NM1-62

Engineering Certification

Cell 1A

February 2019

Engineering Certification Report

FOR LANDFILL CELL 1A CONSTRUCTION

Sundance West, Inc.
Lea County, New Mexico

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3/5/2019
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Submitted To:

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Prepared For:

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Prepared By:

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February 2019

Gordon/PSC Project #: 01053018

GORDON ENVIRONMENTAL PSC

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March 5, 2019

Mr. Jim Griswold
Environmental Bureau Chief
Oil Conservation Division
NM Energy, Minerals and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, NM 87505

Re: Sundance West, Inc. Engineering Certification Report: Landfill Cell 1A Construction [01053018]

Dear Mr. Griswold:

This submittal is provided as engineering certification for the construction of the Landfill Cell 1A at Sundance West, Inc. located in Lea County, New Mexico. Specifically, this Certification Report demonstrates that the double containment liner and leak detection system for Cell 1A have been installed in compliance with the following applicable documents and regulatory requirements:

- Approved Construction Quality Assurance (CQA) Plan February 2015.
- Construction Plans and Project Technical Specifications (September 2017) for Landfill Cell 1A Construction, Sundance West Inc.
- New Mexico Energy, Minerals and Natural Resources Department Regulations (19.15.36.1-19.15.36.20).
- Approved Permit and Permit Conditions.
- Geosynthetic Research Institute (GRI) and American Society of Testing Materials (ASTM) and Industry Standards.

Per Condition of the Permit, the Division was notified "at least 30 days prior to the start of construction of the landfill, evaporations ponds, stabilization and solidification area, or process area…" in advance of construction (**Appendix F**). The following Certification Report describes the activities and procedures performed during the construction of Cell 1A to document compliance with the approved Engineering Design Plans, Project Specifications, and the CQA Plan.

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We appreciate the opportunity of working with the OCD regarding the construction quality assurance for the construction of Cell 1A at Sundance West, Inc. Please contact us with your questions and comments regarding this Engineering Certification Report. (cking@team-psc.com; 505-867-6990)

Very truly yours,

Gordon Environmental/PSC

Carl R. King, P.E.
Senior Project Manager

Charles W. Fiedler, P.E.
Associate

cc: Mr. Jose M. Carrillo, General Manager Sundance West Inc. (Facility Operating Record)
Mr. Michael Ginsberg Esq., Trust Attorney, Sundance West Inc.
Project File, 01053018

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1.0 INTRODUCTION

This Engineering Certification Report describes the Construction Quality Assurance (CQA) activities and procedures applied during the construction of Landfill Cell 1A, henceforth known as *"Cell 1A"*, at Sundance West, Inc. (SWI) located in Lea County, New Mexico. The CQA activities performed document Cell 1A was constructed in accordance with the approved Construction Plans, Project Technical Specifications, 2015 CQA Plan, Geosynthetic Research Institute (GRI) and American Society of Testing Materials (ASTM) Industry Standards, and New Mexico Energy, Minerals and Natural Resources Department (EMNRD), Oil Conservation Division (OCD) regulatory standards.

1.1 EMNRD OCD Notification

The EMNRD OCD was notified prior to Cell 1A liner installation and responded with a Conformation of Compliance letter dated August 2, 2017 and is included in this report in **Appendix F.1**. Construction subsequently began on September 12, 2018. This Engineering Certification Report satisfies the requirements of the applicable Permit Conditions.

1.2 Project Description

The SWI Landfill is located directly west and contiguous with, Sundance Services Inc. (SSI), and approximately 1.5 miles east of the intersection of Wallach Ln. and NM highway 18 as shown on the Site Location Map (**Figure 1**). Mass excavation was performed by Enviroworks LLC with the excavation of soils, placement and compaction of perimeter berm soils, and subgrade fine grading and compaction, performed from September 12, 2018 through November 9, 2018. Geosynthetic Clay Liner (GCL), Secondary Flexible Membrane Liner (FML), Geonet, Leak Detection System, Primary FML, and Geosynthetic Cushion/Drainage Layer installation activities were performed by Southwest Liner Systems, Inc. from November 12, 2018 through December 4, 2018.

1.3 Project Overview

From September 12, 2018 through January 08, 2019, Landfill Cell 1A was constructed at Sundance West Inc., SWI, located in Lea County, New Mexico. Gordon/PSC developed Cell 1A, Project Technical Specifications and the CQA Plan (February 2015); and performed on-site CQA activities. The primary construction activities for Cell 1A are as listed in **Table 1**.

TABLE 1 - Primary Construction Activities

Activity Number	Construction Activity
1	Mass Excavation
2	Construction of perimeter berms
3	Fine Grading
4	Compaction of Subgrade
5	Installation of the Geosynthetic Clay Liner (GCL)
6	Installation of the Secondary Flexible Membrane Liner (FML)
7	Installation of Geonet and Leak Detection System
8	Installation of the Primary Flexible Membrane Liner (FML)
9	Installation of the Geocomposite Liner System
10	Installation of Protective Soil Later (PSL)
11	Construction of the landfill stormwater management system

During mass excavation; placement and compaction of structural fill soils for the perimeter berms; fine grading and compaction to the design base grades were completed by Enviroworks LLC. (**Figure 2**). Upon review and approval of the subgrade by the Gordon/PSC Site CQA Engineer, the Gordon/PSC Site CQA Engineer was on-site during geosynthetics installation to observe, inspect, and record geosynthetic leak detection, and leak detection system installation procedures. The purpose of the CQA work is to document that construction activities performed at SWI comply with the Cell 1A Construction Plans, Project Technical Specifications, 2015 CQA Plan, Geosynthetic Research Institute (GRI) and American Society of Testing Materials (ASTM) Industry Standards, and EMNRD OCD regulatory requirements. The SWI Cell 1A Construction Plans, Project Technical Specifications, 2015 CQA Plan, field observations, and tests were used to provide quantitative criteria with which to evaluate construction.

Gordon/PSC personnel were responsible for the full range of CQA activities as listed in **Table 2.**

TABLE 2 - Gordon/PSC CQA Activities

Activity Number	Gordon/PSC CQA Activity
1	Collect select on-site soils to perform laboratory moisture/density tests (i.e., standard Proctor: ASTM D698) and grain size analyses
2	Review surveying results to confirm that the subgrade met design elevations and slope
3	Provide field density testing of compacted berm soil fill and subgrade soils
4	Review manufacturer's quality assurance and manufacturer's quality control testing results for geosynthetics
5	Review conformance testing results for FML, GCL, Geonet, Nonwoven Geotextile, and Geocomposite
6	Inspect delivered FML, GCL, Geonet, Nonwoven Geotextile, Geocomposite, and leachate collection pipe
7	Observe GCL, secondary FML, Leak Detection System, primary FML, and Geocomposite installation procedures
8	Observe GCL secondary FML, Leak Detection System, primary FML, and Geocomposite material seaming and testing procedures
9	Observe placement of PSL and verify thickness
10	Review documentation, including laboratory and field test results
11	Complete and submit this Engineering Certification Report of completed construction to OCD

1.4 Report Organization

This Certification Report describes the CQA activities and procedures performed during the construction of Cell 1A at SWI. The attached figures, appendices, photographs and daily logs provide appropriate quantitative and qualitative documentation. Cross-reference to the Figures and Attachments are in **bold** type to facilitate the Division's review.

1.5 Qualifications

1.5.1 Mr. Charles W. Fiedler, P.E., Engineer-of-Record

Mr. Charles W. Fiedler, P.E. is the Engineer-of-Record for SWI. He has over 40 years of directly applicable experience in solid waste engineering. Mr. Fiedler is a registered professional engineer in New Mexico and Texas. Mr. Fiedler has supervised construction plans, bid documents, and CQA for over 1,800 acres of landfill development, including 30 Subtitle D landfill cells in New Mexico and Texas. Mr. Fiedler is a regular instructor for NMED and SWANA solid waste operator certification courses. The current resumé for Mr. Fiedler is included in the **Resumés** section (**Appendix G.1**).

1.5.2 Mr. Carl R. King, P.E., Senior Project Manager, Gordon/PSC, Site CQA Engineer

Mr. Carl R. King, P.E. is the Site CQA Engineer for SWI. He has over thirty years of experience developing and constructing lined landfill cells, geosynthetic impoundments, transfer and material recovery facilities and waste-to-energy facilities. Mr. King has served as a Site Construction Quality Assurance (CQA) Engineer for over 1,280 acres of Subtitle D municipal solid waste landfill cells and Subtitle C hazardous waste landfill cells in Arizona, New Mexico, Oklahoma and Texas. Components included construction plan development, project technical specification development, CQA Plan development and updating, soil liner installation, GCL installation, HDPE geomembrane installation, leachate collection system installation, protective soil layer evaluation and installation and construction management. Mr. King's site CQA Engineer duties included assessment and equivalency evaluation and calculations for liner and leak detection system components in compliance with the Construction Plans, CQA Plan and Project Technical Specifications. The current resumé for Mr. King is included in the **Resumés** section (**Appendix G.2**).

1.5.3 Mr. Braden Belliveau, EIT, Gordon/PSC, Site CQA Engineer/Manager

Mr. Braden Belliveau is the Site CQA Engineer/Manager for the SWI Cell 1A project. He serves as the Site CQA Engineer/Manager for Gordon/PSC, and is trained and certified on field instrumentation, industry standards, health and safety, etc. Mr. Belliveau is an EIT and has served as a Site CQA Engineer/Manager at various Subtitle D municipal solid waste landfills in New Mexico. Mr. Belliveau's primary duties are field CQA for cell subgrade soil testing and certification, observation and documentation for geosynthetics installation. The current resumé for Mr. Belliveau is included in the **Resumés** section (**Appendix G.3**).

1.5.4 Mr. Don Gray, Engineering Technician, Gordon/PSC, Project Technologist

Mr. Don Gray is the Site CQA Engineer/Manager for the SWI Cell 1A project. He serves as the Site CQA Engineer/Manager for Gordon/PSC, and is trained and certified on field instrumentation, industry standards, health and safety, etc. Mr. Gray is an Engineering Technician and has served as a Site CQA Engineer/Manager for over 120 acres of Subtitle D municipal solid waste landfills and impoundments in New Mexico. Mr. Gray's primary duties are field CQA for cell subgrade soil testing and certification, observation and documentation for geosynthetics installation, leachate collection system installation, and PSL testing and installation. The current resumé for Mr. Gray is included in the **Resumés** section (**Appendix G.4**).

2.0 LANDFILL CELL 1A CONSTRUCTION

2.1 Summary

The SWI Landfill Cell 1A is the second component of a new facility, and will eventually be complemented with process equipment, administrative offices, and additional evaporation ponds. The total double lined project area, Cell 1A, is approximately 7.5 acres in size as shown on the Sundance West Design Grades (**Figure 2**).

Mass excavation, berm construction, fine-grading, and PSL placement was conducted by Enviroworks LLC. (EW); and Southwest Liner Systems, Inc. (SLS) performed the installation of the GCL, Secondary FML, Leak Detection System, Primary FML, and a Geocomposite Cushion/Drainage. Conformance testing of geosynthetics was performed by Testing, Research, Consulting and Field Services (TRI) through documentation and quality assurance were performed by Gordon/PSC. **Tables 3** through **5** summarize these construction activities.

Enviroworks LLC. (EW) of Edgewood, New Mexico performed the construction activities listed **Table 3**.

TABLE 3 - Enviroworks LLC Construction Activities

Activity Number	Enviroworks Construction Activity
1	Mass excavation to overall design grades
2	Installation of perimeter berms
3	Fine grading of the cell floor, transition zone, and berms
4	Compaction of the landfill cell, surrounding areas, and berms
5	Installation of Leachate Collection System
6	Installation and verification of PSL placement
7	Construction of the site stormwater management system; and site protection berms

Southwest Liner Systems, Inc. (SLS) of Bernalillo, New Mexico performed the construction activities listed **Table 4**.

TABLE 4 - SLS Construction Activities

Activity Number	SLS Construction Activity
1	Installation of Geosynthetic Clay Liner (GCL)
2	Installation of 60-mil Secondary HDPE FML
3	Installation of the HDPE Geonet and Geocomposite material (Leak Detection Layer)
4	Installation of 60-mil Primary HDPE FML
5	Installation of the Geocomposite material (Geosynthetic Cushion/Drainage Layer)
6	Installation of 40-mil smooth HDPE FML stormwater flap

Surveying services for the Contractor, as defined in the Contract Documents, were provided by Southwest Survey Solutions (S_3). S_3 is a licensed land surveyor in the State of New Mexico, and survey support activities are listed in **Table 5**.

TABLE 5 - Surveying Support Activities

Licensed Land Surveyor	Support Activity
Southwest Survey Solutions	Record Surveying Services to Enviroworks including: • Final grades of the Landfill Cell 1A • Top of all berms surrounding the project • Edge of liner system • Thickness conformation of PSL (Protective Soil Layer)

2.2 Subgrade Preparation

The following sections describe the activities performed during mass excavation, compacted berm soil fill placement, subgrade preparation, and CQA soil testing.

2.2.1 Clearing, Grubbing and Mass Excavation

EW performed the clearing and grubbing, mass excavation, subgrade fine grading and compaction in addition to placing and compacting perimeter berm soils using select materials from excavation activities. Perimeter berms located on all four sides of the Landfill Cell was constructed to the design grades shown on the Construction Plans. Once design grades were attained and density testing was complete, EW's surveyor, S_3 performed record certification surveys to document that the subgrade, berm elevations and slopes met the design requirements shown on the Construction Plans; and as set forth in the Project Technical Specifications and 2015 CQA Plan.

2.2.2 Coordinate System

The project area was surveyed in a grid pattern so that the locations of sample and testing points used during construction were readily discernible by the CQA Site CQA Engineer/Manager. The survey grid, shown on **Figure 3**, was established by EW's Surveyor, S_3, for use during construction and testing.

2.2.3 Subgrade and Berm Compaction

During excavation, perimeter berms were constructed surrounding Cell 1A, and the future Cell 1B, using excavated soils. Soils were placed in maximum one-foot thick lifts and compacted to 90% of Standard Proctor Dry Density as verified by field density tests. After berm construction, mass excavation, and fine grading to the elevations shown on **Figure 2** was completed, the floor soils

were compacted using a vibratory roller. The in-place density was measured at a minimum frequency of 4 tests per acre, using a InstroTek 3500Explorer®, requiring 30 tests for the 7.5-acre± footprint and approximately 240 tests for berm construction. A total of 34 density tests in the double lined area (**Figure 4**) and 367 density tests for the berm construction was performed. All results passed the required specification of 90%, or higher, of the Reference Standard Proctor. Berm density testing results are the compilation of the berms surrounding Cell 1A and Cell 1B as they were constructed concurrently. Berm density testing locations are omitted from the figures but are included in **Appendix A.2** and **A.3**. The results for the Standard Proctor laboratory tests used as references are provided in **Appendix A.1,** and field compaction testing results are tabulated in **Appendix A.2** and **A.3.** A maximum density of 113.5 lb/ft^3 was used as the Reference Maximum Density for Cell 1A and berms depending on soils encountered during construction activities. The type of soil encountered and stockpiled produced a composite soil that was placed for initial berm construction. As the project continued, berms were constructed either from the stockpile composite or direct placement from subgrade excavation. The maximum density references are labeled in **Appendix A.2.**

2.2.4 Subgrade Acceptance

Upon completion of subgrade construction, Cell 1A was surveyed by S_3. The topography of the subgrade was then verified and accepted by the Gordon/PSC CQA Engineer/Manager prior to geosynthetic liner deployment. **Figure 2** shows the design grades, and **Figure 3** provides the as-built grades for the finished subgrade surface.

The Gordon/PSC Site CQA Engineer/Manager and SLS Field Installation Superintendent (FIS) conducted daily inspections of the subgrade surface prior to liner installation activities for the anticipated liner deployment area. The subgrade surface was found to be in good condition and free from sticks, sharp stones, vegetation and other deleterious material after each daily inspection. The Gordon/PSC CQA Engineer/Manager and the FIS continued to inspect the subgrade surface during liner installation in areas immediately ahead of deployment to identify and remove any large or angular particles, sharp objects, etc. EW provided continual moisture conditioning and rolling of the subgrade ahead of the liner installation as requested by SLS's FIS and the Gordon/PSC Site CQA Engineer/Manager. The results of the inspection and the FIS's acceptance of the subgrade are provided in the Daily Summary Reports, which are included in the **Field Logs** and **Photographs** section.

2.3 Geosynthetic Clay Liner

In accordance with the Construction Plans, Project Technical Specifications and 2015 CQA Plan, the Geosynthetic Clay Liner (GCL) was placed in direct contact with the prepared subgrade. The following sections describe the procedures and activities performed during the GCL installation, observation, and CQA testing to confirm compliance with the Project Specifications.

2.3.1 Geosynthetic Clay Liner Product

Approximately 335,513 ft^2 of Bentoliner NSL, the reinforced GCL material manufactured by GSE Environmental, Houston, Texas, was used in the construction of Cell 1A. Per Project Technical Specifications, granular bentonite was required to be placed between horizontal and longitudinal seams of deployed GCL panels. Copies of the manufacturer's quality assurance (MQA) and manufacturer's quality control (MQC) test results and certifications are included in **Appendix B.1** for the delivered GSE Environmental Bentoliner NSL GCL.

2.3.2 Geosynthetic Clay Liner Installation

The guidelines specified in the Project Technical Specifications, 2015 updated CQA Plan, Construction Plans; and industry standards for GCL installation procedures were strictly followed during lining of Cell 1A. Each roll of GCL was carefully transported from the Contractor's Staging Area to Cell 1A using a rubber-tracked forklift; as verified by the Gordon/PSC Site CQA Engineer/Manager. As each roll was moved, the manufacturer's identification label was removed and submitted to the Gordon/PSC Site CQA Engineer/Manager for documentation in the *GCL Deployment Log* (**Appendix C.7**) and the GCL Layout Drawing (**Figure 5**). These labels were compared with the shipping invoice to verify that the GCL delivered to SWI corresponded with GCL subjected to MQC and MQA (manufacturer) testing (see Section 2.3.3). Each GCL roll was placed in direct contact with the prepared subgrade with the nonwoven geotextile facing upward. GCL was not placed in standing water or deployed during rainfall.

After each roll had been deployed, adjoining rolls were positioned maintaining the minimum overlap used for the on-site GCL of nine (9) inches on the longitudinal seams and twelve (12) inches on the end seams as specified in the Project Technical Specifications and 2015 CQA Plan. Free bentonite was applied on each longitudinal and perpendicular seam at a minimum of 0.25 lbs per linear foot of seam. Material placement was observed by the Gordon/PSC Site CQA Engineer/Manager and FIS for potential damage due to handling or installation. No damages were observed by the Gordon/PSC Site CAQ Engineer/Manager or the installers FIS.

2.3.3 Geosynthetic Clay Liner Testing

GCL testing included manufacturing quality control (MQC), manufacturing quality assurance (MQA), third-party conformance testing, construction quality control (CQC) and construction quality assurance (CQA). Each type of testing is described in the following sections.

2.3.3.1 Geosynthetic Clay Liner Manufacturing Quality Control (MQC) and Manufacturing Quality Assurance (MQA)

MQC and MQA testing of the bentonite and geotextile components, as well as the finished GCL, were performed by the manufacturer prior to shipment of the GCL to SWI. Random samples of the finished GCL were collected from each day's production and tested for the properties listed in **Table 6.**

TABLE 6 - GSE Environmental Bentoliner NSL GCL - MQC/MQA Testing

Bentoliner NSL GCL Property	**ASTM Method**
Free swell	ASTM D5890
Fluid loss	ASTM D5891
Mass per unit area	ASTM D5993
Grab strength	ASTM D6768 and ASTM D4632, Modified
Peel strength	ASTM D6496 and ASTM D4632, Modified
Moisture content	ASTM D2216
Nonwoven and Woven Geotextile Encapsulating Bentonite	**ASTM Method**
Grab strength	ASTM D4632
Mass per unit area	ASTM D5261

The GCL quality control certification and GCL property values and testing frequencies for the on-site material delivered to SWI are provided in **Appendix B.1**.

2.3.3.2 Conformance Testing

Conformance sampling for GCL material was performed by TRI/Environmental, Inc. (TRI), Austin, Texas at the manufacturer's facility prior to shipment of the GCL to SWI. TRI collected samples approximately two feet long from the entire roll width and performed conformance testing at the TRI laboratory in Austin, Texas. Conformance samples were collected at a frequency of at least one (1) per 100,000 ft^2 of GCL installed to verify that the GCL delivered to SWI met the minimum properties listed in the Project Technical Specifications and 2015 CQA Plan. Approximately

335,513 ft^2 of GCL material was deployed within the Landfill Cell 1A, requiring a minimum of four (4) samples. Four (4) samples were tested by TRI for the properties listed in **Table 7**; as specified in the Project Technical Specifications and 2015 CQA Plan.

TABLE 7 - GSE Environmental Bentoliner NSL GCL – Conformance Testing

Bentoliner NSL GCL Property	ASTM Method
Mass per unit area	ASTM D5993
Bentonite – Fluid Loss	ASTM D5891
Bentonite – Swell Index	ASTM D5890

Conformance test results were reviewed by the Gordon/PSC CQA Engineer and accepted in accordance with Project Technical Specifications and 2015 CQA Plan. The conformance test results indicate that the GCL meets the minimum property requirements specified in the Project Technical Specifications and 2015 CQA Plan. The conformance test results for the four (4) samples are included in **Appendix B.2.**

2.3.3.3 Construction Quality Control (CQC) for Geosynthetic Clay Liner

The CQC procedures specified in the Project Technical Specifications and 2015 CQA Plan were strictly followed in order to provide a method to measure and regulate the quality of GCL installation. The Gordon/PSC Site CQA Engineer/Manager and FIS observed and documented GCL panel placement activities to verify that the deployment and seaming procedures were performed in accordance with the Project Technical Specifications and 2015 CQA Plan, including subgrade inspection, seam overlap, application of free bentonite, and precautions against potential GCL damage.

2.3.3.4 Construction Quality Assurance (CQA) for Geosynthetic Clay Liner

The Gordon/PSC Site CQA Engineer/Manager and the FIS inspected each roll of GCL transported to Cell 1A from the staging area. The GCL was inspected for potential damage and uniformity. The roll identification labels were compared with the shipping invoice to verify that the GCL delivered to SWI corresponded with GCL subjected to manufacturers' quality control and quality assurance testing (see Sections 2.3.3.1.).

The Gordon/PSC Site CQA Engineer/Manager and the FIS visually inspected GCL rolls for potential damage during deployment. Any damaged portions of the GCL deployed were repaired by covering the defect with a GCL patch that provided a minimum twelve (12)-inch overlap on all sides of the

defect with bentonite powder applied to the edges of the patch as specified in the Project Technical Specifications and 2015 CQA Plan.

2.3.4 Geosynthetic Clay Liner Deployment Records

Documentation of the GCL deployment and inspection of each panel for damage was required prior to approval and acceptance. The GCL installation was not accepted until the deployment records (**Appendix C.7**), manufacturer's certification reports (**Appendix B.1**) and conformance test results (**Appendix B.2**) were submitted to and approved by the Gordon/PSC Site CQA Engineer. The Cell 1A GCL Layout is shown on **Figure 5**. The Daily Summary Reports and documentation of GCL panel placement was recorded throughout each construction day. Copies of the Daily Summary Reports, the day's GCL panel deployment approval, and photographs documenting GCL panel placement activities are provided in the **Field Logs** and **Photographs** section of this Report.

2.4 60-mil Secondary Flexible Membrane Liner

The Secondary FML was installed in direct contact above the GCL in accordance with the engineering design drawings, project specifications, and the 2015 CQA plan. The following sections describe the procedures and activities performed during FML installation, observation, and CQA testing.

2.4.1 Flexible Membrane Liner Product

The FML utilized in Cell 1A construction was 60-mil, high-density polyethylene (HDPE), manufactured by GSE Environmental of Houston, Texas. Textured FML was designated for the berms/sideslopes and smooth FML was designated for the cell floor lining of Cell 1A and was delivered to SWI in rolls twenty-two and a half (22.5) feet wide by five hundred and sixty (560) feet long and five hundred twenty (520) feet long for smooth and textured liner, respectively. The FML was stored in the Contractor's Staging Area and in accordance with the Project Technical Specifications and the 2015 CQA Plan. The stored FML was not stacked more than two (2) rolls high. The Gordon/PSC Site CQA Engineer/Manager compared roll identification labels with shipping invoices to verify that the FML delivered to SWI corresponded with FML subjected to manufacturer's quality control and quality assurance testing (Section 2.4.3).

2.4.2 Flexible Membrane Liner Installation

The FML installation activities were performed in accordance with the guidelines specified in the Construction Plans, Project Technical Specifications and 2015 CQA Plan; and industry standards for FML handling, placement, and testing. Each roll of FML was carefully moved from the

Contractor's Staging Area southwest of Cell 1A using a rubber-tired forklift, and FML was not placed in standing water or deployed during rainfall. Upon deployment, each roll identification label was removed and submitted to the Gordon/PSC Site CQA Engineer/Manager and then compared with the shipping invoices to verify that the FML delivered to SWI corresponds with FML subjected to manufacturers' quality control and quality assurance testing. FML being deployed was documented in the *Secondary FML Deployment Log* (**Appendix C.8**) and the Secondary 60-Mil Liner Panel Layout drawing (**Figure 6**).

After each FML panel had been deployed, adjoining panels were positioned with a four (4) to six (6) -inch longitudinal overlap required for hot-wedge fusion welding. The overlap distance is required for proper seaming, and to allow peel and shear tests to be performed on the seams. Seams were oriented at approximately forty-five (45) degrees to the line of prevailing base grade slope on the Cell 1A floor, and parallel to the Cell 1A sideslopes, per the Project Technical Specifications and 2015 CQA Plan (see Secondary 60-Mil Liner Panel Layout, **Figure 6**).

2.4.3 Flexible Membrane Liner Testing

FML testing included manufacturer's quality control (MQC) and manufacturer's quality assurance (MQA), conformance testing, construction quality control (CQC), CQA, and seam testing. Each type of testing methodology is discussed in the following sections.

2.4.3.1 Manufacturer's Quality Control (MQC)

Fromosa Plastics Corporation, Texas performed resin testing on the raw materials used in the manufacturing of the FML. These test results and written certifications verified that the FML delivered to SWI has been extruded from an acceptable resin meeting the properties specified in GRI-GM 13, *"Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes"*, are included in **Appendix B.3**.

2.4.3.2 Manufacturer's Quality Assurance (MQA)

As a part of the MQA testing, specific performance and characterization properties were evaluated on random samples collected from the manufactured FML rolls prior to their delivery to SWI as listed in **Table 8.**

TABLE 8 - GSE Environmental HDPE FML - MQA Testing

60-mil HDPE Smooth/Textured HDPE FML Property	ASTM Method
Thickness	ASTM D5994
Asperity Height (Textured)	ASTM D7466
Density	ASTM D1505
Mass per unit area	ASTM D5993
Melt Flow Index	ASTM D1238, Condition E
Tensile Properties	ASTM D6693 and ASTM D 6693, Modified
Tear Resistance	ASTM D1004, Modified
Puncture Resistance	ASTM D4833, Modified
Carbon Black Content	ASTM D4218
Carbon Black Dispersion	ASTM D5596
Environmental Stress Crack Resistance using Notched Constant Tensile Load	ASTM D5397

MQA test results are included in **Appendix B.3**. These results were reviewed by the Gordon/PSC Site CQA Engineer and confirmed against the Project Technical Specifications and 2015 CQA Plan requirements. MQA testing results met the requirements set forth in the Project Technical Specifications and 2015 CQA Plan.

2.4.3.3 Conformance Testing

Conformance sampling for FML material was performed by TRI, Austin, Texas at the manufacturer's facility prior to shipment of the FML to SWI. TRI collected samples approximately two feet long from the entire roll width and performed conformance testing at the TRI laboratory in Austin, Texas. Conformance samples were collected at a frequency of at least one (1) per 100,000 ft^2 of FML installed to verify that the FML delivered to SWI met the minimum properties listed in the Project Technical Specifications and 2015 CQA Plan. Approximately 343,170 ft^2 of HDPE Secondary FML was installed in the Landfill; requiring a minimum of four (4) conformance samples. A total of nine (9) samples of HDPE FML were tested by TRI for conformance.

TRI tested the nine (9) FML samples for the properties listed in **Table 9**; as specified in the Project Technical Specifications and 2015 CQA Plan.

TABLE 9 - GSE Environmental HDPE FML – Conformance Testing

60-mil HDPE (Smooth/Textured) FML Property	ASTM Method
Thickness	ASTM D5994
Density	ASTM D1505
Mass per unit area	ASTM D5993
Tensile Properties	ASTM D6693 and ASTM D 6693, Modified
Tear Resistance	ASTM D1004, Modified
Puncture Resistance	ASTM D4833, Modified
Carbon Black Content	ASTM D4218
Carbon Black Dispersion	ASTM D5596

The conformance test results were reviewed by the Gordon/PSC Site CQA Engineer and accepted in accordance with Project Technical Specifications and 2015 CQA Plan. The conformance test results indicated that the FML met the minimum property requirements specified in the Project Technical Specifications and 2015 CQA Plan. The conformance testing results for the nine (9) samples are included in **Appendix B.4**.

2.4.3.4 Construction Quality Control (CQC)

The quality control procedures specified in the Project Technical Specifications, 2015 CQA Plan; and industry standards were strictly followed in order to provide a method to measure and regulate the quality of Secondary FML installation. These procedures included such activities as start-up trial welds, destructive and non-destructive seam testing, and verification that the deployment and seaming procedures were performed in accordance with the Project Technical Specifications, 2015 CQA Plan and industry standards.

Trial welds were performed at the start and midpoint of each workday; after each break in seaming of one hour or more; and after any equipment shutdown. The trial welds were a minimum of ten (10) feet in length for fusion welders; and a minimum of three (3) feet in length for extrusion fillet welders. One-inch-wide cutouts of the trial welds were field-tested for shear and peel strength using an on-site tensiometer (SLS's tensiometer calibration certificate is provided in **Appendix C.21**) and testing was performed in the presence of the Gordon/PSC Site CQA Engineer/Manager. If the results of the trial weld testing did not comply with the Project Technical Specifications and 2015 CQA Plan, the welder was not permitted to continue seaming until the deficiencies were corrected

and an additional trial weld was performed which passed the field-testing requirements. Trial weld documentation is included in **Appendix C.9**.

The seam testing protocol for the Cell 1A deployed FML included peel and shear testing on mathematically random samples cut from the installed FML (destructive samples) and non-destructive testing (air pressure and/or vacuum box testing) on field seams. The seam-testing program is detailed in Section 2.4.3.5 of this report.

The Gordon/PSC Site CQA Engineer/Manager and FIS observed FML placement activities to verify that the deployment and seaming procedures were performed in accordance with the Project Technical Specifications and 2015 CQA Plan; which included the underlying GCL inspection and approval, seam cleaning, and precautions against potential FML damage during deployment and seaming.

2.4.3.5 Construction Quality Assurance (CQA)

The Gordon/PSC Site CQA Engineer/Manager and FIS visually inspected FML material for manufacturing and installation defects as the FML was deployed. No manufacturing flaws were observed in the deployed FML. The Gordon/PSC Site CQA Engineer/Manager inspected seamed and non-seamed areas of the FML for wrinkles, defects, holes, blisters, etc. After each panel was deployed, the Gordon/PSC Site CQA Engineer/Manager and FIS walked the length of each panel and identified any suspect areas (e.g., defects or blemishes) by marking these areas for repair with a highly visible paint marker.

2.4.3.6 Seam Testing

In accordance with the Project Technical Specifications and 2015 CQA Plan, the field seam verification program consisted of both destructive and non-destructive testing. Sampling and field-testing was performed by the FML installer (SLS) in the presence of the Gordon/PSC Site CQA Engineer/Manager. In addition to field-testing, destructive samples were sent to an independent quality assurance laboratory (TRI/Environmental, Inc., Austin, Texas) for peel and shear strength testing.

A. <u>Destructive Seam Testing</u>

In accordance with the Project Technical Specifications and 2015 CQA Plan, a minimum of one (1) destructive test for every five hundred (500) linear feet of welded seam (an average taken throughout the entire project) was performed on the FML. There were approximately 15,500 lineal

feet of welded seam during installation of the secondary liner, requiring a minimum of thirty-one (31) destructive tests (SDT prefix tests). Thirty-one (31) destructive test samples were collected and evaluated in accordance with the Project Technical Specifications and 2015 CQA Plan.

Each destructive test sample was divided into three segments. The first segment was tested in the field for peel and shear strength by the installer using an on-site tensiometer. The second segment was shipped to an independent quality assurance laboratory (TRI/Environmental, Inc., Austin, Texas) for laboratory testing. The third sample segment was retained by the Gordon/PSC Site CQA Engineer/Manager and delivered to SWI to be archived in the Facility Operating Record. Results of the field destructive tests are provided in **Appendix C.13**; and the independent quality assurance laboratory test results (TRI/Environmental, Inc.) are included in **Appendix D.1**. The field destructive test results, and the independent quality assurance laboratory test results were reviewed by the Gordon/PSC Site CQA Engineer/Manager for conformance with the Project Technical Specifications and 2015 CQA Plan. All peel and shear test results met the requirements of the Project Technical Specifications and 2015 CQA Plan.

B. Non-Destructive Seam Testing

Air pressure testing was performed on double-wedge fusion welded seams except where a channel blockage occurred. Where channel blockages occurred, the seam was air tested on either side of the area was extrusion-welded and vacuum box tested. An additional patch was extrusion welded over the repaired area and vacuum box tested. Vacuum box testing was performed on all extrusion-welded portions of seams and patches. Test results are documented on the *Secondary FML Seam Pressure Test Log* (**Appendix C.11**) and the *Secondary FML Seam Vacuum Test and Defect-Repair Log* (**Appendix C.12**). Seams and repairs were required to pass the non-destructive testing specifications outlined in the Project Technical Specifications and 2015 CQA Plan before being accepted by the Gordon/PSC Site CQA Engineer/Manager.

2.4.4 FML Deployment Records

Documentation for Secondary FML deployment and testing for each panel deployed was required prior to FML approval and acceptance. CQA documentation for the FML deployed in Cell 1A is listed in **Table 10**.

TABLE 10 - HDPE FML Deployment CQA Documentation

HDPE FML Deployment CQA Documentation	Certification Report Appendix Location
Secondary FML Deployment Log	Appendix C.8
Secondary and Primary FML Pre-Weld Qualification Test Record	Appendix C.9
Secondary FML Seaming Log	Appendix C.10
Secondary FML Seam Pressure Test Log	Appendix C.11
Secondary FML Seam Vacuum Test and Defect-Repair Log	Appendix C.12
FML Seam Field Destructive Test Log	Appendix C.13
Demtech Tensiometer Calibration Certification	Appendix C.21

The FML installation was accepted after the data listed in **Table 10** was submitted to, reviewed by, and approved by the Gordon/PSC Site CQA Engineer. The Cell 1A As-built Secondary FML Panel Layout is included as **Figure 6**. Daily Summary Reports were completed after each construction day, and photo documentation recorded the FML placement activity on the Landfill floor and sideslopes. The Daily Summary Reports and forms indicating approval of the previous day's FML installation and project photographs are provided in the **Field Logs** and **Photographs** Section.

2.5 Leak-Detection Zone

Leak-detection zone material was installed directly above the Secondary FML in accordance with the engineering design drawings, project specifications, and 2015 CQA plan. This zone consists of a double sided Geocomposite for the sideslopes and a Geonet for the floor. The following sections describe the procedures and activities performed during the drainage layer installation, observation, and CQA testing.

2.5.1 Leak-Detection Zone Product

The Geocomposite utilized in Cell 1A construction is a 200-mil, high-density polyethylene (HDPE) encapsulated by Nonwoven Geotextile, manufactured by GE Environmental of Kingstree, South Carolina. The Geonet utilized in Cell 1A construction is 200-mil, high-density polyethylene (HDPE), manufactured by GSE Environmental of Kingstree, South Carolina. The leak-detection zone is specified to encompass the entire double lined system and were delivered on-site in rolls 14.5 feet wide by 300 feet long for the Geocomposite and 14.5 feet wide by 330 feet long for the Geonet. Rolls were staged along the western perimeter of Cell 1A to provide easy access, and to minimize handling of the material. In accordance with the CQA Plan and project specifications, material was not stacked more than two rolls high. The labels were compared with the shipping invoice to verify that the materials received corresponded with materials subjected to manufactures quality

control/manufactures quality assurance testing (see Section 2.6.3). The material was also inspected for damage during off-loading and staging.

2.5.2 Leak-Detection Zone Material Installation

The leak detection zone material installation activities were performed in accordance with the guidelines stipulated in the 2015 CQA Plan, project specifications, the engineering design drawings, and industry standards for handling, and placement. Each roll was carefully moved from the staging area to Cell 1A using a rubber-tired extendable forklift. The forklift was not permitted on the Secondary FML, and the material was placed by hand. Upon deployment, each roll label was removed and submitted to the Gordon/PSC Site CQA Engineer/Manager, and panel location documented (see **Figure 7**).

After each panel had been placed, adjoining panels were positioned with a 4 to 6-inch overlap. The overlap distance is required for proper attachment using zip ties placed at 5 feet and 6 inches, longitudinally and end-to-end seams respectively. The Geotextile encapsulating the Geonet core of the Geocomposite were then fused together from panel to panel using industry standard heat tacking methods. Seams were oriented at approximately 45 degrees to the line of prevailing base grade slope, and perpendicular to the sideslopes.

2.5.3 Leak-Detection Zone Testing

Material testing included manufacturer's quality control (MQC) and quality assurance (MQA), conformance testing, construction quality control (CQC), CQA, and seam testing. Each type of testing is discussed in the following sections.

2.5.3.1 Manufacturer's Quality Control (MQC)

Equistar Chemicals, LP, Houston, Texas, performed resin testing on the raw materials used in the manufacturing of the Geocomposite and Geonet. These test results and written certifications that the product delivered has been extruded from an acceptable resin are included in **Appendix B.5** and **B.9**.

2.5.3.2 Manufacturer's Quality Assurance (MQA)

As required by the Project Technical Specifications and 2015 CQA Plan, the manufacturer (GSE) performed the Geocomposite and Geonet property testing listed in **Table 11** prior to delivery of the materials to the site.

TABLE 11 – GSE Environmental Geocomposite and Geonet – MQC Testing

Geocomposite	Geonet	Test Property	ASTM Method
✓	✓	Thickness	ASTM D5199
✓	✓	Density	ASTM D1505
	✓	Melt Index	ASTM D1238
✓	✓	Carbon Black Content	ASTM D4218
✓	✓	Tensile Strength	ASTM D7179
✓		Peel Strength	ASTM D7005
✓	✓	Mass Per Unit Area	ASTM D5261
✓	✓	Transmissivity (loaded)	ASTM D4716

The Geocomposite and Geonet quality control certifications, property values and testing frequencies for the on-site material delivered to SWI are provided in **Appendix B.5** and **B.9**.

2.5.3.3 Conformance Testing

Conformance sampling for the Geocomposite and Geonet material was performed by TRI, Austin, Texas at the manufacturer's facility prior to shipment of the geonet to SWI. TRI collected a sample approximately two feet long from the entire roll width and performed conformance testing at the TRI laboratory in Austin, Texas. Conformance samples were collected at a frequency of at least one (1) per 100,000 ft^2 of geonet installed to verify that the Geocomposite and Geonet delivered to the SWI met the minimum properties listed in the Project Technical Specifications and 2015 CQA Plan. Approximately 87,015 ft^2 of geocomposite and approximately 246,960 ft^2 of Geonet material was installed in Cell 1A requiring a minimum of one (1) Geocomposite and three (3) Geonet samples. TRI tested two (2) Geocomposite and four (4) Geonet conformances samples for the properties listed in **Table 12**; as specified in the Project Technical Specifications and 2015 CQA Plan.

Table 12 – GSE Environmental Geocomposite and Geonet – Conformance Testing

Geocomposite	Geonet	Test Property	ASTM Method
	✓	Thickness	ASTM D1777
✓	✓	Density	ASTM D1505
	✓	Wide Width Tensile Properties	ASTM D4595
	✓	Mass Per Unit Area	ASTM D3776
	✓	Carbon Black	ASTM D1603
	✓	Melt Index	ASTM D1238
✓		Transmissivity	ASTM D4716
✓		Peel Strength	ASTM D7005
✓		Tensile Strength	ASTM D7179

Appendix B.6 and **B.10** provides the independent quality assurance laboratory test results. The results were reviewed by the Gordon/PSC CQA Engineer and compared with the Project Technical Specifications and 2015 CQA Plan for geonet. The properties of the geocomposite and geonet meet or exceed the Project Technical Specifications and 2015 CQA Plan requirements.

2.5.3.4 Construction Quality Control (CQC)

The quality control procedures specified in the project documents were strictly followed in order to provide a method to measure and regulate the quality of geocomposite and geonet installation. These procedures included such activities as proper overlap and correct zip-tie spacing on floor and slopes.

Both the Gordon/PSC Site CQA Engineer/Manager and FIS observed placement activities to verify that the deployment and seaming procedures were performed in accordance with the CQA Plan and project specifications.

2.5.3.5 Construction Quality Assurance (CQA)

The Gordon/PSC Site CQA Engineer/Manager and FIM visually inspected all material for manufacturing and installation defects. No manufacturing flaws were observed in the installed geocomposite and geonet. The Gordon/PSC Site CQA Engineer/Manager inspected all seamed and non-seamed areas of the geonet for wrinkles, defects, etc. After each panel was deployed, the Gordon/PSC Site CQA Engineer/Manager and FIS walked the length of each panel to identify any suspect areas (e.g., defects or tears) by marking these areas for repair with a highly visible paint. No suspect areas were found.

2.5.4 Leak Detection Zone Deployment Records

Documentation for the Leak Detection Zone material deployment was required prior to approval and acceptance. CQA documentation for the geonet deployed in Cell 1A are provided in **Appendix C.14**.

The Leak Detection Zone material installation was accepted after the above-listed data was submitted to, reviewed, and approved by the Gordon/PSC CQA Officer. The Leak Detection Zone Panel As-built for Cell 1A is included as **Figure 7**. Daily Summary Reports were logged during each construction day, and photographs were taken showing the panel placement activity. The Daily Summary Reports and project photographs are provided in the **Field Logs** and **Photographs** Section.

2.6 60-Mil Primary Flexible Membrane Liner

The Primary FML was installed in direct contact above the Leak Detection Zone materials in accordance with the Construction Plans, Project Technical Specifications, and 2015 CQA Plan. The following sections describe the procedures and activities performed during Primary FML installation, observation, and CQA testing.

2.6.1 Flexible Membrane Liner Product

The Primary FML utilized in Cell 1A construction was 60-mil, high-density polyethylene (HDPE), manufactured by GSE Environmental of Houston, Texas. Smooth FML was designated for the floor and textured FML was designated for the sideslopes of Cell 1A. The material was delivered to SWI in rolls twenty-two and a half (22.5) feet wide with by five hundred-sixty (560) feet long for the smooth and five hundred-twenty (520) feet long for the textured FML. The FML was stored in the Contractor's Staging Area and in accordance with the Project Technical Specifications and 2015 CQA Plan. The stored FML was not stacked more than two (2) rolls high. The Gordon/PSC Site CQA Engineer/Manager compared roll identification labels with shipping invoices to verify that the FML delivered to SWI corresponded with FML subjected to manufacturer's quality control and quality assurance testing (Section 2.6.3).

2.6.2 Flexible Membrane Liner Installation

The FML installation activities were performed in accordance with the guidelines specified in the Construction Plans, Project Technical Specifications and 2015 CQA Plan; and industry standards for FML handling, placement, and testing. Each roll of FML was carefully moved from the Contractor's Staging Area at the west end of SWI using a rubber-tired forklift; and FML was not placed in standing water or deployed during rainfall. The forklift was not allowed on the geonet, the Primary HDPE Liner was placed by hand and aided with the use of wire rope and pulling equipment. Upon deployment, each role identification label was removed and submitted to the Gordon/PSC Site CQA Engineer/Manager and were compared with the shipping invoices to verify that the FML delivered to SWI corresponded with FML subjected to manufacturers' quality control and quality assurance testing. FML being deployed was documented in the *Primary FML Deployment Log* (**Appendix C.15**) and Cell 1A 60-Mil Primary Liner Panel Layout drawing (**Figure 8**).After each FML panel had been deployed, adjoining panels were positioned with a four (4) to six (6)- inch longitudinal overlap required for hot-wedge fusion welding. The overlap distance is required for proper seaming, and to allow peel and shear tests to be performed on the seams. Seams were

oriented at approximately forty-five (45) degrees to the line of prevailing base grade slope on the Cell 1A floor, and parallel to the Cell 1A sideslopes, per the Project Technical Specifications and 2015 CQA Plan (see 60-Mil Primary Liner Panel Layout, **Figure 8**).

2.6.3 Flexible Membrane Liner Testing

FML testing included manufacturer's quality control (MQC) and manufacturer's quality assurance (MQA), conformance testing, construction quality control (CQC), CQA, and seam testing. Each type of testing methodology is discussed in the following sections.

2.6.3.1 Manufacturer's Quality Control (MQC)

Formosa Plastics Corp, Texas performed resin testing on the raw materials used in the manufacturing of the smooth, and textured FML. These test results and written certifications verified that the FML delivered to SWI has been extruded from an acceptable resin meeting the properties specified in GRI-GM 13, *"Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes"*, are included in **Appendix B.4**.

2.6.3.2 Manufacturer's Quality Assurance (MQA)

As a part of the MQA testing, specific performance and characterization properties were evaluated on random samples collected from the manufactured FML rolls prior to their delivery to SWI as listed in **Table 13.**

TABLE 13 - GSE Environmental HDPE FML - MQA Testing

60-mil HDPE Double-Sided Textured and Smooth HDPE FML Property	ASTM Method
Thickness	ASTM D5994
Asperity Height (Textured)	ASTM D7466
Density	ASTM D1505
Mass per unit area	ASTM D5993
Melt Flow Index	ASTM D1238, Condition E
Tensile Properties	ASTM D6693 and ASTM D 6693, Modified
Tear Resistance	ASTM D1004, Modified
Puncture Resistance	ASTM D4833, Modified
Carbon Black Content	ASTM D4218
Carbon Black Dispersion	ASTM D5596
Environmental Stress Crack Resistance using Notched Constant Tensile Load	ASTM D5397

MQA test results are included in **Appendix B.3**. These results were reviewed by the Gordon/PSC Site CQA Engineer and confirmed against the Project Technical Specifications and 2015 CQA Plan

requirements. MQA testing results met the requirements set forth in the Project Technical Specifications and 2015 CQA Plan.

2.6.3.3 Conformance Testing

Conformance sampling for FML material was performed by TRI, Austin, Texas at the manufacturer's facility prior to shipment of the FML to SWI. TRI collected samples approximately two feet long from the entire roll width and performed conformance testing at the TRI laboratory in Austin, Texas. Conformance samples were collected at a frequency of at least one (1) per 100,000 ft^2 of FML installed to verify that the FML delivered to the SWI met the minimum properties listed in the Project Technical Specifications and 2015 CQA Plan. Approximately 338,782 ft^2 of primary HDPE FML were installed during Cell 1A construction; requiring a minimum of four (4) HDPE FML conformance samples. Nine (9) samples of the HDPE FML were tested by TRI for conformance.

TRI tested the FML samples for the properties listed in **Table 14**; as specified in the Project Technical Specifications and 2015 CQA Plan.

TABLE 14 - GSE Environmental HDPE FML – Conformance Testing

60-mil HDPE Smooth and Double-sided Textured FML Property	ASTM Method
Thickness	ASTM D5994
Density	ASTM D1505
Mass per unit area	ASTM D5993
Tensile Properties	ASTM D6693 and ASTM D 6693, Modified
Tear Resistance	ASTM D1004, Modified
Puncture Resistance	ASTM D4833, Modified
Carbon Black Content	ASTM D4218
Carbon Black Dispersion	ASTM D5596

The conformance test results were reviewed by the Gordon/PSC Site CQA Engineer and accepted in accordance with Project Technical Specifications and 2015 CQA Plan. The conformance test results indicated that the FML met the minimum property requirements specified in the Project Technical Specifications and 2015 CQA Plan. The conformance testing results for the twenty (20) samples are included in **Appendix B.4.**

2.6.3.4 Construction Quality Control (CQC)

The quality control procedures specified in the Project Technical Specifications, 2015 CQA Plan; and industry standards were strictly followed in order to provide a method to measure and regulate

the quality of FML installation. These procedures included such activities as start-up trial welds, destructive and non-destructive seam testing, and verification that the deployment and seaming procedures were performed in accordance with the Project Technical Specifications, 2015 CQA Plan and industry standards.

Trial welds were performed at the start and midpoint of each workday; after each break in seaming of one hour or more; and after any equipment shutdown. The trial welds were a minimum of ten (10) feet in length for fusion welders; and a minimum of three (3) feet in length for extrusion fillet welders. One-inch-wide cutouts of the trial welds were field-tested for shear and peel strength using an on-site tensiometer (SLS's tensiometer calibration certificate is provided in **Appendix C.21**) and testing was performed in the presence of the Gordon/PSC Site CQA Engineer/Manager. If the results of the trial weld testing did not comply with the Project Technical Specifications and 2015 CQA Plan, the welder was not permitted to continue seaming until the deficiencies were corrected and an additional trial weld was performed which passed the field-testing requirements. Primary trial weld documentation is included in **Appendix C.9**.

The seam testing protocol for the deployed FML included peel and shear testing on mathematically random samples cut from the installed FML (destructive samples) and non-destructive testing (air pressure and/or vacuum box testing) on field seams. The seam-testing program is detailed in Section 2.7.3.6 of this report.

The Gordon/PSC Site CQA Engineer/Manager and FIS observed FML placement activities to verify that the deployment and seaming procedures were performed in accordance with the Project Technical Specifications and 2015 CQA Plan; which included the underlying geonet inspection and approval, seam cleaning, and precautions against potential FML damage during deployment and seaming.

2.6.3.5. Construction Quality Assurance (CQA)

The Gordon/PSC Site CQA Engineer/Manager and FIS visually inspected FML material for manufacturing and installation defects as the FML was deployed. No manufacturing flaws were observed in the deployed FML. The Gordon/PSC Site CQA Engineer/Manager inspected seamed and non-seamed areas of the FML for wrinkles, defects, holes, blisters, etc. After each panel was deployed, the Gordon/PSC Site CQA Engineer/Manager and FIS walked the length of each panel and identified any suspect areas (e.g., defects or blemishes) by marking these areas for repair with a highly visible paint marker.

2.7.3.6 Seam Testing

In accordance with the Project Technical Specifications and 2015 CQA Plan, the field seam verification program consisted of both destructive and non-destructive testing. Sampling and field-testing was performed by the FML installer (SLS) in the presence of the Gordon/PSC Site CQA Engineer/Manager. In addition to field-testing, destructive samples were sent to an independent quality assurance laboratory (TRI/Environmental, Inc., Austin, Texas) for peel and shear strength testing.

A. Destructive Seam Testing

In accordance with the Project Technical Specifications and 2015 CQA Plan, a minimum of one (1) destructive test for every five hundred (500) linear feet of welded seam (an average taken throughout the entire project) was performed on the FML. There were approximately 15,115 lineal feet of welded seam in the Primary Liner requiring a minimum of thirty-one (31) destructive tests. Thirty-one (31) destructive test samples were collected and evaluated in accordance with the Project Technical Specifications and 2015 CQA Plan.

Each destructive test sample was divided into three segments. The first segment was tested in the field for peel and shear strength by the installer using an on-site tensiometer. The second segment was shipped to an independent quality assurance laboratory (TRI/Environmental, Inc., Austin, Texas) for laboratory testing. The third sample segment was retained by the Gordon/PSC Site CQA Engineer/Manager and delivered to SWI to be archived in the Facility Operating Record. Results of the field destructive tests are provided in **Appendix C.13**; and the independent quality assurance laboratory test results (TRI/Environmental, Inc.) are included in **Appendix D.2** . The field destructive test results, and the independent quality assurance laboratory test results were reviewed by the Gordon/PSC Site CQA Engineer/Manager for conformance with the Project Technical Specifications and 2015 CQA Plan. All peel and shear test results met the requirements of the Project Technical Specifications and 2015 CQA Plan.

B. Non-Destructive Seam Testing

Air pressure testing was performed on double-wedge fusion welded seams except where a channel blockage occurred. Where channel blockages occurred, the seam was air tested on either side of the area extrusion-welded and vacuum box tested. An additional patch was extrusion welded over the repaired area and vacuum box tested. Vacuum box testing was performed on all extrusion-welded portions of seams and patches. Test results are documented on the *Primary FML Seam*

Pressure Test Log (**Appendix C.17**) and the *Primary FML Seam Vacuum Test and Defect-Repair Log* (**Appendix C.18**). Seams and repairs were required to pass the non-destructive testing specifications outlined in the Project Technical Specifications and 2015 CQA Plan before being accepted by the Gordon/PSC Site CQA Engineer/Manager.

2.6.4 FML Deployment Records

Documentation for FML deployment and testing for each panel deployed was required prior to FML approval and acceptance. CQA documentation for the FML deployed in Cell 1A are listed in **Table 15**.

TABLE 15 - HDPE Primary FML Deployment CQA Documentation

HDPE FML Deployment CQA Documentation	Certification Report Appendix Location
Secondary and Primary FML Pre-Weld Qualification Test Log	Appendix C.9
Primary FML Deployment Log	Appendix C.15
Primary FML Seaming Log	Appendix C.16
Primary FML Seam Pressure Test Log	Appendix C.17
Primary FML Seam Vacuum Test and Defect-Repair Log	Appendix C.18
Demtech Tensiometer Calibration Certification	Appendix C.21

The FML installation was accepted after the data listed in **Table 15** was submitted to, reviewed by, and approved by the Gordon/PSC Site CQA Engineer. The Cell 1A As-built FML Panel Layout is included as **Figure 8**. Daily Summary Reports were completed after each construction day, and photo documentation recorded the FML placement activity on the Cell 1A floor and sideslopes. The Daily Summary Reports and forms indicating approval of the previous day's FML installation and project photographs are provided in the **Field Logs** and **Photographs** Section.

2.7 Geosynthetic Cushion/Drainage Layer

Geosynthetic Cushion/Drainage Layer was installed directly above the primary FML in accordance with the engineering design drawings, project specifications, and 2015 CQA plan. This layer consists of a double sided Geocomposite for the sideslopes and a single-sided Geocomposite for the floor. The following sections describe the procedures and activities performed during the drainage layer installation, observation, and CQA testing.

2.7.1 Geosynthetic Cushion/Drainage Layer Product

The Geocomposite utilized in Cell 1A construction is a 200-mil, high-density polyethylene (HDPE) encapsulated on both sides for double-sided and one side for a single-sided Nonwoven Geotextile, manufactured by GE Environmental of Kingstree, South Carolina. The Cushion/Drainage Layer material is specified to encompass the entire double lined system and were delivered on-site in rolls 14.5 feet wide by 300 feet long for both styles of Geocomposite. Rolls were staged along the western perimeter of Cell 1A to provide easy access, and to minimize handling of the material. In accordance with the CQA Plan and project specifications, material was not stacked more than two rolls high. The labels were compared with the shipping invoice to verify that the materials received corresponded with materials subjected to manufactures quality control/manufactures quality assurance testing (see Section 2.7.3). The material was also inspected for damage during off-loading and staging.

2.7.2 Geosynthetic Cushion/Drainage Layer Material Installation

The Cushion/Drainage Layer material installation activities were performed in accordance with the guidelines stipulated in the 2015 CQA Plan, project specifications, the engineering design drawings, and industry standards for handling, and placement. Each roll was carefully moved from the staging area to Cell 1A using a rubber-tired extendable forklift. The forklift was not permitted on the Primary FML, and the material was placed by hand. Upon deployment, each roll label was removed and submitted to the Gordon/PSC Site CQA Engineer/Manager, and panel location documented (see **Figure 9**).

After each panel had been placed, adjoining panels were positioned with a 4 to 6-inch overlap. The overlap distance is required for proper attachment using zip ties placed at 5 feet and 6 inches, longitudinally and end-to-end seams respectively. The Geotextile encapsulating the Geonet core of the Geocomposite were then fused together using industry standard heat tacking methods. Seams were oriented at approximately 45 degrees to the line of prevailing base grade slope, and perpendicular to the sideslopes.

2.7.3 Geosynthetic Cushion/Drainage Layer Testing

Geonet testing included manufacturer's quality control (MQC) and quality assurance (MQA), conformance testing, construction quality control (CQC), CQA, and seam testing. Each type of testing is discussed in the following sections.

2.7.3.1 Manufacturer's Quality Control (MQC)

Equistar Chemicals, LP, Houston, Texas, performed resin testing on the raw materials used in the manufacturing of the Geocomposite. These test results and written certifications that the product delivered has been extruded from an acceptable resin are included in **Appendix B.9**.

2.7.3.2 Manufacturer's Quality Assurance (MQA)

As required by the Project Technical Specifications and 2015 CQA Plan, the manufacturer (GSE) performed the Geocomposite property testing listed in **Table 16** prior to delivery of the materials to the site.

TABLE 16 - GSE Environmental Geocomposite - MQC Testing

Geocomposite Property	ASTM Method
Thickness	ASTM D5199
Density	ASTM D1505
Carbon Black Content	ASTM D4218
Tensile Strength	ASTM D7179
Peel Strength	ASTM D7005
Mass Per Unit Area	ASTM D5261
Transmissivity (loaded)	ASTM D4716

The Geocomposite quality control certifications, property values and testing frequencies for the on-site material delivered to SWI are provided in **Appendix B.10**.

2.7.3.3 Conformance Testing

Conformance sampling for the geocomposite material was performed by TRI, Austin, Texas at the manufacturer's facility prior to shipment of the geocomposite to SWI. TRI collected a sample approximately two feet long from the entire roll width and performed conformance testing at the TRI laboratory in Austin, Texas. Conformance samples were collected at a frequency of at least one (1) per 100,000 ft^2 installed to verify that the geocomposite delivered to the SWI met the minimum properties listed in the Project Technical Specifications and 2015 CQA Plan. Approximately 86,940 ft^2 of double-sided geocomposite and approximately 247,743 ft^2 of single-sided geocomposite material was installed in Cell 1A requiring a minimum of one (1) double-sided geocomposite and three (3) single-sided geocomposite samples. TRI tested one (1) geocomposite conformance sample for the properties listed in **Table 17**; as specified in the Project Technical Specifications and 2015 CQA Plan.

TABLE 17 - GSE Environmental Geocomposite - Conformance Testing

Geocomposite Property	ASTM Method
Density	ASTM D1505
Transmissivity	ASTM D4716
Peel Strength	ASTM D7005
Tensile Strength	ASTM D7179

Appendix B.10. provides the independent quality assurance laboratory test results. The results were reviewed by the Gordon/PSC CQA Engineer and compared with the Project Technical Specifications and 2015 CQA Plan for geocomposite. The properties of the geocomposite meet or exceed the Project Technical Specifications and 2015 CQA Plan requirements.

2.7.3.4 Construction Quality Control (CQC)

The quality control procedures specified in the project documents were strictly followed in order to provide a method to measure and regulate the quality of Geocomposite installation. These procedures included such activities as proper overlap and correct zip-tie spacing on floor and sideslopes.

Both the Gordon/PSC Site CQA Engineer/Manager and FIS observed placement activities to verify that the deployment and seaming procedures were performed in accordance with the CQA Plan and project specifications.

2.7.3.5 Construction Quality Assurance (CQA)

The Gordon/PSC Site CQA Engineer/Manager and FIM visually inspected all material for manufacturing and installation defects. No manufacturing flaws were observed in the installed geocomposite. The Gordon/PSC Site CQA Engineer/Manager inspected all seamed and non-seamed areas of the geocomposite for wrinkles, defects, etc. After each panel was deployed, the Gordon/PSC Site CQA Engineer/Manager and FIS walked the length of each panel to identify any suspect areas (e.g., defects or tears) by marking these areas for repair with a highly visible paint. No suspect areas were found.

2.7.4 Geosynthetic Cushion/Drainage Layer Deployment Records

Documentation for the Cushion/Drainage Layer material deployment was required prior to approval and acceptance. CQA documentation for the geocomposite deployed in Cell 1A is provided in **Appendix C.19**.

The Drainage/Cushion Layer material installation was accepted after the above-listed data was submitted to, reviewed, and approved by the Gordon/PSC CQA Officer. The Geosynthetic Cushion/Drainage Layer Panel As-built for Cell 1A is included as **Figure 9**. Daily Summary Reports were logged during each construction day, and photographs were taken showing the geocomposite placement activity. The Daily Summary Reports and project photographs are provided in the **Field Logs** and **Photographs** Section.

2.8 Protective Soil Layer

Upon completion of the GCL, FML, geotextile and geocomposite installation, and after confirming that all repairs were adequately addressed, Enviroworks began placing a minimum two (2) foot thickness of PSL on the cell floor and sideslope. Material for the PSL is comprised of on-site soil material pre-qualified by the Gordon/PSC Site CQA Engineer/Manager.

Gordon/PSC observed the placement of the PSL to ensure that the methods and material used during construction did not damage the installed liner system. The thickness of the PSL was verified by field survey measurements on January 7th, 2019 conducted by S_3 (**Figure 3**). The survey indicates that a minimum of two (2) feet of PSL was placed over the top of the cell floor and sideslope liner systems.

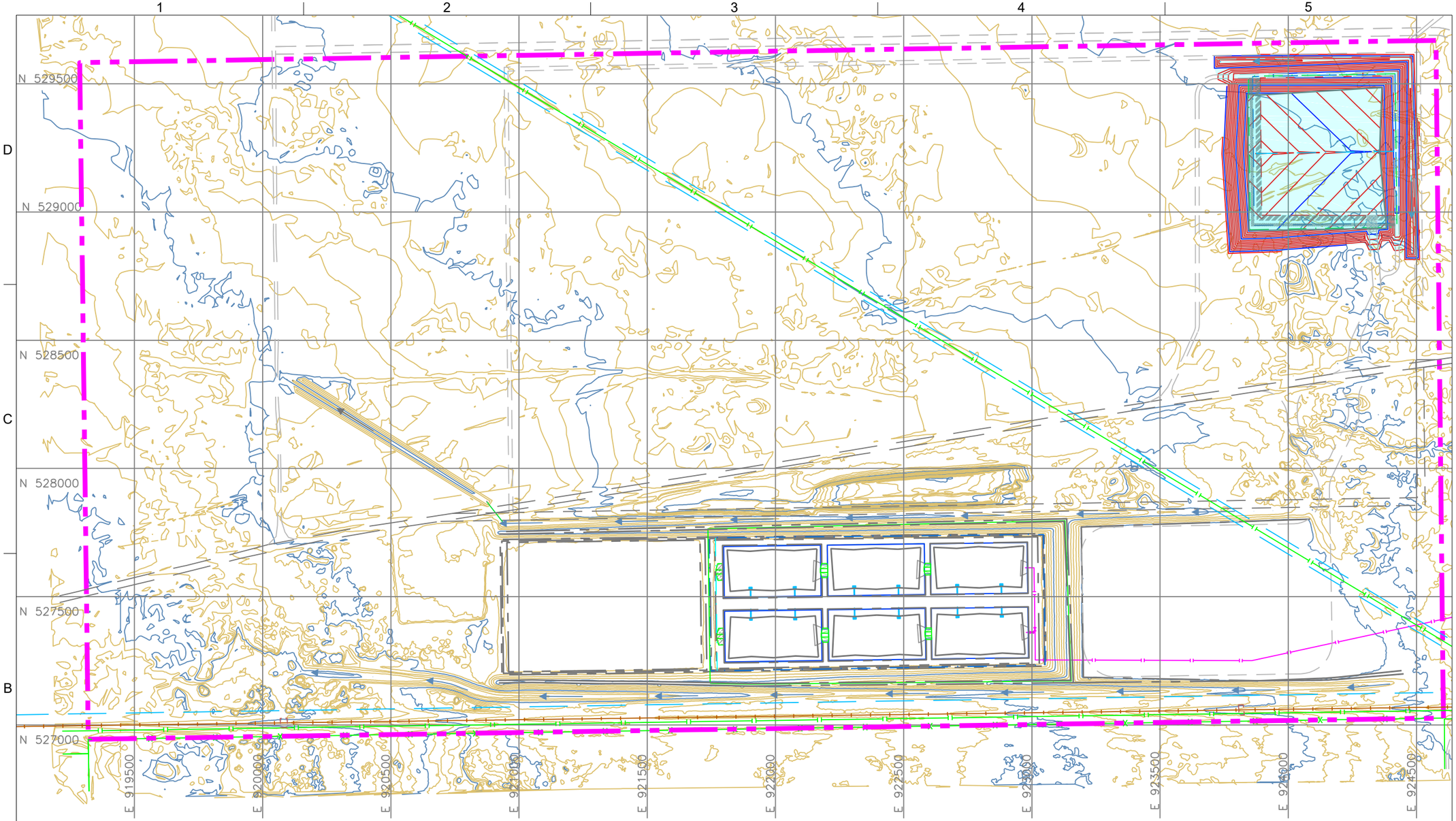
2.9 Future Liner Tie-in Details, Stormwater and Liner Protection Berm

Future liner tie-in will be to Cell 1A directly to the west, and Cell 2A directly to the south of Cell 1A. The design for the stormwater and liner protection berm constructed in the perimeter transition zones of Cell 1A, as shown on **Figure 2,** serves the intended purpose to control stormwater run-on and to protect the installed liner system. The Contractor constructed the stormwater and liner protection berm by placing soil along the floor and sideslope of the cell until design grades were achieved.

3.0 ENGINEERING CERTIFICATION

This Engineering Certification Report demonstrates that the composite liner and leak detection system for Cell 1A has been installed in accordance with the New Mexico Energy, Minerals and Natural Resources Department Regulations (19.15.36.11 – 19.15.36.112 NMAC). This Certification is sealed by Charles W. Fiedler, a New Mexico Professional Engineer with extensive applicable experience with waste engineering and geosynthetic liner systems (**Appendix G**).

FIGURES



LEGEND

- PROPERTY BOUNDARY
- 3400 — EXISTING GRADE CONTOUR – 10'
- EXISTING GRADE CONTOUR – 2'
- 3400 — EXISTING GRADE DEPRESSION CONTOUR – 10'
- EXISTING GRADE DEPRESSION CONTOUR – 2'
- EXISTING ROAD – UNPAVED
- 3400 — PROPOSED GRADE CONTOUR – 10'
- PROPOSED GRADE CONTOUR – 2'
- PROPOSED ROAD – UNPAVED
- TOE OF SLOPE
- TOP OF SLOPE
- RUN-ON/RUNOFF CONTROLS
- EDGE OF CELL (LIMIT OF WASTE)
- EDGE OF LEACHATE CONTAINMENT LINER
- EDGE OF LEAK DETECTION LINER
- PROJECT AREA
- E 920000 / N 527000 — SITE GRID

N

0 200' 400'

GORDON ENVIRONMENTAL | PSC

SUNDANCE WEST SURFACE WASTE MANAGEMENT FACILITY

SUB-PHASE 2
LAND DISPOSAL CELL 1A
CQA REPORT FIGURES

LEA COUNTY, NEW MEXICO

KEY PLAN

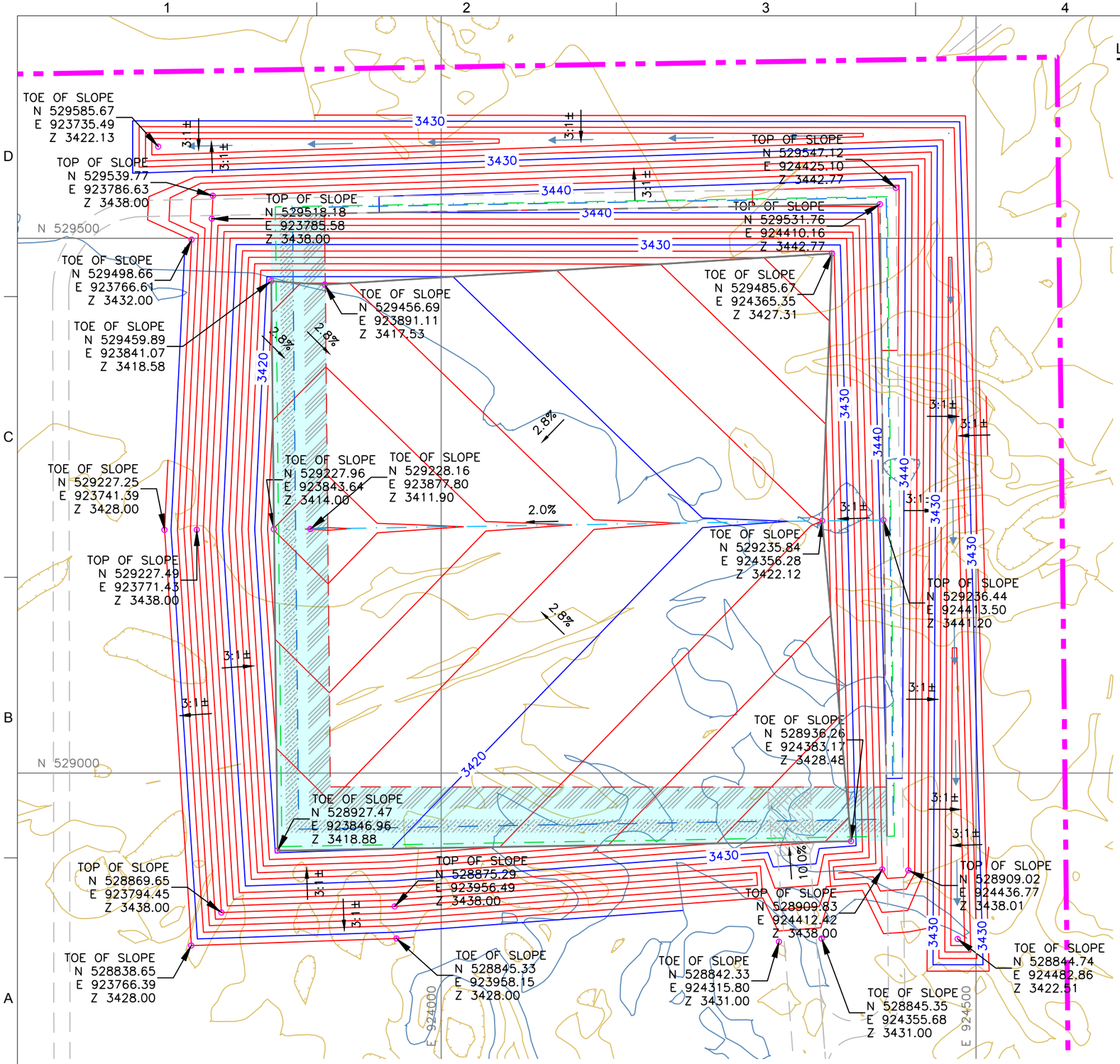
NO	DATE	DESCRIPTION
-	01/31/2019	REPORT ISSUE

ISSUING OFFICE: RIO RANCHO PROJECT NO: 0530.18

SITE LOCATION MAP

FIGURE 1

FILE NAME: X:\2017\0111.17\02_DSGN\02_DWG\050_CIVIL\03_LandDisp\CQA Cell 1A figures\ACAD\FIG 1 Site Location Map.dwg LAYOUT NAME: FIGURE 1 PRINTED: Tuesday, February 12, 2019 - 11:12am USER: DNavarro



LEGEND

	PROPERTY BOUNDARY
3400	EXISTING GRADE CONTOUR – 10'
	EXISTING GRADE CONTOUR – 2'
3400	EXISTING GRADE DEPRESSION CONTOUR – 10'
	EXISTING GRADE DEPRESSION CONTOUR – 2'
3400	PROPOSED GRADE CONTOUR – 10'
	PROPOSED GRADE CONTOUR – 2'
	PROPOSED ROAD – UNPAVED
	TOE OF SLOPE
	TOP OF SLOPE
	RUN-ON/RUNOFF CONTROLS
	EDGE OF CELL (LIMIT OF WASTE)
	EDGE OF LEACHATE CONTAINMENT LINER
	EDGE OF LEAK DETECTION LINER
	CELL TRANSITION ZONE
E 924000 / N 529600	SITE GRID

GORDON ENVIRONMENTAL PSC

SUNDANCE WEST SURFACE WASTE MANAGEMENT FACILITY

SUB-PHASE 2
LAND DISPOSAL CELL 1A
CQA REPORT FIGURES

LEA COUNTY, NEW MEXICO

KEY PLAN

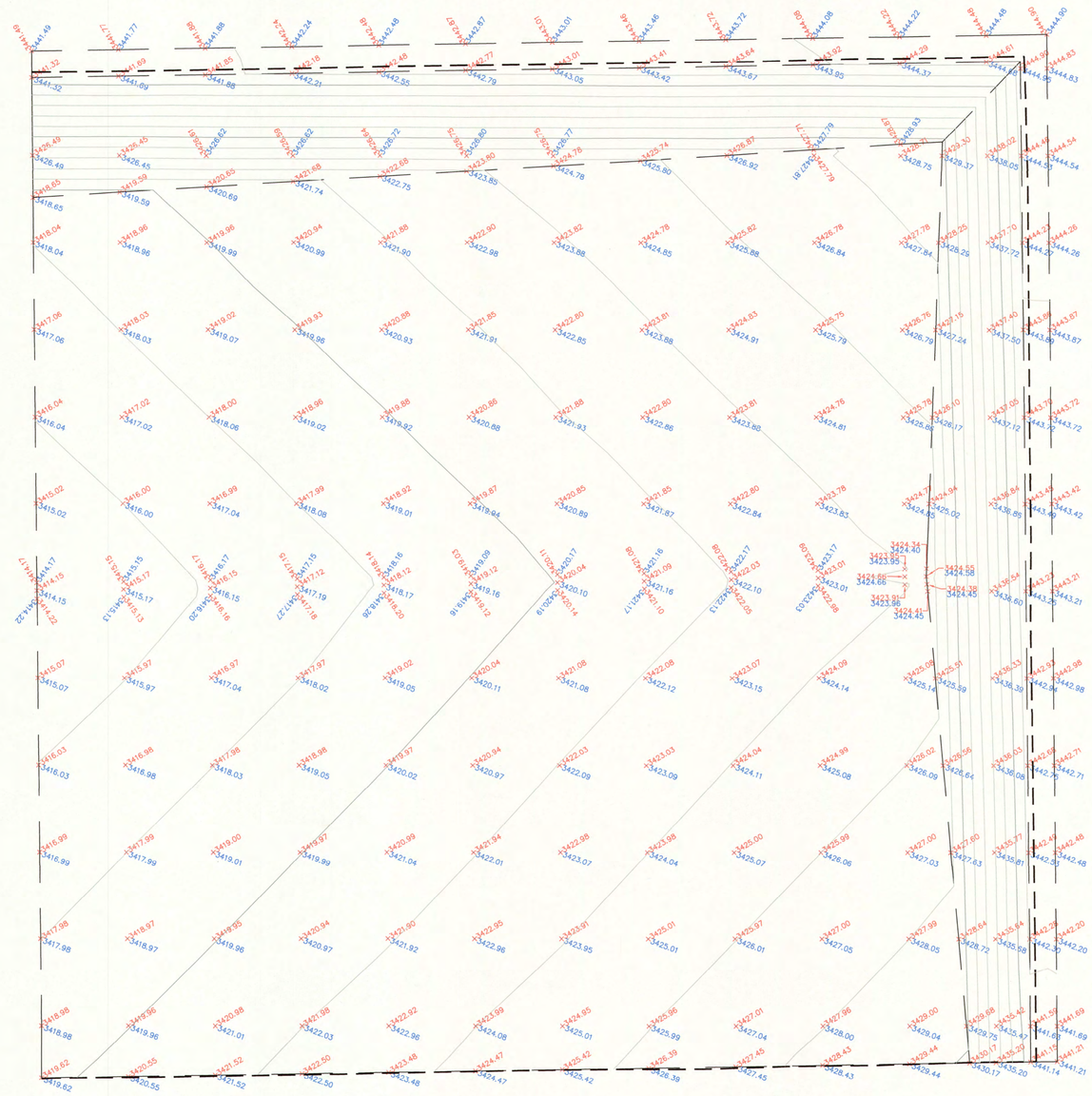
NO	DATE	DESCRIPTION
-	01/31/2019	REPORT ISSUE

ISSUING OFFICE: RIO RANCHO PROJECT NO: 0530.18

SUBGRADE DESIGN GRADES

FIGURE 2

FILE NAME: X:\2017\0111.17\02_DSGN\02_DWG\050_CIVIL\03_LandDisp\CQA Cell 1A figures\ACAD\FIG 2 Subgrade Design Grades.dwg LAYOUT NAME: FIGURE 2 PRINTED: Tuesday, February 12, 2019 - 12:24pm USER: DNavarro



LEGEND

5180	= DESIGN CONTOUR
— — —	= ASBUILT LINER LIMIT
— —	= DESIGN FEATURE LINE
3400.00	= DESIGN OPS LAYER
3400.00	= ASBUILT OPS LAYER

JAMES FLACK
NEW MEXICO
14942
REGISTERED PROFESSIONAL SURVEYOR
11-29-18

I HEREBY CERTIFY THAT ON THIS DATE 11-29-18, A OPERATIONS LAYER AS-BUILT SURVEY WAS PERFORMED ON THE EUNICE LANDFILL IN EUNICE, NM UNDER MY DIRECT SUPERVISION. I FURTHER CERTIFY THAT ALL OBSERVED SUB GRADE AS-BUILT ELEVATIONS ARE TRUE AND ACCURATE.

