesses. Construction staking was completed by the contractor, using their own GPS equipment and personnel to verify material thickness as needed.

Additional GPS survey shots were taken during final cover construction for as-built records. These survey shots included: berm breaklines, flowlines, and locations of restoration activities. Complete survey data is contained in Appendix B.

3.2 LLDPE Geomembrane Testing and Quality Control

All geomembrane installation was performed with construction oversight by a dedicated, CQA technician from GCS and an on-site field engineer from Carlson McCain. Construction testing and quality control activities for installation of the composite final cover liner included the following:

- reviewing panel/roll and resin certifications from the manufacturer
- inspecting and accepting of subgrade surface upon which composite liner was installed
- preparing and testing pre-seaming trial welds
- observing panel/roll deployment, placement/positioning, and seaming
- performing non-destructive testing of all seams
- performing destructive testing of seams
- observing and non-destructively testing patches and repairs

Prior to delivery of the LLDPE geomembrane to the site, the manufacturer submitted pre-certification documentation for properties of the rolls to be used on the Project, as required by the Specifications. The roll certifications are included in Appendix C. The subgrade was inspected and approved for installation of liner by GCS prior to deployment. The Subgrade Acceptance Form is included in Appendix C.

Pre-seaming trial seams were prepared at the beginning of each seaming period with each piece of seaming equipment by the corresponding operator. Generally, there were two seaming periods on each day that seaming was performed (morning and afternoon). One-inch-wide

coupons were cut out of the trial seams and tested on-site by the geomembrane installer, under observation by Carlson McCain personnel, for mechanical seam strength (shear and peel) using a calibrated tensiometer. All trial seams met the minimum required seam strengths of 60 pounds per inch (lbs/in) for shear and 50 lbs/in for peel of split-wedge-welded seams, and 60 lbs/in for shear and 44 lbs/in for peel of extrusion-welded seams. Trial seam tests are reported on the Trial Weld Forms included in Appendix C.

All seams were non-destructively tested for leaks using either the air-channel test for dual-wedge welded seams or the vacuum box test for extrusion welded seams. Non-destructive testing was completed until each seam achieved passing results; any leaks found through non-destructive testing were repaired and re-tested. Non-destructive testing is included on the Panel Seaming Forms and Repair Forms in Appendix C.

Destructive seam tests were performed on samples taken randomly from seams in the installed geomembrane. Carlson McCain marked destructive samples at a rate of one sample per 500 lineal feet of seam and walked over every seam of the final cover geomembrane. A total of 13 destructive seam samples were marked and tested. The destructive seam samples were tested on-site by the geomembrane installer, under observation by Carlson McCain personnel, for shear and peel strength using a calibrated tensiometer. All seam destructive testing passed in accordance with the Technical Specifications and results are recorded on the Destructive Testing Forms included in Appendix C.

Repairs at seam joints, seam burnouts, rips, tears, or other holes in the geomembrane were mended by extrusion welding a geomembrane patch or cap over damaged areas. Small punctures or manufacturer deformities in the geomembrane were repaired by placing an extrusion bead over damaged areas. All patches, caps, and beads were vacuum tested to verify that the repairs did not leak. Repairs to the geomembrane liner are noted on the As-built Panel Layout Drawing and Repair Forms included in Appendix C.

The 40-mil textured LLDPE geomembrane was installed and tested in conformance with the Technical Specifications. The geomembrane installer's As-built Panel Layout Drawing, Subgrade Acceptance Forms, Tensiometer Calibration Certificate, and Quality Control Reports are included in Appendix C.

3.3 Soil Testing

SET performed soil-testing activities on granular drainage material, and topsoil for the project. Granular drainage material testing included soil classification, grain size analysis, and permeability analysis. Topsoil testing included analyses of grain-size. Topsoil samples were also sent to the University of Minnesota Soils Testing Laboratory for organic matter, pH, and fertilizer recommendation.

3.3.1 Granular Drainage Material

Imported granular drainage material was tested at stockpile locations on-site and once placed throughout the duration of the project. Source and in-place sampling included hydraulic conductivity analysis to determine permeability and particle size analysis to determine maximum particle size, percent passing the No. 200 sieve, and uniformity coefficient for the drainage material. Approximately 7,000 cubic yards of granular drainage material was placed over the 3.75 acre project, requiring four source hydraulic conductivity tests (1 test per 2,000 cubic yards), two source particle size tests (1 test per 5,000 cubic yards), four source soil classification and descriptions (1 test per 2,000 cubic yards), four in-place hydraulic conductivity tests (1 test per acre), and four in-place particle size tests (1 test per acre) according to MPCA guidance. Samples were taken at the rates listed above, note four source particle size tests were taken (exceeding requirements) to obtain the required number of soil classifications and descriptions. All samples met the Specifications for minimum permeability of 1.0×10^{-2} centimeters per second, uniformity coefficient less than 6.0, and no more than 5% passing the No. 200 sieve. All samples had 100% passing the 1/2-inch sieve, but several samples did not meet the particle size requirement of 100% passing the 3/8-inch sieve. Greater than 99% of the granular drainage material passed the 3/8-inch sieve though, and the rocks retained on the 3/8-inch sieve were round in nature. Due to the low variance (less than 1% difference) from Specifications and round nature of the rocks, it was concluded the material would not harm the final cover geomembrane and was deemed acceptable by Carlson McCain for granular drainage material. Test results for granular drainage material are summarized in Table 1. Complete results are included in Appendix D for all granular drainage material testing.

3.3.2 Topsoil

Onsite topsoil has been shown to support vegetation, but because additional topsoil had to be imported for the project, the imported material was tested to determine suitability and fertilizer recommendations. Topsoil testing included analyses of particle size, organic matter, and pH, and was completed according to MPCA guidance; one test was completed per requirements for the source material for particle size and soil classification and description, while three tests were completed to fulfill the minimum requirement for nutrient testing. The material met requirements for particle size but did show pH slightly higher than the recommended range. Fertilizing was completed according to recommendations from the University of Minnesota Soils Testing Laboratory at a rate of 0 lbs Nitrogen, 40 lbs Phosphorous, and 40 lbs Potassium and the topsoil was determined to be capable to support plant growth, so the slightly higher pH was approved by Carlson McCain. Topsoil testing is summarized in Table 2 and test results are included in Appendix D.

4.0 CONCLUSION

Construction of the 2023 Final Closure Project at the OTP Hoot Lake Ash Landfill has been completed in material conformance with the "Technical Specifications 2023 Final Cover Construction", prepared by Carlson McCain, Inc. dated January 2023, and in compliance with the requirements for notification, construction, materials, and testing contained in MPCA Permit No. SW-211. Final Closure of the OTP Hoot Lake Ash Landfill (SW-211) has been completed in accordance with the Closure Plan dated September 18, 2017, with MN Administrative Rules § 7035.2635 and with Code of Federal Regulations § 257.102(f)(3).

Tables

Table 1
Granular Drainage Material Testing Summary
2023 Hoot Lake Ash Landfill Final Closure
Otter Tail Power

Sample No.	Percent Passing 3/8 inch Sieve	Percent Passing No. 4 Sieve	Percent Passing No. 200 Sieve	USCS Soil Classification	Uniformity Coefficient	Constant Head Permeability (cm/sec)
Source Tests						
S-1	100	100	0.1	SP	3.1	4.3 x 10-2
S-2	100	100	0.1	SP	3.0	4.5 x 10-2
S-3	99.7	99.7	0.3	SP	3.0	1.9 x 10-2
S-4	99.7	99.5	0.6	SP	2.9	1.9 x 10-2
Average	99.9	99.8	0.3	SP	3.0	3.2×10^{-2}
In-Place Tests						
P-1	99.6	98.7	0.6	SP	3.1	2.2 x 10-2
P-2	99.9	99.7	0.6	SP	3.1	1.7 x 10-2
P-3	99.7	99.4	0.5	SP	3.1	1.7 x 10-2
P-4	99.6	99.4	0.7	SP	3.3	1.8 x 10-2
Average	99.7	99.3	0.6	SP	3.1	1.9×10^{-2}
Required	100	-	≤ 5.0	SP, SC, SM, SW-SM, SW-SC, SP-SM, SP-SC	≤ 6.0	$\geq 1.0 \times 10^{-3}$

Notes:

1. Source testing was completed from stockpiled material onsite.
2. Samples S-3, S-4, P-1, P-2, P-3, and P-4 have >99% Passing the 3/8 inch sieve; accepted by Engineer
3. See lab reports in Appendix D for additional information

Table 2
Topsoil Source Testing Summary
2023 Hoot Lake Ash Landfill Final Closure
Otter Tail Power

Sample No.	Percent Passing 2 inch Sieve	Percent Passing No. 4 Sieve	Percent Passing No. 10 Sieve	Percent Passing No. 200 Sieve	USCS Soil Classification	Organic Matter	pH
T-1	100	96	95	74.5	CL	-	-
HLP1	-	-	-	-	-	4.7	7.9
HLP2	-	-	-	-	-	4.5	8.0
HLP3	-	-	-	-	-	4.6	7.8
Average	100	96	95	75	CL	4.6	7.9
Guidance	100	-	≥90	-	SM, ML, SC, SC-SM, CL, ML, MH	-	6.1-7.5

Notes:

1. Source testing was completed from stockpiled material onsite.
2. Samples HLP1, HLP2, and HLP3 show pH slightly above recommended range, soil fertiliezed according to recommendation; accepted by Engineer
3. See lab reports in Appendix D for additional information

Appendix A – Construction Photographs

Construction Photographs

Hoot Lake Ash Landfill 2023 Final Closure

Photo 1 7/10/2023	Subgrade grading, looking northeast at landfill.

Photo 2 7/10/2023	Common fill and buffer excavation from the borrow area; looking southwest.

Construction Photographs

Hoot Lake Ash Landfill 2023 Final Closure

Photo 3 8/29/2023	LLDPE geomembrane liner deployment starting on south slope; looking east.

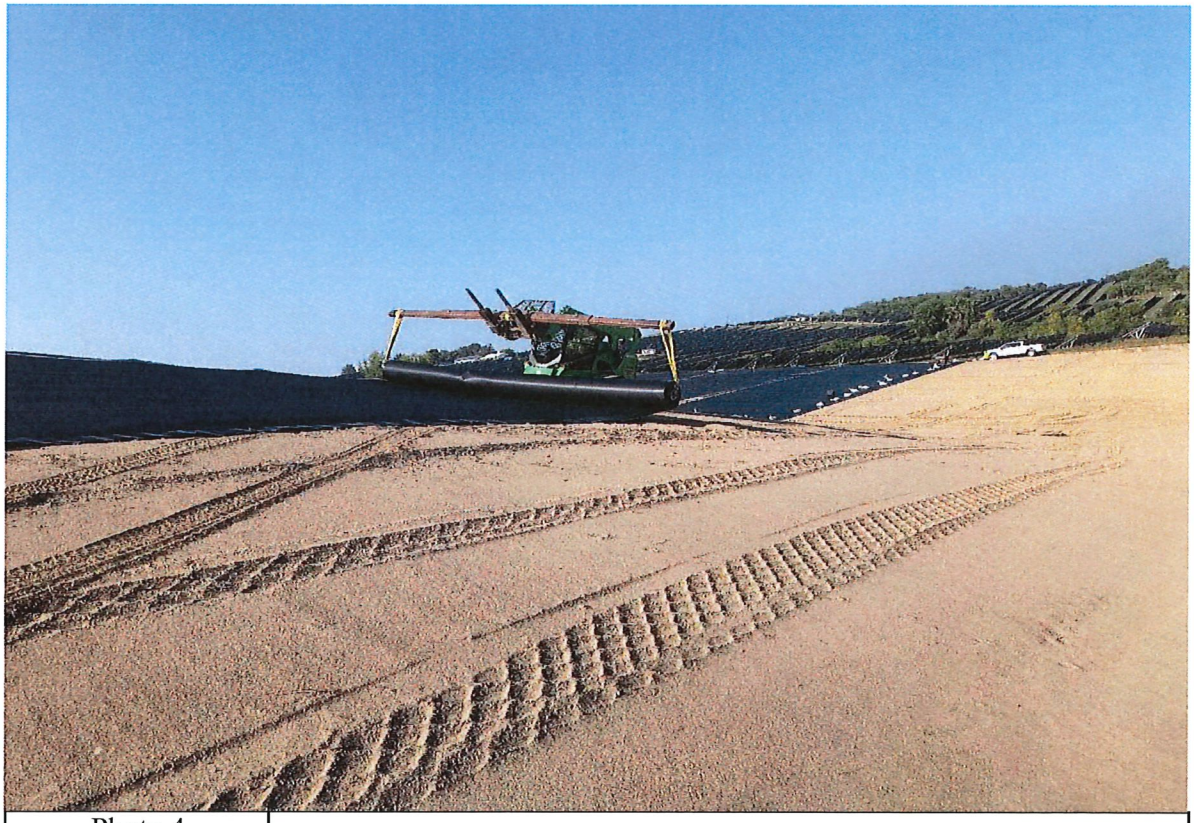


Photo 4 8/29/2023	Skid-steer deploying geomembrane over smooth rolled buffer soil.

Construction Photographs

Hoot Lake Ash Landfill 2023 Final Closure

Photo 5 8/29/2023	Dual-wedge welding of geomembrane panels

Photo 6 8/30/2023	LLDPE geomembrane liner deployment starting on west slope; looking east.

Construction Photographs

Hoot Lake Ash Landfill 2023 Final Closure

Photo 7 8/31/2023	Geomembrane installed over final cover and tie-in; looking southwest.

Photo 8 8/31/2023	Geomembrane installed over final cover and tie-in; looking northwest.

Construction Photographs

Hoot Lake Ash Landfill 2023 Final Closure

Photo 9 8/31/2023	Vacuum tested repair of destruct sample location

Photo 10 8/31/2023	Extrusion welded final cover geomembrane to base liner geomembrane.

Construction Photographs

Hoot Lake Ash Landfill 2023 Final Closure

Photo 11 9/5/2023	Granular drainage material placement over geomembrane on south slope; looking southwest.

Photo 12 9/5/2023	Granular drainage material placement over geomembrane on south slope; looking northeast.

Construction Photographs

Hoot Lake Ash Landfill 2023 Final Closure

Photo 13 9/20/2023	Topsoil rough graded on stormwater berm; looking southwest

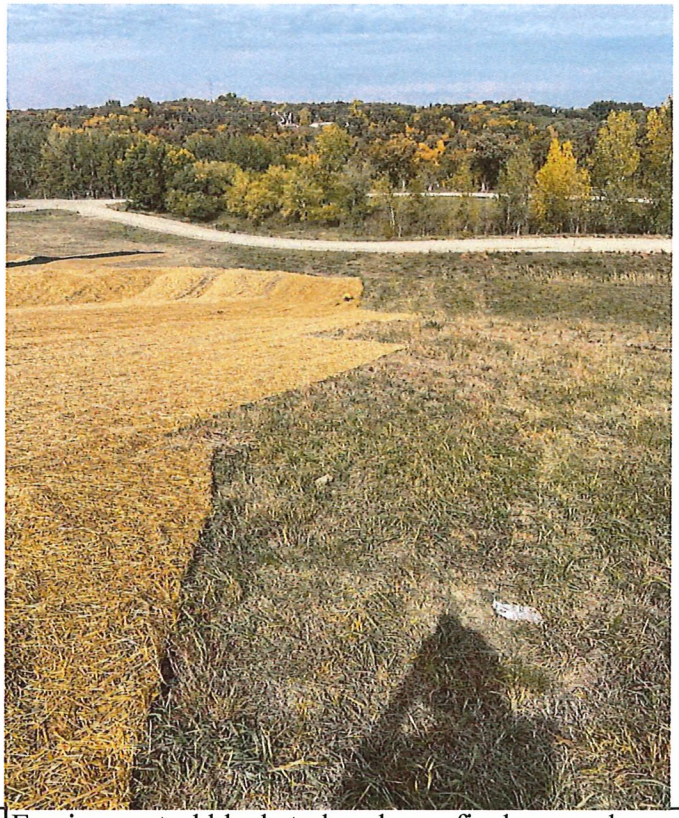


Photo 14 9/25/2023	Erosion control blanket placed over final cover along north half of tie-in to existing liner; looking north.

Construction Photographs

Hoot Lake Ash Landfill 2023 Final Closure

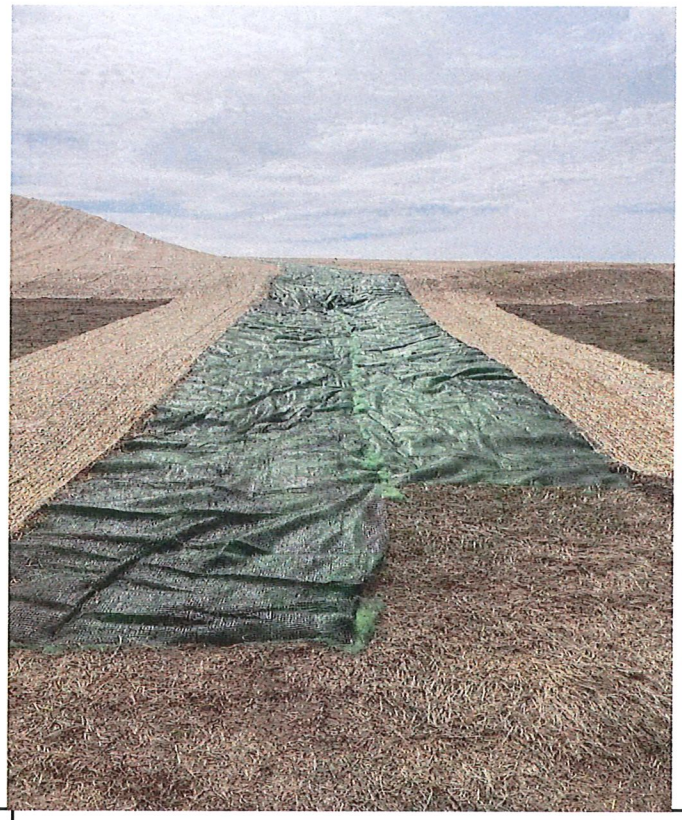


Photo 15 9/25/2023	Turf mat placed through north stormwater channel; looking south.

Photo 16 9/25/2023	Turf mat placed through south stormwater channel below landfill, rip rap plunge pool at base; looking south.

Construction Photographs

Hoot Lake Ash Landfill 2023 Final Closure

Photo 17 9/25/2023	Restored borrow area; looking south.

Appendix B – Survey Verification Data

Final Cover Survey Verification Tabulation
Final Cover Survey Verification Figures

Final Cover Survey Verification Tabulation

Survey Verification Tabulation
Hoot Lake Ash Landfill 2023 Final Closure
Otter Tail Power

Liner Grade Design				As-Built Liner Grade					As-Built Granular Drainage Layer					As-Built Rooting Soil Layer						As-Built Topsoil Layer					Final Thickness		
Point No.	Northing (ft)	Easting (ft)	Elevation (ft)	Northing (ft)	Easting (ft)	Elevation (ft)	Elevation Difference from Design	Comments	Point No.	Northing (ft)	Easting (ft)	Elevation (ft)	Granular Drainage Material Thickness (ft)	Point No.	Northing (ft)	Easting (ft)	Elevation (ft)	Rooting Soil Thickness (ft)	Comments	Point No.	Northing (ft)	Easting (ft)	Elevation (ft)	Topsoil Thickness (ft)	Req.	As-Built	Comments

NOTE: As-Built Grades shown from Surveyor Record Drawings

As-Built Survey Finish Grade Points

Hoot Lake Ash Landfill 2023 Final Closure

Otter Tail Power

Point No.	Northing	Easting	Elevation	Description
5000	166441.85	419888.54	1291.56	ECB
5001	166445.33	419884.29	1290.86	ECB
5002	166443.11	419834.09	1289.88	ECB
5003	166444.25	419795.29	1289.83	ECB
5004	166447.19	419777.71	1289.65	ECB
5005	166454.75	419753.28	1288.88	ECB
5006	166449.23	419686.86	1289.31	ECB
5007	166445.48	419631.44	1289.81	ECB
5008	166441.97	419587.46	1290.24	ECB
5009	166440.89	419561.31	1289.68	ECB
5010	166425.03	419560.71	1290.79	ECB
5011	166353.90	419560.47	1290.34	ECB
5012	166294.22	419562.58	1290.17	ECB
5013	166223.12	419564.61	1289.90	ECB
5014	166154.22	419568.55	1289.05	ECB
5015	166081.74	419572.04	1288.61	ECB
5016	166012.16	419573.41	1288.02	ECB
5017	165940.87	419575.26	1287.32	ECB
5018	165906.06	419577.90	1287.29	ECB
5019	165897.32	419585.23	1286.97	ECB
5020	165892.19	419596.51	1287.06	ECB
5021	165893.52	419665.17	1287.18	ECB
5022	165896.54	419739.69	1287.82	ECB
5023	165899.20	419805.29	1287.66	ECB
5024	165902.95	419880.08	1289.10	ECB
5025	165959.08	419878.17	1302.17	ECB
5026	165968.76	419887.74	1304.98	ECB
5027	165986.38	419893.00	1309.36	ECB
5028	166004.59	419897.40	1316.58	ECB
5029	166006.81	419887.58	1316.01	ECB
5030	166025.12	419891.22	1316.88	ECB
5031	166074.87	419907.01	1328.92	ECB
5032	166104.78	419913.71	1334.38	ECB
5033	166108.23	419936.90	1334.47	ECB
5034	166103.65	419959.23	1334.43	ECB
5035	166104.36	419990.41	1334.04	ECB
5036	166124.97	419989.41	1334.07	ECB
5037	166126.35	419996.79	1334.01	ECB
5038	166132.97	419996.21	1333.85	ECB
5039	166133.77	420002.24	1334.06	ECB
5040	166146.60	420001.15	1334.12	ECB
5041	166144.00	419974.32	1334.30	ECB
5042	166139.64	419974.51	1334.41	ECB
5043	166131.35	419913.86	1334.96	ECB

As-Built Survey Finish Grade Points

Hoot Lake Ash Landfill 2023 Final Closure

Otter Tail Power

Point No.	Northing	Easting	Elevation	Description
5044	166208.73	419913.26	1335.86	ECB
5045	166262.09	419914.78	1333.98	ECB
5046	166273.13	419909.02	1331.55	ECB
5047	166296.91	419910.10	1325.61	ECB
5048	166297.73	419902.93	1325.44	ECB
5049	166333.18	419904.77	1316.41	ECB
5050	166334.32	419896.99	1316.14	ECB
5051	166369.55	419893.71	1309.90	ECB
5052	166414.66	419891.64	1297.84	ECB
5053	166431.72	419907.71	1292.47	ECB
5054	166437.25	419972.21	1290.91	ECB
5055	166439.54	420041.85	1292.42	ECB
5056	166384.07	420042.63	1303.79	ECB
5057	166370.02	420034.76	1307.63	ECB
5058	166370.24	419967.92	1308.26	ECB
5059	166383.12	419911.04	1304.61	ECB
5060	166406.92	419905.62	1299.16	ECB
5061	166441.69	419769.79	1291.91	Berm
5062	166441.73	419773.61	1291.86	Berm
5063	166441.27	419775.33	1291.24	Berm
5064	166458.11	419771.88	1289.50	Berm
5065	166457.70	419774.02	1289.38	Berm
5066	166457.02	419776.52	1288.61	Berm
5067	166473.91	419774.42	1287.72	Berm
5068	166473.55	419777.10	1287.48	Berm
5069	166473.16	419779.32	1287.00	Berm
5070	166484.36	419775.97	1286.43	Berm
5071	166484.38	419779.84	1286.02	Berm
5072	166485.07	419764.45	1286.35	Berm
5073	166485.58	419759.91	1285.74	Berm
5074	166469.87	419762.46	1287.83	Berm
5075	166470.11	419760.02	1287.64	Berm
5076	166470.52	419757.78	1287.25	Berm
5077	166459.08	419760.35	1288.96	Berm
5078	166459.00	419758.15	1288.77	Berm
5079	166459.14	419755.85	1288.28	Berm
5080	166493.31	419782.27	1284.73	ECB
5081	166492.06	419759.10	1285.03	ECB
5082	166441.38	419746.74	1292.86	Berm
5083	166438.51	419747.14	1291.67	Berm
5084	166443.67	419746.62	1292.79	Berm
5085	166453.45	419747.15	1289.09	Berm
5086	166452.20	419718.83	1289.01	Berm
5087	166441.83	419719.50	1292.91	Berm

As-Built Survey Finish Grade Points

Hoot Lake Ash Landfill 2023 Final Closure

Otter Tail Power

Point No.	Northing	Easting	Elevation	Description
5088	166439.65	419719.93	1292.96	Berm
5089	166436.80	419720.42	1291.91	Berm
5090	166435.76	419696.74	1292.09	Berm
5091	166438.71	419696.68	1293.21	Berm
5092	166440.88	419696.56	1293.11	Berm
5093	166450.62	419695.88	1289.22	Berm
5094	166447.93	419661.11	1289.40	Berm
5095	166439.70	419660.88	1292.72	Berm
5096	166437.49	419660.63	1292.86	Berm
5097	166435.14	419660.43	1292.12	Berm
5098	166435.01	419636.30	1291.81	Berm
5099	166436.81	419636.11	1292.34	Berm
5100	166438.57	419636.19	1292.20	Berm
5101	166446.28	419636.07	1289.76	Berm
5102	166442.93	419604.62	1290.14	Berm
5103	166436.69	419604.25	1291.96	Berm
5104	166434.07	419604.22	1291.41	Berm
5105	166495.17	419777.99	1284.62	TurfMat
5106	166496.14	419772.22	1284.57	TurfMat
5107	166490.96	419770.68	1285.19	TurfMat
5108	166489.82	419776.91	1285.37	TurfMat
5109	166491.95	419765.37	1285.08	TurfMat
5110	166477.35	419763.93	1287.25	TurfMat
5111	166477.05	419768.67	1286.61	TurfMat
5112	166476.59	419774.75	1287.43	TurfMat
5113	166462.29	419772.34	1288.89	TurfMat
5114	166462.47	419766.70	1288.03	TurfMat
5115	166462.81	419761.48	1288.62	TurfMat
5116	166445.54	419759.12	1291.74	TurfMat
5117	166445.35	419764.49	1290.64	TurfMat
5118	166444.62	419770.23	1291.53	TurfMat
5119	166380.82	419767.41	1296.45	TurfMat
5120	166381.25	419767.18	1296.50	TurfMat
5121	166380.96	419759.22	1296.39	TurfMat
5122	166308.81	419761.92	1301.61	TurfMat
5123	166310.10	419774.33	1302.39	TurfMat
5124	166251.95	419781.92	1307.05	TurfMat
5125	166251.24	419775.97	1306.17	TurfMat
5126	166250.40	419770.57	1306.13	TurfMat
5127	166164.31	419794.02	1313.64	TurfMat
5128	166163.64	419788.33	1312.65	TurfMat
5129	166162.78	419782.20	1312.58	TurfMat
5130	166081.86	419793.05	1312.71	TurfMat
5131	166081.67	419804.65	1313.65	TurfMat