NORTH

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

FIGURE 3

REV.	DATE	BY

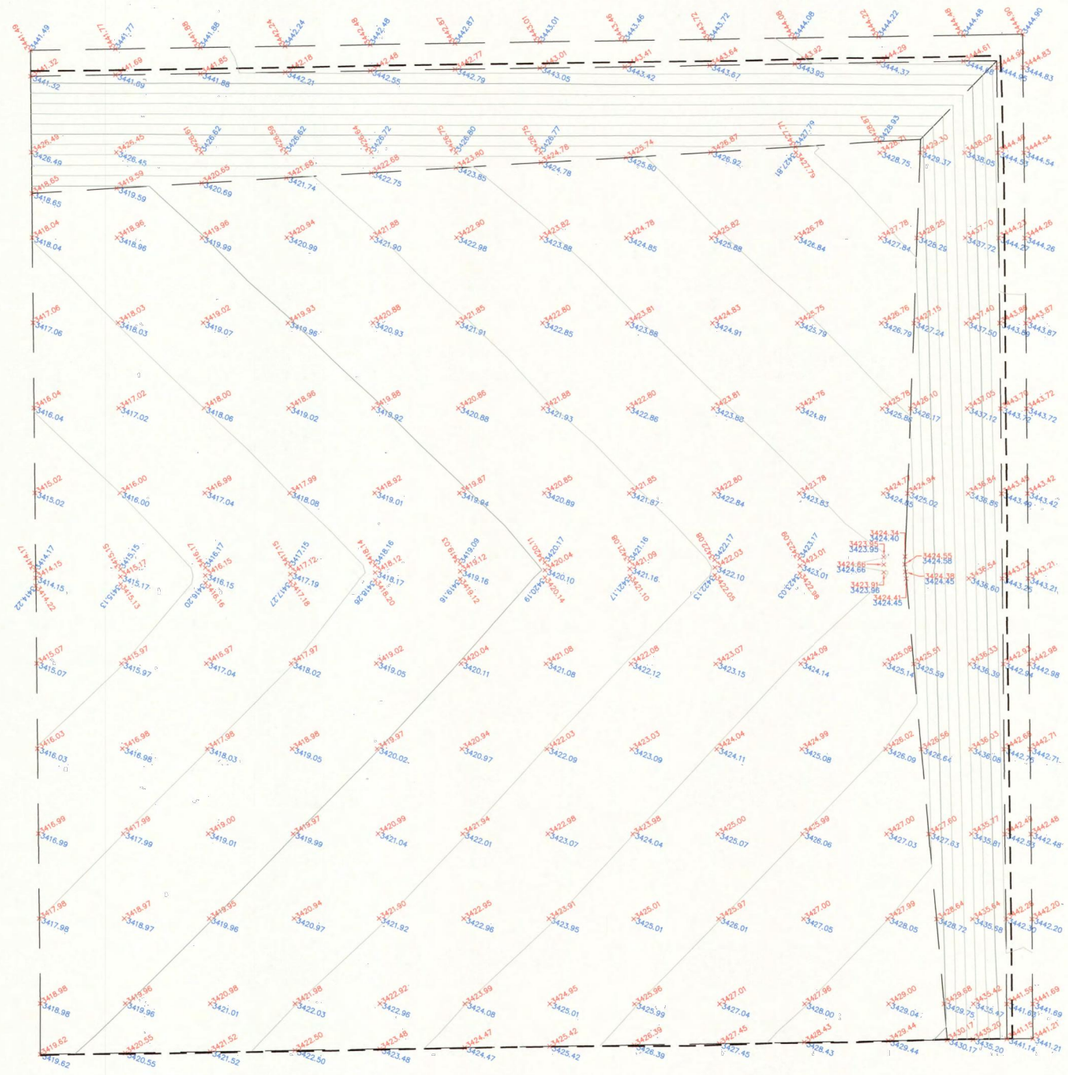
18213 E WARNER ROAD
BLDG A SUITE 5
GILBERT, AZ 85296
PHONE: (480) 4144121
FAX: (888) 870-6203
EMAIL: s3survey@s3-az.com

DRAWN: JB
CHECKED: GR
DATE: 01/29/19
DWG: -

SUNDANCE WEST LANDFILL
EUNICE, NEW MEXICO
CELL 1A OPS LAYER EXHIBIT

PROJECT NO.
18_120EW

SHEET NUMBER
1
1 OF 1



LEGEND

5180	= DESIGN CONTOUR
— — —	= ASBUILT LINER LIMIT
— —	= DESIGN FEATURE LINE
3400.00	= DESIGN OPS LAYER
3400.00	= ASBUILT OPS LAYER

JAMES FLACK NEW MEXICO 14942 REGISTERED PROFESSIONAL SURVEYOR

11-29-18

I HEREBY CERTIFY THAT ON THIS DATE 11–29–18, A OPERATIONS LAYER AS–BUILT SURVEY WAS PERFORMED ON THE EUNICE LANDFILL IN EUNICE, NM UNDER MY DIRECT SUPERVISION. I FURTHER CERTIFY THAT ALL OBSERVED SUB GRADE AS–BUILT ELEVATIONS ARE TRUE AND ACCURATE.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

FIGURE 3

REV.	DATE	BY

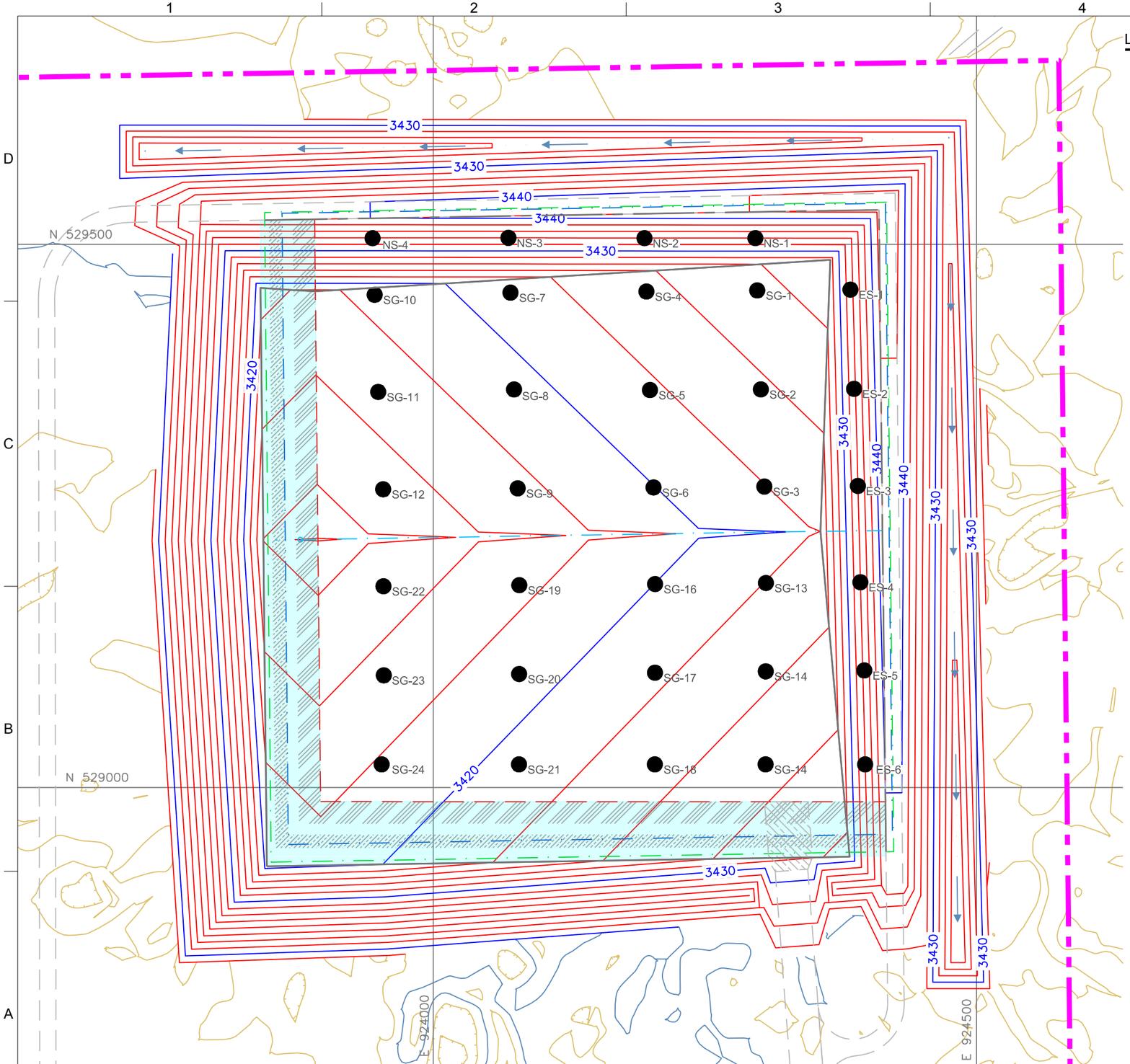
18213 E WARNER ROAD
BLDG A SUITE 5
GILBERT, AZ 85296
PHONE: (480) 4144121
FAX: (888) 870-6203
EMAIL: s3survey@s-3-az.com

DRAWN: JB
CHECKED: CR
DATE: 01/29/19
DWG: -

SUNDANCE WEST LANDFILL
EUNICE, NEW MEXICO
CELL 1A OPS LAYER EXHIBIT

PROJECT NO.
18_120EW

SHEET NUMBER
1
1 OF 1



LEGEND

	PROPERTY BOUNDARY
3400	EXISTING GRADE CONTOUR – 10'
	EXISTING GRADE CONTOUR – 2'
3400	EXISTING GRADE DEPRESSION CONTOUR – 10'
	EXISTING GRADE DEPRESSION CONTOUR – 2'
	EXISTING ROAD – UNPAVED
3400	PROPOSED GRADE CONTOUR – 10'
	PROPOSED GRADE CONTOUR – 2'
	PROPOSED ROAD – UNPAVED
	TOE OF SLOPE
	TOP OF SLOPE
	RUN-ON/RUNOFF CONTROLS
	EDGE OF CELL (LIMIT OF WASTE)
	EDGE OF LEACHATE CONTAINMENT LINER
	EDGE OF LEAK DETECTION LINER
SG-3	APPROXIMATE SUBGRADE DENSITY TEST LOCATION
	CELL TRANSITION ZONE
E 920000 N 527000	SITE GRID

N

0 50' 100'

GORDON ENVIRONMENTAL PSC

SUNDANCE WEST SURFACE WASTE MANAGEMENT FACILITY

SUB-PHASE 2
LAND DISPOSAL CELL 1A
CQA REPORT FIGURES

LEA COUNTY, NEW MEXICO

KEY PLAN

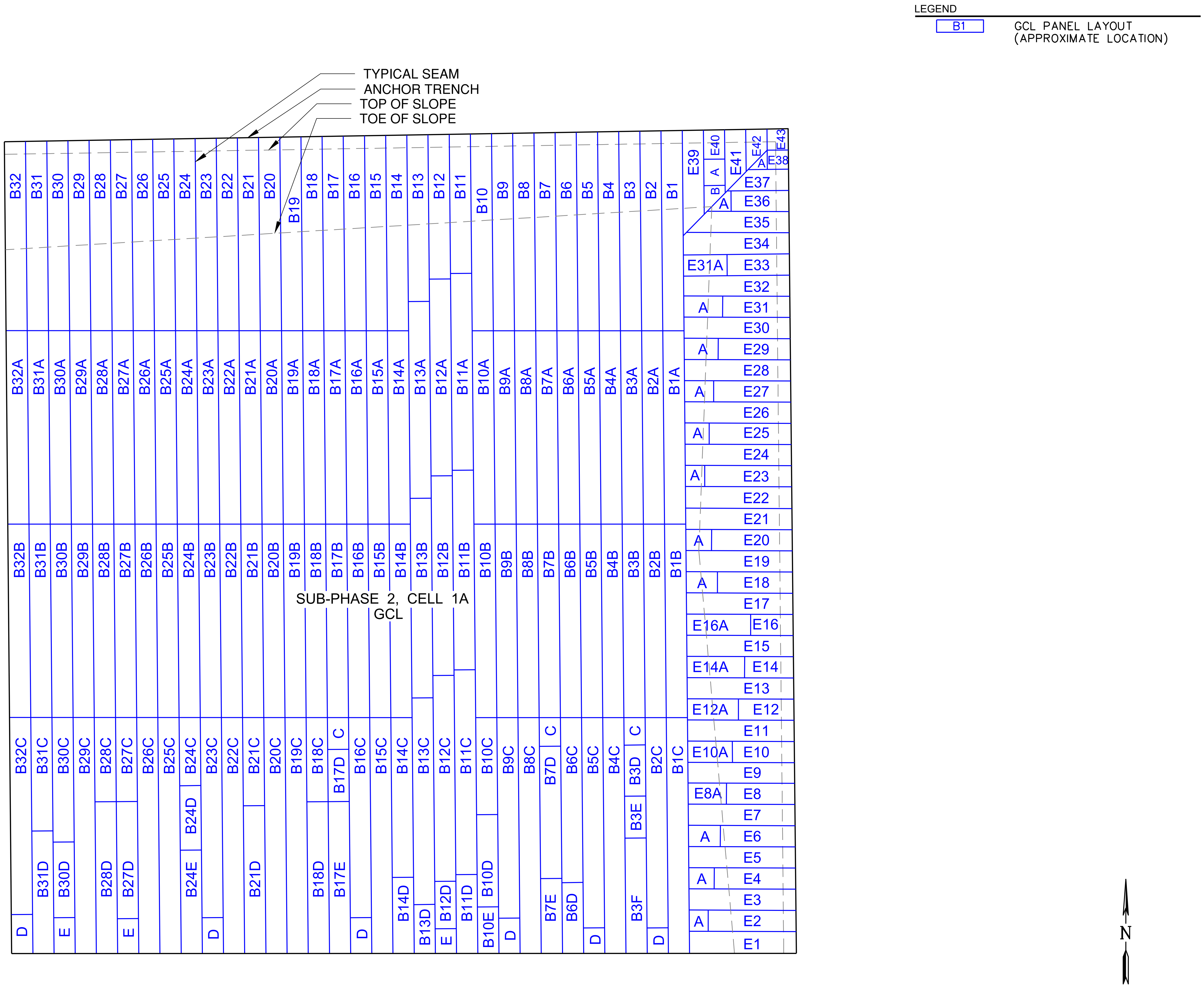
NO	DATE	DESCRIPTION
-	01/31/2019	REPORT ISSUE

ISSUING OFFICE: RIO RANCHO PROJECT NO: 0530.18

FIELD DENSITY TEST LOCATIONS

FIGURE 4

FILE NAME: X:\2017\0111.17\02_DSGN\02_DWG\050_CIVIL\03_LandDisp\CQA Cell 1A figures\ACAD\FIG 4 Field Density Test Locations 01.29.2019.dwg LAYOUT NAME: FIGURE4 PRINTED: Tuesday, February 12, 2019 - 12:14pm USER: DNavarro



THIS DOCUMENT IS RELEASED UNDER THE AUTHORITY OF CHARLES WALTER FIEDLER, P.E., NEW MEXICO LICENSE #19731 EXCLUSIVELY FOR THE PURPOSES CITED BELOW. IT IS NOT TO BE USED FOR ANY ADDITIONAL PURPOSES UNDER ANY CONDITION.

GORDON ENVIRONMENTAL | PSC

SUNDANCE WEST SURFACE WASTE MANAGEMENT FACILITY

SUB-PHASE 2
LAND DISPOSAL CELL 1A
CQA REPORT FIGURES

LEA COUNTY, NEW MEXICO

KEY PLAN

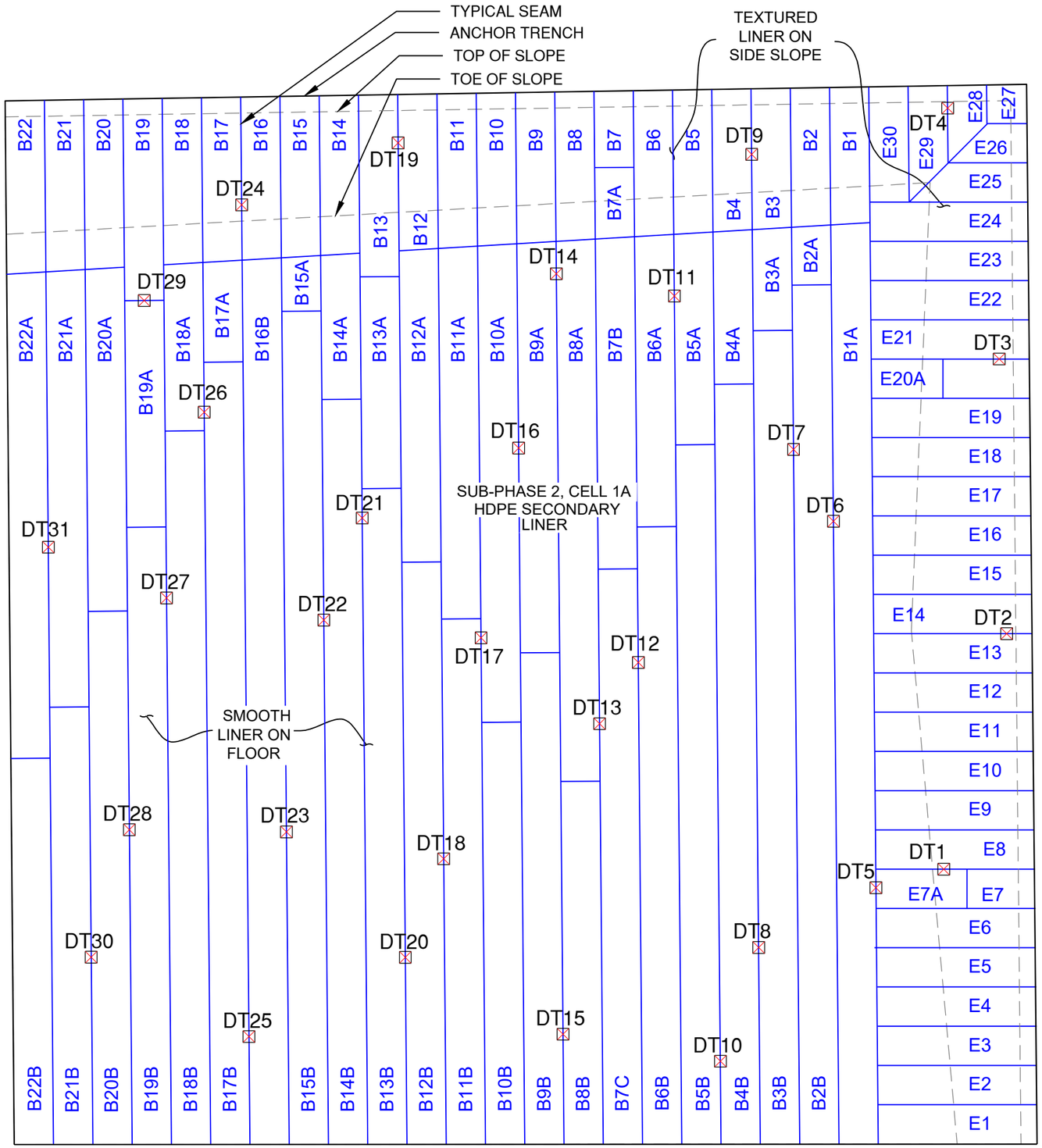
NO	DATE	DESCRIPTION
-	01/31/2019	REPORT ISSUE

ISSUING OFFICE: RIO RANCHO PROJECT NO: 0530.18

GCL PANEL LAYOUT

FIGURE 5

FILE NAME: X:\2017\0111.17\02_DSGN\02_DWG\050_CIVIL\03_LandDisp\CQA Cell 1A figures\ACAD\FIG-5 GCL Panel Layout 01.29.2019.dwg LAYOUT NAME: FIGURE 5 PRINTED: Tuesday, February 12, 2019 - 10:52am USER: DNavarro



LEGEND

B1	HDPE PANEL LAYOUT (APPROXIMATE LOCATION)
DT1	DESTRUCTIVE TEST (APPROXIMATE LOCATION)

GORDON ENVIRONMENTAL PSC

SUNDANCE WEST SURFACE WASTE MANAGEMENT FACILITY

SUB-PHASE 2
LAND DISPOSAL CELL 1A
CQA REPORT FIGURES

LEA COUNTY, NEW MEXICO

KEY PLAN

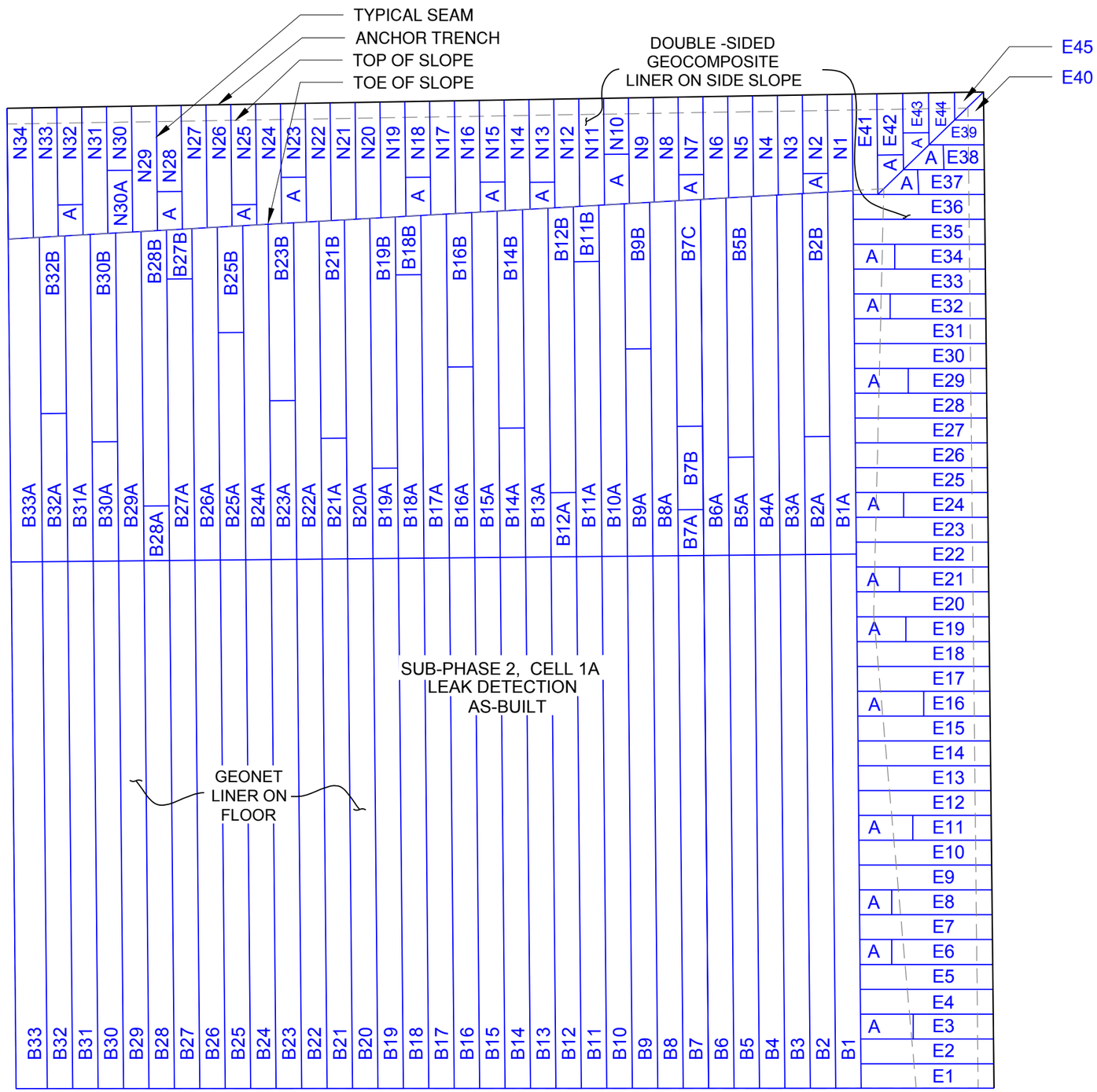
NO	DATE	DESCRIPTION
-	01/31/2019	REPORT ISSUE

ISSUING OFFICE: RIO RANCHO PROJECT NO: 0530.18

60-MIL SECONDARY LINER PANEL LAYOUT

FIGURE 6

FILE NAME: X:\2017\0111.17\02_DSGN\02_DWG\050_CIVIL\03_LandDisp\CQA Cell 1A figures\ACAD\FIG-6 60Mil Secondary Liner Panel Layout 01.29.2019.dwg LAYOUT NAME: FIGURE 6 PRINTED: Tuesday, February 12, 2019 - 10:49am USER: DNavarro



GORDON ENVIRONMENTAL PSC

SUNDANCE WEST SURFACE WASTE MANAGEMENT FACILITY

SUB-PHASE 2
LAND DISPOSAL CELL 1A
CQA REPORT FIGURES

LEA COUNTY, NEW MEXICO

KEY PLAN

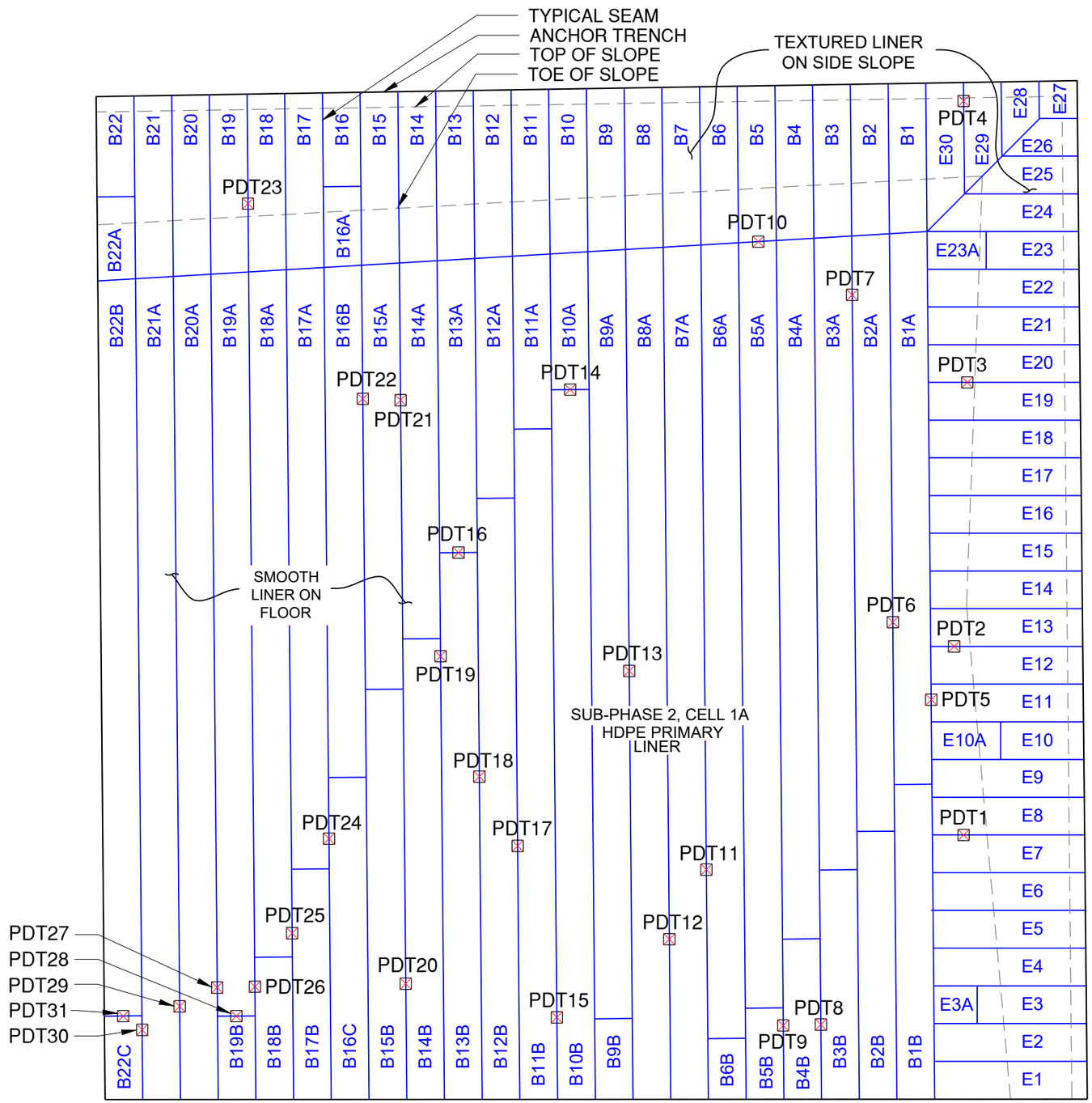
NO	DATE	DESCRIPTION
-	01/31/2019	REPORT ISSUE

ISSUING OFFICE: RIO RANCHO PROJECT NO: 0530.18

GEOSYNTHETIC LEAK DETECTION LAYER AS-BUILT

FIGURE 7

FILE NAME: X:\2017\0111.17\02_DSGN\02_DWG\050_CIVIL\03_LandDisp\CQA Cell 1A figures\ACAD\FIG-7 Geonet Panel Layout 01.29.2019.dwg LAYOUT NAME: FIGURE 7 PRINTED: Tuesday, February 12, 2019 - 12:27pm USER: DNavarro



LEGEND

B1	HDPE PANEL LAYOUT (APPROXIMATE LOCATION)
PDT1	DESTRUCTIVE TEST (APPROXIMATE LOCATION)

GORDON ENVIRONMENTAL PSC

SUNDANCE WEST SURFACE WASTE MANAGEMENT FACILITY

SUB-PHASE 2
LAND DISPOSAL CELL 1A
CQA REPORT FIGURES

LEA COUNTY, NEW MEXICO

KEY PLAN

NO	DATE	DESCRIPTION
-	01/31/2019	REPORT ISSUE

ISSUING OFFICE: RIO RANCHO PROJECT NO: 0530.18

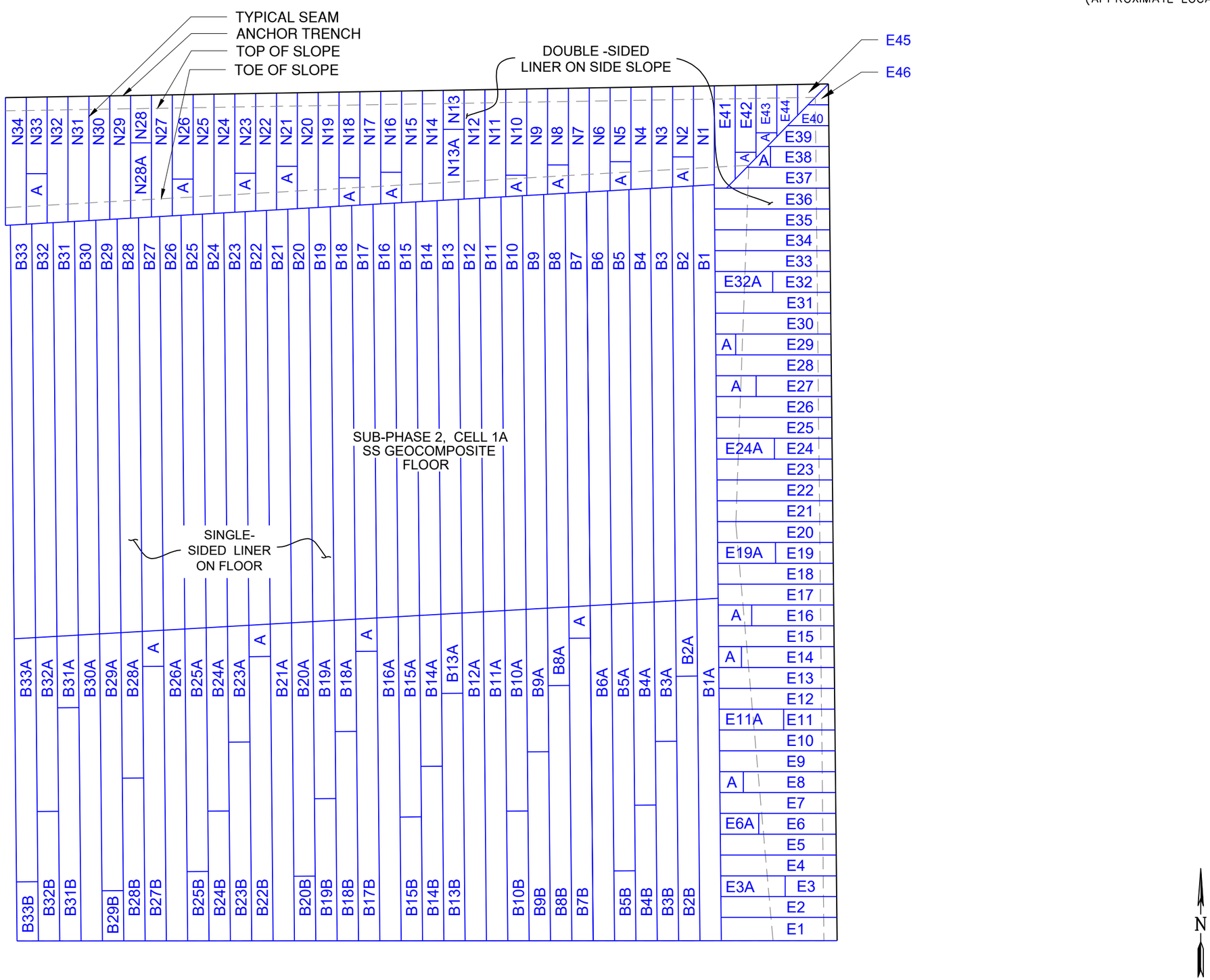
60-MIL PRIMARY LINER PANEL LAYOUT

FIGURE 8

FILE NAME: X:\2017\0111.17\02_DSGN\02_DWG\050_CIVIL\03_LandDisp\CQA Cell 1A figures\ACAD\FIG-8 60Mil Primary Liner Panel Layout 01.29.2019.dwg LAYOUT NAME: FIGURE 8 PRINTED: Tuesday, February 12, 2019 - 10:38am USER: DNavarro

LEGEND

B1 — GEOCOMPOSITE PANEL LAYOUT (APPROXIMATE LOCATION)



GORDON ENVIRONMENTAL PSC

SUNDANCE WEST SURFACE WASTE MANAGEMENT FACILITY

SUB-PHASE 2
LAND DISPOSAL CELL 1A
CQA REPORT FIGURES

LEA COUNTY, NEW MEXICO

KEY PLAN

NO	DATE	DESCRIPTION
-	01/31/2019	REPORT ISSUE

ISSUING OFFICE: RIO RANCHO PROJECT NO: 0530.18

GEOSYNTHETIC CUSHION/ DRAINAGE LAYOUT AS-BUILT

FIGURE 9

FILE NAME: X:\2017\0111.17\02_DSGN\02_DWG\050_CIVIL\03_LandDisp\CQA Cell 1A figures\ACAD\FIG-9 Geocomposite Liner Panel Layout 01.29.2019.dwg LAYOUT NAME: FIGURE 9 PRINTED: Tuesday, February 12, 2019 - 10:35am USER: DNavarro

FIELD LOG AND PHOTOGRAPHS

Daily Summary Reports

333 Rio Rancho Blvd. NE, Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FIELD OBSERVATION REPORT

September 12, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 65-99		☒ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks-Billy Burke and Chris Sheerer.

Work Observed/In-Progress: Clearing and grubbing of work area in progress.

Items Discussed/Observations: Enviroworks and Gordon/PSC spoke about tanks to be moved, anticipated water lines, rectangular cages found onsite, and Sundance Services moving any water lines that are found.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-345D Cat excavator; 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:

☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

X:\2018\0530.18\05 CONSTR\01 REPT\Daily Reports\Cell 1A\2018-09-12 Field Observation Report DG 9-12-18.docm

333 Rio Rancho Blvd. NE, Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FIELD OBSERVATION REPORT

September 13, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☒ Thursday
☐ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 65-99		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks-Billy Burke.

Work Observed/In-Progress: Clearing and grubbing of work area in progress.

Items Discussed/Observations: Enviroworks and Gordon/PSC schedule and spoke about tanks to be moved, anticipated water lines, rectangular cages found onsite, and Sundance Services moving any water lines that are found. Sundance Services, Joe Carrillo, and Gordon/PSC spoke about moving the water line, searched out shut off valves, and met with Ray of PB materials. Sundance to move water line when grubbing has been completed and line has been delivered.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-345D Cat excavator; 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (1 Komatsu HM400 down)

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:

☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

X:\2018\0530.18\05 CONSTR\01 REPT\Daily Reports\Cell 1A\2018-09-13 Field Observation Report DG 9-13-18.docm

333 Rio Rancho Blvd. NE, Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FIELD OBSERVATION REPORT

September 14, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☐ Tuesday	☒ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 60-84		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks-Billy Burke.

Work Observed/In-Progress: Clearing and grubbing of work area in progress.

Items Discussed/Observations: Enviroworks continued to clear and grub. Spoke with Joe Carrillo about today's plans and was advised to go home early.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-345D Cat excavator; 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (1 Komatsu HM400 down)

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:

☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

X:\2018\0530.18\05 CONSTR\01 REPT\Daily Reports\Cell 1A\2018-09-14 Field Observation Report DG 9-14-18.docm

333 Rio Rancho Blvd. NE, Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FIELD OBSERVATION REPORT

September 17, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☒ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 62-82		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks-Billy Burke.

Work Observed/In-Progress: Clearing and grubbing of work area in progress.

Items Discussed/Observations: Enviroworks continued to clear and grub. Spoke with Billy Burke of Enviroworks on working around the uncovered 3" poly line on top of existing grade.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-345D Cat excavator; 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (1 Komatsu HM400 down)

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:

☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

X:\2018\0530.18\05 CONSTR\01 REPT\Daily Reports\Cell 1A\2018-09-17 Field Observation Report DG 9-17-18.docm

GORDON ENVIRONMENTAL PSC

333 Rio Rancho Blvd. NE, Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FIELD OBSERVATION REPORT

September 18, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 64-86		☒ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks-Billy Burke.

Work Observed/In-Progress: Clearing and grubbing of work area in progress.

Items Discussed/Observations: Enviroworks continued to clear and grub. Billy Burke of Enviroworks indicated the discovery of a second rectangular pipe fence structure. On-site crew to use shovels to confirm no structures are located within its confines. An RFI will be submitted on how to handle removal, etc.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-345D Cat excavator; 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (1 Komatsu HM400 down)

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:

☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

X:\2018\0530.18\05 CONSTR\01 REPT\Daily Reports\Cell 1A\2018-09-18 Field Observation Report DG 9-18-18.docm

333 Rio Rancho Blvd. NE, Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FIELD OBSERVATION REPORT

September 19, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 66-87		☒ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks-Billy Burke, Sean Grossette and Chris Sheerer, Gordon/PSC-Don Gray and Carl King, Sundance West-Joe and Michael Carrillo, Michael Ginsberg and Misty Pratt.

Work Observed/In-Progress: Clearing and grubbing of work area in progress.

Items Discussed/Observations: Enviroworks continued to clear and grub. Our weekly construction meeting was held. See attached construction meeting minutes.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-345D Cat excavator; 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (1 Komatsu HM400 down)

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:

☒ Attachments 2018-09-19 SundanceWest_Progress_Mtg_Minutes_FINAL.pdf

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GORDON ENVIRONMENTAL PSC

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Rio Rancho, New Mexico 87124
505.867.6990

FIELD OBSERVATION REPORT

September 20, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☒ Thursday
☐ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 62-80		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks-Billy Burke.

Work Observed/In-Progress: Clearing and grubbing of work area in progress.

Items Discussed/Observations: Enviroworks continued to clear and grub. A second 3" poly line was struck and punctured during excavation. It was later established that this line feeds the office of PB Materials. Joe Carrillo of Sundance West repaired the line. Line was struck and punctured a second time at close of business. This line will be repaired early am on 9-21-18.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-345D Cat excavator; 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (1 Komatsu HM400 down)

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:

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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

September 21, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☐ Tuesday	☒ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 73-80		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks-Billy Burke.

Work Observed/In-Progress: Clearing and grubbing of work area in progress.

Items Discussed/Observations: Enviroworks continued to clear and grub. The second poly line was struck and punctured a third time at around noon today. Joe Carrillo of Sundance West repaired the line in the afternoon.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-345D Cat excavator; 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon, 1 Cat 740D articulating dump truck, (1 Komatsu HM400 down)

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:

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FIELD OBSERVATION REPORT

September 25, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☒ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 57-93		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks-Billy Burke and Chris Sheerer, Gordon/PSC-Don Gray and Carl King, Sundance West-Joe and Michael Carrillo.

Work Observed/In-Progress: Clearing and grubbing of work area in progress.

Items Discussed/Observations: Enviroworks continued to clear and grub. See attached meeting minutes.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-345D Cat excavator; 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon, 1 Cat 740D articulating dump truck, (1 Komatsu HM400 down)

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:

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FIELD OBSERVATION REPORT

September 26, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☒ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☒ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 51-66		☒ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks-Billy Burke and Chris Sheerer.

Work Observed/In-Progress: Clearing and grubbing of work area in progress.

Items Discussed/Observations: Enviroworks continued to clear and grub. There was a significant amount of precipitation the preceding night. No significant construction slow-downs incurred as a result of the precipitation.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-345D Cat excavator; 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon, 1 Cat 740D articulating dump truck, (1 Komatsu HM400 down)

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:

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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

September 27, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☒ Warm	☒ Clear	☐ Dusty	☐ Monday	☒ Thursday
☒ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 53-77		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks-Billy Burke and Chris Sheerer.

Work Observed/In-Progress: Clearing and grubbing of work area in progress. Subgrade for placing of berms was ready for initial density testing. 12 Density tests were performed. All tests passed the required ≥90% of their corresponding RSP.

Items Discussed/Observations: Enviroworks continued to clear and grub.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-345D Cat excavator; 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon, 1 Cat 740D articulating dump truck, (1 Komatsu HM400 down)

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:

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FIELD OBSERVATION REPORT

October 1, 2018

FROM: Carl King

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☒ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 65-82		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks - Billy Burke.

Work Observed/In-Progress: Clearing and grubbing of work area in progress. Began Cell 1A east berm and removal of the temporary cell access road through cell subgrade area. Excavate caliche at west end of cell for berm. Photos taken.

Items Discussed/Observations: Two self-contained fuel tanks were delivered today at the current Cell 1A and at the 7-10 evaporation ponds.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (1 Komatsu HM400 down)

Requested Revisions or Interpretations:

Items to Verify: Using caliche for berm rather than stockpile for entry road. Billy will address with Chris on Tuesday.

Information or Action Required:

☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

October 2, 2018

FROM: Carl King

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☒ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☒ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 66-84		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Scherer, Billy Burke.
Weekly progress meeting: Sean Grossetete, Dan Erickson

Work Observed/In-Progress: Clearing and grubbing of work area in progress. Continue Cell 1A east berm and began Cell 1A south berm. Continued to excavate caliche at west end of cell for berms. Moving from North to south restricted by old water line. Density tests taken.

Items Discussed/Observations: Attempted to wheel roll soils for compaction. Contractor will moisture condition and use sheep's foot roller. Billy identified water line leak at one of the previously repaired locations.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (1 Komatsu HM400 down)

Requested Revisions or Interpretations: Chris Sherer asked for confirmation of spillway elevations for ponds 7-10. Alex McBrien confirmed that each series steps by 6-inches.

Items to Verify: Using caliche for berm construction rather than stockpile for entry road. Billy will address with Chris on Tuesday.

Information or Action Required:

☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

October 3, 2018

FROM: Carl King

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 66-91		☒ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Scherer, Billy Burke.

Work Observed/In-Progress: Continued construction of the Cell 1A east berm and Cell 1A south berm. Continue to excavate caliche at west end of cell for berm materials. Moving from North to south restricted by old water line. Density tests taken along west and south Cell 1A.

Items Discussed/Observations: Joe Carrillo met with CM and Chris Scherer to discuss water lines. Delivery of HDPE pipe delayed. Joe cut the south dry line at the east extent. Chris will drag the line to the west to eliminate interference with construction of Cell 1A east berm. Joe will use the south dry line to splice into the north active line to reroute out of the current construction area.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (1 Komatsu HM400 down)

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required: Enviroworks removed two existing water lines from Cell 1A and pulled them to the west. Joe will make water tie-in on Thursday morning. Surveyor flagged extent of Cell 1B for reference when re-routing water tie-ins. Joe anticipated pipe delivery Friday, 10/5/18.

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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

October 4, 2018

FROM: Carl King

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☒ Thursday
☐ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 65-91		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Scherer, Billy Burke.

Work Observed/In-Progress: Continued construction of the Cell 1A east berm and Cell 1A south berm. Continued to excavate caliche at west end of cell in a north to south orientation. Density tests taken along the west and south areas of Cell 1A.

Items Discussed/Observations:

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (1 Komatsu HM400 down)

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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FIELD OBSERVATION REPORT

October 8, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☒ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 55-81		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Scherer, Billy Burke.

Work Observed/In-Progress: Continued filling of the Cell 1A east berm and Cell 1A south berms. Caliche/sand mix material for the cell for berms was excavated. 14 density tests were obtained along the east, and south berms of Cell 1A.

Items Discussed/Observations:

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (1 Komatsu HM400 down)

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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FIELD OBSERVATION REPORT

October 9, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☒ Hot	☐ Muddy	☐ _____	☒ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 52-72		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Scherer, Billy Burke, and Mike Webb.

Work Observed/In-Progress: Continued filling of Cell 1A east berm and Cell 1A south berms. Continued Excavation of caliche/sand mix material for cell for berms. 22 density tests obtained along the east, south and north berms of Cell 1A.

Items Discussed/Observations: See attached meeting minutes.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (1 Komatsu HM400 down). The Cat excavator went down. The Komatsu excavator was borrowed from the pending evaporation ponds job to keep the project moving forward.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
☒ Attachments 2018-10-09 SundanceWest_Progress_Mtg_Minutes.pdf

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

October 10, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☒ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☒ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☒ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ Cool	Temperature Range 42-74		☒ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Scherer, Billy Burke, and Mike Webb.

Work Observed/In-Progress: Continued filling of Cell 1A east berm and Cell 1A south berms. Caliche/sand mix material was excavated for cell for berms. 10 density tests were obtained along east, south and north berms of Cell 1A.

Items Discussed/Observations:.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-Cat 740B articulating dump truck; 1-345D Cat excavator (Down); 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (1 Komatsu HM400 down), 1-Komatsu excavator, 1 Cat vibratory roller.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

October 11, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☒ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☒ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☒ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ Cool	Temperature Range 59-65		☒ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Scherer, Billy Burke, and Mike Webb.

Work Observed/In-Progress: Continued filling of Cell 1A east berm and Cell 1A south berms. Caliche/sand mix materials were excavated for cell berms. Began filling access road with competent caliche material when encountered.

Items Discussed/Observations:.

Equipment: 2-Komatsu HM400 articulating dump trucks; 1-Cat 740B articulating dump truck; 1-345D Cat excavator (Down); 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (1 Komatsu HM400 down), 1-Komatsu excavator, 1 Cat vibratory roller.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

October 15, 2018

FROM: Carl King

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☒ Monday	☐ Thursday
☒ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☒ Cold	☐ Cool _____	Temperature Range 37-42		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Billy Burke, and Mike Webb.

Work Observed/In-Progress: Continued filling of Cell 1A east berm, Cell 1A south berm and Cell 1A north berm. Caliche/sand mix was excavated for cell berms. Began filling access road with competent caliche material when encountered.

Items Discussed/Observations: Water truck inoperable since Friday. Density tests taken today were limited to the east and south berms of Cell 1A due to water limitations.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon (down); 1 Cat vibratory roller.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

October 16, 2018

FROM: Carl King

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☐ Clear	☐ Dusty	☐ Monday	☐ Thursday
☒ Overcast	☒ Foggy	☐ Hot	☒ Muddy	☐ _____	☒ Tuesday	☐ Friday
☒ Rain	☒ Cold	☐ Cool _____	Temperature Range 40-44		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Billy Burke, and Mike Webb.

Work Observed/In-Progress: Continued filling of Cell 1A east berm, Cell 1A south berm and Cell 1A north berm. Caliche/sand mix was excavated for cell berms.

Items Discussed/Observations: Met with Joe regarding phasing and access roads. This will be a topic for discussion with Enviroworks during the weekly construction meeting. A scheduling meeting was held with Sean, Mark, Misty, and Joe. Misty authorized the purchase of geosynthetics for Cell 1B so that production can be scheduled.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

October 17, 2018

FROM: Carl King

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☐ Clear	☐ Dusty	☐ Monday	☐ Thursday
☒ Overcast	☒ Foggy	☐ Hot	☒ Muddy	☐ _____	☐ Tuesday	☐ Friday
☒ Rain	☒ Cold	☐ Cool _____	Temperature Range 42-47		☒ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Billy Burke, and Mike Webb.

Work Observed/In-Progress: Continued filling of Cell 1A east berm, Cell 1A south berm and Cell 1A north berm. Caliche/sand mix structural fill material was excavated for the cell berms.

Items Discussed/Observations: Completed Cell 1A north berm lifts 5 and 6 with 12 density tests. Lift 9 on the south berm received 6 density tests.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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333 Rio Rancho Blvd. NE, Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FIELD OBSERVATION REPORT

October 18, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☐ Clear	☐ Dusty	☐ Monday	☒ Thursday
☒ Overcast	☒ Foggy	☐ Hot	☒ Muddy	☐ _____	☐ Tuesday	☐ Friday
☒ Rain	☒ Cold	☐ Cool _____	Temperature Range 43-46		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer, and Mike Webb.

Work Observed/In-Progress: No work completed today due to excessive overnight rains. These rains left the site too muddy to work without creating more damage to prior work. Enviroworks to pull off-site until Monday 10-22-18.

Items Discussed/Observations: Completed Cell 1A north berm lift 5 density tests.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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333 Rio Rancho Blvd. NE, Suite 400
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505.867.6990

FIELD OBSERVATION REPORT

October 23, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☐ Clear	☐ Dusty	☐ Monday	☐ Thursday
☒ Overcast	☒ Foggy	☐ Hot	☒ Muddy	☐ _____	☒ Tuesday	☐ Friday
☒ Rain	☒ Cold	☐ Cool _____	Temperature Range 46-53		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer, and Mike Webb.

Work Observed/In-Progress: Continued mass excavation to near design grades on the cell floor. 12 density tests performed on the north berm, all passed their required >90% RSP.

Items Discussed/Observations:

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-John Deere 410E articulating dump truck, 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

October 24, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☐ Clear	☐ Dusty	☐ Monday	☐ Thursday
☒ Overcast	☒ Foggy	☐ Hot	☒ Muddy	☐ _____	☐ Tuesday	☐ Friday
☒ Rain	☒ Cold	☐ Cool _____	Temperature Range 46-53		☒ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer, and Mike Webb.

Work Observed/In-Progress: Two crews worked to clear and grub Cell 1B. One crew worked drainage channels to the north and east of Cell 1A.

Items Discussed/Observations: Due to heavy precipitation the night before, the excavated surface of Cell 1A was vulnerable to heavy equipment damage. In an effort to continue working, most of the available equipment was redirected to Cell 1B for clearing and grubbing. One excavator and 3 ADTs began excavating the drainage structure along the east side of the east perimeter berm.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-John Deere 410E articulating dump truck, 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator and three Cat 740B articulating dump trucks.

Requested Revisions or Interpretations: Chris Sheerer and Don Gray spoke about surveying the drainage features along the north and east berms of Cell 1A. It was agreed that this was acceptable as long as Enviroworks continued to maintain the features until the jobs was accepted by the owner.

Items to Verify:

Information or Action Required:
☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

October 25, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☐ Clear	☐ Dusty	☐ Monday	☒ Thursday
☒ Overcast	☒ Foggy	☐ Hot	☒ Muddy	☐ _____	☐ Tuesday	☐ Friday
☒ Rain	☒ Cold	☐ Cool _____	Temperature Range 47-74		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer, and Mike Webb.

Work Observed/In-Progress: Two crews worked to clear and grub Cell 1B. One crew to worked drainage channels to the north and east of Cell 1A.

Items Discussed/Observations: The excavated surface of Cell 1A remained vulnerable to heavy equipment damage. In an effort to continue working, most of the available equipment was redirected to Cell 1B for clear and grubbing. One excavator and 3 ADT's began excavating the drainage along the east side of the east perimeter berm.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-John Deere 410E articulating dump truck, 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator and three Cat 740B articulating dump trucks.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

October 29, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☒ Warm	☒ Clear	☐ Dusty	☒ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ Cool _____	Temperature Range 46-80		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer

Work Observed/In-Progress: Two crews mass excavated Cell 1B today. One crew worked on clear and grubbing of Cell 1B.

Items Discussed/Observations:

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-John Deere 410E articulating dump truck, 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

October 30, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☒ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☒ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ Cool	Temperature Range 50-75		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer

Work Observed/In-Progress: Two crews mass excavated Cell 1B. One crew worked on clearing and grubbing of Cell 1B.

Items Discussed/Observations: Chris Sheerer and Sean Grosette, of Enviroworks, Mark DeCarlo of Southwest Liner Systems, and Don Gray, Charles Fiedler, and Carl King of Gordon/PSC met with the board of Sundance regarding the progress of construction, future construction plans, and anticipated dates for completion. Details will be worked out over the next week or so.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-John Deere 410E articulating dump truck, 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

October 31, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☐ Clear	☐ Dusty	☐ Monday	☐ Thursday
☒ Overcast	☐ Foggy	☐ Hot	☒ Muddy	☐ _____	☐ Tuesday	☐ Friday
☒ Rain	☒ Cold	☐ Cool _____	Temperature Range 50-55		☒ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer

Work Observed/In-Progress: Two crews mass excavated Cell 1B. One crew worked on clearing and grubbing of Cell 1B.

Items Discussed/Observations: Rains the night before created unsuitable surface conditions for heavy equipment on the cell floor. Enviroworks will continued mass excavation efforts but stayed off the floor of the cell. Only the first cut to be made today. Southwest liner has been unloading materials all week. All materials have been received except for the textured liner that is to be delivered.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-John Deere 410E articulating dump truck, 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

November 1, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☒ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☒ Cool	Temperature Range 30-60		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer

Work Observed/In-Progress: All three crews worked on mass excavation of Cell 1B. Two crews focused on the first lift that was being cut to grade.

Items Discussed/Observations: Enviroworks was finalizing fill on the west end of the north berm. They began placing materials along east end of north berm and the west berm.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-John Deere 410E articulating dump truck, 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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505.867.6990

FIELD OBSERVATION REPORT

November 2, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☒ Friday
☐ Rain	☐ Cold	☒ Cool	Temperature Range 35-63		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer

Work Observed/In-Progress: All three crews worked on mass excavation of Cell 1B. Two crews focused on the first lift being cut to grade.

Items Discussed/Observations: Enviroworks placed materials along the east end of the north berm and the west berm. Since mid-morning yesterday approximately three trucks have been transporting materials in an effort to build a berm across Pond 5. This berm should be completed today.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-John Deere 410E articulating dump truck, 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

One ADT idle today.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

November 5, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☒ Warm	☒ Clear	☐ Dusty	☒ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ Cool	Temperature Range 44-75		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer

Work Observed/In-Progress: All three crews worked on mass excavation of Cell 1B. Two focused on the first lift that was being cut to grade. Gordon/PSC performed three density tests along the far west end of the south berm. All density tests passed their required ≥90% RSP.

Items Discussed/Observations: Enviroworks placed materials along east end of the north berm and the west berm. Since the mid-morning of 11-1-18, approximately three trucks have been transporting materials in an effort to build a berm across Pond 5. This berm should be completed today.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-John Deere 410E articulating dump truck, 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
☐ Attachments

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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Rio Rancho, New Mexico 87124
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FIELD OBSERVATION REPORT

November 6, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☒ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☒ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ Cool	Temperature Range 41-75		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer

Work Observed/In-Progress: All three crews worked on mass excavation of Cell 1B. Two focused on the first lift that was being cut to grade. Gordon/PSC performed twelve density tests along the cell floor north of the leachate trench. All density tests passed their required ≥90% RSP.

Items Discussed/Observations: Enviroworks placed materials along east end of the north berm and the west berm. Since the mid-morning of 11-1-18, approximately three trucks have been transporting materials in an effort to build a berm across Pond 5. Trucks were still moving material to the SSI site, unclear for what use. Weekly project meeting held via phone today.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-John Deere 410E articulating dump truck, 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

1 Komatsu ADT down.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
☒ Attachments: 2018-11-6 Sundance West_Progress_Mtg_Minutes

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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505.867.6990

FIELD OBSERVATION REPORT

November 7, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☒ Cold	☐ Cool _____	Temperature Range 44-53		☒ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer

Work Observed/In-Progress: All three crews worked on mass excavation of Cell 1B. Two focused on the first lift that was being cut to grade. Gordon/PSC performed six density tests along the base-grade for the west berm. All density tests passed their required ≥90% RSP.

Items Discussed/Observations: Enviroworks placed materials along east end of the north berm and the west berm. Since the mid-morning of 11-1-18 approximately three trucks have been transporting SSI materials in an effort to build a berm across Pond 5. Trucks were still moving material to the SSI site. It was unclear for what use.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-John Deere 410E articulating dump truck, 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

1 Komatsu ADT down. 1-345 excavator down.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

November 8, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☒ Thursday
☒ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☒ Cold	☐ Cool _____	Temperature Range 44-46		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer

Work Observed/In-Progress: All three crews worked on mass excavation of Cell 1B. Two focused on the first lift that was being cut to grade. Gordon/PSC performed twelve density tests along the cell floor south of the leachate trench. All density tests passed their required ≥90% RSP.

Items Discussed/Observations: Enviroworks placed materials along the east end of the north berm and the west berm. Since the mid-morning of 11-1-18, approximately three trucks have been transporting SSI materials in an effort to build a berm across Pond 5. Trucks still moving material to the SSI site. It was unclear for what use.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-John Deere 410E articulating dump truck, 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

1 Komatsu ADT down. 1-345 excavator down.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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FIELD OBSERVATION REPORT

November 9, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☒ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☒ Friday
☐ Rain	☒ Cold	☐ Cool	Temperature Range 39-41		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer

Work Observed/In-Progress: All three crews worked on mass excavation of Cell 1B. Two focused on the first lift that was being cut to grade. Gordon/PSC performed ten density tests along the sideslopes of the north and south berms. All density tests passed their required ≥90% RSP.

Items Discussed/Observations: Enviroworks placed materials along east end of the north berm and the west berm. Since mid-morning 11-1-18 approximately three trucks have been transporting materials to SSI.

Equipment: 2-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-John Deere 410E articulating dump truck, 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

1 Komatsu ADT down. 1-345 excavator down.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

November 12, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☒ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☒ Cold	☐ Cool _____	Temperature Range 33-34		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer; Southwest Liner Systems, Inc. – Lorenzo Zazpe

Work Observed/In-Progress: Enviroworks: All three crews worked on mass excavation of Cell 1B. Two focused on the first lift that was being cut to grade. Southwest Liner Systems: Offloaded two truckloads of textured FML material. Throughout the day materials were moved from the stockpile to the cell floor to begin lining operations on 11-13-18.

Items Discussed/Observations: Enviroworks placed materials along the east end of the north berm and the west berm. Since the mid-morning of 11-1-18 approximately three trucks have been transporting materials to SSI.

Equipment: 3-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

2 Komatsu ADT's down.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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333 Rio Rancho Blvd. NE, Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FIELD OBSERVATION REPORT

November 13, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☒ Tuesday	☐ Friday
☐ Rain	☒ Cold	☐ Cool _____	Temperature Range 26-46		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer; Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Don Gray and Carl King.

Work Observed/In-Progress: Enviroworks: All three crews worked on mass excavation of Cell 1B. Two on the first lift that was being cut to grade. Southwest Liner Systems: Placed GCL to panel E34 and secondary FML to panel E24. Gordon/PSC performed 12 density tests along the north and east berms. All density tests passed their required ≥90% of RSP.

Items Discussed/Observations: Enviroworks placed materials along the east end of the north berm and the west berm. Since the mid-morning of 11-1-18 approximately three trucks have been transporting materials to SSI.

Equipment: 3-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

2 Komatsu ADT's down.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
☒ Attachments: 2018-11-13 Sundance West_Progress_Mtg_Minutes

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

November 14, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☒ Cool	Temperature Range 26-46		☒ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer; Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Don Gray and Carl King.

Work Observed/In-Progress: Enviroworks: Two crews worked on mass excavation of Cell 1B. One crew focused on the first lift being cut to near-grade. Southwest Liner Systems: Placed GCL to panel B7D and secondary FML to panel B5B.

Items Discussed/Observations: Enviroworks placed materials along west end of the north berm and the west berm. Since the mid-morning of 11-1-18 approximately three trucks have been transporting materials to SSI.

Equipment: 3-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Water truck down half day.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

November 15, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☐ Monday	☒ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☒ Cool	Temperature Range 26-64		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer; Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Don Gray and Carl King.

Work Observed/In-Progress: Enviroworks: Two crews worked on mass excavation of Cell 1B. One focused on the first lift being cut to near-grade. Southwest Liner Systems: Placed GCL to panel B18D and secondary FML to panel B12B.

Items Discussed/Observations: Enviroworks placed materials along west end of the north berm and the west berm. Since mid-morning 11-1-18 approximately three trucks have been transporting materials to SSI.

Equipment: 3-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Water truck down. 1-345D Cat excavator and three Cat 740B articulating dump trucks worked a separate job on the SSI site.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

November 16, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☒ Friday
☐ Rain	☐ Cold	☒ Cool	Temperature Range 26-66		☐ Wednesday	☐ _____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer; Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Don Gray and Carl King.

Work Observed/In-Progress: Enviroworks: Two excavators worked on mass excavation of Cell 1B. One worked on the first lift that was being cut to near-grade. One excavator worked on the drainage features north of Cell 1B. Earthwork crew shut down for the weekend at 12:00 today. Southwest Liner Systems: Placed GCL to panel B28D and secondary FML to panel B19B.

Items Discussed/Observations: Enviroworks placed materials along the west end of the north berm and the west berm. Since the mid-morning of 11-1-18 approximately three trucks have been transporting materials to SSI.

Equipment: 3-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Water truck down.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

November 17, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☒ Cool	Temperature Range 26-53		☐ Wednesday	☒ Saturday

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer; Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Don Gray and Carl King.

Work Observed/In-Progress: Enviroworks: Offsite for weekend. Southwest Liner Systems: Placed GCL to panel B32D and secondary FML to panel B22B. This completes the installation of the secondary liner system.

Items Discussed/Observations:

Equipment: 3-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Water truck down.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
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Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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FIELD OBSERVATION REPORT

November 19, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☒ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☒ Cool_____	Temperature Range 25-64		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer; Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Don Gray.

Work Observed/In-Progress: Enviroworks: Worked on mass excavation of Cell 1B. Two excavators focused on two lifts of material removal. Approximately 2-3 trucks were still hauling caliche material to the SSI site. Southwest Liner Systems: Placed Double sided composite along the east berm to Panel E45. Primary liner was placed along the east slope to panel E22. This is the beginning of the drainage layer and primary layers of the landfill liner system.

Items Discussed/Observations:

Equipment: 3-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Water truck and 1-CAT 345D excavator down.

Requested Revisions or Interpretations:

Items to Verify:

Information or Action Required:
☐ Attachments:

Copies: ☐ Owner ☐A/E ☐ Contractor ☐ Consultants ☐_____ ☐ _____ ☐ File

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FIELD OBSERVATION REPORT

November 26, 2018

FROM: Carl King; Braden Belliveau

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☒ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☒ Cool_____	Temperature Range 29-53		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer; Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Carl King and Braden Belliveau.

Work Observed/In-Progress: Enviroworks: Worked on mass excavation of Cell 1B. Two excavators worked through two lifts of removal and placed as structural fill for the north, west and south berms. Gordon-PSC conducted density tests but disabled compactor impacting progress. Southwest Liner Systems: Placed double sided composite along the north berm to Panel E45; placed geonet from panel B-6 through B-26..

Items Discussed/Observations:

Equipment: 3-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller (down).

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Requested Revisions or Interpretations: None

Items to Verify: None

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐A/E ☐ Contractor ☐ Consultants ☐_____ ☐ _____ ☐ File

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505.867.6990

FIELD OBSERVATION REPORT

November 27, 2018

FROM: Carl King; Braden Belliveau

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☒ Tuesday	☐ Friday
☐ Rain	☐ Cold	☒ Cool	Temperature Range 32-68		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer; Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Carl King and Braden Belliveau.

Work Observed/In-Progress: Enviroworks: Worked on mass excavation of Cell 1B. Two excavators focused on two lifts of removal and placement as structural fill for the north, west and south berms. Conducted density tests but disabled compactor impacting progress. Southwest Liner Systems: Placed Primary Liner from Panel B-4 through B-10; completed the placement of geonet starting with Panel B-20..

Items Discussed/Observations:

Equipment: 3-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller (down).

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐A/E ☐ Contractor ☐ Consultants ☐_____ ☐ _____ ☐ File

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505.867.6990

FIELD OBSERVATION REPORT

November 28, 2018

FROM: Carl King; Braden Belliveau

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☒ Cool_____	Temperature Range 40-75		☒ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer; Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Carl King and Braden Belliveau.

Work Observed/In-Progress: Enviroworks: Worked on mass excavation of Cell 1B. Two excavators focused on two lifts of removal and placement as structural fill for the north, west and south berms. Conducted density tests but disabled compactor impacting progress. Southwest Liner Systems: Placed Primary Liner from Panel B-11 through B-16, and Primary Liner on the north slope up to B-22. This completed liner placement on the north slope. The primary liner was dual-track welded to the secondary liner along the south edge from B-1 through B-10.

Items Discussed/Observations:

Equipment: 3-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller (down).

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐A/E ☐ Contractor ☐ Consultants ☐_____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

November 29, 2018

FROM: Carl King; Braden Belliveau

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☐ Monday	☒ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☒ Windy	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☒ Cool	Temperature Range 54-77		☐ Wednesday	☐ Saturday

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer; Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Carl King and Braden Belliveau.

Work Observed/In-Progress: Enviroworks: Worked on mass excavation and grading of Cell 1B with Cat grader. One excavator worked on final mass removal and placed excavated soil as structural fill for the north, west and south berms. Conducted density tests. Southwest Liner Systems; Finished Primary Liner and began laying out the top layer of double sided geocomposite on the east slope.

Items Discussed/Observations:

Equipment: 3-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ File

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FIELD OBSERVATION REPORT

November 30, 2018

FROM: Carl King; Braden Belliveau

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☒ Warm	☒ Clear	☒ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☒ Very Windy	☐ Tuesday	☒ Friday
☐ Rain	☐ Cold	☐ Cool	Temperature Range 40-75		☐ Wednesday	☐ Saturday

Persons Contacted/Present at Site: Enviroworks – Chris Sheerer; Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Carl King and Braden Belliveau.

Work Observed/In-Progress: Enviroworks: Worked on final grading of Cell 1B. Conducted density tests. Southwest Liner Systems: Placed final geocomposite layer from Panels B-11 through B-16. Work was called to a halt for the day at approximately 11:00 due to high wind gusts of up to 35 mph.

Items Discussed/Observations: Discussed with Southwest Liner Systems welding an FML layer inside of the Chimney Drain heading west to collect any potential leachate, until the completion of Cell 1B.

Equipment: 3-Komatsu HM400 articulating dump trucks; 3-Cat 740B articulating dump truck; 1-345D Cat excavator; 1-Komatsu PC 490LC excavator, 2-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller (down).

Additional equipment from pond excavation: 1-345D Cat excavator, one D6T Cat dozer and three Cat 740B articulating dump trucks.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

December 1, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☒ AM Winds	Temperature Range 34-63		☐ Wednesday	☒ Saturday

Persons Contacted/Present at Site: Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Don Gray.

Work Observed/In-Progress: Enviroworks: Offsite for the weekend. Southwest Liner Systems: Placed Single Sided composite, top layer, on the floor from to Panel B-13A.

Items Discussed/Observations:

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-349D Cat excavator, 2 D6T Cat dozer and 1 Cat 740B articulating dump trucks, and 2-Komatsu HM400 articulating dump trucks

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

December 2, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☒ AM Winds	Temperature Range 34-61		☐ Wednesday	☒ Sunday

Persons Contacted/Present at Site: Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Don Gray.

Work Observed/In-Progress: Enviroworks: Offsite for the weekend. Southwest Liner Systems: Placed Single Sided composite, top layer, on the floor to Panel B-15B.

Items Discussed/Observations:

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Additional equipment from pond excavation: 1-349D Cat excavator, 2 D6T Cat dozer and 1 Cat 740B articulating dump trucks, and 2-Komatsu HM400 articulating dump trucks

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

December 3, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☒ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐_____	Temperature Range 27-55		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. - Chris Sheerer and Billy Burke; Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Don Gray.

Work Observed/In-Progress: Enviroworks: Moved caliche material from stockpile to the north and west perimeter berms. Gordon/PSC performed several density tests. The six tests taken along the north berm passed. The west and south berms require additional water and compaction efforts. Southwest Liner Systems: Placed Single Sided composite, top layer, on the floor to Panel B-30A.

Items Discussed/Observations:

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐A/E ☐ Contractor ☐ Consultants ☐_____ ☐ _____ ☒ File

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333 Rio Rancho Blvd. NE, Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FIELD OBSERVATION REPORT

December 4, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☒ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐_____	Temperature Range 23-52		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. - Chris Sheerer and Billy Burke; Southwest Liner Systems, Inc. – Lorenzo Zazpe; Gordon/PSC – Don Gray.

Work Observed/In-Progress: Enviroworks: Installed plywood along the south edge of installed liner system. Enviroworks also placed loads of soil along the west end to aid in the protection of the system from excessive winds. Placement of PSL was initiated starting in the SE corner. Southwest Liner Systems: Completed placement of the Single Sided composite, top layer, on the floor.

Items Discussed/Observations: Gordon/PSC observed initial placement and spoke with Enviroworks field personnel on proper installation techniques.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☒ Attachments: 2018-12-04 Sundance West_Progress_Mtg_Minutes

Copies: ☐ Owner ☐A/E ☐ Contractor ☐ Consultants ☐_____ ☐ _____ ☒ File

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505.867.6990

FIELD OBSERVATION REPORT

December 5, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☒ Cloudy afternoon	Temperature Range 39-53		☒ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. - Chris Sheerer and Billy Burke; Southwest Liner Systems, Inc. – Gabe Zazpe; Gordon/PSC – Don Gray.

Work Observed/In-Progress: Enviroworks: Continued installation of pre-selected PSL material. Approximately 1/3 of the south half of the cell completed by COB. Southwest Liner Systems: Onsite waiting on truck. Aided Gordon/PSC with 9 density tests along the west and south berms. All tests passed their respective ≥90% of.

Items Discussed/Observations: Gordon/PSC observed initial placement and spoke with Enviroworks field personnel regarding proper installation techniques.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

December 6, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☐ Monday	☒ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ Cloudy afternoon	Temperature Range 34-45		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. - Chris Sheerer and Billy Burke; Gordon/PSC – Don Gray.

Work Observed/In-Progress: Enviroworks: Continued installation of pre-selected PSL material. Approximately 2/3 of the south half of the cell completed by COB.

Items Discussed/Observations: Gordon/PSC observed initial placement and spoke with Enviroworks field personnel regarding proper installation techniques.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

December 7, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☒ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☒ Friday
☐ Rain	☐ Cold	☐ Cloudy afternoon	Temperature Range 32-40		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. - Chris Sheerer and Billy Burke; Gordon/PSC – Don Gray.

Work Observed/In-Progress: Enviroworks: Continued installation of pre-selected PSL material. Approximately 3/4 of the south half of the cell completed by COB.

Items Discussed/Observations: Gordon/PSC observed initial placement and spoke with Enviroworks field personnel regarding proper installation techniques.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozers; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

December 11, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☒ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☒ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ _____	Temperature Range 30-55		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. - Chris Sheerer and Billy Burke; Gordon/PSC – Don Gray.

Work Observed/In-Progress: Enviroworks: Continued installation of pre-selected PSL material. Approximately 3/4 of the south half of the cell is complete. A temporary ramp was built to begin placement of PSL on the north side of the leachate trench.

Items Discussed/Observations: Gordon/PSC observed initial placement and spoke with Enviroworks field personnel regarding proper installation techniques. Leachate line will be delayed due to a manufacturing delay in the production of pipe.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☒ Attachments: 2018-12-11 Sundance West_Progress_Mtg_Minutes

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FIELD OBSERVATION REPORT

December 12, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☒ Partly Cloudy	Temperature Range 37-64		☒ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. - Chris Sheerer and Billy Burke; Gordon/PSC – Don Gray.

Work Observed/In-Progress: Enviroworks: Continued installation of pre-selected PSL material. Approximately 3/4 of the south half of the cell is complete. A temporary ramp was built to begin placement of PSL on the north side of the leachate trench. Approximately ½ of the north side of the cell has had PSL placed upon it.

Items Discussed/Observations: Gordon/PSC observed initial placement and spoke with Enviroworks field personnel regarding the proper installation techniques. Leachate line will be delayed due to a manufacturing delay in the production of pipe.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

December 13, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☒ Snow	☐ Warm	☐ Clear	☐ Dusty	☐ Monday	☒ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☒ Muddy	☐ _____	☐ Tuesday	☐ Friday
☒ Rain	☒ Cold	☒ Partly Cloudy	Temperature Range 34-52		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. - Chris Sheerer and Billy Burke; Gordon/PSC – Don Gray.

Work Observed/In-Progress: Enviroworks: Continued installation of pre-selected PSL material. Approximately 3/4 of the south half of the cell is complete. A temporary ramp was built to begin placement of PSL on the north side of the leachate trench. Approximately 2/3 of the north side of the cell has had PSL placed upon it.

Items Discussed/Observations: Gordon/PSC observed initial placement and spoke with Enviroworks field personnel regarding proper installation techniques. Leachate line will be delayed due to a manufacturing delay in the production of pipe.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐A/E ☐ Contractor ☐ Consultants ☐_____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

December 17, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☒ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☒ Cold	☒ Partly Cloudy	Temperature Range 38-57		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. - Chris Sheerer and Billy Burke; Gordon/PSC – Don Gray.

Work Observed/In-Progress: Enviroworks: Continued installation of pre-selected PSL material. Approximately 3/4 of the south half of the cell is complete. A temporary ramp was built to begin placement of PSL on the north side of the leachate trench. Approximately 3/4 of the north side of the cell has had PSL placed upon it.

Items Discussed/Observations: Gordon/PSC observed initial placement and spoke with Enviroworks field personnel regarding proper installation techniques. Leachate line will be delayed due to a manufacturing delay in the production of pipe.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐A/E ☐ Contractor ☐ Consultants ☐_____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

December 18, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☒ Tuesday	☐ Friday
☐ Rain	☒ Cold	☒ Partly Cloudy	Temperature Range 38-59		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. - Chris Sheerer and Billy Burke; Gordon/PSC – Don Gray.

Work Observed/In-Progress: Enviroworks: Continued installation of pre-selected PSL material. Approximately 3/4 of the south half of the cell is complete. A temporary ramp was built to begin placement of PSL on the north side of the leachate trench. Approximately 3/4 of the north side of the cell has had PSL placed upon it. EW cutting PSL to grade using GPS dozer. PSL placement cannot be completed until the Leachate Collection System is installed. EW worked to clean up sideslopes of the perimeter berms.

Items Discussed/Observations: Gordon/PSC observed initial placement and spoke with Enviroworks field personnel regarding proper installation techniques. Leachate line will be delayed due to a manufacturing delay in the production of pipe.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☒ Attachments: 2018-12-18 Sundance West_Progress_Mtg_Minutes

Copies: ☐ Owner ☐A/E ☐ Contractor ☐ Consultants ☐_____ ☐ _____ ☒ File

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505.867.6990

FIELD OBSERVATION REPORT

December 19, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☒ Cold	☒ Partly Cloudy	Temperature Range 38-66		☒ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. - Chris Sheerer and Billy Burke; Gordon/PSC – Don Gray.

Work Observed/In-Progress: PSL was placed to maximum extents without infringing upon the future installation of the Leachate Collection System. Enviroworks continues to compact and dress sideslopes to design grade.

Items Discussed/Observations: Gordon/PSC observed initial placement and spoke with Enviroworks field personnel regarding proper installation techniques. Leachate line will be delayed due to a manufacturing delay in the production of pipe.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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505.867.6990

FIELD OBSERVATION REPORT

December 20, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☒ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☒ Cold	☒ Partly Cloudy	Temperature Range 30-54		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. - Chris Sheerer; Gordon/PSC – Don Gray.

Work Observed/In-Progress: PSL was placed to maximum extents without infringing upon the future installation of the Leachate Collection System. Enviroworks continues to compact and dress sideslopes to design grade. Gordon/PSC performed 24 density tests along the floor of Cell 1B, and 10 density tests along the compacted anchor trenches for Cell 1A. All passed ≥90% of the required RSP.

Items Discussed/Observations: Gordon/PSC observed initial placement and spoke with Enviroworks field personnel regarding proper installation techniques. Leachate line will be delayed due to a manufacturing delay in the production of pipe.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐A/E ☐ Contractor ☐ Consultants ☐_____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

December 21, 2018

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☒ Friday
☐ Rain	☒ Cold	☒ Partly Cloudy	Temperature Range 30-54		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. - Chris Sheerer and Billy Burke; Gordon/PSC – Don Gray.

Work Observed/In-Progress: PSL is placed to maximum extents without infringing upon the installation of the Leachate Collection System. Enviroworks continues to compact and dress sideslopes to design grades.

Items Discussed/Observations: Gordon/PSC observed initial placement and spoke with Enviroworks field personnel regarding proper installation techniques. Leachate line will be delayed due to a manufacturing delay in the production of pipe.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

January 03, 2019

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☒ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☒ Cold	☐ Partly Cloudy	Temperature Range 23-50		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. – Chris, Southwest Liner Systems – Lorenzo Zazpe, Gordon/PSC – Don Gray.

Work Observed/In-Progress: PSL is placed to maximum extents without infringing upon the installation of the Leachate Collection System. Enviroworks continues to compact and dress sideslopes to design grade. Gordon/PSC performed 4 density tests along the slope of the north berm. All test passed their required ≥90% of RSP. Southwest Liner Systems cleaned the tie-in to Cell 1A and staged material for lining activities on Jan 04.

Items Discussed/Observations: Gordon/PSC observed initial placement and spoke with Enviroworks field personnel regarding proper installation techniques. Leachate line will be delayed due to a manufacturing delay in the production of pipe.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐A/E ☐ Contractor ☐ Consultants ☐_____ ☐ _____ ☒ File

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505.867.6990

FIELD OBSERVATION REPORT

January 04, 2019

FROM: Don Gray

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☒ Friday
☐ Rain	☒ Cold	☐ Partly Cloudy	Temperature Range 27-64		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. – Chris, Southwest Liner Systems – Lorenzo Zazpe, Gordon/PSC – Don Gray and Braden Belliveau.

Work Observed/In-Progress: PSL is placed to maximum extents without infringing upon the installation of the Leachate Collection System. Enviroworks continues to compact and dress sideslopes to design grade. Gordon/PSC observed placement of GCL and FML to panels 40 and 28 respectively.

Items Discussed/Observations:

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller, 1-extended reach forklift and all associated lining equipment.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐A/E ☐ Contractor ☐ Consultants ☐_____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

January 05, 2019

FROM: Braden Belliveau

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☐ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☒ Cold	☐ Partly Cloudy	Temperature Range 21-68		☐ Wednesday	☒ Saturday_____

Persons Contacted/Present at Site: Southwest Liner Systems – Lorenzo Zazpe, Gordon/PSC –Braden Belliveau.

Work Observed/In-Progress: Gordon/PSC observed placement of GCL and FML to panels 51 and 35 respectively.

Items Discussed/Observations:

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller, 1-extended reach forklift and all associated lining equipment.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐A/E ☐ Contractor ☐ Consultants ☐_____ ☐ _____ ☒ File

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FIELD OBSERVATION REPORT

January 06, 2019

FROM: Braden Belliveau

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather
☒ Clear ☐ Snow ☐ Warm
☐ Overcast ☐ Foggy ☐ Hot
☐ Rain ☒ Cold ☐ Partly Cloudy

Site Conditions
☒ Clear ☐ Dusty
☐ Muddy ☐ _____
Temperature Range 21-68

Day
☐ Monday ☐ Thursday
☐ Tuesday ☐ Friday
☐ Wednesday ☐ Saturday
☒ Sunday

Persons Contacted/Present at Site: Southwest Liner Systems – Lorenzo Zazpe, Gordon/PSC –Braden Belliveau.

Work Observed/In-Progress: Southwest Liner Systems called a halt to work upon arrival at the site due to morning rain and expected high winds beginning at 1100.

Items Discussed/Observations:

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller, 1-extended reach forklift and all associated lining equipment.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐A/E ☐ Contractor ☐ Consultants ☐_____ ☐ _____ ☒ File

X:\2018\0530.18\05 CONSTR\01 REPT\Daily Reports\Cell 1A\2019-01-06 Field Observation Report DG 01-06-2019.docm

333 Rio Rancho Blvd. NE, Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FIELD OBSERVATION REPORT

January 07, 2019

FROM: Braden Belliveau

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☒ Clear	☐ Snow	☒ Warm	☒ Clear	☐ Dusty	☒ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☐ Tuesday	☐ Friday
☐ Rain	☐ Cold	☐ Partly Cloudy	Temperature Range 39-64		☐ Wednesday	☐ Saturday_____

Persons Contacted/Present at Site: Enviroworks LLC. – Chris, Southwest Liner Systems – Lorenzo Zazpe, Gordon/PSC – Braden Belliveau.

Work Observed/In-Progress: Enviroworks began to piece together the leachate collection pipe using butt-fusion welding.

Items Discussed/Observations: Gordon/PSC observed placement of geotextile in the leachate trench. Gordon/PSC spoke with Enviroworks field personnel regarding proper installation techniques.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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333 Rio Rancho Blvd. NE, Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FIELD OBSERVATION REPORT

January 08, 2019

FROM: Braden Belliveau

PROJECT NAME: Sundance West Phase 2, Cell 1A

PROJECT NO.: 01053018.02

Weather			Site Conditions		Day	
☐ Clear	☐ Snow	☒ Warm	☒ Clear	☐ Dusty	☐ Monday	☐ Thursday
☐ Overcast	☐ Foggy	☐ Hot	☐ Muddy	☐ _____	☒ Tuesday	☐ Friday
☐ Rain	☐ Cold	☒ Partly Cloudy	Temperature Range 39-53		☐ Wednesday	☐ Saturday

Persons Contacted/Present at Site: Enviroworks LLC. – Chris, Southwest Liner Systems – Lorenzo Zazpe, Gordon/PSC – Carl King.

Work Observed/In-Progress: Enviroworks places the leachate collection pipe in the trench and backfills the trench with 6 inches of gravel. The grade of the pipe is confirmed to be 2% before backfilling. Enviroworks begins fine grading of Cell 1A.

Items Discussed/Observations: Gordon/PSC observed placement of the leachate collection pipe in the leachate trench. Gordon/PSC spoke with Enviroworks field personnel regarding proper installation techniques. Southwest placed plastic liner and a pump in remaining uncovered leachate trench in preparation for any potential rain event.

Equipment: 3-Cat 740B articulating dump truck, 1-Komatsu PC 490LC excavator, 1-D6T Cat dozer; 1-140M Cat grader; 1-CAT water wagon; 1 Cat vibratory roller.

Requested Revisions or Interpretations: None.

Items to Verify: None.

Information or Action Required: None.
☐ Attachments:

Copies: ☐ Owner ☐ A/E ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☒ File

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FIELD LOG AND PHOTOGRAPHS

Project Photographs

Project Photographs

9-17-18 Clear and Grub of project area. Northwest view.

9-19-18 Unused tanks to be removed from the project area. North view.

Project Photographs

9-23-18 Area of deep roots cleared. West view.

10-01-18 Area cleared, staked, and ready for berm construction. Southwest view.

Project Photographs

10-9-18 Excavation and berm construction from above. East view.

10-23-18 Excavation and berm construction from above. East view.

Project Photographs

10-25-18 Landfill excavation, berm and perimeter drainage construction. Southwest view.

10-31-18 Berm construction density test in progress.

Project Photographs

11-05-18 Southern berm construction nearing completion. West view.

11-13-18 Installed GCL with panel number, roll number, and length marked.

Project Photographs

11-13-18 Free bentonite applied to GCL seams.

11-13-18 Textured FML panel installed and marked with panel number and roll number.

Project Photographs

11-13-18 Textured FML panel marked with a destructive test to be cut.

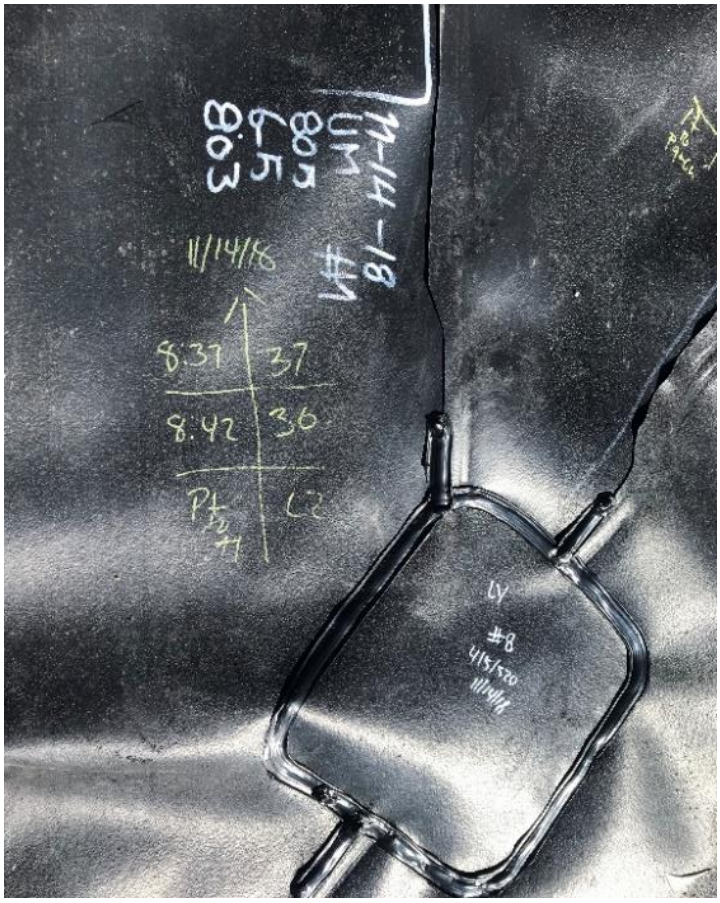
11-13-18 Textured FML secondary liner installed on the east slope. East view.

Project Photographs

11-14-18 On-site destructive test in progress.

11-14-18 Bead repair on installed FML.

Project Photographs

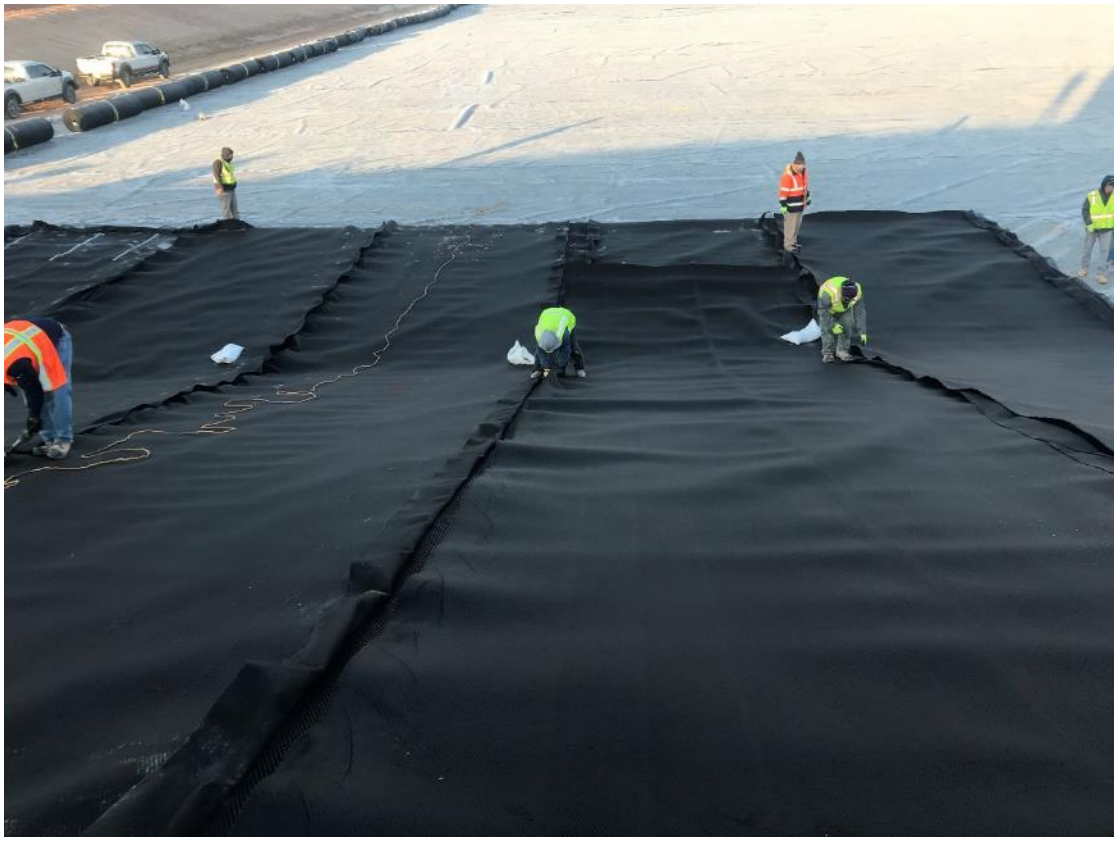


11-14-18 FML installed with a patch, seaming and air test information.