As-Built Survey Finish Grade Points

Hoot Lake Ash Landfill 2023 Final Closure

Otter Tail Power

Point No.	Northing	Easting	Elevation	Description
5132	166014.57	419795.42	1303.32	TurfMat
5133	166016.36	419783.14	1302.96	TurfMat
5134	165954.58	419774.67	1293.69	TurfMat
5135	165953.96	419785.61	1293.95	TurfMat
5136	165899.31	419788.03	1288.03	TurfMat
5137	165899.02	419775.31	1287.54	TurfMat
5138	165878.15	419780.67	1285.79	TurfMat
5139	165878.56	419793.11	1286.13	TurfMat
5140	165858.19	419794.21	1279.16	TurfMat
5141	165857.70	419788.03	1278.28	TurfMat
5142	165857.03	419782.01	1278.48	TurfMat
5143	165821.07	419784.43	1266.39	TurfMat
5144	165821.18	419790.32	1265.77	TurfMat
5145	165821.58	419796.58	1266.93	TurfMat
5146	165779.18	419799.08	1253.71	TurfMat
5147	165778.40	419792.96	1252.83	TurfMat
5148	165777.81	419786.74	1253.41	TurfMat
5149	165776.53	419783.18	1253.32	ECB
5150	165777.88	419801.87	1254.04	ECB
5151	165822.68	419799.99	1266.69	ECB
5152	165822.56	419780.46	1266.87	ECB
5153	165858.02	419778.07	1278.87	ECB
5154	165879.04	419796.60	1286.04	ECB
5155	166120.63	419410.57	1280.24	Mulch
5156	166031.88	419409.59	1282.17	Mulch
5157	165928.24	419416.87	1283.99	Mulch
5158	165932.45	419483.79	1284.05	Mulch
5159	166026.55	419478.92	1280.59	Mulch
5160	166124.21	419462.81	1280.31	Mulch
5161	166111.38	419529.30	1280.92	ECB
5162	166089.48	419530.68	1281.24	ECB
5163	166091.83	419548.01	1286.83	ECB
5164	166113.11	419548.07	1287.21	ECB
5165	166285.78	419543.05	1288.64	ECB
5166	166284.35	419517.30	1280.01	ECB
5167	166310.09	419509.63	1278.14	ECB
5168	166311.06	419541.51	1288.57	ECB
5169	166444.88	419510.63	1280.81	ECB
5170	166422.71	419506.30	1279.25	ECB
5171	166412.15	419540.90	1290.08	ECB
5172	166440.80	419542.71	1289.73	ECB
5173	165688.30	420811.05	1277.07	Mulch
5174	165689.41	420734.84	1275.94	Mulch
5175	165690.96	420666.16	1274.63	Mulch

As-Built Survey Finish Grade Points

Hoot Lake Ash Landfill 2023 Final Closure

Otter Tail Power

Point No.	Northing	Easting	Elevation	Description
5176	165691.48	420590.95	1275.92	Mulch
5177	165697.83	420514.66	1277.79	Mulch
5178	165692.25	420440.38	1279.75	Mulch
5179	165688.62	420364.83	1279.16	Mulch
5180	165688.03	420291.33	1282.91	Mulch
5181	165700.73	420220.51	1287.68	Mulch
5182	165751.23	420199.72	1283.40	Mulch
5183	165750.84	420238.77	1276.88	Mulch
5184	165748.40	420289.50	1276.01	Mulch
5185	165748.44	420364.74	1275.04	Mulch
5186	165753.56	420437.25	1275.51	Mulch
5187	165754.55	420514.78	1275.40	Mulch
5188	165751.95	420592.92	1273.76	Mulch
5189	165749.77	420666.79	1271.77	Mulch
5190	165748.84	420734.90	1271.20	Mulch
5191	165750.09	420820.03	1274.06	Mulch
5192	165792.07	420820.65	1272.31	Mulch
5193	165795.15	420736.21	1270.69	Mulch
5194	165795.04	420664.89	1270.76	Mulch
5195	165794.89	420593.16	1271.80	Mulch
5196	165795.91	420513.03	1273.58	Mulch
5197	165793.50	420435.57	1275.69	Mulch
5198	165793.25	420362.87	1276.05	Mulch
5199	165792.05	420288.49	1276.44	Mulch
5200	165792.49	420236.34	1276.67	Mulch
5201	165788.93	420195.61	1284.10	Mulch
5202	165850.20	420191.05	1287.57	Mulch
5203	165851.26	420239.66	1279.39	Mulch
5204	165854.00	420289.71	1277.47	Mulch
5205	165859.31	420360.38	1278.22	Mulch
5206	165863.44	420390.11	1285.58	Mulch
5207	165921.20	420381.25	1289.73	Mulch
5208	165904.25	420357.37	1284.15	Mulch
5209	165898.10	420290.23	1283.65	Mulch
5210	165896.94	420237.68	1284.50	Mulch
5211	165894.71	420191.68	1288.37	Mulch
5212	165819.73	420400.74	1284.14	Mulch
5213	165823.33	420428.92	1282.87	Mulch
5214	165864.51	420421.05	1284.94	Mulch
5215	165921.02	420418.14	1288.51	Mulch
5216	165865.71	420469.53	1275.32	Mulch
5217	165824.30	420467.65	1275.57	Mulch
5218	165869.72	420510.47	1273.74	Mulch
5219	165871.78	420589.82	1272.67	Mulch

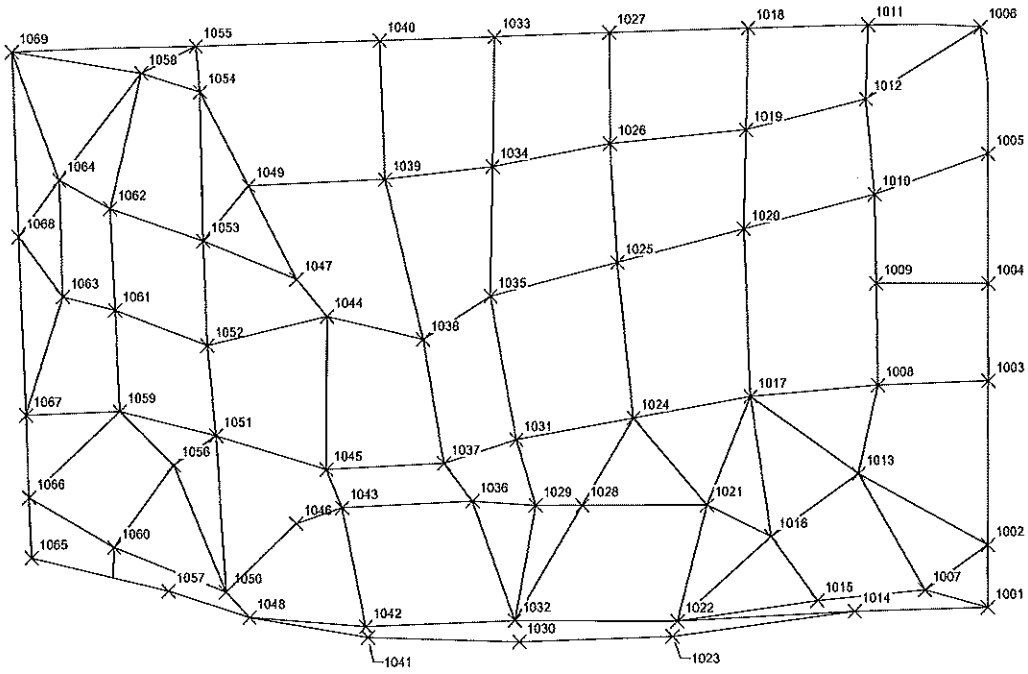
As-Built Survey Finish Grade Points

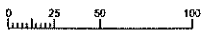
Hoot Lake Ash Landfill 2023 Final Closure

Otter Tail Power

Point No.	Northing	Easting	Elevation	Description
5220	165869.23	420663.53	1271.69	Mulch
5221	165867.16	420735.44	1271.37	Mulch
5222	165866.70	420821.91	1272.08	Mulch
5223	165995.61	420820.11	1277.38	Mulch
5224	166013.86	420737.50	1284.05	Mulch
5225	165954.81	420733.83	1273.12	Mulch
5226	165958.32	420665.09	1273.47	Mulch
5227	166010.29	420662.47	1284.73	Mulch
5228	165964.83	420591.68	1283.70	Mulch
5229	165917.82	420590.31	1273.64	Mulch
5230	165918.97	420510.81	1283.72	Mulch
5231	165910.80	420466.23	1283.53	Mulch
10601	165769.94	419793.19	1252.60	TurfMat
10602	166441.81	419888.54	1291.57	ECB

Final Cover Survey Verification Figures

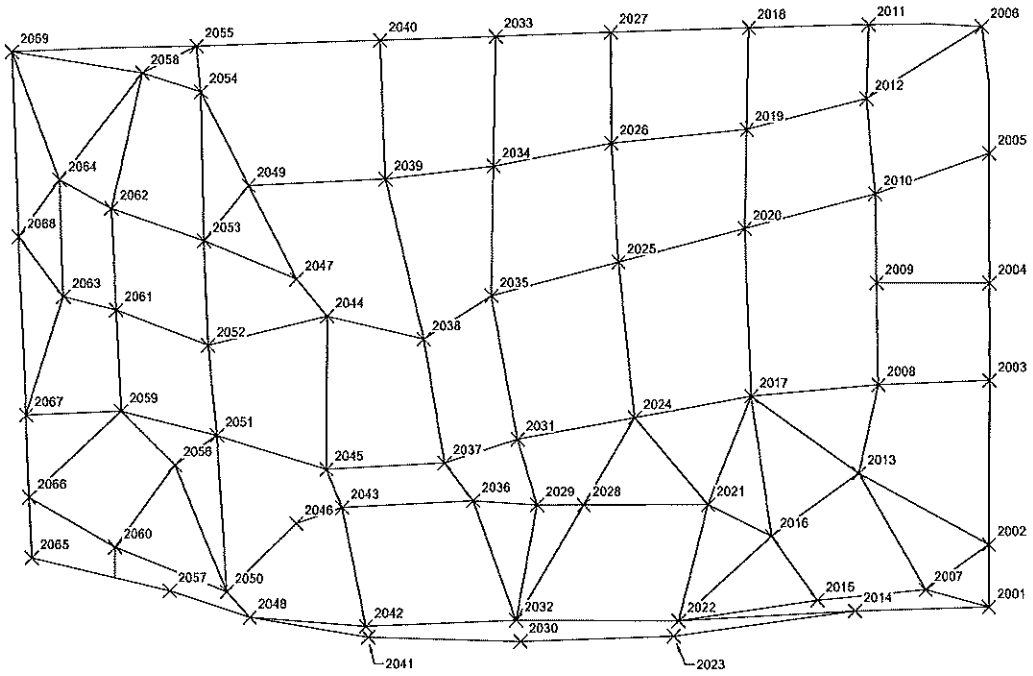




CARLSON McCAIN
ENGINEERING SURVEYING ENVIRONMENTAL

FIGURE 1
GEOMEMBRANE SURVEY VERIFICATION

2023 FINAL CLOSURE
HOOT LAKE ASH LANDFILL
OTTER TAIL POWER - FERGUS FALLS, MN



N

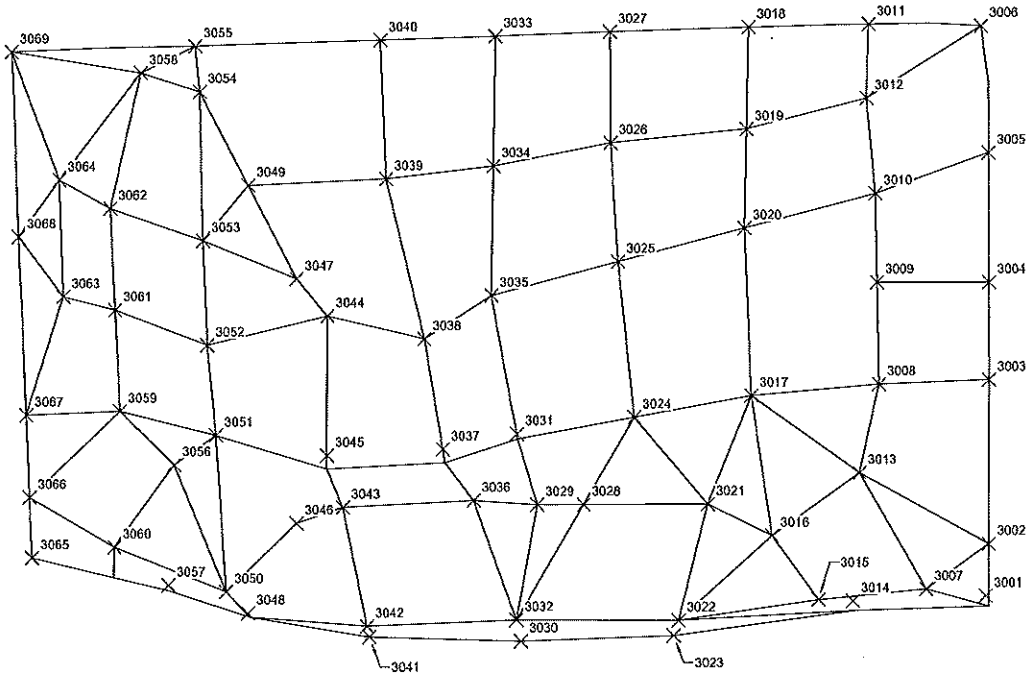
0 25 50 100

SCALE IN FEET

CARLSON McCAIN

ENGINEERING SURVEYING ENVIRONMENTAL

FIGURE 2
GRANULAR DRAINAGE MATERIAL SURVEY VERIFICATION
2023 FINAL CLOSURE
HOOT LAKE ASH LANDFILL
OTTER TAIL POWER - FERGUS FALLS, MN



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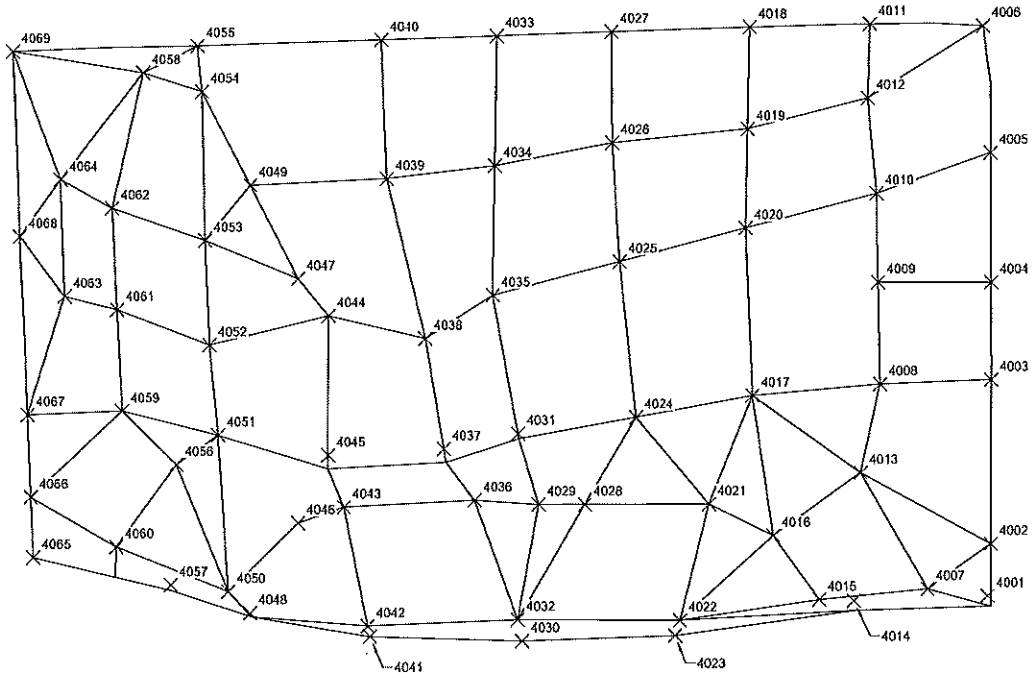
SCALE IN FEET

CARLSON McCAIN

ENGINEERS SURVEYORS ENVIRONMENTAL

FIGURE 3
ROOTING SOIL SURVEY VERIFICATION
2023 FINAL CLOSURE
HOOT LAKE ASH LANDFILL
OTTER TAIL POWER - FERGUS FALLS, MN



0 25 50 100

SCALE IN FEET

CARLSON McCAIN

ENGINEERING SURVEYING ENVIRONMENTAL

FIGURE 4
FINAL GRADE SURVEY VERIFICATION
2023 FINAL CLOSURE
HOOT LAKE ASH LANDFILL
OTTER TAIL POWER - FERGUS FALLS, MN

Appendix C – Geomembrane Installation Data

Manufacturer Quality Control Documentation
Tensiometer Calibration Certificate
Final Cover As-Built Panel Layout Drawing
Final Cover Subgrade Acceptance Forms
Final Cover Trial Weld Forms
Final Cover Panel Seaming Forms
Final Cover Field Destructive Testing Forms
Final Cover Repair Forms

Manufacturer Quality Control Documentation

Product: 40-LLD-11-BLK-BLK-GRI-STD-24.00
Project : Hoot Lake Ash Landfill, MN
Customer: Global Containment Solutions, LLC.
Cust PO: 23-03-1054-01

QC'd By: Mathesh Patel
Date: August 8, 2023

We hereby certify the following test results for the above referenced product/project :

Count	Roll Number	Area (sq ft)	Thickness MAV (mil)	Thickness MIN (mil)	Asperity Height (mil)		Tensile at Break (ppi)		Elong at Break (%)		Tear Resistance (lb)		Punct Resist (lb)	Density (g/cc)	Carbon Black (%)	CB Disp (Views in Cat 1 or 2)	Resin OIT (Minute)	Resin Lot #
			ASTM D 5994	ASTM D 5994	ASTM D 7466		ASTM D 6693		ASTM D 6693		ASTM D 1004		ASTM D 4833	ASTM D 1505	ASTM D 4218	ASTM D 5596	ASTM D 3895	
					Side A	Side B	MD	TD	MD	TD	MD	TD						
01	3101259001	16,920.00	39	35	24	24	147	132	597	550	37	36	97	0.933	2.6	10	143	DQE810370
02	3101259002	16,920.00	39	35	23	24	158	132	610	545	34	35	95	0.932	2.4	10	143	DQE810370
03	3101259003	16,920.00	39	36	23	25	158	132	610	545	34	35	95	0.932	2.4	10	143	DQE810370
04	3101259004	16,920.00	39	34	24	25	158	132	610	545	34	35	95	0.932	2.4	10	143	DQE810370
05	3101259005	16,920.00	41	37	23	23	158	132	610	545	34	35	95	0.932	2.4	10	143	DQE810370
06	3101259006	16,920.00	40	37	22	24	150	131	585	542	34	35	95	0.932	2.4	10	143	DQE810370
07	3101259007	16,920.00	41	38	21	24	150	131	585	542	34	35	95	0.932	2.4	10	143	DQE810370
08	3101259008	16,920.00	40	37	24	26	150	131	585	542	34	35	95	0.932	2.4	10	143	DQE810370
09	3101259009	16,800.00	39	34	24	25	150	131	585	542	34	35	95	0.932	2.4	10	143	DQE810370
10	3101259010	16,920.00	39	36	23	26	150	131	585	542	34	35	95	0.932	2.4	10	143	DQE810370
11	3101259011	16,920.00	40	36	22	24	155	132	622	560	35	36	96	0.932	2.5	10	143	DQE810370
12	3101259012	16,920.00	39	35	22	25	155	132	622	560	35	36	96	0.932	2.5	10	143	DQE810370

SKAPS Industries
571 Industrial Parkway
Commerce, GA 30529

Phone: 706-336-7000
Fax: 706-336-7007
E-Mail:contact@skaps.com

CoA Date: 05/15/2023

Certificate of Analysis

Shipped To: SKAPS
571 Industrial Park Way
COMMERCE GA 30529-1326
USA

Recipient: JETAL
Fax:

Delivery #: 80906566
PO #: 30131230075
Weight: 187400.000 LB
Ship Date: 05/15/2023
Package: BULK
Mode: Hopper Car
Car #: GPLX076893
Seal No: 348946

Product:
MARLEX 7104 POLYETHYLENE in Bulk

Lot Number: DQE810370

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.36	g/10min
Density	D1505	0.920	g/cm3
Production date		20230507	

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem). **However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

JIAHUI LI
QUALITY ASSURANCE SUPERINTENDENT

For CoA questions contact Leslie Dziamara at +1-832-813-4806

Tensiometer Calibration Certificate

DEMTECH Services Inc.®

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester [T-0100/A or T-0100SE/A]

Device Calibrated: S-Type load cell

Range: 0 - 750 lbs. Tension

Model No: XTS2-750

Serial No: 266627

Calibration Apparatus: Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029

A/D Module Serial No: 3322266627

Channel No: N/A

Indicator reading with no load: 0

Dead Weight:		Reference Cell	
W1	2	R1	2
W2	152	R2	152
W3	302	R3	302

Offset: -6.332791 Scale: 3.327377

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: Marc Scott Date: 08/24/23

Signature:

DEMTECH Services Inc.®

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester [T-0100/A or T-0100SE/A]
Device Calibrated: S-Type load cell
Range: 0 - 750 lbs. Tension
Model No: M2405-750#
Serial No: 78956

Calibration Apparatus: Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029
A/D Module Serial No: 119078956
Channel No: N/A

Dead Weight: W1 2, W2 152, W3 302
Reference Cell: R1 2, R2 152, R3 302

Indicator reading with no load: 0

Offset: -4.668729 Scale: 3.326045

Applied Force lbs.	Cell Response:	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: Marc Scott Date 08/24/23

Signature: Marc Scott

DEMTECH Services Inc.

CALIBRATION CERTIFICATE

Tensiometer Model	Pro-Tester [T-0100/A or T-0100SE/A]
Device Calibrated	S-Type load cell
Range	0 - 750 lbs. Tension
Model No	M2405-75/08
Serial No	75541
A/D Module Model No	T-029
A/D Module Serial No	2622275541
Channel No	N/A

Calibration Apparatus

Pro-Cal unit, model TC-0100/A

Dead Weight		Reference Cell	
W1	2	R1	2
W2	152	R2	152
W3	302	R3	302

Indicator reading with no load: 0

Offset: -4.761933 Scale: 3.330406

Applied Force lbs.	Cell Response	Deviation Error:
2	2	0.00
52	52	0.00
102	102	0.00
152	152	0.00
202	202	0.00
252	252	0.00
302	302	0.00

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation Voltage: 5 V DC

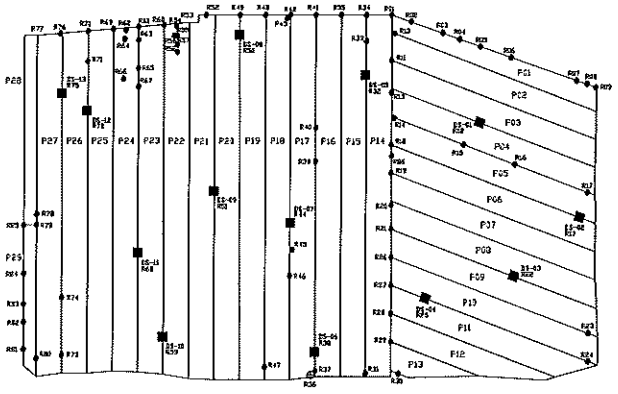
This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: Marc Scott Date: 08/24/23

Signature:

Final Cover As-Built Panel Layout Drawing



40 MIL LLDPE TEXTURED
RECORD DRAWING

PXX	PANEL NUMBER
RXX	REPAIR
DS-XX RXX	DESTRUCT
	BOOT

SCALE-1"= 40'
40 0 40 80

NOTES:
1. RECORD DRAWING IS BASED ON FIELD OBSERVATIONS AND NOT SURVEYED LOCATIONS.

GEOSYNTHETIC CONSTRUCTION SOLUTIONS
45 EAST FIRST STREET
SUITE 110
DULUTH, MN 55804
PHONE (218) 724-4999

NORTH

MOOT LAKE ASH LANDFILL
2023 FINAL CLOSURE
FERGUS FALLS, MN

DRAWN BY	DATE
Don Gurlac	9-9-24
SCALE	
1"=40'	
JOB NUMBER	
23-09-1054	
SHEET NUMBER	
1 - 1	

Final Cover Subgrade Acceptance Forms

CERTIFICATE OF SUBGRADE SURFACE ACCEPTANCE

INSTALLER: GLOBAL CONTAINMENT SOLUTIONS, LLC

PROJECT NAME: Hoot Lake Closure PROJECT NO: 23-03-1054

LOCATION: Fergus Falls, MN

AREA ACCEPTED: 96,624 sq.ft.

PANEL NUMBERS: P1-17

GRADE ACCEPTANCE: INSPECTOR:

GENERAL CONTRACTOR:

OWNER:

AUTHORIZED REPRESENTATIVE:

The undersigned, Thavone Daranikone ,certifies that he/she is a representative of GLOBAL CONTAINMENT SOLUTIONS, LLC authorized to execute this certificate, that he/she has visually inspected the subgrade surface described above on _____ and found the surface to be acceptable for installation of the geomembrane.

This certification is based on observation of the surface of the subgrade only. No subsurface inspections or test have been performed and Environmental Specialties International, Inc. makes no representations or warranties regarding conditions which may exist below the surface of the subgrade.

AUTHORIZED REPRESENTATIVE OF GLOBAL CONTAINMENT SOLUTIONS, LLC

	Superintendent	8/29/2023
Signature	*Title*	*DATE*

OWNER REPRESENTATIVE

		8/29/23
Signature	*Title*	*DATE*

CERTIFICATE OF SUBGRADE SURFACE ACCEPTANCE

INSTALLER: GLOBAL CONTAINMENT SOLUTIONS, LLC

PROJECT NAME: Hoot Lake Closure PROJECT NO: 23-03-1054

LOCATION: Fergus Falls, MN

AREA ACCEPTED: 83,304 sq.ft.

PANEL NUMBERS: P18-29

GRADE ACCEPTANCE: INSPECTOR:

GENERAL CONTRACTOR:

OWNER:

AUTHORIZED REPRESENTATIVE:

The undersigned, Thavone Daranikone ,certifies that he/she is a representative of GLOBAL CONTAINMENT SOLUTIONS, LLC authorized to execute this certificate, that he/she has visually inspected the subgrade surface described above on _____ and found the surface to be acceptable for installation of the geomembrane.

This certification is based on observation of the surface of the subgrade only. No subsurface inspections or test have been performed and Environmental Specialties International, Inc. makes no representations or warranties regarding conditions which may exist below the surface of the subgrade.

AUTHORIZED REPRESENTATIVE OF GLOBAL CONTAINMENT SOLUTIONS, LLC

	Superintendent	8/30/2023
Signature	*Title*	*DATE*

OWNER REPRESENTATIVE

	Supt	8/30/23
Signature	*Title*	*DATE*

405 East Forest Street, Oconomowoc, WI 53066

Final Cover Trial Weld Forms

Global Containment Solutions LLC
Preweld Test Report

Project Name: Hoot Lake Closure **Job #** 22-03-1054 **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL **Primary** **Pond**

Job Description: Cap **Secondary** **Cell**

Reported By : Guadalupe Estrada **Cap** X

Other :

Peel Test Extrusion Minimum	44	PPI
Peel Test Fusion Minimum	50	PPI
Shear Test Minimum	60	PPI

Liner Types **S = Smooth** **T = Textured** **SG = Super Grip**

Weld Date / Liner Type	Time AM / PM	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Ambient Temp		Coupon 1 A / B	Coupon 2 A / B	Coupon 3 A / B	Coupon 4 A / B	Coupon 5 A / B	Test Results
8.29.23	9:09	NM	4941	6	860		67	Peel	70 / 67	70 / 67	70 / 64	70 / 68	68 / 689	Pass
S TO S	AM							Shear	88	85	83	87	86	
8.29.23	9:15	NM	4941	6	860		67	Peel	77 / 75	76 / 77	78 / 76	69 / 70	76 / 76	Pass
T TO T	AM							Shear	87	88	91	85	82	
8.29.23	9:12	NM	4941	6	860		67	Peel	66 / 70	68 / 68	68 / 70	68 / 72	71 / 70	Pass
S TO T	AM							Shear	87	87	84	86	86	
8.29.23	9:00	MB	4940	6	800		67	Peel	67 / 68	65 / 68	63 / 63	67 / 68	63 / 65	Pass
S TO S	AM							Shear	84	83	86	86	88	
8.29.23	1:09	NM	4941	6	860		78	Peel	63 / 65	63 / 65	68 / 65	68 / 66	69 / 70	Pass
S TO T	PM							Shear	89	86	82	86	89	
8.29.23	1:10	MB	4940	6	800		78	Peel	70 / 64	68 / 70	73 / 70	64 / 75	69 / 71	Pass
S TO S	PM							Shear	86	84	82	83	85	
8.29.23	4:01	NM	4941	6	860		77	Peel	63 / 65	63 / 68	71 / 65	73 / 73	66 / 66	Pass
T TO T	AM							Shear	86	84	93	93	87	
8.30.23	8:00	NM	4941	6	860		61	Peel	66 / 68	67 / 67	63 / 66	69 / 67	63 / 64	Pass
S TO S	AM							Shear	85	87	87	83	87	
8.30.23	8:00	MB	4940	6	800		61	Peel	63 / 67	64 / 66	66 / 66	64 / 65	64 / 67	Pass
S TO S	PM							Shear	84	87	85	91	90	
8.30.23	1:13	NM	4941	6	860		77	Peel	71 / 72	77 / 72	74 / 77	78 / 80	79 / 74	
S TO S	PM							Shear	89	85	85	90	86	
8.30.23	1:00	DB	77		550	400	77	Peel	81	72	73	76	74	Pass
T TO T	PM							Shear	89	86	90	93	89	
8.30.23	3:34	NM	422		550	550	77	Peel	90	81	73	83	92	Pass
T TO T	PM							Shear	94	98	94	102	93	
8.31.23	7:34	NM	422		550	550	67	Peel	73	91	73	83	90	Pass
T TO T	AM							Shear	88	93	94	95	89	
8.31.23	7:00	DB	77		550	550	67	Peel	89	89	86	85	88	Pass
T TO T	AM							Shear	88	87	93	90	88	
8.31.23	8:15	MB	813		550	550	67	Peel	82	86	82	87	88	Pass
T TO T	AM							Shear	88	87	89	90	86	
8.31.23	1:30	NM	422		550	550	78	Peel	78	81	70	80	79	Pass
T TO T	PM							Shear	87	87	87	86	87	

Global Containment Solutions LLC
Preweld Test Report

Project Name: Hoot Lake Closure **Job #** 22-03-1054 **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL **Primary** ☐ **Pond** ☐ **Peel Test Extrusion Minimum** 44 **PPI**

Job Description: Cap **Secondary** ☐ **Cell** ☐ **Peel Test Fusion Minimum** 50 **PPI**

Reported By : Guadalupe Estrada **Cap** ☒ **Shear Test Minimum** 60 **PPI**

Other :

Liner Types **S = Smooth** **T = Textured** **SG = Super Grip**

Weld Date Liner Type	Time AM | PM	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Ambient Temp		Coupon 1 A	Coupon 1 B	Coupon 2 A	Coupon 2 B	Coupon 3 A	Coupon 3 B	Coupon 4 A	Coupon 4 B	Coupon 5 A	Coupon 5 B	Test Results
8.31.23	1:40	MB	813		550	550	78	Peel	77		75		79		79		77		Pass
T TO T	PM							Shear	93		92		86		85		86		
8.31.23	1:40	DB	77		550	500	78	Peel	80		77		78		77		80		Pass
T TO T	PM							Shear	85		87		85		87		85		
	:							Peel											
TO								Shear											
	:							Peel											
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Final Cover Panel Seaming Forms

Global Containment Solutions LLC

Seam Control Form

Project Name: Hoot Lake Closure | **Job #** 22-03-1054 | **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL | Primary [ ] | Pond [ ] | **Air Pressure Test** 30 PSI

Job Description: Cap | Secondary [ ] | Cell [ ] | **Air Pressure Hold Time** 5 Minutes

Reported By Guadalupe Estrada | Cap [X] | **Allowable Air Pressure Loss** 3 PSI

Other

8,838	Total LF of Welding to Date Combined	Extrusion LF Weld Total To Date	1,078	Fusion LF Weld Total To Date:	7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In / PSI IN	AT Time Out / PSI OUT	PSI Loss	Test Results
8.29.23	1 / 2	203	9:25 AM	MB	4940	6	860		8.29.23	Air Pressure	4:39 / 30	4:44 / 30		Pass
Seam Notes														
8.29.23	2 / 3	202	9:19 AM	NM	4941	6	860		8.29.23	Air Pressure	4:37 / 30	4:42 / 30		Pass
Seam Notes														
8.29.23	3 / 4	202	9:42 AM	NM	4941	6	860		8.29.23	Air Pressure	4:43 / 30	4:48 / 30		Pass
Seam Notes														
8.29.23	4 / 5	71	9:50 AM	MB	4940	6	860		8.29.23	Air Pressure	4:44 / 30	4:49 / 30		Pass
Seam Notes														
8.29.23	4 / 5	131	9:59 AM	MB	4940	6	860		8.29.23	Air Pressure	4:45 / 30	4:50 / 30		Pass
Seam Notes														
8.29.23	5 / 6	202	10:05 AM	NM	4941	6	860		8.29.23	Air Pressure	4:49 / 30	4:54 / 30		Pass
Seam Notes														
8.29.23	6 / 7	202	10:25 AM	MB	4940	6	860		8.29.23	Air Pressure	4:50 / 30	4:55 / 29	1	Pass
Seam Notes														
8.29.23	7 / 8	202	10:25 AM	NM	4941	6	860		8.29.23	Air Pressure	4:52 / 30	4:57 / 30		Pass
Seam Notes														

Global Containment Solutions LLC
Seam Control Form

Project Name:	Hoot Lake Closure	**Job #**	22-03-1054	**Superintendent:**	Thavone Daranikone		
Material Type:	40 mil f/2 LL	**Primary**		**Pond**		**Air Pressure Test**	30 PSI
Job Description:	Cap	**Secondary**		**Cell**		**Air Pressure Hold Time**	5 Minutes
Reported By	Guadalupe Estrada			**Cap**	X	**Allowable Air Pressure Loss**	3 PSI
Other							

8,838	**Total LF of Welding to Date Combined**	**Extrusion LF Weld Total To Date**	1,078	**Fusion LF Weld Total To Date:**	7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In / PSI IN	AT Time Out / PSI OUT	PSI Loss	Test Results
8.29.23	8 / 9	204	10:48 AM	MB	4940	6	860		8.30.23	Air Pressure	1:30 / 30	1:35 / 29	1	Pass
Seam Notes														
8.29.23	9 / 10	10	10:19 AM	NM	4941	6	860		8.30.23	Air Pressure	1:50 / 30	1:55 / 30		Pass
Seam Notes														
8.29.23	9 / 10	195	10:19 AM	NM	4941	6	860		8.30.23	Air Pressure	1:35 / 30	1:40 / 30		Pass
Seam Notes														
8.29.23	10 / 11	9	11:15 AM	MB	4940	6	860		8.30.23	Air Pressure	1:51 / 30	1:56 / 30		Pass
Seam Notes														
8.29.23	10 / 11	196	11:15 AM	MB	4940	6	860		8.30.23	Air Pressure	1:45 / 30	1:50 / 30		Pass
Seam Notes														
8.29.23	11 / 12	163	11:15 AM	NM	4941	6	860		8.30.23	Air Pressure	1:55 / 30	2:00 / 30		Pass
Seam Notes														
8.29.23	12 / 13	88	11:35 AM	MB	4940	6	860		8.30.23	Air Pressure	2:01 / 30	2:06 / 30		Pass
Seam Notes														
8.29.23	1 / 14	22	1:41 PM	NM	4941	6	860		8.29.23	Air Pressure	4:30 / 30	4:35 / 30		Pass
Seam Notes														

Global Containment Solutions LLC

Seam Control Form

Project Name: Hoot Lake Closure | **Job #** 22-03-1054 | **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL | Primary [ ] | Pond [ ] | **Air Pressure Test** 30 PSI

Job Description: Cap | Secondary [ ] | Cell [ ] | **Air Pressure Hold Time** 5 Minutes

Reported By Guadalupe Estrada | Cap [X] | **Allowable Air Pressure Loss** 3 PSI

Other

8,838 Total LF of Welding to Date Combined	Extrusion LF Weld Total To Date: 1,078	Fusion LF Weld Total To Date: 7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In / PSI IN	AT Time Out / PSI OUT	PSI Loss	Test Results
8.29.23	2 / 14	26	1:44 PM	NM	4941	6	860		8.30.23	Air Pressure	1:05 / 30	1:10 / 30		Pass
Seam Notes														
8.29.23	3 / 14	26	1:47 PM	NM	4941	6	860		8.30.23	Air Pressure	1:06 / 30	1:11 / 30		Pass
Seam Notes														
8.29.23	4 / 14	26	1:50 PM	NM	4941	6	860		8.30.23	Air Pressure	1:07 / 30	1:12 / 30		Pass
Seam Notes														
8.29.23	5 / 14	10	1:53 PM	NM	4941	6	860		8.30.23	Air Pressure	1:08 / 30	1:13 / 30		Pass
Seam Notes														
8.29.23	5 / 14	16	1:55 PM	NM	4941	6	860		8.30.23	Air Pressure	1:10 / 30	1:15 / 30		Pass
Seam Notes														
8.29.23	6 / 14	26	1:58 PM	NM	4941	6	860		8.30.23	Air Pressure	1:11 / 30	1:16 / 30		Pass
Seam Notes														
8.29.23	7 / 14	26	2:01 PM	NM	4941	6	860		8.30.23	Air Pressure	1:20 / 30	1:25 / 30		Pass
Seam Notes														
8.29.23	8 / 14	26	2:04 PM	NM	4941	6	860		8.30.23	Air Pressure	1:21 / 30	1:26 / 30		Pass
Seam Notes														

Global Containment Solutions LLC

Seam Control Form

Project Name:	Hoot Lake Closure	**Job #**	22-03-1054	**Superintendent:**	Thavone Daranikone		
Material Type:	40 mil f/2 LL	**Primary**		**Pond**		**Air Pressure Test**	30 **PSI**
Job Description:	Cap	**Secondary**		**Cell**		**Air Pressure Hold Time**	5 **Minutes**
Reported By	Guadalupe Estrada			**Cap**	X	**Allowable Air Pressure Loss**	3 **PSI**
Other							

8,838	**Total LF of Welding to Date Combined**	**Extrusion LF Weld Total To Date**	1,078	**Fusion LF Weld Total To Date:** 7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In / PSI IN	AT Time Out / PSI OUT	PSI Loss	Test Results
8.29.23	9 / 14	26	2:07 PM	NM	4941	6	860		8.30.23	Air Pressure	1:33 / 30	1:38 / 30		Pass
Seam Notes														
8.29.23	10 / 14	26	2:10 PM	NM	4941	6	860		8.30.23	Air Pressure	1:42 / 30	1:47 / 30		Pass
Seam Notes														
8.29.23	11 / 14	26	2:13 PM	NM	4941	6	860		8.30.23	Air Pressure	1:43 / 30	1:48 / 30		Pass
Seam Notes														
8.29.23	12 / 14	26	2:16 PM	NM	4941	6	860		8.30.23	Air Pressure	2:10 / 30	2:15 / 30		Pass
Seam Notes														
8.29.23	13 / 14	26	2:19 PM	NM	4941	6	860		8.30.23	Air Pressure	2:16 / 30	2:21 / 30		Pass
Seam Notes														
8.29.23	14 / 15	23	2:20 PM	MB	4940	6	860		8.29.23	Air Pressure	4:23 / 30	4:28 / 30		Pass
Seam Notes														
8.29.23	14 / 15	311	2:23 PM	MB	4940	6	860		8.29.23	Air Pressure	4:20 / 30	4:25 / 30		Pass
Seam Notes														
8.29.23	15 / 16	334	2:56 PM	NM	4941	6	860		8.30.23	Air Pressure	4:18 / 30	4:23 / 30		Pass
Seam Notes														

Global Containment Solutions LLC

Seam Control Form

Project Name: Hoot Lake Closure | **Job #** 22-03-1054 | **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL | Primary [ ] | Pond [ ] | **Air Pressure Test** 30 PSI

Job Description: Cap | Secondary [ ] | Cell [ ] | **Air Pressure Hold Time** 5 Minutes

Reported By Guadalupe Estrada | Cap [X] | **Allowable Air Pressure Loss** 3 PSI

Other

8,838	Total LF of Welding to Date Combined	Extrusion LF Weld Total To Date	1,078	Fusion LF Weld Total To Date:	7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In / PSI IN	AT Time Out / PSI OUT	PSI Loss	Test Results
8.29.23	16 / 17	104	3:20 PM	MB	4940	6	860		8.29.23	Air Pressure	4:10 / 30	4:15 / 30		Pass
Seam Notes														
8.29.23	16 / 17	31	3:33 PM	MB	4940	6	860		8.29.23	Air Pressure	4:02 / 30	4:07 / 30		Pass
Seam Notes														
8.29.23	16 / 17	199	3:38 PM	MB	4940	6	860		8.29.23	Air Pressure	4:00 / 30	4:05 / 30		Pass
Seam Notes														
8.29.23	14 / EX	24	4:03 PM	NM	4941	6	860		8.29.23	Air Pressure	4:25 / 30	4:30 / 30		Pass
Seam Notes														
8.29.23	15 / EX	24	4:06 PM	NM	4941	6	860		8.29.23	Air Pressure	4:19 / 30	4:24 / 30		Pass
Seam Notes														
8.29.23	16 / EX	24	4:09 PM	NM	4941	6	860		8.29.23	Air Pressure	4:16 / 30	4:21 / 30		Pass
Seam Notes														
8.29.23	17 / EX	21	4:12 PM	NM	4941	6	860		8.29.23	Air Pressure	4:15 / 30	4:20 / 30		Pass
Seam Notes														
8.29.23	1 / EX	20	4:28 PM	NM	4941	6	860		8.30.23	Air Pressure	6:12 / 30	6:17 / 30		Pass
Seam Notes														

Global Containment Solutions LLC

Seam Control Form

Project Name: Hoot Lake Closure | **Job #** 22-03-1054 | **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL | Primary [ ] | Pond [ ] | **Air Pressure Test** 30 PSI

Job Description: Cap | Secondary [ ] | Cell [ ] | **Air Pressure Hold Time** 6 Minutes

Reported By Guadalupe Estrada | Cap [X] | **Allowable Air Pressure Loss** 3 PSI

Other

8,838	Total LF of Welding to Date Combined	Extrusion LF Weld Total To Date	1,078	Fusion LF Weld Total To Date:	7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In / PSI IN	AT Time Out / PSI OUT	PSI Loss	Test Results
8.29.23	1 / EX	65	4:31 PM	NM	4941	6	860		8.30.23	Air Pressure	6:05 / 30	6:10 / 28	2	Pass
Seam Notes														
8.29.23	1 / EX	31	4:39 PM	NM	4941	6	860		8.30.23	Air Pressure	5:46 / 30	5:51 / 30		Pass
Seam Notes														
8.29.23	1 / EX	20	4:44 PM	NM	4941	6	860		8.30.23	Air Pressure	5:45 / 30	5:50 / 30		Pass
Seam Notes														
8.29.23	1 / EX	17	4:47 PM	NM	4941	6	860		8.30.23	Air Pressure	5:44 / 30	5:49 / 30		Pass
Seam Notes														
8.29.23	1 / EX	33	4:49 PM	NM	4941	6	860		8.30.23	Air Pressure	5:40 / 30	5:45 / 30		Pass
Seam Notes														
8.29.23	1 / EX	17	4:55 PM	NM	4941	6	860		8.30.23	Air Pressure	5:38 / 30	5:43 / 30		Pass
Seam Notes														
8.30.23	17 / 18	96	8:10 AM	MB	4940	6	860		8.30.23	Air Pressure	2:20 / 30	2:25 / 30		Pass
Seam Notes														
8.30.23	17 / 18	241	8:22 AM	MB	4940	6	860		8.30.23	Air Pressure	2:18 / 30	2:23 / 30		Pass
Seam Notes														

Global Containment Solutions LLC

Seam Control Form

Project Name:	Hoot Lake Closure	**Job #**	22-03-1054	**Superintendent:**	Thavone Daranikone		
Material Type:	40 mil f/2 LL	Primary		Pond		**Air Pressure Test**	30 PSI
Job Description:	Cap	Secondary		Cell		**Air Pressure Hold Time**	5 Minutes
Reported By	Guadalupe Estrada			Cap	X	**Allowable Air Pressure Loss**	3 PSI
Other							

8,838	Total LF of Welding to Date Combined	Extrusion LF Weld Total To Date	1,078	Fusion LF Weld Total To Date:	7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In / PSI IN	AT Time Out / PSI OUT	PSI Loss	Test Results
8.30.23	18 / 19	17	8:18 AM	NM	4941	6	860		8.30.23	Air Pressure	2:21 / 30	2:26 / 30		Pass
Seam Notes														
8.30.23	18 / 19	320	8:21 AM	NM	4941	6	860		8.30.23	Air Pressure	2:22 / 30	2:27 / 30		Pass
Seam Notes														
8.30.23	19 / 20	337	8:55 AM	MB	4940	6	860		8.30.23	Air Pressure	2:23 / 30	2:28 / 30		Pass
Seam Notes														
8.30.23	20 / 21	337	9:03 AM	NM	4941	6	860		8.30.23	Air Pressure	2:24 / 30	2:29 / 30		Pass
Seam Notes														
8.30.23	21 / 22	329	9:35 AM	MB	4940	6	860		8.30.23	Air Pressure	2:55 / 30	3:00 / 30		Pass
Seam Notes														
8.30.23	22 / 23	323	9:44 AM	NM	4941	6	860		8.30.23	Air Pressure	3:10 / 30	3:15 / 30		Pass
Seam Notes														
8.30.23	23 / 24	264	9:15 AM	MB	4940	6	860		8.30.23	Air Pressure	3:25 / 30	3:30 / 30		Pass
Seam Notes														
8.30.23	23 / 24	17	9:49 AM	MB	4940	6	860		8.30.23	Air Pressure	3:40 / 30	3:45 / 30		Pass
Seam Notes														

Global Containment Solutions LLC
Seam Control Form

Project Name: Hoot Lake Closure | **Job #** 22-03-1054 | **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL | Primary [ ] | Pond [ ] | **Air Pressure Test** 30 PSI

Job Description: Cap | Secondary [ ] | Cell [ ] | **Air Pressure Hold Time** 6 Minutes

Reported By Guadalupe Estrada | Cap [X] | **Allowable Air Pressure Loss** 3 PSI

Other

8,838 Total LF of Welding to Date Combined	Extrusion LF Weld Total To Date: 1,078	Fusion LF Weld Total To Date: 7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In / PSI IN	AT Time Out / PSI OUT	PSI Loss	Test Results
8.30.23	23 / 24	26	9:52 AM	MB	4940	6	860		8.30.23	Air Pressure	3:42 / 30	3:47 / 30		Pass
Seam Notes														
8.30.23	23 / 24	12	9:55 AM	MB	4940	6	860		8.30.23	Air Pressure	3:43 / 30	3:48 / 30		Pass
Seam Notes														
8.30.23	24 / 25	316	10:30 AM	NM	4941	6	860		8.30.23	Air Pressure	3:55 / 30	4:00 / 30		Pass
Seam Notes														
8.30.23	25 / 26	291	10:55 AM	MB	4940	6	860		8.30.23	Air Pressure	4:05 / 30	4:10 / 30		Pass
Seam Notes														
8.30.23	25 / 26	28	11:32 AM	MB	4940	6	860		8.30.23	Air Pressure	4:03 / 30	4:08 / 30		Pass
Seam Notes														
8.30.23	26 / 27	17	11:00 AM	NM	4941	6	860		8.30.23	Air Pressure	4:15 / 30	4:20 / 30		Pass
Seam Notes														
8.30.23	26 / 27	54	11:03 AM	NM	4941	6	860		8.30.23	Air Pressure	4:16 / 30	4:21 / 30		Pass
Seam Notes														
8.30.23	26 / 27	243	11:09 AM	NM	4941	6	860		8.30.23	Air Pressure	4:28 / 30	4:33 / 30		Pass
Seam Notes														

Global Containment Solutions LLC
Seam Control Form

Project Name: Hoot Lake Closure | **Job #** 22-03-1054 | **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL | **Primary** | **Pond**

Job Description: Cap | **Secondary** | **Cell**

Reported By Guadalupe Estrada | **Cap** X

Other

Air Pressure Test 30 PSI

Air Pressure Hold Time 5 Minutes

Allowable Air Pressure Loss 3 PSI

8,838 Total LF of Welding to Date Combined	Extrusion LF Weld Total To Date: 1,078	Fusion LF Weld Total To Date: 7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In / PSI IN	AT Time Out / PSI OUT	PSI Loss	Test Results
8.30.23	27 / 28	175	11:59 AM	NM	4941	6	860		8.30.23	Air Pressure	4:50 / 30	4:55 / 30		Pass
Seam Notes														
8.30.23	27 / 29	17	11:40 AM	NM	4941	6	860		8.30.23	Air Pressure	4:30 / 30	4:35 / 30		Pass
Seam Notes														
8.30.23	27 / 29	123	11:43 AM	NM	4941	6	860		8.30.23	Air Pressure	4:31 / 30	4:36 / 30		Pass
Seam Notes														
8.30.23	28 / 29	12	11:55 AM	MB	4940	6	860		8.30.23	Air Pressure	4:00 / 30	4:05 / 30		Pass
Seam Notes														
8.30.23	17 / EX	3	2:00 PM	NM	4941	6	860		8.30.23	Air Pressure	5:30 / 30	5:35 / 30		Pass
Seam Notes														
8.30.23	18 / EX	24	2:00 PM	NM	4941	6	860		8.30.23	Air Pressure	5:30 / 30	5:35 / 30		Pass
Seam Notes														
8.30.23	19 / EX	24	2:03 PM	NM	4941	6	860		8.30.23	Air Pressure	5:26 / 30	5:31 / 30		Pass
Seam Notes														
8.30.23	20 / EX	24	2:06 PM	NM	4941	6	860		8.30.23	Air Pressure	5:25 / 30	5:30 / 30		Pass
Seam Notes														

Global Containment Solutions LLC

Seam Control Form

Project Name: Hoot Lake Closure | **Job #** 22-03-1054 | **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL | Primary [ ] Pond [ ]

Job Description: Cap | Secondary [ ] Cell [ ]

Reported By Guadalupe Estrada | Cap [X]

Other

Air Pressure Test 30 PSI

Air Pressure Hold Time 5 Minutes

Allowable Air Pressure Loss 3 PSI

8,838 Total LF of Welding to Date Combined	Extrusion LF Weld Total To Date: 1,078	Fusion LF Weld Total To Date: 7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In / PSI IN	AT Time Out / PSI OUT	PSI Loss	Test Results
8.30.23	21 / EX	15	2:09 PM	NM	4941	6	860		8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	21 / EX	7	2:11 PM	NM	4941	6	860		8.30.23	Air Pressure	5:15 / 30	5:20 / 30		Pass
Seam Notes														
8.30.23	21 / EX	10	2:12 PM	NM	4941	6	860		8.30.23	Air Pressure	5:15 / 30	5:20 / 30		Pass
Seam Notes														
8.30.23	22 / EX	25	2:14 PM	NM	4941	6	860		8.30.23	Air Pressure	5:14 / 30	5:19 / 30		Pass
Seam Notes														
8.30.23	23 / EX	25	2:17 PM	NM	4941	6	860		8.30.23	Air Pressure	5:11 / 30	5:16 / 30		Pass
Seam Notes														
8.30.23	24 / EX	24	2:20 PM	NM	4941	6	860		8.30.23	Air Pressure	5:10 / 30	5:15 / 30		Pass
Seam Notes														
8.30.23	25 / EX	24	2:22 PM	NM	4941	6	860		8.30.23	Air Pressure	5:03 / 30	5:08 / 30		Pass
Seam Notes														
8.30.23	26 / EX	24	2:25 PM	NM	4941	6	860		8.30.23	Air Pressure	5:02 / 30	5:07 / 30		Pass
Seam Notes														

Global Containment Solutions LLC

Seam Control Form

Project Name: Hoot Lake Closure | **Job #** 22-03-1054 | **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL | **Primary** | **Pond**

Job Description: Cap | **Secondary** | **Cell**

Reported By Guadalupe Estrada | **Cap** X

Other

Air Pressure Test 30 PSI

Air Pressure Hold Time 5 Minutes

Allowable Air Pressure Loss 3 PSI

8,838	Total LF of Welding to Date Combined	Extrusion LF Weld Total To Date	1,078	Fusion LF Weld Total To Date:	7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In PSI IN	AT Time Out PSI OUT	PSI Loss	Test Results
8.30.23	27 / EX	24	2:28 PM	NM	4941	6	860		8.30.23	Air Pressure	5:00 30	5:05 30		Pass
Seam Notes														
8.30.23	28 / EX	12	1:30 PM	DB	77		550	500	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	28 / EX	175	1:32 PM	DB	77		550	500	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	29 / EX	45	4:00 PM	DB	77		550	500	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	29 / EX	16	4:44 PM	DB	77		550	500	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	29 / EX	12	4:55 PM	DB	77		550	500	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	29 / EX	17	5:35 PM	DB	77		550	500	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	29 / EX	3	6:00 PM	DB	77		550	500	8.31.23	Vacuum	:	:		Pass
Seam Notes														

Global Containment Solutions LLC
Seam Control Form

Project Name: Hoot Lake Closure | **Job #** 22-03-1054 | **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL | **Primary** | **Pond**

Job Description: Cap | **Secondary** | **Cell**

Reported By Guadalupe Estrada | **Cap** X

Other

Air Pressure Test 30 PSI

Air Pressure Hold Time 5 Minutes

Allowable Air Pressure Loss 3 PSI

8,838	Total LF of Welding to Date Combined	Extrusion LF Weld Total To Date	1,078	Fusion LF Weld Total To Date:	7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In PSI IN	AT Time Out PSI OUT	PSI Loss	Test Results
8.30.23	29 / EX	37	3:34 PM	NM	422		550	500	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	29 / EX	16	3:50 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	27 / EX	24	4:01 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	26 / EX	24	4:19 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	25 / EX	24	4:28 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	24 / EX	24	4:51 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	23 / EX	24	4:54 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	22 / EX	24	4:57 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														

Global Containment Solutions LLC
Seam Control Form

Project Name: Hoot Lake Closure | **Job #** 22-03-1054 | **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL | Primary [ ] Pond [ ]

Job Description: Cap | Secondary [ ] Cell [ ]

Reported By Guadalupe Estrada | Cap [X]

Other

Air Pressure Test 30 PSI

Air Pressure Hold Time 5 Minutes

Allowable Air Pressure Loss 3 PSI

8,838 Total LF of Welding to Date Combined	Extrusion LF Weld Total To Date: 1,078	Fusion LF Weld Total To Date: 7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In / PSI IN	AT Time Out / PSI OUT	PSI Loss	Test Results
8.30.23	21 / EX	24	5:15 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	20 / EX	24	5:40 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.30.23	19 / EX	24	5:57 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	18 / EX	24	8:03 AM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	17 / EX	24	8:20 AM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	16 / EX	24	9:11 AM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	15 / EX	24	9:20 AM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	14 / EX	24	9:36 AM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														

Global Containment Solutions LLC

Seam Control Form

Project Name:	Hoot Lake Closure	**Job #**	22-03-1054	**Superintendent:**	Thavone Daranikone		
Material Type:	40 mil f/2 LL	**Primary**		**Pond**		**Air Pressure Test**	30 PSI
Job Description:	Cap	**Secondary**		**Cell**		**Air Pressure Hold Time**	5 Minutes
Reported By	Guadalupe Estrada			**Cap**	X	**Allowable Air Pressure Loss**	3 PSI
Other							

8,838	**Total LF of Welding to Date Combined**	**Extrusion LF Weld Total To Date**	1,078	**Fusion LF Weld Total To Date:**	7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In / PSI IN	AT Time Out / PSI OUT	PSI Loss	Test Results
8.31.23	R30 / EX	16	10:05 AM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	13 / EX	66	10:08 AM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	12 / EX	73	10:36 AM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	11 / EX	38	11:25 AM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	11 / EX	8	11:51 AM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	10 / EX	26	11:55 AM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	9 / EX	26	1:00 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	8 / EX	26	1:30 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														

Global Containment Solutions LLC

Seam Control Form

Project Name: Hoot Lake Closure | **Job #** 22-03-1054 | **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL | Primary [ ] Pond [ ]

Job Description: Cap | Secondary [ ] Cell [ ]

Reported By Guadalupe Estrada | Cap [X]

Other

Air Pressure Test 30 PSI

Air Pressure Hold Time 5 Minutes

Allowable Air Pressure Loss 3 PSI

8,838 Total LF of Welding to Date Combined	Extrusion LF Weld Total To Date: 1,078	Fusion LF Weld Total To Date: 7,760