11-15-18 Wedge welding machine.

Project Photographs

11-16-18 GCL installation in progress, north slope/berm. Northwest view.



11-19-18 Installation of double-sided geocomposite on east slope/berm. West view.

Project Photographs

11-19-18 FML liner progression from east to west. East view.

11-20-18 Patch repair in progress, primary liner.

Project Photographs

11-28-18 Liner installation progression. North view.

12-1-18 Installation of single-sided geocomposite on cell floor. North view.

Project Photographs

12-4-18 Completed geosynthetics installation of Cell 1A. Protective Soil Layer placement in southeast corner. Note Cell 1B excavation progression. East view.

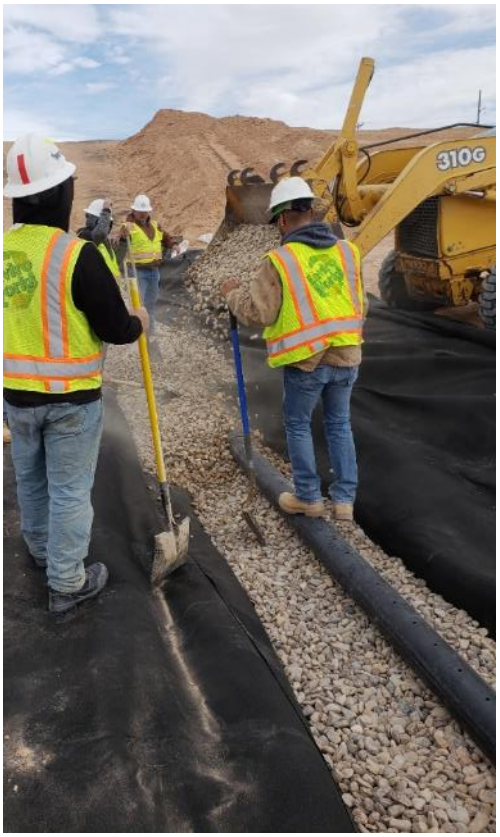
12-5-18 Protective Soil Layer installation in progress. Northeast view.

Project Photographs

12-12-18 Protective Soil Layer installation in progress. Northeast view.

1-08-19 Fusing of HDPE pipe for Leachate Collection System.
Note geotextile and bedding aggregate.

Project Photographs



1-08-19 Installation of the Leachate Collection System. East view.

APPENDIX A

Geotechnical Soil Testing

A.1. Moisture / Density Relationships

Soils / Aggregates

Report Date: September 26, 2018

Client		**Project**	
Name:	ParkHill Smith & Cooper	**Name:**	(18-519-02102) Sundance West Cell 1A
Address:	4222 85th Street Lubbock, TX 79423	**Address:**	Eunice, NM
Attention:	Don Gray	**Phase:**	**Task:**
PO Number:		**Manager:**	Roberto Balderrama
Sample Date:	9/19/2018 by Client	**Lab/Ref. #:**	2102-02L
Source:	Onsite stockpile	**Description:**	Field description: Brown fine clean sand ASTM D2487 lab description: Poorly graded sand with silt, Fine grain, No PI

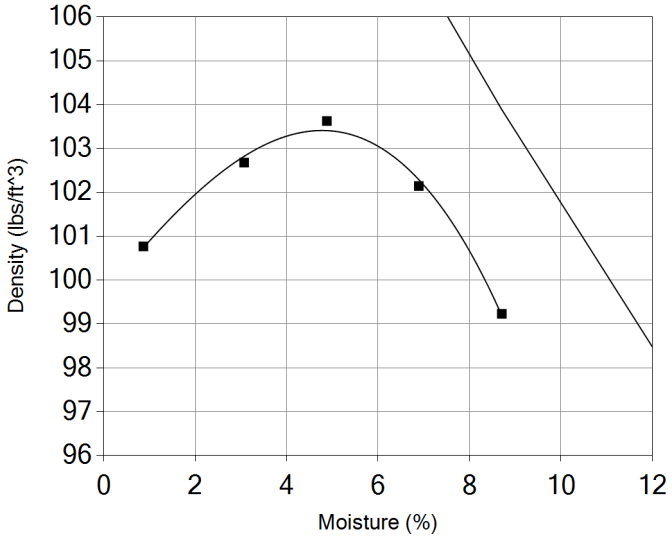
Type of Specification: No project specification was provided.

Sieve Analysis: (ASTM C117-13/C136-14)

200 Wash Procedure: A

Sieve Size	Passing	Specification Min	Specification Max
#4	100%		
#8	100%		
#10	100%		
#16	100%		
#30	100%		
#40	100%		
#50	95%		
#60	87%		
#100	38%		
#200	6.1%		

Fineness Modulus: 0.67



Plasticity Index (ASTM D4318-10) PI Air Dried.

Preparation Method: Dry **Liquid Limit Method:** A

Soil Classification (ASTM D2487-11) SP-SM

		Specification Min	Specification Max
Liquid Limit:	NV		
Plastic Limit:	NV		
Plasticity Index:	NP		

Moisture Density Relationship: (ASTM D698-12) Method: A

Preparation Method: Dry **Rammer Type:** Manual

Specific Gravity: 1.95 Assumed

Maximum Density (lbs/ft^3): 103.4

Optimum Moisture (%): 4.8

Remarks: Material is sandy / non-plastic. Sample slides in bowl; would not roll, flattens.

Distribution: Don Gray

Reviewed By: Roberto Balderrama

Amec Foster Wheeler Environment & Infrastructure, Inc. - 1104 Main Street Eunice, NM 88231 phone: (575) 394-0424 fax: (505) 821-7371

Soils / Aggregates

Report Date: September 26, 2018

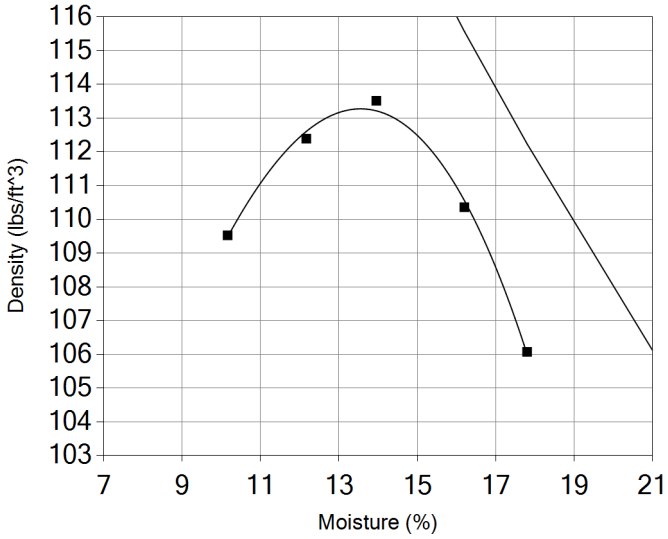
Client		**Project**	
Name:	ParkHill Smith & Cooper	**Name:**	(18-519-02102) Sundance West Cell 1A
Address:	4222 85th Street Lubbock, TX 79423	**Address:**	Eunice, NM
Attention:	Don Gray	**Phase:**	**Task:**
PO Number:		**Manager:**	Roberto Balderrama
Sample Date:	9/19/2018 by Client	**Lab/Ref. #:**	2102-01L
Source:	Onsite stockpile	**Description:**	Field description: Tan fine silty sand w/ small friable caliche ASTM D2487 lab description: Silty sand, Coarse to Fine grain, No PI

Type of Specification: No project specification was provided.

Sieve Analysis: (ASTM C117-13/C136-14)

200 Wash Procedure: A

Sieve Size	Passing	Specification Min	Specification Max
3/4in.	100%		
1/2in.	99%		
3/8in.	99%		
#4	99%		
#8	98%		
#10	97%		
#16	96%		
#30	94%		
#40	92%		
#50	88%		
#100	53%		
#200	24%		



Plasticity Index (ASTM D4318-10) PI Air Dried.

Preparation Method: Dry **Liquid Limit Method:** A

Soil Classification (ASTM D2487-11) SM

		Specification Min	Specification Max
Liquid Limit:	NV		
Plastic Limit:	NV		
Plasticity Index:	NP		

Moisture Density Relationship: (ASTM D698-12) Method: B

Preparation Method: Dry **Rammer Type:** Manual

Specific Gravity: 2.651
Assumed

Maximum Density (lbs/ft^3): 113.3

Optimum Moisture (%): 13.6

Remarks: Material is sandy / non-plastic. Sample slides in bowl; would not roll, flattens.

Distribution: Don Gray

Reviewed By: Roberto Balderrama

Amec Foster Wheeler Environment & Infrastructure, Inc. - 1104 Main Street Eunice, NM 88231 phone: (575) 394-0424 fax: (505) 821-7371

Soils / Aggregates

Report Date: September 26, 2018

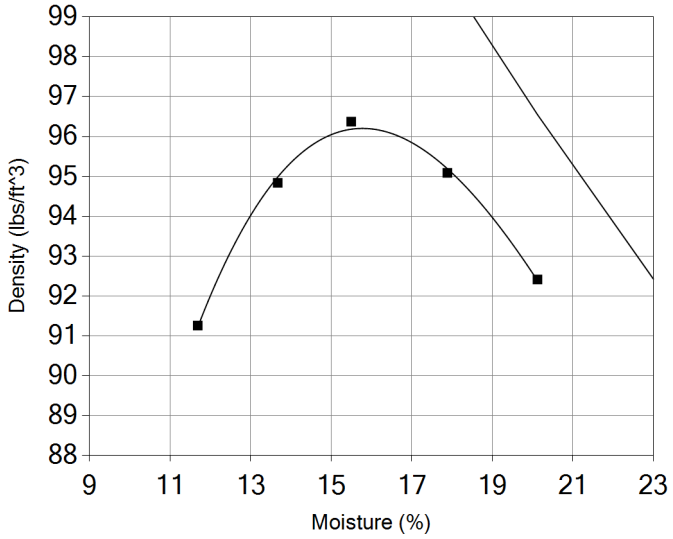
Client		**Project**	
Name:	ParkHill Smith & Cooper	**Name:**	(18-519-02102) Sundance West Cell 1A
Address:	4222 85th Street Lubbock, TX 79423	**Address:**	Eunice, NM
Attention:	Don Gray	**Phase:**	**Task:**
PO Number:		**Manager:**	Roberto Balderrama
Sample Date:	9/19/2018 by Client	**Lab/Ref. #:**	2102-03L
Source:	Onsite stockpile	**Description:**	Field description: Reddish tan silty sand w/ friable caliche ASTM D2487 lab description: Silty sand, Fine grain, No PI

Type of Specification: No project specification was provided.

Sieve Analysis: (ASTM C117-13/C136-14)

200 Wash Procedure: A

Sieve Size	Passing	Specification Min	Specification Max
1/2in.	100%		
3/8in.	100%		
#4	99%		
#8	89%		
#10	86%		
#16	77%		
#30	68%		
#40	64%		
#50	57%		
#100	34%		
#200	18%		



Plasticity Index (ASTM D4318-10) PI Air Dried.

Preparation Method: Dry **Liquid Limit Method:** A

Soil Classification (ASTM D2487-11) SM

		Specification Min	Specification Max
Liquid Limit:	NV		
Plastic Limit:	NV		
Plasticity Index:	NP		

Moisture Density Relationship: (ASTM D698-12) Method: B

Preparation Method: Dry **Rammer Type:** Mechanical

Specific Gravity: 2.251
Assumed

Maximum Density (lbs/ft^3): 96.2

Optimum Moisture (%): 15.8

Remarks:

Distribution: Don Gray

Reviewed By: Roberto Balderrama

Amec Foster Wheeler Environment & Infrastructure, Inc. - 1104 Main Street Eunice, NM 88231 phone: (575) 394-0424 fax: (505) 821-7371

APPENDIX A

Geotechnical Soil Testing

A.2. Subgrade (Cell 1A Floor) Test Results

333 Rio Rancho Blvd., Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West

LOCATION: Floor
PROJECT NO.: 01053018
PAGE NO.: 1

TESTING INSTRUMENT: Instrotek 3500

TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
B	1A-1	99%	112.1	12.2	11/6/2018	FLOOR
B	1A-2	92%	103.8	12.6	11/6/2018	FLOOR
B	1A-3	91%	103.1	6.9	11/6/2018	FLOOR
B	1A-4	92%	103.8	10.5	11/6/2018	FLOOR
B	1A-5	94%	106.1	11.8	11/6/2018	FLOOR
B	1A-6	99%	112.0	15.3	11/6/2018	FLOOR
B	1A-7	96%	109.2	11.5	11/6/2018	FLOOR
B	1A-8	93%	105.1	11.1	11/6/2018	FLOOR
B	1A-9	94%	106.9	9.3	11/6/2018	FLOOR
B	1A-10	90%	102.1	10.5	11/6/2018	FLOOR
B	1A-11	99%	112.3	6.6	11/6/2018	FLOOR
B	1A-12	91%	103.6	9.7	11/6/2018	FLOOR
B	1A-13	100%	113.3	8.2	11/8/2018	FLOOR
B	1A-14	99%	112.6	8.5	11/8/2018	FLOOR
B	1A-15	99%	112.6	7.9	11/8/2018	FLOOR
B	1A-16	100%	112.9	9.8	11/8/2018	FLOOR
B	1A-17	99%	112.6	10.7	11/8/2018	FLOOR
B	1A-18	92%	104.6	9.1	11/8/2018	FLOOR
B	1A-19	90%	101.8	9.8	11/8/2018	FLOOR
B	1A-20	99%	112.2	9.7	11/8/2018	FLOOR
B	1A-21	91%	102.9	7.0	11/8/2018	FLOOR
B	1A-22	99%	112.5	10.2	11/8/2018	FLOOR
B	1A-23	99%	112.7	10.4	11/8/2018	FLOOR
B	1A-24	98%	111.0	9.6	11/8/2018	FLOOR

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FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West

LOCATION: Sidewall
PROJECT NO.: 01053018
PAGE NO.: 2

TESTING INSTRUMENT: Instrotek 3500

TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
B	ES1	99%	112.4	9.3	11/9/2018	CELL 1A SIDEWALL
B	ES2	98%	111.6	9.1	11/9/2018	CELL 1A SIDEWALL
B	ES3	94%	106.9	8.8	11/9/2018	CELL 1A SIDEWALL
B	ES4	93%	105.1	6.3	11/9/2018	CELL 1A SIDEWALL
B	ES5	99%	112.6	9.4	11/9/2018	CELL 1A SIDEWALL
B	ES6	97%	109.7	7.8	11/9/2018	CELL 1A SIDEWALL
B	NS1	96%	109.3	12.6	11/9/2018	CELL 1A SIDEWALL
B	NS2	97%	109.8	10.1	11/9/2018	CELL 1A SIDEWALL
B	NS3	98%	111.6	9.2	11/9/2018	CELL 1A SIDEWALL
B	NS4	99%	112.4	11.8	11/9/2018	CELL 1A SIDEWALL

APPENDIX A

Geotechnical Soil Testing

A.3. Berm Density Testing Results

333 Rio Rancho Blvd., Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West
LOCATION: Berm
PROJECT NO.: 01053018
PAGE NO.: 1
TESTING INSTRUMENT: Instrotek 3500
TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
B	S1-1	90%	102.2	5.3	9/27/2018	
B	S1-2	99%	112.5	8.1	9/27/2018	
D	S1-3	96%	100.4	3.9	9/27/2018	
B	S1-4	94%	106.9	3.4	9/27/2018	
B	S1-5	89%	100.8	1.7	9/27/2018	
B	S1-6	93%	105.4	5.6	9/27/2018	
B	E1-1	95%	107.2	6.6	9/27/2018	
B	E1-2	99%	112.1	6.2	9/27/2018	
B	E1-3	95%	107.8	5.7	9/27/2018	
B	E1-4	97%	110.2	13.2	9/27/2018	
B	E1-5	98%	110.6	5.6	9/27/2018	
B	E1-6	96%	109.0	9.9	9/27/2018	
D	E1-2	95%	99.0	8.2	10/2/2018	
B	E2-2	91%	102.7	6.3	10/2/2018	
B	E3-2	96%	108.5	10.8	10/2/2018	
D	E4-2	95%	99.6	9.1	10/2/2018	
B	E5-2	91%	102.7	4.6	10/2/2018	
D	E6-2	96%	100.0	5.9	10/2/2018	
B	S1-2	99%	112.1	5.9	10/3/2018	
B	S2-2	97%	110.0	4.6	10/3/2018	
D	S3-2	97%	100.7	5.5	10/3/2018	
D	S4-2	96%	100.5	4.9	10/3/2018	
B	S5-2	90%	102.0	5.0	10/3/2018	
B	S6-2	90%	101.7	4.5	10/3/2018	
B	E1-3	92%	104.2	6.2	10/3/2018	
B	E2-3	94%	106.5	5.7	10/3/2018	
B	E3-3	89%	100.6	6.3	10/3/2018	
B	E4-3	90%	102.2	5.3	10/3/2018	
D	E5-3	97%	101.0	6.3	10/3/2018	
D	E6-3	97%	101.4	4.1	10/3/2018	
B	E1-4	94%	106.9	7.0	10/3/2018	
B	E2-4	95%	107.5	4.4	10/3/2018	
B	E3-4	92%	103.9	5.5	10/3/2018	
B	E4-4	92%	104.0	4.9	10/3/2018	

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FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West
LOCATION: Berm
PROJECT NO.: 01053018
PAGE NO.: 2
TESTING INSTRUMENT: Instrotek 3500
TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
B	E5-4	91%	103.0	3.6		
D	E5-4	97%	101.4	5.2		
D	E1-5	94%	98.1	4.1		
B	E2-5	94%	106.4	9.2		
B	E3-5	97%	109.4	7.0		
B	E4-5	90%	102.4	7.7		
B	E5-5	91%	103.1	5.1		
D	E6-5	96%	100.0	4.7		
D	E1-6	96%	100.2	3.8		
B	E2-6	95%	107.6	8.8		
B	E3-6	91%	103.3	7.0		
B	E4-6	95%	107.4	7.2		
B	E5-6	90%	101.6	5.1		
B	E6-6	90%	101.8	4.8		
B	S1-3	93%	105.9	6.5		
D	S2-3	96%	100.3	5.5		
B	S3-3	90%	102.1	4.4		
B	S4-3	91%	102.6	3.8		
B	S5-3	92%	104.1	5.3		
D	S6-3	95%	99.6	4.2		
B	N1-1	94%	106.8	5.2		
B	N1-2	92%	104.5	5.8		
B	N1-3	95%	107.6	5.9		
B	N1-4	90%	102.4	5.8		
B	N1-5	95%	107.5	4.4		
B	N1-6	90%	101.8	4.0		
B	S1-4	96%	108.8	6.4		
D	S2-4	95%	98.8	5.9		
B	S3-4	88%	99.7	5.3		
B	S4-4	92%	104.4	3.7		
B	S5-4	92%	103.8	5.6		
B	S6-4	91%	102.7	3.5		

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FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West
LOCATION: Berm
PROJECT NO.: 01053018
PAGE NO.: 3
TESTING INSTRUMENT: Instrotek 3500
TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
B	N1-2	90%	101.8	3.6	10/9/2018	
B	N2-2	92%	104.7	3.9	10/9/2018	
B	N3-2	92%	104.5	5.8	10/9/2018	
D	N4-2	96%	100.0	3.5	10/9/2018	
B	N5-2	91%	103.6	4.5	10/9/2018	
B	N6-2	96%	108.6	5.6	10/9/2018	
B	E1-7	98%	111.4	6.5	10/10/2018	
B	E2-7	96%	108.8	7.6	10/10/2018	
B	E3-7	93%	105.7	4.4	10/10/2018	
B	E4-7	95%	107.9	5.8	10/10/2018	
B	E5-7	93%	105.4	4.9	10/10/2018	
B	E6-7	97%	109.7	3.8	10/10/2018	
B	S1-5	94%	106.4	3.9	10/10/2018	
B	S2-5	93%	105.5	2.8	10/10/2018	
B	S3-5	93%	105.0	3.2	10/10/2018	
B	S4-5	94%	106.3	4.8	10/10/2018	
B	S5-5	91%	102.8	15.4	10/15/2018	
D	S6-5	96%	100.2	12.2	10/15/2018	
B	S1-6	92%	104.5	15.3	10/15/2018	
B	S2-6	93%	104.9	13.4	10/15/2018	
B	S3-6	96%	108.7	13.9	10/15/2018	
B	S4-6	98%	110.6	10.9	10/15/2018	
B	S5-6	90%	101.9	13.6	10/15/2018	
B	S6-6	90%	101.9	13.8	10/15/2018	
D	E1-8	96%	100.0	12.8	10/15/2018	
D	E2-8	95%	99.5	14.6	10/15/2018	
B	E3-8	95%	107.8	15.2	10/15/2018	
B	E4-8	94%	107.0	14.4	10/15/2018	
B	E5-8	98%	110.6	9.1	10/15/2018	
B	E6-8	96%	108.3	9.9	10/15/2018	

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FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West
LOCATION: Berm
PROJECT NO.: 01053018
PAGE NO.: 4
TESTING INSTRUMENT: Instrotek 3500
TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
D	N1-3	96%	100.1	10.0	10/16/2018	
D	N2-3	96%	100.5	9.8	10/16/2018	
B	N3-3	90%	101.7	9.1	10/16/2018	
B	N4-3	91%	102.9	9.9	10/16/2018	
B	N5-3	92%	104.3	10.8	10/16/2018	
B	N6-3	90%	102.0	11.9	10/16/2018	
B	N1-4	95%	107.7	10.3	10/16/2018	
B	N2-4	91%	102.6	15.1	10/16/2018	
B	N3-4	92%	104.4	3.9	10/16/2018	
B	N4-4	91%	102.6	10.6	10/16/2018	
B	N5-4	91%	103.1	13.1	10/16/2018	
B	N6-4	90%	102.5	11.5	10/16/2018	
B	E1-9	96%	108.8	8.8	10/16/2018	
B	E2-9	99%	112.0	14.5	10/16/2018	
B	E3-9	92%	104.4	10.7	10/16/2018	
B	E4-9	99%	112.1	8.8	10/16/2018	
B	E5-9	91%	103.5	5.5	10/16/2018	
D	E6-9	96%	100.0	11.0	10/16/2018	
B	E1-10	98%	111.3	8.6	10/16/2018	
B	E2-10	99%	112.0	14.5	10/16/2018	
B	E3-10	97%	110.1	9.8	10/16/2018	
B	E4-10	99%	112.6	8.5	10/16/2018	
B	E5-10	92%	103.9	5.5	10/16/2018	
D	E6-10	95%	99.0	12.8	10/16/2018	
B	S1-7	98%	111.2	8.5	10/16/2018	
B	S2-7	99%	112.5	3.1	10/16/2018	
B	S3-7	98%	111.1	7.3	10/16/2018	
B	S4-7	98%	110.9	7.8	10/16/2018	
B	S5-7	98%	110.7	6.5	10/16/2018	
B	S6-7	92%	104.4	3.2	10/16/2018	

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FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West
LOCATION: Berm
PROJECT NO.: 01053018
PAGE NO.: 5

TESTING INSTRUMENT: Instrotek 3500
TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
D	S1-8	97%	101.2	6.1	10/16/2018	
B	S2-8	93%	105.1	2.7	10/16/2018	
B	S3-8	97%	110.0	7.1	10/16/2018	
B	S4-8	99%	111.8	8.1	10/16/2018	
B	S5-8	98%	111.3	6.2	10/16/2018	
D	S6-8	97%	101.2	3.4	10/16/2018	
B	N1-5	90%	102.2	5.1	10/17/2018	
B	N2-5	90%	102.1	8.6	10/17/2018	
B	N3-5	93%	105.1	8.5	10/17/2018	
B	N4-5	94%	106.3	4.1	10/17/2018	
B	N5-5	96%	108.3	4.7	10/17/2018	
B	N6-5	97%	110.3	6.7	10/17/2018	
B	S1-9	96%	108.4	7.0	10/17/2018	
B	S2-9	99%	112.0	8.5	10/17/2018	
B	S3-9	94%	106.4	12.3	10/17/2018	
D	S4-9	95%	99.1	9.4	10/17/2018	Mostly Caliche
D	S5-9	95%	99.4	9.9	10/17/2018	Mostly Caliche
D	S6-9	95%	98.7	9.3	10/17/2018	Mostly Caliche
B	N1-6	98%	110.5	4.8	10/17/2018	
B	N2-6	97%	109.6	7.3	10/17/2018	
B	N3-6	90%	102.5	8.8	10/17/2018	
B	N4-6	99%	112.4	9.0	10/17/2018	
B	N5-6	92%	104.1	8.3	10/17/2018	
B	N6-6	90%	102.3	5.8	10/17/2018	
B	N1-7	94%	106.2	18.0	10/23/2018	
D	N2-7	93%	97.0	12.5	10/23/2018	Caliche/Clay
B	N3-7	91%	103.4	13.0	10/23/2018	
B	N4-7	91%	103.6	13.8	10/23/2018	
B	N5-7	91%	103.2	13.3	10/23/2018	
B	N6-7	90%	101.8	14.4	10/23/2018	

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FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West
LOCATION: Berm
PROJECT NO.: 01053018
PAGE NO.: 6
TESTING INSTRUMENT: Instrotek 3500
TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
B	N1-8	97%	109.7	17.6	10/23/2018	
B	N2-8	91%	102.6	13.2	10/23/2018	
B	N3-8	92%	103.9	12.5	10/23/2018	
B	N4-8	92%	104.7	13.3	10/23/2018	
B	N5-8	92%	104.1	13.3	10/23/2018	
B	N6-8	95%	107.3	12.9	10/23/2018	
B	N1-9	98%	111.5	13.9	10/30/2018	
B	N2-9	92%	104.3	12.6	10/30/2018	
B	N3-9	99%	112.6	10.2	10/30/2018	
D	N4-9	93%	97.0	10.4	10/30/2018	
B	N5-9	99%	111.8	14.4	10/30/2018	
B	N6-9	94%	106.4	6.3	10/30/2018	
B	N1-10	99%	112.5	13.7	10/30/2018	
B	N2-10	94%	106.7	13.2	10/30/2018	
B	N3-10	98%	111.6	10.6	10/30/2018	
D	N4-10	92%	96.1	11.2	10/30/2018	
B	N5-10	99%	112.3	13.7	10/30/2018	
B	N6-10	97%	109.5	7.1	10/30/2018	
B	N7-1	99%	112.5	12.0	10/31/2018	Subgrade
D	N8-1	97%	101.2	8.8	10/31/2018	Subgrade
B	N9-1	94%	106.4	4.2	10/31/2018	Subgrade
B	N10-1	92%	104.1	11.3	11/9/2018	Subgrade
D	N11-1	94%	98.4	8.5	11/9/2018	Subgrade
D	N12-1	93%	96.7	9.4	11/9/2018	Subgrade
D	W1-1	94%	98.0	11.6	11/9/2018	Subgrade
B	W2-1	90%	101.7	3.3	10/31/2018	Subgrade
B	W3-1	90%	102.1	4.9	10/31/2018	Subgrade
B	W4-1	96%	109.2	12.1	10/31/2018	Subgrade
B	W5-1	94%	107.0	5.8	10/31/2018	Subgrade
D	W6-1	94%	98.0	3.5	10/31/2018	Subgrade

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FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West
LOCATION: Berm
PROJECT NO.: 01053018
PAGE NO.: 7
TESTING INSTRUMENT: Instrotek 3500
TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
B	N7-2	99%	112.1	10.3	11/1/2018	
D	N8-2	94%	98.0	7.8	11/1/2018	Clay/Sand w/light caliche
D	N9-2	91%	95.4	9.9	11/1/2018	Clay/Sand w/light caliche
D	N10-2	96%	100.1	8.6	11/5/2018	
D	N11-2	97%	101.0	13.7	11/5/2018	
D	N12-2	94%	98.5	7.5	11/5/2018	
B	N1-11	92%	104.1	8.6	11/1/2018	
B	N2-11	95%	107.7	7.4	11/1/2018	
B	N3-11	90%	102.2	5.7	11/1/2018	
D	N4-11	97%	100.7	9.7	11/1/2018	
B	N5-11	91%	102.8	6.4	11/1/2018	
D	N6-11	96%	100.2	11.2	11/1/2018	
D	S7-1	97%	100.9	13.5	11/20/2018	Basegrade
B	S8-1	90%	101.5	9.4	11/20/2018	Basegrade
B	S9-1	93%	105.0	6.4	11/20/2018	Basegrade
B	S10-1	90%	101.6	6.1	11/5/2018	Basegrade
B	S11-1	94%	106.3	2.4	11/5/2018	Basegrade
B	S12-1	95%	107.6	6.3	11/5/2018	Basegrade
B	N7-3	92%	104.2	8.6	11/13/2018	
B	N8-3	91%	102.7	5.7	11/13/2018	
D	N9-3	97%	101.4	6.2	11/13/2018	
B	N10-3	96%	108.8	8.1	11/13/2018	
B	N11-3	94%	107.0	4.7	11/13/2018	
B	N12-3	91%	103.4	4.6	11/13/2018	
B	W1-1	90%	101.6	7.8	11/7/2018	
B	W2-1	91%	103.4	8.6	11/7/2018	
B	W3-1	90%	102.0	7.4	11/7/2018	
B	W4-1	96%	108.8	7.5	11/7/2018	
D	W5-1	96%	100.4	8.7	11/7/2018	
D	W6-1	96%	100.0	9.6	11/7/2018	

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Rio Rancho, New Mexico 87124
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FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West
LOCATION: Berm
PROJECT NO.: 01053018
PAGE NO.: 8
TESTING INSTRUMENT: Instrotek 3500
TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
D	W1-3	97%	100.9	11.4	11/13/2018	
B	W2-3	91%	103.5	6.9	11/13/2018	
B	W3-3	91%	103.5	8.8	11/13/2018	
B	W4-3	92%	104.8	8.7	11/13/2018	
B	W5-3	92%	104.6	6.1	11/13/2018	
D	W6-3	97%	101.3	6.6	11/13/2018	
B	W1-4	92%	104.6	7.2	11/13/2018	
B	W2-4	96%	108.9	5.9	11/13/2018	
B	W3-4	91%	102.8	5.9	11/13/2018	
B	W4-4	95%	108.2	9.1	11/20/2018	
B	W5-4	95%	107.7	6.3	11/20/2018	
B	W6-4	92%	104.6	8.8	11/20/2018	
B	W1-5	94%	106.6	7.1	11/13/2018	
B	W2-5	96%	108.9	5.6	11/13/2018	
B	W3-5	91%	102.8	6.2	11/13/2018	
B	W4-5	94%	106.9	9.0	11/20/2018	
D	W5-5	97%	101.2	11.3	11/20/2018	
B	W6-5	91%	103.5	9.9	11/20/2018	
D	S7-2	96%	100.0	13.1	11/20/2018	
B	S8-2	93%	105.9	9.0	11/20/2018	
B	S9-2	90%	101.5	7.0	11/20/2018	
B	S10-2	93%	104.9	9.1	11/15/2018	
D	S11-2	97%	100.9	9.1	11/15/2018	
B	S12-2	90%	102.2	7.3	11/15/2018	
B	S7-3	94%	106.6	8.2	11/26/2018	
B	S8-3	99%	111.8	4.1	11/26/2018	
D	S9-3	97%	100.8	6.4	11/26/2018	
B	S10-3	91%	103.5	9.2	11/15/2018	
D	S11-3	97%	101.4	8.8	11/15/2018	
D	S12-3	97%	100.8	7.9	11/15/2018	

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Rio Rancho, New Mexico 87124
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FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West
LOCATION: Berm
PROJECT NO.: 01053018
PAGE NO.: 9
TESTING INSTRUMENT: Instrotek 3500
TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
B	N7-4	90%	101.5	7.0	11/20/2018	
B	N8-4	95%	107.5	7.5	11/20/2018	
B	N9-4	93%	105.6	4.5	11/20/2018	
B	N10-4	96%	108.5	10.4	11/20/2018	
B	N11-4	94%	106.2	9.1	11/20/2018	
B	N12-4	90%	102.5	8.0	11/20/2018	
B	N7-5	91%	103.1	6.9	11/20/2018	
B	N8-5	95%	107.8	6.9	11/20/2018	
B	N9-5	91%	103.2	4.6	11/20/2018	
B	N10-5	95%	107.9	9.6	11/20/2018	
B	N11-5	93%	105.2	9.5	11/20/2018	
B	N12-5	92%	104.3	7.0	11/20/2018	
B	S7-4	97%	110.0	8.0	11/26/2018	
B	S8-4	96%	108.9	4.6	11/26/2018	
B	S9-4	95%	107.2	6.7	11/26/2018	
D	S10-4	97%	101.3	10.9	11/20/2018	
B	S11-4	92%	104.1	8.4	11/20/2018	
B	S12-4	90%	101.8	10.8	11/20/2018	
D	S7-5	96%	100.0	16.2	11/27/2018	
B	S8-5	97%	109.4	10.3	11/27/2018	
B	S9-5	92%	104.7	9.5	11/27/2018	
B	S10-5	91%	103.6	10.2	11/20/2018	
B	S11-5	93%	105.7	9.0	11/20/2018	
B	S12-5	92%	104.0	10.4	11/20/2018	
B	W1-6	96%	108.5	8.6	11/20/2018	
B	W2-6	94%	106.1	6.3	11/20/2018	
B	W3-6	94%	106.7	8.2	11/20/2018	
B	W4-6	97%	109.4	9.1	11/20/2018	
B	W5-6	95%	108.2	8.8	11/20/2018	
B	W6-6	95%	107.7	9.9	11/20/2018	

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Rio Rancho, New Mexico 87124
505.867.6990

FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West
LOCATION: Berm
PROJECT NO.: 01053018
PAGE NO.: 10
TESTING INSTRUMENT: Instrotek 3500
TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
D	S7-6	97%	101.3	16.0	11/27/2018	
B	S8-6	95%	107.9	9.3	11/27/2018	
B	S9-6	92%	104.5	9.3	11/27/2018	
B	S10-6	91%	102.8	4.5	11/26/2018	
B	S11-6	93%	105.9	9.8	11/26/2018	
D	S12-6	97%	100.8	7.1	11/26/2018	
B	S7-7	91%	102.6	9.1	11/28/2018	
B	S8-7	92%	104.8	8.3	11/28/2018	
B	S9-7	91%	103.0	7.0	11/28/2018	
B	S10-7	91%	102.7	4.3	11/26/2018	
B	S11-7	91%	103.4	9.9	11/26/2018	
D	S12-7	95%	98.6	7.7	11/26/2018	
D	W1-7	97%	101.3	12.5	11/27/2018	
B	W2-7	94%	106.1	14.5	11/27/2018	
B	W3-7	96%	108.3	6.0	11/27/2018	
B	W4-7	95%	107.7	8.8	11/27/2018	
B	W5-7	88%	100.2	12.2	11/27/2018	
B	W6-7	93%	105.3	6.9	11/27/2018	
B	W1-8	93%	105.1	14.0	11/27/2018	
B	W2-8	90%	102.1	12.6	11/27/2018	
B	W3-8	90%	102.2	6.1	11/27/2018	
B	W4-8	95%	108.2	8.7	11/27/2018	
B	W5-8	91%	102.8	11.8	11/27/2018	
D	W6-8	96%	100.4	7.0	11/27/2018	
B	N7-6	95%	107.6	7.3	11/26/2018	
B	N8-6	93%	105.3	6.6	11/26/2018	
B	N9-6	96%	109.3	5.2	11/26/2018	
B	N10-6	96%	108.3	5.6	11/26/2018	
B	N11-6	92%	104.5	4.6	11/26/2018	
B	N12-6	90%	101.5	4.7	11/26/2018	

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Rio Rancho, New Mexico 87124
505.867.6990

FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West
LOCATION: Berm
PROJECT NO.: 01053018
PAGE NO.: 11
TESTING INSTRUMENT: Instrotek 3500
TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
B	N7-7	97%	109.8	7.2	11/26/2018	
B	N8-7	91%	103.6	6.7	11/26/2018	
B	N9-7	99%	111.9	5.0	11/26/2018	
B	N10-7	92%	104.8	5.8	11/26/2018	
D	N11-7	96%	100.0	4.8	11/26/2018	
D	N12-7	95%	98.6	4.8	11/26/2018	
B	N7-8	90%	102.0	4.1	11/26/2018	
B	N8-8	93%	105.8	3.8	11/26/2018	
B	N9-8	92%	104.7	5.5	11/26/2018	
D	N10-8	97%	100.7	5.1	11/26/2018	
B	N11-8	90%	102.3	4.2	11/26/2018	
B	N12-8	91%	103.5	5.3	11/26/2018	
B	S7-8	93%	105.1	8.9	11/29/2018	
B	S8-8	93%	105.1	7.6	11/29/2018	
D	S9-8	96%	100.1	4.7	11/29/2018	
D	S10-8	96%	100.1	3.9	11/26/2018	
D	S11-8	96%	100.2	4.2	11/26/2018	
B	S12-8	94%	106.3	5.3	11/26/2018	
D	S7-9	96%	100.1	8.2	11/30/2018	
B	S8-9	90%	102.5	6.3	11/30/2018	
B	S9-9	91%	102.7	7.2	11/30/2018	
B	S10-9	91%	103.5	9.9	11/27/2018	
B	S11-9	90%	102.5	13.5	11/27/2018	
D	S12-9	96%	100.5	14.6	11/27/2018	
B	N7-9	90%	102.2	10.5	11/27/2018	
D	N8-9	97%	100.7	5.4	11/27/2018	
D	N9-9	97%	100.7	12.3	11/27/2018	
B	N10-9	90%	101.5	5.8	11/27/2018	
B	N11-9	94%	106.1	9.8	11/27/2018	
B	N12-9	92%	104.2	8.2	11/27/2018	

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FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West
LOCATION: Berm
PROJECT NO.: 01053018
PAGE NO.: 12
TESTING INSTRUMENT: Instrotek 3500
TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
B	W1-9	91%	103.5	7.9	11/28/2018	
D	W2-9	97%	100.8	9.8	11/28/2018	
B	W3-9	91%	102.7	7.6	11/28/2018	
D	W4-9	97%	100.9	8.9	11/28/2018	
B	W5-9	91%	102.7	8.0	11/28/2018	
D	W6-9	96%	100.5	11.4	11/28/2018	
B	W1-10	92%	104.3	8.7	11/28/2018	
B	W2-10	90%	102.1	10.2	11/28/2018	
D	W3-10	96%	100.1	8.9	11/28/2018	
D	W4-10	97%	101.1	7.4	11/28/2018	
B	W5-10	94%	106.0	7.6	11/28/2018	
D	W6-10	96%	100.2	9.9	11/28/2018	
B	S7-10	90%	102.5	6.8	12/5/2018	
B	S8-10	93%	105.5	8.8	12/5/2018	
B	S9-10	91%	103.5	6.6	12/5/2018	
D	S10-10	97%	101.2	8.8	11/28/2018	
B	S11-10	90%	101.9	11.4	11/28/2018	
B	S12-10	90%	101.7	10.1	11/28/2018	
B	N7-10	97%	109.4	6.2	11/30/2018	
B	N8-10	93%	105.7	7.7	11/30/2018	
B	N9-10	93%	105.2	7.9	11/30/2018	
B	N10-10	99%	111.7	5.4	11/30/2018	
B	N11-10	95%	107.7	4.8	11/30/2018	
B	N12-10	96%	108.9	6.2	11/30/2018	
D	N7-11	96%	100.2	9.1	12/3/2018	
B	N8-11	93%	105.4	7.8	12/3/2018	
D	N9-11	97%	101.3	5.2	12/3/2018	
D	N10-11	96%	100.6	8.5	12/3/2018	
B	N11-11	91%	102.7	7.9	12/3/2018	
B	N12-11	93%	105.2	7.5	12/3/2018	

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505.867.6990

FIELD COMPACTION TESTING FORM

PROJECT NAME: Cell 1A
OWNER: Sundance West
PROJECT LOCATION: Sundance West
LOCATION: Berm/Anchor Trench
PROJECT NO.: 01053018
PAGE NO.: 13
TESTING INSTRUMENT: Instrotek 3500
TECHNICIAN: DG

SOIL TYPE	DESCRIPTION	REF STD PROCTOR		90% (PCF)	OPTIMAL MOISTURE
A-psl	Brown fine clean sand	103.4 pcf	90% optimum	93.1	4.8 % Moisture
B	Tan silty sand	113.3 pcf	90% optimum	102.0	13.6 % Moisture
C-14' depth	Reddish tan silty sand w/caliche	96.2 pcf	90% optimum	86.6	15.8 % Moisture
D	**Averages:**	**104.3**		**93.9**	

Soil Type	TEST NUMBER	% RSP	DRY DENSITY (PCF)	% MOISTURE	DATE COMPLETED	NOTES
B	W7-11	91%	103.3	9.9	12/5/2018	
B	W8-11	94%	106.6	7.7	12/5/2018	
B	W9-11	93%	104.9	7.0	12/5/2018	
B	W10-11	94%	106.1	6.3	12/5/2018	
D	W11-11	97%	101.0	8.7	12/5/2018	
D	W12-11	96%	100.0	10.3	12/5/2018	
D	S7-11	97%	100.9	11.4	12/5/2018	
B	S8-11	91%	103.5	6.9	12/5/2018	
B	S9-11	91%	103.4	8.8	12/5/2018	
B	S10-11	92%	104.8	8.7	12/5/2018	
B	S11-11	92%	104.6	6.1	12/5/2018	
D	S12-11	97%	101.3	6.6	12/5/2018	
D	East AT 1	93%	96.7	11.6	12/20/2018	
D	East AT 2	96%	100.0	12.6	12/20/2018	
D	East AT 3	91%	94.6	12.0	12/20/2018	
D	East AT 4	96%	100.6	11.0	12/20/2018	
D	East AT 5	94%	98.5	12.1	12/20/2018	
D	East AT 6	94%	98.2	10.7	12/20/2018	
D	North AT 1	90%	94.1	9.0	12/20/2018	
D	North AT 2	92%	96.0	11.7	12/20/2018	
D	North AT 3	92%	95.8	10.7	12/20/2018	
D	North AT 4	91%	94.6	9.3	12/20/2018	

APPENDIX B

Material Manufacturer Certification and Conformance Testing Results

B.1. GCL Certifications

Report Date
9/12/2018

BentoLiner Manufacturing Certification

Sales Order: 85199

Customer: Southwest Liner Systems, Inc.

Project: SWLS/Sundance West Phase 2, Landfill Cell 1A

Product Type: BLI-075-06N-03S-D-30 BentoLiner NSL

The GCL purchased and shipped for the above referenced project does meet or exceed the project specifications.

The GCL supplied to this project has been continuously inspected for the presence of needles and is certified to be needle free.

Chuck Taylor
Laboratory Technician

GSE Environmental, LLC

Roll Allocation List

Conformance: 1/100,000sf, min 1/lot, 1'xrw
TRI, TX

Sales Order SO-085199
Customer Name Southwest Liner Systems, Inc.
Project Name SWLS/Sundance West Phase 2, Landfill Cell 1A

Serial number	Item Number	Daily lot	Roll width	Top	Bottom	Clay	Length	
502318790	BLI-075-06N-03S-D-30	28091003	15.50	2025665961	2025644927	1082818C	150.00	
502318794	BLI-075-06N-03S-D-30	28091003	15.50	2025665961	2025644927	1082818C	150.00	Conformance
502318795	BLI-075-06N-03S-D-30	28091003	15.50	2025665961	2025644927	1082818C	150.00	
502318796	BLI-075-06N-03S-D-30	28091003	15.50	2025665961	2025644927	1082818C	150.00	
502318797	BLI-075-06N-03S-D-30	28091003	15.50	2025665961	2025579815	1082818C	150.00	
502318798	BLI-075-06N-03S-D-30	28091003	15.50	2025665961	2025579815	1082818C	150.00	
502318799	BLI-075-06N-03S-D-30	28091003	15.50	2025665544	2025579815	1082818C	150.00	
502318800	BLI-075-06N-03S-D-30	28091003	15.50	2025665544	2025579815	1082818C	150.00	
502318801	BLI-075-06N-03S-D-30	28091003	15.50	2025665544	2025579815	1082818C	150.00	
502318802	BLI-075-06N-03S-D-30	28091003	15.50	2025665544	2025579815	1082818C	150.00	
502318803	BLI-075-06N-03S-D-30	28091003	15.50	2025665544	2025579815	1082818C	150.00	
502318804	BLI-075-06N-03S-D-30	28091003	15.50	2025665544	2025579815	1082818C	150.00	
502318805	BLI-075-06N-03S-D-30	28091003	15.50	2025665544	2025579815	1082818C	150.00	
502318806	BLI-075-06N-03S-D-30	28091003	15.50	2025665544	2025579815	1082818C	150.00	
502318807	BLI-075-06N-03S-D-30	28091003	15.50	2025665544	2025579815	1082818C	150.00	
502318808	BLI-075-06N-03S-D-30	28091003	15.50	2025665546	2025579815	1082818C	150.00	
502318809	BLI-075-06N-03S-D-30	28091003	15.50	2025665546	2025579815	1082818C	150.00	
502318810	BLI-075-06N-03S-D-30	28091003	15.50	2025665546	2025579815	1082818C	150.00	
502318811	BLI-075-06N-03S-D-30	28091003	15.50	2025665546	2025579815	1082818C	150.00	
502318812	BLI-075-06N-03S-D-30	28091003	15.50	2025665546	2025579815	1082818C	150.00	
502318813	BLI-075-06N-03S-D-30	28091003	15.50	2025665546	2025579815	1082818C	150.00	
502318814	BLI-075-06N-03S-D-30	28091003	15.50	2025665546	2025579815	1082818C	150.00	
502318815	BLI-075-06N-03S-D-30	28091003	15.50	2025665546	2025579815	1082818C	150.00	
502318816	BLI-075-06N-03S-D-30	28091003	15.50	2025665546	2025579815	1082818C	150.00	
502318817	BLI-075-06N-03S-D-30	28091003	15.50	2025665546	2025579815	1082818C	150.00	
502318818	BLI-075-06N-03S-D-30	28091003	15.50	2025665953	2025579815	1082818C	150.00	
502318819	BLI-075-06N-03S-D-30	28091003	15.50	2025665953	2025579815	1082818C	150.00	
502318820	BLI-075-06N-03S-D-30	28091003	15.50	2025665953	2025579815	1082818D	150.00	
502318821	BLI-075-06N-03S-D-30	28091003	15.50	2025665953	2025579815	1082818D	150.00	
502318822	BLI-075-06N-03S-D-30	28091003	15.50	2025665953	2025579815	1082818D	106.00	
502318823	BLI-075-06N-03S-D-30	28091003	15.50	2025665953	2025617281	1082818D	150.00	
502318824	BLI-075-06N-03S-D-30	28091003	15.50	2025665953	2025617281	1082818D	150.00	
502318825	BLI-075-06N-03S-D-30	28091003	15.50	2025665953	2025617281	1082818D	150.00	
502318826	BLI-075-06N-03S-D-30	28091003	15.50	2025665953	2025617281	1082818D	150.00	
502318827	BLI-075-06N-03S-D-30	28091003	15.50	2025665953	2025617281	1082818D	150.00	
502318828	BLI-075-06N-03S-D-30	28091003	15.50	2025665542	2025617281	1082818D	150.00	
502318829	BLI-075-06N-03S-D-30	28091003	15.50	2025665542	2025617281	1082818D	150.00	
502318830	BLI-075-06N-03S-D-30	28091003	15.50	2025665542	2025617281	1082818D	150.00	
502318831	BLI-075-06N-03S-D-30	28091003	15.50	2025665542	2025617281	1082818D	150.00	
502318832	BLI-075-06N-03S-D-30	28091003	15.50	2025665542	2025617281	1082818D	150.00	
502318833	BLI-075-06N-03S-D-30	28091003	15.50	2025665542	2025617281	1082818D	150.00	
502318834	BLI-075-06N-03S-D-30	28091003	15.50	2025665542	2025617281	1082818D	150.00	

Roll Allocation List

Sales Order SO-085199
Customer Name Southwest Liner Systems, Inc.
Project Name SWLS/Sundance West Phase 2, Landfill Cell 1A

Serial number	Item Number	Daily lot	Roll width	Top	Bottom	Clay	Length	
502318835	BLI-075-06N-03S-D-30	28091003	15.50	2025665542	2025617281	1082818D	150.00	
502318836	BLI-075-06N-03S-D-30	28091003	15.50	2025665542	2025617281	1082818D	150.00	
502318837	BLI-075-06N-03S-D-30	28091003	15.50	2025665958	2025617281	1082818D	150.00	
502318838	BLI-075-06N-03S-D-30	28091003	15.50	2025665958	2025617281	1082818D	150.00	
502318839	BLI-075-06N-03S-D-30	28091003	15.50	2025665958	2025617281	1082818D	150.00	
502318840	BLI-075-06N-03S-D-30	28091003	15.50	2025665958	2025617281	1082818D	150.00	
502318841	BLI-075-06N-03S-D-30	28091003	15.50	2025665958	2025617281	1082818D	150.00	
502318842	BLI-075-06N-03S-D-30	28091003	15.50	2025665958	2025617281	1082818D	150.00	
502318843	BLI-075-06N-03S-D-30	28091003	15.50	2025665958	2025617281	1082818D	150.00	
502318844	BLI-075-06N-03S-D-30	28091003	15.50	2025665958	2025617281	1082818D	150.00	
502318845	BLI-075-06N-03S-D-30	28091003	15.50	2025665958	2025617281	1082818D	150.00	Conformance
502318846	BLI-075-06N-03S-D-30	28091003	15.50	2025667749	2025617281	1082818D	150.00	
502318847	BLI-075-06N-03S-D-30	28091003	15.50	2025667749	2025617281	1082818D	150.00	
502318848	BLI-075-06N-03S-D-30	28091003	15.50	2025667749	2025617281	1082818D	150.00	
502318849	BLI-075-06N-03S-D-30	28091003	15.50	2025667749	2025617281	1082818D	150.00	
502318850	BLI-075-06N-03S-D-30	28091003	15.50	2025667749	2025617281	1082818D	150.00	
502318851	BLI-075-06N-03S-D-30	28091003	15.50	2025667749	2025644928	1083118A	150.00	
502318852	BLI-075-06N-03S-D-30	28091003	15.50	2025667749	2025644928	1083118A	150.00	
502318853	BLI-075-06N-03S-D-30	28091003	15.50	2025667749	2025644928	1083118A	150.00	
502318854	BLI-075-06N-03S-D-30	28091003	15.50	2025665960	2025644928	1083118A	150.00	
502318855	BLI-075-06N-03S-D-30	28091003	15.50	2025665960	2025644928	1083118A	150.00	
502318856	BLI-075-06N-03S-D-30	28091003	15.50	2025665960	2025644928	1083118A	150.00	
502318857	BLI-075-06N-03S-D-30	28091003	15.50	2025665960	2025644928	1083118A	150.00	
502318858	BLI-075-06N-03S-D-30	28091003	15.50	2025665960	2025644928	1083118A	150.00	
502318859	BLI-075-06N-03S-D-30	28091003	15.50	2025665960	2025644928	1083118A	150.00	
502318860	BLI-075-06N-03S-D-30	28091003	15.50	2025665960	2025644928	1083118A	150.00	
502318861	BLI-075-06N-03S-D-30	28091003	15.50	2025665960	2025644928	1083118A	150.00	
502318862	BLI-075-06N-03S-D-30	28091003	15.50	2025665960	2025644928	1083118A	150.00	
502318863	BLI-075-06N-03S-D-30	28091003	15.50	2025665959	2025644928	1083118A	150.00	
502318864	BLI-075-06N-03S-D-30	28091003	15.50	2025665959	2025644928	1083118A	150.00	
502318865	BLI-075-06N-03S-D-30	28091003	15.50	2025665959	2025644928	1083118A	150.00	
502318866	BLI-075-06N-03S-D-30	28091003	15.50	2025665959	2025644928	1083118A	150.00	
502318867	BLI-075-06N-03S-D-30	28091003	15.50	2025665959	2025644928	1083118A	150.00	
502318868	BLI-075-06N-03S-D-30	28091003	15.50	2025665959	2025644928	1083118A	150.00	
502318869	BLI-075-06N-03S-D-30	28091003	15.50	2025665959	2025644928	1083118A	150.00	
502318870	BLI-075-06N-03S-D-30	28091003	15.50	2025665959	2025617279	1083118A	150.00	
502318871	BLI-075-06N-03S-D-30	28091003	15.50	2025665959	2025617279	1083118A	150.00	
502318873	BLI-075-06N-03S-D-30	28091003	15.50	2025665965	2025617279	1083118A	150.00	
502318874	BLI-075-06N-03S-D-30	28091003	15.50	2025665965	2025617279	1083118A	150.00	
502318875	BLI-075-06N-03S-D-30	28091003	15.50	2025665965	2025617279	1083118A	150.00	
502318876	BLI-075-06N-03S-D-30	28091003	15.50	2025665965	2025617279	1083118A	150.00	
502318877	BLI-075-06N-03S-D-30	28091003	15.50	2025665965	2025617279	1083118A	150.00	

Roll Allocation List

Sales Order SO-085199
Customer Name Southwest Liner Systems, Inc.
Project Name SWLS/Sundance West Phase 2, Landfill Cell 1A

Serial number	Item Number	Daily lot	Roll width	Top	Bottom	Clay	Length	
502318878	BLI-075-06N-03S-D-30	28091003	15.50	2025665965	2025617279	1083118B	150.00	
502318879	BLI-075-06N-03S-D-30	28091003	15.50	2025665965	2025617279	1083118B	150.00	
502318880	BLI-075-06N-03S-D-30	28091103	15.50	2025665965	2025617279	1083118B	150.00	
502318881	BLI-075-06N-03S-D-30	28091103	15.50	2025665965	2025617279	1083118B	150.00	
502318882	BLI-075-06N-03S-D-30	28091103	15.50	2025665952	2025617279	1083118B	150.00	
502318883	BLI-075-06N-03S-D-30	28091103	15.50	2025665952	2025617279	1083118B	150.00	
502318884	BLI-075-06N-03S-D-30	28091103	15.50	2025665952	2025617279	1083118B	150.00	
502318885	BLI-075-06N-03S-D-30	28091103	15.50	2025665952	2025617279	1083118B	150.00	
502318886	BLI-075-06N-03S-D-30	28091103	15.50	2025665952	2025617279	1083118B	150.00	
502318887	BLI-075-06N-03S-D-30	28091103	15.50	2025665952	2025617279	1083118B	150.00	
502318888	BLI-075-06N-03S-D-30	28091103	15.50	2025665952	2025617279	1083118B	150.00	
502318889	BLI-075-06N-03S-D-30	28091103	15.50	2025665952	2025617279	1083118B	150.00	
502318890	BLI-075-06N-03S-D-30	28091103	15.50	2025665952	2025617279	1083118B	150.00	Conformance
502318891	BLI-075-06N-03S-D-30	28091103	15.50	2025665954	2025617279	1083118B	150.00	
502318892	BLI-075-06N-03S-D-30	28091103	15.50	2025665954	2025617279	1083118B	150.00	
502318893	BLI-075-06N-03S-D-30	28091103	15.50	2025665954	2025617279	1083118B	150.00	
502318894	BLI-075-06N-03S-D-30	28091103	15.50	2025665954	2025617279	1083118B	150.00	
502318895	BLI-075-06N-03S-D-30	28091103	15.50	2025665954	2025629250	1083118B	150.00	
502318896	BLI-075-06N-03S-D-30	28091103	15.50	2025665954	2025629250	1083118B	150.00	
502318897	BLI-075-06N-03S-D-30	28091103	15.50	2025665954	2025629250	1083118B	150.00	
502318898	BLI-075-06N-03S-D-30	28091103	15.50	2025665954	2025629250	1083118B	150.00	
502318899	BLI-075-06N-03S-D-30	28091103	15.50	2025665954	2025629250	1083118B	150.00	
502318901	BLI-075-06N-03S-D-30	28091103	15.50	2025627154	2025629250	1083118B	150.00	
502318902	BLI-075-06N-03S-D-30	28091103	15.50	2025627154	2025629250	1083118B	150.00	
502318903	BLI-075-06N-03S-D-30	28091103	15.50	2025627154	2025629250	1083118B	150.00	
502318904	BLI-075-06N-03S-D-30	28091103	15.50	2025627154	2025629250	1083118B	150.00	
502318905	BLI-075-06N-03S-D-30	28091103	15.50	2025627154	2025629250	1083118B	150.00	
502318906	BLI-075-06N-03S-D-30	28091103	15.50	2025627154	2025629250	1083118B	150.00	
502318907	BLI-075-06N-03S-D-30	28091103	15.50	2025627154	2025629250	1083118B	150.00	
502318908	BLI-075-06N-03S-D-30	28091103	15.50	2025627154	2025629250	1083118B	150.00	
502318909	BLI-075-06N-03S-D-30	28091103	15.50	2025627138	2025629250	1083118C	150.00	
502318910	BLI-075-06N-03S-D-30	28091103	15.50	2025627138	2025629250	1083118C	150.00	
502318911	BLI-075-06N-03S-D-30	28091103	15.50	2025627138	2025629250	1083118C	150.00	
502318912	BLI-075-06N-03S-D-30	28091103	15.50	2025627138	2025629250	1083118C	150.00	
502318913	BLI-075-06N-03S-D-30	28091103	15.50	2025627138	2025629250	1083118C	150.00	
502318914	BLI-075-06N-03S-D-30	28091103	15.50	2025627138	2025629250	1083118C	150.00	
502318915	BLI-075-06N-03S-D-30	28091103	15.50	2025627138	2025629250	1083118C	150.00	
502318916	BLI-075-06N-03S-D-30	28091103	15.50	2025627138	2025629250	1083118C	150.00	
502318917	BLI-075-06N-03S-D-30	28091103	15.50	2025627138	2025629250	1083118C	150.00	
502318918	BLI-075-06N-03S-D-30	28091103	15.50	2025627131	2025629250	1083118C	150.00	
502318919	BLI-075-06N-03S-D-30	28091103	15.50	2025627131	2025629250	1083118C	150.00	
502318920	BLI-075-06N-03S-D-30	28091103	15.50	2025627131	2025620501	1083118C	150.00	

Roll Allocation List

Sales Order SO-085199
Customer Name Southwest Liner Systems, Inc.
Project Name SWLS/Sundance West Phase 2, Landfill Cell 1A

Serial number	Item Number	Daily lot	Roll width	Top	Bottom	Clay	Length	
502318921	BLI-075-06N-03S-D-30	28091103	15.50	2025627131	2025620501	1083118C	150.00	
502318922	BLI-075-06N-03S-D-30	28091103	15.50	2025627131	2025620501	1083118C	150.00	
502318923	BLI-075-06N-03S-D-30	28091103	15.50	2025627131	2025620501	1083118C	150.00	
502318924	BLI-075-06N-03S-D-30	28091103	15.50	2025627131	2025620501	1083118C	82.00	
502318926	BLI-075-06N-03S-D-30	28091103	15.50	2025627131	2025620501	1083118C	150.00	
502318927	BLI-075-06N-03S-D-30	28091103	15.50	2025627131	2025620501	1083118C	150.00	
502318928	BLI-075-06N-03S-D-30	28091103	15.50	2025627145	2025620501	1083118C	142.00	
502318930	BLI-075-06N-03S-D-30	28091103	15.50	2025627145	2025620501	1083118C	150.00	
502318931	BLI-075-06N-03S-D-30	28091103	15.50	2025627145	2025620501	1083118C	114.00	
502318932	BLI-075-06N-03S-D-30	28091103	15.50	2025627145	2025620501	1083118C	150.00	
502318933	BLI-075-06N-03S-D-30	28091103	15.50	2025627145	2025620501	1083118C	150.00	Conformance
502318934	BLI-075-06N-03S-D-30	28091103	15.50	2025627145	2025620501	1083118C	150.00	
502318935	BLI-075-06N-03S-D-30	28091103	15.50	2025627145	2025620501	1083118C	150.00	
502318936	BLI-075-06N-03S-D-30	28091103	15.50	2025627145	2025620501	1083118C	150.00	
502318937	BLI-075-06N-03S-D-30	28091103	15.50	2025627145	2025620501	1083118D	150.00	
502318938	BLI-075-06N-03S-D-30	28091103	15.50	2025582839	2025620501	1083118D	114.00	
502318939	BLI-075-06N-03S-D-30	28091103	15.50	2025582839	2025620501	1083118D	150.00	
502318940	BLI-075-06N-03S-D-30	28091103	15.50	2025582839	2025620501	1083118D	150.00	
502318941	BLI-075-06N-03S-D-30	28091103	15.50	2025582839	2025620501	1083118D	150.00	
502318945	BLI-075-06N-03S-D-30	28091103	15.50	2025582839	2025620501	1083118D	150.00	
502318946	BLI-075-06N-03S-D-30	28091103	15.50	2025627144	2025620501	1083118D	150.00	
502318947	BLI-075-06N-03S-D-30	28091103	15.50	2025627144	2025620501	1083118D	150.00	
502318948	BLI-075-06N-03S-D-30	28091103	15.50	2025627144	2025620501	1083118D	150.00	
502318949	BLI-075-06N-03S-D-30	28091103	15.50	2025627144	2025620501	1083118D	150.00	
502318950	BLI-075-06N-03S-D-30	28091103	15.50	2025627144	2025620501	1083118D	150.00	
502318951	BLI-075-06N-03S-D-30	28091103	15.50	2025627144	2025620501	1083118D	150.00	
502318952	BLI-075-06N-03S-D-30	28091103	15.50	2025627144	2025620501	1083118D	150.00	
502318953	BLI-075-06N-03S-D-30	28091103	15.50	2025627144	2025620501	1083118D	150.00	
502318954	BLI-075-06N-03S-D-30	28091103	15.50	2025627144	2025620501	1083118D	150.00	
502318955	BLI-075-06N-03S-D-30	28091103	15.50	2025627143	2025620501	1083118D	150.00	
502318956	BLI-075-06N-03S-D-30	28091103	15.50	2025627143	2025629252	1083118D	150.00	
502318957	BLI-075-06N-03S-D-30	28091103	15.50	2025627143	2025629252	1083118D	150.00	
502318958	BLI-075-06N-03S-D-30	28091103	15.50	2025627143	2025629252	1083118D	150.00	
502318959	BLI-075-06N-03S-D-30	28091103	15.50	2025627143	2025629252	1083118D	150.00	
502318960	BLI-075-06N-03S-D-30	28091103	15.50	2025627143	2025629252	1083118D	150.00	
502318961	BLI-075-06N-03S-D-30	28091103	15.50	2025627143	2025629252	1083118D	150.00	
502318962	BLI-075-06N-03S-D-30	28091103	15.50	2025627143	2025629252	1083118D	150.00	
502318963	BLI-075-06N-03S-D-30	28091103	15.50	2025627143	2025629252	1083118D	150.00	
502318964	BLI-075-06N-03S-D-30	28091103	15.50	2025627162	2025629252	1083118D	150.00	
502318965	BLI-075-06N-03S-D-30	28091103	15.50	2025627162	2025629252	1083118D	150.00	
502318966	BLI-075-06N-03S-D-30	28091103	15.50	2025627162	2025629252	1083118D	96.00	
502318967	BLI-075-06N-03S-D-30	28091103	15.50	2025627162	2025629252	1083118D	150.00	

Roll Allocation List

Sales Order SO-085199
Customer Name Southwest Liner Systems, Inc.
Project Name SWLS/Sundance West Phase 2, Landfill Cell 1A

Serial number	Item Number	Daily lot	Roll width	Top	Bottom	Clay	Length
502318968	BLI-075-06N-03S-D-30	28091103	15.50	2025627162	2025629252	1083118D	150.00
502318969	BLI-075-06N-03S-D-30	28091103	15.50	2025627162	2025629252	1083118D	96.00

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Sep/12/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	BLI-075-06N-03S-D-30	

Roll Number	ASTM D4632 Grab Strength (lbs)	Puncture Resistance ASTM D4833 (lbs)	ASTM D4632 Peel Strength (lbs)	ASTM D6768 Tensile Strength (ppi)	ASTM D6496 Peel Strength (ppi)	ASTM D5993 Clay Content @ 0% Moisture (lbs/sf) GCL mass	ASTM D5993 Clay Content @ 0% Moisture (lbs/sf)	ASTM D5890 Free Swell (ml/2g)	ASTM D2216 Moisture Content (%)	ASTM D5891 Fluid Loss (ml)	ASTM D4643 Moisture Content (%) GCL moisture content
502318790	168	105	45	35.9	9.3	1.00	0.82	31.5	11.9	13.8	10.7
502318794	168	105	45	35.9	9.3	1.00	0.82	31.5	11.9	13.8	10.7
502318795	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318796	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318797	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318798	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318799	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318800	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318801	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318802	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318803	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318804	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318805	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318806	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318807	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318808	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318809	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318810	209	105	60	49.9	12.0	0.91	0.83	31.5	11.9	13.8	9.8
502318811	155	105	46	45.0	8.8	0.91	0.84	31.5	11.9	13.8	10.3
502318812	155	105	46	45.0	8.8	0.91	0.84	31.5	11.9	13.8	10.3
502318813	155	105	46	45.0	8.8	0.91	0.84	31.5	11.9	13.8	10.3
502318814	155	105	46	45.0	8.8	0.91	0.84	31.5	11.9	13.8	10.3
502318815	155	105	46	45.0	8.8	0.91	0.84	31.5	11.9	13.8	10.3
502318816	155	105	46	45.0	8.8	0.91	0.84	31.5	11.9	13.8	10.3
502318817	155	105	46	45.0	8.8	0.91	0.84	31.5	11.9	13.8	10.3
502318818	155	105	46	45.0	8.8	0.91	0.84	31.5	11.9	13.8	10.3
502318819	155	105	46	45.0	8.8	0.91	0.84	31.5	11.9	13.8	10.3
502318820	155	105	46	45.0	8.8	0.91	0.84	33.5	10.0	12.8	10.3
502318821	155	105	46	45.0	8.8	0.91	0.84	33.5	10.0	12.8	10.3
502318822	155	105	46	45.0	8.8	0.91	0.84	33.5	10.0	12.8	10.3
502318823	155	105	46	45.0	8.8	0.91	0.84	33.5	10.0	12.8	10.3
502318824	155	105	46	45.0	8.8	0.91	0.84	33.5	10.0	12.8	10.3
502318825	155	105	46	45.0	8.8	0.91	0.84	33.5	10.0	12.8	10.3
502318826	155	105	46	45.0	8.8	0.91	0.84	33.5	10.0	12.8	10.3

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Sep/12/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	BLI-075-06N-03S-D-30	

Roll Number	ASTM D4632 Grab Strength (lbs)	Puncture Resistance ASTM D4833 (lbs)	ASTM D4632 Peel Strength (lbs)	ASTM D6768 Tensile Strength (ppi)	ASTM D6496 Peel Strength (ppi)	ASTM D5993 Clay Content @ 0% Moisture (lbs/sf) GCL mass	ASTM D5993 Clay Content @ 0% Moisture (lbs/sf)	ASTM D5890 Free Swell (ml/2g)	ASTM D2216 Moisture Content (%)	ASTM D5891 Fluid Loss (ml)	ASTM D4643 Moisture Content (%) GCL moisture content
502318827	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318828	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318829	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318830	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318831	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318832	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318833	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318834	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318835	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318836	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318837	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318838	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318839	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318840	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318841	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318842	180	105	50	49.8	9.3	0.91	0.83	33.5	10.0	12.8	10.3
502318843	165	105	49	43.6	9.5	0.87	0.80	33.5	10.0	12.8	10.1
502318844	165	105	49	43.6	9.5	0.87	0.80	33.5	10.0	12.8	10.1
502318845	165	105	49	43.6	9.5	0.87	0.80	33.5	10.0	12.8	10.1
502318846	165	105	49	43.6	9.5	0.87	0.80	33.5	10.0	12.8	10.1
502318847	165	105	49	43.6	9.5	0.87	0.80	33.5	10.0	12.8	10.1
502318848	165	105	49	43.6	9.5	0.87	0.80	33.5	10.0	12.8	10.1
502318849	165	105	49	43.6	9.5	0.87	0.80	33.5	10.0	12.8	10.1
502318850	165	105	49	43.6	9.5	0.87	0.80	33.5	10.0	12.8	10.1
502318851	165	105	49	43.6	9.5	0.87	0.80	35.0	10.1	14.4	10.1
502318852	165	105	49	43.6	9.5	0.87	0.80	35.0	10.1	14.4	10.1
502318853	165	105	49	43.6	9.5	0.87	0.80	35.0	10.1	14.4	10.1
502318854	165	105	49	43.6	9.5	0.87	0.80	35.0	10.1	14.4	10.1
502318855	165	105	49	43.6	9.5	0.87	0.80	35.0	10.1	14.4	10.1
502318856	165	105	49	43.6	9.5	0.87	0.80	35.0	10.1	14.4	10.1
502318857	165	105	49	43.6	9.5	0.87	0.80	35.0	10.1	14.4	10.1
502318858	165	105	49	43.6	9.5	0.87	0.80	35.0	10.1	14.4	10.1
502318859	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9
502318860	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Sep/12/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	BLI-075-06N-03S-D-30	

Roll Number	ASTM D4632 Grab Strength (lbs)	Puncture Resistance ASTM D4833 (lbs)	ASTM D4632 Peel Strength (lbs)	ASTM D6768 Tensile Strength (ppi)	ASTM D6496 Peel Strength (ppi)	ASTM D5993 Clay Content @ 0% Moisture (lbs/sf) GCL mass	ASTM D5993 Clay Content @ 0% Moisture (lbs/sf)	ASTM D5890 Free Swell (ml/2g)	ASTM D2216 Moisture Content (%)	ASTM D5891 Fluid Loss (ml)	ASTM D4643 Moisture Content (%) GCL moisture content
502318861	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9
502318862	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9
502318863	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9
502318864	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9
502318865	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9
502318866	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9
502318867	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9
502318868	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9
502318869	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9
502318870	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9
502318871	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9
502318873	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9
502318874	183	105	42	42.8	7.4	0.86	0.79	35.0	10.1	14.4	10.9
502318875	173	114	56	47.7	11.3	0.92	0.85	35.0	10.1	14.4	10.6
502318876	173	114	56	47.7	11.3	0.92	0.85	35.0	10.1	14.4	10.6
502318877	173	114	56	47.7	11.3	0.92	0.85	35.0	10.1	14.4	10.6
502318878	173	114	56	47.7	11.3	0.92	0.85	37.5	10.6	14.4	10.6
502318879	173	114	56	47.7	11.3	0.92	0.85	37.5	10.6	14.4	10.6
502318880	173	114	56	47.7	11.3	0.92	0.85	37.5	10.6	14.4	10.6
502318881	173	114	56	47.7	11.3	0.92	0.85	37.5	10.6	14.4	10.6
502318882	173	114	56	47.7	11.3	0.92	0.85	37.5	10.6	14.4	10.6
502318883	173	114	56	47.7	11.3	0.92	0.85	37.5	10.6	14.4	10.6
502318884	173	114	56	47.7	11.3	0.92	0.85	37.5	10.6	14.4	10.6
502318885	173	114	56	47.7	11.3	0.92	0.85	37.5	10.6	14.4	10.6
502318886	173	114	56	47.7	11.3	0.92	0.85	37.5	10.6	14.4	10.6
502318887	173	114	56	47.7	11.3	0.92	0.85	37.5	10.6	14.4	10.6
502318888	173	114	56	47.7	11.3	0.92	0.85	37.5	10.6	14.4	10.6
502318889	173	114	56	47.7	11.3	0.92	0.85	37.5	10.6	14.4	10.6
502318890	173	114	56	47.7	11.3	0.92	0.85	37.5	10.6	14.4	10.6
502318891	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0
502318892	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0
502318893	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0
502318894	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0
502318895	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Sep/12/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	BLI-075-06N-03S-D-30	

Roll Number	ASTM D4632 Grab Strength (lbs)	Puncture Resistance ASTM D4833 (lbs)	ASTM D4632 Peel Strength (lbs)	ASTM D6768 Tensile Strength (ppi)	ASTM D6496 Peel Strength (ppi)	ASTM D5993 Clay Content @ 0% Moisture (lbs/sf) GCL mass	ASTM D5993 Clay Content @ 0% Moisture (lbs/sf)	ASTM D5890 Free Swell (ml/2g)	ASTM D2216 Moisture Content (%)	ASTM D5891 Fluid Loss (ml)	ASTM D4643 Moisture Content (%) GCL moisture content
502318896	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0
502318897	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0
502318898	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0
502318899	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0
502318901	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0
502318902	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0
502318903	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0
502318904	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0
502318905	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0
502318906	197	114	50	49.2	10.0	0.90	0.83	37.5	10.6	14.4	10.0
502318907	178	114	42	46.1	8.8	0.85	0.77	37.5	10.6	14.4	10.0
502318908	178	114	42	46.1	8.8	0.85	0.77	37.5	10.6	14.4	10.0
502318909	178	114	42	46.1	8.8	0.85	0.77	36.5	10.1	14.2	10.0
502318910	178	114	42	46.1	8.8	0.85	0.77	36.5	10.1	14.2	10.0
502318911	178	114	42	46.1	8.8	0.85	0.77	36.5	10.1	14.2	10.0
502318912	178	114	42	46.1	8.8	0.85	0.77	36.5	10.1	14.2	10.0
502318913	178	114	42	46.1	8.8	0.85	0.77	36.5	10.1	14.2	10.0
502318914	178	114	42	46.1	8.8	0.85	0.77	36.5	10.1	14.2	10.0
502318915	178	114	42	46.1	8.8	0.85	0.77	36.5	10.1	14.2	10.0
502318916	178	114	42	46.1	8.8	0.85	0.77	36.5	10.1	14.2	10.0
502318917	178	114	42	46.1	8.8	0.85	0.77	36.5	10.1	14.2	10.0
502318918	110	114	62	43.3	12.6	0.89	0.82	36.5	10.1	14.2	9.6
502318919	110	114	62	43.3	12.6	0.89	0.82	36.5	10.1	14.2	9.6
502318920	110	114	62	43.3	12.6	0.89	0.82	36.5	10.1	14.2	9.6
502318921	110	114	62	43.3	12.6	0.89	0.82	36.5	10.1	14.2	9.6
502318922	110	114	62	43.3	12.6	0.89	0.82	36.5	10.1	14.2	9.6
502318923	110	114	62	43.3	12.6	0.89	0.82	36.5	10.1	14.2	9.6
502318924	110	114	62	43.3	12.6	0.89	0.82	36.5	10.1	14.2	9.6
502318926	110	114	62	43.3	12.6	0.89	0.82	36.5	10.1	14.2	9.6
502318927	110	114	62	43.3	12.6	0.89	0.82	36.5	10.1	14.2	9.6
502318928	110	114	62	43.3	12.6	0.89	0.82	36.5	10.1	14.2	9.6
502318930	110	114	62	43.3	12.6	0.89	0.82	36.5	10.1	14.2	9.6
502318931	110	114	62	43.3	12.6	0.89	0.82	36.5	10.1	14.2	9.6
502318932	110	114	62	43.3	12.6	0.89	0.82	36.5	10.1	14.2	9.6

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Sep/12/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	BLI-075-06N-03S-D-30	

Roll Number	ASTM D4632 Grab Strength (lbs)	Puncture Resistance ASTM D4833 (lbs)	ASTM D4632 Peel Strength (lbs)	ASTM D6768 Tensile Strength (ppi)	ASTM D6496 Peel Strength (ppi)	ASTM D5993 Clay Content @ 0% Moisture (lbs/sf) GCL mass	ASTM D5993 Clay Content @ 0% Moisture (lbs/sf)	ASTM D5890 Free Swell (ml/2g)	ASTM D2216 Moisture Content (%)	ASTM D5891 Fluid Loss (ml)	ASTM D4643 Moisture Content (%) GCL moisture content
502318933	110	114	62	43.3	12.6	0.89	0.82	36.5	10.1	14.2	9.6
502318934	186	114	55	45.5	11.1	0.89	0.82	36.5	10.1	14.2	9.8
502318935	186	114	55	45.5	11.1	0.89	0.82	36.5	10.1	14.2	9.8
502318936	186	114	55	45.5	11.1	0.89	0.82	36.5	10.1	14.2	9.8
502318937	186	114	55	45.5	11.1	0.89	0.82	38.0	10.3	13.8	9.8
502318938	186	114	55	45.5	11.1	0.89	0.82	38.0	10.3	13.8	9.8
502318939	186	114	55	45.5	11.1	0.89	0.82	38.0	10.3	13.8	9.8
502318940	186	114	55	45.5	11.1	0.89	0.82	38.0	10.3	13.8	9.8
502318941	186	114	55	45.5	11.1	0.89	0.82	38.0	10.3	13.8	9.8
502318945	186	114	55	45.5	11.1	0.89	0.82	38.0	10.3	13.8	9.8
502318946	186	114	55	45.5	11.1	0.89	0.82	38.0	10.3	13.8	9.8
502318947	186	114	55	45.5	11.1	0.89	0.82	38.0	10.3	13.8	9.8
502318948	186	114	55	45.5	11.1	0.89	0.82	38.0	10.3	13.8	9.8
502318949	186	114	55	45.5	11.1	0.89	0.82	38.0	10.3	13.8	9.8
502318950	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318951	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318952	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318953	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318954	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318955	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318956	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318957	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318958	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318959	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318960	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318961	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318962	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318963	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318964	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318965	209	114	37	36.3	7.5	0.90	0.82	38.0	10.3	13.8	10.6
502318966	115	114	45	36.0	9.0	0.96	0.88	38.0	10.3	13.8	10.9
502318967	115	114	45	36.0	9.0	0.96	0.88	38.0	10.3	13.8	10.9
502318968	115	114	45	36.0	9.0	0.96	0.88	38.0	10.3	13.8	10.9

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Sep/12/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	BLI-075-06N-03S-D-30	

Roll Number	ASTM D4632 Grab Strength (lbs)	Puncture Resistance ASTM D4833 (lbs)	ASTM D4632 Peel Strength (lbs)	ASTM D6768 Tensile Strength (ppi)	ASTM D6496 Peel Strength (ppi)	ASTM D5993 Clay Content @ 0% Moisture (lbs/sf) GCL mass	ASTM D5993 Clay Content @ 0% Moisture (lbs/sf)	ASTM D5890 Free Swell (ml/2g)	ASTM D2216 Moisture Content (%)	ASTM D5891 Fluid Loss (ml)	ASTM D4643 Moisture Content (%) GCL moisture content
502318969	115	114	45	36.0	9.0	0.96	0.88	38.0	10.3	13.8	10.9

Laboratory Manager _____

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: 12-Sep-2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
85199	Southwest Liner Systems, Inc.	SWLS/Sundance West Phase 2, Landfill Cell 1A	BLI-GEO-NW-0605	

Roll Number	Mass per Unit Area ASTM D5261 (oz/yd²)
2025665542	7.84
2025665544	8.33
2025665546	8.33
2025665953	7.04
2025665958	7.60
2025665959	7.60
2025665960	7.33
2025665961	7.33
2025667749	7.66
2025582839	7.27
2025627131	8.03
2025627138	7.54
2025627143	7.25
2025627144	7.25
2025627145	7.25
2025627154	7.04
2025627162	8.03
2025665952	7.04
2025665954	7.04
2025665965	7.66

Laboratory Manager Mauricio Ossa

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: 12-Sep-2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
85199	Southwest Liner Systems, Inc.	SWLS/Sundance West Phase 2, Landfill Cell 1A	BLI-GEO-WS-0305	

Roll Number	Mass per Unit Area ASTM D5261 (oz/yd²)
2025579815	3.28
2025617279	3.28
2025617281	3.28
2025620501	3.33
2025629250	3.28
2025629252	3.28
2025644927	3.26
2025644928	3.26

Laboratory Manager Mauricio Ossa

GSE BENTOLINER

CERTIFICATE OF ANALYSIS 2018

PRODUCT : NATIONAL® 30

SHIPPED FROM: **BENTONITE PERFORMANCE MINERALS LLC**
554 US HWY 212
COLONY PLANT
BELLE FOURCHE, S.D. 57717

BOL #	LOAD DATE	**LOT CODE**	% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC MEQ **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
B0003954051	**08-28-18**	**1082818B**	**9.2**	**0.23**	**5.79**	**12.4**	**108**	**31**	**990**
B0003956966	**08-29-18**	**1082818C**	**11.5**	**0.25**	**3.37**	**12.8**	**110**	**32**	**988**

AUGUST		% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC meq **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
No. of CARS **65**	M AVG	**8.84**	**0.18**	**4.16**	**13.91**	**107.72**	**30.49**	**959.34**
	STD DEV	**0.90**	**0.33**	**1.92**	**1.01**	**4.80**	**1.89**	**62.45**

YTD		% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC meq **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
No. of CARS **474**	M AVG	**8.89**	**0.29**	**4.15**	**13.61**	**109.85**	**31.09**	**959.18**
	STD DEV	**0.92**	**0.53**	**1.99**	**1.13**	**5.37**	**1.84**	**72.06**

SOLD TO: GSE CLAY LINING TECHNOLOGY, Co.
3150 FIRST AVENUE
SPEARFISH, SD 57783

Attn: Bob Stadler (rstadler@gseworld.com)
Chuck Taylor (ctaylor@gseworld.com)
Cheryl Hofer (chofer@gseworld.com)
(ezimmel@gseworld.com)

For any questions contact.
Q.A. SUPERVISOR
Shannon Pollmiller
307-896-8505 or
(Shannon.Pollmiller@halliburton.com

SHIPPED TO: GSE CLAY LINING TECHNOLOGY, Co.
3150 FIRST AVENUE
SPEARFISH, SD 57783

CC: Thomas Anderson
Jason Tawse

Prepared by: TO
08/29/18

GSE BENTOLINER

CERTIFICATE OF ANALYSIS 2018

PRODUCT : NATIONAL® 30

SHIPPED FROM: **BENTONITE PERFORMANCE MINERALS LLC**
554 US HWY 212
COLONY PLANT
BELLE FOURCHE, S.D. 57717

BOL #	LOAD DATE	**LOT CODE**	% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC MEQ **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
B0003956968	**08-30-18**	**1082818D**	**9.2**	**0.19**	**8.10**	**12.6**	**110**	**31**	**979**

AUGUST		% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC meq **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
No. of CARS **66**	M AVG	**8.84**	**0.18**	**4.21**	**13.89**	**107.75**	**30.50**	**959.61**
	STD DEV	**0.90**	**0.33**	**1.96**	**1.02**	**4.77**	**1.88**	**62.06**

YTD		% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC meq **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
No. of CARS **475**	M AVG	**8.89**	**0.29**	**4.16**	**13.61**	**109.85**	**31.09**	**959.22**
	STD DEV	**0.92**	**0.53**	**1.99**	**1.13**	**5.37**	**1.84**	**72.00**

SOLD TO: GSE CLAY LINING TECHNOLOGY, Co.
3150 FIRST AVENUE
SPEARFISH, SD 57783

Attn: Bob Stadler (rstadler@gseworld.com)
Chuck Taylor (ctaylor@gseworld.com)
Cheryl Hofer (chofer@gseworld.com)
(ezimmel@gseworld.com)

For any questions contact.
Q.A. SUPERVISOR
Shannon Pollmiller
307-896-8505 or
(Shannon.Pollmiller@halliburton.com