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Test Date	Test Type	AT Time In / PSI IN	AT Time Out / PSI OUT	PSI Loss	Test Results
8.31.23	7 / EX	26	1:57 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	6 / EX	26	2:27 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	5 / EX	26	3:00 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	4 / EX	26	3:14 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	3 / EX	26	3:32 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	2 / EX	26	3:42 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														
8.31.23	1 / EX	18	4:00 PM	NM	422		550	550	8.31.23	Vacuum	:	:		Pass
Seam Notes														

Final Cover Field Destructive Testing Forms

Global Containment Solutions LLC
Destructive Sample Information

Project Name: Hoot Lake Closure **Job #** 22-03-1054 **Superintendent:** Thavone Darankone

Material Type: 40 mil f/2 LL
Job Description: Cap
Reported By: Guadalupe Estrada
Other:

Primary [ ] **Secondary** [ ]
Pond [ ] **Cell** [ ] **Cap** [X]

Peel Test Extrusion Minimum 44 PPI
Peel Test Fusion Minimum 50 PPI
Shear Test Minimum 60 PPI

D.S. No.	Seam No.	Weld Date	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp		Coupon 1 A ! B	Coupon 2 A ! B	Coupon 3 A ! B	Coupon 4 A ! B	Coupon 5 A ! B	Test Results
1	3 / 4	8.29.23	NM	4941	6	860		Peel	77 ! 76	80 ! 80	79 ! 79	78 ! 78	79 ! 76	Pass
								Shear	85	91	97	98	90	
	DS Location and Notes													
2	5 / 6	8.29.23	NM	4941	6	860		Peel	79 ! 72	75 ! 77	76 ! 78	75 ! 73	77 ! 74	Pass
								Shear	82	82	80	81	82	
	DS Location and Notes													
3	8 / 9	8.29.23	MB	4940	6	860		Peel	81 ! 77	87 ! 78	78 ! 79	82 ! 80	79 ! 79	Pass
								Shear	81	82	81	81	81	
	DS Location and Notes													
4	10 / 11	8.29.23	MB	4940	6	860		Peel	82 ! 73	77 ! 73	79 ! 77	79 ! 73	78 ! 74	Pass
								Shear	83	86	89	85	89	
	DS Location and Notes													
5	14 / 15	8.29.23	MB	4940	6	860		Peel	77 ! 80	77 ! 81	79 ! 78	79 ! 78	87 ! 87	Pass
								Shear	81	85	81	85	86	
	DS Location and Notes													
6	16 / 17	8.29.23	MB	4940	6	860		Peel	80 ! 77	80 ! 78	82 ! 79	84 ! 82	82 ! 80	Pass
								Shear	82	88	83	85	86	
	DS Location and Notes													
7	17 / 18	8.30.21	MB	4940	6	860		Peel	83 ! 77	79 ! 82	82 ! 78	78 ! 79	77 ! 77	Pass
								Shear	89	80	82	83	85	
	DS Location and Notes													
8	19 / 20	8.30.21	MB	4940	6	860		Peel	77 ! 74	81 ! 77	79 ! 75	82 ! 76	78 ! 75	Pass
								Shear	82	82	80	82	83	
	DS Location and Notes													
9	20 / 21	8.30.21	NM	4941	6	860		Peel	86 ! 82	83 ! 78	83 ! 80	85 ! 70	84 ! 80	Pass
								Shear	87	83	86	80	83	
	DS Location and Notes													

Global Containment Solutions LLC
Destructive Sample Information

Project Name: Hoot Lake Closure **Job #** 22-03-1054 **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL **Primary** ☐ **Pond** ☐ **Peel Test Extrusion Minimum** 44 **PPI**
Job Description: Cap **Secondary** ☐ **Cell** ☐ **Peel Test Fusion Minimum** 50 **PPI**
Reported By: Guadalupe Estrada **Cap** ☒ **Shear Test Minimum** 60 **PPI**
Other:

D.S. No.	Seam No.	Weld Date	Operator Name/ ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp		Coupon 1		Coupon 2		Coupon 3		Coupon 4		Coupon 5		Test Results
									A	B	A	B	A	B	A	B	A	B	
10	22 / 23	8.30.21	NM	4941	6	860		Peel	76	76	77	77	79	74	81	77	77	75	Pass
								Shear	81		83		81		84		87		
	DS Location and Notes																		
11	23 / 24	8.30.21	MB	4940	6	860		Peel	82	79	68	80	78	80	74	78	77	79	Pass
								Shear	84		83		81		80		82		
	DS Location and Notes																		
12	25 / 26	8.30.21	MB	4940	6	860		Peel	81	77	81	79	80	78	82	80	81	78	Pass
								Shear	88		83		82		83		84		
	DS Location and Notes																		
13	26 / 27	8.30.21	NM	4940	6	860		Peel	81	78	80	78	83	78	80	76	82	78	Pass
								Shear	87		82		83		82		85		
	DS Location and Notes																		
	/							Peel											
								Shear											
	DS Location and Notes																		
	/							Peel											
								Shear											
	DS Location and Notes																		
	/							Peel											
								Shear											
	DS Location and Notes																		
	/							Peel											
								Shear											
	DS Location and Notes																		
	/							Peel											
								Shear											
	DS Location and Notes																		

Final Cover Repair Forms

Global Containment Solutions LLC

Repair Report

Project Name Hoot Lake Closure **Job # :** 22-03-1054 **Superintendent:** Thavone Darankone

Material Type: 40 mil f/2 LL **Primary** **Pond**

Job Description: Cap **Secondary** **Cell**

Reported by : Guadalupe Estrada **Cap** X

Other:

Damage Codes					SF Patch Material	Test Type	Abbrv.	Repair Types
CR --Crease	FS --Failed Seam	MatD --Material Defect	LL --Lost Lap	CF --Custom Fit	872	Vacuum	*S=South	C--Cap Strip
DS --Destruct Sample	WR --Wrinkle	WS --Welder Restart	MD --Mechanical Damage	PB --Pipe Boot		Air Pressure	*N=North	P--Patch
SI --Subgrade Irregularity	AV --Airvent	RW --Roller Wrinkle	DO --Damage By Others	BO --Bum Out	LF Welded	Spark	*W=West	B--Extrusion Bead
SJ --Seam Joint	AO --Add On	CS --Concrete Structure		AT -Air Test	1098.00	Air Lance	*E=East	

Repair Number	Damage Code	Seam Number	Panel Number	Location	Repair Type	Patch (Feet)			Bead (Inches)	Date Welded	Operator Name	Machine Number	Test Type	Test Results	Date Complete
1	SJ			1/14/EX	P	3	x	12		8.31.23	MB	813	Vacuum	Pass	8.31.23
2	BO	1/EX			P	2	x	5		8.31.23	MB	813	Vacuum	Pass	8.31.23
3	SJ	1/EX		50' SONEOS	P	2	x	3		8.31.23	MB	813	Vacuum	Pass	8.31.23
4	BO	1/EX		67' SONEOS	P	2	x	4		8.31.23	MB	813	Vacuum	Pass	8.31.23
5	SJ	1/EX		87' SONEOS	P	2	x	2		8.31.23	MB	813	Vacuum	Pass	8.31.23
6	SJ	1/EX		118' SONEOS	P	2	x	5		8.31.23	MB	813	Vacuum	Pass	8.31.23
7	SJ	1/EX		182' SONEOS	P	2	x	4		8.31.23	MB	813	Vacuum	Pass	8.31.23
8	BO	1/EX		192' SONEOS	P	2	x	5		8.31.23	MB	813	Vacuum	Pass	8.31.23
9	SI	1/EX		204' SONEOS	P	2	x	3		8.31.23	NM	422	Vacuum	Pass	8.31.23
10	BO		1/2/14		P	2	x	7		8.31.23	MB	813	Vacuum	Pass	8.31.23
11	SJ		2/3/14		P	2	x	3		8.31.23	MB	813	Vacuum	Pass	8.31.23
12	DS-1	3/4		88' SONEOS	P	2	x	6		8.31.23	MB	813	Vacuum	Pass	8.31.23
13	SJ	4/14		4' WOEEOS	P	3	x	7		8.31.23	MB	813	Vacuum	Pass	8.31.23
14	SJ	4/5		3' SONEOS	P	3	x	6		8.31.23	MB	813	Vacuum	Pass	8.31.23
15	BO	4/5		72' SONEOS	P	4	x	5		8.31.23	MB	813	Vacuum	Pass	8.31.23
16	WR	4/5		195' SONEOS	P	2	x	14		8.31.23	NM	422	Vacuum	Pass	8.31.23
17	DS-2	5/6		187' SONEOS	P	2	x	6		8.31.23	NM	422	Vacuum	Pass	8.31.23
18	SJ		5/6/14		P	2	x	3		8.31.23	MB	813	Vacuum	Pass	8.31.23
19	SJ		6/7/14		P	2	x	2		8.31.23	MB	813	Vacuum	Pass	8.31.23
20	SJ	8/14		4'WOEEOS	P	4	x	7		8.31.23	DB	77	Vacuum	Pass	8.31.23

Global Containment Solutions LLC

Repair Report

Project Name Hoot Lake Closure **Job # :** 22-03-1054 **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL **Primary** **Pond**

Job Description: Cap **Secondary** **Cell**

Reported by : Guadalupe Estrada **Cap** X

Other:

Damage Codes					SF Patch Material	Test Type	Abbrv.	Repair Types
CR --Crease	FS --Failed Seam	MatD --Material Defect	LL --Lost Lap	CF --Custom Fit	872	Vacuum	*S=South	C--Cap Strip
DS --Destruct Sample	WR --Wrinkle	WS --Welder Restart	MD --Mechanical Damage	PB --Pipe Boot		Air Pressure	*N=North	P--Patch
SI --Subgrade Irregularity	AV --Airvent	RW --Roller Wrinkle	DO --Damage By Others	BO --Burn Out	LF Welded	Spark	*W=West	B--Extrusion Bead
SJ --Seam Joint	AO --Add On	CS --Concrete Structure		AT -Air Test	1098.00	Air Lance	*E=East	

Repair Number	Damage Code	Seam Number	Panel Number	Location	Repair Type	Patch (Feet)			Bead (Inches)	Date Welded	Operator Name	Machine Number	Test Type	Test Results	Date Complete
21	SJ		8/9/14		P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
22	DS-3	8/9		122' SONEOS	P	2	x	6		8.31.23	MB	813	Vacuum	Pass	8.31.23
23	WR	9/10		196' SONEOS	P	2	x	3		8.31.23	NM	422	Vacuum	Pass	8.31.23
24	WR	10/11		196' SONEOS	P	2	x	2		8.31.23	NM	422	Vacuum	Pass	8.31.23
25	DS-4	10/11		34' SONEOS	P	2	x	6		8.31.23	DB	77	Vacuum	Pass	8.31.23
26	SJ		9/10/14		P	2	x	3		8.31.23	DB	77	Vacuum	Pass	8.31.23
27	SJ		10/11/14		P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
28	SJ		11/12/14		P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
29	SJ		12/13/14		P	2	x	3		8.31.23	DB	77	Vacuum	Pass	8.31.23
30	AO	13/EX		8' SONEOS	P	6	x	16		8.31.23	NM	422	Vacuum	Pass	8.31.23
31	WR	14/15		331' WOEEOS	P	2	x	5		8.31.23	NM	422	Vacuum	Pass	8.31.23
32	DS-5	14/15		56' WOEEOS	P	2	x	6		8.31.23	DB	77	Vacuum	Pass	8.31.23
33	BO	14/15		24' WOEEOS	P	2	x	4		8.31.23	MB	813	Vacuum	Pass	8.31.23
34	SJ			14/15/EX	P	2	x	3		8.31.23	MB	813	Vacuum	Pass	8.31.23
35	SJ			15/16/EX	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
36	PB	16/17		333' WOEEOS, 4' NOS	P	3	x	3		8.31.23	NM	422	Vacuum	Pass	8.31.23
37	BO	16/17		329' WOEEOS	P	2	x	6		8.31.23	NM	422	Vacuum	Pass	8.31.23
38	DS-6	16/17		312' WOEEOS	P	2	x	5		8.31.23	NM	422	Vacuum	Pass	8.31.23
39	BO	16/17		135' WOEEOS	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
40	BO	16/17		104' WOEEOS	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23

Global Containment Solutions LLC
Repair Report

Project Name Hoot Lake Closure | **Job # :** 22-03-1054 | **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL | **Primary** | **Pond**

Job Description: Cap | **Secondary** | **Cell**

Reported by : Guadalupe Estrada | **Cap** X

Other:

Damage Codes					SF Patch Material	Test Type	Abbrv.	Repair Types
CR --Crease	FS --Failed Seam	MatD --Material Defect	LL --Lost Lap	CF --Custom Fit	872	Vacuum	*S=South	C--Cap Strip
DS --Destruct Sample	WR --Wrinkle	WS --Welder Restart	MD --Mechanical Damage	PB --Pipe Boot		Air Pressure	*N=North	P--Patch
SI --Subgrade Irregularity	AV --Airvent	RW --Roller Wrinkle	DO --Damage By Others	BO --Burn Out	LF Welded	Spark	*W=West	B--Extrusion Bead
SJ --Seam Joint	AO --Add On	CS --Concrete Structure		AT -Air Test	1098.00	Air Lance	*E=East	

Repair Number	Damage Code	Seam Number	Panel Number	Location	Repair Type	Patch (Feet)			Bead (Inches)	Date Welded	Operator Name	Machine Number	Test Type	Test Results	Date Complete
41	SJ			16/17/EX	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
42	SJ			17/18/EX	P	3	x	4		8.31.23	DB	77	Vacuum	Pass	8.31.23
43	MD	18/EX		13' NOSEOS, 3' WOS	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
44	DS-7	17/18		192' WOEEOS	P	2	x	5		8.31.23	DB	77	Vacuum	Pass	8.31.23
45	MD	17/18		217' WOEEOS, 2' SOS	P	2	x	4		8.31.23	DB	77	Vacuum	Pass	8.31.23
46	BO	17/18		241' WOEEOS	P	2	x	3		8.31.23	DB	77	Vacuum	Pass	8.31.23
47	BO	18/19		325' WOEEOS	P	3	x	11		8.31.23	NM	422	Vacuum	Pass	8.31.23
48	SJ			18/19/EX	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
49	SJ			19/20/EX	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
50	DS-8	19/20		19' WOEEOS	P	2	x	6		8.31.23	DB	77	Vacuum	Pass	8.31.23
51	DS-9	20/21		163' WOEEOS	P	2	x	6		8.31.23	DB	77	Vacuum	Pass	8.31.23
52	AO	21/EX		8' NOSEOS	P	3	x	14		8.31.23	DB	77	Vacuum	Pass	8.31.23
53	SJ			21/22/EX	P	3	x	4		8.31.23	DB	77	Vacuum	Pass	8.31.23
54	MD	22/EX		12' NOSEOS, 2' WOS	P	2	x	3		8.31.23	DB	77	Vacuum	Pass	8.31.23
55	MD	21/22		12' WOEEOS, 11' NOS	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
56	MD	21/22		12' WOEEOS, 14' NOS	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
57	MD	21/22		20' WOEEOS, 11' NOS	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
58	MD	21/22		27' WOEEOS, 11' NOS	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
59	DS-10	22/23		289' WOEEOS	P	2	x	6		8.31.23	NM	422	Vacuum	Pass	8.31.23
60	SJ			22/23/EX	P	2	x	3		8.31.23	DB	77	Vacuum	Pass	8.31.23

Global Containment Solutions LLC
Repair Report

Project Name Hoot Lake Closure | **Job # :** 22-03-1054 | **Superintendent:** Thavone Daranikone

Material Type: 40 mil f/2 LL | **Primary** | **Pond**

Job Description: Cap | **Secondary** | **Cell**

Reported by : Guadalupe Estrada | **Cap** X

Other:

Damage Codes					SF Patch Material	Test Type	Abbrv.	Repair Types
CR --Crease	FS --Failed Seam	MatD --Material Defect	LL --Lost Lap	CF --Custom Fit	872	Vacuum	*S=South	C--Cap Strip
DS --Destruct Sample	WR --Wrinkle	WS --Welder Restart	MD --Mechanical Damage	PB --Pipe Boot		Air Pressure	*N=North	P--Patch
SI --Subgrade Irregularity	AV --Airvent	RW --Roller Wrinkle	DO --Damage By Others	BO --Burn Out	LF Welded	Spark	*W=West	B--Extrusion Bead
SJ --Seam Joint	AO --Add On	CS --Concrete Structure		AT -Air Test	1098.00	Air Lance	*E=East	

Repair Number	Damage Code	Seam Number	Panel Number	Location	Repair Type	Patch (Feet)			Bead (Inches)	Date Welded	Operator Name	Machine Number	Test Type	Test Results	Date Complete
61	SJ			23/24/EX	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
62	MD	24/EX		12' NOSEOS, 2' WOS	P	3	x	3		8.31.23	DB	77	Vacuum	Pass	8.31.23
63	BO	23/24		12' WOEEOS	P	2	x	3		8.31.23	DB	77	Vacuum	Pass	8.31.23
64	MD	23/24		11' WOEEOS, 13' NOS	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
65	BO	23/24		38' WOEEOS	P	2	x	3		8.31.23	DB	77	Vacuum	Pass	8.31.23
66	MD	23/24		48' WOEEOS, 14' NOS	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
67	BO	23/24		55' WOEEOS	P	2	x	3		8.31.23	DB	77	Vacuum	Pass	8.31.23
68	DS-11	23/24		209' WOEEOS	P	2	x	6		8.31.23	DB	77	Vacuum	Pass	8.31.23
69	SJ			24/25/EX	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
70	SJ			25/26/EX	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
71	BO	25/26		28' WOEEOS	P	2	x	3		8.31.23	DB	77	Vacuum	Pass	8.31.23
72	DS-12	25/26		74' WOEEOS	P	2	x	6		8.31.23	DB	77	Vacuum	Pass	8.31.23
73	BO	26/27		297' WOEEOS	P	2	x	5		8.30.23	DB	77	Vacuum	Pass	8.31.23
74	BO	26/27		244' WOEEOS	P	2	x	3		8.30.23	DB	77	Vacuum	Pass	8.31.23
75	DS-13	26/27		55' WOEEOS	P	2	x	6		8.31.23	DB	77	Vacuum	Pass	8.31.23
76	SJ	27/EX		2' NOSEOS	P	2	x	5		8.31.23	DB	77	Vacuum	Pass	8.31.23
77	SJ			27/28/EX	P	2	x	2		8.31.23	DB	77	Vacuum	Pass	8.31.23
78	BO	27/28		165' WOEEOS	P	2	x	4		8.30.23	DB	77	Vacuum	Pass	8.31.23
79	SJ			27/28/29	P	2	x	3		8.30.23	DB	77	Vacuum	Pass	8.31.23
80	BO	27/29		123' WOEEOS	P	2	x	3		8.30.23	DB	77	Vacuum	Pass	8.31.23

Global Containment Solutions LLC
Repair Report

Project Name Hoot Lake Closure
Material Type: 40 mil f/2 LL
Job Description: Cap
Reported by : Guadalupe Estrada
Other:

Job # : 22-03-1054
Primary | **Pond**
Secondary | **Cell**
Cap X

Superintendent: Thavone Daranikone

Damage Codes					
CR --Crease	FS --Failed Seam	MatD --Material Defect	LL --Lost Lap	CF --Custom Fit	
DS --Destruct Sample	WR --Wrinkle	WS --Welder Restart	MD --Mechanical Damage	PB --Pipe Boot	
SI --Subgrade Irregularity	AV --Airvent	RW --Roller Wrinkle	DO --Damage By Others	BO --Burn Out	
SJ --Seam Joint	AO --Add On	CS --Concrete Structure		AT -Air Test	

SF Patch Material	Test Type	Abbrv.	Repair Types
872	Vacuum	*S=South	C--Cap Strip
	Air Pressure	*N=North	P--Patch
LF Welded	Spark	*W=West	B--Extrusion Bead
1098.00	Air Lance	*E=East	

Repair Number	Damage Code	Seam Number	Panel Number	Location	Repair Type	Patch (Feet)				Bead (Inches)	Date Welded	Operator Name	Machine Number	Test Type	Test Results	Date Complete
81	SJ	29/EX		115' WOEEOS	P	2	x	2			8.30.23	DB	77	Vacuum	Pass	8.31.23
82	SJ	29/EX		90' WOEEOS	P	2	x	2			8.30.23	DB	77	Vacuum	Pass	8.31.23
83	WR	29/EX		73' WOEEOS	P	2	x	3			8.30.23	DB	77	Vacuum	Pass	8.31.23
84	SI	29/EX		45' WOEEOS	P	2	x	2			8.30.23	DB	77	Vacuum	Pass	8.31.23
85	SJ			28/29/EX	P	2	x	4			8.30.23	DB	77	Vacuum	Pass	8.31.23
86	BO	5/14		10' WOEEOS	P	2	x	2			8.31.23	MB	813	Vacuum	Pass	8.31.23
87							x									
88							x									
89							x									
90							x									
91							x									
92							x									
93							x									
94							x									
95							x									
96							x									
97							x									
98							x									
99							x									
100							x									

Appendix D – Soil Testing Data

Granular Drainage Material Source Particle Size Test Reports
Granular Drainage Material Source Hydraulic Conductivity Test Reports
Granular Drainage Material In-Place Particle Size Test Reports
Granular Drainage Material In-Place Hydraulic Conductivity Test Reports
Topsoil Source Particle Size Test Reports
Topsoil Source Nutrient Test Reports

Granular Drainage Material Source Particle Size Test Reports

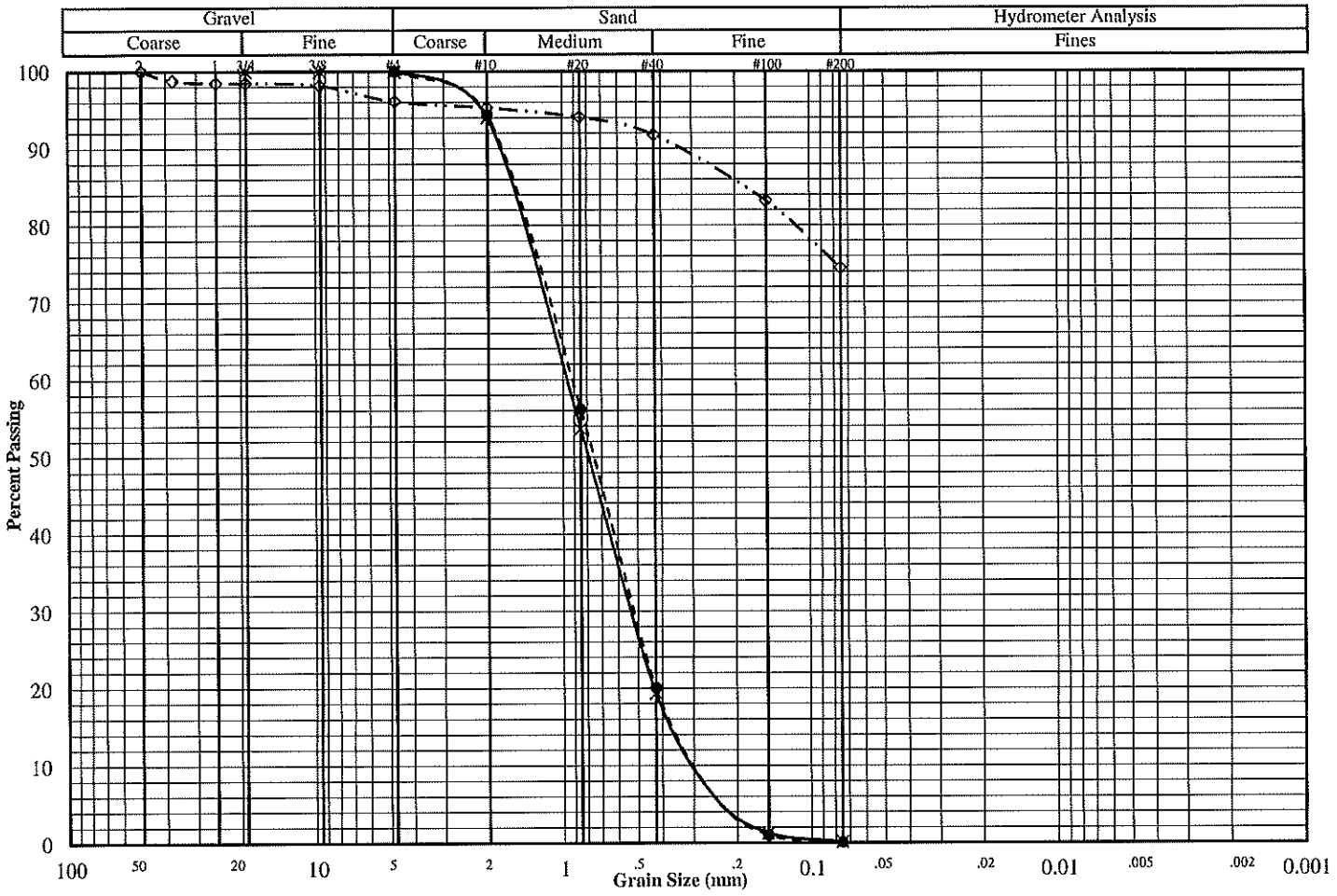
Grain Size Distribution ASTM D422-16

Job No. : **14554**

Project:	Hoot Lake Landfill Final Cover Project	Test Date:	8/4/23
Reported To:	Carlson McCain	Report Date:	8/9/23

	Location / Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Classification
*		S-1		Bulk	Sand, medium grained (SP)
●		S-2		Bulk	Sand, medium grained (SP)
◇		~~T-1~~		~~Bulk~~	~~Lean Clay w/ sand and a trace of gravel (CL)~~

Note: source topsoil test included in report ~~is crossed out, see~~ topsoil source testing reports for ~~data~~



Additional Results	*	●	◇
Liquid Limit			
Plastic Limit			
Plasticity Index ASTM:D4318			
Water Content ASTM:D2216			
Dry Density (pcf) ASTM:D7263			
Specific Gravity ASTM:D854			
Porosity			
Organic Content ASTM:D2974			
pH ASTM:D4972 Method B			

Percent Passing

	*	●	◇
Mass (g)	17880.0	18962.0	~~9173.6~~
2"			~~100.0~~
1.5"			~~98.8~~
1"			~~98.5~~
3/4"	100.0		98.5
3/8"	100.0		~~98.2~~
#4	100.0	100.0	96.1
#10	94.0	94.3	~~95.3~~
#20	53.6	56.2	~~94.1~~
#40	19.3	20.0	91.8
#100	1.3	1.0	~~8.2~~
#200	0.1	0.1	74.5

	*	●	◇
D_{60}			
D_{30}			
D_{10}			
C_U			
C_C			

Remarks:

(* = assumed)

9530 James Ave South

SOIL ENGINEERING TESTING, INC.