SHIPPED TO: GSE CLAY LINING TECHNOLOGY, Co.
3150 FIRST AVENUE
SPEARFISH, SD 57783

CC: Thomas Anderson
Jason Tawse

Prepared by: TO
08/30/18

GSE BENTOLINER

CERTIFICATE OF ANALYSIS 2018

PRODUCT : NATIONAL® 30

SHIPPED FROM: **BENTONITE PERFORMANCE MINERALS LLC**
554 US HWY 212
COLONY PLANT
BELLE FOURCHE, S.D. 57717

BOL #	LOAD DATE	**LOT CODE**	% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC MEQ **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
B0003956971	**08-31-18**	**1083118A**	**9.6**	**0.32**	**4.13**	**14.0**	**116**	**31**	**982**
B0003956972	**08-31-18**	**1083118B**	**9.4**	**0.08**	**1.63**	**14.2**	**110**	**29**	**981**

SEPTEMBER		% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC meq **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
No. of CARS **15**	M AVG	**9.43**	**1.44**	**2.98**	**14.47**	**107.45**	**31.86**	**942.18**
	STD DEV	**0.45**	**2.07**	**1.34**	**2.03**	**4.87**	**2.20**	**91.87**

YTD		% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC meq **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
No. of CARS **493**	M AVG	**8.92**	**0.35**	**4.08**	**13.67**	**109.69**	**31.11**	**957.65**
	STD DEV	**0.91**	**0.71**	**1.99**	**1.22**	**5.41**	**1.86**	**73.29**

SOLD TO: GSE CLAY LINING TECHNOLOGY, Co.
3150 FIRST AVENUE
SPEARFISH, SD 57783

Attn: Bob Stadler (rstadler@gseworld.com)
Chuck Taylor (ctaylor@gseworld.com)
Cheryl Hofer (chofer@gseworld.com)
(ezimmel@gseworld.com)

For any questions contact.
Q.A. SUPERVISOR
Shannon Pollmiller
307-896-8505 or
(Shannon.Pollmiller@halliburton.com

SHIPPED TO: GSE CLAY LINING TECHNOLOGY, Co.
3150 FIRST AVENUE
SPEARFISH, SD 57783

CC: Thomas Anderson
Jason Tawse

Prepared by: TO
09/11/18

GSE BENTOLINER

CERTIFICATE OF ANALYSIS 2018

PRODUCT : NATIONAL® 30

SHIPPED FROM: **BENTONITE PERFORMANCE MINERALS LLC**
554 US HWY 212
COLONY PLANT
BELLE FOURCHE, S.D. 57717

BOL #	LOAD DATE	**LOT CODE**	% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC MEQ **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
B0003956973	**09-01-18**	**1083118C**	**9.3**	**0.14**	**3.65**	**13.4**	**106**	**35**	**1012**

SEPTEMBER		% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC meq **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
No. of CARS **1**	M AVG	**9.30**	**0.14**	**3.65**	**13.40**	**106.00**	**35.00**	**1012.00**
	STD DEV	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

YTD		% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC meq **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
No. of CARS **479**	M AVG	**8.90**	**0.30**	**4.13**	**13.64**	**109.78**	**31.09**	**958.39**
	STD DEV	**0.91**	**0.55**	**2.00**	**1.16**	**5.41**	**1.85**	**72.32**

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Cheryl Hofer (chofer@gseworld.com)
(ezimmel@gseworld.com)

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Q.A. SUPERVISOR
Shannon Pollmiller
307-896-8505 or
(Shannon.Pollmiller@halliburton.com

SHIPPED TO: GSE CLAY LINING TECHNOLOGY, Co.
3150 FIRST AVENUE
SPEARFISH, SD 57783

CC: Thomas Anderson
Jason Tawse

Prepared by: TO
09/01/18

GSE BENTOLINER

CERTIFICATE OF ANALYSIS 2018

PRODUCT : NATIONAL® 30

SHIPPED FROM: **BENTONITE PERFORMANCE MINERALS LLC**
554 US HWY 212
COLONY PLANT
BELLE FOURCHE, S.D. 57717

BOL #	LOAD DATE	**LOT CODE**	% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC MEQ **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
B0003956974	**09-01-18**	**1083118D**	**9.0**	**0.08**	**1.60**	**12.0**	**110**	**33**	**975**

SEPTEMBER		% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC meq **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
No. of CARS **2**	M AVG	**9.15**	**0.11**	**2.63**	**12.70**	**108.00**	**34.00**	**993.50**
	STD DEV	**0.15**	**0.03**	**1.03**	**0.70**	**2.00**	**1.00**	**18.50**

YTD		% MOIST **12 MAX**	Mesh % + 20 **15 MAX**	Mesh % - 200 **10 MAX**	FL **18 MAX**	MBC meq **70 MIN**	SWELL INDEX **25 MIN**	PWA **750 MIN**
No. of CARS **480**	M AVG	**8.90**	**0.30**	**4.12**	**13.63**	**109.78**	**31.09**	**958.42**
	STD DEV	**0.91**	**0.55**	**2.00**	**1.16**	**5.40**	**1.85**	**72.26**

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(ezimmel@gseworld.com)

For any questions contact.
Q.A. SUPERVISOR
Shannon Pollmiller
307-896-8505 or
(Shannon.Pollmiller@halliburton.com

SHIPPED TO: GSE CLAY LINING TECHNOLOGY, Co.
3150 FIRST AVENUE
SPEARFISH, SD 57783

CC: Thomas Anderson
Jason Tawse

Prepared by: TO
09/01/18

4/10/2018

GSE ENVIRONMENTAL™

Geotextile Durability GRI-GCL3

Roll #21270936 BLI-GEO-WS-0305 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	120.9	120.9
2	103.7	113.4
3	126.1	94.2
4	135.6	90.2
5	128.5	100.4
Avg.	123.0	103.8
SD	12.0	13.0
Strength Retained (%) 84.4		

Roll #2025327556 BLI-GEO-NW-0605 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	33.6	32
2	34.6	34.9
3	35.8	40.8
4	34.2	43.4
5	40.2	37.5
Avg.	35.7	37.7
SD	2.7	4.5
Strength Retained (%) 105.7		

Roll #21250897 BLI-GEO-WS-0305 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	118.8	110.8
2	117.8	118
3	111.8	94
4	100.8	116.7
5	123.8	129.6
Avg.	114.6	113.8
SD	8.8	13.0
Strength Retained (%) 99.3		

Roll #2025297591 BLI-GEO-NW-0605 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	33.8	43.3
2	34.1	31.8
3	26.2	35
4	37.1	33.9
5	43.7	42.1
Avg.	35.0	37.2
SD	6.3	5.2
Strength Retained (%) 106.4		

Roll #21250895 BLI-GEO-WS-0305 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	128.3	110.9
2	128.1	122.2
3	126.9	118.7
4	107.7	113.0
5	115.9	77.8
Avg.	121.4	108.5
SD	9.2	17.7
Strength Retained (%) 89.4		

Roll #2025310781 BLI-GEO-NW-0605 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	41.4	33.9
2	31.7	36.9
3	34.7	41.2
4	37.7	34.1
5	41.5	38.2
Avg.	37.4	36.9
SD	4.3	3.0
Strength Retained (%) 98.6		

Roll #21270903 BLI-GEO-WS-0305 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	88.8	138.2
2	118.9	105.4
3	122.4	123.5
4	123.4	124.2
5	135.4	108.2
Avg.	117.8	119.9
SD	17.4	13.4
Strength Retained (%) 101.8		

Roll #2025297652 BLI-GEO-NW-0605 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	37.3	36.4
2	32.5	37
3	37.7	34.7
4	40.8	36.3
5	38.6	43.1
Avg.	37.4	37.5
SD	3.0	3.2
Strength Retained (%) 100.3		

Roll #21270903 BLI-GEO-WS-0305 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	127.8	133.8
2	143	135.4
3	134.1	135.9
4	132.8	140.3
5	136.4	132.3
Avg.	134.8	135.5
SD	5.6	3.0
Strength Retained (%) 100.5		

Roll #2025307690 BLI-GEO-NW-0605 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	45	42.2
2	34.6	52.4
3	26.4	37.2
4	29.4	27.1
5	35.2	32.2
Avg.	34.1	38.2
SD	7.1	9.7
Strength Retained (%) 112.0		

Roll #21280871 BLI-GEO-WS-0305 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	168.5	136.4
2	134.2	127.7
3	130.6	117.9
4	132.5	139.1
5	134.7	125
Avg.	140.1	129.2
SD	16.0	8.6
Strength Retained (%) 92.2		

Roll #2025276623 BLI-GEO-NW-0605 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	31.5	29.6
2	30.1	30.9
3	24.2	38.1
4	41	30.3
5	38.2	38.8
Avg.	33.0	33.5
SD	6.7	4.5
Strength Retained (%) 101.6		

Roll #21250933 BLI-GEO-WS-0305 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	173.7	141
2	114	133.4
3	153.5	124.8
4	135.5	140.5
5	139.2	122.4
Avg.	143.2	132.4
SD	22.2	8.6
Strength Retained (%) 92.5		

Roll #2025272404 BLI-GEO-NW-0605 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	50.3	36
2	45.6	46.1
3	40.2	30.5
4	32.4	37.1
5	31.7	53.4
Avg.	40.0	40.6
SD	8.1	9.1
Strength Retained (%) 101.4		

Roll #21201970 BLI-GEO-WS-0305 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	139.1	141.8
2	142	140.8
3	130.1	128.5
4	136.9	136.6
5	182.3	143.9
Avg.	146.1	138.3
SD	20.7	6.1
Strength Retained (%) 94.7		

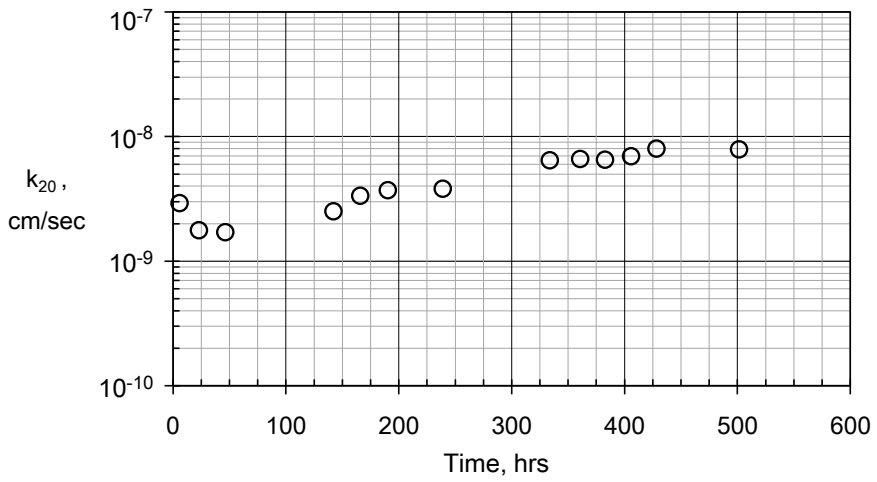
Roll #2025324973 BLI-GEO-NW-0605 ASTM D 6768 - MD		
	Unexposed (lb/in)	50 Days @ 60°C (lb/in)
1	34.4	27.3
2	34	32.8
3	29.2	42.1
4	29.4	22.9
5	24.3	34.8
Avg.	30.3	32.0
SD	4.1	7.3
Strength Retained (%) 105.7		

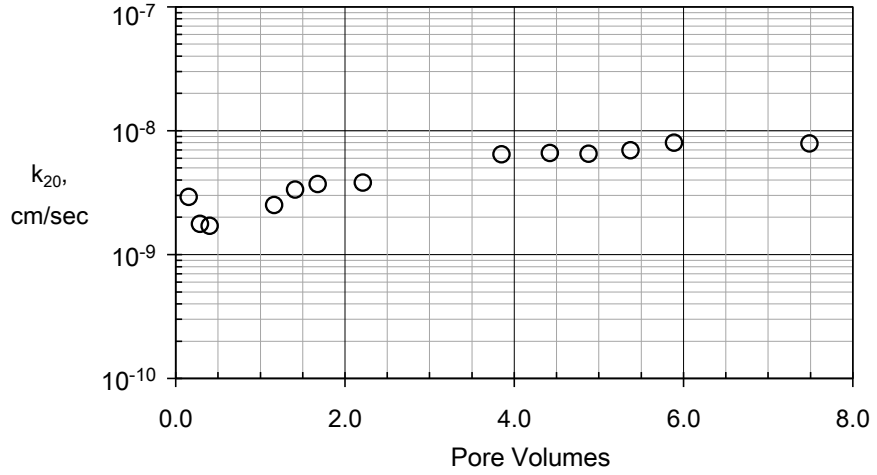
Don Cunningham

Don Cunningham
Lab Technician III

GCL Compatibility Test (ASTM D6766 Scenario I Method C)

Client:	GSE	TRI Log #:	28340
Project:	Yearly Testing	Test Start Date:	6/13/2017
Sample ID:	Lot 1042017C		
Product Type:	BPM National Bentonite		





Initial Conditions

Sample Diameter (in)	4.00
Sample Height (in)	-
Moisture Content (%)	10.4
pH	8.6
EC (mS)	1.6

Notes:

Final Conditions

Sample Diameter (in)	4.00
Sample Height (in)	0.19
Moisture Content (%)	97.7
G_s (assumed)	2.65
Porosity, n	0.72
1 Pore Volume (cc)	28.6
Effective Confining Stress at the Efluent End (psi)	5.0
Average Effective Confining Stress (psi)	4.0
Total Back-Pressure (psi)	75.0
pH	6.9
EC (mS)	12.3

Notes:

Description of test liquid:
0.1 M Calcium Chloride Solution

Termination Criteria:
GRI-GCL3 - Outflow-to-inflow hydrauilc conductity within 25%

Results(1)

Hydraulic Conductivity, k_{20}(2) (cm/s)	7.6×10^{-9}
Flux, q_t (m^3/m^2)/s	2.2×10^{-8}
Hydraulic Gradient, i (m/m)	561.0

(1): Average values obtained from the last 3 readings.

(2): Hydraulic Conductivity, k, corrected to 20°C

Jeffrey A. Kuhn, Ph.D, P.E., 8/8/2017

Quality Review / Date

Tested by: Shawn O'Connor

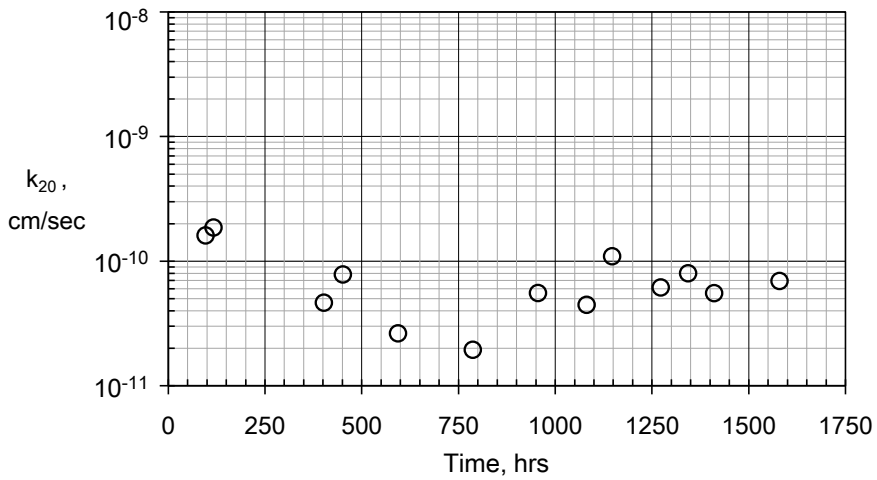
TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

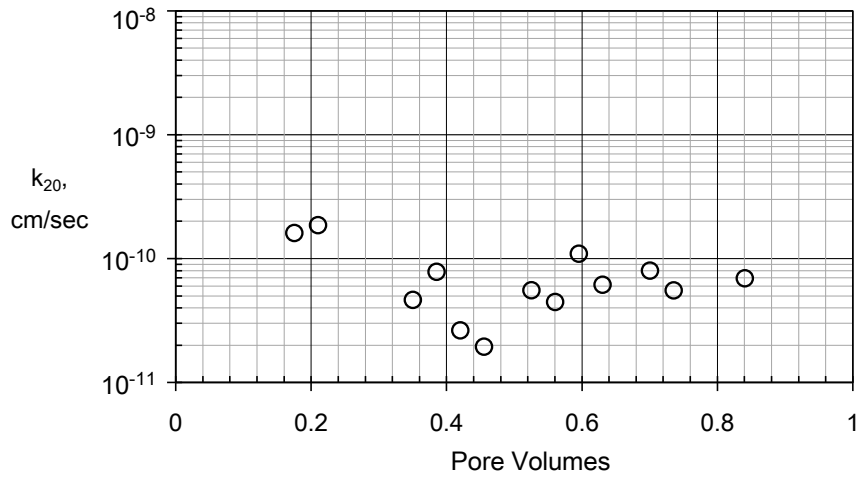
Reading #	Time (hr)	Pore Volumes	Gradient, i (m/m)	k_{20} (cm/s)	Q_{in} / Q_{out}	pH	EC (mS)
1	5.8	0.2	657.6	2.93E-09	4.00	- -	- -
2	22.9	0.3	653.2	1.77E-09	1.75	- -	- -
3	46.3	0.4	647.2	1.71E-09	0.75	- -	- -
4	142.1	1.2	613.2	2.51E-09	0.95	- -	- -
5	165.8	1.4	602.4	3.35E-09	1.00	- -	- -
6	190.3	1.7	590.4	3.71E-09	0.93	- -	- -
7	238.9	2.2	566.4	3.82E-09	0.93	- -	- -
8	333.8	3.8	493.8	6.46E-09	0.97	7.69	8.6
9	360.7	4.4	642.3	6.61E-09	0.91	- -	- -
10	382.7	4.9	621.9	6.53E-09	0.96	- -	- -
11	405.8	5.4	600.0	6.96E-09	0.96	- -	- -
12	428.3	5.9	576.7	8.01E-09	0.90	- -	- -
13	501.4	7.5	506.3	7.90E-09	0.98	6.93	12.3

TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

GCL Compatibility Test (ASTM D6766 Scenario I Method C)

Client:	GSE	TRI Log #:	28340
Project:	Yearly Testing	Test Start Date:	5/31/2017
Sample ID:	Lot 1042017C		
Product Type:	BPM National Bentonite		





Initial Conditions

Sample Diameter (in)	4.00
Sample Height (in)	-
Moisture Content (%)	10.4
pH	8.6
EC (mS)	1.6

Notes:

Final Conditions

Sample Diameter (in)	4.00
Sample Height (in)	0.13
Moisture Content (%)	62.3
G_s (assumed)	2.65
Porosity, n	0.58
1 Pore Volume (cc)	15.6
Effective Confining Stress at the Efluent End (psi)	72.5
Average Effective Confining Stress (psi)	71.5
Total Back-Pressure (psi)	30.0
pH	7.5
EC (mS)	2.4

Notes:

Description of test liquid:
0.1 M Calcium Chloride Solution

Termination Criteria:
GRI-GCL3 - Outflow-to-inflow hydrauilc conductity within 25%

Results(1)

Hydraulic Conductivity, k_{20}(2) (cm/s)	6.8×10^{-11}
Flux, q_t (m^3/m^2)/s	3.3×10^{-10}
Hydraulic Gradient, i (m/m)	1411.3

(1): Average values obtained from the last 3 readings.

(2): Hydraulic Conductivity, k, corrected to 20°C

Jeffrey A. Kuhn, Ph.D, P.E., 8/8/2017

Quality Review / Date

Tested by: Shawn O'Connor

TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

Reading #	Time (hr)	Pore Volumes	Gradient, i (m/m)	k_{20} (cm/s)	Q_{in} / Q_{out}	pH	EC (mS)
1	96.4	0.18	1443.2	1.61E-10	1.67	- -	- -
2	116.9	0.21	1441.6	1.86E-10	1.00	- -	- -
3	402.1	0.35	1435.3	4.64E-11	1.33	- -	- -
4	451.2	0.39	1433.3	7.82E-11	1.00	- -	- -
5	593.7	0.42	1431.8	2.63E-11	1.00	- -	- -
6	786.9	0.46	1430.0	1.95E-11	1.00	- -	- -
7	955.3	0.53	1425.5	5.55E-11	0.67	- -	- -
8	1081.0	0.56	1422.7	4.47E-11	0.50	- -	- -
9	1147	0.60	1417.6	1.10E-10	1.00	- -	- -
10	1272	0.63	1416.9	6.15E-11	0.33	- -	- -
11	1343	0.70	1414.4	8.00E-11	2.00	- -	- -
12	1410	0.74	1412.8	5.54E-11	1.00	- -	- -
13	1580	0.84	1406.7	6.94E-11	1.00	7.54	2.4

TRI ENVIRONMENTAL, INC.
9063 BEE CAVES RD. – AUSTIN, TX 78733 – USA | PH: 800.880.TEST OR 512.263.2101

APPENDIX B

Material Manufacturer Certification and Conformance Testing Results

B.2. GCL Conformance Testing Results

September 20, 2018

Mail To:

Mark Decarlo
Southwest Liner Systems
301 Calle Industrial
Bernalillo, NM 87004

email: swls.md@gmail.com

Bill To:

<= Same (P.O. # SW1819)

Dear Mr. Decarlo:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report for laboratory testing.

Project:	**Sundance West Phase 2 Landfill - Cell 1A**
TRI Job Reference Number:	41074
Material(s) Tested:	Four, Solmax GSE Bentoliner NSL GCL(s)
Test(s) Requested:	Mass/Unit Area (ASTM D5993) Bentonite - Swell Index (ASTM D5890) Bentonite - Fluid Loss (ASTM D5891)

If you have any questions or require any additional information, please call us at 1-800-880-8378.

Sincerely,

Mansukh Patel
Geosynthetic Services Division
www.GeosyntheticTesting.com

Lead GCL Technical Contact - Jeffrey A. Kuhn, Ph.D., P.E., jkuhn@tri-env.com, 512-952-1212

GCL TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE Bentoliner NSL GCL
Sample Identification: 502318794
TRI Log #: 41074

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Bentonite - Mass/Unit Area (ASTM D5993, result @ 0% M.C.)													
Bentonite mass/unit area (lbs/ft^2)	0.79	0.73	0.80	0.87	0.87						**0.81**	0.06	0.75 min
Moisture Content (%)	10.5	10.4	10.4	10.2	9.8						**10.3**	0.3	
Bentonite - Swell Index (ASTM D5890)													
Swell index (mL/2g)		33									**33**		24 min
Note: Bentonite sample tested is taken from finished GCL product.													
Bentonite - Fluid Loss (ASTM D5891)													
Slurry temperature at test intiation:		26.4	° C		Slurry temperature at test completion:				23.0	° C			
Fluid Loss (mL)		12.6									**12.6**		18 max
Note: Bentonite sample tested is taken from finished GCL product.													

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

GCL TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE Bentoliner NSL GCL
Sample Identification: 502318845
TRI Log #: 41074

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Bentonite - Mass/Unit Area (ASTM D5993, result @ 0% M.C.)													
Bentonite mass/unit area (lbs/ft^2)	0.90	0.78	0.95	0.87	0.90						**0.88**	0.06	0.75 min
Moisture Content (%)	10.0	9.9	9.8	9.7	9.1						**9.7**	0.4	
Bentonite - Swell Index (ASTM D5890)													
Swell index (mL/2g)		33									**33**		24 min
Note: Bentonite sample tested is taken from finished GCL product.													
Bentonite - Fluid Loss (ASTM D5891)													
Slurry temperature at test intiation:		26.5	° C		Slurry temperature at test completion:				22.9	° C			
Fluid Loss (mL)		13.8									**13.8**		18 max
Note: Bentonite sample tested is taken from finished GCL product.													

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GCL TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE Bentoliner NSL GCL
Sample Identification: 502318890
TRI Log #: 41074

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Bentonite - Mass/Unit Area (ASTM D5993, result @ 0% M.C.)													
Bentonite mass/unit area (lbs/ft^2)	0.96	0.93	1.02	0.78	0.88						**0.91**	0.09	0.75 min
Moisture Content (%)	9.9	9.9	9.8	9.9	9.6						**9.8**	0.1	
Bentonite - Swell Index (ASTM D5890)													
Swell index (mL/2g)		33									**33**		24 min
Note: Bentonite sample tested is taken from finished GCL product.													
Bentonite - Fluid Loss (ASTM D5891)													
Slurry temperature at test intiation:		26.4	° C		Slurry temperature at test completion:				23.3	° C			
Fluid Loss (mL)		14.2									**14.2**		18 max
Note: Bentonite sample tested is taken from finished GCL product.													

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GCL TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE Bentoliner NSL GCL
Sample Identification: 502318933
TRI Log #: 41074

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Bentonite - Mass/Unit Area (ASTM D5993, result @ 0% M.C.)													
Bentonite mass/unit area (lbs/ft^2)	0.83	0.82	1.01	0.91	0.80						**0.87**	0.09	0.75 min
Moisture Content (%)	9.2	9.0	9.0	9.0	8.5						**8.9**	0.3	
Bentonite - Swell Index (ASTM D5890)													
Swell index (mL/2g)		33									**33**		24 min
Note: Bentonite sample tested is taken from finished GCL product.													
Bentonite - Fluid Loss (ASTM D5891)													
Slurry temperature at test intiation:		26.5	° C		Slurry temperature at test completion:				23.7	° C			
Fluid Loss (mL)		14.0									**14.0**		18 max
Note: Bentonite sample tested is taken from finished GCL product.													

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

APPENDIX B

Material Manufacturer Certification and Conformance Testing Results

B.3. FML Certifications

GSE Roll Allocation

Order SO-085199
Customer Southwest Liner Systems, Inc.
Project Name SWLS-Sundance West Phase 2 Landfill Cell 1A

Roll#	Resin Lot	Product Code	Mfg Date	Length
108197865	18F1260	HDS-060AE-BBB-B-00	8/24/2018	560
108197871	18F1260	HDS-060AE-BBB-B-00	8/24/2018	560
108197872	18F1260	HDS-060AE-BBB-B-00	8/24/2018	560
108197873	18F1260	HDS-060AE-BBB-B-00	8/24/2018	560
108197874	18F1260	HDS-060AE-BBB-B-00	8/24/2018	560
108197875	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197876	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197877	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197878	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197879	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197880	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197881	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197882	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197883	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197884	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197885	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197886	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197887	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197888	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197889	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197890	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197891	18F1260	HDS-060AE-BBB-B-00	8/25/2018	560
108197892	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197893	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197894	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197895	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197896	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197897	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197898	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197899	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197900	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197901	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197902	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197903	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197904	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197905	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197906	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197907	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197908	18F1260	HDS-060AE-BBB-B-00	8/26/2018	560
108197909	18F1260	HDS-060AE-BBB-B-00	8/27/2018	560
108197910	18G1147	HDS-060AE-BBB-B-00	8/27/2018	560
108197911	18G1147	HDS-060AE-BBB-B-00	8/27/2018	560
108197912	18G1147	HDS-060AE-BBB-B-00	8/27/2018	560
108197913	18G1147	HDS-060AE-BBB-B-00	8/27/2018	560
108197917	18G1147	HDS-060AE-BBB-B-00	8/27/2018	560

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Aug/28/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	HDS-060AE-BBB-B-00	

Roll Number	Average Thickness ASTM D5199 (mils)	Minimum Thickness ASTM D5199 (mils)	Yield Strength ASTM D6693 (ppi) MD	Yield Strength ASTM D6693 (ppi) TD	Yield Elongation ASTM D6693 (%) MD	Yield Elongation ASTM D6693 (%) TD	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833 (lbs)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)
108197865	60	56	143	147	17	18	301	296	828	837	50	47	147	0.944	2.5	10
108197871	62	59	139	149	17	18	302	316	857	887	49	46	150	0.944	2.6	10
108197872	61	59	137	143	17	18	280	286	824	842	48	45	143	0.944	2.4	10
108197873	61	59	137	143	17	18	280	286	824	842	48	45	143	0.944	2.4	10
108197874	61	59	137	143	17	18	280	286	824	842	48	45	143	0.944	2.4	10
108197875	61	59	139	145	17	18	282	300	823	878	49	46	149	0.944	2.4	10
108197876	61	56	139	145	17	18	282	300	823	878	49	46	149	0.944	2.4	10
108197877	61	58	139	145	17	18	282	300	823	878	49	46	149	0.944	2.4	10
108197878	61	57	149	152	18	18	287	304	777	860	51	47	151	0.941	2.7	10
108197879	61	57	149	152	18	18	287	304	777	860	51	47	151	0.941	2.7	10
108197880	61	59	149	152	18	18	287	304	777	860	51	47	151	0.941	2.7	10
108197881	60	58	144	151	18	18	297	294	801	883	52	50	151	0.941	2.7	10
108197882	61	59	144	151	18	18	297	294	801	883	52	50	151	0.943	2.7	10
108197883	61	58	144	151	18	18	297	294	801	883	52	50	151	0.943	2.7	10
108197884	61	59	152	159	18	18	299	315	797	885	52	49	152	0.943	2.4	10
108197885	62	60	152	159	18	18	299	315	797	885	52	49	152	0.943	2.4	10
108197886	62	59	152	159	18	18	299	315	797	885	52	49	152	0.943	2.4	10
108197887	61	59	138	140	18	18	269	281	774	778	50	49	146	0.943	2.4	10
108197888	61	59	138	140	18	18	269	281	774	778	50	49	146	0.943	2.3	10
108197889	61	59	138	140	18	18	269	281	774	778	50	49	146	0.943	2.3	10
108197890	61	59	136	137	17	18	286	269	827	755	49	49	146	0.943	2.6	10
108197891	61	59	136	137	17	18	286	269	827	755	49	49	146	0.943	2.6	10
108197892	61	59	136	137	17	18	286	269	827	755	49	49	146	0.944	2.5	10
108197893	63	61	146	141	18	17	289	244	725	831	47	48	145	0.944	2.3	10
108197894	63	61	146	141	18	17	289	244	725	831	47	48	145	0.944	2.3	10
108197895	61	59	146	141	18	17	289	244	725	831	47	48	145	0.944	2.7	10
108197896	61	59	144	146	18	18	294	297	793	853	48	50	149	0.944	2.7	10
108197897	61	60	144	146	18	18	294	297	793	853	48	50	149	0.944	2.7	10
108197898	61	59	144	146	18	18	294	297	793	853	48	50	149	0.944	2.4	10
108197899	61	60	152	158	18	18	282	303	759	865	51	49	150	0.944	2.4	10
108197900	61	58	152	158	18	18	282	303	759	865	51	49	150	0.944	2.7	10
108197901	62	60	152	158	18	18	282	303	759	865	51	49	150	0.944	2.7	10
108197902	61	59	140	149	18	18	274	302	752	857	49	51	153	0.945	2.6	10
108197903	62	59	140	149	18	18	274	302	752	857	49	51	153	0.945	2.6	10

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Aug/28/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	HDS-060AE-BBB-B-00	

Roll Number	Average Thickness ASTM D5199 (mils)	Minimum Thickness ASTM D5199 (mils)	Yield Strength ASTM D6693 (ppi) MD	Yield Strength ASTM D6693 (ppi) TD	Yield Elongation ASTM D6693 (%) MD	Yield Elongation ASTM D6693 (%) TD	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833 (lbs)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)
108197904	61	57	140	149	18	18	274	302	752	857	49	51	153	0.945	2.6	10
108197905	61	60	150	154	18	18	266	275	749	788	49	50	153	0.945	2.6	10
108197906	62	60	150	154	18	18	266	275	749	788	49	50	153	0.945	2.4	10
108197907	61	60	150	154	18	18	266	275	749	788	49	50	153	0.945	2.4	10
108197908	62	59	155	154	17	18	279	263	799	723	50	51	149	0.945	2.5	10
108197909	61	59	155	154	17	18	279	263	799	723	50	51	149	0.945	2.5	10
108197910	61	58	155	154	17	18	279	263	799	723	50	51	149	0.945	2.3	10
108197911	61	60	152	151	18	17	280	261	779	757	50	48	188	0.945	2.3	10
108197912	62	58	152	151	18	17	280	261	779	757	50	48	188	0.944	2.6	10
108197913	61	58	152	151	18	17	280	261	779	757	50	48	188	0.944	2.6	10
108197917	61	59	145	152	18	18	296	317	804	907	50	48	153	0.944	2.6	10

Laboratory Manager _____

19103 Gundle Road Houston, TX 77073

Formosa Plastics

FORMOSA PLASTICS CORPORATION, TEXAS
201 FORMOSA DRIVE
PO BOX 700
POINT COMFORT TX 77978
PHONE:(888)FPCUSA3

Certificate of Analysis
(CONFIDENTIAL)

CUSTOMER:GSE ENVIRONMENTAL, LLC
UP TRACK 14732 WESTFIELD
19103 GUNDLE ROAD
HOUSTON TX 77070
PRODUCT :HL3812
RAILCAR FPAX980353
CLEANING/INSPECTION NO: 980353062218

S/O NO : ET6A842
CUSTOMER PO : 03-513116
DATE SHIPPED: 7/27/18
LOT NO : 18F1260
WEIGHT (LB) : 195,600.00
CUSTID:FT03112 SPIDE3

TEST ITEM	REFERENCE METHOD	TEST VALUE
Melt Index,g/10min	ASTM D1238	.069
HLMI, g/10 min.	ASTM D1238	11.4
Density, g/cm3	ASTM D1505	.9366

Notes:
Notes: Additive levels were tested and meet the min specification for this lot As a result Standard OIT (by ASTM D3895) is greater than 120 mins (nominal values not tested on every lot). As a result, High Pres sure OI T (by ASTM D5885) is greater than 1000 mins.

Linda Kao

QC SUPERVISOR: LINDA KAO

Formosa Plastics

FORMOSA PLASTICS CORPORATION, TEXAS
201 FORMOSA DRIVE
PO BOX 700
POINT COMFORT TX 77978
PHONE:(888)FPCUSA3

Certificate of Analysis
(CONFIDENTIAL)

CUSTOMER:GSE ENVIRONMENTAL, LLC
UP TRACK 14732 WESTFIELD
19103 GUNDLE ROAD
HOUSTON TX 77070
PRODUCT :HL3812
RAILCAR FPAX215190
CLEANING/INSPECTION NO: 215190071218

S/O NO : ET6A857
CUSTOMER PO : 03-513116
DATE SHIPPED: 7/31/18
LOT NO : 18G1147
WEIGHT (LB) : 198,150.00
CUSTID:FT03112 SPIDE3

TEST ITEM	REFERENCE METHOD	TEST VALUE
Melt Index,g/10min	ASTM D1238	.065
HLMI, g/10 min.	ASTM D1238	10.5
Density, g/cm3	ASTM D1505	.9363

Notes:
Notes: Additive levels were tested and meet the min specification for this lot As a result Standard OIT (by ASTM D3895) is greater than 120 mins (nominal values not tested on every lot). As a result, High Pres sure OI T (by ASTM D5885) is greater than 1000 mins.

Linda Kao

QC SUPERVISOR: LINDA KAO

Report Date
8/28/2018

Quality Assurance Laboratory Test Results

Job Name: SWLS- Sundance West Phase 2 Landfill Cell 1A
Sales Order: 85199

Required Testing: ASTM D 3895 -- Standard Test Method for Oxidative Induction Time of Polyolefins by Differential Scanning Calorimetry
ASTM D 5397 -- Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test

Specification: D 3895 - > 100 Minutes
D 5397 - > 500 Hours

Frequency: 1/200,000 lbs.

Product Code	Resin Lot Number	Test Results
HDS-060AE-BBB-B-00	18F1260	PASS
HDS-060AE-BBB-B-00	18G1147	PASS

Approved By:	Lana Hickman
Date Approved:	August 28, 2018

Report Date
8/28/2018

SOLMAX GSE

Quality Assurance Laboratory Test Results

Job Name: SWLS- Sundance West Phase 2 Landfill Cell 1A
SO Number: 85199

The table below summarizes additive performance of GSE Houston products as perceived by OIT retention after UV and Oven Aging per GRI Test Method GM13:

		Oven Aging @ 85° C (ASTM D 5721)				UV Resistance per GRI GM11			
		90 days per ASTM D 5885				1600 hours UV Aging per ASTM D 5885			
Product Type	**Formulation**	Initial HP OIT (min)	Final HP OIT (min)	Retained (%)	GRI Criteria (%)	Initial HP OIT (min)	Final HP OIT (min)	Retained (%)	GRI Criteria (%)
HDPE Geomembrane	Formosa HL3812	744	674	90	80	744	700	95	50

Approved By: Lana Hickman
Date: August 28, 2018

GSE Roll Allocation

Order SO-085199
Customer Southwest Liner Systems, Inc.
Project Name Sundance West Phase 2, Landfill Cell 1A

Roll#	Resin Lot	Product Code	Mfg Date	Length
102191310	18G1299	HDT-060GE-BBB-B-W0	10/25/2018	520
102191311	18G1299	HDT-060GE-BBB-B-W0	10/25/2018	520
102191312	18G1299	HDT-060GE-BBB-B-W0	10/25/2018	520
102191313	18G1299	HDT-060GE-BBB-B-W0	10/26/2018	520
102191314	18G1299	HDT-060GE-BBB-B-W0	10/26/2018	520
102191315	18G1299	HDT-060GE-BBB-B-W0	10/26/2018	520
102191316	18G1299	HDT-060GE-BBB-B-W0	10/26/2018	520
102191317	18G1299	HDT-060GE-BBB-B-W0	10/26/2018	520
102191318	18G1276	HDT-060GE-BBB-B-W0	10/26/2018	520
102191319	18G1276	HDT-060GE-BBB-B-W0	10/26/2018	520
102191320	18G1276	HDT-060GE-BBB-B-W0	10/26/2018	520
104192270	18G1188	HDT-060GE-BBB-B-W0	10/18/2018	520
104192271	18G1188	HDT-060GE-BBB-B-W0	10/18/2018	520
104192272	18G1188	HDT-060GE-BBB-B-W0	10/18/2018	520
104192273	18G1188	HDT-060GE-BBB-B-W0	10/19/2018	520
104192274	18G1188	HDT-060GE-BBB-B-W0	10/19/2018	520
104192275	18G1188	HDT-060GE-BBB-B-W0	10/19/2018	520
104192277	18G1188	HDT-060GE-BBB-B-W0	10/19/2018	520
104192279	18G1188	HDT-060GE-BBB-B-W0	10/19/2018	520

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Oct/29/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	HDT-060GE-BBB-B-W0	

Roll Number	Average Thickness ASTM D5994 (mils)	Minimum Thickness ASTM D5994 (mils)	Yield Strength ASTM D6693 (ppi) MD	Yield Strength ASTM D6693 (ppi) TD	Yield Elongation ASTM D6693 (%) MD	Yield Elongation ASTM D6693 (%) TD	Break Strength ASTM D6693 (ppi) MD	Break Strength ASTM D6693 (ppi) TD	Break Elongation ASTM D6693 (%) MD	Break Elongation ASTM D6693 (%) TD	Tear Resistance ASTM D1004 (lbs) MD	Tear Resistance ASTM D1004 (lbs) TD	Puncture Resistance ASTM D4833 (lbs)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Carbon Black Dispersion ASTM D5596 (Views in Cat1-Cat2)	Asperity Height ASTM D7466 (mils) A Side	Asperity Height ASTM D7466 (mils) B Side
102191310	58	57	157	159	18	17	200	165	529	474	55	52	144	0.945	2.4	10	26	23
102191311	60	55	157	159	18	17	200	165	529	474	55	52	144	0.945	2.4	10	26	23
102191312	60	54	157	159	18	17	200	165	529	474	55	52	144	0.945	2.4	10	26	23
102191313	59	58	157	159	18	17	200	165	529	474	55	52	144	0.945	2.4	10	26	23
102191314	59	57	158	160	17	17	200	131	543	242	55	52	154	0.945	2.2	10	26	23
102191315	60	56	158	160	17	17	200	131	543	242	55	52	154	0.945	2.2	10	26	23
102191316	61	61	158	160	17	17	200	131	543	242	55	52	154	0.945	2.2	10	27	24
102191317	61	60	158	160	17	17	200	131	543	242	55	52	154	0.945	2.2	10	27	24
102191318	59	54	164	165	17	17	207	176	572	514	54	56	142	0.942	2.2	10	26	24
102191319	58	55	164	165	17	17	207	176	572	514	54	56	142	0.942	2.2	10	26	24
102191320	58	51	164	165	17	17	207	176	572	514	54	56	142	0.942	2.2	10	26	24
104192270	66	56	160	159	18	18	223	192	577	514	55	51	153	0.944	2.2	10	22	22
104192271	59	54	138	139	18	17	206	173	589	550	48	47	143	0.944	2.3	10	22	22
104192272	61	57	145	145	17	18	201	186	559	550	49	47	142	0.944	2.3	10	22	22
104192273	62	56	152	152	17	17	227	182	645	510	51	49	152	0.944	2.4	10	22	21
104192274	58	52	150	152	18	18	201	183	525	507	53	51	153	0.944	2.4	10	22	21
104192275	61	57	143	143	18	18	183	215	524	702	48	49	143	0.944	2.5	10	25	21
104192277	59	55	143	143	18	18	183	215	524	702	48	49	143	0.944	2.5	10	25	21
104192279	59	55	147	146	17	18	187	193	529	573	48	50	143	0.944	2.5	10	22	20

Laboratory Manager _____

19103 Gundle Road Houston, TX 77073

Formosa Plastics

FORMOSA PLASTICS CORPORATION, TEXAS
201 FORMOSA DRIVE
PO BOX 700
POINT COMFORT TX 77978
PHONE:(888)FPCUSA3

Certificate of Analysis
(CONFIDENTIAL)

CUSTOMER:GSE ENVIRONMENTAL, LLC
UP TRACK 14732 WESTFIELD
19103 GUNDLE ROAD
HOUSTON TX 77070
PRODUCT :HL3812
RAILCAR GPLX075830
CLEANING/INSPECTION NO: 075830072618

S/O NO : ETAA034
CUSTOMER PO : 03-513918
DATE SHIPPED: 10/17/18
LOT NO : 18G1299
WEIGHT (LB) : 197,250.00
CUSTID:FT03112 SPIDE3

TEST ITEM	REFERENCE METHOD	TEST VALUE
Melt Index,g/10min	ASTM D1238	.080
HLMI, g/10 min.	ASTM D1238	12.1
Density, g/cm3	ASTM D1505	.9378

Notes:
Notes: Additive levels were tested and meet the min specification for this lot As a result Standard OIT (by ASTM D3895) is greater than 120 mins (nominal values not tested on every lot). As a result, High Pres sure OI T (by ASTM D5885) is greater than 1000 mins.

Linda Kao

QC SUPERVISOR: LINDA KAO

Formosa Plastics

FORMOSA PLASTICS CORPORATION, TEXAS
201 FORMOSA DRIVE
PO BOX 700
POINT COMFORT TX 77978
PHONE:(888)FPCUSA3

Certificate of Analysis
(CONFIDENTIAL)

CUSTOMER:GSE ENVIRONMENTAL, LLC
UP TRACK 14732 WESTFIELD
19103 GUNDLE ROAD
HOUSTON TX 77070
PRODUCT :HL3812
RAILCAR FPAX200802
CLEANING/INSPECTION NO: 200802072418

S/O NO : ET8A888
CUSTOMER PO : 03-513624
DATE SHIPPED: 9/24/18
LOT NO : 18G1276
WEIGHT (LB) : 197,550.00
CUSTID:FT03112 SPIDE3

TEST ITEM	REFERENCE METHOD	TEST VALUE
Melt Index,g/10min	ASTM D1238	.070
HLMI, g/10 min.	ASTM D1238	11.5
Density, g/cm3	ASTM D1505	.9364

Notes:
Notes: Additive levels were tested and meet the min specification for this lot As a result Standard OIT (by ASTM D3895) is greater than 120 mins (nominal values not tested on every lot). As a result, High Pres sure OI T (by ASTM D5885) is greater than 1000 mins.

Linda Kao

QC SUPERVISOR: LINDA KAO

Formosa Plastics

FORMOSA PLASTICS CORPORATION, TEXAS
201 FORMOSA DRIVE
PO BOX 700
POINT COMFORT TX 77978
PHONE:(888)FPCUSA3

Certificate of Analysis
(CONFIDENTIAL)

CUSTOMER:GSE ENVIRONMENTAL, LLC
UP TRACK 14732 WESTFIELD
19103 GUNDLE ROAD
HOUSTON TX 77070
PRODUCT :HL3812
RAILCAR FURX873412
CLEANING/INSPECTION NO: 873412071618

S/O NO : ET8A868
CUSTOMER PO : 03-513624
DATE SHIPPED: 9/03/18
LOT NO : 18G1188
WEIGHT (LB) : 196,750.00
CUSTID:FT03112 SPIDE3

TEST ITEM	REFERENCE METHOD	TEST VALUE
Melt Index,g/10min	ASTM D1238	.070
HLMI, g/10 min.	ASTM D1238	10.8
Density, g/cm3	ASTM D1505	.9370

Notes:
Notes: Additive levels were tested and meet the min specification for this lot As a result Standard OIT (by ASTM D3895) is greater than 120 mins (nominal values not tested on every lot). As a result, High Pres sure OI T (by ASTM D5885) is greater than 1000 mins.

Linda Kao

QC SUPERVISOR: LINDA KAO

Report Date
10/29/2018

Quality Assurance Laboratory Test Results

Job Name: SWLS/Sundance West Phase 2, Landfill Cell 1A
Sales Order: 85199

Required Testing: ASTM D 3895 -- Standard Test Method for Oxidative Induction Time of Polyolefins by Differential Scanning Calorimetry
ASTM D 5397 -- Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test

Specification: D 3895 - > 100 Minutes
D 5397 - > 500 Hours

Frequency: 1/200,000 lbs.

Product Code	Resin Lot Number	Test Results
HDT-060GE-BBB-B-W0	18G1299	PASS
HDT-060GE-BBB-B-W0	18G1276	PASS
HDT-060GE-BBB-B-W0	18G1188	PASS

Approved By:	Lana Hickman
Date Approved:	October 29, 2018

Report Date
10/29/2018

SOLMAX GSE

Quality Assurance Laboratory Test Results

Job Name: SWLS/Sundance West Phase 2, Landfill Cell 1A
SO Number: 85199

The table below summarizes additive performance of GSE Houston products as perceived by OIT retention after UV and Oven Aging per GRI Test Method GM13:

		Oven Aging @ 85° C (ASTM D 5721)				UV Resistance per GRI GM11			
		90 days per ASTM D 5885				1600 hours UV Aging per ASTM D 5885			
Product Type	**Formulation**	Initial HP OIT (min)	Final HP OIT (min)	Retained (%)	GRI Criteria (%)	Initial HP OIT (min)	Final HP OIT (min)	Retained (%)	GRI Criteria (%)
HDPE Geomembrane	Formosa HL3812	744	674	90	80	744	700	95	50

Approved By: Lana Hickman
Date: October 29, 2018

APPENDIX B

Material Manufacturer Certification and Conformance Testing Results

B.4. FML Conformance Testing Results

September 14, 2018

Mail To:

Mark Decarlo
Southwest Liner Systems
301 Calle Industrial
Bernalillo, NM 87004

email: swls.md@gmail.com

Bill To:

<= Same (P.O. # SW1819)

Dear Mr. Decarlo:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**Sundance West Phase 2 Landfill - Cell 1A**
TRI Job Reference Number:	40709
Material(s) Tested:	Seven, Solmax GSE 60 mil Smooth HDPE Geomembrane(s)
Test(s) Requested:	Thickness (ASTM D 5199) Density (ASTM D 1505) Carbon Black Content (ASTM D 1603, mod.) Carbon Dispersion (ASTM D 5596) Tensile Properties (ASTM D 6693) Tear Resistance (ASTM D 1004) Puncture Strength (ASTM D 4833)

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file

GEOMEMBRANE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE 60 mil Smooth HDPE Geomembrane
Sample Identification: 108197872
TRI Log #: 40709

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 5199)													
Thickness (mils)	62.1	62.0	61.6	63.4	60.0	59.4	62.0	62.0	64.4	63.0	**62.0**	1.5	60 min ave
											59.4	<< min	54 min ind
Density (ASTM D 1505)													
Density (g/cm3)	0.945	0.945	0.945								**0.945**	0.000	0.94 min
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.53	2.54									**2.54**	0.01	2.0 - 3.0
Carbon Black Dispersion (ASTM D 5596)													
Rating - 1st field view	1	1	1	1	1								9 Cat 1 or 2
Rating - 2nd field view	1	1	1	1	1								1 Cat 3
Tensile Properties (ASTM D 6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	145	152	152	151	153						**151**	3	126 min
TD Yield Strength (ppi)	163	162	165	162	163						**163**	1	126 min
MD Break Strength (ppi)	278	267	308	231	267						**270**	28	228 min
TD Break Strength (ppi)	300	321	321	330	313						**317**	11	228 min
MD Yield Elongation (%)	19	20	20	20	20						**20**	0	12 min
TD Yield Elongation (%)	18	19	19	16	19						**18**	1	12 min
MD Break Elongation (%)	766	724	820	650	730						**738**	62	700 min
TD Break Elongation (%)	821	882	877	896	838						**863**	32	700 min
Tear Resistance (ASTM D 1004)													
MD Tear Strength (lbs)	52	52	52	52	52	50	50	50	52	51	**51**	1	42 min
TD Tear Strength (lbs)	48	49	48	49	47	48	48	48	48	49	**48**	1	42 min
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	145	137	135	134	134						**137**	4	108 min

MD Machine Direction TD Transverse Direction

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

GEOMEMBRANE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE 60 mil Smooth HDPE Geomembrane
Sample Identification: 108197880
TRI Log #: 40709

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 5199)													
Thickness (mils)	61.2	60.7	59.1	60.3	60.8	63.1	62.3	61.3	59.5	60.0	**60.8**	1.2	60 min ave
											59.1	<< min	54 min ind
Density (ASTM D 1505)													
Density (g/cm3)	0.945	0.945	0.945								**0.945**	0.000	0.94 min
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.47	2.47									**2.47**	0.00	2.0 - 3.0
Carbon Black Dispersion (ASTM D 5596)													
Rating - 1st field view	1	1	1	1	1								9 Cat 1 or 2
Rating - 2nd field view	1	1	1	1	1								1 Cat 3
Tensile Properties (ASTM D 6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	147	153	150	156	155						**152**	4	126 min
TD Yield Strength (ppi)	157	157	159	165	157						**159**	3	126 min
MD Break Strength (ppi)	281	290	284	307	304						**293**	12	228 min
TD Break Strength (ppi)	284	278	296	274	301						**287**	12	228 min
MD Yield Elongation (%)	19	19	19	21	19						**19**	1	12 min
TD Yield Elongation (%)	18	18	18	17	19						**18**	1	12 min
MD Break Elongation (%)	775	780	792	834	821						**800**	26	700 min
TD Break Elongation (%)	824	809	840	766	862						**820**	36	700 min
Tear Resistance (ASTM D 1004)													
MD Tear Strength (lbs)	50	53	52	50	51	49	49	50	49	51	**51**	1	42 min
TD Tear Strength (lbs)	50	47	47	49	48	47	47	50	47	46	**48**	1	42 min
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	135	133	133	132	131						**133**	2	108 min

MD Machine Direction TD Transverse Direction

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

GEOMEMBRANE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE 60 mil Smooth HDPE Geomembrane
Sample Identification: 108197887
TRI Log #: 40709

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 5199)													
Thickness (mils)	61.6	63.0	61.0	60.7	61.6	61.0	63.0	60.8	60.6	60.4	**61.4**	0.9	60 min ave
											60.4	<< min	54 min ind
Density (ASTM D 1505)													
Density (g/cm3)	0.944	0.944	0.945								**0.944**	0.001	0.94 min
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.51	2.50									**2.51**	0.01	2.0 - 3.0
Carbon Black Dispersion (ASTM D 5596)													
Rating - 1st field view	1	1	1	1	1								9 Cat 1 or 2
Rating - 2nd field view	1	1	1	1	1								1 Cat 3
Tensile Properties (ASTM D 6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	147	142	146	153	147						**147**	4	126 min
TD Yield Strength (ppi)	167	161	161	162	157						**162**	4	126 min
MD Break Strength (ppi)	255	293	293	312	292						**289**	21	228 min
TD Break Strength (ppi)	301	298	289	299	297						**297**	5	228 min
MD Yield Elongation (%)	20	19	19	22	19						**20**	1	12 min
TD Yield Elongation (%)	18	19	19	16	21						**19**	2	12 min
MD Break Elongation (%)	670	775	773	794	771						**757**	49	700 min
TD Break Elongation (%)	819	840	805	831	841						**827**	15	700 min
Tear Resistance (ASTM D 1004)													
MD Tear Strength (lbs)	50	53	51	53	51	50	53	50	51	52	**51**	1	42 min
TD Tear Strength (lbs)	48	49	49	49	48	47	48	48	50	50	**48**	1	42 min
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	142	141	132	135	133						**137**	4	108 min

MD Machine Direction TD Transverse Direction

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

GEOMEMBRANE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE 60 mil Smooth HDPE Geomembrane
Sample Identification: 108197894
TRI Log #: 40709

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 5199)													
Thickness (mils)	62.5	61.7	63.7	62.1	62.0	62.2	59.2	61.0	59.2	60.5	**61.4**	1.4	60 min ave
											59.2	<< min	54 min ind
Density (ASTM D 1505)													
Density (g/cm3)	0.945	0.945	0.945								**0.945**	0.000	0.94 min
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.40	2.44									**2.42**	0.03	2.0 - 3.0
Carbon Black Dispersion (ASTM D 5596)													
Rating - 1st field view	1	1	1	1	1								9 Cat 1 or 2
Rating - 2nd field view	1	1	1	1	1								1 Cat 3
Tensile Properties (ASTM D 6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	146	156	154	157	155						**154**	4	126 min
TD Yield Strength (ppi)	165	160	161	154	153						**159**	5	126 min
MD Break Strength (ppi)	289	307	273	279	306						**291**	15	228 min
TD Break Strength (ppi)	319	286	314	281	263						**293**	24	228 min
MD Yield Elongation (%)	19	21	19	21	17						**19**	2	12 min
TD Yield Elongation (%)	18	19	18	17	20						**18**	1	12 min
MD Break Elongation (%)	813	819	749	762	833						**795**	37	700 min
TD Break Elongation (%)	903	825	887	815	760						**838**	58	700 min
Tear Resistance (ASTM D 1004)													
MD Tear Strength (lbs)	52	51	51	51	52	50	50	49	52	51	**51**	1	42 min
TD Tear Strength (lbs)	47	48	48	49	48	46	47	47	47	47	**47**	1	42 min
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	131	129	127	127	127						**128**	2	108 min

MD Machine Direction TD Transverse Direction

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

GEOMEMBRANE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE 60 mil Smooth HDPE Geomembrane
Sample Identification: 108197901
TRI Log #: 40709

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 5199)													
Thickness (mils)	62.2	62.2	63.5	62.6	62.3	61.7	63.3	63.5	61.7	63.0	**62.6**	0.7	60 min ave
											61.7	<< min	54 min ind
Density (ASTM D 1505)													
Density (g/cm3)	0.945	0.945	0.945								**0.945**	0.000	0.94 min
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.63	2.62									**2.63**	0.01	2.0 - 3.0
Carbon Black Dispersion (ASTM D 5596)													
Rating - 1st field view	1	1	1	1	1								9 Cat 1 or 2
Rating - 2nd field view	1	1	1	1	1								1 Cat 3
Tensile Properties (ASTM D 6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	154	156	156	152	156						**155**	2	126 min
TD Yield Strength (ppi)	159	162	159	157	161						**160**	2	126 min
MD Break Strength (ppi)	313	315	275	265	321						**298**	26	228 min
TD Break Strength (ppi)	310	306	262	304	303						**297**	20	228 min
MD Yield Elongation (%)	19	18	20	21	18						**19**	1	12 min
TD Yield Elongation (%)	18	22	18	17	20						**19**	2	12 min
MD Break Elongation (%)	793	797	708	709	824						**766**	54	700 min
TD Break Elongation (%)	846	830	720	834	811						**808**	51	700 min
Tear Resistance (ASTM D 1004)													
MD Tear Strength (lbs)	51	52	51	51	52	51	50	51	52	51	**51**	1	42 min
TD Tear Strength (lbs)	48	49	48	48	48	48	49	47	49	47	**48**	1	42 min
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	134	132	131	131	130						**132**	1	108 min

MD Machine Direction TD Transverse Direction

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

GEOMEMBRANE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE 60 mil Smooth HDPE Geomembrane
Sample Identification: 108197908
TRI Log #: 40709

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 5199)													
Thickness (mils)	62.6	61.5	64.4	60.7	62.2	62.5	63.1	61.3	61.0	62.2	**62.2**	1.1	60 min ave
											60.7	<< min	54 min ind
Density (ASTM D 1505)													
Density (g/cm3)	0.945	0.945	0.945								**0.945**	0.000	0.94 min
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.57	2.57									**2.57**	0.00	2.0 - 3.0
Carbon Black Dispersion (ASTM D 5596)													
Rating - 1st field view	1	1	1	1	1								9 Cat 1 or 2
Rating - 2nd field view	1	1	1	1	1								1 Cat 3
Tensile Properties (ASTM D 6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	154	159	153	151	152						**154**	3	126 min
TD Yield Strength (ppi)	160	158	155	154	156						**157**	2	126 min
MD Break Strength (ppi)	301	275	307	281	273						**287**	16	228 min
TD Break Strength (ppi)	296	309	304	271	301						**296**	15	228 min
MD Yield Elongation (%)	20	18	18	19	16						**18**	1	12 min
TD Yield Elongation (%)	18	20	16	17	19						**18**	2	12 min
MD Break Elongation (%)	806	726	845	786	759						**784**	45	700 min
TD Break Elongation (%)	830	892	871	790	846						**846**	39	700 min
Tear Resistance (ASTM D 1004)													
MD Tear Strength (lbs)	50	50	49	51	50	50	51	49	50	50	**50**	1	42 min
TD Tear Strength (lbs)	47	48	48	48	48	47	47	47	47	47	**48**	1	42 min
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	129	131	130	130	130						**130**	1	108 min

MD Machine Direction TD Transverse Direction

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

GEOMEMBRANE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE 60 mil Smooth HDPE Geomembrane
Sample Identification: 108197917
TRI Log #: 40709

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 5199)													
Thickness (mils)	61.4	61.3	60.7	60.0	63.4	62.0	63.7	63.1	62.2	60.6	**61.8**	1.3	60 min ave
											60.0	<< min	54 min ind
Density (ASTM D 1505)													
Density (g/cm3)	0.945	0.945	0.945								**0.945**	0.000	0.94 min
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.40	2.36									**2.38**	0.03	2.0 - 3.0
Carbon Black Dispersion (ASTM D 5596)													
Rating - 1st field view	1	1	1	1	1								9 Cat 1 or 2
Rating - 2nd field view	1	1	1	1	1								1 Cat 3
Tensile Properties (ASTM D 6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	159	151	156	150	144						**152**	6	126 min
TD Yield Strength (ppi)	158	159	154	156	158						**157**	2	126 min
MD Break Strength (ppi)	300	279	316	308	277						**296**	17	228 min
TD Break Strength (ppi)	290	302	289	273	300						**291**	12	228 min
MD Yield Elongation (%)	20	19	19	23	19						**20**	2	12 min
TD Yield Elongation (%)	18	20	17	18	22						**19**	2	12 min
MD Break Elongation (%)	771	741	812	816	744						**777**	36	700 min
TD Break Elongation (%)	809	830	804	764	812						**804**	24	700 min
Tear Resistance (ASTM D 1004)													
MD Tear Strength (lbs)	49	49	51	50	51	50	50	49	50	49	**50**	1	42 min
TD Tear Strength (lbs)	47	48	47	49	48	47	47	46	47	47	**47**	1	42 min
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	129	128	128	128	127						**128**	1	108 min

MD Machine Direction TD Transverse Direction

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

November 7, 2018

Mail To:

Mark Decarlo
Southwest Liner Systems
301 Calle Industrial
Bernalillo NM 87004

email: swls.md@gmail.com

Bill To:

<= Same (P.O. # SW1819)

Dear Mr DeCarlo:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**Sundance West Phase 2 Landfill - Cell 1A**
TRI Job Reference Number:	42586
Material(s) Tested:	Two, Solmax GSE 60 mil Textured HDPE Geomembranes
Test(s) Requested:	Thickness (ASTM D 5994) Density (ASTM D 1505) Carbon Black Content (ASTM D 1603, mod.) Carbon Dispersion (ASTM D 5596) Tensile Properties (ASTM D 6693) Puncture Strength (ASTM D 4833) Tear Resistance (ASTM D 1004)

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Jarrett A. Nelson
Technical Director
Geosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file

GEOMEMBRANE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE 60 mil Textured HDPE Geomembrane
Sample Identification: 102191310
TRI Log #: 42586

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 5994)													
													57 min ave
Thickness (mils)	62	63	62	63	64	62	64	64	62	63	63	1	54 min 8 of 10
											62	<< min	51 min ind
Density (ASTM D 1505)													
Density (g/cm3)	0.945	0.945	0.945								0.945	0.000	0.940 min
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.05	2.13									2.09	0.06	2.0 - 3.0
Carbon Black Dispersion (ASTM D 5596)													
Rating - 1st field view	1	1	1	1	1								
Rating - 2nd field view	1	1	1	1	1								
Tensile Properties (ASTM D 6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	161	159	162	160	168						162	4	126 min
TD Yield Strength (ppi)	156	161	167	162	162						162	4	126 min
MD Break Strength (ppi)	173	183	122	119	164						152	30	90 min
TD Break Strength (ppi)	143	200	142	155	207						169	32	90 min
MD Yield Elongation (%)	16	16	16	16	16						16	0	12 min
TD Yield Elongation (%)	18	21	18	20	18						19	1	12 min
MD Break Elongation (%)	507	545	191	129	479						370	195	100 min
TD Break Elongation (%)	399	540	99	383	533						391	179	100 min
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	138	143	142	145	143						142	2	90 min
Tear Resistance (ASTM D 1004)													
MD Tear Strength (lbs)	47	50	53	50	55	53	53	54	53	56	52	3	42 min
TD Tear Strength (lbs)	53	54	53	49	60	57	59	54	55	56	55	3	42 min

MD Machine Direction TD Transverse Direction

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

GEOMEMBRANE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE 60 mil Textured HDPE Geomembrane
Sample Identification: 102191318
TRI Log #: 42586

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 5994)													
													57 min ave
Thickness (mils)	60	64	61	64	65	62	62	60	62	66	63	2	54 min 8 of 10
											60	<< min	51 min ind
Density (ASTM D 1505)													
Density (g/cm3)	0.946	0.946	0.946								0.946	0.000	0.940 min
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.21	2.23									2.22	0.01	2.0 - 3.0
Carbon Black Dispersion (ASTM D 5596)													
Rating - 1st field view	1	1	1	1	1								
Rating - 2nd field view	1	1	1	1	1								
Tensile Properties (ASTM D 6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	175	171	170	168	158						168	6	126 min
TD Yield Strength (ppi)	150	170	167	162	170						164	8	126 min
MD Break Strength (ppi)	191	195	133	184	127						166	33	90 min
TD Break Strength (ppi)	214	212	207	161	194						198	22	90 min
MD Yield Elongation (%)	17	17	16	17	16						17	1	12 min
TD Yield Elongation (%)	15	18	19	17	17						17	1	12 min
MD Break Elongation (%)	507	539	224	501	64						367	212	100 min
TD Break Elongation (%)	585	517	559	418	492						514	65	100 min
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	141	139	144	144	138						142	3	90 min
Tear Resistance (ASTM D 1004)													
MD Tear Strength (lbs)	51	55	53	52	54	52	53	54	55	55	53	1	42 min
TD Tear Strength (lbs)	61	56	55	54	58	57	56	54	54	54	56	2	42 min

MD Machine Direction TD Transverse Direction

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

November 8, 2018

Mail To:

Mark Decarlo
Southwest Liner Systems
301 Calle Industrial
Bernalillo NM 87004

email: swls.md@gmail.com

Bill To:

<= Same (P.O. # SW1819)

Dear Mr DeCarlo:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**Sundance West Phase 2 Landfill - Cell 1A**
TRI Job Reference Number:	42279
Material(s) Tested:	One, Solmax GSE 60 mil Textured HDPE Geomembranes
Test(s) Requested:	Thickness (ASTM D 5994) Density (ASTM D 1505) Carbon Black Content (ASTM D 1603, mod.) Carbon Dispersion (ASTM D 5596) Tensile Properties (ASTM D 6693) Puncture Strength (ASTM D 4833) Tear Resistance (ASTM D 1004)

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Richard S. Lacey*, P.E.
Senior EngineerGeosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file

GEOMEMBRANE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE 60 mil Textured HDPE Geomembrane
Sample Identification: 104192271
TRI Log #: 42279

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 5994)													
Thickness (mils)	66	64	60	67	61	64	67	66	63	66	64	3	57 min ave 54, 8 of 10
											60	<< min	51 min ind
Density (ASTM D 1505)													
Density (g/cm3)	0.944	0.944	0.944								0.944	0.000	0.940 min
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.35	2.40									2.38	0.04	2.0 - 3.0
Carbon Black Dispersion (ASTM D 5596)													
Rating - 1st field view	1	1	1	1	1								
Rating - 2nd field view	1	1	1	1	1								
Tensile Properties (ASTM D 6693, 2 ipm strain rate)													
MD Yield Strength (ppi)	141	134	146	149	144						143	6	126 min
TD Yield Strength (ppi)	145	155	137	143	146						145	6	126 min
MD Break Strength (ppi)	215	180	206	209	182						198	16	90 min
TD Break Strength (ppi)	198	200	150	179	49						155	63	90 min
MD Yield Elongation (%)	16	17	19	19	19						18	1	12 min
TD Yield Elongation (%)	16	16	18	17	19						17	1	12 min
MD Break Elongation (%)	595	547	579	553	515						558	31	100 min
TD Break Elongation (%)	588	561	482	528	161						464	174	100 min
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	128	127	119	122	119						123	4	90 min
Tear Resistance (ASTM D 1004)													
MD Tear Strength (lbs)	49	50	48	49	50	50	48	53	48	48	49	2	42 min
TD Tear Strength (lbs)	50	45	45	48	45	45	44	45	48	43	46	2	42 min

MD Machine Direction TD Transverse Direction

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

APPENDIX B

Material Manufacturer Certification and Conformance Testing Results

B.5. Geonet Certifications

Roll Allocation List

Sales Order SO-085199
Customer Name Southwest Liner Systems, Inc.
Project Name SWLS/Sundance West Phase 2, Landfill Cell 1A

Serial number	Item Number	Resin Lot	Manufacturing date	Length
131553538	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553539	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553540	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553541	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553542	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553543	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553544	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553545	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553546	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553547	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553565	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553566	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553567	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553568	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553569	GNS-200E-00-00-E-00	CB118H0203	9/28/2018	330.00
131553741	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553742	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553743	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553744	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553745	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553746	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553747	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553748	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553749	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553750	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553751	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553752	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553753	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553754	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553755	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553756	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553757	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553758	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553759	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553760	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553761	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553762	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553763	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553764	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553765	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553766	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553767	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553768	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553769	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553770	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553771	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553772	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553773	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553774	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553775	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553776	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553777	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553778	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553779	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553780	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00
131553781	GNS-200E-00-00-E-00	CB118H2701	9/30/2018	330.00

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Oct/2/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	GNS-200E-00-00-E-00	

Roll Number	Geonet Thickness ASTM D5199 (mils)	Tensile Strength ASTM D7179 (ppi)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Geonet Mass per Unit Area ASTM D5261 (lbs/ft²)
131553538	226	65	0.956	2.3	0.177
131553539	226	65	0.956	2.3	0.177
131553540	226	65	0.956	2.3	0.177
131553541	226	65	0.956	2.3	0.177
131553542	226	65	0.956	2.3	0.177
131553543	226	65	0.956	2.3	0.177
131553544	226	65	0.956	2.3	0.177
131553545	226	65	0.956	2.3	0.177
131553546	226	65	0.956	2.3	0.177
131553547	226	65	0.956	2.3	0.177
131553565	219	68	0.952	2.3	0.176
131553566	228	62	0.956	2.3	0.178
131553567	228	62	0.956	2.3	0.178
131553568	228	62	0.956	2.3	0.178
131553569	228	62	0.956	2.3	0.178
131553741	228	63	0.960	2.6	0.182
131553742	227	58	0.962	2.7	0.177
131553743	227	58	0.962	2.7	0.177
131553744	227	58	0.962	2.7	0.177
131553745	227	58	0.962	2.7	0.177
131553746	227	58	0.962	2.7	0.177
131553747	227	58	0.962	2.7	0.177
131553748	227	58	0.962	2.7	0.177
131553749	227	58	0.962	2.7	0.177
131553750	227	58	0.962	2.7	0.177
131553751	227	58	0.962	2.7	0.177
131553752	226	64	0.962	2.7	0.177
131553753	226	64	0.962	2.7	0.177
131553754	226	64	0.962	2.7	0.177
131553755	226	64	0.962	2.7	0.177
131553756	226	64	0.962	2.7	0.177
131553757	226	64	0.962	2.7	0.177
131553758	226	64	0.962	2.7	0.177
131553759	226	64	0.962	2.7	0.177

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Oct/2/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	GNS-200E-00-00-E-00	

Roll Number	Geonet Thickness ASTM D5199 (mils)	Tensile Strength ASTM D7179 (ppi)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Geonet Mass per Unit Area ASTM D5261 (lbs/ft²)
131553760	226	64	0.962	2.7	0.177
131553761	226	64	0.962	2.7	0.177
131553762	228	65	0.961	2.6	0.176
131553763	228	65	0.961	2.6	0.176
131553764	228	65	0.961	2.6	0.176
131553765	228	65	0.961	2.6	0.176
131553766	228	65	0.961	2.6	0.176
131553767	228	65	0.961	2.6	0.176
131553768	228	65	0.961	2.6	0.176
131553769	228	65	0.961	2.6	0.176
131553770	228	65	0.961	2.6	0.176
131553771	228	65	0.961	2.6	0.176
131553772	227	62	0.957	2.3	0.220
131553773	227	62	0.957	2.3	0.220
131553774	227	62	0.957	2.3	0.220
131553775	227	62	0.957	2.3	0.220
131553776	227	62	0.957	2.3	0.220
131553777	227	62	0.957	2.3	0.220
131553778	227	62	0.957	2.3	0.220
131553779	227	62	0.957	2.3	0.220
131553780	227	62	0.957	2.3	0.220
131553781	227	62	0.957	2.3	0.220

Laboratory Manager _____

Equistar Chemicals, LP
One Houston Center
1221 McKinney
Houston TX 77010

Certificate Of Analysis

Certificate of Analysis Contact:

Ship-To Address:
GSE ENVIRONMENTAL LLC
1245 EASTLAND AVE
KINGSTREE SC 29556
UNITED STATES

Product Name	: PETROTHENE LR732001	**Customer Order No.**	: 03-513370
Batch Number	: CB118H0203	**Customer Number**	: 151477
Vehicle Number	: CITX200390	**Date Shipped**	: August 08, 2018
Estimated Quantity	: 214,550 LBS	**Equistar Order No.**	: 5181425 000010
Material Number	: 16838	**Delivery Item No.**	: 8101135739 000010

Test Description	Test Result	Unit of Measure	
Vehicle ID	CITX200390		
Vehicle Type	HOPPER CAR H		
Density, Extrudate @ 23C	0.9533	g/cm3	STM 011
Melt Index, 2160g @ 190C	0.34	g/10 min.	STM 002

Delivery Number:

Cust/PO Number:

Print Date: August 08, 2018 BSSIMMO1

Data reported was generated in an approved Quality Assurance Lab.

This information is available 24 hours a day at https://lyb.customerxpress.com/
Questions ? Call Customer Service: 888-777-0232

Equistar Chemicals, LP
One Houston Center
1221 McKinney
Houston TX 77010

Certificate Of Analysis

Certificate of Analysis Contact:

Ship-To Address:
GSE ENVIRONMENTAL LLC
1245 EASTLAND AVE
KINGSTREE SC 29556
UNITED STATES

Product Name	: PETROTHENE LR732001	**Customer Order No.**	: 03-513370
Batch Number	: CB118H2701	**Customer Number**	: 151477
Vehicle Number	: CITX200367	**Date Shipped**	: August 28, 2018
Estimated Quantity	: 214,000 LBS	**Equistar Order No.**	: 5216507 000010
Material Number	: 16838	**Delivery Item No.**	: 8101185260 000010

Test Description	Test Result	Unit of Measure	
Vehicle ID	CITX200367		
Vehicle Type	HOPPER CAR H		
Density, Extrudate @ 23C	0.9521	g/cm3	STM 011
Melt Index, 2160g @ 190C	0.28	g/10 min.	STM 002

Delivery Number:

Cust/PO Number:

Print Date: August 29, 2018 BSSIMMO1

Data reported was generated in an approved Quality Assurance Lab.

This information is available 24 hours a day at https://lyb.customerxpress.com/
Questions ? Call Customer Service: 888-777-0232

Report Date
10/2/2018

Quality Assurance Laboratory Test Results

Job Name: SWLS/Sundance West Phase 2 Landfill Cell 1A
Sales Order: 85199

Required Testing: ASTM D 1238, 190 / 2.16 -- Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer

Frequency: 1/50,000 sf

Specification: ≤ 1.0 g/10 minutes

Product Code	Roll Number	Result
GNS-200E-00-00-E-00	131553538	0.37
GNS-200E-00-00-E-00	131553565	0.35
GNS-200E-00-00-E-00	131553741	0.34
GNS-200E-00-00-E-00	131553751	0.40
GNS-200E-00-00-E-00	131553761	0.40
GNS-200E-00-00-E-00	131553771	0.34
GNS-200E-00-00-E-00	131553781	0.35

Approved by: Barbara McCrea
Date: October 2, 2018

GSE ENVIRONMENTAL™ GSE Environmental, LLC.

Transmissivity Report

ASTM D4716

Roll No. 131553538

ROLL IDENTIFICATION

Roll Number	131553538
Product Name	GNS-200E-00-00-E-00
Production Date	9/28/2018

CUSTOMER INFORMATION

Order Number	85199
Customer Name	Southwest Liner Systems, Inc.
Project Name	SWLS/Sundance West Phase 2, Landfill Cell 1A
Location	Eunice NM

Pressure (psf)	Gradient	Net/Composite	Transmissivity Results (m^2/sec)	(gal/min/ft)	Seat Time (min)	Boundary
10,000	0.10	Net	4.16E-03	20.10	15	SS Plates

GSE QC APPROVED

GSE Roll Allocation

Order SO-085199

Customer Southwest Liner Systems, Inc.

Project Name Sundance West Phase 2, Landfill Cell 1A

TRI AUSTIN

1/100,000 sf min 1/lot 1 ft x RW

Total sf on job 277,200 sf

Roll#	Resin Lot	Product Code	Mfg Date	Length	Pick up
131553538	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	10/3
131553539	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	
131553540	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	
131553541	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	
131553542	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	
131553543	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	
131553544	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	
131553545	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	
131553546	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	
131553547	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	
131553565	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	
131553566	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	
131553567	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	
131553568	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	
131553569	CB118H0203	GNS-200E-00-00-E-00	9/28/2018	330	
131553741	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	10/3
131553742	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553743	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553744	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553745	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553746	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553747	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553748	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553749	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553750	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553751	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553752	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553753	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553754	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553755	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553756	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553757	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553758	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553759	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553760	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553761	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	10/3
131553762	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553763	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553764	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553765	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553766	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553767	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553768	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553769	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553770	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553771	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553772	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553773	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553774	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553775	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553776	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553777	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553778	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553779	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553780	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	
131553781	CB118H2701	GNS-200E-00-00-E-00	9/30/2018	330	10/3

APPENDIX B

Material Manufacturer Certification and Conformance Testing Results

B.6. Geonet Conformance Testing Results

October 24, 2018

Mail To:

Mark DeCarlo
Southwest Liner Systems
301 Calle Industrial
Bernalillo NM 87004

email: swls.md@gmail.com

Bill To:

<= Same (P.O. # SW1819)

Dear Mr DeCarlo:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**Sundance West Phase 2 Landfill - Cell 1A**
TRI Job Reference Number:	41754
Material(s) Tested:	Four, GSE 200 mil Geonet
Test(s) Requested:	Thickness (ASTM D 1777) - GN Mass/Unit Area (ASTM D 3776) - GN Density (ASTM D 1505) - GN Carbon Black Content (ASTM D 1603, mod.) - GN Melt Flow (ASTM D 1238) - GN Wide Width Tensile (ASTM D 4595) - GN

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file

GEONET TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: GSE 200 mil Geonet
Sample Identification: 131553538
TRI Log #: 41754

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 1777)													
Thickness (mils)	221	224	222	225	222	227	223	222	231	234	**225**	5	200 min
Thickness (mm)	5.61	5.69	5.63	5.71	5.63	5.77	5.66	5.65	5.88	5.95	**5.72**	0.11	
											5.61	<< min	
Mass/Unit Area (ASTM D 3776, Option C)													
5" diameter circle (grams)	10.26	10.96	10.19	11.10	11.23	11.64	10.8	10.8	11.26	11.11	**10.93**	0.45	
Mass/Unit Area (lb/sq.ft)	0.17	0.18	0.16	0.18	0.18	0.19	0.17	0.17	0.18	0.18	**0.18**	0.01	0.16 min
Mass/Unit Area (g/m2)	810	865	804	876	886	919	852	851	889	877	**863**	35	
Density (ASTM D 1505)													
Density (g/cm3)	0.954	0.954	0.954								**0.954**	0.000	0.94 min
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.68	2.73									**2.71**	0.04	2.0 - 3.0
Melt Flow Index (ASTM D 1238, Method A, 190°C / 2.16 kg)													
Melt Flow Index (g/10 min)	0.24										**0.24**		≤1.0

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GEONET TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: GSE 200 mil Geonet
Sample Identification: 131553538
TRI Log #: 41754

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.
Wide Width Tensile Properties (ASTM D 4595)												
MD Specimen Width (inches)	8											
MD Specimen Width (mm)	203											
MD Ultimate Strength (lbs)	526	463	479	457	426	449					**467**	34
MD Ultimate Strength (N)	2340	2060	2134	2035	1895	2000					**2077**	151
MD Ultimate Strength (ppi)	65.7	57.9	59.9	57.2	53.2	56.2					**58.3**	4.2
MD Ultimate Strength (kN/m)	11.5	10.1	10.5	10.0	9.33	9.84					**10.2**	0.7
MD Strength @ 2% Strain (lbs)	202	149	181	155	150	153					**165**	22
MD Strength @ 2% Strain (N)	899	661	805	689	669	679					**734**	97
MD Strength @ 2% Strain (ppi)	25.3	18.6	22.6	19.4	18.8	19.1					**20.6**	2.7
MD Strength at 2% Strain (kN/m)	4.43	3.25	3.96	3.39	3.29	3.34					**3.61**	0.48
MD Strength @ 5% Strain (lbs)	334	254	300	269	241	262					**277**	34
MD Strength @ 5% Strain (N)	1488	1129	1333	1198	1072	1164					**1231**	153
MD Strength @ 5% Strain (ppi)	41.8	31.7	37.4	33.7	30.1	32.7					**34.6**	4.3
MD Strength at 5% Strain (kN/m)	7.32	5.56	6.56	5.90	5.28	5.73					**6.06**	0.76
MD Strength @ 10% Strain (lbs)	430	330	390	357	319	344					**362**	41
MD Strength @ 10% Strain (N)	1913	1469	1733	1587	1418	1532					**1609**	185
MD Strength @ 10% Strain (ppi)	53.7	41.3	48.7	44.6	39.8	43.0					**45.2**	5.2
MD Strength at 10% Strain (kN/m)	9.42	7.23	8.53	7.81	6.98	7.54					**7.92**	0.91
MD Break Elongation (%)	23.6	394	25.5	26.2	30.3	27.2					**87.7**	149.8
TD Specimen Width (in)	8											
TD Specimen Width (mm)	203											
TD Ultimate Strength (lbs)	221	227	255	261	239	235					**240**	16
TD Ultimate Strength (N)	982	1012	1134	1162	1064	1046					**1066**	70
TD Ultimate Strength (ppi)	27.6	28.4	31.8	32.7	29.9	29.4					**30.0**	2.0
TD Ultimate Strength (kN/m)	4.83	4.98	5.58	5.72	5.24	5.15					**5.25**	0.34
TD Strength @ 2% Strain (lbs)	20.8	19.7	21.0	19.5	17.3	20.0					**19.7**	1.3
TD Strength @ 2% Strain (N)	92.4	87.8	93.5	86.8	76.8	89.0					**87.7**	6.0
TD Strength @ 2% Strain (ppi)	2.60	2.47	2.63	2.44	2.16	2.50					**2.46**	0.17
TD Strength at 2% Strain (kN/m)	0.45	0.43	0.46	0.43	0.38	0.44					**0.43**	0.03
TD Strength @ 5% Strain (lbs)	38.3	38.5	40.4	35.9	35.0	38.0					**37.7**	1.9
TD Strength @ 5% Strain (N)	170	171	180	160	156	169					**168**	9
TD Strength @ 5% Strain (ppi)	4.78	4.81	5.04	4.49	4.37	4.75					**4.71**	0.24
TD Strength at 5% Strain (kN/m)	0.84	0.84	0.88	0.79	0.77	0.83					**0.82**	0.04
TD Strength @ 10% Strain (lbs)	55.1	58.6	61.4	55.0	53.7	57.8					**56.9**	2.9
TD Strength @ 10% Strain (N)	245	261	273	245	239	257					**253**	13
TD Strength @ 10% Strain (ppi)	6.89	7.33	7.68	6.88	6.71	7.23					**7.12**	0.36
TD Strength at 10% Strain (kN/m)	1.21	1.28	1.35	1.20	1.17	1.27					**1.25**	0.06
TD Break Elongation (%)	163	108	161	207	202	191					**172**	37

MD Machine Direction TD Transverse Direction

GEONET TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: GSE 200 mil Geonet
Sample Identification: 131553741
TRI Log #: 41754

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 1777)													
Thickness (mils)	225	222	220	229	219	219	233	231	227	229	**225**	5	200 min
Thickness (mm)	5.71	5.63	5.59	5.81	5.57	5.55	5.93	5.86	5.77	5.83	**5.72**	0.13	
											5.55	<< min	
Mass/Unit Area (ASTM D 3776, Option C)													
5" diameter circle (grams)	10.56	10.49	10.07	10.11	9.88	11.10	11.3	10.7	10.91	11.12	**10.62**	0.49	
Mass/Unit Area (lb/sq.ft)	0.17	0.17	0.16	0.16	0.16	0.18	0.18	0.17	0.18	0.18	**0.17**	0.01	0.16 min
Mass/Unit Area (g/m2)	834	828	795	798	780	876	893	841	861	878	**838**	39	
Density (ASTM D 1505)													
Density (g/cm3)	0.953	0.953	0.953								**0.953**	0.000	0.94 min
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.40	2.38									**2.39**	0.01	2.0 - 3.0
Melt Flow Index (ASTM D 1238, Method A, 190°C / 2.16 kg)													
Melt Flow Index (g/10 min)	0.14										**0.14**		≤1.0

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GEONET TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: GSE 200 mil Geonet
Sample Identification: 131553741
TRI Log #: 41754

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.
Wide Width Tensile Properties (ASTM D 4595)												
MD Specimen Width (inches)	8											
MD Specimen Width (mm)	203											
MD Ultimate Strength (lbs)	445	440	464	477	466	513					**467**	26
MD Ultimate Strength (N)	1978	1959	2066	2124	2072	2282					**2080**	116
MD Ultimate Strength (ppi)	55.6	55.0	58.0	59.7	58.2	64.1					**58.4**	3.3
MD Ultimate Strength (kN/m)	9.74	9.64	10.2	10.5	10.2	11.2					**10.2**	0.6
MD Strength @ 2% Strain (lbs)	168	155	167	162	164	168					**164**	5
MD Strength @ 2% Strain (N)	746	690	742	719	731	749					**729**	22
MD Strength @ 2% Strain (ppi)	21.0	19.4	20.8	20.2	20.5	21.0					**20.5**	0.6
MD Strength at 2% Strain (kN/m)	3.67	3.40	3.65	3.54	3.60	3.69					**3.59**	0.11
MD Strength @ 5% Strain (lbs)	283	267	298	281	273	289					**282**	11
MD Strength @ 5% Strain (N)	1259	1190	1327	1252	1215	1286					**1255**	49
MD Strength @ 5% Strain (ppi)	35.4	33.4	37.3	35.2	34.1	36.1					**35.3**	1.4
MD Strength at 5% Strain (kN/m)	6.20	5.86	6.53	6.16	5.98	6.33					**6.18**	0.24
MD Strength @ 10% Strain (lbs)	359	343	387	372	356	381					**366**	17
MD Strength @ 10% Strain (N)	1600	1526	1722	1657	1585	1694					**1631**	73
MD Strength @ 10% Strain (ppi)	44.9	42.9	48.4	46.5	44.5	47.6					**45.8**	2.1
MD Strength at 10% Strain (kN/m)	7.87	7.51	8.47	8.15	7.80	8.33					**8.02**	0.36
MD Break Elongation (%)	182	272	224	28.5	178	368					**209**	113
TD Specimen Width (in)	8											
TD Specimen Width (mm)	203											
TD Ultimate Strength (lbs)	247	234	234	262	249	250					**246**	11
TD Ultimate Strength (N)	1100	1040	1041	1167	1110	1111					**1095**	48
TD Ultimate Strength (ppi)	30.9	29.2	29.2	32.8	31.2	31.2					**30.8**	1.4
TD Ultimate Strength (kN/m)	5.41	5.12	5.12	5.74	5.46	5.47					**5.39**	0.24
TD Strength @ 2% Strain (lbs)	24.1	22.1	20.7	18.9	27.7	20.8					**22.4**	3.1
TD Strength @ 2% Strain (N)	107	98.4	92.1	84.1	123	92.7					**100**	14
TD Strength @ 2% Strain (ppi)	3.01	2.76	2.59	2.36	3.47	2.60					**2.80**	0.39
TD Strength at 2% Strain (kN/m)	0.53	0.48	0.45	0.41	0.61	0.46					**0.49**	0.07
TD Strength @ 5% Strain (lbs)	46.3	40.8	39.2	37.1	52.4	40.4					**42.7**	5.6
TD Strength @ 5% Strain (N)	206	182	175	165	233	180					**190**	25
TD Strength @ 5% Strain (ppi)	5.79	5.11	4.90	4.64	6.54	5.05					**5.34**	0.70
TD Strength at 5% Strain (kN/m)	1.01	0.89	0.86	0.81	1.15	0.88					**0.94**	0.12
TD Strength @ 10% Strain (lbs)	61.7	60.5	51.3	56.9	75.8	60.1					**61.0**	8.2
TD Strength @ 10% Strain (N)	274	269	228	253	337	267					**272**	36
TD Strength @ 10% Strain (ppi)	7.71	7.56	6.41	7.11	9.48	7.51					**7.63**	1.02
TD Strength at 10% Strain (kN/m)	1.35	1.32	1.12	1.25	1.66	1.32					**1.34**	0.18
TD Break Elongation (%)	164	113	128	175	191	154					**154**	29

MD Machine Direction TD Transverse Direction

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GEONET TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: GSE 200 mil Geonet
Sample Identification: 131553761
TRI Log #: 41754

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 1777)													
Thickness (mils)	234	225	228	235	231	229	222	222	222	220	**227**	5	200 min
Thickness (mm)	5.94	5.71	5.80	5.96	5.87	5.83	5.63	5.64	5.65	5.59	**5.76**	0.14	
											5.59	<< min	
Mass/Unit Area (ASTM D 3776, Option C)													
5" diameter circle (grams)	11.47	10.11	10.02	10.38	11.58	11.28	10.7	10.4	10.92	10.21	**10.71**	0.58	
Mass/Unit Area (lb/sq.ft)	0.19	0.16	0.16	0.17	0.19	0.18	0.17	0.17	0.18	0.16	**0.17**	0.01	0.16 min
Mass/Unit Area (g/m2)	905	798	791	819	914	890	842	823	862	806	**845**	45	
Density (ASTM D 1505)													
Density (g/cm3)	0.952	0.952	0.952								**0.952**	0.000	0.94 min
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.29	2.32									**2.31**	0.02	2.0 - 3.0
Melt Flow Index (ASTM D 1238, Method A, 190°C / 2.16 kg)													
Melt Flow Index (g/10 min)	0.23										**0.23**		≤1.0

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GEONET TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: GSE 200 mil Geonet
Sample Identification: 131553761
TRI Log #: 41754

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.
Wide Width Tensile Properties (ASTM D 4595)												
MD Specimen Width (inches)	8											
MD Specimen Width (mm)	203											
MD Ultimate Strength (lbs)	427	483	473	478	529	530					**487**	39
MD Ultimate Strength (N)	1901	2149	2104	2129	2355	2359					**2166**	173
MD Ultimate Strength (ppi)	53.4	60.4	59.1	59.8	66.2	66.3					**60.9**	4.8
MD Ultimate Strength (kN/m)	9.36	10.6	10.4	10.5	11.6	11.6					**10.7**	0.8
MD Strength @ 2% Strain (lbs)	162	172	157	156	182	200					**171**	17
MD Strength @ 2% Strain (N)	721	764	699	692	811	890					**763**	77
MD Strength @ 2% Strain (ppi)	20.2	21.5	19.6	19.5	22.8	25.0					**21.4**	2.2
MD Strength at 2% Strain (kN/m)	3.55	3.76	3.44	3.41	3.99	4.38					**3.75**	0.38
MD Strength @ 5% Strain (lbs)	275	296	274	261	308	335					**292**	27
MD Strength @ 5% Strain (N)	1223	1317	1219	1163	1370	1492					**1298**	121
MD Strength @ 5% Strain (ppi)	34.4	37.0	34.3	32.7	38.5	41.9					**36.4**	3.4
MD Strength at 5% Strain (kN/m)	6.02	6.48	6.00	5.73	6.74	7.34					**6.39**	0.60
MD Strength @ 10% Strain (lbs)	350	385	361	342	411	433					**380**	36
MD Strength @ 10% Strain (N)	1558	1713	1605	1522	1828	1925					**1692**	160
MD Strength @ 10% Strain (ppi)	43.8	48.1	45.1	42.7	51.3	54.1					**47.5**	4.5
MD Strength at 10% Strain (kN/m)	7.67	8.43	7.90	7.49	9.00	9.47					**8.33**	0.79
MD Break Elongation (%)	25.9	25.2	282	380	340	25.1					**180**	172
TD Specimen Width (in)	8											
TD Specimen Width (mm)	203											
TD Ultimate Strength (lbs)	240	247	251	248	222	227					**239**	12
TD Ultimate Strength (N)	1069	1097	1115	1105	986	1012					**1064**	53
TD Ultimate Strength (ppi)	30.0	30.8	31.3	31.0	27.7	28.4					**29.9**	1.5
TD Ultimate Strength (kN/m)	5.26	5.40	5.49	5.44	4.85	4.98					**5.24**	0.26
TD Strength @ 2% Strain (lbs)	17.0	20.0	19.4	21.2	17.4	16.8					**18.7**	1.8
TD Strength @ 2% Strain (N)	76	89	86	94	78	75					**83**	8
TD Strength @ 2% Strain (ppi)	2.13	2.51	2.42	2.65	2.18	2.11					**2.33**	0.23
TD Strength at 2% Strain (kN/m)	0.37	0.44	0.42	0.46	0.38	0.37					**0.41**	0.04
TD Strength @ 5% Strain (lbs)	35.1	41.4	35.9	40.7	32.5	33.0					**36.4**	3.8
TD Strength @ 5% Strain (N)	156	184	160	181	144	147					**162**	17
TD Strength @ 5% Strain (ppi)	4.38	5.18	4.48	5.09	4.06	4.13					**4.55**	0.48
TD Strength at 5% Strain (kN/m)	0.77	0.91	0.79	0.89	0.71	0.72					**0.80**	0.08
TD Strength @ 10% Strain (lbs)	54.4	63.0	48.8	61.7	48.1	50.3					**54.4**	6.6
TD Strength @ 10% Strain (N)	242	280	217	275	214	224					**242**	29
TD Strength @ 10% Strain (ppi)	6.80	7.87	6.10	7.72	6.02	6.28					**6.80**	0.82
TD Strength at 10% Strain (kN/m)	1.19	1.38	1.07	1.35	1.05	1.10					**1.19**	0.14
TD Break Elongation (%)	225	217	179	170	173	174					**189**	24

MD Machine Direction TD Transverse Direction

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GEONET TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: GSE 200 mil Geonet
Sample Identification: 131553781
TRI Log #: 41754

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 1777)													
Thickness (mils)	223	216	227	223	229	235	233	220	220	216	**224**	7	200 min
Thickness (mm)	5.65	5.50	5.75	5.67	5.81	5.96	5.91	5.58	5.58	5.47	**5.69**	0.17	
											5.47	<< min	
Mass/Unit Area (ASTM D 3776, Option C)													
5" diameter circle (grams)	10.41	10.30	11.08	10.30	10.48	10.29	10.9	11.3	10.54	10.78	**10.64**	0.36	
Mass/Unit Area (lb/sq.ft)	0.17	0.17	0.18	0.17	0.17	0.17	0.18	0.18	0.17	0.17	**0.17**	0.01	0.16 min
Mass/Unit Area (g/m2)	822	813	875	813	827	812	861	894	832	851	**840**	29	
Density (ASTM D 1505)													
Density (g/cm3)	0.952	0.952	0.952								**0.952**	0.000	0.94 min
Carbon Black Content (ASTM D 1603, mod.)													
% Carbon Black	2.63	2.66									**2.65**	0.02	2.0 - 3.0
Melt Flow Index (ASTM D 1238, Method A, 190°C / 2.16 kg)													
Melt Flow Index (g/10 min)	0.26										**0.26**		≤1.0

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GEONET TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: GSE 200 mil Geonet
Sample Identification: 131553781
TRI Log #: 41754

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.
Wide Width Tensile Properties (ASTM D 4595)												
MD Specimen Width (inches)	8											
MD Specimen Width (mm)	203											
MD Ultimate Strength (lbs)	464	445	458	468	476	496					**468**	17
MD Ultimate Strength (N)	2066	1982	2038	2083	2120	2208					**2083**	77
MD Ultimate Strength (ppi)	58.0	55.7	57.3	58.5	59.6	62.0					**58.5**	2.2
MD Ultimate Strength (kN/m)	10.2	9.75	10.0	10.3	10.4	10.9					**10.3**	0.4
MD Strength @ 2% Strain (lbs)	158	157	171	152	153	182					**162**	12
MD Strength @ 2% Strain (N)	704	701	763	677	682	811					**723**	53
MD Strength @ 2% Strain (ppi)	19.8	19.7	21.4	19.0	19.2	22.8					**20.3**	1.5
MD Strength at 2% Strain (kN/m)	3.47	3.45	3.75	3.33	3.36	3.99					**3.56**	0.26
MD Strength @ 5% Strain (lbs)	281	277	289	271	272	304					**282**	13
MD Strength @ 5% Strain (N)	1250	1231	1286	1208	1210	1355					**1257**	56
MD Strength @ 5% Strain (ppi)	35.1	34.6	36.1	33.9	34.0	38.1					**35.3**	1.6
MD Strength at 5% Strain (kN/m)	6.15	6.06	6.33	5.94	5.96	6.67					**6.18**	0.28
MD Strength @ 10% Strain (lbs)	361	364	371	362	361	398					**369**	14
MD Strength @ 10% Strain (N)	1606	1620	1649	1612	1605	1771					**1644**	64
MD Strength @ 10% Strain (ppi)	45.1	45.5	46.3	45.3	45.1	49.7					**46.2**	1.8
MD Strength at 10% Strain (kN/m)	7.91	7.97	8.12	7.93	7.90	8.71					**8.09**	0.32
MD Break Elongation (%)	397	25.2	28.4	28.1	30.7	24.9					**89.1**	151.1
TD Specimen Width (in)	8											
TD Specimen Width (mm)	203											
TD Ultimate Strength (lbs)	238	236	227	227	256	215					**233**	14
TD Ultimate Strength (N)	1058	1051	1009	1011	1141	956					**1038**	62
TD Ultimate Strength (ppi)	29.7	29.5	28.3	28.4	32.1	26.9					**29.1**	1.8
TD Ultimate Strength (kN/m)	5.21	5.17	4.96	4.97	5.62	4.71					**5.11**	0.31
TD Strength @ 2% Strain (lbs)	18.6	17.4	21.5	15.6	17.9	18.5					**18.2**	1.9
TD Strength @ 2% Strain (N)	82.9	77.3	95.8	69.6	79.5	82.1					**81.2**	8.6
TD Strength @ 2% Strain (ppi)	2.33	2.17	2.69	1.95	2.23	2.31					**2.28**	0.24
TD Strength at 2% Strain (kN/m)	0.41	0.38	0.47	0.34	0.39	0.40					**0.40**	0.04
TD Strength @ 5% Strain (lbs)	38.2	32.6	43.2	29.9	36.5	36.8					**36.2**	4.6
TD Strength @ 5% Strain (N)	170	145	192	133	162	164					**161**	21
TD Strength @ 5% Strain (ppi)	4.77	4.07	5.40	3.73	4.56	4.60					**4.52**	0.58
TD Strength at 5% Strain (kN/m)	0.84	0.71	0.95	0.65	0.80	0.81					**0.79**	0.10
TD Strength @ 10% Strain (lbs)	58.9	48.7	64.4	45.1	57.2	56.0					**55.0**	7.0
TD Strength @ 10% Strain (N)	262	217	287	201	254	249					**245**	31
TD Strength @ 10% Strain (ppi)	7.36	6.09	8.06	5.64	7.15	7.00					**6.88**	0.88
TD Strength at 10% Strain (kN/m)	1.29	1.07	1.41	0.99	1.25	1.23					**1.21**	0.15
TD Break Elongation (%)	163	133	140	199	143	130					**151**	26

MD Machine Direction TD Transverse Direction

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APPENDIX B

Material Manufacturer Certification and Conformance Testing Results

B.7. Geotextile Certifications

GSE Roll Allocation

Order : SO-085199
Customer : Southwest Liner Systems, Inc.
Project Name : SWLS/Sundance West Phase 2, Landfill Cell 1A

Roll#	Product Code	Mfg Date	Length
2024872579	GEO-100E-EBC-E-005	3/16/2017	300
2024874181	GEO-100E-EBC-E-005	3/16/2017	300
2025468016	GEO-100E-EBC-E-005	4/23/2018	300
2025704014	GEO-100E-EBC-E-005	9/20/2018	300

SOLMAX GSE

ROLL TEST DATA REPORT

Report Date: Sep/26/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Arcadia, FL	GEO-100E-EBC-E-005	

GSE QC APPROVED

ROLL #	ASTM D4751 A0S (mm)	ASTM D6241 CBR PUNCTURE (lbs)	Mass per Unit Area ASTM D5261 (oz/yd²)	ASTM D4632 Elongation @ Break (%) MD	ASTM D4632 Grab Strength (lbs) MD	ASTM D4533 Trapezoidoal Tear (lbs) MD	ASTM D4491 Permeability (cm/sec)	ASTM D4491 Permittivity (sec-1)	Water Flow D4491 gpm/ft2	ASTM D4632 Elongation @ Break (%) TD	ASTM D4632 Grab Strength (lbs) TD	ASTM D4533 Trapezoidoal Tear (lbs) TD
2024872579	0.125	1111	10.21	76	422	144	0.313	1.34	99	97	410	157
2024874181	0.125	1111	11.89	84	519	161	0.313	1.34	99	103	536	169
2025468016	0.125	1192	11.15	88	404	147	0.301	1.21	90	91	469	172
2025704014	0.150	883	10.59	70	355	142	0.339	1.31	97	102	378	131

Laboratory Supervisor: Lana Hickman

1245 Eastland Avenue
Kingstree, SC 29556
Phone 843-382-4603
Fax 843-382-4604

Date: September 26, 2018

Project: 85199 SWLS/Sundance West Phase 2, Landfill Cell 1A

Ref: Ultraviolet (UV) Resistance

To Whom It May Concern:

The resistance of nonwoven needle punched geotextiles to ultraviolet light depends primarily on antioxident and carbon black package mixed with resin to prepare a formulation for fiber extrusion. As long as this formulation remains the same the UV resistance of a geotextiles does not change. Therefore, UV testing is performed only once per resin formulation, according to ASTM Test Method D4355 and results are included on GSE geotextile specification sheet. Currently, all GSE geotextiles meet or exceed a value of 70% strength retained after 500 hours of UV exposure. GSE will meet or exceed this value for the referenced project.

Although GSE geotextiles are manufactured using one of the best available antioxident packages, we recommend covering the geotextiles within 30 days of exposure to direct Sunlight. This period does not include time during which geotextiles rolls remain on site covered in black shrink-wrap. Our recommendation is based on UV performance data published in technical literature indicating geotextile strength can decrease sharply after prolonged exposure to Sunlight.

Mauricio Ossa

Mauricio Ossa
Geosynthetics Manager

APPENDIX B

Material Manufacturer Certification and Conformance Testing Results

B.8. Geotextile Conformance Testing Results

October 23, 2018

Mail To:

Mark Decarlo
Southwest Liner Systems
301 Calle Industrial
Bernalillo, NM 87004

email: swls.md@gmail.com

Bill To:

<= Same

Dear Mr. Decarlo:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**Sundance West Phase 2 Landfill - Cell 1A**
TRI Job Reference Number:	41719
Material(s) Tested:	Three, Solmax GSE 10 oz Nonwoven Geotextiles
Test(s) Requested:	Thickness (ASTM D 5199) Mass/Unit Area (ASTM D 5261) Grab Tensile (ASTM D 4632) Puncture Strength (ASTM D 4833) Trapezoidal Tear (ASTM D 4533) Mullen Burst (ASTM D 3786) Apparent Opening Size (ASTM D 4751)

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file

GEOTEXTILE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE 10 oz Nonwoven Geotextile
Sample Identification: 2024872579
TRI Log #: 41719

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 5199)													
Thickness (mils)	117	116	105	84	81	87	91	90	93	86	**95**	13	
											81	<< min	
Mass/Unit Area (ASTM D 5261)													
5" diameter circle (grams)	5.15	5.01	4.91	4.73	4.94	4.62	4.47	4.78	4.79	4.32	**4.77**	0.25	
Mass/Unit Area (oz/sq.yd)	11.98	11.65	11.42	11.00	11.49	10.75	10.40	11.12	11.14	10.05	**11.10**	0.58	9.1 min
Grab Tensile Properties (ASTM D 4632)													
MD - Tensile Strength (lbs)	417	446	435	487	518	384	433	507	362	458	**445**	50	230 min
TD - Tensile Strength (lbs)	496	355	542	572	540	580	521	452	416	481	**496**	71	230 min
MD - Elong. @ Max. Load (%)	69	79	73	73	77	63	83	87	63	66	**73**	8	50 min
TD - Elong. @ Max. Load (%)	89	127	92	86	94	89	85	91	119	85	**96**	15	50 min
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	220	206	209	260	222						**224**	22	120 min
Trapezoidal Tear (ASTM D 4533)													
MD - Tear Strength (lbs)	132	145	165	157	170	142	130	125	131	121	**142**	17	90 min
TD - Tear Strength (lbs)	161	178	184	168	176	169	178	150	190	176	**173**	12	90 min
Mullen Burst Strength (ASTM D 3786, modified)													
Tare (psi): 49													
Burst Strength (psi)	830	670	730	690	660	770	650	620	820	690	**713**	72	520 min
											Tare Not Subtracted		
Apparent Opening Size (ASTM D 4751)													
Opening Size Diameter (mm)	0.103	0.104	0.120	0.114	0.102						**0.109**	0.008	
Sieve No.	140	140	100	100	140						**140**		80 max

MD Machine Direction TD Transverse Direction

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GEOTEXTILE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE 10 oz Nonwoven Geotextile
Sample Identification: 2025468016
TRI Log #: 41719

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 5199)													
Thickness (mils)	74	85	93	94	88	87	83	96	86	86	**87**	6	
											74	<< min	
Mass/Unit Area (ASTM D 5261)													
5" diameter circle (grams)	4.36	4.66	4.78	4.73	5.26	4.82	4.22	4.96	5.18	4.61	**4.76**	0.33	
Mass/Unit Area (oz/sq.yd)	10.14	10.84	11.12	11.00	12.23	11.21	9.82	11.54	12.05	10.72	**11.07**	0.76	9.1 min
Grab Tensile Properties (ASTM D 4632)													
MD - Tensile Strength (lbs)	342	415	391	386	454	408	385	376	323	360	**384**	37	230 min
TD - Tensile Strength (lbs)	496	513	501	477	523	442	512	570	493	404	**493**	45	230 min
MD - Elong. @ Max. Load (%)	79	94	95	88	86	73	94	89	81	87	**87**	7	50 min
TD - Elong. @ Max. Load (%)	95	86	84	88	100	85	96	87	76	105	**90**	9	50 min
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	222	236	164	207	148						**195**	38	120 min
Trapezoidal Tear (ASTM D 4533)													
MD - Tear Strength (lbs)	119	145	161	135	131	151	161	131	137	160	**143**	15	90 min
TD - Tear Strength (lbs)	175	188	214	209	184	178	135	207	200	205	**190**	24	90 min
Mullen Burst Strength (ASTM D 3786, modified)													
Tare (psi): 49													
Burst Strength (psi)	640	590	720	590	560	580	510	620	650	560	**602**	58	520 min
											Tare Not Subtracted		
Apparent Opening Size (ASTM D 4751)													
Opening Size Diameter (mm)	0.105	0.108	0.092	0.111	0.089						**0.101**	0.010	
Sieve No.	140	140	140	100	140						**140**		80 max

MD Machine Direction TD Transverse Direction

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GEOTEXTILE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE 10 oz Nonwoven Geotextile
Sample Identification: 2025704014
TRI Log #: 41719

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Thickness (ASTM D 5199)													
Thickness (mils)	92	99	101	97	100	98	100	94	98	99	**98**	3	
											92	<< min	
Mass/Unit Area (ASTM D 5261)													
5" diameter circle (grams)	4.74	4.70	3.89	4.23	4.51	4.79	4.34	4.27	4.44	5.12	**4.50**	0.35	
Mass/Unit Area (oz/sq.yd)	11.03	10.93	9.05	9.84	10.49	11.14	10.09	9.93	10.33	11.91	**10.47**	0.81	9.1 min
Grab Tensile Properties (ASTM D 4632)													
MD - Tensile Strength (lbs)	327	382	394	375	514	402	362	287	336	469	**385**	67	230 min
TD - Tensile Strength (lbs)	332	316	305	318	342	437	418	423	407	370	**367**	50	230 min
MD - Elong. @ Max. Load (%)	70	79	93	89	65	75	81	74	81	67	**77**	9	50 min
TD - Elong. @ Max. Load (%)	126	101	91	85	95	97	100	91	91	144	**102**	19	50 min
Puncture Resistance (ASTM D 4833)													
Puncture Strength (lbs)	152	168	216	188	208						**186**	27	120 min
Trapezoidal Tear (ASTM D 4533)													
MD - Tear Strength (lbs)	115	136	126	183	146	121	121	135	132	116	**133**	20	90 min
TD - Tear Strength (lbs)	144	154	148	111	145	166	138	133	154	164	**146**	16	90 min
Mullen Burst Strength (ASTM D 3786, modified)													
Tare (psi): 49													
Burst Strength (psi)	640	590	540	540	550	540	570	600	600	670	**584**	45	520 min
											Tare Not Subtracted		
Apparent Opening Size (ASTM D 4751)													
Opening Size Diameter (mm)	0.094	0.110	0.122	0.126	0.112						**0.113**	0.012	
Sieve No.	140	100	100	100	100						**100**		80 max

MD Machine Direction TD Transverse Direction

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APPENDIX B

Material Manufacturer Certification and Conformance Testing Results

B.9. Geocomposite Certifications

PRIMARY

Roll Allocation List

Sales Order SO-085199
Customer Name Southwest Liner Systems, Inc.
Project Name SWLS/Sundance West Phase 2, Landfill Cell 1A

Serial number	Item Number	Resin Lot	Top	Bottom	Manufacturing date	Length
131553610	FS2-225E-10-10-E-00	CB118H0203	2025703157	2025703171	9/28/2018	200.00
131553611	FS2-225E-10-10-E-00	CB118H0203	2025703157	2025703171	9/28/2018	200.00
131553612	FS2-225E-10-10-E-00	CB118H0203	2025703157	2025703171	9/28/2018	200.00
131553613	FS2-225E-10-10-E-00	CB118H0203	2025703157	2025703171	9/28/2018	200.00
131553614	FS2-225E-10-10-E-00	CB118H0203	2025703135	2025703134	9/28/2018	200.00
131553615	FS2-225E-10-10-E-00	CB118H0203	2025703135	2025703134	9/28/2018	200.00
131553616	FS2-225E-10-10-E-00	CB118H0203	2025703135	2025703134	9/28/2018	200.00
131553617	FS2-225E-10-10-E-00	CB118H0203	2025703135	2025703134	9/28/2018	200.00
131553618	FS2-225E-10-10-E-00	CB118H0203	2025703136	2025703141	9/28/2018	200.00
131553619	FS2-225E-10-10-E-00	CB118H0203	2025703136	2025703141	9/28/2018	200.00
131553620	FS2-225E-10-10-E-00	CB118H0203	2025703136	2025703141	9/29/2018	200.00
131553621	FS2-225E-10-10-E-00	CB118H0203	2025703136	2025703141	9/29/2018	200.00
131553622	FS2-225E-10-10-E-00	CB118H0203	2025703138	2025703107	9/29/2018	200.00
131553623	FS2-225E-10-10-E-00	CB118H0203	2025703138	2025703107	9/29/2018	200.00
131553624	FS2-225E-10-10-E-00	CB118H0203	2025703138	2025703107	9/29/2018	200.00
131553625	FS2-225E-10-10-E-00	CB118H0203	2025703138	2025703107	9/29/2018	200.00
131553626	FS2-225E-10-10-E-00	CB118H0203	2025703130	2025703107	9/29/2018	200.00
131553627	FS2-225E-10-10-E-00	CB118H0203	2025703130	2025703110	9/29/2018	200.00
131553628	FS2-225E-10-10-E-00	CB118H0203	2025703130	2025703110	9/29/2018	200.00
131553629	FS2-225E-10-10-E-00	CB118H0203	2025703130	2025703110	9/29/2018	200.00
131553630	FS2-225E-10-10-E-00	CB118H0203	2025703130	2025703110	9/29/2018	200.00
131553631	FS2-225E-10-10-E-00	CB118H0203	2025703137	2025703110	9/29/2018	200.00
131553632	FS2-225E-10-10-E-00	CB118H0203	2025703137	2025703100	9/29/2018	200.00
131553633	FS2-225E-10-10-E-00	CB118H0203	2025703137	2025703100	9/29/2018	200.00
131553634	FS2-225E-10-10-E-00	CB118H0203	2025703099	2025703100	9/29/2018	200.00
131553635	FS2-225E-10-10-E-00	CB118H0203	2025703099	2025703126	9/29/2018	200.00
131553636	FS2-225E-10-10-E-00	CB118H0203	2025703099	2025703126	9/29/2018	200.00
131553637	FS2-225E-10-10-E-00	CB118H0203	2025703099	2025703126	9/29/2018	200.00
131553638	FS2-225E-10-10-E-00	CB118H0203	2025703099	2025703126	9/29/2018	200.00
131553639	FS2-225E-10-10-E-00	CB118H0203	2025703105	2025703126	9/29/2018	200.00
131553640	FS2-225E-10-10-E-00	CB118H0203	2025703105	2025703123	9/29/2018	200.00
131553641	FS2-225E-10-10-E-00	CB118H0203	2025703105	2025703123	9/29/2018	200.00
131553642	FS2-225E-10-10-E-00	CB118H0203	2025703105	2025703123	9/29/2018	200.00
131553643	FS2-225E-10-10-E-00	CB118H0203	2025703124	2025703116	9/29/2018	200.00
131553644	FS2-225E-10-10-E-00	CB118H0203	2025703124	2025703116	9/29/2018	200.00
131553645	FS2-225E-10-10-E-00	CB118H0203	2025703124	2025703116	9/29/2018	200.00
131553646	FS2-225E-10-10-E-00	CB118H0203	2025703124	2025703116	9/29/2018	200.00
131553647	FS2-225E-10-10-E-00	CB118H0203	2025703115	2025703116	9/29/2018	200.00
131553650	FS2-225E-10-10-E-00	CB118H0203	2025703115	2025703153	9/29/2018	200.00
131553651	FS2-225E-10-10-E-00	CB118H0203	2025703115	2025703153	9/29/2018	200.00
131553652	FS2-225E-10-10-E-00	CB118H0203	2025703115	2025703153	9/29/2018	200.00
131553653	FS2-225E-10-10-E-00	CB118H0203	2025703094	2025703153	9/29/2018	200.00
131553654	FS2-225E-10-10-E-00	CB118H0203	2025703094	2025703129	9/29/2018	200.00
131553655	FS2-225E-10-10-E-00	CB118H0203	2025703094	2025703129	9/29/2018	200.00
131553656	FS2-225E-10-10-E-00	CB118H0203	2025703094	2025703129	9/29/2018	200.00
131553657	FS2-225E-10-10-E-00	CB118H0203	2025703104	2025703129	9/29/2018	200.00
131553658	FS2-225E-10-10-E-00	CB118H0203	2025703104	2025703151	9/29/2018	200.00
131553659	FS2-225E-10-10-E-00	CB118H0203	2025703104	2025703151	9/29/2018	200.00
131553660	FS2-225E-10-10-E-00	CB118H0203	2025703104	2025703151	9/29/2018	200.00
131553661	FS2-225E-10-10-E-00	CB118H0203	2025703169	2025703151	9/29/2018	200.00
131553662	FS2-225E-10-10-E-00	CB118H2701	2025703169	2025703132	9/29/2018	200.00
131553663	FS2-225E-10-10-E-00	CB118H2701	2025703169	2025703132	9/29/2018	200.00
131553664	FS2-225E-10-10-E-00	CB118H2701	2025703169	2025703132	9/29/2018	200.00
131553665	FS2-225E-10-10-E-00	CB118H2701	2025703175	2025703132	9/29/2018	200.00
131553666	FS2-225E-10-10-E-00	CB118H2701	2025703175	2025703096	9/29/2018	200.00
131553667	FS2-225E-10-10-E-00	CB118H2701	2025703175	2025703096	9/29/2018	200.00
131553668	FS2-225E-10-10-E-00	CB118H2701	2025703175	2025703096	9/29/2018	200.00
131553669	FS2-225E-10-10-E-00	CB118H2701	2025703174	2025703096	9/29/2018	200.00
131553670	FS2-225E-10-10-E-00	CB118H2701	2025703174	2025703161	9/29/2018	200.00
131553671	FS2-225E-10-10-E-00	CB118H2701	2025703174	2025703161	9/29/2018	200.00
131553672	FS2-225E-10-10-E-00	CB118H2701	2025703174	2025703161	9/29/2018	200.00
131553673	FS2-225E-10-10-E-00	CB118H2701	2025703162	2025703161	9/29/2018	200.00
131553674	FS2-225E-10-10-E-00	CB118H2701	2025703162	2025703176	9/29/2018	200.00
131553675	FS2-225E-10-10-E-00	CB118H2701	2025703162	2025703176	9/29/2018	200.00
131553676	FS2-225E-10-10-E-00	CB118H2701	2025703162	2025703176	9/29/2018	200.00

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Oct/3/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	FS2-225E-10-10-E-00	

Roll Number	Geonet Thickness ASTM D5199 (mils)	Tensile Strength ASTM D7179 (ppi)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Ply Adhesion Average ASTM D7005 (ppi) Side A	Ply Adhesion Average ASTM D7005 (ppi) Side B	Geonet Mass per Unit Area ASTM D5261 (lbs/ft²)
131553610	240	75	0.953	2.4	2.7	3.3	0.197
131553611	236	70	0.962	2.5	2.5	2.5	0.199
131553612	236	70	0.962	2.5	2.5	2.5	0.199
131553613	236	70	0.962	2.5	2.5	2.5	0.199
131553614	236	70	0.962	2.5	2.5	2.5	0.199
131553615	236	70	0.962	2.5	2.5	2.5	0.199
131553616	236	70	0.962	2.5	2.5	2.5	0.199
131553617	236	70	0.962	2.5	2.5	2.5	0.199
131553618	236	70	0.962	2.5	2.5	2.5	0.199
131553619	236	70	0.962	2.5	2.5	2.5	0.199
131553620	236	70	0.962	2.5	2.5	2.5	0.199
131553621	236	70	0.962	2.5	2.5	2.5	0.199
131553622	236	70	0.962	2.5	2.5	2.5	0.199
131553623	236	70	0.962	2.5	2.5	2.5	0.199
131553624	236	70	0.962	2.5	2.5	2.5	0.199
131553625	236	70	0.962	2.5	2.5	2.5	0.199
131553626	236	70	0.962	2.5	2.5	2.5	0.199
131553627	236	77	0.953	2.3	2.2	2.4	0.198
131553628	236	77	0.953	2.3	2.2	2.4	0.198
131553629	236	77	0.953	2.3	2.2	2.4	0.198
131553630	236	77	0.953	2.3	2.2	2.4	0.198
131553631	236	77	0.953	2.3	2.2	2.4	0.198
131553632	236	77	0.953	2.3	2.2	2.4	0.198
131553633	236	77	0.953	2.3	2.2	2.4	0.198
131553634	236	77	0.953	2.3	2.2	2.4	0.198
131553635	236	77	0.953	2.3	2.2	2.4	0.198
131553636	236	77	0.953	2.3	2.2	2.4	0.198
131553637	236	77	0.953	2.3	2.2	2.4	0.198
131553638	236	77	0.953	2.3	2.2	2.4	0.198
131553639	236	77	0.953	2.3	2.2	2.4	0.198
131553640	236	77	0.953	2.3	2.2	2.4	0.198
131553641	236	77	0.953	2.3	2.2	2.4	0.198
131553642	236	77	0.953	2.3	2.2	2.4	0.198
131553643	234	71	0.951	2.5	1.5	1.7	0.190

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Oct/3/2018

Sales Order No.	***Customer Name***	***Project Location***	***Product Name***	***BOL Number***
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	FS2-225E-10-10-E-00	

Roll Number	Geonet Thickness ASTM D5199 (mils)	Tensile Strength ASTM D7179 (ppi)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Ply Adhesion Average ASTM D7005 (ppi) Side A	Ply Adhesion Average ASTM D7005 (ppi) Side B	Geonet Mass per Unit Area ASTM D5261 (lbs/ft²)
131553644	234	71	0.951	2.5	1.5	1.7	0.190
131553645	234	71	0.951	2.5	1.5	1.7	0.190
131553646	234	71	0.951	2.5	1.5	1.7	0.190
131553647	234	71	0.951	2.5	1.5	1.7	0.190
131553650	234	71	0.951	2.5	1.5	1.7	0.190
131553651	234	71	0.951	2.5	1.5	1.7	0.190
131553652	234	71	0.951	2.5	1.5	1.7	0.190
131553653	234	71	0.951	2.5	1.5	1.7	0.190
131553654	234	71	0.951	2.5	1.5	1.7	0.190
131553655	234	71	0.951	2.5	1.5	1.7	0.190
131553656	234	71	0.951	2.5	1.5	1.7	0.190
131553657	234	71	0.951	2.5	1.5	1.7	0.190
131553658	234	71	0.951	2.5	1.5	1.7	0.190
131553659	234	71	0.951	2.5	1.5	1.7	0.190
131553660	234	71	0.951	2.5	1.5	1.7	0.190
131553661	237	72	0.955	2.3	2.2	2.2	0.193
131553662	237	72	0.955	2.3	2.2	2.2	0.193
131553663	237	72	0.955	2.3	2.2	2.2	0.193
131553664	237	72	0.955	2.3	2.2	2.2	0.193
131553665	237	72	0.955	2.3	2.2	2.2	0.193
131553666	237	72	0.955	2.3	2.2	2.2	0.193
131553667	237	72	0.955	2.3	2.2	2.2	0.193
131553668	237	72	0.955	2.3	2.2	2.2	0.193
131553669	237	72	0.955	2.3	2.2	2.2	0.193
131553670	237	72	0.955	2.3	2.2	2.2	0.193
131553671	237	72	0.955	2.3	2.2	2.2	0.193
131553672	237	72	0.955	2.3	2.2	2.2	0.193
131553673	237	72	0.955	2.3	2.2	2.2	0.193
131553674	237	72	0.955	2.3	2.2	2.2	0.193
131553675	237	72	0.955	2.3	2.2	2.2	0.193

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

PRIMARY

Report Date: Oct/3/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	FS2-225E-10-10-E-00	

Roll Number	Geonet Thickness ASTM D5199 (mils)	Tensile Strength ASTM D7179 (ppi)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Ply Adhesion Average ASTM D7005 (ppi) Side A	Ply Adhesion Average ASTM D7005 (ppi) Side B	Geonet Mass per Unit Area ASTM D5261 (lbs/ft²)
131553676	237	72	0.955	2.3	2.2	2.2	0.193

Laboratory Manager _____

19103 Gundle Road Houston, TX 77073

PRIMARY

GSE Lining Technology, LLC.

ROLL TEST DATA REPORT

Report Date: Oct/03/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	FBR-100E-EBC-E-00	

GSE QC APPROVED

ROLL #	ASTM D4751 A0S (mm)	Mass per Unit Area ASTM D5261 (oz/yd²)	ASTM D4632 Elongation @ Break (%) MD	ASTM D4632 Grab Strength (lbs) MD	ASTM D4533 Trapezoidoal Tear (lbs) MD	ASTM D4491 Permittivity (sec-1)	ASTM D4833 Puncture Resistance (lbs)	Water Flow D4491 gpm/ft2	ASTM D4632 Elongation @ Break (%) TD	ASTM D4632 Grab Strength (lbs) TD	ASTM D4533 Trapezoidoal Tear (lbs) TD
2025703094	0.125	11.3	78	396	140	1.45	216	107	95	434	155
2025703096	0.125	11.3	78	396	140	1.45	216	107	95	434	155
2025703099	0.125	12.6	79	447	153	1.38	240	102	91	488	167
2025703100	0.125	12.6	79	447	153	1.38	240	102	91	488	167
2025703104	0.150	11.3	76	360	132	1.70	222	125	90	459	161
2025703105	0.150	11.3	76	360	132	1.70	222	125	90	459	161
2025703107	0.150	11.3	76	360	132	1.70	222	125	90	459	161
2025703110	0.150	11.0	83	373	127	1.73	189	127	93	431	152
2025703115	0.150	11.0	83	373	127	1.73	189	127	93	431	152
2025703116	0.150	10.3	77	373	155	1.71	196	126	88	399	177
2025703123	0.150	10.6	73	352	148	1.65	196	122	88	439	185
2025703124	0.150	10.6	73	352	148	1.65	196	122	88	439	185
2025703126	0.150	10.6	73	352	148	1.65	196	122	88	439	185
2025703129	0.125	11.8	77	373	129	1.26	210	93	86	450	153
2025703130	0.125	11.8	77	373	129	1.26	210	93	86	450	153
2025703132	0.125	11.8	77	373	129	1.26	210	93	86	450	153
2025703134	0.125	10.6	78	372	123	1.33	213	98	86	470	159
2025703135	0.125	10.6	78	372	123	1.33	213	98	86	470	159
2025703136	0.125	10.6	78	372	123	1.33	213	98	86	470	159
2025703137	0.125	10.6	78	372	123	1.33	213	98	86	470	159
2025703138	0.125	10.6	78	372	123	1.33	213	98	86	470	159
2025703141	0.125	10.3	78	348	126	1.30	187	96	88	395	147
2025703151	0.150	11.5	91	417	118	1.28	189	94	94	460	160
2025703153	0.125	10.1	86	375	130	1.46	185	108	94	394	199
2025703157	0.125	10.1	86	375	130	1.46	185	108	94	394	199
2025703161	0.150	10.7	81	375	138	1.35	186	100	94	424	168
2025703162	0.150	10.7	81	375	138	1.35	186	100	94	424	168
2025703169	0.125	10.9	83	347	134	1.38	182	102	96	441	146
2025703171	0.125	12.1	85	415	139	1.28	231	95	92	492	158
2025703174	0.125	12.1	85	415	139	1.28	231	95	92	492	158

Laboratory Supervisor: Thomas Harrelson

PRIMARY

GSE Lining Technology, LLC.

ROLL TEST DATA REPORT

Report Date: Oct/03/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	FBR-100E-EBC-E-00	

GSE QC APPROVED

ROLL #	ASTM D4751 A0S (mm)	Mass per Unit Area ASTM D5261 (oz/yd²)	ASTM D4632 Elongation @ Break (%) MD	ASTM D4632 Grab Strength (lbs) MD	ASTM D4533 Trapezoidoal Tear (lbs) MD	ASTM D4491 Permittivity (sec-1)	ASTM D4833 Puncture Resistance (lbs)	Water Flow D4491 gpm/ft2	ASTM D4632 Elongation @ Break (%) TD	ASTM D4632 Grab Strength (lbs) TD	ASTM D4533 Trapezoidoal Tear (lbs) TD
2025703175	0.125	12.1	85	415	139	1.28	231	95	92	492	158
2025703176	0.125	11.4	82	389	127	1.31	200	97	95	463	157

Laboratory Supervisor: Thomas Harrelson

Equistar Chemicals, LP
One Houston Center
1221 McKinney
Houston TX 77010

Certificate Of Analysis

Certificate of Analysis Contact:

Ship-To Address:
GSE ENVIRONMENTAL LLC
1245 EASTLAND AVE
KINGSTREE SC 29556
UNITED STATES

Product Name	: PETROTHENE LR732001	**Customer Order No.**	: 03-513370
Batch Number	: CB118H0203	**Customer Number**	: 151477
Vehicle Number	: CITX200390	**Date Shipped**	: August 08, 2018
Estimated Quantity	: 214,550 LBS	**Equistar Order No.**	: 5181425 000010
Material Number	: 16838	**Delivery Item No.**	: 8101135739 000010

Test Description	Test Result	Unit of Measure	
Vehicle ID	CITX200390		
Vehicle Type	HOPPER CAR H		
Density, Extrudate @ 23C	0.9533	g/cm3	STM 011
Melt Index, 2160g @ 190C	0.34	g/10 min.	STM 002

Delivery Number:

Cust/PO Number:

Print Date: August 08, 2018 BSSIMMO1

Data reported was generated in an approved Quality Assurance Lab.

This information is available 24 hours a day at https://lyb.customerxpress.com/
Questions ? Call Customer Service: 888-777-0232

Equistar Chemicals, LP
One Houston Center
1221 McKinney
Houston TX 77010

Certificate Of Analysis

Certificate of Analysis Contact:

Ship-To Address:
GSE ENVIRONMENTAL LLC
1245 EASTLAND AVE
KINGSTREE SC 29556
UNITED STATES

Product Name	: PETROTHENE LR732001	**Customer Order No.**	: 03-513370
Batch Number	: CB118H2701	**Customer Number**	: 151477
Vehicle Number	: CITX200367	**Date Shipped**	: August 28, 2018
Estimated Quantity	: 214,000 LBS	**Equistar Order No.**	: 5216507 000010
Material Number	: 16838	**Delivery Item No.**	: 8101185260 000010

Test Description	Test Result	Unit of Measure	
Vehicle ID	CITX200367		
Vehicle Type	HOPPER CAR H		
Density, Extrudate @ 23C	0.9521	g/cm3	STM 011
Melt Index, 2160g @ 190C	0.28	g/10 min.	STM 002

Delivery Number:

Cust/PO Number:

Print Date: August 29, 2018 BSSIMMO1

Data reported was generated in an approved Quality Assurance Lab.

This information is available 24 hours a day at https://lyb.customerxpress.com/
Questions ? Call Customer Service: 888-777-0232

PRIMARY

Report Date
10/3/2018

Quality Assurance Laboratory Test Results

Job Name: SWLS/Sundance West Phase 2 Landfill Cell 1A
Sales Order: 85199

Required Testing: ASTM D 1238, 190 / 2.16 -- Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer

Frequency: 1/50,000 sf

Specification: ≤ 1.0 g/10 minutes

Product Code	Roll Number	Result
FS2-225E-10-10-E-00	131553610	0.31
FS2-225E-10-10-E-00	131553626	0.31
FS2-225E-10-10-E-00	131553642	0.32
FS2-225E-10-10-E-00	131553660	0.35
FS2-225E-10-10-E-00	131553667	0.35

Approved by: Barbara McCrea
Date: October 3, 2018

1245 Eastland Avenue
Kingstree, SC 29556
Phone 843-382-4603
Fax 843-382-4604

Date: October 3, 2018

Project: # 85199

Ref: Ultraviolet (UV) Resistance

To Whom It May Concern:

The resistance of nonwoven needle punched geotextiles to ultraviolet light depends primarily on antioxident and carbon black package mixed with resin to prepare a formulation for fiber extrusion. As long as this formulation remains the same the UV resistance of a geotextiles does not change. Therefore, UV testing is performed only once per resin formulation, according to ASTM Test Method D4355 and results are included on GSE geotextile specification sheet. Currently, all GSE geotextiles meet or exceed a value of 70% strength retained after 500 hours of UV exposure. GSE will meet or exceed this value for the referenced project.

Although GSE geotextiles are manufactured using one of the best available antioxident packages, we recommend covering the geotextiles within 30 days of exposure to direct Sunlight. This period does not include time during which geotextiles rolls remain on site covered in black shrink-wrap. Our recommendation is based on UV performance data published in technical literature indicating geotextile strength can decrease sharply after prolonged exposure to Sunlight.

Mauricio Ossa

Mauricio Ossa
Director of Global Quality

PRIMARY

GSE ENVIRONMENTAL™ GSE Environmental, LLC.

Transmissivity Report

ASTM D4716

Roll No. 131553610

ROLL IDENTIFICATION

Roll Number	131553610
Product Name	FS2-225E-10-10-E-00
Production Date	9/28/2018

CUSTOMER INFORMATION

Order Number	85199
Customer Name	Southwest Liner Systems, Inc.
Project Name	SWLS/Sundance West Phase 2, Landfill Cell 1A
Location	Eunice NM

Pressure (psf)	Gradient	Net/Composite	Transmissivity Results (m^2/sec)	(gal/min/ft)	Seat Time (min)	Boundary
10,000	0.10	Composite	1.18E-03	5.70	15	SS Plates
10,000	0.10	Net	5.17E-03	24.98	15	SS Plates

GSE QC APPROVED

GSE Roll Allocation

Order SO-085199

Customer Southwest Liner Systems, Inc.
Project Name Sundance West Phase 2, Landfill Cell 1A

TRI/AUSTIN
1/100,000 sf, min 1/lot
Geonet: 1 ft x 1 ft coupons
Geotextile: 3 ft x RW
Finished Geocomposite 2 ft x 2 ft
Total sf on job 195,000 sf

PRIMARY

Roll#	Resin Lot	Product Code	Mfg Date	Length	Pick up
131553610	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	10/3
131553611	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553612	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553613	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553614	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553615	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553616	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553617	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553618	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553619	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553620	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553621	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553622	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553623	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553624	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553625	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553626	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553627	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553628	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553629	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553630	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553631	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553632	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553633	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553634	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553635	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553636	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553637	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553638	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553639	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553640	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553641	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553642	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	10/3
131553643	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553644	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553645	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553646	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553647	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553650	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553651	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553652	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553653	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553654	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553655	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553656	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553657	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553658	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553659	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553660	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553661	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553662	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553663	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553664	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553665	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553666	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553667	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553668	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553669	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553670	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553671	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553672	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553673	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553674	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553675	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553676	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	10/3

Roll Allocation List

Sales Order SO-085199
Customer Name Southwest Liner Systems, Inc.
Project Name SWLS/Sundance West Phase 2, Landfill Cell 1A

Serial number	Item Number	Resin Lot	Top	Bottom	Manufacturing date	Length
131553610	FS2-225E-10-10-E-00	CB118H0203	2025703157	2025703171	9/28/2018	200.00
131553611	FS2-225E-10-10-E-00	CB118H0203	2025703157	2025703171	9/28/2018	200.00
131553612	FS2-225E-10-10-E-00	CB118H0203	2025703157	2025703171	9/28/2018	200.00
131553613	FS2-225E-10-10-E-00	CB118H0203	2025703157	2025703171	9/28/2018	200.00
131553614	FS2-225E-10-10-E-00	CB118H0203	2025703135	2025703134	9/28/2018	200.00
131553615	FS2-225E-10-10-E-00	CB118H0203	2025703135	2025703134	9/28/2018	200.00
131553616	FS2-225E-10-10-E-00	CB118H0203	2025703135	2025703134	9/28/2018	200.00
131553617	FS2-225E-10-10-E-00	CB118H0203	2025703135	2025703134	9/28/2018	200.00
131553618	FS2-225E-10-10-E-00	CB118H0203	2025703136	2025703141	9/28/2018	200.00
131553619	FS2-225E-10-10-E-00	CB118H0203	2025703136	2025703141	9/28/2018	200.00
131553620	FS2-225E-10-10-E-00	CB118H0203	2025703136	2025703141	9/29/2018	200.00
131553621	FS2-225E-10-10-E-00	CB118H0203	2025703136	2025703141	9/29/2018	200.00
131553622	FS2-225E-10-10-E-00	CB118H0203	2025703138	2025703107	9/29/2018	200.00
131553623	FS2-225E-10-10-E-00	CB118H0203	2025703138	2025703107	9/29/2018	200.00
131553624	FS2-225E-10-10-E-00	CB118H0203	2025703138	2025703107	9/29/2018	200.00
131553625	FS2-225E-10-10-E-00	CB118H0203	2025703138	2025703107	9/29/2018	200.00
131553626	FS2-225E-10-10-E-00	CB118H0203	2025703130	2025703107	9/29/2018	200.00
131553627	FS2-225E-10-10-E-00	CB118H0203	2025703130	2025703110	9/29/2018	200.00
131553628	FS2-225E-10-10-E-00	CB118H0203	2025703130	2025703110	9/29/2018	200.00
131553629	FS2-225E-10-10-E-00	CB118H0203	2025703130	2025703110	9/29/2018	200.00
131553630	FS2-225E-10-10-E-00	CB118H0203	2025703130	2025703110	9/29/2018	200.00
131553631	FS2-225E-10-10-E-00	CB118H0203	2025703137	2025703110	9/29/2018	200.00
131553632	FS2-225E-10-10-E-00	CB118H0203	2025703137	2025703100	9/29/2018	200.00
131553633	FS2-225E-10-10-E-00	CB118H0203	2025703137	2025703100	9/29/2018	200.00
131553634	FS2-225E-10-10-E-00	CB118H0203	2025703099	2025703100	9/29/2018	200.00
131553635	FS2-225E-10-10-E-00	CB118H0203	2025703099	2025703126	9/29/2018	200.00
131553636	FS2-225E-10-10-E-00	CB118H0203	2025703099	2025703126	9/29/2018	200.00
131553637	FS2-225E-10-10-E-00	CB118H0203	2025703099	2025703126	9/29/2018	200.00
131553638	FS2-225E-10-10-E-00	CB118H0203	2025703099	2025703126	9/29/2018	200.00
131553639	FS2-225E-10-10-E-00	CB118H0203	2025703105	2025703126	9/29/2018	200.00
131553640	FS2-225E-10-10-E-00	CB118H0203	2025703105	2025703123	9/29/2018	200.00
131553641	FS2-225E-10-10-E-00	CB118H0203	2025703105	2025703123	9/29/2018	200.00
131553642	FS2-225E-10-10-E-00	CB118H0203	2025703105	2025703123	9/29/2018	200.00
131553643	FS2-225E-10-10-E-00	CB118H0203	2025703124	2025703116	9/29/2018	200.00
131553644	FS2-225E-10-10-E-00	CB118H0203	2025703124	2025703116	9/29/2018	200.00
131553645	FS2-225E-10-10-E-00	CB118H0203	2025703124	2025703116	9/29/2018	200.00
131553646	FS2-225E-10-10-E-00	CB118H0203	2025703124	2025703116	9/29/2018	200.00
131553647	FS2-225E-10-10-E-00	CB118H0203	2025703115	2025703116	9/29/2018	200.00
131553650	FS2-225E-10-10-E-00	CB118H0203	2025703115	2025703153	9/29/2018	200.00
131553651	FS2-225E-10-10-E-00	CB118H0203	2025703115	2025703153	9/29/2018	200.00
131553652	FS2-225E-10-10-E-00	CB118H0203	2025703115	2025703153	9/29/2018	200.00
131553653	FS2-225E-10-10-E-00	CB118H0203	2025703094	2025703153	9/29/2018	200.00
131553654	FS2-225E-10-10-E-00	CB118H0203	2025703094	2025703129	9/29/2018	200.00
131553655	FS2-225E-10-10-E-00	CB118H0203	2025703094	2025703129	9/29/2018	200.00
131553656	FS2-225E-10-10-E-00	CB118H0203	2025703094	2025703129	9/29/2018	200.00
131553657	FS2-225E-10-10-E-00	CB118H0203	2025703104	2025703129	9/29/2018	200.00
131553658	FS2-225E-10-10-E-00	CB118H0203	2025703104	2025703151	9/29/2018	200.00
131553659	FS2-225E-10-10-E-00	CB118H0203	2025703104	2025703151	9/29/2018	200.00
131553660	FS2-225E-10-10-E-00	CB118H0203	2025703104	2025703151	9/29/2018	200.00
131553661	FS2-225E-10-10-E-00	CB118H0203	2025703169	2025703151	9/29/2018	200.00
131553662	FS2-225E-10-10-E-00	CB118H2701	2025703169	2025703132	9/29/2018	200.00
131553663	FS2-225E-10-10-E-00	CB118H2701	2025703169	2025703132	9/29/2018	200.00
131553664	FS2-225E-10-10-E-00	CB118H2701	2025703169	2025703132	9/29/2018	200.00
131553665	FS2-225E-10-10-E-00	CB118H2701	2025703175	2025703132	9/29/2018	200.00
131553666	FS2-225E-10-10-E-00	CB118H2701	2025703175	2025703096	9/29/2018	200.00
131553667	FS2-225E-10-10-E-00	CB118H2701	2025703175	2025703096	9/29/2018	200.00
131553668	FS2-225E-10-10-E-00	CB118H2701	2025703175	2025703096	9/29/2018	200.00
131553669	FS2-225E-10-10-E-00	CB118H2701	2025703174	2025703096	9/29/2018	200.00
131553670	FS2-225E-10-10-E-00	CB118H2701	2025703174	2025703161	9/29/2018	200.00
131553671	FS2-225E-10-10-E-00	CB118H2701	2025703174	2025703161	9/29/2018	200.00
131553672	FS2-225E-10-10-E-00	CB118H2701	2025703174	2025703161	9/29/2018	200.00
131553673	FS2-225E-10-10-E-00	CB118H2701	2025703162	2025703161	9/29/2018	200.00
131553674	FS2-225E-10-10-E-00	CB118H2701	2025703162	2025703176	9/29/2018	200.00
131553675	FS2-225E-10-10-E-00	CB118H2701	2025703162	2025703176	9/29/2018	200.00
131553676	FS2-225E-10-10-E-00	CB118H2701	2025703162	2025703176	9/29/2018	200.00

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Oct/3/2018

Sales Order No.	***Customer Name***	***Project Location***	***Product Name***	***BOL Number***
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	FS2-225E-10-10-E-00	

Roll Number	Geonet Thickness ASTM D5199 (mils)	Tensile Strength ASTM D7179 (ppi)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Ply Adhesion Average ASTM D7005 (ppi) Side A	Ply Adhesion Average ASTM D7005 (ppi) Side B	Geonet Mass per Unit Area ASTM D5261 (lbs/ft²)
131553610	240	75	0.953	2.4	2.7	3.3	0.197
131553611	236	70	0.962	2.5	2.5	2.5	0.199
131553612	236	70	0.962	2.5	2.5	2.5	0.199
131553613	236	70	0.962	2.5	2.5	2.5	0.199
131553614	236	70	0.962	2.5	2.5	2.5	0.199
131553615	236	70	0.962	2.5	2.5	2.5	0.199
131553616	236	70	0.962	2.5	2.5	2.5	0.199
131553617	236	70	0.962	2.5	2.5	2.5	0.199
131553618	236	70	0.962	2.5	2.5	2.5	0.199
131553619	236	70	0.962	2.5	2.5	2.5	0.199
131553620	236	70	0.962	2.5	2.5	2.5	0.199
131553621	236	70	0.962	2.5	2.5	2.5	0.199
131553622	236	70	0.962	2.5	2.5	2.5	0.199
131553623	236	70	0.962	2.5	2.5	2.5	0.199
131553624	236	70	0.962	2.5	2.5	2.5	0.199
131553625	236	70	0.962	2.5	2.5	2.5	0.199
131553626	236	70	0.962	2.5	2.5	2.5	0.199
131553627	236	77	0.953	2.3	2.2	2.4	0.198
131553628	236	77	0.953	2.3	2.2	2.4	0.198
131553629	236	77	0.953	2.3	2.2	2.4	0.198
131553630	236	77	0.953	2.3	2.2	2.4	0.198
131553631	236	77	0.953	2.3	2.2	2.4	0.198
131553632	236	77	0.953	2.3	2.2	2.4	0.198
131553633	236	77	0.953	2.3	2.2	2.4	0.198
131553634	236	77	0.953	2.3	2.2	2.4	0.198
131553635	236	77	0.953	2.3	2.2	2.4	0.198
131553636	236	77	0.953	2.3	2.2	2.4	0.198
131553637	236	77	0.953	2.3	2.2	2.4	0.198
131553638	236	77	0.953	2.3	2.2	2.4	0.198
131553639	236	77	0.953	2.3	2.2	2.4	0.198
131553640	236	77	0.953	2.3	2.2	2.4	0.198
131553641	236	77	0.953	2.3	2.2	2.4	0.198
131553642	236	77	0.953	2.3	2.2	2.4	0.198
131553643	234	71	0.951	2.5	1.5	1.7	0.190

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Oct/3/2018

Sales Order No.	***Customer Name***	***Project Location***	***Product Name***	***BOL Number***
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	FS2-225E-10-10-E-00	

Roll Number	Geonet Thickness ASTM D5199 (mils)	Tensile Strength ASTM D7179 (ppi)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Ply Adhesion Average ASTM D7005 (ppi) Side A	Ply Adhesion Average ASTM D7005 (ppi) Side B	Geonet Mass per Unit Area ASTM D5261 (lbs/ft²)
131553644	234	71	0.951	2.5	1.5	1.7	0.190
131553645	234	71	0.951	2.5	1.5	1.7	0.190
131553646	234	71	0.951	2.5	1.5	1.7	0.190
131553647	234	71	0.951	2.5	1.5	1.7	0.190
131553650	234	71	0.951	2.5	1.5	1.7	0.190
131553651	234	71	0.951	2.5	1.5	1.7	0.190
131553652	234	71	0.951	2.5	1.5	1.7	0.190
131553653	234	71	0.951	2.5	1.5	1.7	0.190
131553654	234	71	0.951	2.5	1.5	1.7	0.190
131553655	234	71	0.951	2.5	1.5	1.7	0.190
131553656	234	71	0.951	2.5	1.5	1.7	0.190
131553657	234	71	0.951	2.5	1.5	1.7	0.190
131553658	234	71	0.951	2.5	1.5	1.7	0.190
131553659	234	71	0.951	2.5	1.5	1.7	0.190
131553660	234	71	0.951	2.5	1.5	1.7	0.190
131553661	237	72	0.955	2.3	2.2	2.2	0.193
131553662	237	72	0.955	2.3	2.2	2.2	0.193
131553663	237	72	0.955	2.3	2.2	2.2	0.193
131553664	237	72	0.955	2.3	2.2	2.2	0.193
131553665	237	72	0.955	2.3	2.2	2.2	0.193
131553666	237	72	0.955	2.3	2.2	2.2	0.193
131553667	237	72	0.955	2.3	2.2	2.2	0.193
131553668	237	72	0.955	2.3	2.2	2.2	0.193
131553669	237	72	0.955	2.3	2.2	2.2	0.193
131553670	237	72	0.955	2.3	2.2	2.2	0.193
131553671	237	72	0.955	2.3	2.2	2.2	0.193
131553672	237	72	0.955	2.3	2.2	2.2	0.193
131553673	237	72	0.955	2.3	2.2	2.2	0.193
131553674	237	72	0.955	2.3	2.2	2.2	0.193
131553675	237	72	0.955	2.3	2.2	2.2	0.193

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Oct/3/2018

Sales Order No.	***Customer Name***	***Project Location***	***Product Name***	***BOL Number***
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	FS2-225E-10-10-E-00	

Roll Number	Geonet Thickness ASTM D5199 (mils)	Tensile Strength ASTM D7179 (ppi)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Ply Adhesion Average ASTM D7005 (ppi) Side A	Ply Adhesion Average ASTM D7005 (ppi) Side B	Geonet Mass per Unit Area ASTM D5261 (lbs/ft²)
131553676	237	72	0.955	2.3	2.2	2.2	0.193

Laboratory Manager _____

SECONDARY

GSE Lining Technology, LLC.

ROLL TEST DATA REPORT

Report Date: Oct/03/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	FBR-100E-EBC-E-00	

GSE QC APPROVED

ROLL #	ASTM D4751 A0S (mm)	Mass per Unit Area ASTM D5261 (oz/yd²)	ASTM D4632 Elongation @ Break (%) MD	ASTM D4632 Grab Strength (lbs) MD	ASTM D4533 Trapezoidoal Tear (lbs) MD	ASTM D4491 Permittivity (sec-1)	ASTM D4833 Puncture Resistance (lbs)	Water Flow D4491 gpm/ft2	ASTM D4632 Elongation @ Break (%) TD	ASTM D4632 Grab Strength (lbs) TD	ASTM D4533 Trapezoidoal Tear (lbs) TD
2025703094	0.125	11.3	78	396	140	1.45	216	107	95	434	155
2025703096	0.125	11.3	78	396	140	1.45	216	107	95	434	155
2025703099	0.125	12.6	79	447	153	1.38	240	102	91	488	167
2025703100	0.125	12.6	79	447	153	1.38	240	102	91	488	167
2025703104	0.150	11.3	76	360	132	1.70	222	125	90	459	161
2025703105	0.150	11.3	76	360	132	1.70	222	125	90	459	161
2025703107	0.150	11.3	76	360	132	1.70	222	125	90	459	161
2025703110	0.150	11.0	83	373	127	1.73	189	127	93	431	152
2025703115	0.150	11.0	83	373	127	1.73	189	127	93	431	152
2025703116	0.150	10.3	77	373	155	1.71	196	126	88	399	177
2025703123	0.150	10.6	73	352	148	1.65	196	122	88	439	185
2025703124	0.150	10.6	73	352	148	1.65	196	122	88	439	185
2025703126	0.150	10.6	73	352	148	1.65	196	122	88	439	185
2025703129	0.125	11.8	77	373	129	1.26	210	93	86	450	153
2025703130	0.125	11.8	77	373	129	1.26	210	93	86	450	153
2025703132	0.125	11.8	77	373	129	1.26	210	93	86	450	153
2025703134	0.125	10.6	78	372	123	1.33	213	98	86	470	159
2025703135	0.125	10.6	78	372	123	1.33	213	98	86	470	159
2025703136	0.125	10.6	78	372	123	1.33	213	98	86	470	159
2025703137	0.125	10.6	78	372	123	1.33	213	98	86	470	159
2025703138	0.125	10.6	78	372	123	1.33	213	98	86	470	159
2025703141	0.125	10.3	78	348	126	1.30	187	96	88	395	147
2025703151	0.150	11.5	91	417	118	1.28	189	94	94	460	160
2025703153	0.125	10.1	86	375	130	1.46	185	108	94	394	199
2025703157	0.125	10.1	86	375	130	1.46	185	108	94	394	199
2025703161	0.150	10.7	81	375	138	1.35	186	100	94	424	168
2025703162	0.150	10.7	81	375	138	1.35	186	100	94	424	168
2025703169	0.125	10.9	83	347	134	1.38	182	102	96	441	146
2025703171	0.125	12.1	85	415	139	1.28	231	95	92	492	158
2025703174	0.125	12.1	85	415	139	1.28	231	95	92	492	158

Laboratory Supervisor: Thomas Harrelson

GSE Lining Technology, LLC.

SECONDARY

ROLL TEST DATA REPORT

Report Date: Oct/03/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	FBR-100E-EBC-E-00	

GSE QC APPROVED

ROLL #	ASTM D4751 A0S (mm)	Mass per Unit Area ASTM D5261 (oz/yd²)	ASTM D4632 Elongation @ Break (%) MD	ASTM D4632 Grab Strength (lbs) MD	ASTM D4533 Trapezoidoal Tear (lbs) MD	ASTM D4491 Permittivity (sec-1)	ASTM D4833 Puncture Resistance (lbs)	Water Flow D4491 gpm/ft2	ASTM D4632 Elongation @ Break (%) TD	ASTM D4632 Grab Strength (lbs) TD	ASTM D4533 Trapezoidoal Tear (lbs) TD
2025703175	0.125	12.1	85	415	139	1.28	231	95	92	492	158
2025703176	0.125	11.4	82	389	127	1.31	200	97	95	463	157

Laboratory Supervisor: Thomas Harrelson

Equistar Chemicals, LP
One Houston Center
1221 McKinney
Houston TX 77010

Certificate Of Analysis

Certificate of Analysis Contact:

Ship-To Address:
GSE ENVIRONMENTAL LLC
1245 EASTLAND AVE
KINGSTREE SC 29556
UNITED STATES

Product Name	: PETROTHENE LR732001	**Customer Order No.**	: 03-513370
Batch Number	: CB118H0203	**Customer Number**	: 151477
Vehicle Number	: CITX200390	**Date Shipped**	: August 08, 2018
Estimated Quantity	: 214,550 LBS	**Equistar Order No.**	: 5181425 000010
Material Number	: 16838	**Delivery Item No.**	: 8101135739 000010

Test Description	Test Result	Unit of Measure	
Vehicle ID	CITX200390		
Vehicle Type	HOPPER CAR H		
Density, Extrudate @ 23C	0.9533	g/cm3	STM 011
Melt Index, 2160g @ 190C	0.34	g/10 min.	STM 002

Delivery Number:

Cust/PO Number:

Print Date: August 08, 2018 BSSIMMO1

Data reported was generated in an approved Quality Assurance Lab.

This information is available 24 hours a day at https://lyb.customerxpress.com/
Questions ? Call Customer Service: 888-777-0232

Equistar Chemicals, LP
One Houston Center
1221 McKinney
Houston TX 77010

Certificate Of Analysis

Certificate of Analysis Contact:

Ship-To Address:
GSE ENVIRONMENTAL LLC
1245 EASTLAND AVE
KINGSTREE SC 29556
UNITED STATES

Product Name	: PETROTHENE LR732001	**Customer Order No.**	: 03-513370
Batch Number	: CB118H2701	**Customer Number**	: 151477
Vehicle Number	: CITX200367	**Date Shipped**	: August 28, 2018
Estimated Quantity	: 214,000 LBS	**Equistar Order No.**	: 5216507 000010
Material Number	: 16838	**Delivery Item No.**	: 8101185260 000010

Test Description	Test Result	Unit of Measure	
Vehicle ID	CITX200367		
Vehicle Type	HOPPER CAR H		
Density, Extrudate @ 23C	0.9521	g/cm3	STM 011
Melt Index, 2160g @ 190C	0.28	g/10 min.	STM 002

Delivery Number:

Cust/PO Number:

Print Date: August 29, 2018 BSSIMMO1

Data reported was generated in an approved Quality Assurance Lab.

This information is available 24 hours a day at https://lyb.customerxpress.com/
Questions ? Call Customer Service: 888-777-0232

SECONDARY

Report Date
10/3/2018

Quality Assurance Laboratory Test Results

Job Name: SWLS/Sundance West Phase 2 Landfill Cell 1A
Sales Order: 85199

Required Testing: ASTM D 1238, 190 / 2.16 -- Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer

Frequency: 1/50,000 sf

Specification: ≤ 1.0 g/10 minutes

Product Code	Roll Number	Result
FS2-225E-10-10-E-00	131553610	0.31
FS2-225E-10-10-E-00	131553626	0.31
FS2-225E-10-10-E-00	131553642	0.32
FS2-225E-10-10-E-00	131553660	0.35
FS2-225E-10-10-E-00	131553667	0.35

Approved by: Barbara McCrea
Date: October 3, 2018

1245 Eastland Avenue
Kingstree, SC 29556
Phone 843-382-4603
Fax 843-382-4604

Date: October 3, 2018

Project: # 85199

Ref: Ultraviolet (UV) Resistance

To Whom It May Concern:

The resistance of nonwoven needle punched geotextiles to ultraviolet light depends primarily on antioxident and carbon black package mixed with resin to prepare a formulation for fiber extrusion. As long as this formulation remains the same the UV resistance of a geotextiles does not change. Therefore, UV testing is performed only once per resin formulation, according to ASTM Test Method D4355 and results are included on GSE geotextile specification sheet. Currently, all GSE geotextiles meet or exceed a value of 70% strength retained after 500 hours of UV exposure. GSE will meet or exceed this value for the referenced project.

Although GSE geotextiles are manufactured using one of the best available antioxident packages, we recommend covering the geotextiles within 30 days of exposure to direct Sunlight. This period does not include time during which geotextiles rolls remain on site covered in black shrink-wrap. Our recommendation is based on UV performance data published in technical literature indicating geotextile strength can decrease sharply after prolonged exposure to Sunlight.

Mauricio Ossa

Mauricio Ossa
Director of Global Quality

SECONDARY

GSE ENVIRONMENTAL™ GSE Environmental, LLC.

Transmissivity Report

ASTM D4716

Roll No. 131553610

ROLL IDENTIFICATION		CUSTOMER INFORMATION	
Roll Number	131553610	**Order Number**	85199
Product Name	FS2-225E-10-10-E-00	**Customer Name**	Southwest Liner Systems, Inc.
Production Date	9/28/2018	**Project Name**	SWLS/Sundance West Phase 2, Landfill Cell 1A
		Location	Eunice NM

Pressure (psf)	Gradient	Net/Composite	Transmissivity Results (m^2/sec)	(gal/min/ft)	Seat Time (min)	Boundary
10,000	0.10	Composite	1.18E-03	5.70	15	SS Plates
10,000	0.10	Net	5.17E-03	24.98	15	SS Plates

GSE QC APPROVED

GSE Roll Allocation

SECONDARY

Order SO-085199

Customer Southwest Liner Systems, Inc.
Project Name Sundance West Phase 2, Landfill Cell 1A

TRI/AUSTIN
1/100,000 sf, min 1/lot
Geonet: 1 ft x 1 ft coupons
Geotextile: 3 ft x RW
Finished Geocomposite 2 ft x 2 ft
Total sf on job 195,000 sf

Roll#	Resin Lot	Product Code	Mfg Date	Length	Pick up
131553610	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	10/3
131553611	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553612	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553613	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553614	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553615	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553616	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553617	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553618	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553619	CB118H0203	FS2-225E-10-10-E-00	9/28/2018	200	
131553620	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553621	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553622	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553623	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553624	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553625	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553626	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553627	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553628	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553629	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553630	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553631	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553632	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553633	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553634	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553635	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553636	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553637	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553638	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553639	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553640	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553641	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553642	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	10/3
131553643	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553644	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553645	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553646	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553647	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553650	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553651	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553652	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553653	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553654	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553655	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553656	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553657	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553658	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553659	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553660	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553661	CB118H0203	FS2-225E-10-10-E-00	9/29/2018	200	
131553662	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553663	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553664	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553665	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553666	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553667	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553668	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553669	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553670	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553671	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553672	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553673	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553674	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553675	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	
131553676	CB118H2701	FS2-225E-10-10-E-00	9/29/2018	200	10/3

Roll Allocation List

Sales Order SO-085199
Customer Name Southwest Liner Systems, Inc.
Project Name SWLS/Sundance West Phase 2, Landfill Cell 1A

Serial number	Item Number	Resin Lot	Bottom	Manufacturing date	Length
131553677	FS1-200E-10-00-FA-00	CB118H2701	2025703176	9/29/2018	288.00
131553678	FS1-200E-10-00-FA-00	CB118H2701	2025703172	9/29/2018	288.00
131553679	FS1-200E-10-00-FA-00	CB118H2701	2025703172	9/29/2018	288.00
131553680	FS1-200E-10-00-FA-00	CB118H2701	2025703172	9/29/2018	288.00
131553681	FS1-200E-10-00-FA-00	CB118H2701	2025703090	9/29/2018	288.00
131553682	FS1-200E-10-00-FA-00	CB118H2701	2025703090	9/29/2018	288.00
131553683	FS1-200E-10-00-FA-00	CB118H2701	2025703090	9/29/2018	288.00
131553684	FS1-200E-10-00-FA-00	CB118H2701	2025703165	9/29/2018	288.00
131553685	FS1-200E-10-00-FA-00	CB118H2701	2025703165	9/29/2018	288.00
131553686	FS1-200E-10-00-FA-00	CB118H2701	2025703165	9/29/2018	288.00
131553687	FS1-200E-10-00-FA-00	CB118H2701	2025703133	9/29/2018	200.00
131553688	FS1-200E-10-00-FA-00	CB118H2701	2025703133	9/29/2018	288.00
131553689	FS1-200E-10-00-FA-00	CB118H2701	2025703133	9/29/2018	288.00
131553690	FS1-200E-10-00-FA-00	CB118H2701	2025703166	9/29/2018	288.00
131553691	FS1-200E-10-00-FA-00	CB118H2701	2025703166	9/29/2018	288.00
131553692	FS1-200E-10-00-FA-00	CB118H2701	2025703160	9/29/2018	288.00
131553693	FS1-200E-10-00-FA-00	CB118H2701	2025703160	9/29/2018	288.00
131553694	FS1-200E-10-00-FA-00	CB118H2701	2025703160	9/29/2018	288.00
131553695	FS1-200E-10-00-FA-00	CB118H2701	2025703156	9/29/2018	288.00
131553696	FS1-200E-10-00-FA-00	CB118H2701	2025703156	9/29/2018	288.00
131553697	FS1-200E-10-00-FA-00	CB118H2701	2025703156	9/29/2018	288.00
131553698	FS1-200E-10-00-FA-00	CB118H2701	2025703127	9/29/2018	288.00
131553699	FS1-200E-10-00-FA-00	CB118H2701	2025703127	9/29/2018	288.00
131553700	FS1-200E-10-00-FA-00	CB118H2701	2025703127	9/29/2018	288.00
131553701	FS1-200E-10-00-FA-00	CB118H2701	2025703177	9/29/2018	288.00
131553702	FS1-200E-10-00-FA-00	CB118H2701	2025703177	9/29/2018	288.00
131553703	FS1-200E-10-00-FA-00	CB118H2701	2025703177	9/29/2018	288.00
131553704	FS1-200E-10-00-FA-00	CB118H2701	2025703122	9/29/2018	288.00
131553705	FS1-200E-10-00-FA-00	CB118H2701	2025703122	9/29/2018	288.00
131553706	FS1-200E-10-00-FA-00	CB118H2701	2025703122	9/30/2018	288.00
131553707	FS1-200E-10-00-FA-00	CB118H2701	2025703170	9/30/2018	288.00
131553708	FS1-200E-10-00-FA-00	CB118H2701	2025703170	9/30/2018	288.00
131553709	FS1-200E-10-00-FA-00	CB118H2701	2025703170	9/30/2018	288.00
131553710	FS1-200E-10-00-FA-00	CB118H2701	2025703164	9/30/2018	288.00
131553711	FS1-200E-10-00-FA-00	CB118H2701	2025703164	9/30/2018	288.00
131553712	FS1-200E-10-00-FA-00	CB118H2701	2025703164	9/30/2018	288.00
131553713	FS1-200E-10-00-FA-00	CB118H2701	2025703180	9/30/2018	288.00
131553714	FS1-200E-10-00-FA-00	CB118H2701	2025703180	9/30/2018	288.00
131553715	FS1-200E-10-00-FA-00	CB118H2701	2025703180	9/30/2018	288.00
131553716	FS1-200E-10-00-FA-00	CB118H2701	2025703178	9/30/2018	288.00
131553717	FS1-200E-10-00-FA-00	CB118H2701	2025703178	9/30/2018	288.00
131553718	FS1-200E-10-00-FA-00	CB118H2701	2025703181	9/30/2018	288.00
131553719	FS1-200E-10-00-FA-00	CB118H2701	2025703181	9/30/2018	288.00
131553720	FS1-200E-10-00-FA-00	CB118H2701	2025703181	9/30/2018	288.00
131553721	FS1-200E-10-00-FA-00	CB118H2701	2025703118	9/30/2018	288.00
131553722	FS1-200E-10-00-FA-00	CB118H2701	2025703118	9/30/2018	288.00
131553723	FS1-200E-10-00-FA-00	CB118H2701	2025703118	9/30/2018	288.00
131553724	FS1-200E-10-00-FA-00	CB118H2701	2025703117	9/30/2018	288.00
131553725	FS1-200E-10-00-FA-00	CB118H2701	2025703117	9/30/2018	288.00
131553726	FS1-200E-10-00-FA-00	CB118H2701	2025703117	9/30/2018	288.00
131553727	FS1-200E-10-00-FA-00	CB118H2701	2025703155	9/30/2018	288.00
131553728	FS1-200E-10-00-FA-00	CB118H2701	2025703155	9/30/2018	288.00
131553729	FS1-200E-10-00-FA-00	CB118H2701	2025703155	9/30/2018	288.00
131553730	FS1-200E-10-00-FA-00	CB118H2701	2025703159	9/30/2018	288.00
131553731	FS1-200E-10-00-FA-00	CB118H2701	2025703159	9/30/2018	288.00
131553732	FS1-200E-10-00-FA-00	CB118H2701	2025703159	9/30/2018	288.00
131553733	FS1-200E-10-00-FA-00	CB118H2701	2025703167	9/30/2018	288.00
131553734	FS1-200E-10-00-FA-00	CB118H2701	2025703167	9/30/2018	288.00
131553735	FS1-200E-10-00-FA-00	CB118H2701	2025703167	9/30/2018	288.00
131553736	FS1-200E-10-00-FA-00	CB118H2701	2025703111	9/30/2018	288.00
131553737	FS1-200E-10-00-FA-00	CB118H2701	2025703111	9/30/2018	288.00
131553738	FS1-200E-10-00-FA-00	CB118H2701	2025703111	9/30/2018	288.00
131553739	FS1-200E-10-00-FA-00	CB118H2701	2025703168	9/30/2018	288.00
131553740	FS1-200E-10-00-FA-00	CB118H2701	2025703168	9/30/2018	288.00

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Oct/2/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	FS1-200E-10-00-FA-00	

Roll Number	Geonet Thickness ASTM D5199 (mils)	Tensile Strength ASTM D7179 (ppi)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Ply Adhesion Average ASTM D7005 (ppi) Side A	Geonet Mass per Unit Area ASTM D5261 (lbs/ft²)
131553677	222	56	0.952	2.5	2.3	0.163
131553678	218	59	0.958	2.5	2.8	0.164
131553679	218	59	0.958	2.5	2.8	0.164
131553680	218	59	0.958	2.5	2.8	0.164
131553681	218	59	0.958	2.5	2.8	0.164
131553682	218	59	0.958	2.5	2.8	0.164
131553683	218	59	0.958	2.5	2.8	0.164
131553684	218	59	0.958	2.5	2.8	0.164
131553685	218	59	0.958	2.5	2.8	0.164
131553686	218	59	0.958	2.5	2.8	0.164
131553687	218	59	0.958	2.5	2.8	0.164
131553688	218	59	0.958	2.5	2.8	0.164
131553689	219	61	0.965	2.6	2.9	0.166
131553690	219	61	0.965	2.6	2.9	0.166
131553691	219	61	0.965	2.6	2.9	0.166
131553692	219	61	0.965	2.6	2.9	0.166
131553693	219	61	0.965	2.6	2.9	0.166
131553694	219	61	0.965	2.6	2.9	0.166
131553695	219	61	0.965	2.6	2.9	0.166
131553696	219	61	0.965	2.6	2.9	0.166
131553697	219	61	0.965	2.6	2.9	0.166
131553698	219	61	0.965	2.6	2.9	0.166
131553699	219	61	0.965	2.6	2.9	0.166
131553700	218	62	0.966	2.5	1.6	0.170
131553701	218	62	0.966	2.5	1.6	0.170
131553702	218	62	0.966	2.5	1.6	0.170
131553703	218	62	0.966	2.5	1.6	0.170
131553704	218	62	0.966	2.5	1.6	0.170
131553705	218	62	0.966	2.5	1.6	0.170
131553706	218	62	0.966	2.5	1.6	0.170
131553707	218	62	0.966	2.5	1.6	0.170
131553708	218	62	0.966	2.5	1.6	0.170
131553709	218	62	0.966	2.5	1.6	0.170
131553710	218	62	0.966	2.5	1.6	0.170

GSE Environmental, LLC

ROLL TEST DATA REPORT

GSE QC APPROVED

Report Date: Oct/2/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	FS1-200E-10-00-FA-00	

Roll Number	Geonet Thickness ASTM D5199 (mils)	Tensile Strength ASTM D7179 (ppi)	Density ASTM D1505 (g/cc)	Carbon Black Content ASTM D4218 (%)	Ply Adhesion Average ASTM D7005 (ppi) Side A	Geonet Mass per Unit Area ASTM D5261 (lbs/ft²)
131553711	218	62	0.966	2.5	2.6	0.170
131553712	217	62	0.963	2.3	2.6	0.160
131553713	217	62	0.963	2.3	2.6	0.160
131553714	217	62	0.963	2.3	2.6	0.160
131553715	217	62	0.963	2.3	2.6	0.160
131553716	217	62	0.963	2.3	2.6	0.160
131553717	217	62	0.963	2.3	2.6	0.160
131553718	217	62	0.963	2.3	2.6	0.160
131553719	217	62	0.963	2.3	2.6	0.160
131553720	217	62	0.963	2.3	2.6	0.160
131553721	217	62	0.963	2.3	2.6	0.160
131553722	217	62	0.963	2.3	2.6	0.160
131553723	220	59	0.963	2.6	2.6	0.168
131553724	220	59	0.963	2.6	2.6	0.168
131553725	220	59	0.963	2.6	2.6	0.168
131553726	220	59	0.963	2.6	2.6	0.168
131553727	220	59	0.963	2.6	2.6	0.168
131553728	220	59	0.963	2.6	2.6	0.168
131553729	220	59	0.963	2.6	2.6	0.168
131553730	220	59	0.963	2.6	2.6	0.168
131553731	220	59	0.963	2.6	2.6	0.168
131553732	220	59	0.963	2.6	2.6	0.168
131553733	228	64	0.955	2.5	3.0	0.176
131553734	228	64	0.955	2.5	3.0	0.176
131553735	228	64	0.955	2.5	3.0	0.176
131553736	228	64	0.955	2.5	3.0	0.176
131553737	228	64	0.955	2.5	3.0	0.176
131553738	228	64	0.955	2.5	3.0	0.176
131553739	228	64	0.955	2.5	3.0	0.176
131553740	228	64	0.955	2.5	3.0	0.176

Laboratory Manager _____

GSE Lining Technology, LLC.