Bloomington, MN 55431

Grain Size Distribution ASTM D422-16

Job No. : **14641**

Project: Hoot Lake Project

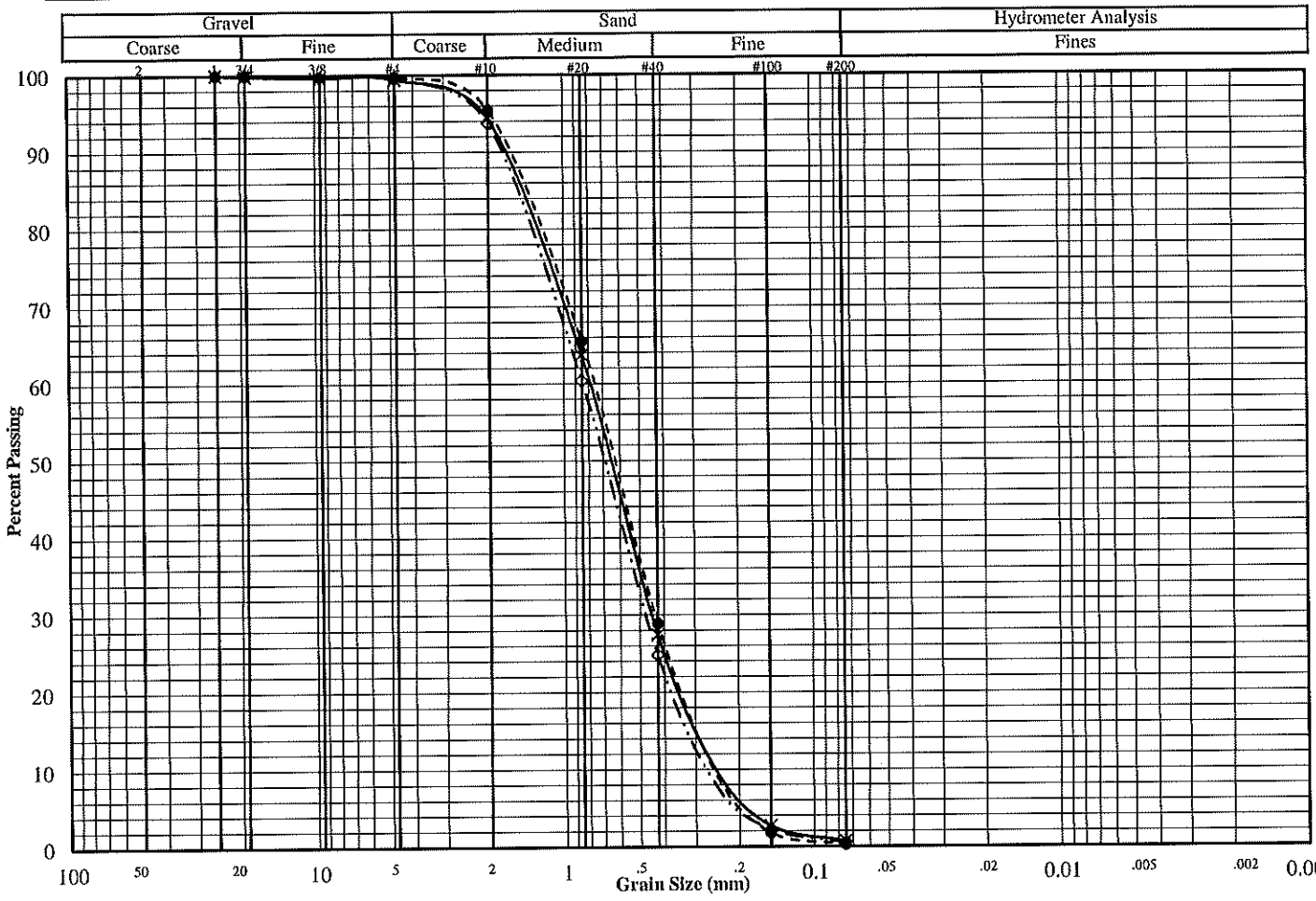
Test Date: 9/20/23

Reported To: Carlson McCain

Report Date: 9/25/23

	Location / Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Classification
*		S-2		Bulk	Sand, medium grained (SP)
●		S-3		Bulk	Sand, medium grained (SP)
◇		S-4		Bulk	Sand, medium grained (SP)

Note: in-place test included in report is crossed out, see in-place testing reports for data



Additional Results	*	●	◇
Liquid Limit			
Plastic Limit			
Plasticity Index ASTM:D4318			
Water Content ASTM:D2216			
Dry Density (pcf) ASTM:D7263			
Specific Gravity ASTM:D854			
Porosity			
Organic Content ASTM:D2974			
pH ASTM:D4972 Method B			

(* = assumed)

Percent Passing

	*	●	◇
Mass (g)	18371.0	15136.0	18814.0
2"	100.0		
1.5"	100.0		
1"	100.0	100.0	
3/4"	99.8	99.9	100.0
3/8"	99.6	99.7	99.7
#4	99.4	99.7	99.5
#10	94.3	95.5	93.8
#20	63.7	65.5	60.4
#40	27.4	28.9	24.8
#100	2.7	1.8	2.2
#200	0.7	0.3	0.6

	*	●	◇
D_{60}			
D_{30}			
D_{10}			
C_U			
C_C			

Remarks:

9530 James Ave South

SOIL ENGINEERING TESTING, INC.

Bloomington, MN 55431

Granular Drainage Material Source Hydraulic Conductivity Test Reports

Hydraulic Conductivity Test Data ASTM D2434

Project: Hoot Lake Landfill Final Cover Project Date: 8/9/2023

Client: Carlson McCain Job No.: 14554

Boring No.: _____ Depth (ft): _____

Sample No.: S-1 Type: Bulk

Location: _____

Soil Type: Sand, medium grained (SP)

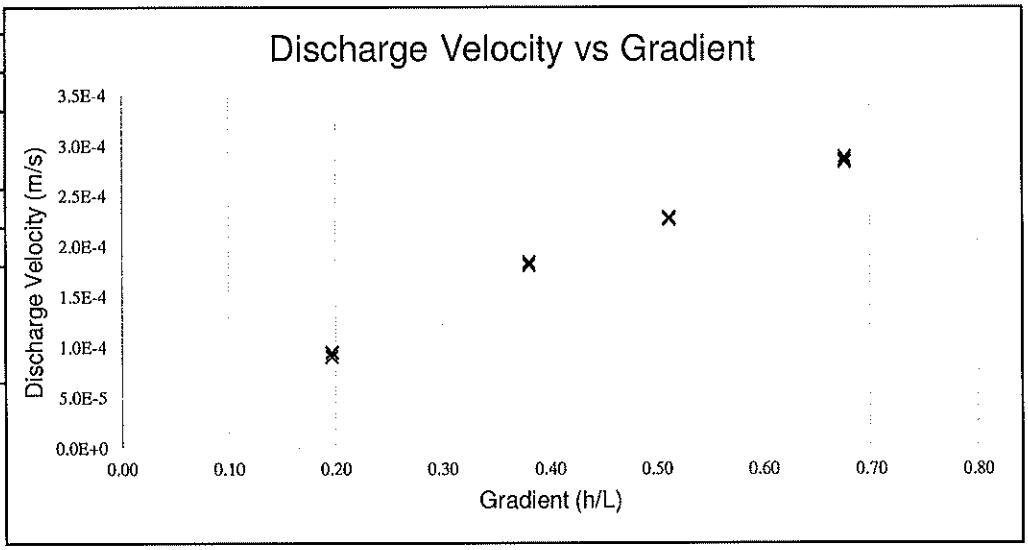
Ht (in) 5.44 Dia. (in): 3.00

W.C.(%): 0.4 Yd (pcf): 108.1

Compaction: Specimen reconstituted using a moderate compactive effort at the as received moisture content.

K @ 20°C (cm/sec): 4.3×10^{-2}

K @ 20°C (ft/min): 8.5×10^{-2}



Boring No.: _____ Depth (ft): _____

Sample No.: S-2 Type: Bulk

Location: _____

Soil Type: Sand, medium grained (SP)

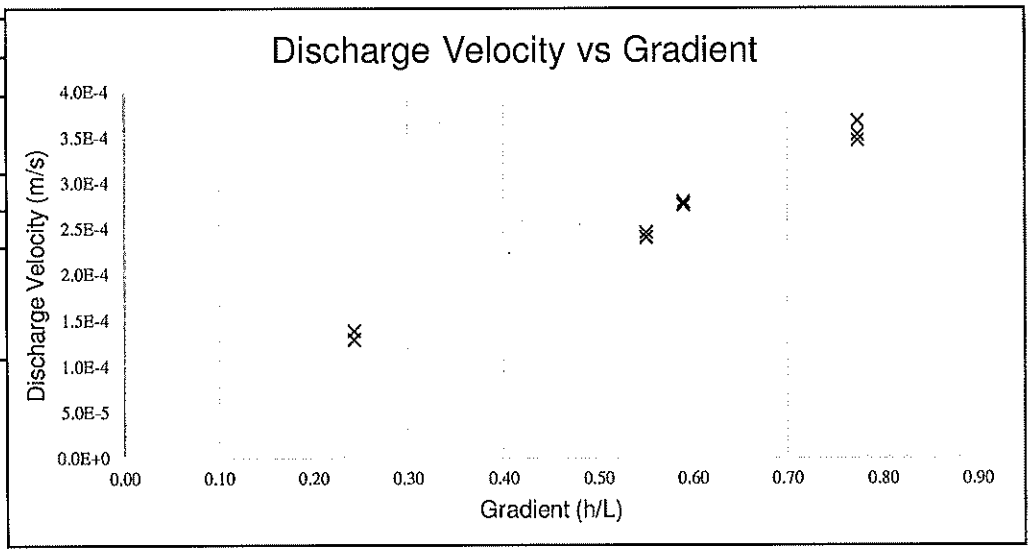
Ht (in) 5.28 Dia. (in): 3.00

W.C.(%): 0.4 Yd (pcf): 108.9

Compaction: Specimen reconstituted using a moderate compactive effort at the as received moisture content.

K @ 20°C (cm/sec): 4.5×10^{-2}

K @ 20°C (ft/min): 8.9×10^{-2}



Boring No.: _____ Depth (ft): _____

Sample No.: _____ Type: _____

Location: _____

Soil Type: _____

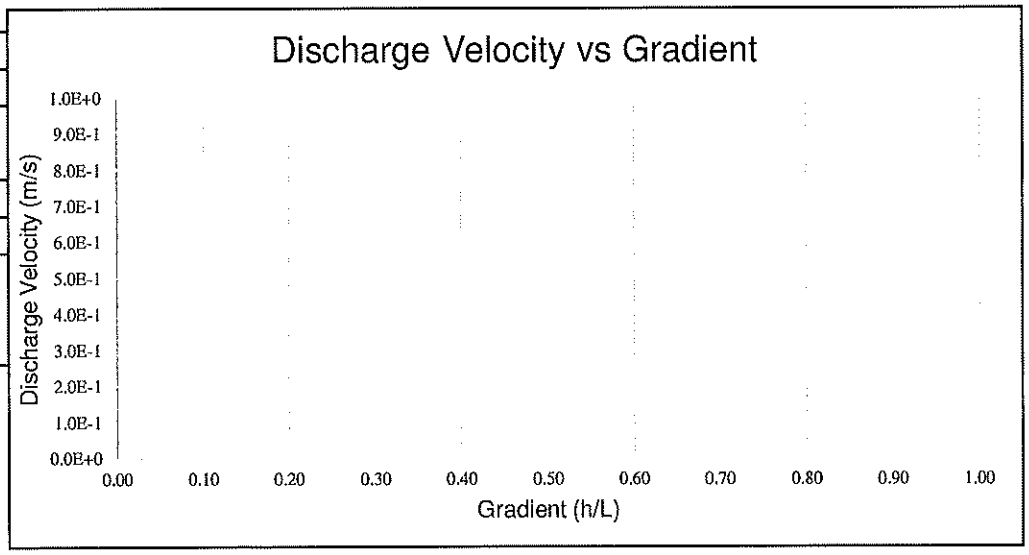
Ht (in) _____ Dia. (in): _____

W.C.(%): _____ Yd (pcf): _____

Compaction: _____

K @ 20°C (cm/sec): _____

K @ 20°C (ft/min): _____



9530 James Ave South · Bloomington, MN 55431

ET Engineering Testing, Inc.

Hydraulic Conductivity Test Data ASTM D2434

Project: Hoot Lake Project Date: 9/25/2023

Client: Carlson McCain Job No.: 14641

Boring No.: Depth (ft):

Sample No.: P-4 Type: Bulk

Location:

Soil Type: medium (SP)

Ht (in) 5.33 Dia. (in): 3.00

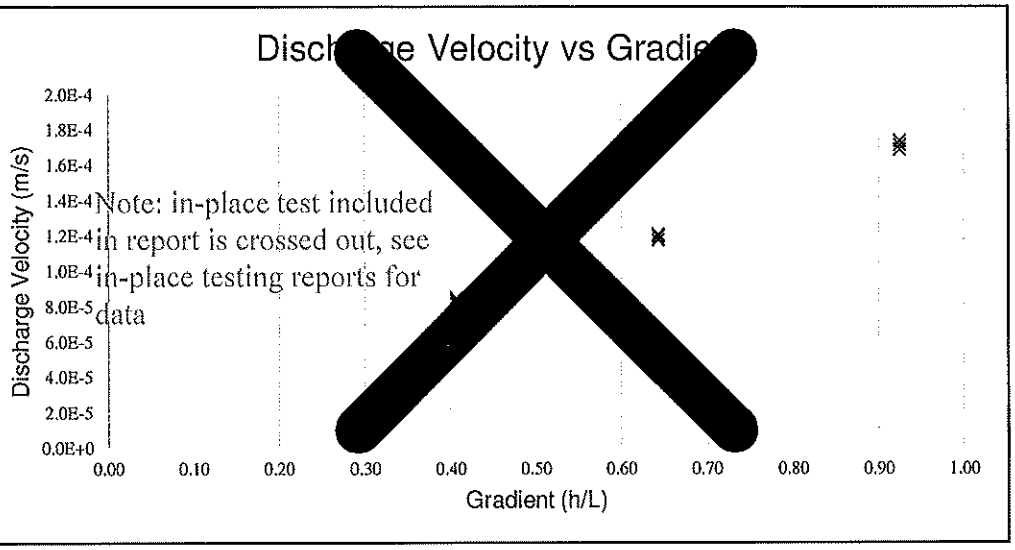
W.C.(%): 0.1 Yd (pcf): 111.4

Compaction: Specimen compacted using a moderate compactive effort at the as received moisture content.

K @ 20°C (cm/sec): 1.8 x 10 $^{-2}$

K @ 20°C (ft/min): 3.6 x 10 $^{-2}$

Note: in-place test included in report is crossed out, see in-place testing reports for data



Boring No.: Depth (ft):

Sample No.: S-3 Type: Bulk

Location:

Soil Type: Sand, medium grained (SP)

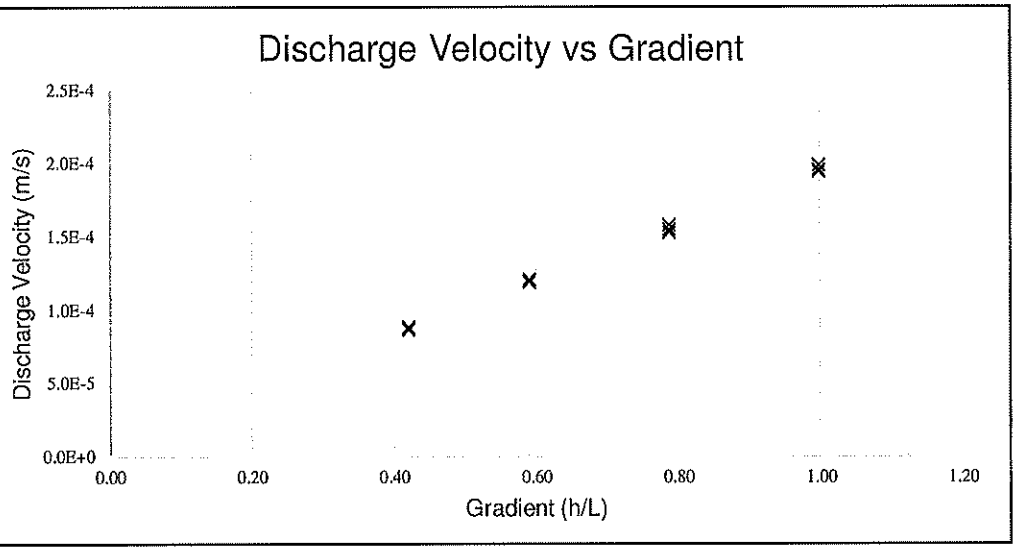
Ht (in) 5.53 Dia. (in): 3.00

W.C.(%): 0.1 Yd (pcf): 109.5

Compaction: Specimen compacted using a moderate compactive effort at the as received moisture content.

K @ 20°C (cm/sec): 1.9 x 10 $^{-2}$

K @ 20°C (ft/min): 3.8 x 10 $^{-2}$



Boring No.: Depth (ft):

Sample No.: S-4 Type: Bulk

Location:

Soil Type: Sand, medium grained (SP)

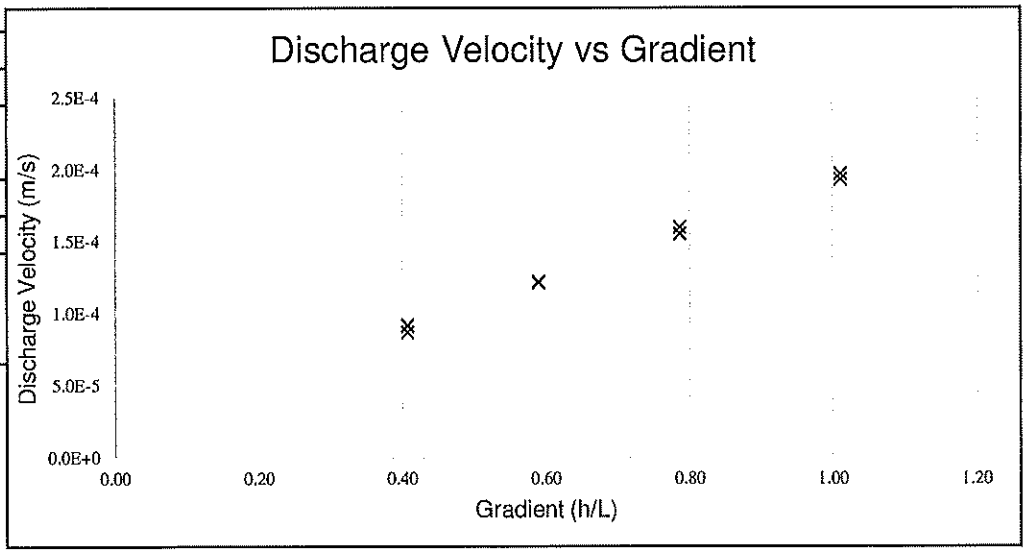
Ht (in) 5.52 Dia. (in): 3.00

W.C.(%): 0.2 Yd (pcf): 109.3

Compaction: Specimen compacted using a moderate compactive effort at the as received moisture content.

K @ 20°C (cm/sec): 1.9 x 10 $^{-2}$

K @ 20°C (ft/min): 3.8 x 10 $^{-2}$



9530 James Ave South

SOIL ENGINEERING TESTING, INC.

Bloomington, MN 55431

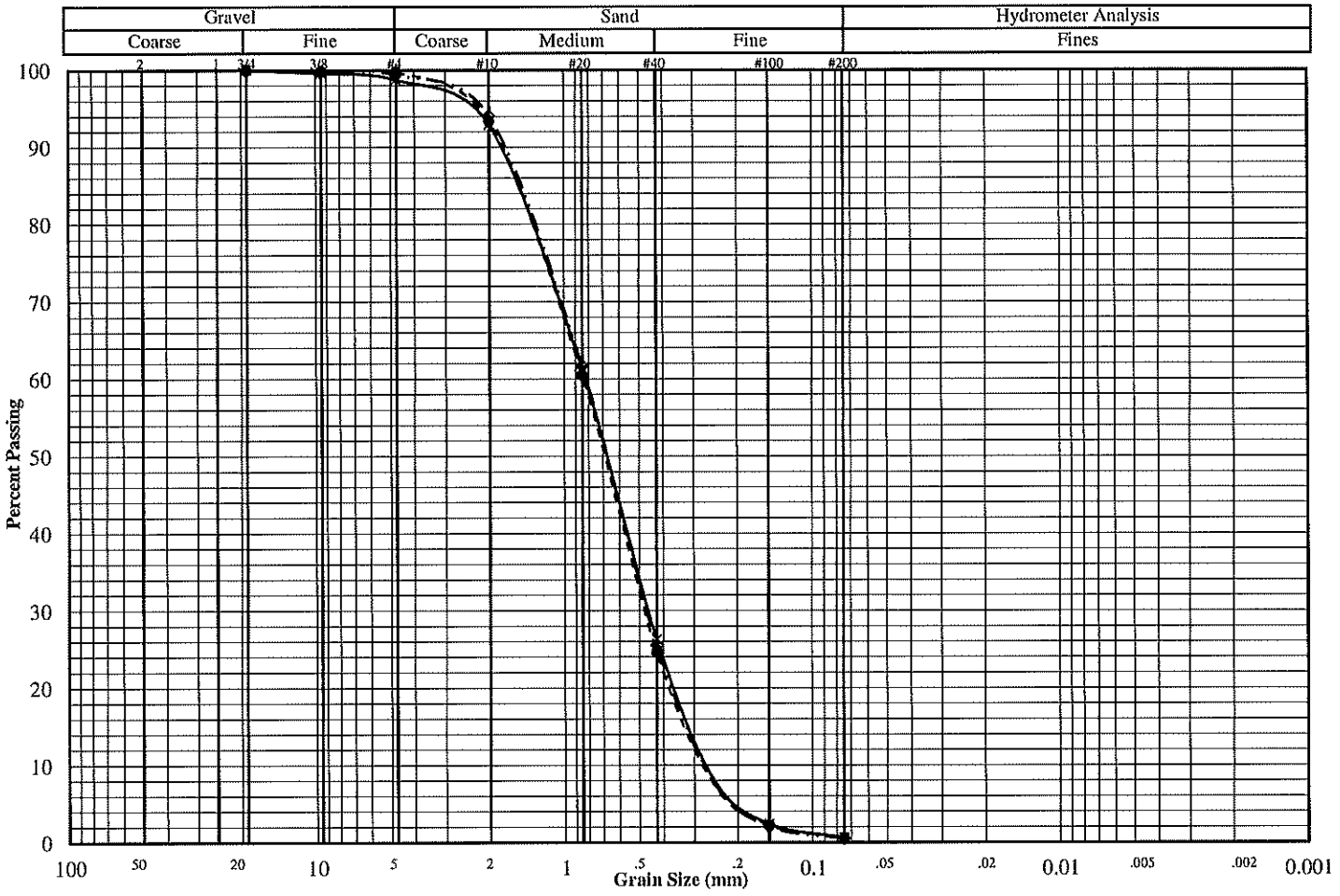
Granular Drainage Material In-Place Particle Size Test Reports

Grain Size Distribution ASTM D422-16

Job No. : **14641**

Project:	Hoot Lake Project	Test Date:	9/20/23
Reported To:	Carlson McCain	Report Date:	9/25/23

	Location / Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Classification
*		P-1		Bulk	Sand, medium grained (SP)
●		P-2		Bulk	Sand, medium grained (SP)
◇		P-3		Bulk	Sand, medium grained (SP)



Additional Results	*	●	◇
Liquid Limit			
Plastic Limit			
Plasticity Index ASTM:D4318			
Water Content ASTM:D2216			
Dry Density (pcf) ASTM:D7263			
Specific Gravity ASTM:D854			
Porosity			
Organic Content ASTM:D2974			
pH ASTM:D4972 Method B			

Percent Passing	*	●	◇
Mass (g)	16994.0	17610.0	19535.0
2"			
1.5"			
1"			
3/4"	100.0	100.0	100.0
3/8"	99.6	99.9	99.7
#4	98.7	99.7	99.4
#10	92.9	93.4	94.1
#20	61.3	60.5	61.7
#40	26.3	24.6	25.5
#100	2.4	2.2	2.0
#200	0.6	0.6	0.5

	*	●	◇
D_{60}			
D_{30}			
D_{10}			
C_U			
C_C			

Remarks:

(* = assumed)

9530 James Ave South

SOIL ENGINEERING TESTING, INC.

Bloomington, MN 55431

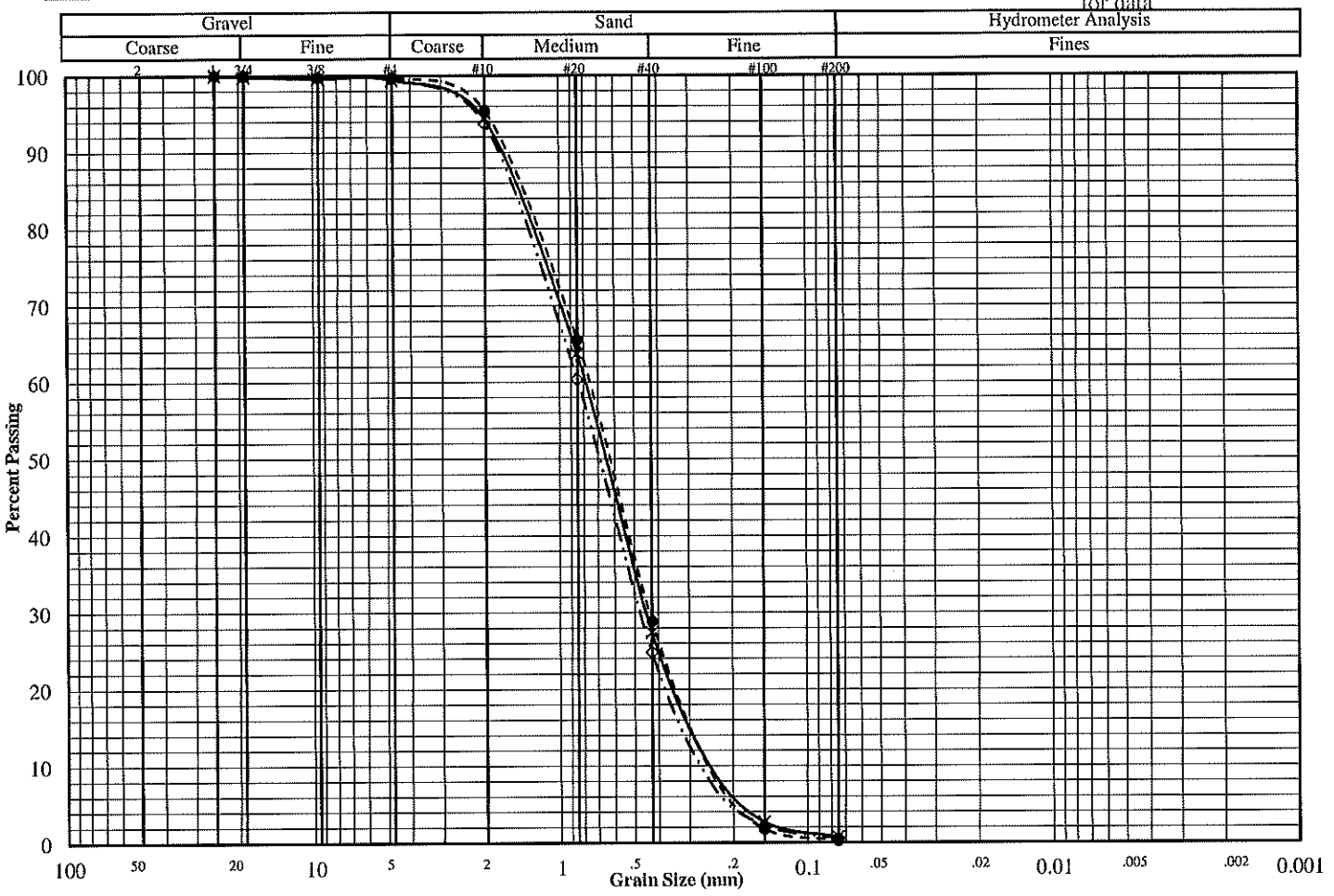
Grain Size Distribution ASTM D422-16

Job No. : **14641**

Project:	Hoot Lake Project	Test Date:	9/20/23
Reported To:	Carlson McCain	Report Date:	9/25/23

	Location / Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Classification
*		P-4		Bulk	Sand, medium grained (SP)
●		~~S-3~~		~~Bulk~~	~~Sand, medium grained (SP)~~
◇		~~S-4~~		~~Bulk~~	~~Sand, medium grained (SP)~~

Note: source tests included in report are crossed out, see source testing reports for data



Additional Results	*	●	◇
Liquid Limit			
Plastic Limit			
Plasticity Index ASTM:D4318			
Water Content ASTM:D2216			
Dry Density (pcf) ASTM:D7263			
Specific Gravity ASTM:D854			
Porosity			
Organic Content ASTM:D2974			
pH ASTM:D4972 Method B			

Percent Passing

	*	●	◇
Mass (g)	16371.0	~~15136.0~~	~~18014.0~~
2"		~~X~~	~~X~~
1.5"		~~X~~	~~X~~
1"	100.0	~~100.0~~	~~X~~
3/4"	99.8	~~99.8~~	~~100.0~~
3/8"	99.6	~~X~~	~~X~~
#4	99.4	~~99.7~~	~~X~~
#10	94.3	~~X~~	~~X~~
#20	63.7	~~X~~	~~X~~
#40	27.4	~~X~~	~~X~~
#100	2.7	~~1.8~~	~~X~~
#200	0.7	~~X~~	~~X~~

	*	●	◇
D_{60}			
D_{30}			
D_{10}			
C_U			
C_C			

Remarks:

(* = assumed)

9530 James Ave South

SOIL ENGINEERING TESTING, INC.