ROLL TEST DATA REPORT

Report Date: Oct/02/2018

Sales Order No.	Customer Name	Project Location	Product Name	BOL Number
SO-085199	Southwest Liner Systems, Inc.	Eunice NM US	FBR-100E-EBC-E-005	

GSE QC APPROVED

ROLL #	ASTM D4751 A0S (mm)	Mass per Unit Area ASTM D5261 (oz/yd²)	ASTM D4632 Elongation @ Break (%) MD	ASTM D4632 Grab Strength (lbs) MD	ASTM D4533 Trapezoidoal Tear (lbs) MD	ASTM D4491 Permittivity (sec-1)	ASTM D4833 Puncture Resistance (lbs)	Water Flow D4491 gpm/ft2	ASTM D4632 Elongation @ Break (%) TD	ASTM D4632 Grab Strength (lbs) TD	ASTM D4533 Trapezoidoal Tear (lbs) TD
2025703090	0.125	12.3	78	448	151	1.44	235	106	94	467	176
2025703111	0.150	11.0	83	373	127	1.73	189	127	93	431	152
2025703117	0.150	10.3	77	373	155	1.71	196	126	88	399	177
2025703118	0.150	10.3	77	373	155	1.71	196	126	88	399	177
2025703122	0.150	10.6	73	352	148	1.65	196	122	88	439	185
2025703127	0.150	10.6	73	352	148	1.65	196	122	88	439	185
2025703133	0.125	11.8	77	373	129	1.26	210	93	86	450	153
2025703155	0.125	10.1	86	375	130	1.46	185	108	94	394	199
2025703156	0.125	10.1	86	375	130	1.46	185	108	94	394	199
2025703159	0.150	10.7	81	375	138	1.35	186	100	94	424	168
2025703160	0.150	10.7	81	375	138	1.35	186	100	94	424	168
2025703164	0.125	10.9	83	347	134	1.38	182	102	96	441	146
2025703165	0.125	10.9	83	347	134	1.38	182	102	96	441	146
2025703166	0.125	10.9	83	347	134	1.38	182	102	96	441	146
2025703167	0.125	10.9	83	347	134	1.38	182	102	96	441	146
2025703168	0.125	10.9	83	347	134	1.38	182	102	96	441	146
2025703170	0.125	12.1	85	415	139	1.28	231	95	92	492	158
2025703172	0.125	12.1	85	415	139	1.28	231	95	92	492	158
2025703176	0.125	11.4	82	389	127	1.31	200	97	95	463	157
2025703177	0.125	11.4	82	389	127	1.31	200	97	95	463	157
2025703178	0.125	11.4	82	389	127	1.31	200	97	95	463	157
2025703180	0.125	11.4	82	389	127	1.31	200	97	95	463	157
2025703181	0.125	11.4	82	389	127	1.31	200	97	95	463	157

Laboratory Supervisor: Thomas Harrelson

Equistar Chemicals, LP
One Houston Center
1221 McKinney
Houston TX 77010

Certificate Of Analysis

Certificate of Analysis Contact:

Ship-To Address:
GSE ENVIRONMENTAL LLC
1245 EASTLAND AVE
KINGSTREE SC 29556
UNITED STATES

Product Name	: PETROTHENE LR732001	**Customer Order No.**	: 03-513370
Batch Number	: CB118H2701	**Customer Number**	: 151477
Vehicle Number	: CITX200367	**Date Shipped**	: August 28, 2018
Estimated Quantity	: 214,000 LBS	**Equistar Order No.**	: 5216507 000010
Material Number	: 16838	**Delivery Item No.**	: 8101185260 000010

Test Description	Test Result	Unit of Measure	
Vehicle ID	CITX200367		
Vehicle Type	HOPPER CAR H		
Density, Extrudate @ 23C	0.9521	g/cm3	STM 011
Melt Index, 2160g @ 190C	0.28	g/10 min.	STM 002

Delivery Number:

Cust/PO Number:

Print Date: August 29, 2018 BSSIMMO1

Data reported was generated in an approved Quality Assurance Lab.

This information is available 24 hours a day at https://lyb.customerxpress.com/
Questions ? Call Customer Service: 888-777-0232

Report Date
10/2/2018

Quality Assurance Laboratory Test Results

Job Name: SWLS/Sundance West Phase 2 Landfill Cell 1A
Sales Order: 85199

Required Testing: ASTM D 1238, 190 / 2.16 -- Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer

Frequency: 1/50,000 sf

Specification: ≤ 1.0 g/10 minutes

Product Code	Roll Number	Result
FS1-200E-10-00-FA-00	131553677	0.30
FS1-200E-10-00-FA-00	131553688	0.26
FS1-200E-10-00-FA-00	131553699	0.31
FS1-200E-10-00-FA-00	131553710	0.37
FS1-200E-10-00-FA-00	131553721	0.28
FS1-200E-10-00-FA-00	131553732	0.23

Approved by: Barbara McCrea
Date: October 2, 2018

1245 Eastland Avenue
Kingstree, SC 29556
Phone 843-382-4603
Fax 843-382-4604

Date: October 2, 2018

Project: # 85199

Ref: Ultraviolet (UV) Resistance

To Whom It May Concern:

The resistance of nonwoven needle punched geotextiles to ultraviolet light depends primarily on antioxident and carbon black package mixed with resin to prepare a formulation for fiber extrusion. As long as this formulation remains the same the UV resistance of a geotextiles does not change. Therefore, UV testing is performed only once per resin formulation, according to ASTM Test Method D4355 and results are included on GSE geotextile specification sheet. Currently, all GSE geotextiles meet or exceed a value of 70% strength retained after 500 hours of UV exposure. GSE will meet or exceed this value for the referenced project.

Although GSE geotextiles are manufactured using one of the best available antioxident packages, we recommend covering the geotextiles within 30 days of exposure to direct Sunlight. This period does not include time during which geotextiles rolls remain on site covered in black shrink-wrap. Our recommendation is based on UV performance data published in technical literature indicating geotextile strength can decrease sharply after prolonged exposure to Sunlight.

Mauricio Ossa

Mauricio Ossa
Director of Global Quality

GSE ENVIRONMENTAL™ GSE Environmental, LLC.

Transmissivity Report

ASTM D4716

Roll No. 131553677

ROLL IDENTIFICATION

Roll Number	131553677
Product Name	FS1-200E-10-00-FA-00
Production Date	9/29/2018

CUSTOMER INFORMATION

Order Number	85199
Customer Name	Southwest Liner Systems, Inc.
Project Name	SWLS/Sundance West Phase 2, Landfill Cell 1A
Location	Eunice NM

Pressure (psf)	Gradient	Net/Composite	Transmissivity Results (m^2/sec)	(gal/min/ft)	Seat Time (min)	Boundary
10,000	0.10	Composite	1.82E-03	8.79	15	SS Plates
10,000	0.10	Net	4.70E-03	22.71	15	SS Plates

GSE QC APPROVED

GSE Roll Allocation

Order SO-085199
Customer Southwest Liner Systems, Inc.
Project Name Sundance West Phase 2, Landfill Cell 1A

TRI/AUSTIN
1/100,000 sf, min 1/lot
Geonet: 1 ft x 1 ft coupons
Geotextile: 3 ft x RW
Finished Geocomposite 2 ft x 2 ft coupons
Total sf on job 271,872 sf

Roll#	Resin Lot	Product Code	Mfg Date	Length	Pick up
131553677	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	10/3
131553678	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553679	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553680	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553681	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553682	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553683	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553684	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553685	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553686	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553687	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	200	
131553688	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553689	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553690	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553691	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553692	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553693	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553694	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553695	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553696	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553697	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553698	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553699	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	10/3
131553700	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553701	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553702	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553703	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553704	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553705	CB118H2701	FS1-200E-10-00-FA-00	9/29/2018	288	
131553706	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553707	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553708	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553709	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553710	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553711	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553712	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553713	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553714	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553715	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553716	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553717	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553718	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553719	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553720	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553721	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	10/3
131553722	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553723	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553724	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553725	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553726	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553727	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553728	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553729	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553730	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553731	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553732	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553733	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553734	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553735	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553736	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553737	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553738	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553739	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	
131553740	CB118H2701	FS1-200E-10-00-FA-00	9/30/2018	288	

APPENDIX B

Material Manufacturer Certification and Conformance Testing Results

B.10. Geocomposite Conformance Testing Results

October 23, 2018

Mail To:

Mark Decarlo
Southwest Liner Systems
301 Calle Industrial
Bernalillo, NM 87004

email: swls.md@gmail.com

Bill To:

<= Same

Dear Mr. Decarlo:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**Sundance West Phase 2 Landfill - Cell 1A**
TRI Job Reference Number:	41755
Material(s) Tested:	Two, Solmax GSE FS2-225E-10-10-E-00 Double Sided Geocomposites
Test(s) Requested:	Transmissivity (ASTM D 4716) - GC Peel Strength (ASTM D 7005) - GC Density (ASTM D 1505) - GN Tensile Properties (ASTM D 7179, 12 ipm strain rate) - GN

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com

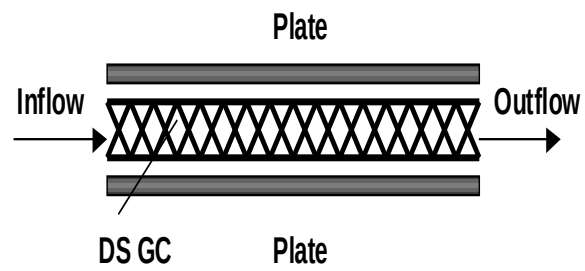
*Signature is on file

GEOCOMPOSITE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE FS2-225E-10-10-E-00 Double Sided Geocomposite
Sample Identification: 131553610
TRI Log #: 41755

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Hydraulic Transmissivity (ASTM D 4716)													
Direction Tested: Machine Direction													
Normal Load (psf):	10,000												
Hydraulic Gradient:	0.1												
Test Length (in)	12												
Test Width (in)	12												
Plate / Sample / Plate													
Seat Time (hours)	Specimen		1			2							
	Volume (cc)	539	536	545	510	509	507						
	Time (s)	50.34	50.37	50.62	50.46	50.46	50.50						
0.25	Flow Rate (GPM/ft width)	0.17	0.17	0.17	0.16	0.16	0.16				0.16	0.01	
	Transmissivity (m^2/s)	3.51E-04	3.49E-04	3.53E-04	3.31E-04	3.31E-04	3.29E-04				3.41E-04	1.14E-05	$1x10^{-4}$ min
	Test Temp (C)		20.2			20.2							
	Temp. Corr. Factor		0.999			0.999							
Peel Strength (ASTM D 7005)													
A - MD Average Peel Strength (ppi)	2.33	2.52	0.68	3.54	2.28						2.27	1.03	1.00 min
A - MD Average Peel Strength (g/in)	1058	1144	309	1607	1035						1031	466	
B - MD Average Peel Strength (ppi)	3.44	1.61	1.97	2.32	3.17						2.50	0.78	1.00 min
B - MD Average Peel Strength (g/in)	1562	731	894	1053	1439						1136	354	
Note: A and B represent a randomly assigned top and bottom of the sample													
Density (ASTM D 1505)					GEONET COMPONENT								
Density (g/cm3)	0.953	0.953	0.953								0.953	0.000	0.940 min
Tensile Properties (ASTM D 7179, 12 ipm strain rate)					GEONET COMPONENT								
MD Max. Strength (ppi)	69	73	79	66	78						73	6	45 min
MD Elong. @ Max. Strength (%)	24	23	21	28	23						24	2	

MD Machine Direction

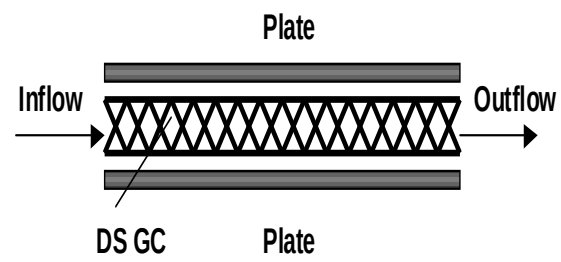


TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

GEOCOMPOSITE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE FS2-225E-10-10-E-00 Double Sided Geocomposite
Sample Identification: 131553642
TRI Log #: 41755

PARAMETER	TEST REPLICATE NUMBER										MEAN	STD. DEV.	PROJ. SPEC.
	1	2	3	4	5	6	7	8	9	10			
Hydraulic Transmissivity (ASTM D 4716)													
Direction Tested: Machine Direction													
Normal Load (psf): 10,000													
Hydraulic Gradient: 0.1													
Test Length (in) 12													
Test Width (in) 12													
Plate / Sample / Plate													
Seat Time (hours)	Specimen		1			2							
Volume (cc)		533	532	528	546	544	548						
Time (s)		50.56	50.40	50.37	50.46	50.48	50.48						
0.25 Flow Rate (GPM/ft width)		0.17	0.17	0.17	0.17	0.17	0.17				0.17	0.00	
0.25 Transmissivity (m^2/s)		3.47E-04	3.47E-04	3.44E-04	3.55E-04	3.54E-04	3.56E-04				3.51E-04	5.35E-06	$1x10^{-4}$ min
Test Temp (C)			20.1			20.1							
Temp. Corr. Factor			1.001			1.001							
Peel Strength (ASTM D 7005)													
A - MD Average Peel Strength (ppi)	2.31	3.72	2.53	2.22	3.67						2.89	0.74	1.00 min
A - MD Average Peel Strength (g/in)	1049	1689	1149	1008	1666						1312	338	
B - MD Average Peel Strength (ppi)	2.69	2.71	2.75	2.23	4.03						2.88	0.68	1.00 min
B - MD Average Peel Strength (g/in)	1221	1230	1249	1012	1830						1308	307	
Note: A and B represent a randomly assigned top and bottom of the sample													
Density (ASTM D 1505)					GEONET COMPONENT								
Density (g/cm3)	0.953	0.953	0.953								0.953	0.000	0.940 min
Tensile Properties (ASTM D 7179, 12 ipm strain rate)					GEONET COMPONENT								
MD Max. Strength (ppi)	73	75	79	77	66						74	5	45 min
MD Elong. @ Max. Strength (%)	25	21	21	21	26						23	2	



MD Machine Direction

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

November 6, 2018

Mail To:

Mark Decarlo
Southwest Liner Systems
301 Calle Industrial
Bernalillo, NM 87004

email: swls.md@gmail.com

Bill To:

<= Same (PO# SW1819)

Dear Mr. Decarlo:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**Sundance West Phase 2 Landfill - Cell 1A**
TRI Job Reference Number:	41758
Material(s) Tested:	Three, Solmax GSE FS1-200E-10-00-FA-00 Single Sided Geocomposite
Test(s) Requested:	Transmissivity (ASTM D 4716) - GC Peel Strength (ASTM D 7005) - GC Density (ASTM D 1505) - GN Tensile Properties (ASTM D 7179, 12 ipm strain rate) - GN

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Richard S. Lacey*, P.E.
Senior EngineerGeosynthetic Services Division
www.GeosyntheticTesting.com

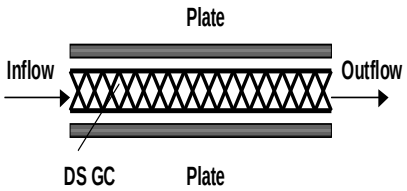
*Signature is on file

GEOCOMPOSITE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE FS1-200E-10-00-FA-00 Single Sided Geocomposite
Sample Identification: 131553677
TRI Log #: 41758

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Hydraulic Transmissivity (ASTM D 4716)													
Direction Tested: Machine Direction													
Normal Load (psf): 10,000													
Hydraulic Gradient: 0.1													
Test Length (in) 12													
Test Width (in) 12													
Plate / Sample / Plate													
Seat Time (hours)	Specimen		1			2							
Volume (cc)		705	703	698	715	713	715						
Time (s)		10.37	10.37	10.37	10.44	10.43	10.40						
0.25 Flow Rate (GPM/ft width)		1.07	1.07	1.06	1.10	1.09	1.10				1.08	0.02	
0.25 Transmissivity (m^2/s)		2.22E-03	2.22E-03	2.20E-03	2.27E-03	2.26E-03	2.28E-03				2.24E-03	3.24E-05	$1x10^{-4}$ min
Test Temp (C)			20.3			19.7							
Temp. Corr. Factor			0.997			1.011							
Peel Strength (ASTM D 7005)													
A - MD Average Peel Strength (ppi)	2.98	2.18	2.23	2.38	1.01						2.16	0.72	1.0 min
A - MD Average Peel Strength (g/in)	1353	990	1012	1081	459						979	325	
Note: A and B represent a randomly assigned top and bottom of the sample													
Thickness (ASTM D 5199)					GEONET COMPONENT								
Thickness (mils)	223	224	224	228	235	237	228	229	224	230	228.3	4.6	200 min
											223.2	<< min	
Tensile Properties (ASTM D 7179, 12 ipm strain rate)					GEONET COMPONENT								
MD Max. Strength (ppi)	61	67	69	69	57						65	5	45 min
MD Elong. @ Max. Strength (%)	31	30	31	31	35						32	2	

MD Machine Direction



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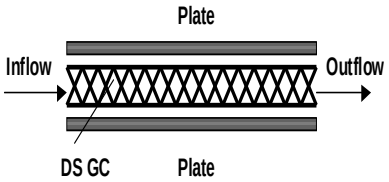
GEOCOMPOSITE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE FS1-200E-10-00-FA-00 Single Sided Geocomposite
Sample Identification: 131553699
TRI Log #: 41758

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Hydraulic Transmissivity (ASTM D 4716)													
Direction Tested: Machine Direction													
Normal Load (psf): 10,000													
Hydraulic Gradient: 0.1													
Test Length (in) 12													
Test Width (in) 12													
Plate / Sample / Plate													
Seat Time (hours)	Specimen		1			2							
Volume (cc)		624	632	631	694	695	689						
Time (s)		10.31	10.43	10.43	10.40	10.43	10.37						
0.25 Flow Rate (GPM/ft width)		0.97	0.97	0.97	1.07	1.07	1.07				1.02	0.05	
0.25 Transmissivity (m^2/s)		2.02E-03	2.02E-03	2.02E-03	2.22E-03	2.21E-03	2.21E-03				2.11E-03	1.08E-04	$1x10^{-4}$ min
Test Temp (C)			19.5			19.6							
Temp. Corr. Factor			1.015			1.013							
Peel Strength (ASTM D 7005)													
A - MD Average Peel Strength (ppi)	2.18	3.39	1.50	1.33	1.80						2.04	0.82	1.0 min
A - MD Average Peel Strength (g/in)	990	1539	681	604	817						926	373	
Note: A and B represent a randomly assigned top and bottom of the sample													
Thickness (ASTM D 5199)					GEONET COMPONENT								
Thickness (mils)	223	224	227	225	237	240	235	232	224	226	229.2	6.2	200 min
											222.5	<< min	
Tensile Properties (ASTM D 7179, 12 ipm strain rate)					GEONET COMPONENT								
MD Max. Strength (ppi)	59	64	72	56	60						62	6	45 min
MD Elong. @ Max. Strength (%)	31	30	30	37	38						33	4	



MD Machine Direction

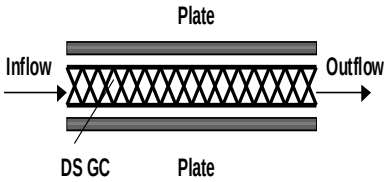
TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

GEOCOMPOSITE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE FS1-200E-10-00-FA-00 Single Sided Geocomposite
Sample Identification: 131553721
TRI Log #: 41758

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Hydraulic Transmissivity (ASTM D 4716)													
Direction Tested: Machine Direction													
Normal Load (psf): 10,000													
Hydraulic Gradient: 0.1													
Test Length (in) 12													
Test Width (in) 12													
Plate / Sample / Plate													
Seat Time (hours)	Specimen		1			2							
Volume (cc)		754	753	743	861	865	862						
Time (s)		10.46	10.46	10.37	10.37	10.40	10.40						
0.25 Flow Rate (GPM/ft width)		1.16	1.16	1.15	1.33	1.33	1.33				1.24	0.10	
0.25 Transmissivity (m^2/s)		2.40E-03	2.39E-03	2.38E-03	2.75E-03	2.76E-03	2.75E-03				2.57E-03	1.99E-04	$1x10^{-4}$ min
Test Temp (C)			19.6			19.7							
Temp. Corr. Factor			1.013			1.011							
Peel Strength (ASTM D 7005)													
A - MD Average Peel Strength (ppi)	3.64	3.73	1.03	1.58	2.24						2.44	1.21	1.0 min
A - MD Average Peel Strength (g/in)	1653	1693	468	717	1017						1110	550	
Note: A and B represent a randomly assigned top and bottom of the sample													
Thickness (ASTM D 5199)					GEONET COMPONENT								
Thickness (mils)	225	220	230	228	235	231	234	231	223	223	228.0	5.0	200 min
											219.8	<< min	
Tensile Properties (ASTM D 7179, 12 ipm strain rate)					GEONET COMPONENT								
MD Max. Strength (ppi)	60	64	65	70	58						63	5	45 min
MD Elong. @ Max. Strength (%)	31	32	37	29	38						33	4	

MD Machine Direction



TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

November 6, 2018

Mail To:

Mark Decarlo
Southwest Liner Systems
301 Calle Industrial
Bernalillo, NM 87004

email: swls.md@gmail.com

Bill To:

<= Same

Dear Mr. Decarlo:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**Sundance West Phase 2 Landfill - Cell 1A**
TRI Job Reference Number:	41835
Material(s) Tested:	One, Solmax GSE FS2-225E-10-10-E-00 Double Sided Geocomposites
Test(s) Requested:	Transmissivity (ASTM D 4716) - GC Peel Strength (ASTM D 7005) - GC Thickness (ASTM D 5199) - GN Tensile Properties (ASTM D 7179, 12 ipm strain rate) - GN

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

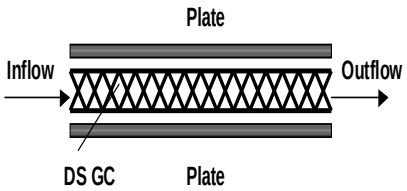
Richard S. Lacey*, P.E.
Senior EngineerGeosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file

GEOCOMPOSITE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE FS2-225E-10-10-E-00 Double Sided Geocomposite
Sample Identification: 131553676
TRI Log #: 41835

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Hydraulic Transmissivity (ASTM D 4716)													
Direction Tested: Machine Direction													
Normal Load (psf): 10,000													
Hydraulic Gradient: 0.1													
Test Length (in) 12													
Test Width (in) 12													
Plate / Sample / Plate													
Seat Time (hours)	Specimen		1			2							
Volume (cc)		597	598	591	649	647	641						
Time (s)		40.40	40.43	40.40	40.37	40.43	40.40						
0.25 Flow Rate (GPM/ft width)		0.24	0.24	0.24	0.26	0.26	0.26				0.25	0.01	
Transmissivity (m^2/s)		4.97E-04	4.97E-04	4.92E-04	5.40E-04	5.37E-04	5.33E-04				5.16E-04	2.29E-05	$1x10^{-4}$ min
Test Temp (C)			19.1			19.1							
Temp. Corr. Factor			1.024			1.024							
Peel Strength (ASTM D 7005)													
A - MD Average Peel Strength (ppi)	1.93	2.33	1.29	2.92	2.25						2.14	0.60	1.00 min
A - MD Average Peel Strength (g/in)	876	1058	586	1326	1022						973	271	
B - MD Average Peel Strength (ppi)	1.19	1.73	0.58	1.96	2.90						1.67	0.87	1.00 min
B - MD Average Peel Strength (g/in)	540	785	262	890	1317						759	395	
Note: A and B represent a randomly assigned top and bottom of the sample													
Thickness (ASTM D 5199)					GEONET COMPONENT								
Thickness (mils)	231	229	254	257	260	253	247	253	232	236	245	12	200 min
											229	<< min	
Tensile Properties (ASTM D 7179, 12 ipm strain rate)					GEONET COMPONENT								
MD Max. Strength (ppi)	71	66	77	70	88						74	9	45 min
MD Elong. @ Max. Strength (%)	29	32	33	29	31						31	2	



MD Machine Direction

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

January 7, 2019

Mail To:

Mark Decarlo
Southwest Liner Systems
301 Calle Industrial
Bernalillo, NM 87004

email: swls.md@gmail.com

Bill To:

<= Same (PO# SW1819)

Dear Mr. Decarlo:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the sample(s) listed below.

Project:	**Sundance West Phase 2 Landfill - Cell 1A**
TRI Job Reference Number:	43367
Material(s) Tested:	Three, Solmax GSE FS1-200E-10-00-FA-00 Single Sided Geocomposite
Test(s) Requested:	Transmissivity (ASTM D 4716) - GC Peel Strength (ASTM D 7005) - GC Density (ASTM D 1505) - GN Tensile Properties (ASTM D 7179, 12 ipm strain rate) - GN

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Mansukh Patel
Laboratory Manager
Geosynthetic Services Division
www.GeosyntheticTesting.com

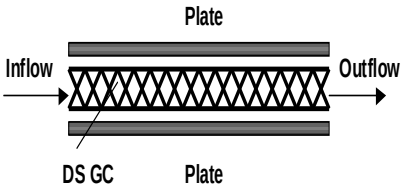
*Signature is on file

GEOCOMPOSITE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE FS1-200E-10-00-FA-00 Single Sided Geocomposite
Sample Identification: 131558754
TRI Log #: 43367

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Hydraulic Transmissivity (ASTM D 4716)													
Direction Tested: Machine Direction													
Normal Load (psf): 10,000													
Hydraulic Gradient: 0.1													
Test Length (in) 12													
Test Width (in) 12													
Plate / Sample / Plate													
Seat Time (hours)	Specimen		1			2							
Volume (cc)		509	508	506	782	781	780						
Time (s)		10.40	10.40	10.43	10.37	10.43	10.46						
0.25 Flow Rate (GPM/ft width)		0.78	0.78	0.78	1.20	1.19	1.19				0.99	0.23	
Transmissivity (m^2/s)		1.62E-03	1.62E-03	1.61E-03	2.49E-03	2.47E-03	2.46E-03				2.05E-03	4.70E-04	$1x10^{-4}$ min
Test Temp (C)			19.7			19.9							
Temp. Corr. Factor			1.011			1.006							
Peel Strength (ASTM D 7005)													
A - MD Average Peel Strength (ppi)	5.67	4.79	7.06	5.19	2.12						4.97	1.81	1.0 min
A - MD Average Peel Strength (g/in)	2574	2175	3205	2356	962						2255	820	
Note: A and B represent a randomly assigned top and bottom of the sample													
Density (ASTM D 1505)					GEONET COMPONENT								
Density (g/cm3)	0.954	0.954	0.954								0.954	0.000	
Tensile Properties (ASTM D 7179, 12 ipm strain rate)					GEONET COMPONENT								
MD Max. Strength (ppi)	58	63	73	84	85						72	12	45 min
MD Elong. @ Max. Strength (%)	33	32	28	27	29						30	3	

MD Machine Direction

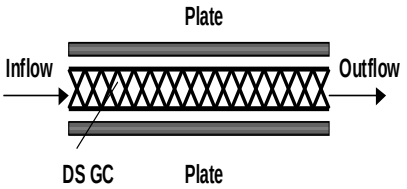


TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

GEOCOMPOSITE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE FS1-200E-10-00-FA-00 Single Sided Geocomposite
Sample Identification: 131558777
TRI Log #: 43367

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Hydraulic Transmissivity (ASTM D 4716)													
Direction Tested: Machine Direction													
Normal Load (psf): 10,000													
Hydraulic Gradient: 0.1													
Test Length (in) 12													
Test Width (in) 12													
Plate / Sample / Plate													
Seat Time (hours)	Specimen		1			2							
Volume (cc)		561	561	559	767	764	764						
Time (s)		10.53	10.50	10.53	10.46	10.40	10.40						
0.25 Flow Rate (GPM/ft width)		0.85	0.85	0.85	1.16	1.16	1.16				1.00	0.17	
Transmissivity (m^2/s)		1.76E-03	1.76E-03	1.75E-03	2.40E-03	2.40E-03	2.40E-03				2.08E-03	3.55E-04	$1x10^{-4}$ min
Test Temp (C)			20.0			20.3							
Temp. Corr. Factor			1.004			0.997							
Peel Strength (ASTM D 7005)													
A - MD Average Peel Strength (ppi)	3.06	5.01	2.42	1.10	3.69						3.06	1.45	1.0 min
A - MD Average Peel Strength (g/in)	1389	2275	1099	499	1675						1387	660	
Note: A and B represent a randomly assigned top and bottom of the sample													
Density (ASTM D 1505)					GEONET COMPONENT								
Density (g/cm3)	0.954	0.954	0.954								0.954	0.000	
Tensile Properties (ASTM D 7179, 12 ipm strain rate)					GEONET COMPONENT								
MD Max. Strength (ppi)	58	64	68	72	88						70	11	45 min
MD Elong. @ Max. Strength (%)	29	29	31	27	29						29	1	



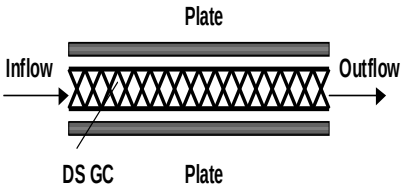
MD Machine Direction

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

GEOCOMPOSITE TEST RESULTS
TRI Client: Southwest Liner Systems
Project: Sundance West Phase 2 Landfill - Cell 1A

Material: Solmax GSE FS1-200E-10-00-FA-00 Single Sided Geocomposite
Sample Identification: 131558939
TRI Log #: 43367

PARAMETER	TEST REPLICATE NUMBER 1	2	3	4	5	6	7	8	9	10	MEAN	STD. DEV.	PROJ. SPEC.
Hydraulic Transmissivity (ASTM D 4716)													
Direction Tested: Machine Direction													
Normal Load (psf): 10,000													
Hydraulic Gradient: 0.1													
Test Length (in) 12													
Test Width (in) 12													
Plate / Sample / Plate													
Seat Time (hours)	Specimen		1			2							
	Volume (cc)	597	598	594	587	584	584						
	Time (s)	10.43	10.50	10.37	15.37	15.40	15.46						
0.25	Flow Rate (GPM/ft width)	0.90	0.90	0.90	0.60	0.60	0.59				0.75	0.17	
	Transmissivity (m^2/s)	1.87E-03	1.86E-03	1.87E-03	1.24E-03	1.23E-03	1.23E-03				1.55E-03	3.44E-04	$1x10^{-4}$ min
	Test Temp (C)		20.4			20.5							
	Temp. Corr. Factor		0.995			0.992							
Peel Strength (ASTM D 7005)													
A - MD Average Peel Strength (ppi)	3.95	5.39	3.48	1.67	4.72						3.84	1.42	1.0 min
A - MD Average Peel Strength (g/in)	1793	2447	1580	758	2143						1744	643	
Note: A and B represent a randomly assigned top and bottom of the sample													
Density (ASTM D 1505)					GEONET COMPONENT								
Density (g/cm3)	0.954	0.954	0.954								0.954	0.000	
Tensile Properties (ASTM D 7179, 12 ipm strain rate)					GEONET COMPONENT								
MD Max. Strength (ppi)	53	57	69	66	62						61	6	45 min
MD Elong. @ Max. Strength (%)	27	29	28	31	29						29	2	



MD Machine Direction

TRI Environmental | 9063 Bee Cave Rd., Austin, TX 78733, USA | 512-263-5944 | www.tri-env.com

APPENDIX C

Cell 1A Liner Installation Documentation

C.1. GCL Inventory Control Log

GORDON ENVIRONMENTAL PSC

333 Rio Rancho Blvd., Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

GCL INVENTORY CONTROL LOG

PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	1053018
CLIENT:	Sundance West, Inc.	**CONTRACTOR:**	SLS
PROJECT LOCATION:	Euncie, New Mexico	**SHEET NUMBER:**	1
MATERIAL TYPE:	GCL	**DATE OF INVENTORY:**	See Below
MATERIAL IDENTIFICATION:	GSE Bentoliner NSL	**INVENTORY MONITOR:**	Don Gray
MATERIAL MANUFACTURER:	GSE	**UNLOADING METHOD:**	Forklift

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	AREA (FT^2)			
1	502318847	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
2	502318848	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
3	502318849	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
4	502318850	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
5	502318851	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
6	502318852	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
7	502318853	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
8	502318855	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
9	502318856	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
10	502318857	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
11	502318858	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
12	502318859	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
13	502318860	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
14	502318861	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
15	502318862	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
16	502318863	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
17	502318864	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
18	502318865	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
19	502318884	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y	Y	11-16-2018
20	502318885	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
21	502318886	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
22	502318887	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
23	502318888	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
24	502318889	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
25	502318890	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y	Y	11-16-2018
26	502318911	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
27	502318912	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
28	502318913	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
29	502318914	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
30	502318915	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018

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GCL INVENTORY CONTROL LOG

PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	1053018
CLIENT:	Sundance West, Inc.	**CONTRACTOR:**	SLS
PROJECT LOCATION:	Euncie, New Mexico	**SHEET NUMBER:**	2
MATERIAL TYPE:	GCL	**DATE OF INVENTORY:**	See Below
MATERIAL IDENTIFICATION:	GSE Bentoliner NSL	**INVENTORY MONITOR:**	Don Gray
MATERIAL MANUFACTURER:	GSE	**UNLOADING METHOD:**	Forklift

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	AREA (FT^2)			
1	502318916	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
2	502318917	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
3	502318822	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
4	502318866	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
5	502318867	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
6	502318868	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
7	502318869	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
8	502318870	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
9	502318871	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
10	502318873	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
11	502318874	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
12	502318875	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
13	502318876	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
14	502318877	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
15	502318878	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
16	502318879	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
17	502318880	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
18	502318881	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
19	502318882	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y	Y	11-16-2018
20	502318883	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
21	502318891	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
22	502318892	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
23	502318893	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
24	502318894	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
25	502318895	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
26	502318896	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
27	502318897	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
28	502318898	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
29	502318934	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
30	502318935	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018

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GCL INVENTORY CONTROL LOG

PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	1053018
CLIENT:	Sundance West, Inc.	**CONTRACTOR:**	SLS
PROJECT LOCATION:	Euncie, New Mexico	**SHEET NUMBER:**	3
MATERIAL TYPE:	GCL	**DATE OF INVENTORY:**	See Below
MATERIAL IDENTIFICATION:	GSE Bentoliner NSL	**INVENTORY MONITOR:**	Don Gray
MATERIAL MANUFACTURER:	GSE	**UNLOADING METHOD:**	Forklift

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	AREA (FT^2)			
1	502318936	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
2	502318937	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
3	502318962	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
4	502318963	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
5	502318964	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
6	502318965	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
7	502318966	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
8	502318918	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
9	502318919	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
10	502318920	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
11	502318921	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
12	502318922	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
13	502318923	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
14	502318924	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
15	502318926	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
16	502318927	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
17	502318928	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
18	502318930	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
19	502318932	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y	Y	11-16-2018
20	502318933	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y	Y	11-16-2018
21	502318938	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
22	502318957	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
23	502318958	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
24	502318967	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
25	502318968	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
26	502318813	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
27	502318814	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
28	502318815	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
29	502318826	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
30	502318827	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018

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GCL INVENTORY CONTROL LOG

PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	1053018
CLIENT:	Sundance West, Inc.	**CONTRACTOR:**	SLS
PROJECT LOCATION:	Euncie, New Mexico	**SHEET NUMBER:**	4
MATERIAL TYPE:	GCL	**DATE OF INVENTORY:**	See Below
MATERIAL IDENTIFICATION:	GSE Bentoliner NSL	**INVENTORY MONITOR:**	Don Gray
MATERIAL MANUFACTURER:	GSE	**UNLOADING METHOD:**	Forklift

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	AREA (FT^2)			
1	502318828	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
2	502318829	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
3	502318830	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
4	502318831	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
5	502318832	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
6	502318837	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
7	502318838	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
8	502318839	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
9	502318840	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
10	502318841	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
11	502318842	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
12	502318843	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
13	502318846	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
14	502318931	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
15	502318941	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
16	502318945	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
17	502318946	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
18	502318947	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
19	502318948	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y	Y	11-16-2018
20	502318949	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
21	502318950	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
22	502318951	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
23	502318952	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
24	502318953	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
25	502318954	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
26	502318955	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
27	502318956	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
28	502318959	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
29	502318960	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
30	502318961	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018

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GCL INVENTORY CONTROL LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 1053018
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS
PROJECT LOCATION: Euncie, New Mexico
SHEET NUMBER: 5

MATERIAL TYPE: GCL
DATE OF INVENTORY: See Below
MATERIAL IDENTIFICATION: GSE Bentoliner NSL
INVENTORY MONITOR: Don Gray
MATERIAL MANUFACTURER: GSE
UNLOADING METHOD: Forklift

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	AREA (FT^2)			
1	502318969	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
2	502318816	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
3	502318817	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
4	502318818	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
5	502318819	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
6	502318820	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
7	502318821	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
8	502318823	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
9	502318824	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
10	502318825	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
11	502318833	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
12	502318834	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
13	502318835	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
14	502318836	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
15	502318844	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
16	502318845	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y	Y	11-16-2018
17	502318854	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
18	502318790	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
19	502318794	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y	Y	11-16-2018
20	502318795	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
21	502318796	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
22	502318899	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
23	502318901	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
24	502318902	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
25	502318903	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
26	502318904	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
27	502318905	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
28	502318906	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
29	502318907	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
30	502318908	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018

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GCL INVENTORY CONTROL LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 1053018
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS
PROJECT LOCATION: Euncie, New Mexico
SHEET NUMBER: 6

MATERIAL TYPE: GCL
DATE OF INVENTORY: See Below
MATERIAL IDENTIFICATION: GSE Bentoliner NSL
INVENTORY MONITOR: Don Gray
MATERIAL MANUFACTURER: GSE
UNLOADING METHOD: Forklift

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	AREA (FT^2)			
1	502318939	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
2	502318940	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
3	502318799	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
4	502318800	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
5	502318801	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
6	502318802	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
7	502318803	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
8	502318804	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
9	502318805	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
10	502318806	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
11	502318807	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
12	502318808	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
13	502318809	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
14	502318810	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
15	502318811	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
16	502318812	BLI-075-06N-03S-D-30	15.5	330.0	2325.0	Y		11-16-2018
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APPENDIX C

Cell 1A Liner Installation Documentation

C.2. Geonet Inventory Control Log

333 Rio Rancho Blvd., Suite 400
Rio Rancho, New Mexico 87124
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GEONET INVENTORY CONTROL LOG

PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	1053018
CLIENT:	Sundance West, Inc.	**CONTRACTOR:**	SLS, Inc.
PROJECT LOCATION:	Eunice, New Mexico	**SHEET NUMBER:**	1
MATERIAL TYPE:	Geonet	**DATE OF INVENTORY:**	10-30-18
MATERIAL IDENTIFICATION:	GNS-200E-00-E-00	**INVENTORY MONITOR:**	Don Gray
MATERIAL MANUFACTURER:	GSE	**UNLOADING METHOD:**	Forklift

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	REMARKS
			LENGTH (FT)	WIDTH (FT)	THICKNESS OR WEIGHT			
1	131553565	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
2	131553566	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
3	131553546	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
4	131553547	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
5	131553569	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
6	131553539	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
7	131553538	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y	Y	
8	131553568	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
9	131553747	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
10	131553567	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
11	131553542	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
12	131553743	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
13	131553744	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
14	131553746	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
15	131553541	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
16	131553753	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
17	131553742	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
18	131553515	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
19	131553751	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
20	131553543	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
21	131553752	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
22	131553540	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
23	131553773	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
24	131553544	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
25	131553770	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
26	131553774	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
27	131553771	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
28	131553761	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y	Y	
29	131553762	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
30	131553745	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		

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GEONET INVENTORY CONTROL LOG

PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	1053018
CLIENT:	Sundance West, Inc.	**CONTRACTOR:**	SLS, Inc.
PROJECT LOCATION:	Eunice, New Mexico	**SHEET NUMBER:**	2
MATERIAL TYPE:	Geonet	**DATE OF INVENTORY:**	10-30-18
MATERIAL IDENTIFICATION:	GNS-200E-00-E-00	**INVENTORY MONITOR:**	Don Gray
MATERIAL MANUFACTURER:	GSE	**UNLOADING METHOD:**	Forklift

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	REMARKS
			LENGTH (FT)	WIDTH (FT)	THICKNESS OR WEIGHT			
1	131553772	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
2	131553759	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
3	131553766	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
4	131553741	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y	Y	
5	131553756	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
6	131553768	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
7	131553767	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
8	131553755	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
9	131553777	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
10	131553769	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
11	131553758	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
12	131553754	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
13	131553776	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
14	131553760	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
15	131553757	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
16	131553763	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
17	131553775	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
18	131553748	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
19	131553765	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
20	131553749	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
21	131553750	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
22	131553781	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y	Y	
23	131553780	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
24	131553779	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
25	131553778	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
26	131553764	GNS-200E-00-00-E-00	330.0	15.5	200 Mil	Y		
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APPENDIX C

Cell 1A Liner Installation Documentation

C.3. FML Inventory Control Log

333 Rio Rancho Blvd., Suite 400
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FML INVENTORY CONTROL LOG

PROJECT NAME: Sundance West Landfill Cell 1A
CLIENT: Sundance West Inc.
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS
SHEET NUMBER: 1

MATERIAL TYPE: Smooth
MATERIAL IDENTIFICATION: GSE Environmental
MATERIAL MANUFACTURER: GSE
DATE OF INVENTORY: See Below
INVENTORY MONITOR: Don Gray
UNLOADING METHOD: Forklift/Spreader Bar

	ROLL NO.	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE INVENTORIED
			LENGTH (FT)	WIDTH (FT)	THICKNESS OR WEIGHT			
1	107172991	HDS-040AE-BBB-B-0	560	23	40MIL	Y		11/1/2018
2	107172990	HDS-040AE-BBB-B-0	560	23	40MIL	Y		11/1/2018
3	108197907	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
4	108197887	HDS-060AE-BBB-B-00	560	23	60MIL	Y	Y	11/1/2018
5	108197913	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
6	108197910	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
7	108197912	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
8	108197903	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
9	108197909	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
10	108197908	HDS-060AE-BBB-B-00	560	23	60MIL	Y	Y	11/1/2018
11	108197904	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
12	108197888	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
13	108197971	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
14	108197917	HDS-060AE-BBB-B-00	560	23	60MIL	Y	Y	11/1/2018
15	108197876	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
16	108197885	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
17	108197883	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
18	108197889	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
19	108197884	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
20	108197874	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
21	108197899	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
22	108197891	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
23	108197875	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
24	108197881	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
25	108197882	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
26	108197880	HDS-060AE-BBB-B-00	560	23	60MIL	Y	Y	11/1/2018
27	108197877	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
28	108197879	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
29	108197893	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
30	108197878	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
31	108197895	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
32	108197906	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
33	108197898	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
34	108197905	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
35	108197902	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
36	108197865	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
37	108197892	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018
38	108197886	HDS-060AE-BBB-B-00	560	23	60MIL	Y		11/1/2018

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FML INVENTORY CONTROL LOG

PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	01053018.00
CLIENT:	Sundance West Inc.	**CONTRACTOR:**	SLS
PROJECT LOCATION:	Eunice, NM	**SHEET NUMBER:**	2
MATERIAL TYPE:	Smooth	**DATE OF INVENTORY:**	See Below
MATERIAL IDENTIFICATION:	GSE Environmental	**INVENTORY MONITOR:**	Don Gray
MATERIAL MANUFACTURER:	GSE	**UNLOADING METHOD:**	Forklift/Spreader Bar

	ROLL NO.	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE INVENTORIED
			LENGTH (FT)	WIDTH (FT)	THICKNESS OR WEIGHT			
1	108197896	HDS-060AE-BBB-B-00	560	23	60 MIL	Y		11/1/2018
2	108197901	HDS-060AE-BBB-B-00	560	23	60 MIL	Y	Y	11/1/2018
3	108197894	HDS-060AE-BBB-B-00	560	23	60 MIL	Y	Y	11/1/2018
4	108197897	HDS-060AE-BBB-B-00	560	23	60 MIL	Y		11/1/2018
5	108197872	HDS-060AE-BBB-B-00	560	23	60 MIL	Y	Y	11/1/2018
6	108197911	HDS-060AE-BBB-B-00	560	23	60 MIL	Y		11/1/2018
7	108197873	HDS-060AE-BBB-B-00	560	23	60 MIL	Y		11/1/2018
8	108197900	HDS-060AE-BBB-B-00	560	23	60 MIL	Y		11/1/2018
9	108197890	HDS-060AE-BBB-B-00	560	23	60 MIL	Y		11/1/2018
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APPENDIX C

Cell 1A Liner Installation Documentation

C.4. Geocomposite Inventory Control Log

333 Rio Rancho Blvd., Suite 400
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GEOCOMPOSITE INVENTORY CONTROL LOG

PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	01053018.00
CLIENT:	Sundance West Inc.	**CONTRACTOR:**	SLS
PROJECT LOCATION:	Eunice, NM	**SHEET NUMBER:**	1
MATERIAL TYPE:	Geocomposite (Double-Sided)	**DATE OF INVENTORY:**	See Below
MATERIAL IDENTIFICATION:	GSE Environmental	**INVENTORY MONITOR:**	Don Gray
MATERIAL MANUFACTURER:	GSE	**UNLOADING METHOD:**	Forklift/Spreader Bar

	GSE MATERIAL IDENTIFICATION NO.	ROLL NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE INVENTORIED
			LENGTH (FT)	WIDTH (FT)	THICKNESS OR WEIGHT			
1	FS2-225E-10-10-E-00	131553658	200		225MIL-10-10OZ	Y		10/31/2018
2	FS2-225E-10-10-E-00	131553675	200		225MIL-10-10OZ	Y		10/31/2018
3	FS2-225E-10-10-E-00	131553657	200		225MIL-10-10OZ	Y		10/31/2018
4	FS2-225E-10-10-E-00	131553676	200		225MIL-10-10OZ	Y	Y	10/31/2018
5	FS2-225E-10-10-E-00	131553656	200		225MIL-10-10OZ	Y		10/31/2018
6	FS2-225E-10-10-E-00	131553654	200		225MIL-10-10OZ	Y		10/31/2018
7	FS2-225E-10-10-E-00	131553674	200		225MIL-10-10OZ	Y		10/31/2018
8	FS2-225E-10-10-E-00	131553665	200		225MIL-10-10OZ	Y		10/31/2018
9	FS2-225E-10-10-E-00	131553661	200		225MIL-10-10OZ	Y		10/31/2018
10	FS2-225E-10-10-E-00	131553660	200		225MIL-10-10OZ	Y		10/31/2018
11	FS2-225E-10-10-E-00	131553643	200		225MIL-10-10OZ	Y		10/31/2018
12	FS2-225E-10-10-E-00	131553663	200		225MIL-10-10OZ	Y		10/31/2018
13	FS2-225E-10-10-E-00	131553664	200		225MIL-10-10OZ	Y		10/31/2018
14	FS2-225E-10-10-E-00	131553659	200		225MIL-10-10OZ	Y		10/31/2018
15	FS2-225E-10-10-E-00	131553662	200		225MIL-10-10OZ	Y		10/31/2018
16	FS2-225E-10-10-E-00	131553623	200		225MIL-10-10OZ	Y		10/31/2018
17	FS2-225E-10-10-E-00	131553622	200		225MIL-10-10OZ	Y		10/31/2018
18	FS2-225E-10-10-E-00	131553642	200		225MIL-10-10OZ	Y	Y	10/31/2018
19	FS2-225E-10-10-E-00	131553641	200		225MIL-10-10OZ	Y		10/31/2018
20	FS2-225E-10-10-E-00	131553651	200		225MIL-10-10OZ	Y		10/31/2018
21	FS2-225E-10-10-E-00	131553637	200		225MIL-10-10OZ	Y		10/31/2018
22	FS2-225E-10-10-E-00	131553630	200		225MIL-10-10OZ	Y		10/31/2018
23	FS2-225E-10-10-E-00	131553611	200		225MIL-10-10OZ	Y		10/31/2018
24	FS2-225E-10-10-E-00	131553640	200		225MIL-10-10OZ	Y		10/31/2018
25	FS2-225E-10-10-E-00	131553610	200		225MIL-10-10OZ	Y	Y	10/31/2018
26	FS2-225E-10-10-E-00	131553644	200		225MIL-10-10OZ	Y		10/31/2018
27	FS2-225E-10-10-E-00	131553639	200		225MIL-10-10OZ	Y		10/31/2018
28	FS2-225E-10-10-E-00	131553638	200		225MIL-10-10OZ	Y		10/31/2018
29	FS2-225E-10-10-E-00	131553628	200		225MIL-10-10OZ	Y		10/31/2018
30	FS2-225E-10-10-E-00	131553645	200		225MIL-10-10OZ	Y		10/31/2018
31	FS2-225E-10-10-E-00	131553633	200		225MIL-10-10OZ	Y		10/31/2018
32	FS2-225E-10-10-E-00	131553624	200		225MIL-10-10OZ	Y		10/31/2018
33	FS2-225E-10-10-E-00	131553673	200		225MIL-10-10OZ	Y		10/31/2018
34	FS2-225E-10-10-E-00	131553632	200		225MIL-10-10OZ	Y		10/31/2018
35	FS2-225E-10-10-E-00	131553636	200		225MIL-10-10OZ	Y		10/31/2018
36	FS2-225E-10-10-E-00	131553635	200		225MIL-10-10OZ	Y		10/31/2018
37	FS2-225E-10-10-E-00	131553647	200		225MIL-10-10OZ	Y		10/31/2018
38	FS2-225E-10-10-E-00	131553672	200		225MIL-10-10OZ	Y		10/31/2018

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GEOCOMPOSITE INVENTORY CONTROL LOG

PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	01053018.00
CLIENT:	Sundance West Inc.	**CONTRACTOR:**	SLS
PROJECT LOCATION:	Eunice, NM	**SHEET NUMBER:**	2
MATERIAL TYPE:	Geocomposite (Double-Sided)	**DATE OF INVENTORY:**	See Below
MATERIAL IDENTIFICATION:	GSE Environmental	**INVENTORY MONITOR:**	Don Gray
MATERIAL MANUFACTURER:	GSE	**UNLOADING METHOD:**	Forklift/Spreader Bar

	GSE MATERIAL IDENTIFICATION NO.	ROLL NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE INVENTORIED
			LENGTH (FT)	WIDTH (FT)	THICKNESS OR WEIGHT			
1	FS2-225E-10-10-E-00	131553671	200		225MIL-10-10OZ	Y		10/31/2018
2	FS2-225E-10-10-E-00	131553646	200		225MIL-10-10OZ	Y		10/31/2018
3	FS2-225E-10-10-E-00	131553634	200		225MIL-10-10OZ	Y		10/31/2018
4	FS2-225E-10-10-E-00	131553663	200		225MIL-10-10OZ	Y		10/31/2018
5	FS2-225E-10-10-E-00	131553616	200		225MIL-10-10OZ	Y		10/31/2018
6	FS2-225E-10-10-E-00	131553655	200		225MIL-10-10OZ	Y		10/31/2018
7	FS2-225E-10-10-E-00	131553612	200		225MIL-10-10OZ	Y		10/31/2018
8	FS2-225E-10-10-E-00	131553629	200		225MIL-10-10OZ	Y		10/31/2018
9	FS2-225E-10-10-E-00	131553653	200		225MIL-10-10OZ	Y		10/31/2018
10	FS2-225E-10-10-E-00	131553627	200		225MIL-10-10OZ	Y		10/31/2018
11	FS2-225E-10-10-E-00	131553621	200		225MIL-10-10OZ	Y		10/31/2018
12	FS2-225E-10-10-E-00	131553626	200		225MIL-10-10OZ	Y		10/31/2018
13	FS2-225E-10-10-E-00	131553620	200		225MIL-10-10OZ	Y		10/31/2018
14	FS2-225E-10-10-E-00	131553625	200		225MIL-10-10OZ	Y		10/31/2018
15	FS2-225E-10-10-E-00	131553619	200		225MIL-10-10OZ	Y		10/31/2018
16	FS2-225E-10-10-E-00	131553615	200		225MIL-10-10OZ	Y		10/31/2018
17	FS2-225E-10-10-E-00	131553618	200		225MIL-10-10OZ	Y		10/31/2018
18	FS2-225E-10-10-E-00	131553614	200		225MIL-10-10OZ	Y		10/31/2018
19	FS2-225E-10-10-E-00	131553617	200		225MIL-10-10OZ	Y		10/31/2018
20	FS2-225E-10-10-E-00	131553613	200		225MIL-10-10OZ	Y		10/31/2018
21	FS2-225E-10-10-E-00	131553667	200		225MIL-10-10OZ	Y		10/31/2018
22	FS2-225E-10-10-E-00	131553631	200		225MIL-10-10OZ	Y		10/31/2018
23	FS2-225E-10-10-E-00	131553652	200		225MIL-10-10OZ	Y		10/31/2018
24	FS2-225E-10-10-E-00	131553666	200		225MIL-10-10OZ	Y		10/31/2018
25	FS2-225E-10-10-E-00	131553650	200		225MIL-10-10OZ	Y		10/31/2018
26	FS2-225E-10-10-E-00	131553669	200		225MIL-10-10OZ	Y		10/31/2018
27	FS2-225E-10-10-E-00	131553668	200		225MIL-10-10OZ	Y		10/31/2018
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333 Rio Rancho Blvd., Suite 400
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GEOCOMPOSITE INVENTORY CONTROL LOG

PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	01053018.00
CLIENT:	Sundance West Inc.	**CONTRACTOR:**	SLS
PROJECT LOCATION:	Eunice, NM	**SHEET NUMBER:**	1
MATERIAL TYPE:	Geocomposite (Single-Sided)	**DATE OF INVENTORY:**	See Below
MATERIAL IDENTIFICATION:	GSE Environmental	**INVENTORY MONITOR:**	Don Gray
MATERIAL MANUFACTURER:	GSE	**UNLOADING METHOD:**	Forklift/Spreader Bar

	GSE MATERIAL IDENTIFICATION NO.	ROLL NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE INVENTORIED
			LENGTH (FT)	WIDTH (FT)	THICKNESS OR WEIGHT			
1	FS1-200E-10-00-E-00	131553690	288		200MIL -10OZ	Y		10/31/2018
2	FS1-200E-10-00-E-00	131553730	288		200MIL -10OZ	Y		10/31/2018
3	FS1-200E-10-00-E-00	131553690	288		200MIL -10OZ	Y		10/31/2018
4	FS1-200E-10-00-E-00	131553731	288		200MIL -10OZ	Y		10/31/2018
5	FS1-200E-10-00-E-00	131553700	288		200MIL -10OZ	Y		10/31/2018
6	FS1-200E-10-00-E-00	131553732	288		200MIL -10OZ	Y		10/31/2018
7	FS1-200E-10-00-E-00	131553701	288		200MIL -10OZ	Y		10/31/2018
8	FS1-200E-10-00-E-00	131553703	288		200MIL -10OZ	Y		10/31/2018
9	FS1-200E-10-00-E-00	131553706	288		200MIL -10OZ	Y		10/31/2018
10	FS1-200E-10-00-E-00	131553704	288		200MIL -10OZ	Y		10/31/2018
11	FS1-200E-10-00-E-00	131553707	288		200MIL -10OZ	Y		10/31/2018
12	FS1-200E-10-00-E-00	131553705	288		200MIL -10OZ	Y		10/31/2018
13	FS1-200E-10-00-E-00	131553714	288		200MIL -10OZ	Y		10/31/2018
14	FS1-200E-10-00-E-00	131553727	288		200MIL -10OZ	Y		10/31/2018
15	FS1-200E-10-00-E-00	131553713	288		200MIL -10OZ	Y		10/31/2018
16	FS1-200E-10-00-E-00	131553728	288		200MIL -10OZ	Y		10/31/2018
17	FS1-200E-10-00-E-00	131553712	288		200MIL -10OZ	Y		10/31/2018
18	FS1-200E-10-00-E-00	131553729	288		200MIL -10OZ	Y		10/31/2018
19	FS1-200E-10-00-E-00	131553733	288		200MIL -10OZ	Y		10/31/2018
20	FS1-200E-10-00-E-00	131553739	288		200MIL -10OZ	Y		10/31/2018
21	FS1-200E-10-00-E-00	131553734	288		200MIL -10OZ	Y		10/31/2018
22	FS1-200E-10-00-E-00	131553740	288		200MIL -10OZ	Y		10/31/2018
23	FS1-200E-10-00-E-00	131553735	288		200MIL -10OZ	Y		10/31/2018
24	FS1-200E-10-00-E-00	131553682	288		200MIL -10OZ	Y		10/31/2018
25	FS1-200E-10-00-E-00	131553683	288		200MIL -10OZ	Y		10/31/2018
26	FS1-200E-10-00-E-00	131553738	288		200MIL -10OZ	Y		10/31/2018
27	FS1-200E-10-00-E-00	131553737	288		200MIL -10OZ	Y		10/31/2018
28	FS1-200E-10-00-E-00	131553702	288		200MIL -10OZ	Y		10/31/2018
29	FS1-200E-10-00-E-00	131553736	288		200MIL -10OZ	Y		10/31/2018
30	FS1-200E-10-00-E-00	131553697	288		200MIL -10OZ	Y		10/31/2018
31	FS1-200E-10-00-E-00	131553684	200		200MIL -10OZ	Y		10/31/2018
32	FS1-200E-10-00-E-00	131553698	200		200MIL -10OZ	Y		10/31/2018
33	FS1-200E-10-00-E-00	131553685	200		200MIL -10OZ	Y		10/31/2018
34	FS1-200E-10-00-E-00	131553686	200		200MIL -10OZ	Y		10/31/2018
35	FS1-200E-10-00-E-00	131553694	200		200MIL -10OZ	Y		10/31/2018
36	FS1-200E-10-00-E-00	131553677	200		200MIL -10OZ	Y		10/31/2018
37	FS1-200E-10-00-E-00	131553695	200		200MIL -10OZ	Y		10/31/2018
38	FS1-200E-10-00-E-00	131553692	200		200MIL -10OZ	Y		10/31/2018

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GEOCOMPOSITE INVENTORY CONTROL LOG

PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	01053018.00
CLIENT:	Sundance West Inc.	**CONTRACTOR:**	SLS
PROJECT LOCATION:	Eunice, NM	**SHEET NUMBER:**	2
MATERIAL TYPE:	Geocomposite (Single-Sided)	**DATE OF INVENTORY:**	See Below
MATERIAL IDENTIFICATION:	GSE Environmental	**INVENTORY MONITOR:**	Don Gray
MATERIAL MANUFACTURER:	GSE	**UNLOADING METHOD:**	Forklift/Spreader Bar

	GSE MATERIAL IDENTIFICATION NO.	ROLL NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE INVENTORIED
			LENGTH (FT)	WIDTH (FT)	THICKNESS OR WEIGHT			
1	FS1-200E-10-00-E-00	131553678	200		200MIL -10OZ	Y		10/31/2018
2	FS1-200E-10-00-E-00	131553693	200		200MIL -10OZ	Y		10/31/2018
3	FS1-200E-10-00-E-00	131553696	200		200MIL -10OZ	Y		10/31/2018
4	FS1-200E-10-00-E-00	131553724	200		200MIL -10OZ	Y		10/31/2018
5	FS1-200E-10-00-E-00	131553699	200		200MIL -10OZ	Y		10/31/2018
6	FS1-200E-10-00-E-00	131553687	200		200MIL -10OZ	Y		10/31/2018
7	FS1-200E-10-00-E-00	131553680	200		200MIL -10OZ	Y		10/31/2018
8	FS1-200E-10-00-E-00	131553725	200		200MIL -10OZ	Y		10/31/2018
9	FS1-200E-10-00-E-00	131553726	200		200MIL -10OZ	Y		10/31/2018
10	FS1-200E-10-00-E-00	131553681	200		200MIL -10OZ	Y		10/31/2018
11	FS1-200E-10-00-E-00	131553688	200		200MIL -10OZ	Y		10/31/2018
12	FS1-200E-10-00-E-00	131553689	200		200MIL -10OZ	Y		10/31/2018
13	FS1-200E-10-00-E-00	131553715	200		200MIL -10OZ	Y		10/31/2018
14	FS1-200E-10-00-E-00	131553723	200		200MIL -10OZ	Y		10/31/2018
15	FS1-200E-10-00-E-00	131553722	200		200MIL -10OZ	Y		10/31/2018
16	FS1-200E-10-00-E-00	131553709	200		200MIL -10OZ	Y		10/31/2018
17	FS1-200E-10-00-E-00	131553711	200		200MIL -10OZ	Y		10/31/2018
18	FS1-200E-10-00-E-00	131553719	200		200MIL -10OZ	Y		10/31/2018
19	FS1-200E-10-00-E-00	131553710	200		200MIL -10OZ	Y		10/31/2018
20	FS1-200E-10-00-E-00	131553721	200		200MIL -10OZ	Y		10/31/2018
21	FS1-200E-10-00-E-00	131553720	200		200MIL -10OZ	Y		10/31/2018
22	FS1-200E-10-00-E-00	131553716	200		200MIL -10OZ	Y		10/31/2018
23	FS1-200E-10-00-E-00	131553717	200		200MIL -10OZ	Y		10/31/2018
24	FS1-200E-10-00-E-00	131553708	200		200MIL -10OZ	Y		10/31/2018
25	FS1-200E-10-00-E-00	131553718	200		200MIL -10OZ	Y		10/31/2018
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APPENDIX C

Cell 1A Liner Installation Documentation

C.5. Geotextile Inventory Control Log

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Rio Rancho, New Mexico 87124
505.867.6990

GEOTEXTILE INVENTORY CONTROL LOG

PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	1053018
CLIENT:	Sundance West, Inc.	**CONTRACTOR:**	SLS
PROJECT LOCATION:	Euncie, New Mexico	**SHEET NUMBER:**	1
MATERIAL TYPE:	Geotextile	**DATE OF INVENTORY:**	See Below
MATERIAL IDENTIFICATION:	Solmax GSE	**INVENTORY MONITOR:**	Don Gray
MATERIAL MANUFACTURER:	GSE	**UNLOADING METHOD:**	Forklift

	ROLL NUMBER	MATERIAL ID NO.	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	CONFORMANCE SAMPLE (Y/N)	DATE OF INVENTORY
			LENGTH (FT)	WIDTH (FT)	AREA (FT^2)			
1	2024872579	GEO-100E-EBC-E-005	300.0	15.0	45000.0	Y		3/16/2017
2	2024874181	GEO-100E-EBC-E-005	300.0	15.0	45000.0	Y		3/16/2017
3	2025468016	GEO-100E-EBC-E-005	300.0	15.0	45001.0	Y		4/23/2018
4	2025704014	GEO-100E-EBC-E-005	300.0	15.0	45002.0	Y		9/20/2018
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APPENDIX C

Cell 1A Liner Installation Documentation

C.6. Leachate Pipe and Riser Pipe Inventory Control Log

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Rio Rancho, New Mexico 87124
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LEACHATE COLLECTION AND RISER PIPE INVENTORY CONTROL LOG

PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	01053018.00
CLIENT:	Sundance West, Inc.	**CONTRACTOR:**	EW
PROJECT LOCATION:	Euncie, New Mexico	**SHEET NUMBER:**	1
MATERIAL TYPE:	Pipe Inventory	**DATE OF INVENTORY:**	See Below
MATERIAL IDENTIFICATION:		**INVENTORY MONITOR:**	Don Gray
MATERIAL MANUFACTURER:		**UNLOADING METHOD:**	

	TYPE	QUANTITY	MATERIAL DIMENSIONS			MANUF. QC CERT. (Y/N)	TOTAL LENGTH	DATE OF INVENTORY
			LENGTH (FT)	DIAM. (IN)	PIPE SDR			
1	Solid HDPE	3	40.0	6.0	11.0	N	120	01/07/19
2	Perforated HDPE	24	40.0	6.0	11.0	N	960	01/07/19
3	End Cap	1	NA	6.0	11.0	N	NA	01/07/19
4	Tee	1	NA	6.0	11.0	N	NA	01/07/19
5	HDPE Blind Flange 1" Thick	1	NA	6.0	11.0	N	NA	01/07/19
6	Stainless Steel Bolts	8	NA	4.0	NA	N	NA	01/07/19
7	Stainless Steel Nuts	8	NA	0.8	NA	N	NA	01/07/19
8	Stainless Steel Flat Washers	16	NA	0.8	NA	N	NA	01/07/19
9	Stainless Steel Backup Ring	1	NA	4.0	7.0	N	NA	01/07/19
10	Neoprene Gasket	1	NA	4.0	7.0	N	NA	01/07/19
11	SCH 80 PVC Cap	1	NA	6.0	11.0	N	NA	01/07/19
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APPENDIX C

Cell 1A Liner Installation Documentation

C.7. GCL Deployment Log

333 Rio Rancho Blvd., Suite 400
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GCL DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 1

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
E1	502318806	76.0	15.5	1,178.0	11-13-18
E2	502318806	74.0	15.5	1,147.0	11-13-18
E2A	502318804	5.0	15.5	77.5	11-13-18
E3	502318804	77.0	15.5	1,193.5	11-13-18
E4	502318804	68.0	15.5	1,054.0	11-13-18
E4A	502318812	10.0	15.5	155.0	11-13-18
E5	502318812	76.0	15.5	1,178.0	11-13-18
E6	502318912		15.5	0.0	11-13-18
E6A	502318909	17.0	15.5	263.5	11-13-18
E7	502318909	76.0	15.5	1,178.0	11-13-18
E8	502318803	57.0	15.5	883.5	11-13-18
E8A	502318803	21.0	15.5	325.5	11-13-18
E9	502318803	76.0	15.5	1,178.0	11-13-18
E10	502318811	52.0	15.5	806.0	11-13-18
E10A	502318811	29.0	15.5	449.5	11-13-18
E11	502318811	77.0	15.5	1,193.5	11-13-18
E12	502318807	43.0	15.5	666.5	11-13-18
E12A	502318807	36.0	15.5	558.0	11-13-18
E13	502318807	77.0	15.5	1,193.5	11-13-18
E14	502318810	37.0	15.5	573.5	11-13-18
E14A	502318810	43.0	15.5	666.5	11-13-18
E15	502318810	77.0	15.5	1,193.5	11-13-18
E16	502318805	29.0	15.5	449.5	11-13-18
E16A	502318805	50.0	15.5	775.0	11-13-18
E17	502318805	77.0	15.5	1,193.5	11-13-18
E18A	502318809	20.0	15.5	310.0	11-13-18
E18	502318809	60.0	15.5	930.0	11-13-18
E19	502318819	78.0	15.5	1,209.0	11-13-18
E20	502318809	71.0	15.5	1,100.5	11-13-18
E20A	502318819	9.0	15.5	139.5	11-13-18
E21	502318910	77.0	15.5	1,193.5	11-13-18
E22	502318910	77.0	15.5	1,193.5	11-13-18
E23	502318817	72.0	15.5	1,116.0	11-13-18
E23A	502318817	6.0	15.5	93.0	11-13-18
E24	502318817	76.0	15.5	1,178.0	11-13-18
E25	502318818	67.0	15.5	1,038.5	11-13-18
E25A	502318818	12.0	15.5	186.0	11-13-18
TOTAL LINER PLACED (FT^2):				29,217.5	

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GCL DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 2

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
E26	502318818	77.0	15.5	1,193.5	11-13-18
E27	502318818	60.0	15.5	930.0	11-13-18
E27A	502318816	18.0	15.5	279.0	11-13-18
E28	502318816	77.0	15.5	1,193.5	11-13-18
E29	502318816	55.0	15.5	852.5	11-13-18
E29A	502318808	24.0	15.5	372.0	11-13-18
E30	502318808	77.0	15.5	1,193.5	11-13-18
E31	502318808	49.0	15.5	759.5	11-13-18
E31A	502318824	31.0	15.5	480.5	11-13-18
E32	502318824	77.0	15.5	1,193.5	11-13-18
E33	502318824	43.0	15.5	666.5	11-13-18
E33A	502318802	35.0	15.5	542.5	11-13-18
E34	502318802	77.0	15.5	1,193.5	11-13-18
E35	502318823	79.0	15.5	1,224.5	11-14-18
E36A	502318823	0.0	15.5	0.0	11-14-18
E36	502318823	43.0	15.5	666.5	11-14-18
E37A	502318823	25.0	15.5	387.5	11-14-18
E38A	502318823	0.0	15.5	0.0	11-14-18
E37	502318799	28.0	15.5	434.0	11-14-18
E38	502318799	12.0	15.5	186.0	11-14-18
E39	502318799	83.0	15.5	1,286.5	11-14-18
E40B	502318799	0.0	15.5	0.0	11-14-18
E40A	502318799	23.0	15.5	356.5	11-14-18
E40	502318821	28.0	15.5	434.0	11-14-18
E41	502318821	53.0	15.5	821.5	11-14-18
E42A	502318821	0.0	15.5	0.0	11-14-18
E42	502318821	13.0	15.5	201.5	11-14-18
E43	502318821	13.0	15.5	201.5	11-14-18
B1	502318820	149.0	15.5	2,309.5	11-14-18
B2	502318800	149.0	15.5	2,309.5	11-14-18
B3	502318801	149.0	15.5	2,309.5	11-14-18
B1A	502318901	149.0	15.5	2,309.5	11-14-18
B2A	502318795	149.0	15.5	2,309.5	11-14-18
B3A	502318794	148.0	15.5	2,294.0	11-14-18
B1B	502318897	149.0	15.5	2,309.5	11-14-18
B2B	502318899	149.0	15.5	2,309.5	11-14-18
B3B	502318902	149.0	15.5	2,309.5	11-14-18
TOTAL LINER PLACED (FT^2):				37,820.0	

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GCL DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 3

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
B1C	502318903	143.0	15.5	2,216.5	11-14-18
B2C	502318904	139.0	15.5	2,154.5	11-14-18
B2D	502318903	5.0	15.5	77.5	11-14-18
B3C	502318904	9.0	15.5	139.5	11-14-18
B3D	502318821	40.0	15.5	620.0	11-14-18
B3E	502318802	39.0	15.5	604.5	11-14-18
B3F	502318907	60.0	15.5	930.0	11-14-18
B4	502318898	149.0	15.5	2,309.5	11-14-18
B5	502318939	50.0	15.5	775.0	11-14-18
B6	502318940	149.0	15.5	2,309.5	11-14-18
B4A	502318790	149.0	15.5	2,309.5	11-14-18
B5A	502318835	149.0	15.5	2,309.5	11-14-18
B6A	502318836	147.0	15.5	2,278.5	11-14-18
B4B	502318844	149.0	15.5	2,309.5	11-14-18
B5B	502318905	148.0	15.5	2,294.0	11-14-18
B6B	502318906	147.0	15.5	2,278.5	11-14-18
B4C	502318825	142.0	15.5	2,201.0	11-14-18
B5C	502318833	137.0	15.5	2,123.5	11-14-18
B6C	502318833	10.0	15.5	155.0	11-14-18
B5D	502318825	7.0	15.5	108.5	11-14-18
B6D	502318907	87.0	15.5	1,348.5	11-14-18
B6E	502318834	51.0	15.5	790.5	11-14-18
B7	502318845	148.0	15.5	2,294.0	11-14-18
B7A	502318796	148.0	15.5	2,294.0	11-14-18
B7B	502318854	148.0	15.5	2,294.0	11-14-18
B7C	502318834	97.0	15.5	1,503.5	11-14-18
B7D	502318908	49.0	15.5	759.5	11-14-18
B8	502318956	149.0	15.5	2,309.5	11-15-18
B9	502318949	148.0	15.5	2,294.0	11-15-18
B10	502318948	149.0	15.5	2,309.5	11-15-18
B11	502318938	111.0	15.5	1,720.5	11-15-18
B8A	502318959	148.0	15.5	2,294.0	11-15-18
B9A	502318953	148.0	15.5	2,294.0	11-15-18
B10A	502318951	148.0	15.5	2,294.0	11-15-18
B11A	502318830	148.0	15.5	2,294.0	11-15-18
B8B	502318950	148.0	15.5	2,294.0	11-15-18
B9B	502318827	147.0	15.5	2,278.5	11-15-18
TOTAL LINER PLACED (FT^2):				64,170.0	

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GCL DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 4

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
B10B	502318967	147.0	15.5	2,278.5	11-15-18
B11B	502318831	148.0	15.5	2,294.0	11-15-18
B8C	502318828	143.0	15.5	2,216.5	11-15-18
B9C	502318829	141.0	15.5	2,185.5	11-15-18
B9D	502318828	6.0	15.5	93.0	11-15-18
B10C	502318924	81.0	15.5	1,255.5	11-15-18
B10D	502318908	60.0	15.5	930.0	11-15-18
B10E	502318829	6.0	15.5	93.0	11-15-18
B11C	502318961	148.0	15.5	2,294.0	11-15-18
B11D	502318908	35.0	15.5	542.5	11-15-18
B12	502318931	112.0	15.5	1,736.0	11-15-18
B13	502318969	126.0	15.5	1,953.0	11-15-18
B14	502318935	149.0	15.5	2,309.5	11-15-18
B12A	502318923	147.0	15.5	2,278.5	11-15-18
B13A	502318927	149.0	15.5	2,309.5	11-15-18
B14A	502318932	149.0	15.5	2,309.5	11-15-18
B12B	502318930	148.0	15.5	2,294.0	11-15-18
B13B	502318937	148.0	15.5	2,294.0	11-15-18
B14B	502318918	148.0	15.5	2,294.0	11-15-18
B12C	502318894	148.0	15.5	2,294.0	11-15-18
B13C	502318919	149.0	15.5	2,309.5	11-15-18
B14C	502318966	95.0	15.5	1,472.5	11-15-18
B12D	502318928	31.0	15.5	480.5	11-15-18
B12E	502318905	5.0	15.5	77.5	11-15-18
B13D	502318928	21.0	15.5	325.5	11-15-18
B14D	502318928	51.0	15.5	790.5	11-15-18
B15	502318933	149.0	15.5	2,309.5	11-15-18
B16	502318922	150.0	15.5	2,325.0	11-15-18
B17	502318896	149.0	15.5	2,309.5	11-15-18
B15A	502318895	148.0	15.5	2,294.0	11-15-18
B16A	502318965	148.0	15.5	2,294.0	11-15-18
B17A	502318962	148.0	15.5	2,294.0	11-15-18
B15C	502318934	148.0	15.5	2,294.0	11-15-18
B16B	502318892	148.0	15.5	2,294.0	11-15-18
B17B	502318797	148.0	15.5	2,294.0	11-15-18
B15C	502318893	142.0	15.5	2,201.0	11-15-18
B16D	502318893	5.0	15.5	77.5	11-15-18
TOTAL LINER PLACED (FT^2):				64,697.0	

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GCL DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 5

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
B16C	502318798	137.0	15.5	2,123.5	11-15-18
B17C	502318798	11.0	15.5	170.5	11-15-18
B17D	502318928	36.0	15.5	558.0	11-15-18
B17E	502318891	49.0	15.5	759.5	11-15-18
B18	502318963	149.0	15.5	2,309.5	11-15-18
B18A	502318964	149.0	15.5	2,309.5	11-15-18
B18B	502318841	148.0	15.5	2,294.0	11-15-18
B18C	502318891	49.0	15.5	759.5	11-15-18
B18D	502318936	100.0	15.5	1,550.0	11-15-18
B19	502318839	149.0	15.5	2,309.5	11-16-18
B20	502318837	147.0	15.5	2,278.5	11-16-18
B21	502318846	149.0	15.5	2,309.5	11-16-18
B19A	502318838	148.0	15.5	2,294.0	11-16-18
B20	502318864	148.0	15.5	2,294.0	11-16-18
BA21A	502318960	48.0	15.5	744.0	11-16-18
B1B	502318853	148.0	15.5	2,294.0	11-16-18
B20B	502318842	148.0	15.5	2,294.0	11-16-18
B21B	502318815	148.0	15.5	2,294.0	11-16-18
B19C	502318848	145.0	15.5	2,247.5	11-16-18
B20C	502318814	148.0	15.5	2,294.0	11-16-18
B21C	502318936	47.0	15.5	728.5	11-16-18
B21D	502318957	98.0	15.5	1,519.0	11-16-18
B22	502318941	149.0	15.5	2,309.5	11-16-18
B23	502318945	149.0	15.5	2,309.5	11-16-18
B24	502318955	149.0	15.5	2,309.5	11-16-18
B22A	502318954	148.0	15.5	2,294.0	11-16-18
B23A	502318920	148.0	15.5	2,294.0	11-16-18
B24A	502318926	149.0	15.5	2,309.5	11-16-18
B22B	502318921	149.0	15.5	2,309.5	11-16-18
B23B	502318958	149.0	15.5	2,309.5	11-16-18
B24B	502318946	149.0	15.5	2,309.5	11-16-18
B22C	502318968	144.0	15.5	2,232.0	11-16-18
B23C	502318947	144.0	15.5	2,232.0	11-16-18
B23D	502318968	4.0	15.5	62.0	11-16-18
B24D	502318941	49.0	15.5	759.5	11-16-18
B24E	502318860	93.0	15.5	1,441.5	11-16-18
B24C	502318947	4.0	15.5	62.0	11-16-18
TOTAL LINER PLACED (FT^2):				66,278.0	

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GCL DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 6

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
B25	503218953	148.0	15.5	2,294.0	11-16-18
B26	503218861	149.0	15.5	2,309.5	11-16-18
B27	503218826	150.0	15.5	2,325.0	11-16-18
B25A	503218856	147.0	15.5	2,278.5	11-16-18
B26A	503218843	148.0	15.5	2,294.0	11-16-18
B27A	503218851	149.0	15.5	2,309.5	11-16-18
B25B	503218832	147.0	15.5	2,278.5	11-16-18
B26B	503218813	147.0	15.5	2,278.5	11-16-18
B27B	503218862	148.0	15.5	2,294.0	11-16-18
B25C	503218852	145.0	15.5	2,247.5	11-16-18
B26C	503218863	143.0	15.5	2,216.5	11-16-18
B27C	503218860	55.0	15.5	852.5	11-16-18
B27D	503215559	91.0	15.5	1,410.5	11-16-18
B27E	503218863	6.0	15.5	93.0	11-16-18
B28	503218849	149.0	15.5	2,309.5	11-16-18
B28A	503218858	148.0	15.5	2,294.0	11-16-18
B28B	503218857	147.0	15.5	2,278.5	11-16-18
B28C	503218859	57.0	15.5	883.5	11-16-18
B28D	503218848	91.0	15.5	1,410.5	11-16-18
B29	502318855	149.0	15.5	2,309.5	11-17-18
B30	502318850	149.0	15.5	2,309.5	11-17-18
B31	502318876	149.0	15.5	2,309.5	11-17-18
B29A	502318877	149.0	15.5	2,309.5	11-17-18
B30A	502318865	148.0	15.5	2,294.0	11-17-18
B31A	502318847	149.0	15.5	2,309.5	11-17-18
B29B	502318875	148.0	15.5	2,294.0	11-17-18
B30B	502318878	149.0	15.5	2,309.5	11-17-18
B31B	502318866	148.0	15.5	2,294.0	11-17-18
B29C	502318874	144.0	15.5	2,232.0	11-17-18
B30C	502318822	105.0	15.5	1,627.5	11-17-18
B30E	502318874	3.0	15.5	46.5	11-17-18
B30D	502318868	40.0	15.5	620.0	11-17-18
B31C	502318868	108.0	15.5	1,674.0	11-17-18
B31D	502318848	36.0	15.5	558.0	11-17-18
B32D	502318848	20.0	15.5	310.0	11-17-18
B32	502318873	150.0	15.5	2,325.0	11-17-18
B32A	502318834	149.0	15.5	2,309.5	11-17-18
TOTAL LINER PLACED (FT^2):				69,099.0	

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GCL DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 7

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
B32B	502318881	150.0	15.5	2,325.0	11-17-18
B32C	502318882	123.0	15.5	1,906.5	11-17-18
TOTAL LINER PLACED (FT^2):				4,231.5	

APPENDIX C

Cell 1A Liner Installation Documentation

C.8. Secondary FML Deployment Log

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FML DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Suncance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 1

DEPLOYMENT LOCATION: Secondary
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
SE1	104192271	76.0	22.5	1,710.0	11-13-18
SE2	104192271	78.0	22.5	1,755.0	11-13-18
SE3	104192271	78.0	22.5	1,755.0	11-13-18
SE4	104192271	79.0	22.5	1,777.5	11-13-18
SE5	104192271	79.0	22.5	1,777.5	11-13-18
SE6	104192271	79.0	22.5	1,777.5	11-13-18
SE7	104192271	44.0	22.5	990.0	11-13-18
SE7A	104192279	36.0	22.5	810.0	11-13-18
SE8	104192279	79.0	22.5	1,777.5	11-13-18
SE9	104192279	79.0	22.5	1,777.5	11-13-18
SE10	104192279	79.0	22.5	1,777.5	11-13-18
SE11	104192279	79.0	22.5	1,777.5	11-13-18
SE12	104192279	79.0	22.5	1,777.5	11-13-18
SE13	104192279	79.0	22.5	1,777.5	11-13-18
SE14	104192270	79.0	22.5	1,777.5	11-13-18
SE15	104192270	79.0	22.5	1,777.5	11-13-18
SE16	104192270	79.0	22.5	1,777.5	11-13-18
SE17	104192270	79.0	22.5	1,777.5	11-13-18
SE18	104192270	79.0	22.5	1,777.5	11-13-18
SE19	104192270	77.0	22.5	1,732.5	11-13-18
SE20	104192270	37.0	22.5	832.5	11-13-18
SE20A	102191318	79.0	22.5	1,777.5	11-13-18
SE21	102191318	79.0	22.5	1,777.5	11-13-18
SE22	102191318	79.0	22.5	1,777.5	11-13-18
SE23	102191318	79.0	22.5	1,777.5	11-13-18
SE24	102191318	79.0	22.5	1,777.5	11-13-18
SE25	102191318	53.0	22.5	1,192.5	11-14-18
SE26	102191318	40.0	22.5	900.0	11-14-18
SE27	102191318	20.0	22.5	450.0	11-14-18
SE28	102191314	28.0	22.5	630.0	11-14-18
SE29	102191314	50.0	22.5	1,125.0	11-14-18
SE30	102191318	67.0	22.5	1,507.5	11-14-18
SB1	102191314	69.0	22.5	1,552.5	11-14-18
SB2	102191314	69.0	22.5	1,552.5	11-14-18
SB1A	108197896	523.0	22.5	11,767.5	11-14-18
SB2A	108197896	34.0	22.5	765.0	11-14-18
SB2B	108197873	492.0	22.5	11,070.0	11-14-18
TOTAL LINER PLACED (FT^2):				75,870.0	

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FML DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Suncance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 2

DEPLOYMENT LOCATION: Secondary
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
SB3	102191314	70.0	22.5	1,575.0	11-14-18
SB4	102191314	70.0	22.5	1,575.0	11-14-18
SB3A	108197873	65.0	22.5	1,462.5	11-14-18
SB3B	108197900	459.0	22.5	10,327.5	11-14-18
SB4A	108197900	91.0	22.5	2,047.5	11-14-18
SB4B	108197890	429.0	22.5	9,652.5	11-14-18
SB5	102191314	70.0	22.5	1,575.0	11-14-18
SB5A	108197980	126.0	22.5	2,835.0	11-14-18
SB5B	108197901	394.0	22.5	8,865.0	11-14-18
SB6	102191314	73.0	22.5	1,642.5	11-15-18
SB7	102191314	30.0	22.5	675.0	11-15-18
SB7A	102191312	45.0	22.5	1,012.5	11-15-18
SB6A	108197901	155.0	22.5	3,487.5	11-15-18
SB6B	108197894	368.0	22.5	8,280.0	11-15-18
SB7B	108197894	185.0	22.5	4,162.5	11-15-18
SB7C	108197902	332.0	22.5	7,470.0	11-15-18
SB8	102191312	76.0	22.5	1,710.0	11-15-18
SB8A	108197892	300.0	22.5	6,750.0	11-15-18
SB8B	108197902	219.0	22.5	4,927.5	11-15-18
SB9	102191312	76.0	22.5	1,710.0	11-15-18
SB9A	108197902	255.0	22.5	5,737.5	11-15-18
SB9B	108197898	263.0	22.5	5,917.5	11-15-18
SB10	102191312	78.0	22.5	1,755.0	11-15-18
SB11	102191312	78.0	22.5	1,755.0	11-15-18
SB10A	108197898	290.0	22.5	6,525.0	11-15-18
SB10B	108197893	225.0	22.5	5,062.5	11-15-18
SB11A	108197865	188.0	22.5	4,230.0	11-15-18
SB11B	108197893	330.0	22.5	7,425.0	11-15-18
SB12	102191312	69.0	22.5	1,552.5	11-15-18
SB12A	108197886	148.0	22.5	3,330.0	11-15-18
SB12B	108197865	370.0	22.5	8,325.0	11-15-18
SB13	102191312	90.0	22.5	2,025.0	11-16-18
SB14	104192277	80.0	22.5	1,800.0	11-16-18
SB13A	108197877	96.0	22.5	2,160.0	11-16-18
SB13B	108197886	409.0	22.5	9,202.5	11-16-18
SB14A	108197895	56.0	22.5	1,260.0	11-16-18
SB14B	108197877	458.0	22.5	10,305.0	11-16-18
TOTAL LINER PLACED (FT^2):				160,110.0	

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FML DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Suncance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 3

DEPLOYMENT LOCATION: Secondary
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
SB15	104192277	82.0	22.5	1,845.0	11-16-18
SB16	104192277	83.0	22.5	1,867.5	11-16-18
SB15A	108197906	16.0	22.5	360.0	11-16-18
SB15B	108197895	498.0	22.5	11,205.0	11-16-18
SB16A	108197906	510.0	22.5	11,475.0	11-16-18
SB17	104192277	86.0	22.5	1,935.0	11-16-18
SB18	104192277	86.0	22.5	1,935.0	11-16-18
SB17A	108197906	28.0	22.5	630.0	11-16-18
SB17B	108197905	480.0	22.5	10,800.0	11-16-18
SB18A	108197905	76.0	22.5	1,710.0	11-16-18
SB18B	108197879	436.0	22.5	9,810.0	11-16-18
SB19	104192277	112.0	22.5	2,520.0	11-16-18
SB19A	108197905	121.0	22.5	2,722.5	11-16-18
SB19B	108197878	364.0	22.5	8,190.0	11-16-18
SB20	104192274	87.0	22.5	1,957.5	11-17-18
SB21	104192274	87.0	22.5	1,957.5	11-17-18
SB20A	108197878	190.0	22.5	4,275.0	11-17-18
SB20B	108197875	317.0	22.5	7,132.5	11-17-18
SB21A	108197882	268.0	22.5	6,030.0	11-17-18
SB21B	108197875	240.0	22.5	5,400.0	11-17-18
SB22	104192274	89.0	22.5	2,002.5	11-17-18
SB22A	108197882	288.0	22.5	6,480.0	11-17-18
SB22B	108197881	220.0	22.5	4,950.0	11-17-18
TOTAL LINER PLACED (FT^2):				107,190.0	

APPENDIX C

Cell 1A Liner Installation Documentation

C.9. Secondary and Primary FML Pre-Weld Qualification Test Logs

333 Rio Rancho Blvd., Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FML TRIAL SEAMING TEST LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Euncie, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 1

PROJECT SPECIFICATIONS

FUSION	TEXTURED:	PEEL	91 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	91 lbs/in	SHEAR	120 lbs/in
EXTRUSION	TEXTURED:	PEEL	78 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	78 lbs/in	SHEAR	120 lbs/in

DATE	TIME	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS				
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5
11-13-18	07:00	GB	UM	1	805º	6.0	-	-	P	188	155	175	-	-
									P	179	154	163	-	-
									S	226	225	224	-	-
11-13-18	07:10	GB	MM	38	805º	6.0	-	-	P	163	159	168	-	-
									P	172	151	121	-	-
									S	231	229	228	-	-
11-13-18	07:20	GB	LY	7	805º	6.0	-	-	P	172	175	188	-	-
									P	174	177	185	-	-
									S	235	231	233	-	-
11-13-18	07:30	GB	GZ	8	-	-	520	415	P	121	139	167	-	-
									P	-	-	-	-	-
									S	200	196	205	-	-
11-13-18	12:40	GB	UM	1	805º	7.0	-	-	P	147	151	149	-	-
									P	110	128	153	-	-
									S	190	198	195	-	-
11-13-18	12:50	GB	LY	7	805º	7.0	-	-	P	152	170	158	-	-
									P	165	157	156	-	-
									S	203	205	204	-	-
11-13-18	13:00	GB	MM	68	805º	7.0	-	-	P	153	152	156	-	-
									P	155	146	152	-	-
									S	196	190	191	-	-
11-13-18	13:10	GB	GZ	8	-	-	510	405	P	154	167	164	-	-
									P	-	-	-	-	-
									S	187	186	189	-	-
					-	-	-	-	P	-	-	-	-	-
									P	-	-	-	-	-
									S	-	-	-	-	-

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FML TRIAL SEAMING TEST LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Euncie, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 2

PROJECT SPECIFICATIONS

FUSION	TEXTURED:	PEEL	91 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	91 lbs/in	SHEAR	120 lbs/in
EXTRUSION	TEXTURED:	PEEL	78 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	78 lbs/in	SHEAR	120 lbs/in

DATE	TIME	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS				
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5
11-14-18	06:25	GB	UM	1	805º	6.5	-	-	P	160	147	150	-	-
									P	179	146	141	-	-
									S	219	223	218	-	-
11-14-18	06:35	GB	DS	68	805º	6.5	-	-	P	156	154	164	-	-
									P	169	150	182	-	-
									S	231	230	231	-	-
11-14-18	06:45	GB	GZ	7	805º	6.5	-	-	P	168	166	167	-	-
									P	164	165	169	-	-
									S	247	244	245	-	-
11-14-18	06:55	GB	LY	8	-	-	520	415	P	120	117	110	-	-
									P	-	-	-	-	-
									S	185	175	179	-	-
11-14-18	12:45	GB	LY	8	-	-	520	415	P	144	133	131	-	-
									P	-	-	-	-	-
									S	173	179	176	-	-
11-14-18	12:55	GB	UM	1	805º	7.0	-	-	P	134	122	123	-	-
									P	126	135	122	-	-
									S	146	153	151	-	-
11-14-18	13:05	GB	DS	68	805º	7.0	-	-	P	131	135	126	-	-
									P	129	117	137	-	-
									S	163	170	172	-	-
11-14-18	13:15	GB	GZ	7	805º	7.0	-	-	P	129	143	137	-	-
									P	123	130	120	-	-
									S	157	161	159	-	-
-	-						-	-	P	-	-	-	-	-
									P	-	-	-	-	-
									S	-	-	-	-	-

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Rio Rancho, New Mexico 87124
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FML TRIAL SEAMING TEST LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Euncie, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 3

PROJECT SPECIFICATIONS

FUSION	TEXTURED:	PEEL	91 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	91 lbs/in	SHEAR	120 lbs/in
EXTRUSION	TEXTURED:	PEEL	78 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	78 lbs/in	SHEAR	120 lbs/in

DATE	TIME	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS				
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5
11-15-18	06:30	GB	UM	1	805º	6.5	-	-	P	159	151	146	-	-
									P	146	150	157	-	-
									S	209	211	210	-	-
11-15-18	06:40	GB	DS	68	805º	6.5	-	-	P	142	143	154	-	-
									P	134	145	141	-	-
									S	208	215	210	-	-
11-15-18	06:50	GB	LY	7	805º	6.5	-	-	P	143	151	134	-	-
									P	139	145	133	-	-
									S	196	199	197	-	-
11-15-18	07:00	GB	MM	8	-'	-	520	415	P	111	124	142	-	-
									P	-	-	-	-	-
									S	175	178	176	-	-
11-15-18	12:30	GB	UM	1	805º	7.0	-	-	P	124	131	131	-	-
									P	133	121	122	-	-
									S	157	159	160	-	-
11-15-18	12:40	GB	DS	68	805º	7.0	-	-	P	124	129	125	-	-
									P	133	131	125	-	-
									S	163	155	161	-	-
11-15-18	12:50	GB	LY	7	805º	7.0	-	-	P	130	130	133	-	-
									P	132	131	131	-	-
									S	166	168	167	-	-
11-15-18	13:00	GB	MM	8	-'	-	520	415	P	140	123	131	-	-
									P	-	-	-	-	-
									S	161	158	159	-	-
-	-				-'	-	-	-	P	-	-	-	-	-
									P	-	-	-	-	-
									S	-	-	-	-	-

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Rio Rancho, New Mexico 87124
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FML TRIAL SEAMING TEST LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Euncie, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 4

PROJECT SPECIFICATIONS

FUSION	TEXTURED:	PEEL	91 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	91 lbs/in	SHEAR	120 lbs/in
EXTRUSION	TEXTURED:	PEEL	78 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	78 lbs/in	SHEAR	120 lbs/in

DATE	TIME	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS				
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5
11-16-18	06:20	GB	UM	1	805º	6.5	-	-	P	141	157	132	-	-
									P	144	161	139	-	-
									S	187	194	192	-	-
11-16-18	06:30	GB	DS	68	805º	6.5	-	-	P	140	153	142	-	-
									P	146	136	136	-	-
									S	193	199	197	-	-
11-16-18	06:40	GB	MM	7	805º	6.5	-	-	P	149	145	133	-	-
									P	152	151	125	-	-
									S	192	189	196	-	-
11-16-18	06:50	GB	GZ	8	-	-	520	415	P	128	129	141	-	-
									P	-	-	-	-	-
									S	199	192	195	-	-
11-16-18	12:30	GB	UM	1	805º	7.0	-	-	P	134	113	131	-	-
									P	139	132	120	-	-
									S	159	161	160	-	-
11-16-18	12:40	GB	DS	68	805º	7.0	-	-	P	117	134	120	-	-
									P	119	130	123	-	-
									S	155	161	162	-	-
11-16-18	12:50	GB	MM	7	805º	7.0	-	-	P	130	129	133	-	-
									P	132	141	118	-	-
									S	164	163	161	-	-
11-16-18	13:00	GB	GZ	8	-	-	510	405	P	126	138	128	-	-
									P	-	-	-	-	-
									S	159	149	154	-	-
					-	-	-	-	P	-	-	-	-	-
									P	-	-	-	-	-
									S	-	-	-	-	-

GORDON ENVIRONMENTAL PSC

333 Rio Rancho Blvd., Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FML TRIAL SEAMING TEST LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Euncie, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 5

PROJECT SPECIFICATIONS

FUSION	TEXTURED:	PEEL	91 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	91 lbs/in	SHEAR	120 lbs/in
EXTRUSION	TEXTURED:	PEEL	78 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	78 lbs/in	SHEAR	120 lbs/in

DATE	TIME	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS				
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5
11-17-18	06:15	GB	UM	1	805º	6.5	-	-	P	138	135	133	-	-
									P	147	140	127	-	-
									S	189	192	191	-	-
11-17-18	06:25	GB	DS	68	805º	6.5	-	-	P	144	142	136	-	-
									P	140	144	161	-	-
									S	186	190	191	-	-
11-17-18	06:35	GB	GZ	7	805º	6.5	-	-	P	144	144	130	-	-
									P	149	137	141	-	-
									S	191	186	190	-	-
11-17-18	06:45	GB	LY	8	-		520	415	P	110	115	99	-	-
									P	-	-	-	-	-
									S	171	181	180	-	-
							-	-	P	-	-	-	-	-
									P	-	-	-	-	-
									S	-	-	-	-	-
							-	-	P	-	-	-	-	-
									P	-	-	-	-	-
									S	-	-	-	-	-
							-	-	P	-	-	-	-	-
									P	-	-	-	-	-
									S	-	-	-	-	-
							-	-	P	-	-	-	-	-
									P	-	-	-	-	-
									S	-	-	-	-	-
							-	-	P	-	-	-	-	-
									P	-	-	-	-	-
									S	-	-	-	-	-

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FML TRIAL SEAMING TEST LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Euncie, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 6

PROJECT SPECIFICATIONS

FUSION	TEXTURED:	PEEL	91 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	91 lbs/in	SHEAR	120 lbs/in
EXTRUSION	TEXTURED:	PEEL	78 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	78 lbs/in	SHEAR	120 lbs/in

DATE	TIME	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS				
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5
11-19-18	06:45	GB	UM	1	805º	6.5	-	-	P	158	172	163	-	-
									P	165	155	167	-	-
									S	207	219	210	-	-
11-19-18	06:55	GB	DS	68	805º	6.5	-	-	P	162	156	156	-	-
									P	155	222	210	-	-
									S	207	149	150	-	-
11-19-18	07:05	GB	LY	7	805º	6.5	-	-	P	156	149	150	-	-
									P	175	159	161	-	-
									S	206	212	209	-	-
11-19-18	07:15	GB	MM	8	-	-	520	415	P	120	115	110	-	-
									P	-	-	-	-	-
									S	180	70	171	-	-
11-19-18	12:20	GB	UM	1	805º	7.0	-	-	P	123	142	146	-	-
									P	138	146	142	-	-
									S	180	185	182	-	-
11-19-18	12:30	GB	DS	68	805º	7.0	-	-	P	134	137	139	-	-
									P	140	145	140	-	-
									S	171	170	172	-	-
11-19-18	12:40	GB	LY	7	805º	7.0	-	-	P	141	140	141	-	-
									P	142	139	150	-	-
									S	163	170	168	-	-
11-19-18	12:50	GB	MM	8	-	-	520	415	P	127	115	126	-	-
									P	-	-	-	-	-
									S	162	160	156	-	-
11-20-18	06:20	GB	UM	1	805º	6.5	-	-	P	141	166	173	-	-
									P	157	188	160	-	-
									S	221	220	219	-	-

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FML TRIAL SEAMING TEST LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Euncie, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 7

PROJECT SPECIFICATIONS

FUSION	TEXTURED:	PEEL	91 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	91 lbs/in	SHEAR	120 lbs/in
EXTRUSION	TEXTURED:	PEEL	78 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	78 lbs/in	SHEAR	120 lbs/in

DATE	TIME	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS				
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5
11-20-18	06:30	GB	DS	68	805º	6.5	-	-	P	179	145	166	-	-
									P	156	170	155	-	-
									S	220	208	210	-	-
11-20-18	06:40	GB	MM	7	805º	6.5	-	-	P	161	111	168	-	-
									P	170	182	160	-	-
									S	228	225	222	-	-
11-20-18	06:50	GB	GZ	8	-	-	520º	415º	P	113	126	122	-	-
									P	-	-	-	-	-
									S	214	190	198	-	-
11-20-18	12:35	GB	UM	1	805º	7.0	-	-	P	156	144	134	-	-
									P	146	155	143	-	-
									S	172	164	171	-	-
11-20-18	12:45	GB	DS	68	805º	7.0	-	-	P	138	133	133	-	-
									P	128	131	126	-	-
									S	170	160	169	-	-
11-20-18	12:55	GB	MM	7	805º	7.0	-	-	P	141	149	143	-	-
									P	120	134	134	-	-
									S	163	168	164	-	-
11-20-18	13:05	GB	GZ	8	-	-	520º	415º	P	152	144	142	-	-
									P	-	-	-	-	-
									S	182	179	171	-	-
11-26-18	06:25	GB	UM	1	805º	6.5	-	-	P	137	148	140	-	-
									P	141	139	142	-	-
									S	92	197	194	-	-
11-26-18	06:35	GB	DS	68	805º	6.5	-	-	P	148	165	164	-	-
									P	171	181	175	-	-
									S	257	223	226	-	-

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FML TRIAL SEAMING TEST LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Euncie, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 8

PROJECT SPECIFICATIONS

FUSION	TEXTURED:	PEEL	91 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	91 lbs/in	SHEAR	120 lbs/in
EXTRUSION	TEXTURED:	PEEL	78 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	78 lbs/in	SHEAR	120 lbs/in

DATE	TIME	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS				
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5
11-26-18	06:40	GB	GZ	7	805º	6.5	-	-	P	136	146	135	-	-
									P	144	145	139	-	-
									S	206	203	205	-	-
11-26-18	06:50	GB	LY	8	-	-	520º	415º	P	119	121	122	-	-
									P	-	-	-	-	-
									S	170	180	176	-	-
11-27-18	12:35	GB	LY	8	-	-	520º	415º	P	131	121	124	-	-
									P	-	-	-	-	-
									S	150	149	145	-	-
11-28-18	06:35	GB	UM	1	805º	6.5	-	-	P	136	147	142	-	-
									P	152	162	149	-	-
									S	219	221	215	-	-
11-28-18	06:45	GB	DS	68	805º	6.5	-	-	P	149	113	117	-	-
									P	141	136	141	-	-
									S	205	191	198	-	-
11-28-18	06:55	GB	LY	7	805º	6.5	-	-	P	139	159	136	-	-
									P	154	158	133	-	-
									S	198	195	196	-	-
11-28-18	07:05	GB	MM	8	-	-	520º	415º	P	134	129	179	-	-
									P	-	-	-	-	-
									S	194	192	198	-	-
11-28-18	12:20	GB	DS	68	805º	7.0	-	-	P	124	122	126	-	-
									P	123	122	120	-	-
									S	145	148	150	-	-
11-28-18	12:30	GB	LY	7	805º	7.0	-	-	P	125	130	119	-	-
									P	132	113	130	-	-
									S	147	149	148	-	-

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FML TRIAL SEAMING TEST LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Euncie, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 9

PROJECT SPECIFICATIONS

FUSION	TEXTURED:	PEEL	91 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	91 lbs/in	SHEAR	120 lbs/in
EXTRUSION	TEXTURED:	PEEL	78 lbs/in	SHEAR	120 lbs/in
	SMOOTH:	PEEL	78 lbs/in	SHEAR	120 lbs/in

DATE	TIME	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS				
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5
11-28-18	12:40	GB	UM	1	805º	7.0	-	-	P	115	117	119	-	-
									P	116	121	120	-	-
									S	150	145	147	-	-
11-28-18	12:50	GB	MM	8	-	-	520º	415º	P	130	119	129	-	-
									P	-	-	-	-	-
									S	150	149	151	-	-
11-29-18	06:20	GB	MM	1	805º	6.5	-	-	P	144	143	139	-	-
									P	141	132	147	-	-
									S	183	180	181	-	-
11-29-18	06:30	GB	DS	68	805º	6.5	-	-	P	160	144	138	-	-
									P	161	141	137	-	-
									S	193	195	190	-	-
11-29-18	06:40	GB	MM	7	805º	6.5	-	-	P	132	144	134	-	-
									P	139	145	139	-	-
									S	179	191	190	-	-
11-29-18	06:50	GB	GZ	8	-	-	520º	415º	P	110	122	112	-	-
									P	-	-	-	-	-
									S	199	185	191	-	-
11-29-18	12:40	GB	GZ	8	-	-	520º	415º	P	121	115	126	-	-
									P	-	-	-	-	-
									S	161	155	154	-	-
-	-	-	-	-	-	-	-	-	P	-	-	-	-	-
									P	-	-	-	-	-
									S	-	-	-	-	-
-	-	-	-	-	-	-	-	-	P	-	-	-	-	-
									P	-	-	-	-	-
									S	-	-	-	-	-

APPENDIX C

Cell 1A Liner Installation Documentation

C.10. Secondary FML Seaming Log

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FML SEAMING LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc
SHEET NUMBER: 1

SEAMING LOCATION: Secondary

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
1	11-13-18	SE1-SE2	79	08:30	UM	1	805º	6.0		DG
2	11-13-18	SE2-SE3	79	08:42	UM	1	805º	6.0		DG
3	11-13-18	SE3-SE4	79	08:44	MM	68	805º	6.0		DG
4	11-13-18	SE4-SE5	79	08:53	LY	7	805º	6.0		DG
5	11-13-18	SE5-SE6	79	09:31	UM	1	805º	6.0		DG
6	11-13-18	SE6-SE7/A	79	09:45	MM	68	805º	6.0		DG
7	11-13-18	SE7-SE7A	22	09:39	LY	7	805º	6.0		DG
8	11-13-18	SE7/A-SE8	79	10:13	UM	1	805º	6.0	SDT1	DG
9	11-13-18	SE8-SE9	79	10:09	LY	7	805º	6.0		DG
10	11-13-18	SE9-SE10	79	10:37	UM	1	805º	6.0		DG
11	11-13-18	SE10-SE11	79	10:35	LY	7	805º	6.0		DG
12	11-13-18	SE11-SE12	79	11:08	UM	1	805º	6.0		DG
13	11-13-18	SE12-SE13	79	11:10	LY	7	805º	6.0		DG
14	11-13-18	SE13-SE14	79	11:32	UM	1	805º	6.0	SDT2	DG
15	11-13-18	SE14-SE15	79	12:50	UM	1	805º	7.0		DG
16	11-13-18	SE15-SE16	79	1250	LY	7	805º	7.0		DG
17	11-13-18	SE16-SE17	79	13:00	MM	68	805º	7.0		DG
18	11-13-18	SE17-SE18	79	13:38	UM	1	805º	7.0		DG
19	11-13-18	SE18-SE19	79	13:44	MM	68	805º	7.0		DG
20	11-13-18	SE19-SE20/A	79	14:08	MM	68	805º	7.0		DG
21	11-13-18	SE20-SE20A	22	14:07	UM	1	805º	7.0		DG
22	11-13-18	SE20/A-SE21	79	15:15	UM	1	805º	7.0	SDT3	DG
23	11-13-18	SE21-SE22	79	14:40	UM	1	805º	7.0		DG
24	11-13-18	SE22-SE23	79	14:44	LY	7	805º	7.0		DG
25	11-13-18	SE23-SE24	79	15:00	UM	1	805º	7.0		DG

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FML SEAMING LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc
SHEET NUMBER: 2

SEAMING LOCATION: Secondary

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
1	11-14-18	SE24-SE25	79	07:38	UM	1	805º	6.5		DG
2	11-14-18	SE25-SE26	50	07:45	GZ	7	805º	6.5		DG
3	11-14-18	SE26-SE27	30	08:07	DS	68	805º	6.5		DG
4	11-14-18	SE27-SE28	25	08:12	DS	68	805º	6.5		DG
5	11-14-18	SE28-SE29	30	07:58	GZ	7	805º	6.5	SDT4	DG
6	11-14-18	SE29-SE30	55	08:03	UM	1	805º	6.5		DG
7	11-14-18	SE30-SB1	69	09:30	GZ	7	805º	6.5		DG
8	11-14-18	SE30/29/28-SE24/25/26	100	08:15	GZ	7	805º	6.5		DG
9	11-14-18	SB1-SB1A	22	09:45	GZ	7	805º	6.5		DG
10	11-14-18	SB2-SB2A	22	09:55	GZ	7	805º	6.5		DG
11	11-14-18	SB2A-SB2B	22	10:00	GZ	7	805º	6.5		DG
12	11-14-18	SE1-24-SB1/A	592	09:41	UM	1	805º	6.5	SDT5	DG
13	11-14-18	SB1A-SB2A	34	09:57	DS	68	805º	6.5	SDT6	DG
14	11-14-18	SB3-SB3A	22	12:45	GZ	7	805º	7.0		DG
15	11-14-18	SB4-SB4A	22	13:07	GZ	7	805º	7.0		DG
16	11-14-18	SB2/A/B-SB3/A	594	12:58	UM	1	805º	7.0	SDT7	DG
17	11-14-18	SB3/A-SB4/A/B	594	13:08	DS	68	805º	7.0	SDT8 & SDT9	DG
18	11-14-18	SB4A-SB4SB	22	13:20	GZ	7	805º	7.0		DG
19	11-14-18	SB4/A/B-SB5/A/S	590	13:55	GZ	7	805º	7.0	SDT10	DG
20	11-14-18	SB5-SB5A	22	14:12	UM	7	805º	7.0		DG
21	11-14-18	SB5A-SB5B	22	14:30	UM	1	805º	7.0		DG
22	11-15-18	SB5/A/B-SB6/A/B	590	08:03	UM	1	805º	6.5	SDT11	DG
23	11-15-18	SB6A-SB6B	22	08:05	LY	7	805º	6.5		DG
24	11-15-18	SB6-SB6A	22	08:25	LY	7	805º	6.5		DG
25	11-15-18	SB7-SB7A	22	07:52	LY	7	805º	6.5		DG

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FML SEAMING LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc
SHEET NUMBER: 3

SEAMING LOCATION: Secondary

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
1	11-15-18	SB7-SB7A	22	07:52	LY	7	805º	6.5		DG
2	11-15-18	SB7A-SB7B	22	08:11	LY	7	805º	6.5		DG
3	11-15-18	SB7B-SB7C	22	08:31	LY	7	805º	6.5		DG
4	11-15-18	SB6/A/B-SB7/A/B/C	592	08:18	DS	68	805º	6.5	SDT12	DG
5	11-15-18	SB7/A/B/C-SB8/A/B	592	09:18	LY	7	805º	6.5	SDT13	DG
6	11-15-18	SB8/A/B-SB9/A/B	594	10:00	UM	1	805º	6.5	SDT14 & SDT15	DG
7	11-15-18	SB9/A/B-SB10/A/B	594	12:50	DS	68	805º	7.0	SDT16	DG
8	11-15-18	SB10/A/B-SB11/A/B	594	13:05	UM	1	805º	7.0	SDT17	DG
9	11-15-18	SB11/A/B-SB12/A/B	594	13:39	LY	7	805º	7.0	SDT18	DG
10	11-15-18	SB8-SB8A	22	10:00	DS	68	805º	6.5		DG
11	11-15-18	SB8A-SB8B	22	09:45	UM	1	805º	6.5		DG
12	11-15-18	SB9-SB9A	22	10:04	DS	68	805º	6.5		DG
13	11-15-18	SB9A-SB9B	22	10:15	DS	68	805º	6.5		DG
14	11-15-18	SB10-SB10A	22	12:40	LY	7	805º	7.0		DG
15	11-15-18	SB10A-SB10B	22	12:56	LY	7	805º	7.0		DG
16	11-15-18	SB11-SB11A	22	13:21	LY	7	805º	7.0		DG
17	11-15-18	SB11A-SB11B	22	13:06	LY	7	805º	7.0		DG
18	11-15-18	SB12-SB12A	22	14:30	UM	1	805º	7.0		DG
19	11-15-18	SB12A-SB12B	22	14:20	DS	68	805º	7.0		DG
20	11-16-18	SB12/A/B-SB13/A/B	587	07:36	UM	1	805º	6.5	SDT19 & ST20	DG
21	11-16-18	SB13-SB13A	22	07:46	MM	7	805º	6.5		DG
22	11-16-18	SB13A-SB13B	22	08:00	MM	7	805º	6.5		DG
23	11-16-18	SB13/A/B-SB14/A/B	587	07:50	DS	68	805º	6.5	SDT21	DG
24	11-16-18	SB14-SB14A	22	08:30	MM	7	805º	6.5		DG
25	11-16-18	SB14A-SB14B	22	08:20	MM	7	805º	6.5		DG

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FML SEAMING LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc
SHEET NUMBER: 4

SEAMING LOCATION: Secondary

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
1	11-16-18	SB14/A/B-SB15/A/B	594	09:16	MM	7	805º	6.5	SDT22	DG
2	11-16-18	SB15-SB15A	22	09:49	DS	68		6.5		DG
3	11-16-18	SB15A-SB15B	22	09:39	DS	68		6.5		DG
4	11-16-18	SB15/A/B-SB16/A	594	09:22	UM	1		6.5	SDT23	DG
5	11-16-18	SB16-SB16A	22	09:54	DS	68		6.5		DG
6	11-16-18	SB16/A-SB17/A/B	594	12:18	DS	68		7.0	SDT24 & SDT25	DG
7	11-16-18	SB17-SB17A	22	12:36	MM	7		7.0		DG
8	11-16-18	SB17A-SB17B	22	12:54	MM	7		7.0		DG
9	11-16-18	SB17/A/B-SB18/A/B	594	12:48	UM	1		7.0	SDT26	DG
10	11-16-18	SB8-SB18A	22	12:45	MM	7		7.0		DG
11	11-16-18	SB18A-SB18B	22	13:04	MM	7		7.0		DG
12	11-16-18	SB18/A/B-SB19/A/B	594	13:30	MM	7		7.0	SDT27	DG
13	11-16-18	SB19-SB19A	22	13:54	DS	68		7.0	SDT29	DG
14	11-16-18	SB19A-SB19B	22	14:01	DS	68		7.0		DG
15	11-17-18	SB19/A/B-SB20/A/B	594	07:40	UM	1		6.5	SDT28	DG
16	11-17-18	SB20-SB20A	22	07:35	GZ	7		6.5		DG
17	11-17-18	SB20A-SB20B	22	08:05	GZ	7		6.5		DG
18	11-17-18	SB20/A/B-SB21/A/B	594	07:50	DS	68		6.5	SDT30	DG
19	11-17-18	SB21-SB21A	22	07:50	GZ	7		6.5		DG
20	11-17-18	SB21A-SB21B	22	08:10	GZ	7		6.5		DG
21	11-17-18	SB21/A/B-SB22/A/B	594	08:55	GZ	7		6.5	SDT31	DG
22	11-17-18	SB22-SB22A	22	09:18	UM	1		6.5		DG
23	11-17-18	SB22A-SB22B	22	08:40	GZ	7		6.5		DG
24										
25										

APPENDIX C

Cell 1A Liner Installation Documentation

C.11. Secondary FML Seam Pressure Test Log

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FML SEAMING PRESSURE TEST LOG

PROJECT SPECIFICATIONS

PROJECT NAME: Sundance West LFCell 1A
OWNER: Sundance West, Inc
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 010153018
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 1
MIN START PSI: 35
TEST DURATION: 5:00
MAX PSI DROP: 3

PRESSURE TEST LOCATION: Secondary

	DATE	PANEL #/PANEL #	TESTER	TIME		PRESSURE		MONITORED BY	PASS/FAIL
				START	FINISH	INITIAL	FINAL		
1	11-13-18	SE1-SE2	CZ	09:31	09:36	40	40	DG	Pass
2	11-13-18	SE2-SE3	CZ	09:32	09:37	39	39	DG	Pass
3	11-13-18	SE3-SE4	CZ	09:33	09:38	40	39	DG	Pass
4	11-13-18	SE4-SE5	CZ	09:47	09:52	40	40	DG	Pass
5	11-13-18	SE5-SE6	CZ	09:48	09:53	39	39	DG	Pass
6	11-13-18	SE6-SE7	CZ	10:15	10:20	40	40	DG	Pass
7	11-13-18	SE6-SE7A	CZ	10:17	10:22	37	37	DG	Pass
8	11-13-18	SE7-SE7A	CZ	10:16	10:21	40	39	DG	Pass
9	11-13-18	SE7/A-SE8	CZ	10:26	10:31	40	39	DG	Pass
10	11-13-18	SE8-SE9	CZ	10:35	10:40	38	38	DG	Pass
11	11-13-18	SE9-SE10	CZ	11:01	11:06	39	39	DG	Pass
12	11-13-18	SE10-SE11	CZ	11:02	11:07	40	39	DG	Pass
13	11-13-18	SE11-SE12	CZ	11:25	11:30	40	40	DG	Pass
14	11-13-18	SE12-SE13	CZ	11:33	11:38	39	37	DG	Pass
15	11-13-18	SE12-SE13	CZ	11:34	11:39	35	35	DG	Pass
16	11-13-18	SE13-SE14	CZ	11:43	11:48	39	39	DG	Pass
17	11-13-18	SE14-SE15	CZ	13:03	13:08	40	40	DG	Pass
18	11-13-18	SE15-SE16	CZ	13:06	13:11	40	39	DG	Pass
19	11-13-18	SE16-SE17	CZ	13:19	13:24	40	39	DG	Pass
20	11-13-18	SE17-SE18	CZ	13:55	14:00	40	39	DG	Pass
21	11-13-18	SE18-SE19	CZ	14:03	14:08	40	39	DG	Pass
22	11-13-18	SE19-SE20/A	CZ	14:24	14:29	40	40	DG	Pass
23	11-13-18	SE20-SE20A	CZ	14:25	14:30	39	38	DG	Pass
24	11-13-18	SE20/S-SE21	CZ	14:33	14:38	39	39	DG	Pass
25	11-13-18	SE21-SE22	CZ	14:51	14:56	39	39	DG	Pass
26	11-13-18	SE22-SE23	CZ	14:55	15:00	40	38	DG	Pass
27	11-13-18	SE23-SE24	CZ	15:07	15:12	40	38	DG	Pass
28	11-14-18	ES24-ES25	CZ	08:24	08:29	39	39	DG	Pass
29	11-14-18	ES25-ES26	CZ	08:20	08:25	40	40	DG	Pass
30	11-14-18	ES26-ES27	CZ	08:52	08:56	35	35	DG	Pass
31	11-14-18	ES27-ES28	CZ	08:51	08:56	39	39	DG	Pass
32	11-14-18	ES28-ES29	CZ	08:38	08:43	35	35	DG	Pass
33	11-14-18	ES28-ES26	CZ	08:50	08:55	40	40	DG	Pass
34	11-14-18	ES25/26-ES29	CZ	08:45	08:50	39	37	DG	Pass
35	11-14-18	ES25-ES29	CZ	08:44	08:49	40	40	DG	Pass
36	11-14-18	ES29-ES30	CZ	08:37	08:42	37	36	DG	Pass
37	11-14-18	ES24/25-ES29	CZ	08:20	08:25	40	39	DG	Pass
38	11-14-18	SB1-SE30	CZ	10:50	10:55	35	35	DG	Pass
39	11-14-18	SB1-SB1A	CZ	10:58	11:03	35	35	DG	Pass
40	11-14-18	SB2-SB2A	CZ	10:59	11:04	40	39	DG	Pass
41	11-14-18	SB2A-SB2B	CZ	12:46	12:51	35	34	DG	Pass
42	11-14-18	SB3-SB3A	CZ	11:37	11:42	40	38	DG	Pass
43	11-14-18	SB4-SB4A	CZ	13:47	13:52	35	34	DG	Pass
44	11-14-18	SB3A-SB3B	CZ	13:48	13:53	40	40	DG	Pass
45	11-14-18	SB5-SB5A	CZ	15:05	13:10	35	34	DG	Pass
46	11-14-18	SB5A-SB5B	CZ	15:04	15:09	40	39	DG	Pass
47	11-14-18	SB4A-SB4B	CZ	13:57	14:02	40	40	DG	Pass
48	11-14-18	SE1→7-SB1	CZ	11:14	11:19	40	39	DG	Pass
49	11-14-18	SE8→24-SB1	CZ	11:13	11:18	40	38	DG	Pass
50	11-14-18	SB1-SB2/A/B	CZ	12:32	12:37	40	39	DG	Pass
51	11-14-18	SB2/A/B-SB3/A/B	CZ	14:55	15:00	36	35	DG	Pass
52	11-14-18	SB2B-SB3B	CZ	14:56	15:01	40	40	DG	Pass
53	11-14-18	SB3/A-SB4/A/B	CZ	14:44	14:49	40	39	DG	Pass
54	11-14-18	SB3A-SB4B	CZ	14:20	14:25	40	40	DG	Pass
55	11-14-18	SB3A-SB4B	CZ	14:26	14:31	36	35	DG	Pass

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FML SEAMING PRESSURE TEST LOG

PROJECT SPECIFICATIONS

PROJECT NAME: Sundance West LFCell 1A
OWNER: Sundance West, Inc
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 010153018
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 2
MIN START PSI: 35
TEST DURATION: 5:00
MAX PSI DROP: 3

PRESSURE TEST LOCATION: Secondary

	DATE	PANEL #/PANEL #	TESTER	TIME		PRESSURE		MONITORED BY	PASS/FAIL
				START	FINISH	INITIAL	FINAL		
1	11-14-18	SB4B-SB5B	CZ	14:39	14:44	40	40	DG	Pass
2	11-14-18	SB4A/B-SB5A/B	CZ	15:20	15:25	39	38	DG	Pass
3	11-14-18	SB4-SB5	CZ	15:28	15:33	37	37	DG	Pass
4	11-15-18	SB5B-SB6B	CZ	09:15	09:20	38	38	DG	Pass
5	11-15-18	SB5A/B-SB6A/B	CZ	09:34	09:39	39	38	DG	Pass
6	11-15-18	SB5/A-SB6/A	CZ	09:45	09:50	39	37	DG	Pass
7	11-15-18	SB6-SB6A	CZ	08:25	08:30	39	38	DG	Pass
8	11-15-18	SB7-SB7A	CZ	08:41	08:46	39	39	DG	Pass
9	11-15-18	SB7A-SB7B	CZ	08:40	08:45	40	39	DG	Pass
10	11-15-18	SB7B-SB7C	CZ	08:53	08:58	39	38	DG	Pass
11	11-15-18	SB6/A/B-SB7/A/B/C	CZ	10:07	10:12	40	40	DG	Pass
12	11-15-18	SB6B-SB7C	CZ	10:06	10:11	40	39	DG	Pass
13	11-15-18	SB8A-SB8B	CZ	10:32	10:37	40	40	DG	Pass
14	11-15-18	SB8-SB8A	CZ	11:06	11:11	38	38	DG	Pass
15	11-15-18	SB7C-SB8A/B	CZ	10:31	10:36	40	39	DG	Pass
16	11-15-18	SB8/A-SB7/A/B/C	CZ	10:56	11:01	40	40	DG	Pass
17	11-15-18	SB8/A/B-SB9/A/B	CZ	11:20	11:25	40	39	DG	Pass
18	11-15-18	SB8/A-SB9/A	CZ	11:32	11:37	39	38	DG	Pass
19	11-15-18	SB9-SB9A	CZ	11:21	11:26	37	36	DG	Pass
20	11-15-18	SB9A-SB9B	CZ	10:40	10:45	40	40	DG	Pass
21	11-15-18	SB10-SB10A	CZ	13:32	13:37	37	37	DG	Pass
22	11-15-18	SB10A-SB10B	CZ	14:03	14:10	39	39	DG	Pass
23	11-15-18	SB11-SB11A	CZ	13:33	13:38	40	40	DG	Pass
24	11-15-18	SB11A-SB11B	CZ	13:50	13:55	39	39	DG	Pass
25	11-15-18	SB12-SB12A	CZ	14:39	14;44	40	40	DG	Pass
26	11-15-18	SB12A-SB12B	CZ	14:46	14:51	40	40	DG	Pass
27	11-15-18	SB9/A-SB10/A	CZ	14:27	14:32	40	39	DG	Pass
28	11-15-18	SB9A/B-SB10A/B	CZ	14:15	14:20	40	40	DG	Pass
29	11-15-18	SB10/A-SB11/A/B	CZ	14:28	14:33	40	40	DG	Pass
30	11-15-18	SB10/A/B-AB11B	CZ	14:13	14:18	40	40	DG	Pass
31	11-16-18	SB12B-SB13B	CZ	09:20	09:25	39	39	DG	Pass
32	11-16-18	SB13-SB13A	CZ	09:44	09:49	39	38	DG	Pass
33	11-16-18	SB13A-SB13B	CZ	08:48	08:53	36	35	DG	Pass
34	11-16-18	B12/A/B-SB13/A/B	CZ	09:19	09:24	40	39	DG	Pass
35	11-16-18	SB13B-SB14B	CZ	09:32	09:37	39	39	DG	Pass
36	11-16-18	SB13/A/B-SB14/A/B	CZ	09:33	09:38	40	40	DG	Pass
37	11-16-18	SB14-SB14A	CZ	09:45	09:50	39	39	DG	Pass
38	11-16-18	SB14A-SB14B	CZ	09:09	09:14	35	34	DG	Pass
39	11-16-18	SB15-SB15A	CZ	10:16	10:21	39	38	DG	Pass
40	11-16-18	SB15A-SB15B	CZ	10:15	10:20	40	40	DG	Pass
41	11-16-18	SB14/A/B-SB15/A/B	CZ	10:50	10:55	39	39	DG	Pass
42	11-16-18	SB14B-SB15B	CZ	10:39	10:44	40	40	DG	Pass
43	11-16-18	SB16-SB16A	CZ	10:17	10:22	38	38	DG	Pass
44	11-16-18	SB16-SB17	CZ	13:42	13:47	39	39	DG	Pass
45	11-16-18	SB16/A-SB17/A/B	CZ	13:40	13:45	40	39	DG	Pass
46	11-16-18	SB17-SB17A	CZ	13:18	13:23	39	39	DG	Pass
47	11-16-18	SB17A-SB17B	CZ	13:17	13:22	40	40	DG	Pass
48	11-16-18	SB15/A/B-SB16/A	CZ	13:00	13:05	40	39	DG	Pass
49	11-16-18	SB18-SB18A	CZ	14:00	14:05	40	40	DG	Pass
50	11-16-18	SB18A-SB18B	CZ	13:51	13:56	39	39	DG	Pass
51	11-16-18	SB19-SB19A	CZ	14:11	14:16	37	37	DG	Pass
52	11-16-18	SB19A-SB19B	CZ	14:20	14:25	39	38	DG	Pass
53	11-16-18	SB17/A/B-SB18/A	CZ	14:10	14:15	40	39	DG	Pass
54	11-16-18	SB17B-SB18/A/B	CZ	13:50	13:55	40	40	DG	Pass
55	11-16-18	SB18/A/B-SB19/A/B	CZ	14:57	15:02	40	40	DG	Pass

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FML SEAMING PRESSURE TEST LOG

PROJECT SPECIFICATIONS

PROJECT NAME: Sundance West LFCell 1A
OWNER: Sundance West, Inc
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 010153018
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 3
MIN START PSI: 35
TEST DURATION: 5:00
MAX PSI DROP: 3

PRESSURE TEST LOCATION: Secondary

	DATE	PANEL #/PANEL #	TESTER	TIME		PRESSURE		MONITORED BY	PASS/FAIL
				START	FINISH	INITIAL	FINAL		
1	11-16-18	SB18B-SB19B	CZ	14:44	14:49	40	40	DG	Pass
2	11-17-18	SB19B-SB20B	CZ	08:28	08:33	40	39	DG	Pass
3	11-17-18	SB20A-SB20B	CZ	09:05	09:10	40	40	DG	Pass
4	11-17-18	SB10-SB10A	CZ	09:14	09:19	37	36	DG	Pass
5	11-17-18	SB19/A/B-SB/A/B	CZ	09:37	09:42	40	39	DG	Pass
6	11-17-18	SB20-SB21	CZ	09:39	09:44	40	40	DG	Pass
7	11-17-18	SB21-SB21A	CZ	09:15	09:39	39	38	DG	Pass
8	11-17-18	SB21A-SB21B	CZ	08:39	08:44	40	39	DG	Pass
9	11-17-18	SB21-SB22	CZ	10:35	10:40	35	35	DG	Pass
10	11-17-18	SB22-SB22A	CZ	09:27	09:37	40	38	DG	Pass
11	11-17-18	SB22A-SB22B	CZ	08:50	08:55	40	40	DG	Pass
12	11-17-18	SBA/B-SB22A/B	CZ	10:04	10:09	40	39	DG	Pass
13	11-17-18	SB20B-SB21B	CZ	08:30	08:35	39	39	DG	Pass
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APPENDIX C

Cell 1A Liner Installation Documentation

C.12. Secondary FML Seam Vacuum Test and Defect-Repair Log

333 Rio Rancho Blvd., Suite 400
Rio Rancho, New Mexico 87124
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FML SEAM VACUUM TEST/REPAIR LOG

PROJECT NAME: Sundance West LF Cell 1A
PROJECT NUMBER: 01053018.00
OWNER: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 1

TEST/REPAIR LOCATION: Secondary
MONITOR: DG

	REPAIR DATE	PANEL	TYPE OF REPAIR	REPAIR TECH	NUMBER OF LEAKS	TESTING TECH ID	DATE ACCEPTED	COMMENTS
1	11/13/2018	E7-E8	DT1	GZ	0	TD	11/13/2018	
2	11/13/2018	E13-E14	DT2	GZ	0	TD	11/13/2018	
3	11/13/2018	E20-E21	DT3	GZ	0	TD	11/13/2018	
4	11/13/2018	E7/E7a-E6	P	GZ	0	TD	11/13/2018	
5	11/13/2018	E7/E7a-E8	P	GZ	0	TD	11/13/2018	
6	11/13/2018	E12-E13	P	GZ	0	TD	11/13/2018	
7	11/13/2018	E20/E20a-E19	P	GZ	0	TD	11/13/2018	
8	11/13/2018	E20/E20a-E21	P	GZ	0	TD	11/13/2018	
9	11/13/2018	E17-E18	P	GZ	0	TD	11/13/2018	
10	11/13/2018	E15-E16	P	GZ	0	TD	11/13/2018	
11	11/14/2018	E28-E29	DT4	LY	0	TD	11/14/2018	
12	11/14/2018	E7a-B1a	DT5	LY	0	TD	11/14/2018	
13	11/14/2018	B1a-B2b	DT6	LY	0	TD	11/14/2018	
14	11/14/2018	B2b-B3b	DT7	LY	0	TD	11/14/2018	
15	11/14/2018	E27/E28-E26	P	LY	0	TD	11/14/2018	
16	11/14/2018	E26	P	LY	0	TD	11/14/2018	
17	11/14/2018	E28/E29-E26	P	LY	0	TD	11/14/2018	
18	11/14/2018	E25/E26-E29	P	LY	0	TD	11/14/2018	
19	11/14/2018	E29/E30-E25	P	LY	0	TD	11/14/2018	
20	11/14/2018	E25-E3	P	LY	0	TD	11/14/2018	
21	11/14/2018	E24/E25-E30	P	LY	0	TD	11/14/2018	
22	11/14/2018	E30/E24-B1	P	LY	0	TD	11/14/2018	
23	11/14/2018	B1/B1a-E24	P	LY	0	TD	11/14/2018	
24	11/14/2018	B1/B2-B1a/B2a	P	LY	0	TD	11/14/2018	
25	11/14/2018	B2a/B2b-B1a	P	LY	0	TD	11/14/2018	
26	11/14/2018	B2a/B2b-B3a	P	LY	0	TD	11/14/2018	
27	11/14/2018	B3b-B4b	DT8	LY	0	TD	11/14/2018	
28	11/15/2018	B3-B4	DT9	MM	0	TD	11/15/2018	
29	11/14/2018	B4b-B5b	DT10	LY	0	TD	11/14/2018	
30	11/14/2018	B1a	P	LY	0	TD	11/14/2018	
31	11/14/2018	E24/E25-B1a	P	LY	0	TD	11/14/2018	
32	11/14/2018	E23/E22-B1a	P	LY	0	TD	11/14/2018	
33	11/14/2018	E22/E21-B1a	P	LY	0	TD	11/14/2018	
34	11/14/2018	E21/E20a-B1a	P	LY	0	TD	11/14/2018	
35	11/14/2018	E20a/E19-B1a	P	LY	0	TD	11/14/2018	
36	11/14/2018	E19/E18-B1a	P	LY	0	TD	11/14/2018	
37	11/14/2018	E18/E17-B1a	P	LY	0	TD	11/14/2018	
38	11/14/2018	E17/E16-B1a	P	LY	0	TD	11/14/2018	
39	11/14/2018	E16/E15-B1a	P	LY	0	TD	11/14/2018	
40	11/14/2018	E15/E14-B1a	P	LY	0	TD	11/14/2018	
41	11/14/2018	E14/E13-B1a	P	LY	0	TD	11/14/2018	
42	11/14/2018	E13/E12-B1a	P	LY	0	TD	11/14/2018	
43	11/14/2018	E12/E11-B1a	P	LY	0	TD	11/14/2018	
44	11/14/2018	E11/E10-B1a	P	LY	0	TD	11/14/2018	
45	11/14/2018	E10/E9-B1a	P	LY	0	TD	11/14/2018	

GORDON ENVIRONMENTAL PSC

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FML SEAM VACUUM TEST/REPAIR LOG

PROJECT NAME: Sundance West LF Cell 1A
PROJECT NUMBER: 01053018.00
OWNER: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 2

TEST/REPAIR LOCATION: Secondary
MONITOR: DG

	REPAIR DATE	PANEL	TYPE OF REPAIR	REPAIR TECH	NUMBER OF LEAKS	TESTING TECH ID	DATE ACCEPTED	COMMENTS
1	11/14/2018	E9/E8-B1a	P	LY	0	TD	11/14/2018	
2	11/14/2018	E8/E7a-B1a	P	LY	0	TD	11/14/2018	
3	11/14/2018	E7a/E6-B1a	P	LY	0	TD	11/14/2018	
4	11/14/2018	E6/E5-B1a	P	LY	0	TD	11/14/2018	
5	11/14/2018	E5/E4-B1a	P	LY	0	TD	11/14/2018	
6	11/14/2018	E4/E3-B1a	P	LY	0	TD	11/14/2018	
7	11/14/2018	E3/E2-B1a	P	LY	0	TD	11/14/2018	
8	11/14/2018	E2/E1-B1a	P	LY	0	TD	11/14/2018	
9	11/14/2018	B3b-B4b	P	LY	0	TD	11/14/2018	
10	11/15/2018	B5-B6a	DT11	MM	0	TD	11/15/2018	
11	11/15/2018	B6b-B7c	DT12	MM	0	TD	11/15/2018	
12	11/15/2018	B7c-B8a	DT13	MM	0	TD	11/15/2018	
13	11/15/2018	B8a-B9a	DT14	MM	0	TD	11/15/2018	
14	11/15/2018	B8b-B9b	DT15	MM	0	TD	11/15/2018	
15	11/15/2018	B9a-B10a	DT16	MM	0	TD	11/15/2018	
16	11/15/2018	B5a/B5b-B6a	P	MM	0	TD	11/15/2018	
17	11/15/2018	B6a/B6b-B5b	P	MM	0	TD	11/15/2018	
18	11/15/2018	B6a/B6b-B7b	P	MM	0	TD	11/15/2018	
19	11/15/2018	B6b-B5b	P	MM	0	TD	11/15/2018	
20	11/15/2018	B6b	P	MM	0	TD	11/15/2018	
21	11/15/2018	B7c/B7b-B6b	P	MM	0	TD	11/15/2018	
22	11/15/2018	B7c/B7b-B8a	P	MM	0	TD	11/15/2018	
23	11/15/2018	B8a/B8b-B7c	P	MM	0	TD	11/15/2018	
24	11/15/2018	B8a/B8b-B9b	P	MM	0	TD	11/15/2018	
25	11/15/2018	B10a-B11b	DT17	MM	0	TD	11/15/2018	
26	11/15/2018	B11b-B12b	DT18	MM	0	TD	11/15/2018	
27	11/15/2018	B9a/B9b-B8a	P	MM	0	TD	11/15/2018	
28	11/15/2018	B9a/B9b-B10a	P	MM	0	TD	11/15/2018	
29	11/15/2018	B10/10a-B9b	P	MM	0	TD	11/15/2018	
30	11/15/2018	B10/10a-B11b	P	MM	0	TD	11/15/2018	
31	11/15/2018	B11/B11a-B10a	P	MM	0	TD	11/15/2018	
32	11/15/2018	B11/B11a-B12b	P	MM	0	TD	11/15/2018	
33	11/15/2018	B12a/B12b-B11a	P	MM	0	TD	11/15/2018	
34	11/15/2018	B7/B7a-B6	P	MM	0	TD	11/15/2018	
35	11/15/2018	B7/B7a-B8	P	MM	0	TD	11/15/2018	
36	11/15/2018	B5/B6-B5a/B6a	P	MM	0	TD	11/15/2018	
37	11/15/2018	B6/B7-B6a/B7a	P	MM	0	TD	11/15/2018	
38	11/15/2018	B7/B8-B7a/B8a	P	MM	0	TD	11/15/2018	
39	11/15/2018	B8/B9-B8a/B9a	P	MM	0	TD	11/15/2018	
40	11/15/2018	B9/B10-B9a/B10a	P	MM	0	TD	11/15/2018	
41	11/15/2018	B10/B11-B10a/B11a	P	MM	0	TD	11/15/2018	
42	11/15/2018	B11/B12-B11a/B12a	P	MM	0	TD	11/15/2018	
43	11/15/2018	B11b-B12b	P	MM	0	TD	11/15/2018	
44	11/16/2018	B12-B13	DT19	GZ	0	TD	11/16/2018	
45	11/16/2018	B12b-B13b	DT20	GZ	0	TD	11/16/2018	

GORDON ENVIRONMENTAL PSC

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FML SEAM VACUUM TEST/REPAIR LOG

PROJECT NAME: Sundance West LF Cell 1A
PROJECT NUMBER: 01053018.00
OWNER: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 3

TEST/REPAIR LOCATION: Secondary
MONITOR: DG

	REPAIR DATE	PANEL	TYPE OF REPAIR	REPAIR TECH	NUMBER OF LEAKS	TESTING TECH ID	DATE ACCEPTED	COMMENTS
1	11/16/2018	B13b-B14b	DT21	GZ	0	TD	11/16/2018	
2	11/16/2018	B14b-B15b	DT22	GZ	0	TD	11/16/2018	
3	11/16/2018	B15b-B16a	DT23	GZ	0	TD	11/16/2018	
4	11/16/2018	B16-B17	DT24	GZ	0	TD	11/16/2018	
5	11/16/2018	B16a-B17b	DT25	GZ	0	TD	11/16/2018	
6	11/16/2018	B13b-B14b	P	GZ	0	TD	11/16/2018	
7	11/16/2018	B12a/B12b-B13	P	GZ	0	TD	11/16/2018	
8	11/16/2018	B13a/B13b-B12a	P	GZ	0	TD	11/16/2018	
9	11/16/2018	B13a/13b-B14b	P	GZ	0	TD	11/16/2018	
10	11/16/2018	B12/12a-B13	P	GZ	0	TD	11/16/2018	
11	11/16/2018	B14a/14b-B13a	P	GZ	0	TD	11/16/2018	
12	11/16/2018	B14a/14b-B15a	P	GZ	0	TD	11/16/2018	
13	11/16/2018	B13/B13a-B12b	P	GZ	0	TD	11/16/2018	
14	11/16/2018	B13/13a-B14a	P	GZ	0	TD	11/16/2018	
15	11/16/2018	B14/14a-B13	P	GZ	0	TD	11/16/2018	
16	11/16/2018	B14/14a-B15/15a	P	GZ	0	TD	11/16/2018	
17	11/16/2018	B15/15a-B16/16a	P	GZ	0	TD	11/16/2018	
18	11/16/2018	B15a/15b-B14a	P	GZ	0	TD	11/16/2018	
19	11/16/2018	B15a/B15b-B16	P	GZ	0	TD	11/16/2018	
20	11/16/2018	B17b-B18a	DT26	GZ	0	TD	11/16/2018	
21	11/16/2018	B18b-B19b	DT27	GZ	0	TD	11/16/2018	
22	11/17/2018	B19b-B20b	DT28	LY	0	TD	11/17/2018	
23	11/16/2018	B19-B19a	DT29	GZ	0	TD	11/16/2018	
24	11/16/2018	B16/16a-B17/17a	P	GZ	0	TD	11/16/2018	
25	11/16/2018	B17/17a-B18	P	GZ	0	TD	11/16/2018	
26	11/16/2018	B18/18a-B17a	P	GZ	0	TD	11/16/2018	
27	11/16/2018	B18/18a-B19	P	GZ	0	TD	11/16/2018	
28	11/16/2018	B17a/17b-B16	P	GZ	0	TD	11/16/2018	
29	11/16/2018	B17a/17b-B18a	P	GZ	0	TD	11/16/2018	
30	11/16/2018	B18a/18b-B17b	P	GZ	0	TD	11/16/2018	
31	11/16/2018	B18a/18b-B19a	P	GZ	0	TD	11/16/2018	
32	11/16/2018	B19/19a-B18a	P	GZ	0	TD	11/16/2018	
33	11/16/2018	B19a/19b-B18b	P	GZ	0	TD	11/16/2018	
34	11/17/2018	B20b-B21b	DT30	LY	0	TD	11/17/2018	
35	11/17/2018	B21a-B22a	DT31	LY	0	TD	11/17/2018	
36	11/17/2018	B20/20a-B19	P	LY	0	TD	11/17/2018	
37	11/17/2018	B19/19a-B20a	P	LY	0	TD	11/17/2018	
38	11/17/2018	B19a/19b-B20a	P	LY	0	TD	11/17/2018	
39	11/17/2018	B20a/20b-B19b	P	LY	0	TD	11/17/2018	
40	11/17/2018	B20a/20b-B21a	P	LY	0	TD	11/17/2018	
41	11/17/2018	B21a/B21b-B20b	P	LY	0	TD	11/17/2018	
42	11/17/2018	B21a/21b-B22a	P	LY	0	TD	11/17/2018	
43	11/17/2018	B22a/22b-B21b	P	LY	0	TD	11/17/2018	
44	11/17/2018	B20/20a-B21/21a	P	LY	0	TD	11/17/2018	
45	11/17/2018	B21/21a-B22/22a	P	LY	0	TD	11/17/2018	

APPENDIX C

Cell 1A Liner Installation Documentation

C.13. FML Seam Field Destructive Test Records

GORDON ENVIRONMENTAL PSC

333 Rio Rancho Blvd., Suite 400
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FML DESTRUCTIVE FIELD TEST RECORD

PROJECT INFORMATION			
PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	01053018.00
CLIENT:	Sundance West, Inc.	**CONTRACTOR:**	SLS, Inc.
PROJECT LOCATION:	Eunice, NM	**SHEET NUMBER:**	1

PROJECT SPECIFICATIONS					
FUSION	TEXTURED:	PEEL	90	SHEAR	120
	SMOOTH:	PEEL	90	SHEAR	120
EXTRUSION	TEXTURED:	PEEL	78	SHEAR	120
	SMOOTH:	PEEL	78	SHEAR	120

DATE	DT #	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS					COMMENTS
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5	
11-13-18	SDT1	GB	UM	1	805º	6.0	-	-	P	134	138	142	141	136	E7A-E8 42' WEST OF EAST AT
									P	143	140	124	125	128	
									S	203	204	208	206	204	
11-13-18	ST2	GB	UM	1	805º	6.0	-	-	P	150	152	143	146	151	E13-E14 16' WEST OF EAST AT
									P	151	151	150	142	150	
									S	196	188	191	194	190	
11-13-18	SDT3	GB	UM	1	805º	7.0	-	-	P	137	152	135	140	132	E20-E21 10' WEST OF EAST AT
									P	145	150	138	148	147	
									S	194	196	197	195	198	
11-4-18	SDT4	GB	GZ	7	805º	6.5	-	-	P	169	151	153	149	165	E29-E29 10' SOUTH OF NORTH AT
									P	157	157	165	164	157	
									S	225	231	221	229	230	
11-4-18	SDT5	GB	UM	1	805º	6.5	-	-	P	139	127	127	136	121	E17A-B1A 3' SOUTH OF B1A-E7A/8 INT
									P	134	133	134	127	127	
									S	161	166	165	161	168	
11-4-18	SDT6	GB	DS	68	805º	6.5	-	-	P	116	123	119	114	119	B1A-B2B 168' SIYTG IF B1/2-B14/2A INT
									P	113	118	121	120	117	
									S	173	176	173	176	178	
11-4-18	SDT7	GB	UM	1	805º	7.0	-	-	P	133	125	116	135	125	B2B-B3B 100' SOUTH OF B2A-B3A/B INT
									P	124	127	120	122	117	
									S	166	167	169	172	17	
11-4-18	SDT8	GB	DS	68	805º	7.0	-	-	P	122	125	130	126	124	B3A-B4B 110' NORTH OF SOUTH EDGE
									P	118	120	113	116	120	
									S	172	176	173	175	174	
11-4-18	SDT9	GB	DS	68	805º	7.0	-	-	P	139	132	140	141	138	B3-B4 22' SOUTH OF NORTH AT
									P	147	153	135	133	139	
									S	171	176	140	175	176	
11-4-18	SDT10	GB	GZ	7	805º	7.0	-	-	P	122	120	143	127	25	B4B-B5B 39' NORTH OF SOUTH EDGE
									P	130	130	151	125	124	
									S	169	170	171	173	172	
11-15-18	SDT11	GB	UM	1	805º	6.5	-	-	P	114	118	126	118	121	B5A-B6A 456' NORTH OF SOUTH EDGE
									P	115	117	117	124	115	
									S	185	183	185	192	185	

GORDON ENVIRONMENTAL PSC

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FML DESTRUCTIVE FIELD TEST RECORD

PROJECT INFORMATION			
PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	01053018.00
CLIENT:	Sundance West, Inc.	**CONTRACTOR:**	SLS, Inc.
PROJECT LOCATION:	Eunice, NM	**SHEET NUMBER:**	2

PROJECT SPECIFICATIONS					
FUSION	TEXTURED:	PEEL	90	SHEAR	120
	SMOOTH:	PEEL	90	SHEAR	120
EXTRUSION	TEXTURED:	PEEL	78	SHEAR	120
	SMOOTH:	PEEL	78	SHEAR	120

DATE	DT #	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS					COMMENTS
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5	
11-15-18	SDT12	GB	DS	68	805º	6.5	-	-	P	124	123	129	126	121	B6B-B7C 95' SOUTH OF B6A/B-B7B INT
									P	12	120	119	121	118	
									S	191	192	190	194	195	
11-15-18	SDT13	GB	LY	7	805º	6.56.5	-	-	P	121	123	111	111	115	B7C-B8A 228' NORTH OF SOUTH EDGE
									P	137	138	125	125	121	
									S	176	178	182	182	183	
11-15-18	SDT14	GB	UM	1	805º	6.5	-	-	P	120	127	126	126	129	B8A-B9A 5' SOUTH OF B8/9-B8A/9A INT
									P	126	126	125	125	131	
									S	174	178	178	178	179	
11-15-18	SDT15	GB	UM	1	805º	7.0	-	-	P	119	130	119	119	118	B8B-B9B 55' NORTH OF SOUTH EDGE
									P	117	124	132	132	125	
									S	176	178	179	179	187	
11-15-18	SDT16	GB	DS	68	805º	7.0	-	-	P	117	120	111	111	120	B9A-B10A 94' SOUTH OF B9/A-B10/A INT
									P	118	113	123	123	112	
									S	154	158	159	39	161	
11-15-18	SDT17	GB	UM	1	805º	7.0	-	-	P	123	114	113	113	112	B10A-B11B 12' SOUTH OF B10A B11A/B INT
									P	113	115	114	114	114	
									S	162	167	163	163	164	
11-15-18	SDT18	GB	LY	7	805º	7.0	-	-	P	114	123	117	117	119	B11B-B12B 160' NORTH OF SOUTH EDGE
									P	128	113	111	111	121	
									S	156	160	161	161	160	
11-15-18	SDT19	GB	UM	1	805º	6.5	-	-	P	136	133	146	120	146	B12-B13 30' SOUTH OF NORTH AT
									P	135	132	142	144	141	
									S	186	185	203	196	191	
11-15-18	SDT20	GB	UM	1	805º	6.5	-	-	P	121	139	122	140	132	B12B-B13B 110' NORTH OF SOUTH EDGE
									P	110	110	135	130	128	
									S	186	183	186	178	185	
11-15-18	SDT21	GB	DS	68	805º	6.5	-	-	P	121	130	129	121	126	B13B-B14B 400' NORTH OF SOUTH EDGE
									P	136	129	140	126	139	
									S	192	194	196	195	198	
11-15-18	SDT22	GB	MM	7	805º	6.5	-	-	P	122	123	121	125	136	B14B-B15B 190' SOUTH OF B14/A-B15/A INT
									P	124	120	122	125	125	
									S	168	174	175	176	174	

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FML DESTRUCTIVE FIELD TEST RECORD

PROJECT INFORMATION			
PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	01053018.00
CLIENT:	Sundance West, Inc.	**CONTRACTOR:**	SLS, Inc.
PROJECT LOCATION:	Eunice, NM	**SHEET NUMBER:**	3

PROJECT SPECIFICATIONS					
FUSION	TEXTURED:	PEEL	90	SHEAR	120
	SMOOTH:	PEEL	90	SHEAR	120
EXTRUSION	TEXTURED:	PEEL	78	SHEAR	120
	SMOOTH:	PEEL	78	SHEAR	120

DATE	DT #	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS					COMMENTS
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5	
11-16-18	SDT23	GB	UM	1	805º	6.5	-	-	P	127	111	118	114	118	B151B-B16A 181' NORTH OF SOUTH EDGE
									P	123	115	128	125	125	
									S	170	173	170	174	176	
11-16-18	SDT24	GB	DS	68	805º	7.0	-	-	P	120	123	129	123	121	B16-B17 30' NORTH OF B16/A-B17/A INT
									P	119	118	123	130	124	
									S	162	163	166	167	165	
11-16-18	SDT25	GB	DS	68	805º	7.0	-	-	P	122	115	115	111	110	B16A-B17B 60' NORTH OF SOUTH EDGE
									P	116	118	113	117	117	
									S	162	164	165	160	161	
11-16-18	SDT26	GB	UM	1	805º	7.0	-	-	P	122	125	124	130	129	B171B-B18A 440' NORTH OF SOUTH EDGE
									P	124	132	126	119	125	
									S	164	166	166	168	170	
11-16-18	SDT27	GB	MM	7	805º	7.0	-	-	P	111	109	115	118	130	B81B-B19B 324' NORTH OF SOUTH EDGE
									P	113	126	116	106	111	
									S	160	163	160	163	162	
11-17-18	SDT28	GB	UM	1	805º	6.5	-	-	P	121	121	133	131	131	B91B-B20B 180' NORTH OF SOUTH EDGE
									P	137	134	141	142	128	
									S	183	187	191	194	196	
11-17-18	SDT29	GB	DS	68	805º	6.5	-	-	P	135	139	132	129	133	B19-B19A 11' WEST OF B19/A-B18A INT
									P	131	126	135	136	118	
									S	152	155	151	150	149	
11-17-18	SDT30	GB	DS	68	805º	6.5	-	-	P	112	119	146	138	133	B20B-B21B 134' NORTH OF SOUTH EDGE
									P	118	133	122	124	110	
									S	194	195	187	188	190	
11-17-18	SDT31	GB	GZ	7	805º	6.5	-	-	P	128	118	117	108	119	B21A-B22A 344' NORTH OF SOUTH EDGE
									P	125	116	122	116	124	
									S	174	175	182	171	125	
							-	-	P						
									P						
									S						
							-	-	P						
									P						
									S						

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FML DESTRUCTIVE FIELD TEST RECORD

PROJECT INFORMATION			
PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	01053018.00
CLIENT:	Sundance West, Inc.	**CONTRACTOR:**	SLS, Inc.
PROJECT LOCATION:	Eunice, NM	**SHEET NUMBER:**	4

PROJECT SPECIFICATIONS					
FUSION	TEXTURED:	PEEL	90	SHEAR	120
	SMOOTH:	PEEL	90	SHEAR	120
EXTRUSION	TEXTURED:	PEEL	78	SHEAR	120
	SMOOTH:	PEEL	78	SHEAR	120

DATE	DT #	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS					COMMENTS
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5	
11-19-18	PDT1	GB	DS	68	805º	7.0	-	-	P	134	131	140	114	145	E7-E8 47' WEST OF EAST AT
									P	144	135	130	131	118	
									S	168	169	172	177	174	
11-19-18	PDT2	GB	LY	7	805º	7.0	-	-	P	136	134	136	147	136	E12-E13 75' WEST OF EAST AT
									P	133	141	139	131	122	
									S	177	183	181	18	180	
11-19-18	PDT3	GB	MM	1	805º	7.0	-	-	P	134	137	131	128	155	E19-E20 50' WEST OF EAST AT
									P	129	129	127	137	132	
									S	140	170	169	172	185	
11-20-18	PDT4	GB	DS	68	805º	6.5	-	-	P	136	161	160	162	150	E29-E20 5' SOUTH OF NORTH AT
									P	147	126	161	171	167	
									S	219	220	223	225	218	
11-20-18	PDT5	GB	UM	1	805º	6.5	-	-	P	157	142	152	155	152	E11-B1A 5' SOUTH OF E11/12-B1A INT
									P	139	144	151	163	147	
									S	180	172	185	186	182	
11-20-18	PDT6	GB	DS	68	805º	6.5	-	-	P	110	117	124	125	126	B1A-B2A 265' NORTH OF SOUTH EDGE
									P	138	129	122	134	127	
									S	173	179	177	187	180	
11-20-18	PDT7	GB	UM	1	805º	7.0	-	-	P	118	119	107	105	115	B2A-B3A 124' SOUTH OF NORTH AT
									P	111	110	114	117	121	
									S	167	169	171	169	170	
11-27-18	PDT8	GB	UM	1	805º	6.5	-	-	P	120	125	141	154	139	B3B-B4B 17' NORTH OF SOUTH EDGE
									P	136	143	125	129	128	
									S	212	214	213	215	210	
11-27-18	PDT9	GB	DS	68	805º	6.5	-	-	P	119	141	137	132	114	B4B-B5B 20' NORTH OF SOUTH EDGE
									P	146	152	149	136	139	
									S	210	214	212	210	209	
11-27-18	PDT10	GB	GZ	7	805º	6.5	-	-	P	151	148	158	153	145	B5-B5A 10' WEST OF B4/A-B5/A INT
									P	149	156	163	154	142	
									S	202	200	196	201	202	
11-27-18	PDT11	GB	UM	1	805º	6.5	-	-	P	131	121	124	127	124	B6A-B7A 115' NORTH OF SOUTH EDGE
									P	130	116	122	123	115	
									S	173	174	183	179	176	

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FML DESTRUCTIVE FIELD TEST RECORD

PROJECT INFORMATION			
PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	01053018.00
CLIENT:	Sundance West, Inc.	**CONTRACTOR:**	SLS, Inc.
PROJECT LOCATION:	Eunice, NM	**SHEET NUMBER:**	5

PROJECT SPECIFICATIONS					
FUSION	TEXTURED:	PEEL	90	SHEAR	120
	SMOOTH:	PEEL	90	SHEAR	120
EXTRUSION	TEXTURED:	PEEL	78	SHEAR	120
	SMOOTH:	PEEL	78	SHEAR	120

DATE	DT #	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS					COMMENTS
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5	
11-20-18	PDT12	GB	DS	68	805º	6.5	-	-	P	127	125	113	112	112	B7A-B8A 68' NORTH OF SOUTH EDGE
									P	159	155	126	137	123	
									S	181	173	177	181	180	
11-20-18	PDT13	GB	GZ	7	805º	6.5	-	-	P	136	126	120	127	120	B8A-B9A 250' NORTH OF SOUTH EDGE
									P	118	124	137	118	141	
									S	172	174	176	175	174	
11-20-18	PDT14	GB	DS	68	805º	6.5	-	-	P	138	145	126	119	118	B10A-B10B 14' WEST PF B10A/B-B9 INT
									P	130	130	125	124	125	
									S	154	159	162	167	165	
11-28-18	PDT15	GB	UM	1	805º	6.5	-	-	P	143	129	140	160	136	B10B-B11B 35' NORTH OF SOUTH EDGE
									P	105	137	125	136	130	
									S	201	199	206	204	199	
11-28-18	PDT16	GB	DS	68	805º	6.5	-	-	P	131	134	139	19	138	B13A-B13B 9' WEST OF B13A/B-B12B INT
									P	145	141	133	135	130	
									S	186	181	179	186	181	
11-28-18	PDT17	GB	LY	7	805º	6.5	-	-	P	123	143	139	140	127	B11B-B12B 135' NORTH OF SOUTH EDGE
									P	128	105	120	112	121	
									S	185	191	188	189	190	
11-28-18	PDT18	GB	DS	68	805º	6.5	-	-	P	147	127	121	123	129	B12B-B13B 175' NORTH OF SOUTH EDGE
									P	116	131	120	138	125	
									S	188	180	193	185	191	
11-28-18	PDT19	GB	UM	1	805º	6.5	-	-	P	121	121	121	122	125	B13B-B14B 253' NORTH OF SOUTH EDGE
									P	133	123	123	125	104	
									S	170	164	174	176	174	
11-28-18	DPDT20	GB	LY	7	805º	6.5	-	-	P	124	127	112	114	118	B14B-B15B 58' NORTH OF SOUTH EDGE
									P	134	111	127	127	127	
									S	160	166	164	167	168	
11-28-18	PDT21	GB	LY	7	805º	6.5	-	-	P	125	137	119	118	113	B14A-B15A 440' NORTH OF SOUTH EDGE
									P	124	114	124	125	127	
									S	166	169	170	164	168	
11-28-18	PDT22	GB	DS	68	805º	6.5	-	-	P	114	122	119	137	129	B15A-B16B 439' NORTH OF SOUTH EDGE
									P	115	120	117	114	116	
									S	161	163	169	166	167	

GORDON ENVIRONMENTAL PSC

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FML DESTRUCTIVE FIELD TEST RECORD

PROJECT INFORMATION			
PROJECT NAME:	Sundance West Landfill Cell 1A	**PROJECT NUMBER:**	01053018.00
CLIENT:	Sundance West, Inc.	**CONTRACTOR:**	SLS, Inc.
PROJECT LOCATION:	Eunice, NM	**SHEET NUMBER:**	6

PROJECT SPECIFICATIONS					
FUSION	TEXTURED:	PEEL	90	SHEAR	120
	SMOOTH:	PEEL	90	SHEAR	120
EXTRUSION	TEXTURED:	PEEL	78	SHEAR	120
	SMOOTH:	PEEL	78	SHEAR	120

DATE	DT #	QC INITIALS	WELDER'S INITIALS	MACHINE NUMBER	WEDGE WELDS		EXTRUSION WELDS		PULL	FIELD TEST RESULTS					COMMENTS
					Temperature	Speed	Barrel Temp	Pre-Heat Temp		Test #1	Test #2	Test #3	Test #4	Test #5	
11-28-18	PDT23	GB	UM	1	805º	6.5	-	-	P	125	128	132	134	134	B18-B19 53' SOUTH OF NORTH AT
									P	131	123	119	124	127	
									S	165	161	169	159	165	
11-29-18	PDT24	GB	UM	1	805º	6.5	-	-	P	122	139	144	139	138	B16C-B17A 142' NORTH OF SOUTH EDGE
									P	128	131	134	133	143	
									S	192	193	192	189	190	
11-29-18	PDT25	GB	MM	7	805º	6.5	-	-	P	124	126	126	135	139	B17B-B18A 91' NORTH OF SOUTH EDGE
									P	127	143	129	127	130	
									S	197	195	198	197	196	
11-29-18	PDT26	GB	DS	68	805º	6.5	-	-	P	125	126	140	124	127	B18B-B19A 56' NORTH OF SOUTH EDGE
									P	142	136	122	123	138	
									S	188	178	189	188	186	
11-29-18	PDT27	GB	UM	1	805º	6.5	-	-	P	121	134	130	151	142	B19A-B20A 45' NORTH OF SOUTH EDGE
									P	141	135	126	115	125	
									S	179	168	180	181	176	
11-29-18	PDT28	GB	DS	68	805º	6.5	-	-	P	131	135	142	143	142	B19A-B19B 9' JWEST OF B19A/B-B18B INT
									P	140	144	132	138	134	
									S	162	166	160	161	165	
11-29-18	PDT29	GB	MM	7	805º	6.5	-	-	P	136	125	118	119	117	43' NORTH OF SOUTH EDGE
									P	113	118	115	129	118	
									S	167	163	169	172	168	
11-29-18	PDT30	GB	DS	68	805º	6.5	-	-	P	113	127	141	24	121	40' NORTH OF SOUTH EDGE
									P	132	110	113	128	125	
									S	171	173	171	174	176	
11-29-18	PDT31	GB	DS	68	805º	6.5	-	-	P	130	141	124	130	128	B22B-B22C 11' WEST OF B22B/A-B21A INT
									P	123	134	140	122	131	
									S	167	173	165	171	168	
							-	-	P						
									P						
									S						
							-	-	P						
									P						
									S						

APPENDIX C

Cell 1A Liner Installation Documentation

C.14. Geonet Deployment Log

333 Rio Rancho Blvd., Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

GEONET DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Celll 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 1

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
B01	131553778	329.0	15.0	4,935.0	11/20/2018
B02	131553780	327.0	15.0	4,905.0	11/20/2018
B03	131553779	329.0	15.0	4,935.0	11/20/2018
B01A	131553764	193.0	15.0	2,895.0	11/20/2018
B02B	131553764	137.0	15.0	2,055.0	11/20/2018
B02A	131553758	58.0	15.0	870.0	11/20/2018
B03A	131553758	193.0	15.0	2,895.0	11/20/2018
B04	131553750	128.0	15.0	1,920.0	11/20/2018
B05	131553781	129.0	15.0	1,935.0	11/20/2018
B04A	131553748	193.0	15.0	2,895.0	11/20/2018
B05B	131553748	135.0	15.0	2,025.0	11/20/2018
B05A	131553758	57.0	15.0	855.0	11/20/2018
B06	131553749	326.0	15.0	4,890.0	11/26/2018
B07	131553763	327.0	15.0	4,905.0	11/26/2018
B08	131553775	326.0	15.0	4,890.0	11/26/2018
B09	131553776	326.0	15.0	4,890.0	11/26/2018
B10	131553757	326.0	15.0	4,890.0	11/26/2018
B06A	131553542	191.0	15.0	2,865.0	11/26/2018
B07C	131553542	132.0	15.0	1,980.0	11/26/2018
B07A	131553758	18.0	15.0	270.0	11/26/2018
B07B	131553759	44.0	15.0	660.0	11/26/2018
B08A	131553759	190.0	15.0	2,850.0	11/26/2018
B09B	131553759	90.0	15.0	1,350.0	11/26/2018
B09A	131553741	102.0	15.0	1,530.0	11/26/2018
B10A	131553741	191.0	15.0	2,865.0	11/26/2018
B11	131553754	327.0	15.0	4,905.0	11/26/2018
B12	131553777	329.0	15.0	4,935.0	11/26/2018
B13	131553755	326.0	15.0	4,890.0	11/26/2018
B14	131553767	327.0	15.0	4,905.0	11/26/2018
B15	131553764	327.0	15.0	4,905.0	11/26/2018
B11B	131553741	34.0	15.0	510.0	11/26/2018
B11A	131553766	157.0	15.0	2,355.0	11/26/2018
B12B	131553766	172.0	15.0	2,580.0	11/26/2018
B12A	131553756	18.0	15.0	270.0	11/26/2018
B13A	131553756	187.0	15.0	2,805.0	11/26/2018
B14B	131553756	124.0	15.0	1,860.0	11/26/2018
B14A	131553768	64.0	15.0	960.0	11/26/2018
TOTAL LINER PLACED (FT^2):				107,835.0	

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GEONET DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Celll 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 2

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
B15A	131553768	184.0	15.0	2,760.0	11/26/2018
B16B	131553768	37.0	15.0	555.0	11/26/2018
B16	131553567	328.0	15.0	4,920.0	11/26/2018
B17	131553760	327.0	15.0	4,905.0	11/26/2018
B18	131553745	326.0	15.0	4,890.0	11/26/2018
B19	131553772	325.0	15.0	4,875.0	11/26/2018
B16A	131553752	106.0	15.0	1,590.0	11/26/2018
B17A	131553752	184.0	15.0	2,760.0	11/26/2018
B18B	131553752	36.0	15.0	540.0	11/26/2018
B18A	131553540	148.0	15.0	2,220.0	11/26/2018
B19B	131553540	174.0	15.0	2,610.0	11/26/2018
B19A	131553747	15.0	15.0	225.0	11/26/2018
B20	131553762	324.0	15.0	4,860.0	11/26/2018
B21	131553761	327.0	15.0	4,905.0	11/26/2018
B22	131553771	325.0	15.0	4,875.0	11/26/2018
B23	131553770	326.0	15.0	4,890.0	11/26/2018
B24	131553774	326.0	15.0	4,890.0	11/26/2018
B25	131553773	328.0	15.0	4,920.0	11/26/2018
B26	131553544	325.0	15.0	4,875.0	11/26/2018
B20A	131553747	189.0	15.0	2,835.0	11/27/2018
B21B	131553747	123.0	15.0	1,845.0	11/27/2018
B21A	131553743	62.0	15.0	930.0	11/27/2018
B22A	131553743	183.0	15.0	2,745.0	11/27/2018
B23B	131553743	85.0	15.0	1,275.0	11/27/2018
B23A	131553744	98.0	15.0	1,470.0	11/27/2018
B24A	131553744	179.0	15.0	2,685.0	11/27/2018
B25B	131553744	51.0	15.0	765.0	11/27/2018
B25A	131553541	127.0	15.0	1,905.0	11/27/2018
B26A	131553541	179.0	15.0	2,685.0	11/27/2018
B27B	131553541	21.0	15.0	315.0	11/27/2018
B27	131553753	327.0	15.0	4,905.0	11/27/2018
B28	131553751	329.0	15.0	4,935.0	11/27/2018
B29	131553543	330.0	15.0	4,950.0	11/27/2018
B30	131553545	329.0	15.0	4,935.0	11/27/2018
B31	131553742	329.0	15.0	4,935.0	11/27/2018
B32	131553538	330.0	15.0	4,950.0	11/27/2018
B33	131553569	329.0	15.0	4,935.0	11/27/2018
TOTAL LINER PLACED (FT^2):				121,065.0	

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GEONET DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Celll 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 3

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
B27a	131553746	158.0	15.0	2,370.0	11/27/2018
B28b	131553746	171.0	15.0	2,565.0	11/27/2018
B28a	131553568	6.0	15.0	90.0	11/27/2018
B29a	131553568	175.0	15.0	2,625.0	11/27/2018
B30b	131553568	144.0	15.0	2,160.0	11/27/2018
B30a	131553539	30.0	15.0	450.0	11/27/2018
B31a	131553539	173.0	15.0	2,595.0	11/27/2018
B32b	131553539	124.0	15.0	1,860.0	11/27/2018
B32a	131553547	50.0	15.0	750.0	11/27/2018
B33a	131553547	173.0	15.0	2,595.0	11/27/2018
TOTAL LINER PLACED (FT^2):				18,060.0	

APPENDIX C

Cell 1A Liner Installation Documentation

C.15. Primary FML Deployment Log

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FML DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Suncance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 1

DEPLOYMENT LOCATION: Primary
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
PE1	104192274	78.0	22.5	1,755.0	11-19-18
PE2	104192274	78.0	22.5	1,755.0	11-19-18
PE3	104192274	69.0	22.5	1,552.5	11-19-18
PE3A	102191311	10.0	22.5	225.0	11-19-18
PE4	102191311	79.0	22.5	1,777.5	11-19-18
PE5	102191311	78.0	22.5	1,755.0	11-19-18
PE6	102191311	78.0	22.5	1,755.0	11-19-18
PE7	102191311	78.0	22.5	1,755.0	11-19-18
PE8	102191311	78.0	22.5	1,755.0	11-19-18
PE9	102191311	78.0	22.5	1,755.0	11-19-18
PE10	102191311	46.0	22.5	1,035.0	11-19-18
PE10A	102191310	34.0	22.5	765.0	11-19-18
PE11	102191310	78.0	22.5	1,755.0	11-19-18
PE12	102191310	78.0	22.5	1,755.0	11-19-18
PE13	102191310	78.0	22.5	1,755.0	11-19-18
PE14	102191310	78.0	22.5	1,755.0	11-19-18
PE15	102191310	78.0	22.5	1,755.0	11-19-18
PE16	102191315	78.0	22.5	1,755.0	11-19-18
PE17	102191315	78.0	22.5	1,755.0	11-19-18
PE18	102191315	78.0	22.5	1,755.0	11-19-18
PE19	102191315	78.0	22.5	1,755.0	11-19-18
PE20	102191315	78.0	22.5	1,755.0	11-19-18
PE21	102191315	78.0	22.5	1,755.0	11-19-18
PE22	102191315	78.0	22.5	1,755.0	11-19-18
PE23	102191315	55.0	22.5	1,237.5	11-19-18
PE23A	102191313	27.0	22.5	607.5	11-20-18
PE24	102191313	78.0	22.5	1,755.0	11-20-18
PE25	102191313	61.0	22.5	1,372.5	11-20-18
PE26	102191313	39.0	22.5	877.5	11-20-18
PE27	102191313	0.0	22.5	0.0	11-20-18
PE28	102191313	33.0	22.5	742.5	11-20-18
PE29	102191313	57.0	22.5	1,282.5	11-20-18
PE30	102191313	80.0	22.5	1,800.0	11-20-18
PB1	102191313	71.0	22.5	1,597.5	11-20-18
PB2	102191313	71.0	22.5	1,597.5	11-20-18
PB1A	108197881	333.0	22.5	7,492.5	11-20-18
PB2A	108197889	367.0	22.5	8,257.5	11-20-18
TOTAL LINER PLACED (FT^2):				67,320.0	