Bloomington, MN 55431

Granular Drainage Material In-Place Hydraulic Conductivity Test Reports

Hydraulic Conductivity Test Data ASTM D2434

Project: Hoot Lake Project Date: 9/25/2023

Client: Carlson McCain Job No.: 14641

Boring No.: _____ Depth (ft): _____

Sample No.: P-1 Type: Bulk

Location: _____

Soil Type: Sand, medium grained (SP)

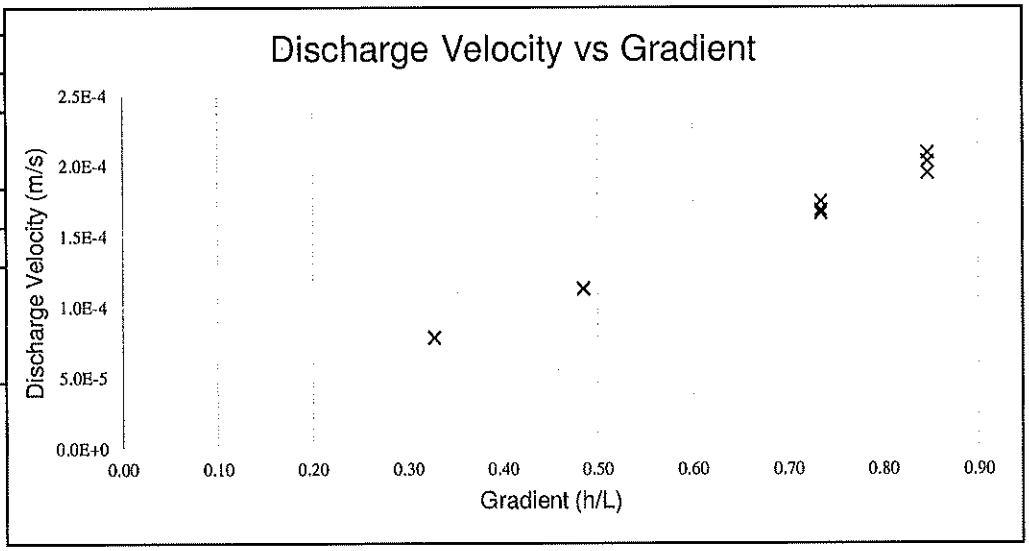
Ht (in) 5.39 Dia. (in): 3.00

W.C.(%): 0.2 Yd (pcf): 110.1

Compaction: Specimen reconstituted using a moderate compactive effort at the as received moisture content.

K @ 20°C (cm/sec): 2.2×10^{-2}

K @ 20°C (ft/min): 4.4×10^{-2}



Boring No.: _____ Depth (ft): _____

Sample No.: P-2 Type: Bulk

Location: _____

Soil Type: Sand, medium grained (SP)

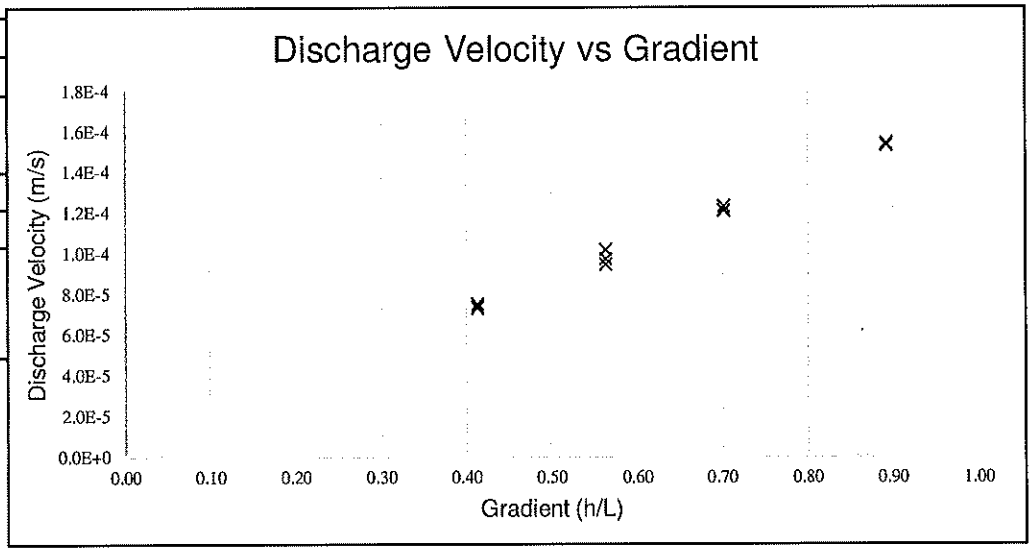
Ht (in) 5.38 Dia. (in): 3.00

W.C.(%): 0.1 Yd (pcf): 111.2

Compaction: Specimen reconstituted using a moderate compactive effort at the as received moisture content.

K @ 20°C (cm/sec): 1.7×10^{-2}

K @ 20°C (ft/min): 3.3×10^{-2}



Boring No.: _____ Depth (ft): _____

Sample No.: P-3 Type: Bulk

Location: _____

Soil Type: Sand, medium grained (SP)

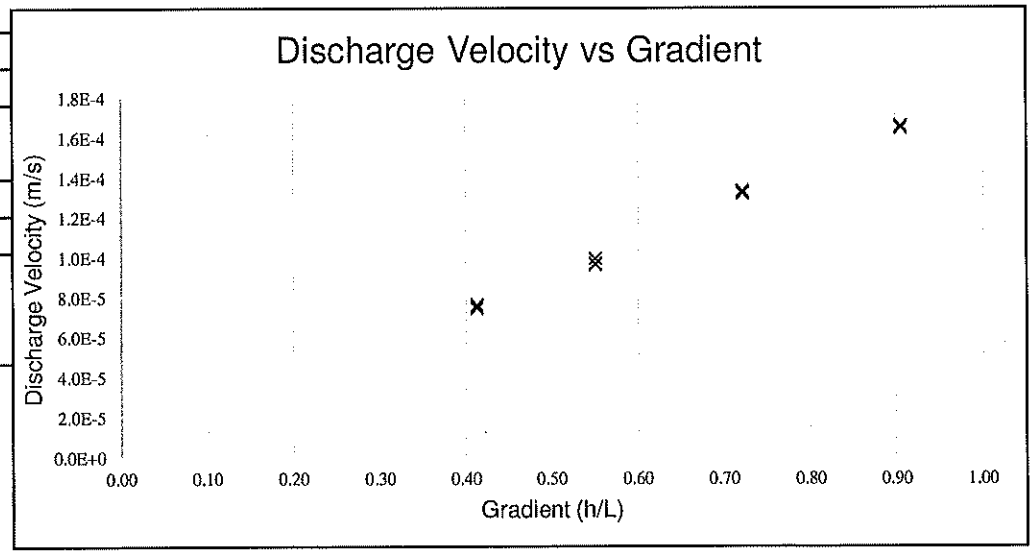
Ht (in) 5.39 Dia. (in): 3.00

W.C.(%): 0.5 Yd (pcf): 110.8

Compaction: Specimen reconstituted using a moderate compactive effort at the as received moisture content.

K @ 20°C (cm/sec): 1.7×10^{-2}

K @ 20°C (ft/min): 3.4×10^{-2}



9630 James Ave South

SOIL ENGINEERING TESTING, INC.

Bloomington, MN 55431

Hydraulic Conductivity Test Data ASTM D2434

Project: Hoot Lake Project Date: 9/25/2023

Client: Carlson McCain Job No.: 14641

Boring No.: _____ Depth (ft): _____

Sample No.: P-4 Type: Bulk

Location: _____

Soil Type: Sand, medium grained (SP)

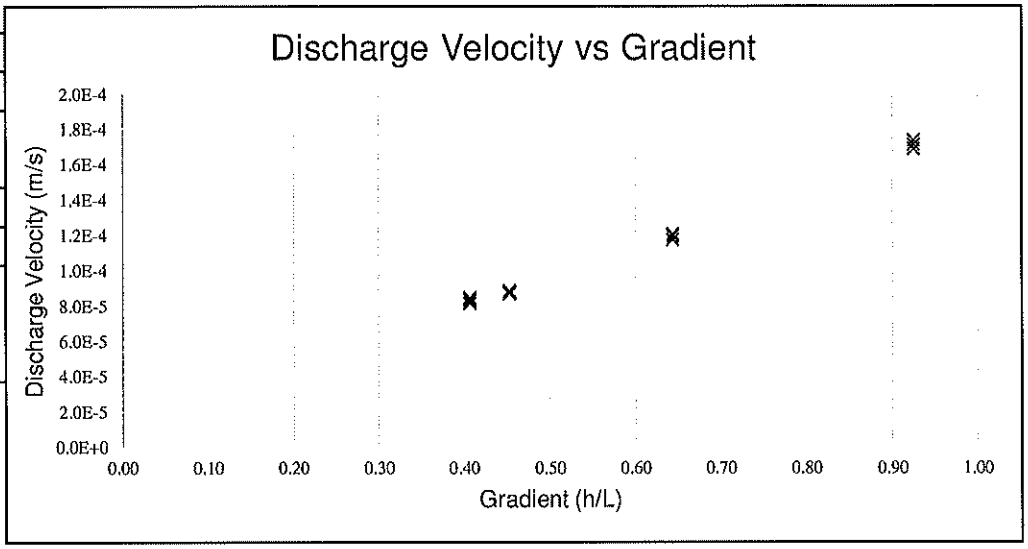
Ht (in) 5.33 Dia. (in): 3.00

W.C.(%): 0.1 Yd (pcf): 111.4

Compaction: Specimen compacted using a moderate compactive effort at the as received moisture content.

K @ 20°C (cm/sec): 1.8×10^{-2}

K @ 20°C (ft/min): 3.6×10^{-2}



Boring No.: _____ Depth (ft): _____

Sample No.: S-3 Type: Bulk

Location: _____

Soil Type: Sand, medium grained (SP)

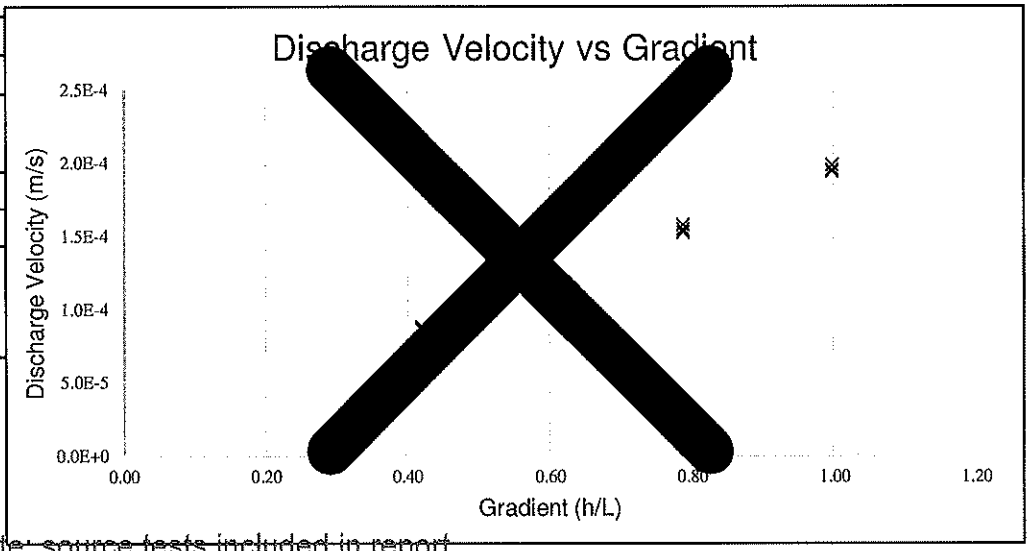
Ht (in) 5.53 Dia. (in): 3.00

W.C.(%): 0.1 Yd (pcf): 109.5

Compaction: Specimen compacted using a moderate compactive effort at the as received moisture content.

K @ 20°C (cm/sec): 1.9×10^{-2}

K @ 20°C (ft/min): 3.8×10^{-2}



Note: source tests included in report are crossed out, see source testing reports for data

Boring No.: _____ Depth (ft): _____

Sample No.: S-4 Type: Bulk

Location: _____

Soil Type: Sand, medium grained (SP)

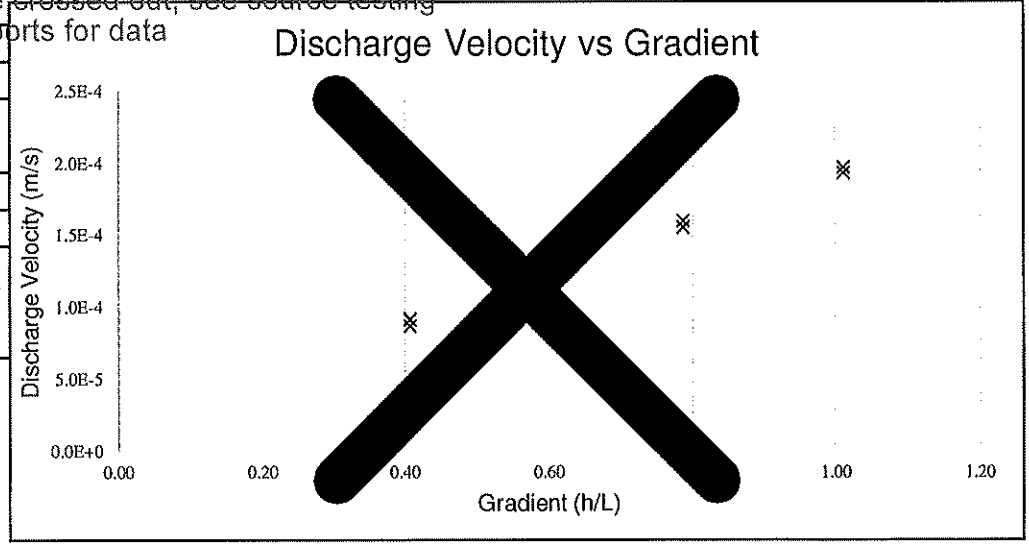
Ht (in) 5.72 Dia. 3.00

W.C.(%): _____ Yd (pcf): 109.3

Compaction: Specimen compacted using a moderate compactive effort at the as received moisture content.

K @ 20°C (cm/sec): 1.9×10^{-2}

K @ 20°C (ft/min): 3.8×10^{-2}



9530 James Ave South

SOIL ENGINEERING TESTING, INC.

Bloomington, MN 55431

Topsoil Source Particle Size Test Reports

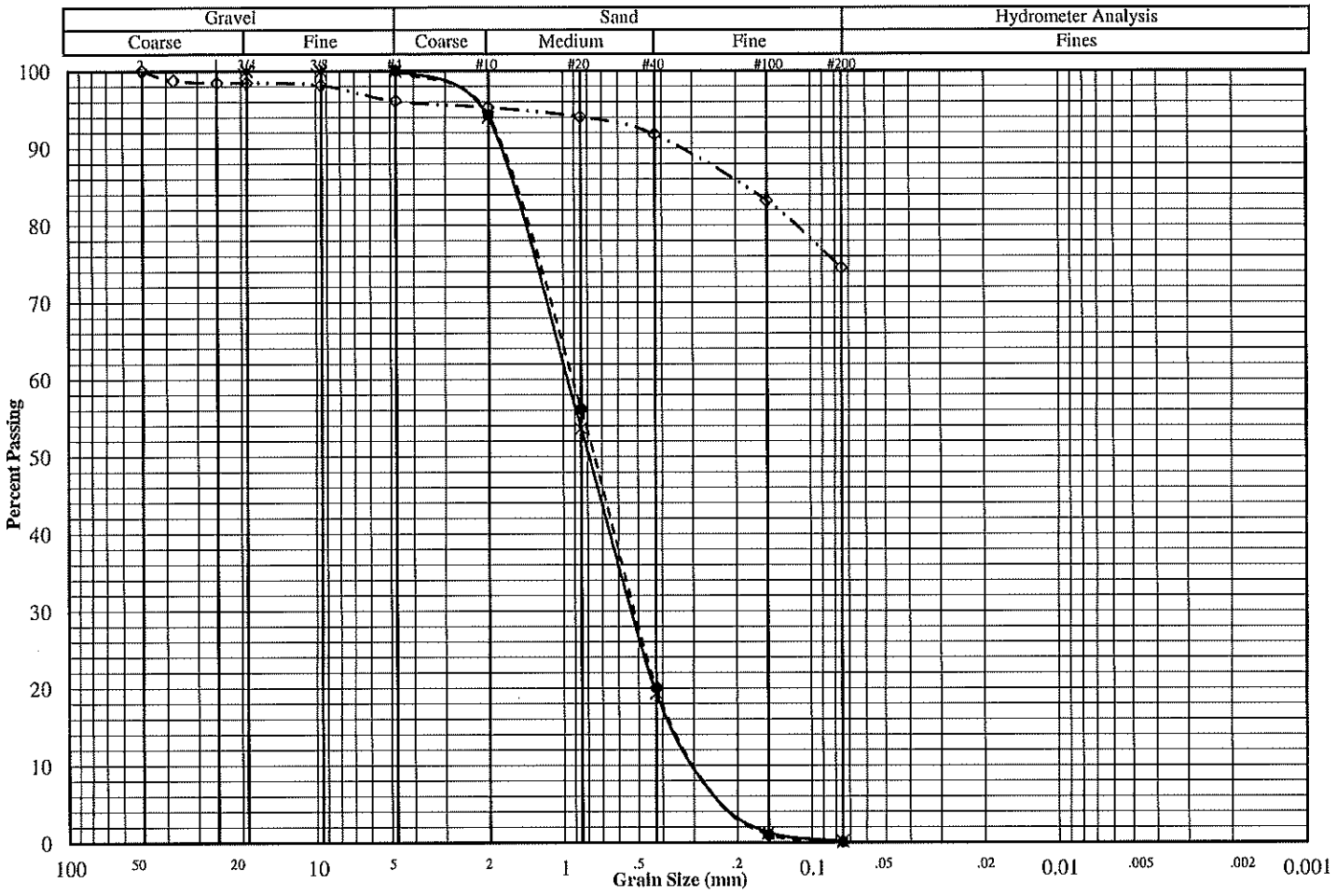
Grain Size Distribution ASTM D422-16

Job No. : **14554**

Project:	Hoot Lake Landfill Final Cover Project	Test Date:	8/4/23
Reported To:	Carlson McCain	Report Date:	8/9/23

	Location / Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Classification
*		~~G-1~~		~~Bulk~~	~~Sandy/medium grained (SP)~~
●		~~G-2~~		~~Bulk~~	~~Sandy/medium grained (SP)~~
◇		T-1		Bulk	Lean Clay w/sand and a trace of gravel (CL)

Note: GDM source tests included in report are crossed out, see GDM ~~source testing reports for~~ data



Additional Results	*	●	◇
Liquid Limit			
Plastic Limit			
Plasticity Index ASTM:D4318			
Water Content ASTM:D2216			
Dry Density (pcf) ASTM:D7263			
Specific Gravity ASTM:D854			
Porosity			
Organic Content ASTM:D2974			
pH ASTM:D4972 Method B			

	Percent Passing		
	*	●	◇
Mass (g)	17880.0	18962.0	9473.6
2"			100.0
1.5"			98.8
1"			98.5
3/4"	100.0		98.5
3/8"	100.0		98.2
#4	100.0	100.0	96.1
#10	94.0	94.3	95.3
#20	53.0	56.2	94.1
#40	19.3	20.0	91.8
#100	1.3	1.0	83.2
#200	0.1	0.1	74.5

	*	●	◇
D_{60}			
D_{30}			
D_{10}			
C_U			
C_C			

Remarks:

(* = assumed)

9530 James Ave South

SOIL ENGINEERING TESTING, INC.

Bloomington, MN 55431

Topsoil Source Nutrient Test Reports

University of Minnesota
Soil Testing Laboratory

SOIL TEST REPORT

Farm and Field

Client Copy
Department of Soil, Water, and Climate
Minnesota Extension Service
Agricultural Experiment Station

CARLSON MCCAIN
BRANNON PETERSON
15650 36TH AVE N
STE 110
PLYMOUTH MN 55446

Page	1
Report No.	87109
Laboratory No.	171144
Date Received	08/09/23
Date Reported	08/11/23

INTERPRETATION OF SOIL TEST RESULTS

Soil Texture Code:	HIGH	PROBLEM	EXCESSIVE	pH	ALKALINE / ACID	N	P	K	
C (coarse):				9		N			Very High
sand, loamy sand, sandy loam	O			8		N			
M (medium):	O				H	N		K	
loam, silt loam	O			7	H	N		K	
F (fine):	O				H	N	P	K	
clay loam, silty clay loam, silty clay	O			6	H	N	P	K	
	O				H	N	P	K	
	O			5	H	N	P	K	Very Low
	LOW	MED	OK						

SOIL TEST RESULTS

Sample/ Field Number	Estimated Soil Texture	Organic Matter %	Soluble Salts mmhos/cm	pH	Buffer Index	Nitrate NO3-N lb/A	Olsen Phosphorus ppm P	Bray 1 Phosphorus ppm P	Potassium ppm K	Sulfur SO4-S ppm	Zinc ppm	Iron ppm	Manganese ppm	Copper ppm	Boron ppm	Calcium ppm	Magnesium ppm
HLP1	**Medium**	**4.7**		**7.9**		**195.2**	**7**	**3**	**102**								

RECOMMENDATIONS

Crop Before Last: CROP NOT SPECIFIED; Last Crop: Fallow

Crop and Yield Goal	Method	Lime #ENP/A	N lb/A	P2O5 lb/A	K2O lb/A	S lb/A	Zn lb/A	Fe lb/A	Mn lb/A	Cu lb/A	B lb/A	Ca lb/A	Mg lb/A
Native Grasses	Broadcast	**0**	**0**	**40**	**40**								
3 tons/acre	Row/Drill												

Comments: 4,5,18

County: OTTER TAIL (WEST). For additional information, contact the soil extension specialist: DANIEL KAISER 612-624-3482 Website: http://soiltest.cfans.umn.edu

Comments

1. The recommended rates of P2O5 and/or K2O are to be broadcast and incorporated before seeding and top-dressed after the 1st cutting of the 1st year in production. Re-test field before the 2nd production year. If oats are seeded as a nurse crop, apply 30 lb. N/acre.
2. The recommended rates of P2O5 and/or K2O are to be top-dressed to the established stand. Re-test in two years.
3. For best results, the recommended rate of lime should be broadcast and incorporated from 6 to 12 months before seeding.
4. If only phosphorus is recommended for any agronomic crop and the recommendation is 30 lb./A or less, it may not be practical to broadcast this low rate. An alternative would be to double this suggested rate and broadcast on alternate years.
5. If only potash is recommended for any agronomic crop and the recommendation is 40lb./A or less, it may not be practical to broadcast this low rate. An alternative would be to double this suggested rate and broadcast on alternate years.
6. Broadcast phosphate will not increase yield at this P level. Use 10-15 lb. P205/acre in a starter.
7. No phosphate fertilizer is recommended, but, if the soil temperature is low and soils are wet, use 10-15 lb. P2O5/acre in a starter for corn.
8. This P level is very low. Use a combination of starter (drill applied for small grain) and broadcast applications. Subtract the rate for starter (drill) from the suggested broadcast rate. Use the starter (drill) rate and broadcast the remainder.
9. This K level is low. Use a combination of starter (drill applied for small grain) and broadcast applications. Subtract the rate for starter (drill) from the suggested broadcast rate. Use the starter (drill) rate and broadcast the remainder.
10. No broadcast potash is recommended. Suggested rate is 10-15 lb. K2O/acre in a starter fertilizer.
11. Use of a starter fertilizer (fertilize with the drill for small grains) is a good way to apply fertilizer at soil test levels where phosphate and/or potash are needed. Do no apply urea, thiosulfate, or boron in contact with the seed. Do not use more than 10-15 lb./acre of N + K2O in contact with the seed for small grain, or 8 lb./acre of N + K2O in contact with the seed for corn production.
12. The soil test for sulfur is appropriate only for coarse textured (sands, loamy sand, sandy loams) soils. Sulfur recommendations are made for sandy soils only. Use an annual application of 25 lb. S/acre for alfalfa and red clover. For corn and small grains use either a broadcast application of 25 lb. S/acre or a band application of 10-15 lb. S/acre. Use this recommendation if there was no soil test for S.
13. In Minnesota, research with agronomic crops has shown that boron (B) use has only been beneficial for alfalfa production on limited soils. Therefore, B is not recommended for other agronomic crops.
14. In Minnesota, use of iron (Fe), manganese (Mn), and copper (Cu) has not increased yield of this crop. Therefore, none is recommended. Use of zinc (Zn), where needed, may increase yield at the recommended rate listed.
15. Although no fertilizer N is recommended on this field, as based on the test result for nitrogen, a small amount of N applied in a starter fertilizer at planting is encouraged.
16. Research trials in Minnesota show that this crop will not respond to the use of micronutrients (Zn, Fe, Mn, Cu, B). Therefore, none are recommended.
17. If the small grain crop follows soybeans, subtact 20 lb. N/acre from the N recommendation listed.
18. Manure applications result in nutrient credits that should be subtracted from fertilizer needs. Proper nutrient crediting is discussed in bulletins: AG-FO-5879C, 5880C, 5881C, 5882C and 5883C available at your County Extension Office.
19. Do not place any fertilizer in contact with the soybean seed.
20. Do not apply more than 5.5 lb./acre of N + K20 in direct contact with the seed.
21. Subtract the NO3-N test result for the top 2 feet from the recommendation value to determine the amount of fertilizer N (lb./acre) to apply.
22. The soil ntitrate test can be used to predict fertilizer N needs in your area if samples are taken before planting in the spring. If the sample was collected at another time, the N recommendation listed is based on yield goal, previous crop, and organic matter content. See Bulletin 3790 B (revised) for more details.
23. The recommended N rate shown should be used if barley is grown for malting purposes. If barley is used for feed, increase rate by 10 percent (multiply by 1.1).
24. Lime recommendations are reported as lbs. of ENP per acre (Effective Neutralizing Power). To determine the tons of lime needed to be applied per acre, divide the ENP recommendation by the "ENP PER TON" value provided by your liming material dealer.
25. No nitrogen is recommended because of NO3-N carryover.

University of Minnesota
Soil Testing Laboratory

SOIL TEST REPORT

Farm and Field

Client Copy
Department of Soil, Water, and Climate
Minnesota Extension Service
Agricultural Experiment Station

CARLSON MCCAIN
BRANNON PETERSON
15650 36TH AVE N
STE 110
PLYMOUTH MN 55446

Page	**2**
Report No.	**87109**
Laboratory No.	**171145**
Date Received	**08/09/23**
Date Reported	**08/11/23**

INTERPRETATION OF SOIL TEST RESULTS

Soil Texture Code:	HIGH	PROBLEM	pH	ALKALINE / ACID	N	P	K	
C (coarse):		EXCESSIVE	9					Very High
sand, loamy sand, sandy loam	O		8					
M (medium):	O			H	N		K	
loam, silt loam	O			H	N		K	
F (fine):	O		7	H	N		K	
clay loam, silty clay loam, silty clay	O			H	N	P	K	
	O		6	H	N	P	K	
	O			H	N	P	K	
	O	OK	5	H	N	P	K	Very Low

SOIL TEST RESULTS

Sample/ Field Number	Estimated Soil Texture	Organic Matter %	Soluble Salts mmhos/cm	pH	Buffer Index	Nitrate NO3-N lb/A	Olsen Phosphorus ppm P	Bray 1 Phosphorus ppm P	Potassium ppm K	Sulfur SO4 -S ppm	Zinc ppm	Iron ppm	Manganese ppm	Copper ppm	Boron ppm	Calcium ppm	Magnesium ppm
HLP2	**Medium**	**4.5**		**8.0**		**154.4**	**7**	**3**	**101**								

RECOMMENDATIONS **Crop Before Last: CROP NOT SPECIFIED; Last Crop: Fallow**

Crop and Yield Goal	Method	Lime #ENP/A	N lb/A	P2O5 lb/A	K2O lb/A	S lb/A	Zn lb/A	Fe lb/A	Mn lb/A	Cu lb/A	B lb/A	Ca lb/A	Mg lb/A
Native Grasses	Broadcast	**0**	**0**	**40**	**40**								
3 tons/acre	Row/Drill												

Comments: 4,5,18

County: OTTER TAIL (WEST). For additional information, contact the soil extension specialist: DANIEL KAISER 612-624-3482 Website: http://soiltest.cfans.umn.edu

Comments

1. The recommended rates of P2O5 and/or K2O are to be broadcast and incorporated before seeding and top-dressed after the 1st cutting of the 1st year in production. Re-test field before the 2nd production year. If oats are seeded as a nurse crop, apply 30 lb. N/acre.
2. The recommended rates of P2O5 and/or K2O are to be top-dressed to the established stand. Re-test in two years.
3. For best results, the recommended rate of lime should be broadcast and incorporated from 6 to 12 months before seeding.
4. If only phosphorus is recommended for any agronomic crop and the recommendation is 30 lb./A or less, it may not be practical to broadcast this low rate. An alternative would be to double this suggested rate and broadcast on alternate years.
5. If only potash is recommended for any agronomic crop and the recommendation is 40lb./A or less, it may not be practical to broadcast this low rate. An alternative would be to double this suggested rate and broadcast on alternate years.
6. Broadcast phosphate will not increase yield at this P level. Use 10-15 lb. P205/acre in a starter.
7. No phosphate fertilizer is recommended, but, if the soil temperature is low and soils are wet, use 10-15 lb. P2O5/acre in a starter for corn.
8. This P level is very low. Use a combination of starter (drill applied for small grain) and broadcast applications. Subtract the rate for starter (drill) from the suggested broadcast rate. Use the starter (drill) rate and broadcast the remainder.
9. This K level is low. Use a combination of starter (drill applied for small grain) and broadcast applications. Subtract the rate for starter (drill) from the suggested broadcast rate. Use the starter (drill) rate and broadcast the remainder.
10. No broadcast potash is recommended. Suggested rate is 10-15 lb. K2O/acre in a starter fertilizer.
11. Use of a starter fertilizer (fertilize with the drill for small grains) is a good way to apply fertilizer at soil test levels where phosphate and/or potash are needed. Do no apply urea, thiosulfate, or boron in contact with the seed. Do not use more than 10-15 lb./acre of N + K2O in contact with the seed for small grain, or 8 lb./acre of N + K2O in contact with the seed for corn production.
12. The soil test for sulfur is appropriate only for coarse textured (sands, loamy sand, sandy loams) soils. Sulfur recommendations are made for sandy soils only. Use an annual application of 25 lb. S/acre for alfalfa and red clover. For corn and small grains use either a broadcast application of 25 lb. S/acre or a band application of 10-15 lb. S/acre. Use this recommendation if there was no soil test for S.
13. In Minnesota, research with agronomic crops has shown that boron (B) use has only been beneficial for alfalfa production on limited soils. Therefore, B is not recommended for other agronomic crops.
14. In Minnesota, use of iron (Fe), manganese (Mn), and copper (Cu) has not increased yield of this crop. Therefore, none is recommended. Use of zinc (Zn), where needed, may increase yield at the recommended rate listed.
15. Although no fertilizer N is recommended on this field, as based on the test result for nitrogen, a small amount of N applied in a starter fertilizer at planting is encouraged.
16. Research trials in Minnesota show that this crop will not respond to the use of micronutrients (Zn, Fe, Mn, Cu, B). Therefore, none are recommended.
17. If the small grain crop follows soybeans, subtact 20 lb. N/acre from the N recommendation listed.
18. Manure applications result in nutrient credits that should be subtracted from fertilizer needs. Proper nutrient crediting is discussed in bulletins: AG-FO-5879C, 5880C, 5881C, 5882C and 5883C available at your County Extension Office.
19. Do not place any fertilizer in contact with the soybean seed.
20. Do not apply more than 5.5 lb./acre of N + K20 in direct contact with the seed.
21. Subtract the NO3-N test result for the top 2 feet from the recommendation value to determine the amount of fertilizer N (lb./acre) to apply.
22. The soil ntitrate test can be used to predict fertilizer N needs in your area if samples are taken before planting in the spring. If the sample was collected at another time, the N recommendation listed is based on yield goal, previous crop, and organic matter content. See Bulletin 3790 B (revised) for more details.
23. The recommended N rate shown should be used if barley is grown for malting purposes. If barley is used for feed, increase rate by 10 percent (multiply by 1.1).
24. Lime recommendations are reported as lbs. of ENP per acre (Effective Neutralizing Power). To determine the tons of lime needed to be applied per acre, divide the ENP recommendation by the "ENP PER TON" value provided by your liming material dealer.
25. No nitrogen is recommended because of NO3-N carryover.

University of Minnesota
Soil Testing Laboratory

SOIL TEST REPORT
Farm and Field

Client Copy
Department of Soil, Water, and Climate
Minnesota Extension Service
Agricultural Experiment Station

CARLSON MCCAIN
BRANNON PETERSON
15650 36TH AVE N
STE 110
PLYMOUTH MN 55446

Page **3**
Report No. **87109**
Laboratory No. **171146**
Date Received **08/09/23**
Date Reported **08/11/23**

INTERPRETATION OF SOIL TEST RESULTS

Soil Texture Code:	HIGH	MED	LOW	PROBLEM	EXCESSIVE
C (coarse):					
sand, loamy sand, sandy loam	O	O	O	O	
M (medium):					
loam, silt loam	O	O	O	O	
F (fine):					
clay loam, silty clay loam, silty clay	O	O	O	O	

	ALKALINE				ACID
9					
8					
7					
6					

	Very High			Very Low
N				
N				
N				K
N	P	P	K	
N	P	P	K	
N	P	P	K	
N	P	P	K	
N	P	P	K	
N	P	P	K	
N	P	P	K	

SOIL TEST RESULTS

Sample/ Field Number	Estimated Soil Texture	Organic Matter %	Soluble Salts mmhos/cm	pH	Buffer Index	Nitrate NO3-N lb/A	Olsen Phosphorus ppm P	Bray 1 Phosphorus ppm P	Potassium ppm K	Sulfur SO4 -S ppm	Zinc ppm	Iron ppm	Manganese ppm	Copper ppm	Boron ppm	Calcium ppm	Magnesium ppm
HLP3	Medium	4.6		7.8		348	14	14	134								

RECOMMENDATIONS **Crop Before Last: CROP NOT SPECIFIED; Last Crop: Fallow**

Crop and Yield Goal	Method	Lime #ENP/A	N lb/A	P2O5 lb/A	K2O lb/A	S lb/A	Zn lb/A	Fe lb/A	Mn lb/A	Cu lb/A	B lb/A	Ca lb/A	Mg lb/A
Native Grasses	Broadcast	0	0	20	10								
3 tons/acre	Row/Drill												

Comments: 4,5,18

County: OTTER TAIL (WEST). For additional information, contact the soil extension specialist: DANIEL KAISER 612-624-3482 Website: http://soiltest.cfans.umn.edu

Comments

1. The recommended rates of P2O5 and/or K2O are to be broadcast and incorporated before seeding and top-dressed after the 1st cutting of the 1st year in production. Re-test field before the 2nd production year. If oats are seeded as a nurse crop, apply 30 lb. N/acre.
2. The recommended rates of P2O5 and/or K2O are to be top-dressed to the established stand. Re-test in two years.
3. For best results, the recommended rate of lime should be broadcast and incorporated from 6 to 12 months before seeding.
4. If only phosphorus is recommended for any agronomic crop and the recommendation is 30 lb./A or less, it may not be practical to broadcast this low rate. An alternative would be to double this suggested rate and broadcast on alternate years.
5. If only potash is recommended for any agronomic crop and the recommendation is 40lb./A or less, it may not be practical to broadcast this low rate. An alternative would be to double this suggested rate and broadcast on alternate years.
6. Broadcast phosphate will not increase yield at this P level. Use 10-15 lb. P205/acre in a starter.
7. No phosphate fertilizer is recommended, but, if the soil temperature is low and soils are wet, use 10-15 lb. P2O5/acre in a starter for corn.
8. This P level is very low. Use a combination of starter (drill applied for small grain) and broadcast applications. Subtract the rate for starter (drill) from the suggested broadcast rate. Use the starter (drill) rate and broadcast the remainder.
9. This K level is low. Use a combination of starter (drill applied for small grain) and broadcast applications. Subtract the rate for starter (drill) from the suggested broadcast rate. Use the starter (drill) rate and broadcast the remainder.
10. No broadcast potash is recommended. Suggested rate is 10-15 lb. K2O/acre in a starter fertilizer.
11. Use of a starter fertilizer (fertilize with the drill for small grains) is a good way to apply fertilizer at soil test levels where phosphate and/or potash are needed. Do no apply urea, thiosulfate, or boron in contact with the seed. Do not use more than 10-15 lb./acre of N + K2O in contact with the seed for small grain, or 8 lb./acre of N + K2O in contact with the seed for corn production.
12. The soil test for sulfur is appropriate only for coarse textured (sands, loamy sand, sandy loams) soils. Sulfur recommendations are made for sandy soils only. Use an annual application of 25 lb. S/acre for alfalfa and red clover. For corn and small grains use either a broadcast application of 25 lb. S/acre or a band application of 10-15 lb. S/acre. Use this recommendation if there was no soil test for S.
13. In Minnesota, research with agronomic crops has shown that boron (B) use has only been beneficial for alfalfa production on limited soils. Therefore, B is not recommended for other agronomic crops.
14. In Minnesota, use of iron (Fe), manganese (Mn), and copper (Cu) has not increased yield of this crop. Therefore, none is recommended. Use of zinc (Zn), where needed, may increase yield at the recommended rate listed.
15. Although no fertilizer N is recommended on this field, as based on the test result for nitrogen, a small amount of N applied in a starter fertilizer at planting is encouraged.
16. Research trials in Minnesota show that this crop will not respond to the use of micronutrients (Zn, Fe, Mn, Cu, B). Therefore, none are recommended.
17. If the small grain crop follows soybeans, subtact 20 lb. N/acre from the N recommendation listed.
18. Manure applications result in nutrient credits that should be subtracted from fertilizer needs. Proper nutrient crediting is discussed in bulletins: AG-FO-5879C, 5880C, 5881C, 5882C and 5883C available at your County Extension Office.
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20. Do not apply more than 5.5 lb./acre of N + K20 in direct contact with the seed.
21. Subtract the NO3-N test result for the top 2 feet from the recommendation value to determine the amount of fertilizer N (lb./acre) to apply.
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23. The recommended N rate shown should be used if barley is grown for malting purposes. If barley is used for feed, increase rate by 10 percent (multiply by 1.1).
24. Lime recommendations are reported as lbs. of ENP per acre (Effective Neutralizing Power). To determine the tons of lime needed to be applied per acre, divide the ENP recommendation by the "ENP PER TON" value provided by your liming material dealer.
25. No nitrogen is recommended because of NO3-N carryover.

Appendix E - Turf Establishment Information

Seed Mix
Erosion Control Blanket Data
Turf Mat Data

Seed Mix

25-121 Sandy General Roadside

Common Name	Scientific Name	Rate (kg/ha)	Rate (lb/ac)	% of Mix (% by wt)	Seeds/ sq ft
Smooth Brome	*Bromus inermis*	8.97	8.00	13.12%	26.25
slender wheatgrass	*Elymus trachycaulus*	2.24	2.00	3.29%	5.08
Hard fescue	*Festuca trachyphylla*	4.76	4.25	6.96%	55.10
Perennial Ryegrass	*Lolium perenne*	15.13	13.50	22.13%	67.25
Park Kentucky bluegrass	*Poa pratensis Park*	17.93	16.00	26.23%	510.50
Canada bluegrass	*Poa compressa*	8.69	7.75	12.70%	425.50
switchgrass	*Panicum virgatum*	1.68	1.50	2.46%	7.73
little bluestem	*Schizachyrium scoparium*	1.68	1.50	2.46%	8.28
sand dropseed	*Sporobolus cryptandrus*	1.68	1.50	2.45%	110.00
	Total Grasses	**62.77**	**56.00**	**91.80%**	**1215.69**
purple prairie clover	*Dalea purpurea*	0.56	0.50	0.82%	2.75
Red Clover	*Trifolium pratense*	5.04	4.50	7.38%	28.13
	Total Forbs	**5.60**	**5.00**	**8.20%**	**30.88**
	Totals:	**68.37**	**61.00**	**100.00%**	**1246.57**
Purpose:	General non-native roadside for dry or sandy soils.				
Planting Area:	Statewide. Well suited for Pine Moraines & Outwash Plains, Mille Lacs Uplands, and Anoka Sand Plain subsections. Mn/DOT Distrct 3A and eastern 3B				

Erosion Control Blanket Data

ERO-GUARD

MATERIALS DATA SHEET:

Product Name: EG- 2sRD
Manufacturer: Ero-Guard, Inc.
Contact: Brian F Dingels (612) 382-2783

Physical Description:

Size: Available in 16' and 8' widths and 112.5' and 562.5' lengths (Custom cuts are available upon request).

Plastic: 2 layers (Top and Bottom) of .5" x .5" opening, lightweight photodegradable polypropylene plastic. EG-2sRD also has a UV degrader added to it to break down the plastic at a more rapid rate.

Thread: 420 denier degradable split yarn, with a UV degrader added to it to match its longevity with that of the plastic.

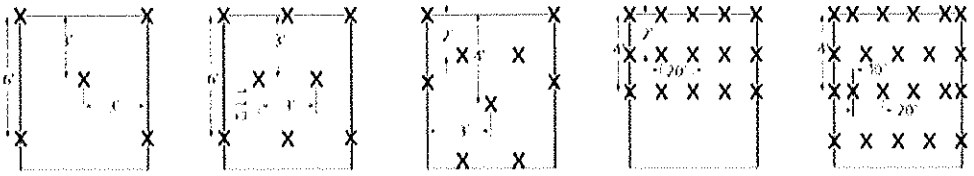
Matrix: 100% weed free agricultural straw, .50 lbs/yd^2

Packaging: All rolls are wrapped tightly with stretch wrap to protect the rolled erosion control product from the weather and elements.

Longevity: The Functional Longevity is approximately 60-90 days depending on sunlight, moisture and environmental conditions.

Recommended Applications: EG-2sRD is recommended for use on slopes up to 3:1 and in low flow channels.

Recommended Installation pattern: The leading edge is to be trenched into a 6" deep trench and the blanket is to be placed parallel to the anticipated water flow. When more than 1 blanket is required, they are to be overlapped 6" on all overlapping sides and tiled in a shingle type pattern as to not let the water underneath the blanket.



.7 staples/yd^2
4:1 SLOPES

1.2 staples/yd^2
3:1 SLOPES

1.75 staples/yd^2
2:1 SLOPES

3.5 staples/yd^2
MED to HIGH
FLOW CHANNEL

3.8 staples/yd^2
HIGH FLOW
CHANNEL

Your Leader In Erosion Control Blankets

412 Hwy 22 South · Mapleton, MN · 56065
Phone: (612) 382-2783 · Fax: (507) 524-3859

Turf Mat Data

American Excelsior Company®
Earth Science Division

Proud Participant in NTPEP and Proud Member of:

PRODUCT DATA SHEET
TRINET® RECYCLEX®

DESCRIPTION

TriNet Recyclex, a three dimensional permanent non-degradable Turf Reinforcement Mat (TRM), consists of 100% post-consumer recycled polyester (green bottles) with 80% five-inch fibers or greater fiber length. It is of consistent thickness with fibers evenly distributed throughout the entire area of the TRM. The top, middle, and bottom of each TRM is stitched together with ultra heavy duty UV stabilized polypropylene nets. Fibers are tightly crimped and curled to allow fiber interlock, and to retain 95% memory of the original shape after loading by hydraulic events. Fibers have a specific gravity greater than 1.0; therefore, the blanket will not float during hydraulic events. TriNet Recyclex TRM meets Federal Government Executive Order initiatives for use of products made from, or incorporating, recycled materials. TriNet Recyclex TRM shall be manufactured in the U.S.A. and the fibers shall be made from 100% recycled post-consumer goods.

TriNet Recyclex TRM has a design soil loss ratio (event-based RUSLE C factor) of .015 and is typically suitable for slopes up to .5H:1V. TriNet Recyclex TRM is rated for channel flows up to 25.0 ft/s (7.62 m/s) and 14 lb/ft² (670 Pa) shear stress.

PHYSICAL PROPERTIES

TriNet Recyclex TRM measurements at time of manufacturing:

Width		8.0 ft (2.4 m)	16 ft (4.9 m)
Length		67.5 ft (20.6 m)	67.5 ft (20.6 m)
Area		60.0 yd² (50.2 m²)	120 yd² (100.34 m²)
Weight		68.9 lb (31.25 kg)	137.8 lb (62.5 kg)
Fiber Length (80% min.)		≥ 5.0 in (≥ 12.7 cm)	≥ 5.0 in (≥ 12.7 cm)
Recyclex Matrix (± 10%)		0.500 lb/yd² (0.271 kg/m²)	0.500 lb/yd² (0.271 kg/m²)
Product Weight (± 10%)		1.148 lb/yd² (0.623 kg/m²)	1.148 lb/yd² (0.623 kg/m²)
Net Openings	Top - Ultra Heavy Duty Polypropylene (UV-Stabilized)	0.45 in x 0.58 in (11.43 mm x 14.73 mm)	0.45 in x 0.58 in (11.43 mm x 14.73 mm)
	Middle - Ultra Heavy Duty Polypropylene (UV-Stabilized)	0.45 in x 0.58 in (11.43 mm x 14.73 mm)	0.45 in x 0.58 in (11.43 mm x 14.73 mm)
	Bottom - Ultra Heavy Duty Polypropylene (UV-Stabilized)	0.45 in x 0.58 in (11.43 mm x 14.73 mm)	0.45 in x 0.58 in (11.43 mm x 14.73 mm)

TYPICAL INDEX VALUES

Index Property	Test Method	Value
Thickness	ASTM D 6525	0.529 in (13.44 mm)
Light Penetration	ASTM D 6567	26.7%
Resiliency	ASTM D 6524	83%
Mass per Unit Area	ASTM D 6566	1.204 lb/yd² (0.653 kg/m²)
MD-Tensile Strength Max.	ASTM D 6818	1000.0 lb/ft (14.59 kN/m)
TD-Tensile Strength Max.	ASTM D 6818	900.0 lb/ft (13.13 kN/m)
MD-Elongation	ASTM D 6818	20.0%
TD-Elongation	ASTM D 6818	19.5%
UV Stability	ASTM D 4355 (1,000 hr)	90% minimum
Porosity	Calculated	96.63%
Stiffness	ASTM D6575	2.62 oz-in
Bench-Scale Rain Splash	ASTM D 7101	SLR = 45.66 @ 2 in/hr [a,b]
Bench-Scale Rain Splash	ASTM D 7101	SLR = 16.45 @ 4 in/hr [a,b]
Bench-Scale Rain Splash	ASTM D 7101	SLR = 12.12 @ 6 in/hr [a,b]
Bench-Scale Shear	ASTM D 7207	4.3 lb/ft2 @ 0.5 in soil loss [b]
Germination Improvement	ASTM D 7322	311%

[a] SLR is the Soil Loss Ratio, as reported by NTPEP/AASHTO. [b] Bench-scale index values should not be used for design purposes.

MADE IN THE U.S.A

850 Avenue H East | Arlington, Texas 76011
Phone 1-800-777-SOIL | Fax 817-385-3585 | www.Curlex.com

American Excelsior Company®
Earth Science Division

Proud Participant in NTPEP and Proud Member of:

ASTM INTERNATIONAL MEMBER | Western Coalition | IECA Member

TriNet® Recyclex®
TURF REINFORCEMENT MAT
SPECIFICATION

PART I - GENERAL

1.01 Summary

A. The Turf Reinforcement Mat (TRM) contains post-consumer recycled polyester fiber for the purpose of erosion control and revegetation as described herein.

B. This work shall consist of furnishing and installing the TRM; including fine grading, installing TRM, stapling, and miscellaneous related work, in accordance with these standard specifications and at the locations identified on drawings or designated by the owner's representative. This work shall include all necessary materials, labor, supervision, and equipment for installation of a complete system.

C. All work of this section shall be performed in accordance with the conditions and requirements of the contract documents.

D. The TRM shall be used to prevent surface erosion and enhance revegetation. Based on a project-by-project engineering analysis, the TRM shall be suitable for the following applications:

1. Slope protection
2. Channel and ditch linings
3. Reservoir embankments and spillways
4. Culvert inlets and outfalls
5. Dikes, levees, and riverbanks

1.02 Performance Requirements

A. TRM shall provide a permanent cover material to reduce slope and/or channel erosion and enhance revegetation.

B. TRM performance requirements:

Slopes[a]:	≤ .5H:1V (ASTM D6459)
C factor[a]:	.015 (ASTM D6459)
Shear Stress[a]:	14.0 lb/ft^2 (670 Pa) (ASTM D6460)
Velocity[a]:	25.0 ft/sec (7.62 m/sec) (ASTM D6460)
Functional Longevity:	Permanent

[a] Slope and channel performance ratings are based on typical industry values.

1.03 Submittals

A. Submittals shall include complete design data, Product Data Sheets, Product Netting Information, SDS, Staple Pattern Guides, Installation Guidelines, Manufacturing Material Specifications, Manufacturing Certifications, CAD details, and a Manufacturing Quality Control Program. In addition, the Manufacturer shall provide a test report providing data showing the performance capabilities of the TRM along with reference installations similar in size and scope to that specified for the project.

1.04 Delivery, Storage, and Handling

A. TRM shall be furnished in rolls and wrapped with suitable material to protect against moisture intrusion and extended ultraviolet exposure prior to placement.

B. TRM shall be of consistent thickness with fibers distributed evenly over the entire area of the TRM.

C. TRM shall be free of defects and voids that would interfere with proper installation or impair performance.

D. TRM shall be stored by the Contractor in a manner that protects them from damage by construction activities.

PART II - PRODUCTS

2.01 Turf Reinforcement Mat

A. TRM shall be TriNet Recyclex, as manufactured by American Excelsior Company, Arlington, TX (1-866-9FIBERS).

B. TriNet Recyclex, a three dimensional non-degradable Turf Reinforcement Mat, consists of 100% post-consumer recycled polyester (green bottles) with 80% of fibers ≥ 5 inches in length. It is of consistent thickness with fibers evenly distributed throughout the entire area of the TRM. The top, middle, and bottom of each TRM shall be covered with ultra-heavy duty polypropylene UV stabilized black netting. Fibers shall be tightly crimped and curled to allow fiber interlock and to retain 95% memory of the original shape after loading by hydraulic events. Fibers shall have a specific gravity of greater than 1.0; therefore, the TRM will not float during hydraulic events. TriNet Recyclex shall meet Federal Government Executive Order initiatives for use of products made from, or incorporating, recycled goods. TriNet Recyclex shall be manufactured in the U.S.A. and the fibers shall be made from 100% recycled post-consumer goods.

C. TRM shall have the following material characteristics:

Width		8.0 ft (2.4 m)	16 ft (4.9 m)
Length		67.5 ft (20.6 m)	67.5 ft (20.6 m)
Area		60.0 yd^2 (50.2 m^2)	120.0 yd^2 (100.34 m^2)
Weight		68.9 lb (31.25 kg)	137.8 lb (62.5 kg)
Fiber Length (80% min.)		≥ 5.0 in (≥ 12.7 cm)	≥ 5.0 in (≥ 12.7 cm)
Recyclex Matrix (± 10%)		0.500 lb/yd^2 (0.271 kg/m^2)	0.500 lb/yd^2 (0.271 kg/m^2)
Product Weight (± 10%)		1.148 lb/yd^2 (0.623 kg/m^2)	1.148 lb/yd^2 (0.623 kg/m^2)
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Bench-Scale Shear	ASTM D 7207	4.3 lb/ft2 @ 0.5 in soil loss [c]
Germination Improvement	ASTM D 7322	311%

[b] SLR is the Soil Loss Ratio, as reported by NTPEP/AASHTO. [c] Bench-scale index values should not be used for design purposes.

2.02 Staples

A. Staples shall be U-shaped, 11 gauge steel wire and shall be 1 inch wide by 6 inches long, or 2 inches wide by 8 inches long.

PART III - EXECUTION

3.01 TRM Supplier Representation

A. Contractor shall coordinate with the TRM supplier for a qualified representative to be present at the job site on the start of installation to provide technical assistance as needed. Contractor shall remain solely responsible for the quality of installation.

3.02 Site Preparation

A. Before placing TRM, the Contractor shall certify that the subgrade has been properly compacted, graded smooth, has no depressions, voids, soft or uncompacted areas, is free from obstructions such as tree roots, protruding stones or other foreign matter, and is seeded and fertilized according to project specifications. The Contractor shall not proceed until all unsatisfactory conditions have been remedied. By beginning construction, Contractor signifies that the preceding work is in conformance with this specification.

B. Contractor shall fine grade the subgrade by hand dressing where necessary to remove local deviations.

C. No vehicular traffic shall be permitted directly on the TRM.

NOTE: Topsoiling, seeding, and fertilizing is not included in this specification.

3.03 Slope Installation

A. TRM shall be installed as directed by the owner's representative in accordance with manufacturer's Installation Guidelines, Staple Pattern Guides, and CAD details. The extent of TRM shall be as shown on the project drawings.

B. TRM shall be orientated in vertical strips and anchored with staples, as identified in the Staple Pattern Guide. Adjacent strips shall be overlapped to allow for installation of a common row of staples that anchor through the nettings of both TRMs. Horizontal joints between TRMs shall be sufficiently overlapped with the uphill end on top for a common row of staples so that the staples anchor through the nettings of both TRMs.

C. Where exposed to overland sheet flow, a trench shall be located at the uphill termination. TRM shall be stapled to the bottom of the trench. The trench shall be backfilled and compacted. Where feasible, the uphill end of the TRM shall be extended three feet over the crest of the slope.

D. Slope TRM shall be overlapped by the channel TRM sufficiently for a common row of staples to anchor through the nettings of both products when terminating into a channel.

3.04 Channel Installation

A. TRM shall be installed as directed by the owner's representative in accordance to manufacturer's Installation Guidelines, Staple Pattern Guides, and CAD details. The extent of TRM shall be as shown on the project drawings.

B. TRM shall be installed parallel to the flow of water. The first roll shall be centered longitudinally in mid-channel and anchored with staples as identified in the Staple Pattern Guide. Subsequent rolls shall follow from channel center outward and be overlapped to allow installation of a common row of staples so that the staples anchor through the nettings of both TRMs.

C. Successive lengths of TRM shall be overlapped sufficiently for a common row of staples with the upstream end on top. Staple the overlap across the end of each of the overlapping lengths so that staples anchor through the nettings of both TRMs.

D. A termination trench shall be located at the upstream termination. TRM shall be stapled to the bottom of the trench. The trench shall be backfilled and compacted.

3.05 Quality Assurance

A. TRM shall not be defective or damaged. Damaged or defective materials shall be replaced at no additional cost to the owner.

B. Product shall be manufactured in accordance to a documented Quality Control Program. At a minimum, the following procedures and documentation shall be provided upon request:
   1. Manufacturing Quality Control Program Manual
   2. First piece inspection of products produced to assure component materials and finished product tolerances are within manufacturer specifications.
   3. Additional inspections for product conformance shall be conducted during the run after the first piece inspection.
   4. Every roll shall be visually inspected.
   5. Additional inspections for product conformance shall be conducted during the run after the first piece inspection.
   6. At a minimum, every third roll shall be weighed to insure conformance of manufacturers specifications.
   7. Each individual erosion control blanket shall be inspected prior to packaging for conformance to manufacturing specifications.

3.06 Clean-up

A. At the completion of this scope of work, Contractor shall remove from the job site and properly dispose of all remaining debris, waste materials, excess materials, and equipment required of or created by Contractor. Disposal of waste materials shall be solely the responsibility of Contractor and shall be done in accordance with applicable waste disposal regulations.

3.07 Method of Measurement

A. The TRM shall be measured by the square yard of surface area covered. No measurement for payment shall be made for overlaps, fine grading, trenching, staples, or other miscellaneous materials necessary for placement of the erosion control TRM.

3.08 Basis of Payment

A. The accepted quantities of TRM shall be paid for at the contract unit price per square yard, complete in place.

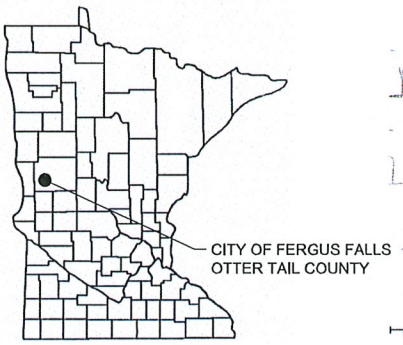
Payment shall be made under:

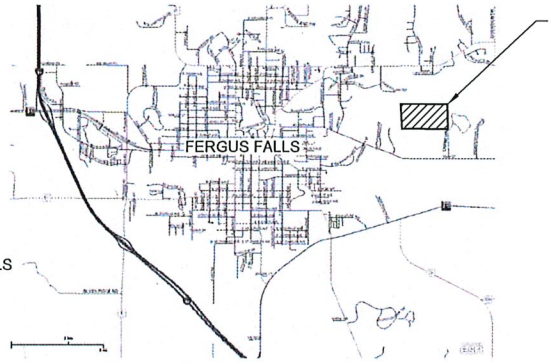
Pay Item	Pay Unit
Turf Reinforcement Mat	Square Yards

Appendix F – Record Drawings

2023 FINAL CLOSURE RECORD DRAWINGS

OTTER TAIL POWER COMPANY
HOOT LAKE ASH LANDFILL
MPCA PERMIT No. SW-211
FERGUS FALLS, MINNESOTA





SITE LOCATION MAP

SCALE IN MILES

SHEET NO.	TITLE
1	INDEX SHEET
2	EXISTING CONDITIONS & SITE PREPARATION PLAN
3	FINAL COVER SUBGRADE GRADING PLAN
4	FINAL COVER GRADING PLAN
5	RESTORATION PLAN
6	FINAL COVER SECTIONS AND DETAILS

CARLSON MCGAIN

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: Brennon L. Peterson
Signature:
Date: 11/15/2023 License #: 49512

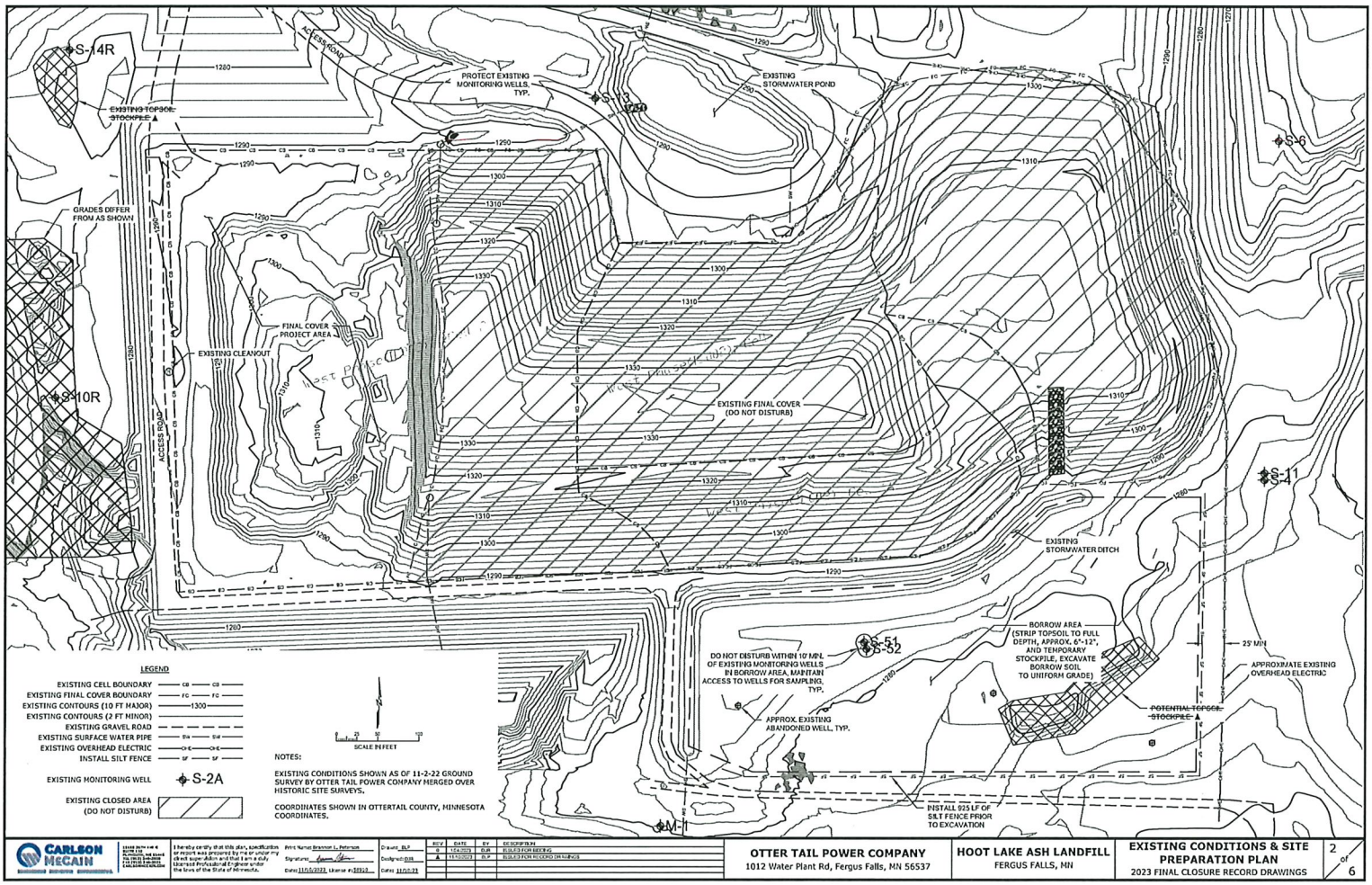
Drawn: BLP
Designed: BLP
Date: 11/15/23

REV	DATE	BY	DESCRIPTION
0	1/24/2023	BLP	ISSUED FOR BIDDING
A	11/15/2023	BLP	ISSUED FOR RECORD DRAWINGS

OTTER TAIL POWER COMPANY
1012 Water Plant Rd, Fergus Falls, MN 56537

HOOT LAKE ASH LANDFILL
FERGUS FALLS, MN

INDEX SHEET
2023 FINAL CLOSURE RECORD DRAWINGS



NOTES:

EXISTING CONDITIONS SHOWN AS OF 11-2-22 GROUND SURVEY BY OTTER TAIL POWER COMPANY MERGED OVER HISTORIC SITE SURVEYS.

COORDINATES SHOWN IN OTTERTAIL COUNTY, MINNESOTA COORDINATES.

CARLSON McCAIN

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: Brennon L. Peterson
Signature:
Date: 11/15/2023 License #: 58912

Drawn: BLP
Designed: BJR
Date: 11/15/23

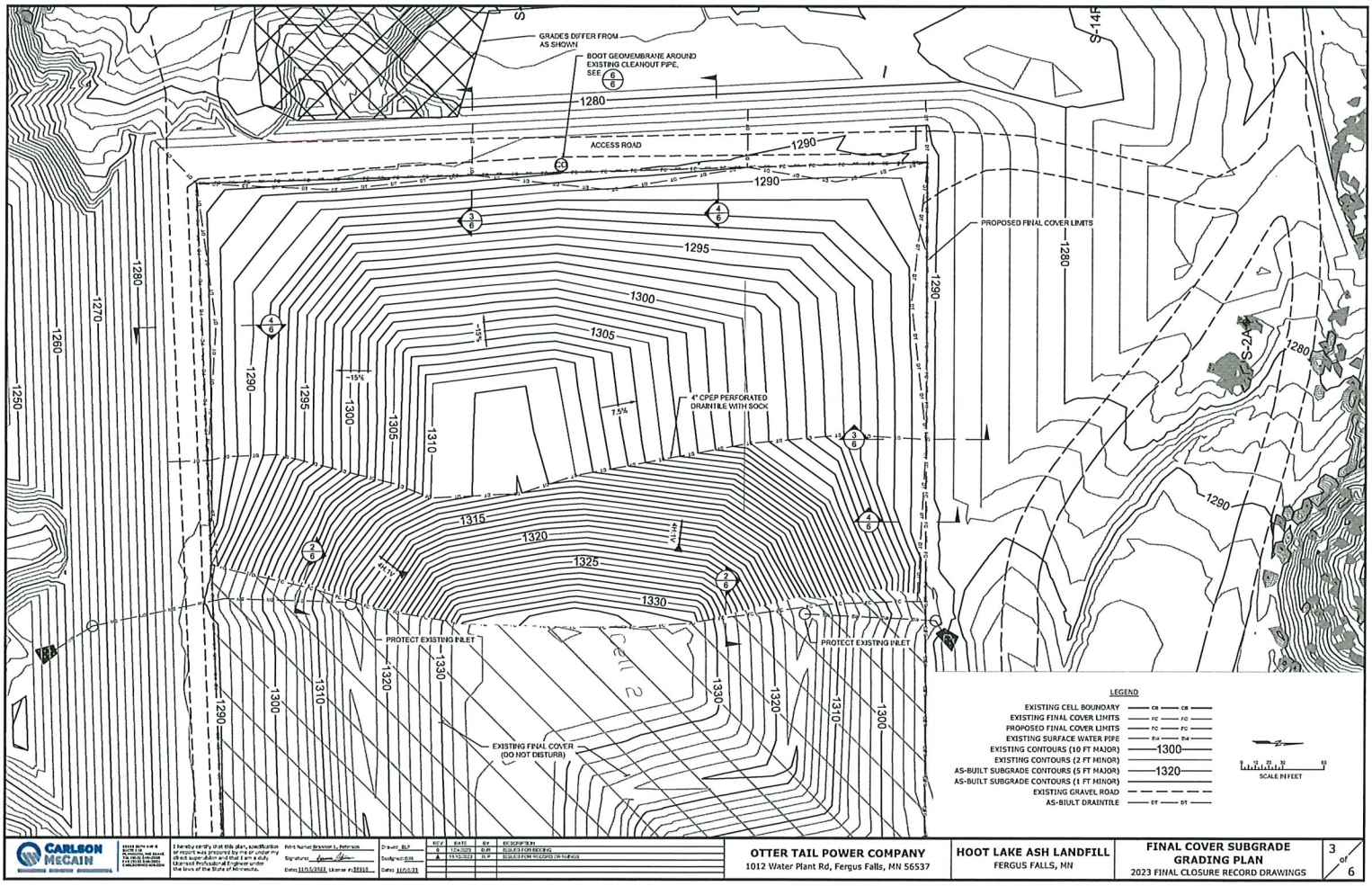
REV	DATE	BY	DESCRIPTION
B	12/4/2023	BJR	ISSUED FOR BIDDING
A	11/15/2023	BLP	ISSUED FOR RECORD DRAWINGS

OTTER TAIL POWER COMPANY
1012 Water Plant Rd, Fergus Falls, MN 56537

HOOT LAKE ASH LANDFILL
FERGUS FALLS, MN

EXISTING CONDITIONS & SITE PREPARATION PLAN
2023 FINAL CLOSURE RECORD DRAWINGS

2 of 6



CARLSON MCCAIN

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: Brennan L. Peterson
Signature:
Date: 11/15/2023 License #: 49918

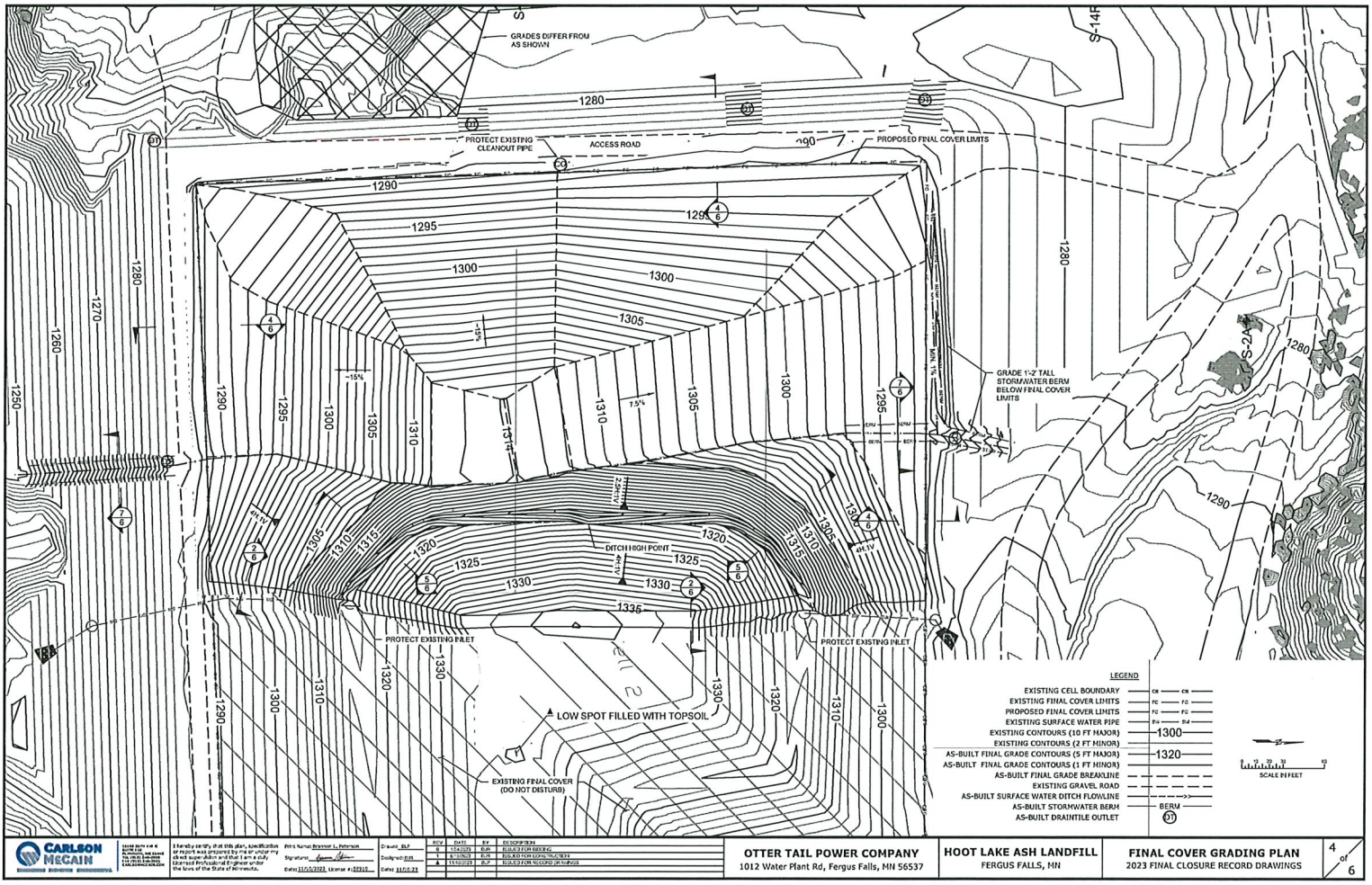
Drawn: BLP
Designed: BJR
Date: 11/15/23

REV	DATE	BY	DESCRIPTION
0	12/4/2023	BJR	ISSUED FOR BIDDING
A	11/15/2023	BLP	ISSUED FOR RECORD DRAWINGS

OTTER TAIL POWER COMPANY
1012 Water Plant Rd, Fergus Falls, MN 56537

HOOT LAKE ASH LANDFILL
FERGUS FALLS, MN

FINAL COVER SUBGRADE GRADING PLAN
2023 FINAL CLOSURE RECORD DRAWINGS



CARLSON MCGAIN

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: Brennan L. Peterson
Signature:
Date: 11/6/2023 License #: 58915

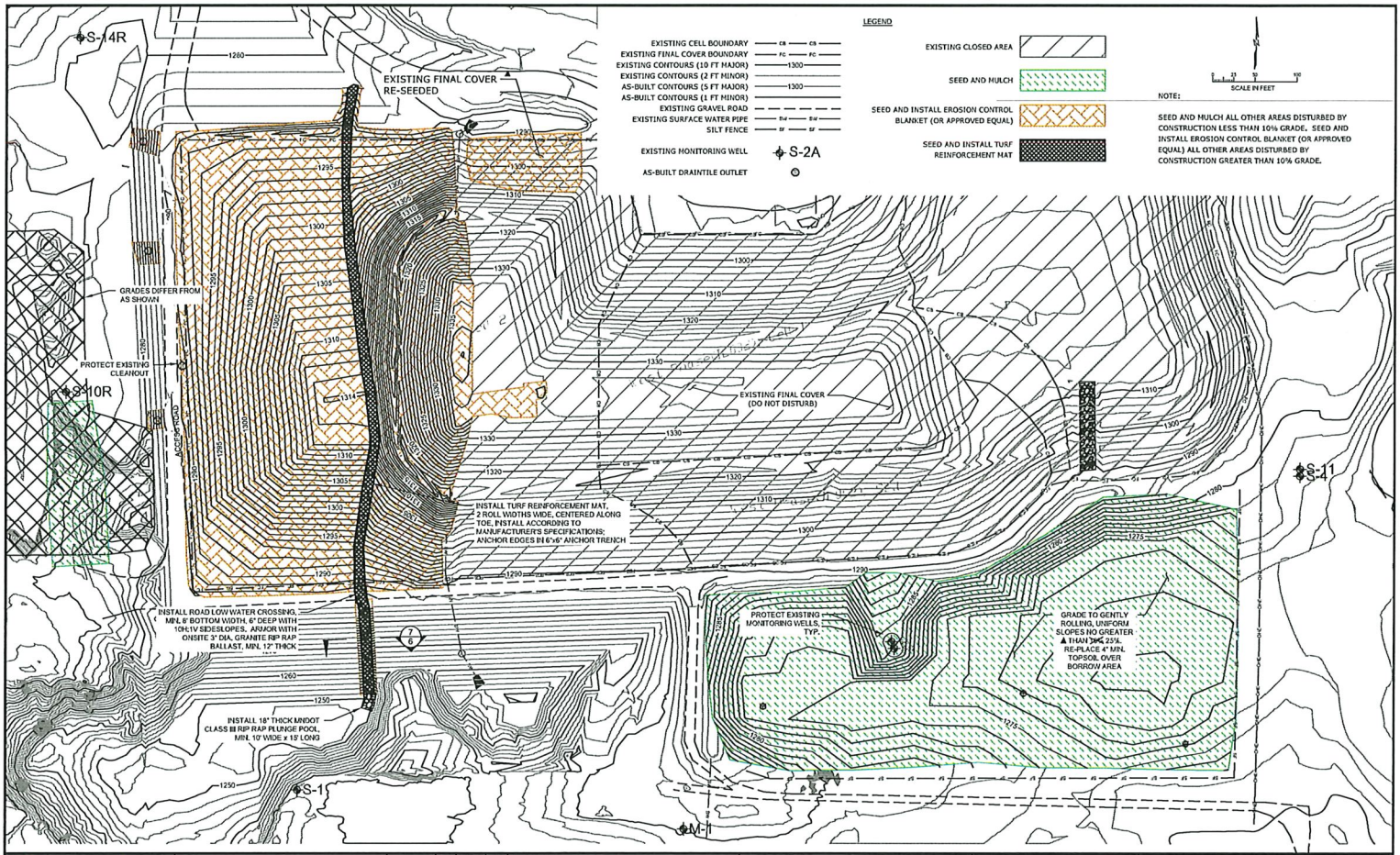
Drawn: ELF
Designed: BJR
Date: 11/6/23

REV	DATE	BY	DESCRIPTION
0	7/14/2023	BJR	ISSUED FOR BIDDING
1	8/1/2023	BJR	ISSUED FOR CONSTRUCTION
A	11/6/2023	BJP	ISSUED FOR RECORD DRAWINGS

OTTER TAIL POWER COMPANY
1012 Water Plant Rd, Fergus Falls, MN 56537

HOOT LAKE ASH LANDFILL
FERGUS FALLS, MN

FINAL COVER GRADING PLAN
2023 FINAL CLOSURE RECORD DRAWINGS



CARLSON MCGAIN

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: Brennan L. Peterson
Signature:
Date: 11/15/2021 License #: 49510

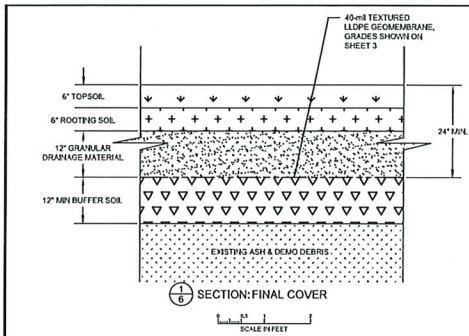
Drawn: ELP
Designed: BJR
Date: 11/15/21

REV	DATE	BY	DESCRIPTION
0	11/4/2021	BJR	ISSUED FOR BIDDING
A	11/15/2021	ELP	ISSUED FOR RECORD DRAWINGS

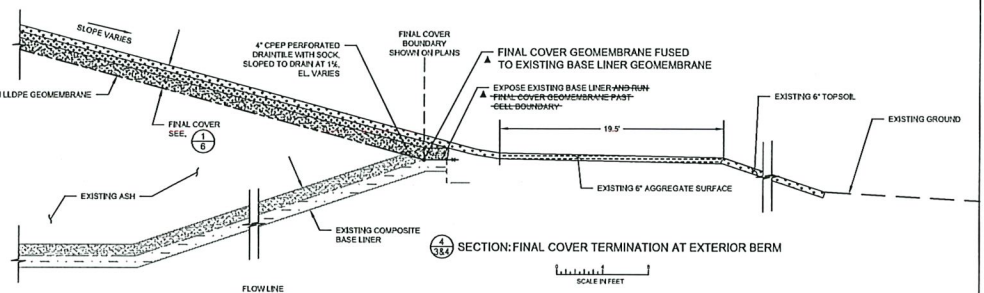
OTTER TAIL POWER COMPANY
1012 Water Plant Rd, Fergus Falls, MN 56537

HOOT LAKE ASH LANDFILL
FERGUS FALLS, MN

RESTORATION PLAN
2023 FINAL CLOSURE RECORD DRAWINGS

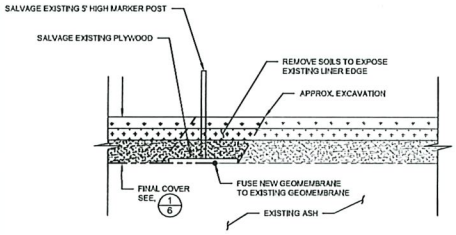


1/6 SECTION: FINAL COVER



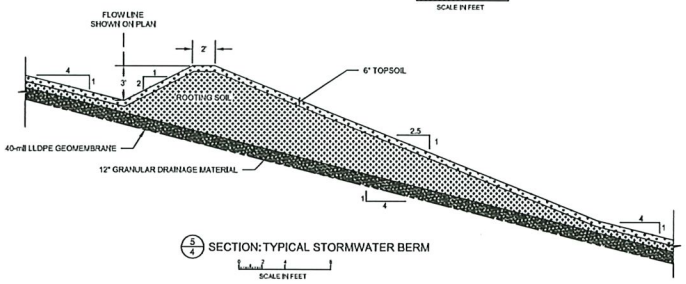
4/3&4 SECTION: FINAL COVER TERMINATION AT EXTERIOR BERM

SCALE IN FEET



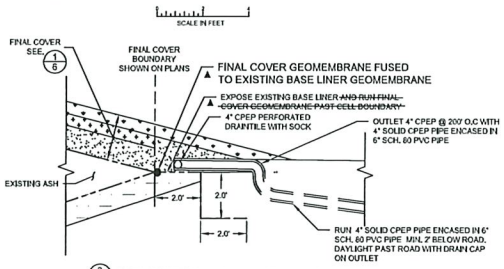
2/3&4 SECTION: CONNECTION TO EXISTING FINAL COVER

SCALE IN FEET



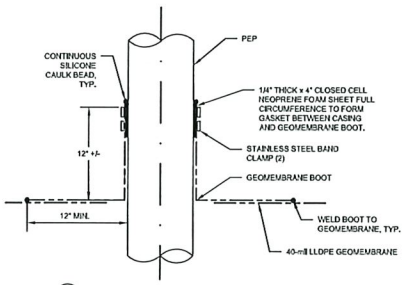
5/4 SECTION: TYPICAL STORMWATER BERM

SCALE IN FEET



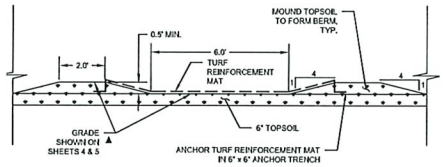
3/3 SECTION: FINAL COVER DRAINTILE OUTLET

SCALE IN FEET



6/3 SECTION: GEOMEMBRANE BOOT

NOT TO SCALE



7/4&5 SECTION: STORMWATER SWALE

NOT TO SCALE

CARLSON MCAIN

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: Brennon L. Peterson
Signature:
Date: 11/15/2023 License #: 58512

Drawn: BLP
Designed: BJR
Date: 11/15/23

REV	DATE	BY	DESCRIPTION
0	12/4/2023	BJR	ISSUED FOR BIDDING
A	11/15/2023	BLP	ISSUED FOR RECORD DRAWINGS

OTTER TAIL POWER COMPANY
1012 Water Plant Rd, Fergus Falls, MN 56537

HOOT LAKE ASH LANDFILL
FERGUS FALLS, MN

FINAL COVER SECTIONS AND DETAILS
2023 FINAL CLOSURE RECORD DRAWINGS

From: Miller, Joseph P (MPCA) <Joseph.P.Miller@state.mn.us>
Sent: Thursday, January 25, 2024 2:23 PM
To: Vukonich, Paul <pvukonich@otpco.com>
Cc: Hokenson, Alex (MPCA) <alex.hokenson@state.mn.us>; Salo, Aaron (MPCA) <Aaron.Salo@state.mn.us>
Subject: Otter Tail Power Co (SW-211) - Final Cover Construction Certification Report

Good afternoon Paul,

The Minnesota Pollution Control Agency (MPCA) has received the following documentation for final closure of Otter Tail Power Company Hoot Lake Ash Landfill (SW-211):

- Final Closure Construction Certification Report dated November 17, 2023 and submitted to the MPCA on November 20, 2023; and
- Recorded Deed Notation dated and submitted January 11, 2024.

The MPCA has reviewed the documentation for compliance with Minn. R. 7035.2610, Minn. R. 7035.2635, and other applicable rules and permit conditions. The MPCA finds that the closure documentation provided in the Final Closure Construction Certification is substantially complete and approves the construction for final closure.

Additionally, the MPCA recommends that the facility mark the edge of waste with signs or posts so that is it clear for any future use and maintenance work.

The Postclosure Care Period officially begins as of January 11, 2024, per this approval. The MPCA will draft the Closure Document and provide that to you for review when complete.

Thank you,

Joseph Miller
Minnesota Pollution Control Agency (MPCA)
Resource Management and Assistance Division
520 Lafayette Rd | Saint Paul, MN | 55155
Phone: (651) 757-2310 | Email: Joseph.P.Miller@state.mn.us
Find us on the web at: www.pca.state.mn.us

MINNESOTA POLLUTION CONTROL AGENCY

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