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FML DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Suncance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 2

DEPLOYMENT LOCATION: Primary
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
PB2B	108197876	156.0	22.5	3,510.0	11-20-18
PB1B	108197889	190.0	22.5	4,275.0	11-20-18
PB3B	108197871	121.0	22.5	2,722.5	11-20-18
PB3A	108197876	400.0	22.5	9,000.0	11-20-18
PB4A	108197871	428.0	22.5	9,630.0	11-27-18
PB4B	108197885	92.0	22.5	2,070.0	11-27-18
PB5A	108197885	458.0	22.5	10,305.0	11-27-18
PB5B	108197917	60.0	22.5	1,350.0	11-27-18
PB6A	108197917	492.0	22.5	11,070.0	11-27-18
PB6B	108197904	26.0	22.5	585.0	11-27-18
PB4	102191319	73.0	22.5	1,642.5	11-27-18
PB5	102191319	73.0	22.5	1,642.5	11-27-18
PB6	102191319	7.0	22.5	157.5	11-27-18
PB7	102191319	75.0	22.5	1,687.5	11-27-18
PB8	102191319	78.0	22.5	1,755.0	11-27-18
PB9	102191319	78.0	22.5	1,755.0	11-27-18
PB7A	108197904	517.0	22.5	11,632.5	11-27-18
PB8A	108197888	516.0	22.5	11,610.0	11-27-18
PB9B	108197888	41.0	22.5	922.5	11-27-18
PB9A	108197909	474.0	22.5	10,665.0	11-27-18
PB10B	108197907	435.0	22.5	9,787.5	11-27-18
PB10A	108197907	81.0	22.5	1,822.5	11-27-18
PB10	102191317	77.0	22.5	1,732.5	11-27-18
PB11A	108197907	120.0	22.5	2,700.0	11-27-18
PB11B	108197913	391.0	22.5	8,797.5	11-28-18
PB12A	108197913	160.0	22.5	3,600.0	11-28-18
PB12B	108197912	352.0	22.5	7,920.0	11-28-18
PB13A	108197912	201.0	22.5	4,522.5	11-28-18
PB13B	108197887	310.0	22.5	6,975.0	11-28-18
PB11	102191317	77.0	22.5	1,732.5	11-28-18
PB12	102191317	79.0	22.5	1,777.5	11-28-18
PB13	102191317	80.0	22.5	1,800.0	11-28-18
PB14	102191317	82.0	22.5	1,845.0	11-28-18
PB15	102191317	82.0	22.5	1,845.0	11-28-18
PB16A	102191317	42.0	22.5	945.0	11-28-18
PB14A	108197887	244.0	22.5	5,490.0	11-28-18
PB14B	108197903	268.0	22.5	6,030.0	11-28-18
TOTAL LINER PLACED (FT^2):				167,310.0	

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FML DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Suncance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 3

DEPLOYMENT LOCATION: Primary
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
PB15A	108197903	287.0	22.5	6,457.5	11-28-18
PB15B	108197908	223.0	22.5	5,017.5	11-28-18
PB16C	108197910	176.0	22.5	3,960.0	11-28-18
PB16B	108197908	335.0	22.5	7,537.5	11-28-18
PB16	102191316	45.0	22.5	1,012.5	11-28-18
PB17	102191316	85.0	22.5	1,912.5	11-28-18
PB18	102191316	86.0	22.5	1,935.0	11-28-18
PB19	102191316	87.0	22.5	1,957.5	11-28-18
PB20	102191316	87.0	22.5	1,957.5	11-28-18
PB21	102191316	88.0	22.5	1,980.0	11-28-18
PB22A	102191316	47.0	22.5	1,057.5	11-28-18
PB22	102191320	46.0	22.5	1,035.0	11-28-18
PB17A	108197910	376.0	22.5	8,460.0	11-29-18
PB17B	108197883	133.0	22.5	2,992.5	11-29-18
PB18A	108197883	421.0	22.5	9,472.5	11-29-18
PB18B	108197911	87.0	22.5	1,957.5	11-29-18
PB18A	108197911	468.0	22.5	10,530.0	11-29-18
PB19B	108197897	42.0	22.5	945.0	11-29-18
PB20A	108197897	505.0	22.5	11,362.5	11-29-18
PB21A	108197880	502.0	22.5	11,295.0	11-29-18
PB22A	108197880	453.0	22.5	10,192.5	11-29-18
PB22B	108197891	50.0	22.5	1,125.0	11-29-18
TOTAL LINER PLACED (FT^2):				104,152.5	

APPENDIX C

Cell 1A Liner Installation Documentation

C.16. Primary FML Seaming Log

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FML SEAMING LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc
SHEET NUMBER: 1

SEAMING LOCATION: Primary

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
1	11-19-18	PE1-PE2	78	12:30	UM	1	805º	7.0		DG
2	11-19-18	PE2-PE3/A	78	12:51	DS	68	805º	7.0		DG
3	11-19-18	PE3/A-PE4	78	12:54	LY	7	805º	7.0		DG
4	11-19-18	PE3-PE3A	22	12:42	LY	7	805º	7.0		DG
5	11-19-18	PE4-PE5	78	12:47	UM	1	805º	7.0		DG
6	11-19-18	PE5-PE6	78	13:00	UM	1	805º	7.0		DG
7	11-19-18	PE6-PE7	78	13:10	UM	1	805º	7.0		DG
8	11-19-18	PE7-PE8	78	13:10	DS	68	805º	7.0	PDT1	DG
9	11-19-18	PE8-PE9	78	13:13	LY	7	805º	7.0		DG
10	11-19-18	PE9-PE10/A	78	13:33	DS	68	805º	7.0		DG
11	11-19-18	PE10-PE10A	22	13:26	DS	68	805º	7.0		DG
12	11-19-18	PE10/A-PE11	78	13:36	UM	1	805º	7.0		DG
13	11-19-18	PE11-PE12	78	13:30	LY	7	805º	7.0		DG
14	11-19-18	PE12-PE13	78	13:50	LY	7	805º	7.0	PDT2	DG
15	11-19-18	PE13-PE14	78	13:49	DS	68	805º	7.0		DG
16	11-19-18	PE14-PE15	78	13:58	UM	1	805º	7.0		DG
17	11-19-18	PE15-PE16	78	14:05	LY	7	805º	7.0		DG
18	11-19-18	PE16-PE17	78	14:18	UM	1	805º	7.0		DG
19	11-19-18	PE17-PE18	78	14:22	LY	7	805º	7.0		DG
20	11-19-18	PE18-PE19	78	14:38	LY	7	805º	7.0		DG
21	11-19-18	PE19-PE20	78	14:35	UM	1	805º	7.0	PDT3	DG
22	11-19-18	PE20-PE21	78	14:48	UM	1	805º	7.0		DG
23	11-19-18	PE21-PE22	78	14:50	DS	68	805º	7.0		DG
24	11-20-18	PE1→24-PB1/A	85	09:35	UM	1	805º	6.5	PDT5	DG
25	11-20-18	PE23-PE23A	22	06:25	UM	1	805º	6.5		DG

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FML SEAMING LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc
SHEET NUMBER: 2

SEAMING LOCATION: Primary

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
1	11-20-18	PE22-PE23/A	78	06:40	UM	1	805º	6.5		DG
2	11-20-18	PE23/A-PE24	78	07:05	UM	1	805º	6.5		DG
3	11-20-18	PE24-PE25	78	06:42	MM	7	805º	6.5		DG
4	11-20-18	PE25-PE26	78	06:59	MM	7	805º	6.5		DG
5	11-20-18	PE26-PE27	78	07:12	MM	7	805º	6.5		DG
6	11-20-18	PE28-PE29	55	07:04	DS	68	805º	6.5		DG
7	11-20-18	PE29-PE30	55	06:53	DS	68	805º	6.5	PDT4	DG
8	11-20-18	PB1-PB1A	22	09:40	MM	7	805º	6.5		DG
9	11-20-18	PB2-PB2A	22	09:55	MM	7	805º	6.5		DG
10	11-20-18	PB2A-PB2B	22	10:10	MM	7	805º	6.5		DG
11	11-20-18	PB1/A/B-PB2/A/B	60	10:01	DS	68	805º	6.5	PDT6	DG
12	11-20-18	PE24/25/26/27-PE28/29/30	85	07:26	DS	68	805º	6.5		DG
13	11-20-18	B1A-B1B	22	09:37	DS	68	805º	6.5		DG
14	11-20-18	PB2/A-PB3/A/B	585	13:08	UM	1	805º	7.0	PDT7	DG
15	11-27-18	PB3/A/B-PB4/A/B	586	06:35	UM	1	805º	6.5	PDT8	DG
16	11-27-18	PB4A-PB4B	22	06:39	DS	68	805º	6.5		DG
17	11-27-18	BPB5A-PB5B	22	06:59	DS	68	805º	6.5		DG
18	11-27-18	PB4/A/B-PB5/A/B	591	07:01	DS	68	805º	6.5	PDT9	DG
19	11-27-18	PB5/A/B-B6/A/B	588	08:15	GZ	7	805º	6.5		DG
20	11-27-18	PB4-PB4A	22	07:25	GZ	7	805º	6.5		DG
21	11-27-18	PB5-PB5A	22	07:40	GZ	7	805º	6.5	PDT10	DG
22	11-27-18	PB6-PB6A	22	07:50	GZ	7	805º	6.5		DG
23	11-27-18	PB6/A/B-PB7/A	590	08:36	UM	1	805º	6.5	PDT11	DG
24	11-27-18	PDT7/A-PDT8/A	593	09:06	DS	68	805º	6.5	PDT12	DG
25	11-27-18	PB7-PB7A	23	08:50	DS	68	805º	6.5		DG

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FML SEAMING LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc
SHEET NUMBER: 3

SEAMING LOCATION: Primary

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
1	11-27-18	PB8-PB8A	22	10:12	UM	1	805º	6.5		DG
2	11-27-18	PB8/A/B-PB9/A/B	590	10:10	GZ	7	805º	6.5	PDT13	DG
3	11-27-18	PB9-PB9A	22	10:45	DS	68	805º	6.5		DG
4	11-27-18	PB10-PB10A	22	10:48	DS	68	805º	6.5		DG
5	11-27-18	PB9A-PB9B	22	10:00	GZ	7	805º	6.5		DG
6	11-27-18	B10A-B10B	22	10:51	DS	68	805º	6.5	PDT14	DG
7	11-27-18	PB9/A/B-PB10/A/B	434	10:22	UM	1	805º	6.5		DG
8	11-27-18	PB10/A-PB9/A	157	11:03	DS	68	805º	6.5		DG
9	11-28-18	PB10/A/B-PB11/A/B	588	06:58	UM	1	805º	6.5	PDT15	DG
10	11-28-18	PB11A-PB11B	22	06:59	DS	68	805º	6.5		DG
11	11-28-18	PB11-PB11A	22	07:59	DS	68	805º	6.5		DG
12	11-28-18	PB11/A/B-PB12/A/B	590	07:21	LY	7	805º	6.5	PDT17	DG
13	11-28-18	PB12A-PB12B	22	7:28	DS	68	805º	6.5		DG
14	11-28-18	PB12-PB12A	22	08:34	UM	1	805º	6.5		DG
15	11-28-18	PB12/A/B-PB13/A/B	590	08:09	DS	68	805º	6.5	PDT18	DG
16	11-28-18	PB13A-PB13B	22	07:44	DS	68	805º	6.5	PDT16	DG
17	11-28-18	PB13/A/B-PB14/A/B	594	08:48	UM	1	805º	6.5	PDT19	DG
18	11-28-18	PB14-PB14A	22	09:02	LY	7	805º	6.5		DG
19	11-28-18	B14A-B14B	22	09:21	LY	7	805º	6.5		DG
20	11-28-18	PB14/A/B-PB15/A/B	591	09:52	LY	7	805º	6.5	PDT20 & PDT2	DG
21	11-28-18	PB15-PB15A	22	09:12	LY	7	805º	6.5		DG
22	11-28-18	PB15A-PB15B	22	09:25	LY	7	805º	6.5		DG
23	11-28-18	PB13-PB13A	22	08:40	UM	1	805º	6.5		DG
24	11-28-18	PB15/A/B-PB16/A/B/C	596	10:05	DS	68	805º	6.5	PDT22	DG
25	11-28-18	PB16-PB16A	22	10:25	UM	1	805º	6.5		DG

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Rio Rancho, New Mexico 87124
505.867.6990

FML SEAMING LOG

PROJECT NAME: Sundance West Landfill Cell 1A
OWNER: Sundance West, Inc.
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 01053018.00
CONTRACTOR: SLS, Inc
SHEET NUMBER: 4

SEAMING LOCATION: Primary

	DATE	PANEL #/PANEL #	APPROX. LENGTH WELDED	START TIME	SEAMER INITIALS	MACHINE #	TEMP SETTING	SPEED SETTING	DESTRUCTIVE TEST	MONITORED BY
1	11-28-18	PB16A-PB16B	22	10:35	UM	1	805º	6.5		DG
2	11-28-18	PB16B-PB16C	22	09;56	DS	68	805º	6.5		DG
3	11-28-18	PB16/A-B17	85	10:45	UM	1	805º	6.5		DG
4	11-28-18	PB17-PB18	86	11:05	UM	1	805º	6.5		DG
5	11-28-18	PB18-PB19	87	11:22	UM	1	805º	6.5	PDT23	DG
6	11-28-18	PB19-PB20	87	12:30	UM	1	805º	7.0		DG
7	11-28-18	PB20-PB21	88	12:40	DS	68	805º	7.0		DG
8	11-28-18	PB21-PB22/A	89	12:45	DS	68	805º	7.0		DG
9	11-28-18	PB22-PB22A	22	12:54	UM	1	805º	7.0		DG
10	11-29-18	PB16B/C-PB17A/B	509	06:25	UM	1	805º	6.5	PDT24	DG
11	11-29-18	PB17A-PB17B	22	06:22	DS	68	805º	6.5		DG
12	11-29-18	PB18A-PB18B	22	06:47	DS	68	805º	6.5		DG
13	11-29-18	PB17A/B-PB18A/B	508	07:16	MM	7	805º	6.5	PDT25	DG
14	11-29-18	PB19A-PB19B	22	07:05	DS	68	805º	6.5	PDT28	DG
15	11-29-18	PB18A/B-PB19A/B	508	07:16	DS	68	805º	6.5	PDT26	DG
16	11-29-18	PB19A/B-PB20A	505	07:53	UM	1	805º	6.5	PDT27	DG
17	11-29-18	PB20A-PB21A	502	08:26	MM	7	805º	6.5	PDT29	DG
18	11-29-18	PB21A-PB22B/C	502	08:57	DS	68	805º	6.5	PDT30	DG
19	11-29-18	PB22B-PB22C	22	08:49	DS	68	805º	6.5	PDT31	DG
20	11-29-18	PB17A→PB22B-PB17→PB22A	135	10:00	MM	7	805º	6.5		DG
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APPENDIX C

Cell 1A Liner Installation Documentation

C.17. Primary FML Seam Pressure Test Log

GORDON ENVIRONMENTAL PSC

333 Rio Rancho Blvd., Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FML SEAMING PRESSURE TEST LOG

PROJECT SPECIFICATIONS

PROJECT NAME: Sundance West LFCell 1A
OWNER: Sundance West, Inc
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 010153018
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 1
MIN START PSI: 35
TEST DURATION: 5:00
MAX PSI DROP: 3

PRESSURE TEST LOCATION: Primary

	DATE	PANEL #/PANEL #	TESTER	TIME		PRESSURE		MONITORED BY	PASS/FAIL
				START	FINISH	INITIAL	FINAL		
1	11-19-18	PE1-PE2	CZ	13:15	13:20	35	35	DG	Pass
2	11-19-18	PE2-PE3/A	CZ	14:25	14:30	40	39	DG	Pass
3	11-19-18	PE3-PE3A	CZ	13:19	13:24	40	39	DG	Pass
4	11-19-18	PE3/A-PE4	CZ	13:18	13:23	40	40	DG	Pass
5	11-19-18	PE4-PE5	CZ	13:31	13:36	39	39	DG	Pass
6	11-19-18	PE5-PE6	CZ	13:32	13:37	39	38	DG	Pass
7	11-19-18	PE6-PE7	CZ	13:40	13:45	37	36	DG	Pass
8	11-19-18	PE7-PE8	CZ	13:41	13:46	39	39	DG	Pass
9	11-19-18	PE8-PE9	CZ	13:42	13:47	39	38	DG	Pass
10	11-19-18	PE9-PE10/A	CZ	14:02	14:07	40	40	DG	Pass
11	11-19-18	PE10-PE10A	CZ	14:04	14:09	40	39	DG	Pass
12	11-19-18	PE10/A-PE11	CZ	14:03	14:08	40	40	DG	Pass
13	11-19-18	PE11-PE12	CZ	14:13	14:18	40	40	DG	Pass
14	11-19-18	PE12-PE13	CZ	14:14	14:19	40	40	DG	Pass
15	11-19-18	PE12-PE13	CZ	14:15	14:20	40	39	DG	Pass
16	11-19-18	PE13-PE14	CZ	14:20	14:25	40	39	DG	Pass
17	11-19-18	PE14-PE15	CZ	14:21	14:26	40	39	DG	Pass
18	11-19-18	PE15-PE16	CZ	14:22	14:27	39	39	DG	Pass
19	11-19-18	PE16-PE17	CZ	14:33	14:38	40	40	DG	Pass
20	11-19-18	PE17-PE18	CZ	14:34	14:39	39	39	DG	Pass
21	11-19-18	PE18-PE19	CZ	14:51	14:56	40	39	DG	Pass
22	11-19-18	PE19-PE20	CZ	14:52	14:57	40	39	DG	Pass
23	11-19-18	PE20-PE21	CZ	15:10	15:06	40	40	DG	Pass
24	11-19-18	PE21-PE22	CZ	15:02	15:07	38	38	DG	Pass
25	11-20-18	PE23-PE23A	CZ	07:01	07:06	39	38	DG	Pass
26	11-20-18	PE22-PE23/A	CZ	07:00	07:05	40	40	DG	Pass
27	11-20-18	PE23/A-PE24/A	CZ	09:5	09:20	39	38	DG	Pass
28	11-20-18	PE24→27-PE28→30	CZ	07:55	08:00	40	38	DG	Pass
29	11-20-18	PE24-PE25	CZ	07:35	07:40	40	39	DG	Pass
30	11-20-18	PE25-PE26	CZ	07:37	07:42	40	40	DG	Pass
31	11-20-18	PE27-PE28	CZ	07:42	07:47	39	39	DG	Pass
32	11-20-18	PE28-PE29	CZ	07:41	07:46	40	39	DG	Pass
33	11-20-18	PE29-PE30	CZ	07:36	07:41	39	39	DG	Pass
34	11-20-18	PE21-PB1A	CZ	11:10	1:15	39	38	DG	Pass
35	11-20-18	PE20-PB1A	CZ	11:14	11:19	40	39	DG	Pass
36	11-20-18	PB1A-PB1B	CZ	13:27	13:32	40	40	DG	Pass
37	11-20-18	PB1A-PB1B	CZ	11:04	11:09	39	38	DG	Pass
38	11-20-18	PB2A-PB2B	CZ	11:05	11:10	40	40	DG	Pass
39	11-20-18	PB3A-PB3B	CZ	13:50	13:55	40	40	DG	Pass
40	11-20-18	PB1/A-PB2/A	CZ					DG	Pass
41	11-20-18	PB2/A-PB3/A	CZ					DG	Pass
42	11-27-18	PB4A-PB4B	CZ	07:21	07:26	40	40	BSB	Pass
43	11-27-18	PB5A-PB5B	CZ	07:20	07:25	38	38	BSB	Pass
44	11-27-18	PB4-PB4A	CZ	08:07	08:12	40	40	BSB	Pass
45	11-27-18	PB5-PB5A	CZ	08:10	08:15	40	39	BSB	Pass
46	11-27-18	PB6-PB6A	CZ	08:12	08:17	40	39	BSB	Pass
47	11-27-18	PB3B-PB4B	CZ	07:30	07:35	40	40	BSB	Pass
48	11-27-18	PB3/A/B-PB4/A/B	CZ	08:43	08:48	40	39	BSB	Pass
49	11-27-18	PB4A/B-PB5A/B	CZ	08:36	08:41	40	40	BSB	Pass
50	11-27-18	PB4B-PB5B	CZ	07:31	07:36	39	38	BSB	Pass
51	11-27-18	PB4-PB5	CZ	09:56	10:01	40	40	BSB	Pass
52	11-27-18	PB6-PB6A	CZ	08:12	08:17	40	39	BSB	Pass
53	11-27-18	PB5/A/B-PB6/A/B	CZ	10:02	10:07	40	39	BSB	Pass
54	11-27-18	PB6/A-PB7/A	CZ	10:15	10:20	40	40	BSB	Pass
55	11-27-18	PB6A-PB6B	CZ	08:50	08:55	40	40	BSB	Pass

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Rio Rancho, New Mexico 87124
505.867.6990

FML SEAMING PRESSURE TEST LOG

PROJECT SPECIFICATIONS

PROJECT NAME: Sundance West LFCell 1A
OWNER: Sundance West, Inc
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 010153018
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 2
MIN START PSI: 35
TEST DURATION: 5:00
MAX PSI DROP: 3

PRESSURE TEST LOCATION: Primary

	DATE	PANEL #/PANEL #	TESTER	TIME		PRESSURE		MONITORED BY	PASS/FAIL
				START	FINISH	INITIAL	FINAL		
1	11-27-18	PB7-PB7A	CZ	10:32	10:37	40	40	BSB	Pass
2	11-27-18	PB8-PB8A	CZ	10:31	10:36	38	37	BSB	Pass
3	11-27-18	PB9-PB9A	CZ	11:17	11:22	40	40	BSB	Pass
4	11-27-18	PB10-PB10A	CZ	11:18	11:23	40	40	BSB	Pass
5	11-27-18	PB9A-PB9B	CZ	10:51	10:56	40	39	BSB	Pass
6	11-27-18	PB10A-PB10B	CZ	11:07	11:12	39	38	BSB	Pass
7	11-27-18	PB10A-PB10B	CZ	11:11	11:16	40	39	BSB	Pass
8	11-27-18	PB6A/B-PB7A	CZ	09:30	09:35	40	40	BSB	Pass
9	11-27-18	PB9A-PB10/A	CZ	11:31	11:36	40	40	BSB	Pass
10	11-27-18	PB9A-PB10B	CZ	11:30	11:35	40	39	BSB	Pass
11	11-27-18	PB7/A-PB8/A	CZ	10:42	10:47	40	40	BSB	Pass
12	11-27-18	PB7A-PB8A	CZ	10:41	10:49	40	40	BSB	Pass
13	11-27-18	PB8A-PB9B	CZ	11:45	11:50	35	34	BSB	Pass
14	11-27-18	PB8A/B-PB9/A/B	CZ	11:44	11:49	40	39	BSB	Pass
15	11-28-18	PB11-PB11A	CZ	08:29	08:34	40	40	BSB	Pass
16	11-28-18	PB11A-PB11B	CZ	08:23	08:28	38	38	BSB	Pass
17	11-28-18	PB12-PB12A	CZ	10:35	10:40	40	40	BSB	Pass
18	11-28-18	PB12A-PB12B	CZ	08:17	08:22	40	39	BSB	Pass
19	11-28-18	PB13-PB13A	CZ	10:32	10:37	39	39	BSB	Pass
20	11-28-18	PB13-PB13B	CZ	08:15	08:20	40	39	BSB	Pass
21	11-28-18	PB11B-PB12B	CZ	08:55	09:00	40	39	BSB	Pass
22	11-28-18	PB11/A/B-PB12/A/B	CZ	08:56	09:01	40	39	BSB	Pass
23	11-28-18	PB10B-PB11B	CZ	09:45	09:50	40	40	BSB	Pass
24	11-28-18	PB10/A/B-PB11/A/B	CZ	10:55	11:00	40	39	BSB	Pass
25	11-28-18	PB14-PB14A	CZ	10:33	10:38	40	40	BSB	Pass
26	11-28-18	PB14A-PB14B	CZ	09:52	09:57	40	40	BSB	Pass
27	11-28-18	PB15-PB15A	CZ	11:02	11:07	40	39	BSB	Pass
28	11-28-18	PB15A-PB15B	CZ	09:54	09:59	40	39	BSB	Pass
29	11-28-18	PB14A-PB15A	CZ	11:21	11:26	40	40	BSB	Pass
30	11-28-18	PB12B-PB13B	CZ	09:10	09:15	40	40	BSB	Pass
31	11-28-18	PB12/A/B-PB13/A/B	CZ	09:40	09:45	35	35	BSB	Pass
32	11-28-18	PB13-PB14	CZ	10:31	10:36	39	38	BSB	Pass
33	11-28-18	PB13/A/B-PB14/A/B	CZ	10:24	10:29	39	38	BSB	Pass
34	11-28-18	PB14A/B-PB15A/B	CZ	11:20	11:25	39	39	BSB	Pass
35	11-28-18	PB16-PB16A	CZ	11:04	11:09	40	40	BSB	Pass
36	11-28-18	PB16A-PB16B	CZ	11:03	11:08	40	40	BSB	Pass
37	11-28-18	PB13B-PB14B	CZ	10:02	10:07	40	40	BSB	Pass
38	11-28-18	PB15/A-PB16A/B	CZ	11:32	11:37	39	39	BSB	Pass
39	11-28-18	PB15A/B-PB16B/C	CZ	11:31	11:36	40	40	BSB	Pass
40	11-28-18	PB17-PB18	CZ	12:43	12:48	40	40	BSB	Pass
41	11-28-18	PB16/A-PB17	CZ	12:38	12:43	37	37	BSB	Pass
42	11-28-18	PB18-PB19	CZ	12:44	12:49	35	35	BSB	Pass
43	11-28-18	PB19-PB20	CZ	13:00	13:05	40	39	BSB	Pass
44	11-28-18	PB20-PB21	CZ	13:01	13:06	40	40	BSB	Pass
45	11-28-18	PB21-PB22/A	CZ	13:09	13:14	40	40	BSB	Pass
46	11-28-18	PB22-PB22A	CZ	13:10	13:15	40	39	BSB	Pass
47	11-29-18	PB16C-PB17A/B	CZ	07:20	07:25	40	39	BSB	Pass
48	11-29-18	PB16C-PB17A	CZ	08:00	08:05	40	39	BSB	Pass
49	11-29-18	PB17B-PB18B	CZ	07:21	07:26	40	40	BSB	Pass
50	11-29-18	PB18A-PB18B	CZ	07:09	07:14	40	40	BSB	Pass
51	11-29-18	PB17A-PB17B	CZ	07:03	07:08	40	40	BSB	Pass
52	11-29-18	PB19A-PB19B	CZ	07:30	07:35	40	40	BSB	Pass
53	11-29-18	PB22A-PB22B	CZ					BSB	Pass
54	11-29-18	PB18B-PB19A	CZ	07:37	07:42	40	39	BSB	Pass
55	11-29-18	PB17A-PB18A	CZ	08:37	08:42	38	38	BSB	Pass

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Rio Rancho, New Mexico 87124
505.867.6990

FML SEAMING PRESSURE TEST LOG

PROJECT SPECIFICATIONS

PROJECT NAME: Sundance West LFCell 1A
OWNER: Sundance West, Inc
PROJECT LOCATION: Eunice, NM
PROJECT NUMBER: 010153018
CONTRACTOR: SLS, Inc.
SHEET NUMBER: 3
MIN START PSI: 35
TEST DURATION: 5:00
MAX PSI DROP: 3

PRESSURE TEST LOCATION: Primary

	DATE	PANEL #/PANEL #	TESTER	TIME		PRESSURE		MONITORED BY	PASS/FAIL
				START	FINISH	INITIAL	FINAL		
1	11-29-18	PB18A/B-PB19A/B	CZ	08:39	08:44	40	39	BSB	Pass
2	11-29-18	PB19B-PB20A	CZ	09:01	09:06	40	39	BSB	Pass
3	11-29-18	PB19A-PB20A	CZ	09:11	09:16	38	38	BSB	Pass
4	11-29-18	PB20A-PB21A	CZ	09:30	09:35	38	38	BSB	Pass
5	11-29-18	PB21A-PB22	CZ	09:31	09:36	40	40	BSB	Pass
6	11-29-18	PB20A-PB21A	CZ	09:41	09:46	40	39	BSB	Pass
7	11-29-18	PB21A-PB22/A/B	CZ	10:07	10:12	40	39	BSB	Pass
8	11-29-18	PB22B-PB22C	CZ	09:18	09:23	40	40	BSB	Pass
9									
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APPENDIX C

Cell 1A Liner Installation Documentation

C.18. Primary FML Seam Vacuum Test and Defect-Repair Log

GORDON ENVIRONMENTAL PSC

333 Rio Rancho Blvd., Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FML SEAM VACUUM TEST/REPAIR LOG

PROJECT NAME: Sundance West LF Cell 1A
PROJECT NUMBER: 01053018.00
OWNER: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 1

TEST/REPAIR LOCATION: Primary
MONITOR: DG

	REPAIR DATE	PANEL	TYPE OF REPAIR	REPAIR TECH	NUMBER OF LEAKS	TESTING TECH ID	DATE ACCEPTED	COMMENTS
1	11/19/2018	E7-E8	PDT1	MM	0	TD	11/19/2018	
2	11/19/2018	E12-E13	PDT2	MM	0	TD	11/19/2018	
3	11/19/2018	E19-E20	PDT3	MM	0	TD	11/19/2018	
4	11/19/2018	E3/E3a-E2	P	MM	0	TD	11/19/2018	
5	11/19/2018	E3/E3a-E4	P	MM	0	TD	11/19/2018	
6	11/19/2018	E10/E10a-E9	P	MM	0	TD	11/19/2018	
7	11/19/2018	E10/E10a-E11	P	MM	0	TD	11/19/2018	
8	11/19/2018	E21-E22	P	MM	0	TD	11/19/2018	
9	11/20/2018	E29-E30	PDT4	GZ	0	TD	11/20/2018	
10	11/20/2018	E22-E23	P	GZ	0	TD	11/20/2018	
11	11/20/2018	E23/23a-E22	P	GZ	0	TD	11/20/2018	
12	11/20/2018	E23/23a-E24	P	GZ	0	TD	11/20/2018	
13	11/20/2018	E24/E25-E30	P	GZ	0	TD	11/20/2018	
14	11/20/2018	E25/E26-E29	P	GZ	0	TD	11/20/2018	
15	11/20/2018	E26/E27-E28	P	GZ	0	TD	11/20/2018	
16	11/20/2018	E28/E29-E26	P	GZ	0	TD	11/20/2018	
17	11/20/2018	E29/E30-E25	P	GZ	0	TD	11/20/2018	
18	11/20/2018	E11-B1a	PDT5	GZ	0	TD	11/20/2018	
19	11/20/2018	B1a-B2a	PDT6	GZ	0	TD	11/20/2018	
20	11/20/2018	B2a-B3a	PDT7	GZ	0	TD	11/20/2018	
21	11/20/2018	B1/B1a-E30	P	GZ	0	TD	11/20/2018	
22	11/20/2018	E30/E24-B1a	P	GZ	0	TD	11/20/2018	
23	11/20/2018	E24/E23a-B1a	P	GZ	0	TD	11/20/2018	
24	11/20/2018	E23/23a-E24	P	GZ	0	TD	11/20/2018	
25	11/20/2018	E23/23a-E22	P	GZ	0	TD	11/20/2018	
26	11/20/2018	E23a/E22-B1a	P	GZ	0	TD	11/20/2018	
27	11/20/2018	E22/E21-B1a	P	GZ	0	TD	11/20/2018	
28	11/20/2018	E21/E20-B1a	P	GZ	0	TD	11/20/2018	
29	11/20/2018	E20/E19-B1a	P	GZ	0	TD	11/20/2018	
30	11/20/2018	E19/E18-B1a	P	GZ	0	TD	11/20/2018	
31	11/20/2018	E18/E17-B1a	P	GZ	0	TD	11/20/2018	
32	11/20/2018	E17/E16-B1a	P	GZ	0	TD	11/20/2018	
33	11/20/2018	E16/E15-B1a	P	GZ	0	TD	11/20/2018	
34	11/20/2018	E15/E14-B1a	P	GZ	0	TD	11/20/2018	
35	11/20/2018	E14/E13-B1a	P	GZ	0	TD	11/20/2018	
36	11/20/2018	E13/E12-B1a	P	GZ	0	TD	11/20/2018	
37	11/20/2018	E12/E11-B1a	P	GZ	0	TD	11/20/2018	
38	11/20/2018	E11/E10a-B1a	P	GZ	0	TD	11/20/2018	
39	11/20/2018	E10a/E9-B1a	P	GZ	0	TD	11/20/2018	
40	11/20/2018	B1a/B1b-E9	P	GZ	0	TD	11/20/2018	
41	11/20/2018	B1a/B1b-B2a	P	GZ	0	TD	11/20/2018	
42	11/20/2018	E9/E8-B1b	P	GZ	0	TD	11/20/2018	
43	11/20/2018	E8/E7-B1b	P	GZ	0	TD	11/20/2018	
44	11/20/2018	E7/E6-B1b	P	GZ	0	TD	11/20/2018	
45	11/20/2018	E6/E5-B1b	P	GZ	0	TD	11/20/2018	

GORDON ENVIRONMENTAL PSC

333 Rio Rancho Blvd., Suite 400
Rio Rancho, New Mexico 87124
505.867.6990

FML SEAM VACUUM TEST/REPAIR LOG

PROJECT NAME: Sundance West LF Cell 1A
PROJECT NUMBER: 01053018.00
OWNER: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 2

TEST/REPAIR LOCATION: Primary
MONITOR: DG

	REPAIR DATE	PANEL	TYPE OF REPAIR	REPAIR TECH	NUMBER OF LEAKS	TESTING TECH ID	DATE ACCEPTED	COMMENTS
1	11/20/2018	E5/E4-B1b	P	GZ	0	TD	11/20/2018	
2	11/20/2018	E4/E3-B1b	P	GZ	0	TD	11/20/2018	
3	11/20/2018	E3/E2-B1b	P	GZ	0	TD	11/20/2018	
4	11/20/2018	E2/E1-B1b	P	GZ	0	TD	11/20/2018	
5	11/20/2018	B2a/2b-B1b	P	GZ	0	TD	11/20/2018	
6	11/20/2018	B2a/2b-B3a	P	GZ	0	TD	11/20/2018	
7	11/20/2018	E21-B1a	P	GZ	0	TD	11/20/2018	
8	11/20/2018	B3a/3b-B2b	P	GZ	0	TD	11/20/2018	
9	11/20/2018	B1	P	GZ	0	TD	11/20/2018	
10	11/20/2018	B3	P	GZ	0	TD	11/20/2018	
11	11/20/2018	B1/B2-B1a/B2a	P	GZ	0	TD	11/20/2018	
12	11/20/2018	B2/B3-B2a/B3a	P	GZ	0	TD	11/20/2018	
13	11/27/2018	B3b-B4b	PDT8	LY	0	TD	11/27/2018	
14	11/27/2018	B4b-B5b	PDT9	LY	0	TD	11/27/2018	
15	11/27/2018	B5-B5a	PDT10	LY	0	TD	11/27/2018	
16	11/27/2018	B3/3a-B4/4a	P	LY	0	TD	11/27/2018	
17	11/27/2018	B3a/3b-B4a	P	LY	0	TD	11/27/2018	
18	11/27/2018	B4/4a-B5/5a	P	LY	0	TD	11/27/2018	
19	11/27/2018	B4/4b-B3b	P	LY	0	TD	11/27/2018	
20	11/27/2018	B4a/4b-B5a	P	LY	0	TD	11/27/2018	
21	11/27/2018	B5/5a-B6/6a	P	LY	0	TD	11/27/2018	
22	11/27/2018	B5a/5b-B4b	P	LY	0	TD	11/27/2018	
23	11/27/2018	B5a/5b-B6a	P	LY	0	TD	11/27/2018	
24	11/27/2018	B6/B6a-B7/7a	P	LY	0	TD	11/27/2018	
25	11/27/2018	B6a/B6b-B5b	P	LY	0	TD	11/27/2018	
26	11/27/2018	B6a/6b-B7a	P	LY	0	TD	11/27/2018	
27	11/27/2018	B7/7a-B8/8a	P	LY	0	TD	11/27/2018	
28	11/27/2018	B8/8a-B9/9a	P	LY	0	TD	11/27/2018	
29	11/27/2018	B9a/9b-B8a	P	LY	0	TD	11/27/2018	
30	11/27/2018	B6a-B7a	P	LY	0	TD	11/27/2018	
31	11/27/2018	B9a/9b-B10b	P	LY	0	TD	11/27/2018	
32	11/27/2018	B9/9a-B10/10a	P	LY	0	TD	11/27/2018	
33	11/27/2018	B10a/B10b-B9a	P	LY	0	TD	11/27/2018	
34	11/27/2018	B6a-B7a	PDT11	LY	0	TD	11/27/2018	
35	11/27/2018	B7a-B8a	PDT12	LY	0	TD	11/27/2018	
36	11/27/2018	B8a-B9a	PDT13	LY	0	TD	11/27/2018	
37	11/27/2018	B10a-B10b	PDT14	LY	0	TD	11/27/2018	
38	11/28/2018	B10/10a-B11/11a	P	MM	0	TD	11/28/2018	
39	11/28/2018	B11/11a-B12/12a	P	MM	0	TD	11/28/2018	
40	11/28/2018	B12/12a-B13/13a	P	MM	0	TD	11/28/2018	
41	11/28/2018	B13/13a-B14/14a	P	MM	0	TD	11/28/2018	
42	11/28/2018	B14/14a-B15/15a	P	MM	0	TD	11/28/2018	
43	11/28/2018	B15/15a-B16a/B16b	P	MM	0	TD	11/28/2018	
44	11/28/2018	B10a/B10b-B11a	P	MM	0	TD	11/28/2018	
45	11/28/2018	B11a/11b-B10b	P	MM	0	TD	11/28/2018	

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Rio Rancho, New Mexico 87124
505.867.6990

FML SEAM VACUUM TEST/REPAIR LOG

PROJECT NAME: Sundance West LF Cell 1A
PROJECT NUMBER: 01053018.00
OWNER: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 3

TEST/REPAIR LOCATION: Primary
MONITOR: DG

	REPAIR DATE	PANEL	TYPE OF REPAIR	REPAIR TECH	NUMBER OF LEAKS	TESTING TECH ID	DATE ACCEPTED	COMMENTS
1	11/28/2018	B11a/11b-B12a	P	MM	0	TD	11/28/2018	
2	11/28/2018	B12a/12b-B11b	P	MM	0	TD	11/28/2018	
3	11/28/2018	B12a/12b-B13a	P	MM	0	TD	11/28/2018	
4	11/28/2018	B13a/13b-B12b	P	MM	0	TD	11/28/2018	
5	11/28/2018	B13a/13b-B14a	P	MM	0	TD	11/28/2018	
6	11/28/2018	B13a-B13b	PDT16	MM	0	TD	11/28/2018	
7	11/28/2018	B10b-B11b	PDT15	MM	0	TD	11/28/2018	
8	11/28/2018	B11b-B12b	PDT17	MM	0	TD	11/28/2018	
9	11/28/2018	B12b-B13b	PDT18	MM	0	TD	11/28/2018	
10	11/28/2018	B14a/14b-B13b	P	MM	0	TD	11/28/2018	
11	11/28/2018	B14a/14b-B15a	P	MM	0	TD	11/28/2018	
12	11/28/2018	B13b-B14b	PDT19	MM	0	TD	11/28/2018	
13	11/28/2018	B15a/15b-B14b	P	MM	0	TD	11/28/2018	
14	11/28/2018	B15a/15b-B16b	P	MM	0	TD	11/28/2018	
15	11/28/2018	B16b/16c-B15b	P	MM	0	TD	11/28/2018	
16	11/28/2018	B16/16a-B15	P	MM	0	TD	11/28/2018	
17	11/28/2018	B16/16a-B17	P	MM	0	TD	11/28/2018	
18	11/28/2018	B16a/B16b-B15/15a	P	MM	0	TD	11/28/2018	
19	11/28/2018	B14b-B15b	PDT20	MM	0	TD	11/28/2018	
20	11/28/2018	B14a-B15a	PDT21	MM	0	TD	11/28/2018	
21	11/28/2018	15a+B255:B268-B15	PDT22	MM	0	TD	11/28/2018	
22	11/28/2018	B22/22a-B21	P	MM	0	TD	11/28/2018	
23	11/28/2018	B18-B19	PDT23	MM	0	TD	11/28/2018	
24	11/28/2018	Sec E1-Pri E1	P	MM	0	TD	11/28/2018	
25	11/28/2018	E1/Pri E1-Sec B1a/Pr	T	MM	0	TD	11/28/2018	
26	11/28/2018	SB1/SB2b-PB1b/PB2	T	MM	0	TD	11/28/2018	
27	11/28/2018	B2b/SB3b-PB2b/PB3	T	MM	0	TD	11/28/2018	
28	11/28/2018	B3b/SB4b-PB3b/PB4	T	MM	0	TD	11/28/2018	
29	11/28/2018	B4b/SB5b-PB4b/PB5	T	MM	0	TD	11/28/2018	
30	11/28/2018	B5b/SB6b-PB5b/PB6	T	MM	0	TD	11/28/2018	
31	11/28/2018	B6b/SB7c-PB6b/PB7	T	MM	0	TD	11/28/2018	
32	11/28/2018	B7c/SB8b-PB7a/PB8	T	MM	0	TD	11/28/2018	
33	11/28/2018	B8b/SB9b-PB8a/PB9	T	MM	0	TD	11/28/2018	
34	11/28/2018	B9b/SB10b-PB9b/B1	T	MM	0	TD	11/28/2018	
35	11/28/2018	0b/SB11b-PB10b/PB	T	MM	0	TD	11/28/2018	
36	11/29/2018	B16a/B16b-B17/B17a	P	GZ	0	TD	11/29/2018	
37	11/29/2018	B17/17a-B18/18a	P	GZ	0	TD	11/29/2018	
38	11/29/2018	B18/18a-B19/19a	P	GZ	0	TD	11/29/2018	
39	11/29/2018	B19/19a-B20/B20a	P	GZ	0	TD	11/29/2018	
40	11/29/2018	B20/20a-B21/21a	P	GZ	0	TD	11/29/2018	
41	11/29/2018	B21/21a-B22a/B22b	P	GZ	0	TD	11/29/2018	
42	11/29/2018	B16b/16c-B17a	P	GZ	0	TD	11/29/2018	
43	11/29/2018	B16c-B17a	PDT24	GZ	0	TD	11/29/2018	
44	11/29/2018	B18a/18b-B17b	P	GZ	0	TD	11/29/2018	
45	11/29/2018	B18a/18b-B19a	P	GZ	0	TD	11/29/2018	

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FML SEAM VACUUM TEST/REPAIR LOG

PROJECT NAME: Sundance West LF Cell 1A
PROJECT NUMBER: 01053018.00
OWNER: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 4

TEST/REPAIR LOCATION: Primary
MONITOR: DG

	REPAIR DATE	PANEL	TYPE OF REPAIR	REPAIR TECH	NUMBER OF LEAKS	TESTING TECH ID	DATE ACCEPTED	COMMENTS
1	11/29/2018	B17b-B17a	PDT25	GZ	0	TD	11/29/2018	
2	11/29/2018	B18b-B19a	PDT26	GZ	0	TD	11/29/2018	
3	11/29/2018	B19a/19b-B18b	P	GZ	0	TD	11/29/2018	
4	11/29/2018	B19a/19b-B20a	P	GZ	0	TD	11/29/2018	
5	11/29/2018	B19a-B19b	PDT28	GZ	0	TD	11/29/2018	
6	11/29/2018	B20a-B19a	PDT27	GZ	0	TD	11/29/2018	
7	11/29/2018	B20a-B21a	PDT29	GZ	0	TD	11/29/2018	
8	11/29/2018	B21a-B22c	PDT30	GZ	0	TD	11/29/2018	
9	11/29/2018	B22b-B22c	PDT31	GZ	0	TD	11/29/2018	
10	11/29/2018	B22b/B22c-B21a	P	GZ	0	TD	11/29/2018	
11	11/29/2018	310b/B11b-SB10b/B1	P	GZ	0	TD	11/29/2018	
12	11/29/2018	311b/B12b-SB11b/B1	T	GZ	0	TD	11/29/2018	
13	11/29/2018	312b/B13b-SB12b/B1	T	GZ	0	TD	11/29/2018	
14	11/29/2018	313b/B14b-SB13b/B1	T	GZ	0	TD	11/29/2018	
15	11/29/2018	B14b/B15b-B14b/B15	T	GZ	0	TD	11/29/2018	
16	11/29/2018	B15b/B16c-B15b/B16	T	GZ	0	TD	11/29/2018	
17	11/29/2018	B16c/B17b-B16a/B17	T	GZ	0	TD	11/29/2018	
18	11/29/2018	B17b/B18b-B17b/B18	T	GZ	0	TD	11/29/2018	
19	11/29/2018	B18b/B19b-B18b/B19	T	GZ	0	TD	11/29/2018	
20	11/29/2018	B19b/B20a-B19b/B20	T	GZ	0	TD	11/29/2018	
21	11/29/2018	320a/B21a-SB20b/B2	T	GZ	0	TD	11/29/2018	
22	11/29/2018	321a/B22c-SB21b/B2	P	GZ	0	TD	11/29/2018	
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APPENDIX C

Cell 1A Liner Installation Documentation

C.19. Geocomposite Deployment Log

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Rio Rancho, New Mexico 87124
505.867.6990

GEOCOMPOSITE DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 1

MATERIAL TYPE: Double-Sided - Secondary Slopes
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
E01	131553661	77.0	15.0	1,155.0	11/19/2018
E02	131553661	77.0	15.0	1,155.0	11/19/2018
E03	131553661	49.0	15.0	735.0	11/19/2018
E03A	131553654	29.0	15.0	435.0	11/19/2018
E04	131553654	76.0	15.0	1,140.0	11/19/2018
E05	131553654	76.0	15.0	1,140.0	11/19/2018
E06A	131553654	17.0	15.0	255.0	11/19/2018
E06	131553665	61.0	15.0	915.0	11/19/2018
E07	131553665	76.0	15.0	1,140.0	11/19/2018
E08	131553665	60.0	15.0	900.0	11/19/2018
E08A	131553676	17.0	15.0	255.0	11/19/2018
E09	131553676	76.0	15.0	1,140.0	11/19/2018
E10	131553676	76.0	15.0	1,140.0	11/19/2018
E11A	131553676	30.0	15.0	450.0	11/19/2018
E11	131553656	49.0	15.0	735.0	11/19/2018
E12	131553656	76.0	15.0	1,140.0	11/19/2018
E13	131553656	76.0	15.0	1,140.0	11/19/2018
E14	131553674	77.0	15.0	1,155.0	11/19/2018
E15	131553674	77.0	15.0	1,155.0	11/19/2018
E16A	131553674	48.0	15.0	720.0	11/19/2018
E16	131553658	30.0	15.0	450.0	11/19/2018
E17	131553658	76.0	15.0	1,140.0	11/19/2018
E18	131553658	76.0	15.0	1,140.0	11/19/2018
E19A	131553658	16.0	15.0	240.0	11/19/2018
E19	131553657	61.0	15.0	915.0	11/19/2018
E20	131553657	77.0	15.0	1,155.0	11/19/2018
E21	131553657	52.0	15.0	780.0	11/19/2018
E21A	131553675	16.0	15.0	240.0	11/19/2018
E22	131553675	76.0	15.0	1,140.0	11/19/2018
E23	131553675	76.0	15.0	1,140.0	11/19/2018
E24A	131553675	36.0	15.0	540.0	11/19/2018
E24	131553663	47.0	15.0	705.0	11/19/2018
E25	131553663	76.0	15.0	1,140.0	11/19/2018
E26	131553663	76.0	15.0	1,140.0	11/19/2018
E27	131553664	77.0	15.0	1,155.0	11/19/2018
E28	131553664	77.0	15.0	1,155.0	11/19/2018
E29	131553664	48.0	15.0	720.0	11/19/2018
TOTAL LINER PLACED (FT^2):				32,895.0	

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Rio Rancho, New Mexico 87124
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GEOCOMPOSITE DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 2

MATERIAL TYPE: Double-Sided - Secondary Slopes
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
E29A	131553660	29.0	15.0	435.0	43423
E30	131553660	77.0	15.0	1,155.0	43423
E31	131553660	77.0	15.0	1,155.0	43423
E32A	131553660	17.0	15.0	255.0	43423
E32	131553659	60.0	15.0	900.0	43423
E33	131553659	78.0	15.0	1,170.0	43423
E34	131553659	63.0	15.0	945.0	43423
E34A	131553662	16.0	15.0	240.0	43423
E35	131553662	77.0	15.0	1,155.0	43423
E36	131553662	77.0	15.0	1,155.0	43423
E37A	131553662	32.0	15.0	480.0	43423
E38A	131553662	0.0	15.0	0.0	43423
E37	131553643	41.0	15.0	615.0	43423
E38	131553643	35.0	15.0	525.0	43423
E39	131553643	39.0	15.0	585.0	43423
E40	131553643	24.0	15.0	360.0	43423
E41	131553643	70.0	15.0	1,050.0	43423
E42A	131553643	17.0	15.0	255.0	43423
E43A	131553643	0.0	15.0	0.0	43423
E42	131553623	49.0	15.0	735.0	43423
E43	131553623	32.0	15.0	480.0	43423
E44	131553623	35.0	15.0	525.0	43423
E45	131553623	16.0	15.0	240.0	43423
N01	131553623	67.0	15.0	1,005.0	43424
N02A	131553623	16.0	15.0	240.0	43424
N02	131553622	52.0	15.0	780.0	43424
N03	131553622	67.0	15.0	1,005.0	43424
N04	131553622	69.0	15.0	1,035.0	43424
N05	131553639	69.0	15.0	1,035.0	43424
N06	131553639	70.0	15.0	1,050.0	43430
N07	131553639	62.0	15.0	930.0	43430
N07A	131553642	11.0	15.0	165.0	43430
N08	131553642	71.0	15.0	1,065.0	43430
N09	131553642	72.0	15.0	1,080.0	43430
N10a	131553642	45.0	15.0	675.0	43430
N10	131553644	29.0	15.0	435.0	43430
N11	131553644	74.0	15.0	1,110.0	43430
TOTAL LINER PLACED (FT^2):				26,025.0	

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Rio Rancho, New Mexico 87124
505.867.6990

GEOCOMPOSITE DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 3

MATERIAL TYPE: Double-Sided - Secondary Slopes
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
N12	131553644	74.0	15.0	1,110.0	11/26/2018
N13A	131553644	23.0	15.0	345.0	11/26/2018
N13	131553610	54.0	15.0	810.0	11/26/2018
N14	131553610	75.0	15.0	1,125.0	11/26/2018
N15	131553610	71.0	15.0	1,065.0	11/26/2018
N15A	131553640	6.0	15.0	90.0	11/26/2018
N16	131553640	76.0	15.0	1,140.0	11/26/2018
N17	131553640	79.0	15.0	1,185.0	11/26/2018
N18A	131553640	36.0	15.0	540.0	11/26/2018
N18	131553611	44.0	15.0	660.0	11/26/2018
N19	131553611	80.0	15.0	1,200.0	11/26/2018
N20	131553611	77.0	15.0	1,155.0	11/26/2018
N21	131553637	80.0	15.0	1,200.0	11/26/2018
N22	131553637	80.0	15.0	1,200.0	11/26/2018
N23A	131553637	40.0	15.0	600.0	11/26/2018
N23	131553636	42.0	15.0	630.0	11/26/2018
N24	131553636	81.0	15.0	1,215.0	11/26/2018
N25	131553636	76.0	15.0	1,140.0	11/26/2018
N25A	131553673	7.0	15.0	105.0	11/26/2018
N26	131553673	83.0	15.0	1,245.0	11/26/2018
N27	131553673	84.0	15.0	1,260.0	11/26/2018
N28A	131553673	25.0	15.0	375.0	11/26/2018
N28	131553633	61.0	15.0	915.0	11/26/2018
N29	131553633	85.0	15.0	1,275.0	11/26/2018
N30A	131553633	52.0	15.0	780.0	11/26/2018
N30	131553624	34.0	15.0	510.0	11/26/2018
N31	131553624	86.0	15.0	1,290.0	11/26/2018
N32	131553624	81.0	15.0	1,215.0	11/26/2018
N32A	131553645	7.0	15.0	105.0	11/26/2018
N33	131553645	87.0	15.0	1,305.0	11/26/2018
N34	131553645	87.0	15.0	1,305.0	11/26/2018
TOTAL LINER PLACED (FT^2):				28,095.0	

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GEOCOMPOSITE DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 1

MATERIAL TYPE: Double-Sided - Primary Slopes
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
E01	131553629	76.0	15.0	1,140.0	11/29/2018
E02	131553629	76.0	15.0	1,140.0	11/29/2018
E03A	131553629	47.0	15.0	705.0	11/29/2018
E03	131553616	31.0	15.0	465.0	11/29/2018
E04	131553616	76.0	15.0	1,140.0	11/29/2018
E05	131553616	76.0	15.0	1,140.0	11/29/2018
E06A	131553616	19.0	15.0	285.0	11/29/2018
E06	131553670	58.0	15.0	870.0	11/29/2018
E07	131553670	76.0	15.0	1,140.0	11/29/2018
E08	131553670	65.0	15.0	975.0	11/29/2018
E08A	131553630	8.0	15.0	120.0	11/29/2018
E09	131553630	76.0	15.0	1,140.0	11/29/2018
E10	131553630	76.0	15.0	1,140.0	11/29/2018
E11A	131553630	41.0	15.0	615.0	11/29/2018
E11	131553646	38.0	15.0	570.0	11/29/2018
E12	131553646	76.0	15.0	1,140.0	11/29/2018
E13	131553646	76.0	15.0	1,140.0	11/29/2018
E14A	131553646	12.0	15.0	180.0	11/29/2018
E14	131553671	65.0	15.0	975.0	11/29/2018
E15	131553671	75.0	15.0	1,125.0	11/29/2018
E16	131553671	62.0	15.0	930.0	11/29/2018
E16A	131553634	15.0	15.0	225.0	11/29/2018
E17	131553634	75.0	15.0	1,125.0	11/29/2018
E18	131553634	75.0	15.0	1,125.0	11/29/2018
E19A	131553634	35.0	15.0	525.0	11/29/2018
E19	131553647	42.0	15.0	630.0	11/29/2018
E20	131553647	77.0	15.0	1,155.0	11/29/2018
E21	131553647	75.0	15.0	1,125.0	11/29/2018
E22	131553672	76.0	15.0	1,140.0	11/29/2018
E23	131553672	76.0	15.0	1,140.0	11/29/2018
E24A	131553672	49.0	15.0	735.0	11/29/2018
E24	131553632	28.0	15.0	420.0	11/29/2018
E25	131553632	76.0	15.0	1,140.0	11/29/2018
E26	131553632	76.0	15.0	1,140.0	11/29/2018
E27A	131553632	21.0	15.0	315.0	11/29/2018
E27	131553635	55.0	15.0	825.0	11/29/2018
E28	131553635	76.0	15.0	1,140.0	11/29/2018
TOTAL LINER PLACED (FT^2):				31,980.0	

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GEOCOMPOSITE DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 2

MATERIAL TYPE: Double-Sided - Primary Slopes
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
E29	131553635	72.0	15.0	1,080.0	11/29/2018
E29A	131553628	4.0	15.0	60.0	11/29/2018
E30	131553628	77.0	15.0	1,155.0	11/29/2018
E31	131553628	77.0	15.0	1,155.0	11/29/2018
E32A	131553628	44.0	15.0	660.0	11/29/2018
E32	131553626	32.0	15.0	480.0	11/30/2018
E33	131553626	75.0	15.0	1,125.0	11/30/2018
E34	131553626	75.0	15.0	1,125.0	11/30/2018
E35A	131553626	21.0	15.0	315.0	11/30/2018
E35	131553653	58.0	15.0	870.0	11/30/2018
E36	131553653	75.0	15.0	1,125.0	11/30/2018
E37	131553653	71.0	15.0	1,065.0	11/30/2018
E38A	131553653	0.0	15.0	0.0	11/30/2018
E38A	131553612	42.0	15.0	630.0	11/30/2018
E39	131553612	42.0	15.0	630.0	11/30/2018
E40	131553612	26.0	15.0	390.0	11/30/2018
E41	131553612	73.0	15.0	1,095.0	11/30/2018
E42A	131553612	31.0	15.0	465.0	11/30/2018
E43A	131553612	0.0	15.0	0.0	11/30/2018
E42	131553627	34.0	15.0	510.0	11/30/2018
E43	131553627	33.0	15.0	495.0	11/30/2018
E44	131553627	34.0	15.0	510.0	11/30/2018
E45	131553627	18.0	15.0	270.0	11/30/2018
E46	131553627	0.0	15.0	0.0	11/30/2018
N01	131553627	67.0	15.0	1,005.0	11/30/2018
N02A	131553627	30.0	15.0	450.0	11/30/2018
N02	131553655	39.0	15.0	585.0	11/30/2018
N03	131553655	68.0	15.0	1,020.0	11/30/2018
N04	131553655	68.0	15.0	1,020.0	11/30/2018
N05A	131553655	23.0	15.0	345.0	11/30/2018
N05	131553651	47.0	15.0	705.0	11/30/2018
N06	131553651	70.0	15.0	1,050.0	11/30/2018
N07	131553651	70.0	15.0	1,050.0	11/30/2018
N08A	131553651	12.0	15.0	180.0	11/30/2018
N08	131553638	61.0	15.0	915.0	11/30/2018
N09	131553638	72.0	15.0	1,080.0	11/30/2018
N10	131553638	69.0	15.0	1,035.0	11/30/2018
TOTAL LINER PLACED (FT^2):				25,650.0	

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GEOCOMPOSITE DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 3

MATERIAL TYPE: Double-Sided - Primary Slopes
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
N10A	131553641	3.0	15.0	45.0	11/30/2018
N11	131553641	74.0	15.0	1,110.0	11/30/2018
N12	131553641	74.0	15.0	1,110.0	11/30/2018
N13A	131553641	48.0	15.0	720.0	11/30/2018
N13	131553621	29.0	15.0	435.0	11/30/2018
N14	131553621	76.0	15.0	1,140.0	11/30/2018
N15	131553621	76.0	15.0	1,140.0	11/30/2018
N16A	131553621	21.0	15.0	315.0	11/30/2018
N16	131553625	57.0	15.0	855.0	11/30/2018
N17	131553625	77.0	15.0	1,155.0	11/30/2018
N18	131553625	67.0	15.0	1,005.0	11/30/2018
N18A	131553620	13.0	15.0	195.0	11/30/2018
N19	131553620	79.0	15.0	1,185.0	11/30/2018
N20	131553620	78.0	15.0	1,170.0	11/30/2018
N21A	131553620	29.0	15.0	435.0	11/30/2018
N21	131553619	53.0	15.0	795.0	11/30/2018
N22	131553619	80.0	15.0	1,200.0	11/30/2018
N23	131553619	68.0	15.0	1,020.0	11/30/2018
N23A	131553615	14.0	15.0	210.0	11/30/2018
N24	131553615	82.0	15.0	1,230.0	11/30/2018
N25	131553615	82.0	15.0	1,230.0	11/30/2018
N26A	131553615	24.0	15.0	360.0	11/30/2018
N26	131553618	62.0	15.0	930.0	11/30/2018
N27	131553618	84.0	15.0	1,260.0	11/30/2018
N28A	131553618	54.0	15.0	810.0	11/30/2018
N28	131553614	31.0	15.0	465.0	11/30/2018
N29	131553614	84.0	15.0	1,260.0	11/30/2018
N30	131553614	85.0	15.0	1,275.0	11/30/2018
N31	131553613	86.0	15.0	1,290.0	11/30/2018
N32	131553613	86.0	15.0	1,290.0	11/30/2018
33A	131553613	29.0	15.0	435.0	11/30/2018
B33	131553617	62.0	15.0	930.0	11/30/2018
B34	131553617	87.0	15.0	1,305.0	11/30/2018
TOTAL LINER PLACED (FT^2):				29,310.0	

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GEOCOMPOSITE DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 1

MATERIAL TYPE: Single-Sided - Primary Floor
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
B01	131553960	284.0	14.75	4,189.0	12/1/2018
B02	131553716	285.0	14.75	4,203.8	12/1/2018
B03	131553717	284.0	14.75	4,189.0	12/1/2018
B04	131553718	286.0	14.75	4,218.5	12/1/2018
B05	131553680	284.0	14.75	4,189.0	12/1/2018
B01a	131553687	233.0	14.75	3,436.8	12/1/2018
B02a	131553687	52.0	14.75	767.0	12/1/2018
B02b	131553688	185.0	14.75	2,728.8	12/1/2018
B03a	131553688	100.0	14.75	1,475.0	12/1/2018
B03b	131553726	135.0	14.75	1,991.3	12/1/2018
B04a	131553726	152.0	14.75	2,242.0	12/1/2018
B04b	131553681	83.0	14.75	1,224.3	12/1/2018
B05a	131553681	205.0	14.75	3,023.8	12/1/2018
B05b	131553689	31.0	14.75	457.3	12/1/2018
B06	131553725	285.0	14.75	4,203.8	12/2/2018
B07	131553699	286.0	14.75	4,218.5	12/2/2018
B08	131553724	264.0	14.75	3,894.0	12/2/2018
B09	131553679	286.0	14.75	4,218.5	12/2/2018
B10	131553693	284.0	14.75	4,189.0	12/2/2018
B06a	131553689	230.0	14.75	3,392.5	12/2/2018
B07a	131553689	22.0	14.75	324.5	12/2/2018
B07b	131553691	211.0	14.75	3,112.3	12/2/2018
B08a	131553691	73.0	14.75	1,076.8	12/2/2018
B08b	131553730	159.0	14.75	2,345.3	12/2/2018
B09a	131553730	126.0	14.75	1,858.5	12/2/2018
B09b	131553731	108.0	14.75	1,593.0	12/2/2018
B10a	131553731	176.0	14.75	2,596.0	12/2/2018
B10b	131553700	53.0	14.75	781.8	12/2/2018
B11	131553696	284.0	14.75	4,189.0	12/2/2018
B12	131553678	186.0	14.75	2,743.5	12/2/2018
B13	131553692	185.0	14.75	2,728.8	12/2/2018
B14	131553695	189.0	14.75	2,787.8	12/2/2018
B15	131553677	291.0	14.75	4,292.3	12/2/2018
B11a	131553700	226.0	14.75	3,333.5	12/2/2018
B12a	131553732	225.0	14.75	3,318.8	12/2/2018
B13a	131553732	59.0	14.75	870.3	12/2/2018
B13b	131553701	169.0	14.75	2,492.8	12/2/2018
TOTAL LINER PLACED (FT^2):				102,896.0	

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GEOCOMPOSITE DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 2

MATERIAL TYPE: Single-Sided - Primary Floor
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
B14A	13155	116.0	14.75	1,711.0	12/2/2018
B14B	13155	111.0	14.75	1,637.3	12/2/2018
B15A	13155	175.0	14.75	2,581.3	12/2/2018
B15B	13155	51.0	14.75	752.3	12/2/2018
B16	13155	283.0	14.75	4,174.3	12/3/2018
B17	13155	284.0	14.75	4,189.0	12/3/2018
B18	13155	284.0	14.75	4,189.0	12/3/2018
B19	13155	284.0	14.75	4,189.0	12/3/2018
B20	13155	284.0	14.75	4,189.0	12/3/2018
B16A	13155	226.0	14.75	3,333.5	12/3/2018
B17B	13155	8.0	14.75	118.0	12/3/2018
B17C	13155	219.0	14.75	3,230.3	12/3/2018
B18A	13155	67.0	14.75	988.3	12/3/2018
B18B	13155	157.0	14.75	2,315.8	12/3/2018
B19A	13155	125.0	14.75	1,843.8	12/3/2018
B19B	13155	100.0	14.75	1,475.0	12/3/2018
B20A	13155	186.0	14.75	2,743.5	12/3/2018
B20B	13155	39.0	14.75	575.3	12/3/2018
B21	13155	286.0	14.75	4,218.5	12/3/2018
B22	13155	285.0	14.75	4,203.8	12/3/2018
B23	13155	285.0	14.75	4,203.8	12/3/2018
B24	13155	288.0	14.75	4,248.0	12/3/2018
B25	13155	285.0	14.75	4,203.8	12/3/2018
B21A	13155	220.0	14.75	3,245.0	12/3/2018
B22A	13155	26.0	14.75	383.5	12/3/2018
B22B	13155	196.0	14.75	2,891.0	12/3/2018
B23A	13155	92.0	14.75	1,357.0	12/3/2018
B23B	13155	132.0	14.75	1,947.0	12/3/2018
B24A	13155	154.0	14.75	2,271.5	12/3/2018
B24B	13155	66.0	14.75	973.5	12/3/2018
B25A	13155	220.0	14.75	3,245.0	12/3/2018
B26	13155	286.0	14.75	4,218.5	12/3/2018
B27	13155	287.0	14.75	4,233.3	12/3/2018
B28	13155	285.0	14.75	4,203.8	12/3/2018
B29	13155	285.0	14.75	4,203.8	12/3/2018
B30	13155	286.0	14.75	4,218.5	12/3/2018
B26A	13155	217.0	14.75	3,200.8	12/3/2018
TOTAL LINER PLACED (FT^2):				105,905.0	

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GEOCOMPOSITE DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 3

MATERIAL TYPE: Single-Sided - Primary Floor
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
B27A	131553727	64.0	14.75	944.0	12/3/2018
B27B	131553729	151.0	14.75	2,227.3	12/3/2018
B28A	131553729	137.0	14.75	2,020.8	12/3/2018
B28B	131553721	81.0	14.75	1,194.8	12/3/2018
B29A	131553721	205.0	14.75	3,023.8	12/3/2018
B29B	131553728	12.0	14.75	177.0	12/3/2018
B30A	131553728	215.0	14.75	3,171.3	12/3/2018
B31	131553733	283.0	14.75	4,174.3	12/4/2018
B32	131553714	284.0	14.75	4,189.0	12/4/2018
B33	131553710	284.0	14.75	4,189.0	12/4/2018
B31A	131553728	58.0	14.75	855.5	12/4/2018
B31B	131553705	160.0	14.75	2,360.0	12/4/2018
B32A	131553705	125.0	14.75	1,843.8	12/4/2018
B32B	131553703	93.0	14.75	1,371.8	12/4/2018
B33A	131553703	191.0	14.75	2,817.3	12/4/2018
B33B	131553707	26.0	14.75	383.5	12/4/2018
			TOTAL LINER PLACED (FT^2):	34,942.8	

APPENDIX C

Cell 1A Liner Installation Documentation

C.20. Geotextile Deployment Log

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GEOTEXTILE DEPLOYMENT LOG

PROJECT NAME: Sundance West Landfill Cell 1A
PROJECT NUMBER: 01053018.00
CLIENT: Sundance West, Inc.
CONTRACTOR: SLS, Inc.
PROJECT LOCATION: Eunice, NM
SHEET NUMBER: 1

MATERIAL TYPE: Geotextile
MONITOR: DG

PANEL NUMBER	ROLL NUMBER	APPROXIMATE LENGTH (FT)	APPROXIMATE WIDTH (FT)	APPROXIMATE AREA (FT^2)	DATE INSTALLED
LP1	2024872579	300.0	15.0	4,500.0	01/11/2019
LP1	2025468016	120.0	15.0	1,800.0	01/11/2019
			TOTAL LINER PLACED (FT^2):	6,300.0	

APPENDIX C

Cell 1A Liner Installation Documentation

C.21. Demtech Tensiometer Calibration Certificate

Demtech Services, Inc.

Placerville, California, USA

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester T-0100

Device Calibrated: S-Type load cell
Range: 0 - 750 lbs. Tension
Model No: M2405-750#
Serial No: **6070**

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

A/D Module Model No: T-029
A/D Module Serial No: **4914006070**
Channel No: N/A

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

Indicator reading with no load: 0

Offset: **5.953869** Scale: **3.326866**

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.

Technician: BF Date: 11/19/18

Demtech Services, Inc.

Placerville, California, USA

CALIBRATION CERTIFICATE

Tensiometer Model: Pro-Tester T-0100

Device Calibrated: S-Type load cell

Range: 0 - 750 lbs. Tension

Model No: M2405-750#

Serial No: **6063**

Calibration Apparatus:

Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029

A/D Module Serial No: **4914006063**

Channel No: N/A

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

Indicator reading with no load: 0

Offset: **1.524708** Scale: **3.322392**

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.

Technician: BF

Date: 11/19/18

APPENDIX D

Independent Laboratory FML Destructive Testing Results

D.1. Secondary Liner Destructive Test

Date: 2018-11-14

Mail To:
Mark Decarlo
Southwest Liner Systems, Inc
P.O. Box 1972
Bernalillo , NM , 87004

Bill To:

Southwest Liner Systems, Inc

e-mail:
mark@slsliner.com swlsmd@gmail.com jzazpe.sls@gmail.com bigz6990@gmail.com

Dear Decarlo,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Sundance Cell 1A**
TRI Job Reference Number:	**42895**
Material(s) Tested:	(3) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42895

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	136	136	139	138	136	**137**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	127	129	137	129	137	**132**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	168	169	166	166	167	**167**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: SDT-2 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	137	136	138	140	142	**139**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	147	138	136	134	139	**139**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	162	163	166	165	167	**165**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42895

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-3 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	139	149	148	148	141	**145**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	131	141	145	145	137	**140**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	169	170	168	167	165	**168**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2018-11-15

Mail To:
Mark Decarlo
Southwest Liner Systems, Inc
P.O. Box 1972
Bernalillo , NM , 87004

Bill To:

Southwest Liner Systems, Inc

e-mail:
mark@slsliner.com swlsmd@gmail.com jzazpe.sls@gmail.com bigz6990@gmail.com

Dear Decarlo,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Sundance Cell 1A**
TRI Job Reference Number:	**42934**
Material(s) Tested:	(7) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Brian Anderson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42934

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-4 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	146	145	147	149	148	**147**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	152	146	151	147	154	**150**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	187	185	185	182	184	**185**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: SDT-5 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	135	132	133	132	130	**132**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	128	120	125	123	128	**125**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	151	149	152	147	151	**150**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42934

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-6 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	120	129	121	129	123	**124**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	112	116	113	115	115	**114**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	162	163	159	160	159	**161**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: SDT-7 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	130	137	125	147	117	**131**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	110	117	110	115	108	**112**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	164	163	160	164	160	**162**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42934

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-8 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	128	124	127	131	130	**128**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	113	120	124	128	121	**121**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	161	157	160	159	160	**159**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: SDT-9 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	161	140	166	139	157	**153**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	131	144	127	141	123	**133**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	171	171	169	172	169	**170**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42934

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-10 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	127	133	132	126	131	**130**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	123	127	126	126	132	**127**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	160	163	160	160	159	**160**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2018-11-16

Mail To:
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Southwest Liner Systems, Inc
P.O. Box 1972
Bernalillo , NM , 87004

Bill To:

Southwest Liner Systems, Inc

e-mail:
mark@slsliner.com swlsmd@gmail.com jzazpe.sls@gmail.com bigz6990@gmail.com

Dear Decarlo,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Sundance Cell 1A**
TRI Job Reference Number:	**42945**
Material(s) Tested:	(8) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Brian Anderson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42945

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-11 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	127	130	125	127	129	**128**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	119	119	117	122	117	**119**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	163	168	169	165	168	**167**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: SDT-12 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	131	131	133	128	134	**131**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	124	131	130	129	136	**130**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	164	160	165	166	165	**164**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42945

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-13 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	119	121	119	123	121	**121**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	133	138	123	136	122	**130**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	161	162	162	164	159	**162**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: SDT-14 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	122	135	132	136	127	**130**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	123	122	126	123	128	**124**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	166	164	167	165	163	**165**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42945

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-15 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	131	135	133	129	132	**132**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	127	129	121	125	127	**126**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	165	168	168	167	165	**167**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: SDT-16 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	123	123	124	129	132	**126**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	128	126	122	134	131	**128**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	163	161	160	160	162	**161**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42945

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-17 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	124	126	119	119	119	**121**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	112	137	123	115	112	**120**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	162	160	159	161	164	**161**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: SDT-18 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	119	127	124	118	126	**123**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	120	121	121	119	122	**121**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	164	165	164	164	162	**164**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2018-11-19

Mail To:
Mark Decarlo
Southwest Liner Systems, Inc
P.O. Box 1972
Bernalillo , NM , 87004

Bill To:

Southwest Liner Systems, Inc

e-mail:
mark@slsliner.com swlsmd@gmail.com jzazpe.sls@gmail.com bigz6990@gmail.com

Dear Decarlo,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Sundance Cell 1A**
TRI Job Reference Number:	**42994**
Material(s) Tested:	(9) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Brian Anderson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42994

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-19 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	136	143	136	143	142	**140**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	117	145	145	146	124	**135**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	173	172	176	175	177	**175**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: SDT-20 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	134	127	125	134	127	**129**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	125	118	120	121	123	**121**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	160	164	163	166	161	**163**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42994

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-21 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	135	132	120	123	134	**129**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	120	125	126	121	121	**123**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	156	162	160	165	160	**161**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: SDT-22 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	120	125	127	116	117	**121**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	126	124	126	120	117	**123**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	163	160	161	162	163	**162**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42994

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-23 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	126	130	125	125	127	**127**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	124	127	124	121	125	**124**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	156	157	161	162	161	**159**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: SDT-24 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	144	141	148	152	136	**144**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	128	133	131	132	129	**131**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	171	169	167	169	168	**169**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42994

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-25 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	129	115	133	116	133	**125**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	119	119	123	119	121	**120**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	157	163	162	166	165	**163**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: SDT-26 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	123	121	123	128	122	**123**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	130	135	135	136	132	**134**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	164	164	166	168	169	**166**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 42994

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-27 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	125	130	128	127	120	**126**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	132	130	125	124	126	**127**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	161	166	159	160	168	**163**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2018-11-20

Mail To:
Mark Decarlo
Southwest Liner Systems, Inc
P.O. Box 1972
Bernalillo , NM , 87004

Bill To:

Southwest Liner Systems, Inc

e-mail:
mark@slsliner.com swlsmd@gmail.com jzazpe.sls@gmail.com bigz6990@gmail.com

Dear Decarlo,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Sundance Cell 1A**
TRI Job Reference Number:	**43018**
Material(s) Tested:	(4) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Brian Anderson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43018

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-28 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	125	133	126	129	127	**128**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	113	112	115	116	118	**115**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	158	159	158	162	161	**160**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: SDT-29 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	135	137	135	142	132	**136**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	133	133	134	139	134	**135**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	149	153	152	150	152	**151**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43018

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: SDT-30 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	120	119	120	118	124	**120**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	127	131	129	128	132	**129**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	165	165	164	163	168	**165**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: SDT-31 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	122	126	121	122	116	**121**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	118	120	117	120	116	**118**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	164	167	164	163	167	**165**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

APPENDIX D

Independent Laboratory FML Destructive Testing Results

D.2. Primary Liner Destructive Test

Date: 2018-11-20

Mail To:
Mark Decarlo
Southwest Liner Systems, Inc
P.O. Box 1972
Bernalillo , NM , 87004

Bill To:

Southwest Liner Systems, Inc

e-mail:
mark@slsliner.com swlsmd@gmail.com jzazpe.sls@gmail.com bigz6990@gmail.com

Dear Decarlo,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Sundance Cell 1A**
TRI Job Reference Number:	**43020**
Material(s) Tested:	(3) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Brian Anderson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43020

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-1 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	151	154	149	150	151	**151**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	136	140	138	143	139	**139**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	180	176	176	174	178	**177**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-2 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	145	153	154	146	148	**149**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	145	143	131	133	132	**137**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	178	182	182	177	176	**179**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43020

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-3 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	153	138	154	142	151	**148**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	126	141	125	137	130	**132**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	174	178	175	176	174	**175**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2018-11-21

Mail To:
Mark Decarlo
Southwest Liner Systems, Inc
P.O. Box 1972
Bernalillo , NM , 87004

Bill To:

Southwest Liner Systems, Inc

e-mail:
mark@slsliner.com swlsmd@gmail.com jzazpe.sls@gmail.com bigz6990@gmail.com

Dear Decarlo,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Sundance Cell 1A**
TRI Job Reference Number:	**43056**
Material(s) Tested:	(4) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Jennifer Tenney
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43056

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-4 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	146	149	141	146	151	**147**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	157	136	133	136	133	**139**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	183	186	178	178	177	**180**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-5 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	146	147	145	146	139	**145**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	147	131	145	145	145	**143**
Peel Incursion (%)	<5	10	<5	<5	<5	
Peel Locus Of Failure Code	SE	AD-BRK	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	168	173	166	165	172	**169**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43056

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-6 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	124	125	141	126	140	**131**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	121	119	132	121	136	**126**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	164	163	164	162	160	**163**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-7 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	127	124	127	123	127	**126**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	111	112	112	110	114	**112**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	164	163	163	165	161	**163**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2018-11-28

Mail To:
Mark Decarlo
Southwest Liner Systems, Inc
P.O. Box 1972
Bernalillo , NM , 87004

Bill To:

Southwest Liner Systems, Inc

e-mail:
mark@slsliner.com swlsmd@gmail.com jzazpe.sls@gmail.com bigz6990@gmail.com

Dear Decarlo,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Sundance Cell 1A**
TRI Job Reference Number:	**43170**
Material(s) Tested:	(7) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Brian Anderson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43170

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-8 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	130	126	127	129	123	**127**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	128	135	115	136	136	**130**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	162	163	159	161	160	**161**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-9 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	129	129	126	135	126	**129**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	127	131	130	123	130	**128**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	159	166	160	163	163	**162**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43170

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-10 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	141	146	146	151	150	**147**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	129	144	139	146	143	**140**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	165	165	163	162	160	**163**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-11 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	132	135	124	123	136	**130**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	122	127	124	129	128	**126**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	162	160	161	163	166	**162**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43170

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-12 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	128	135	138	122	127	**130**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	145	124	117	142	116	**129**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	163	166	166	163	160	**164**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-13 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	131	139	134	134	132	**134**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	128	133	129	119	132	**128**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	159	161	161	163	164	**162**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43170

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-14 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	131	138	128	132	129	**132**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	129	135	128	131	125	**130**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	146	145	146	147	151	**147**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2018-11-29

Mail To:
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Bill To:

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Dear Decarlo,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Sundance Cell 1A**
TRI Job Reference Number:	**43192**
Material(s) Tested:	(9) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Brian Anderson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43192

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-15 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	126	127	127	128	130	**128**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	131	120	130	126	143	**130**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	164	168	166	167	168	**167**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-16 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	140	142	138	140	139	**140**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	129	134	136	126	132	**131**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	160	166	166	165	159	**163**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43192

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-17 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	124	138	135	133	135	**133**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	132	134	128	125	138	**131**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	165	168	165	165	169	**166**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-18 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	130	148	129	130	127	**133**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	124	147	149	117	145	**136**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	166	168	170	169	167	**168**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43192

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-19 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	127	131	127	127	125	**127**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	117	125	114	127	119	**120**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	171	172	172	170	168	**171**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-20 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	126	124	120	126	127	**125**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	124	128	130	129	120	**126**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	167	168	169	171	171	**169**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43192

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-21 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	132	123	124	136	118	**127**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	129	132	129	127	131	**130**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	174	175	172	169	167	**171**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-22 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	120	130	122	126	121	**124**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	124	134	118	128	119	**125**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	170	170	165	167	167	**168**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43192

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-23 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	143	141	149	144	143	**144**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	134	138	135	132	136	**135**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	177	182	180	183	187	**182**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

Date: 2018-11-30

Mail To:
Mark Decarlo
Southwest Liner Systems, Inc
P.O. Box 1972
Bernalillo , NM , 87004

Bill To:

Southwest Liner Systems, Inc

e-mail:
mark@slsliner.com swlsmd@gmail.com jzazpe.sls@gmail.com bigz6990@gmail.com

Dear Decarlo,

Thank you for consulting with TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs. TRI is pleased to submit this final report for laboratory testing.

Project:	**Sundance Cell 1A**
TRI Job Reference Number:	**43214**
Material(s) Tested:	(8) Heat Fusion Weld Seam(s)
Test(s) Requested:	SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)

Codes:	
AD	Adhesion Failure (100% Peel)
BRK	Break in sheeting away from Seam edge.
SE	Break in sheeting at edge of seam.
AD-BRK	Break in sheeting after some adhesion failure - partial peel.
SIP	Separation in the plane of the sheet (leaving the bond intact).
FTB	Film tearing bond (all non "AD" failures).
NON-FTB	100% peel.

If you have any questions or require any additional information, please call us at 1-800-880-8378.
Sincerely,

Brian Anderson
Project Manager
Geosynthetic Services Division
http://www.geosyntheticstestinc.com

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43214

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-24 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	127	132	126	136	133	**131**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	111	125	110	122	126	**119**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	160	158	158	165	160	**160**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-25 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	120	118	118	115	117	**118**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	123	126	124	122	125	**124**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	165	162	162	164	163	**163**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43214

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-26 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	127	127	126	129	125	**127**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	121	129	122	130	124	**125**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	161	161	159	161	159	**160**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-27 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	131	131	132	128	129	**130**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	135	124	118	139	141	**131**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	157	164	157	160	160	**160**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43214

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-28 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	138	136	139	136	141	**138**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	134	131	134	130	133	**132**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	166	163	155	164	156	**161**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-29 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	127	119	116	119	123	**121**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	132	121	129	120	131	**127**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	162	167	164	167	169	**166**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

DESTRUCTIVE SEAM QUALITY ASSURANCE TEST RESULTS
TRI Client: Southwest Liner Systems, Inc
Project: Sundance Cell 1A

Material: 60 mil. HDPE
SAME DAY Peel and Shear (ASTM D 6392/GRI GM19/D 4437/NSF 54/882 mod.)
TRI Log#: 43214

	TEST REPLICATE NUMBER					
PARAMETER	1	2	3	4	5	MEAN
Sample ID: PDT-30 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	116	143	121	135	119	**127**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	117	124	114	127	137	**124**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	166	167	169	167	166	**167**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	
Sample ID: PDT-31 | Weld: Heat Fusion						
Side: A						**Peel A**
Peel Strength (ppi)	134	132	132	131	137	**133**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Side: B						**Peel B**
Peel Strength (ppi)	134	134	131	132	144	**135**
Peel Incursion (%)	<5	<5	<5	<5	<5	
Peel Locus Of Failure Code	SE	SE	SE	SE	SE	
Peel NSF Failure Code	FTB	FTB	FTB	FTB	FTB	
Shear						**Shear**
Shear Strength (ppi)	154	162	160	163	154	**159**
Shear Elongation @ Break (%)	>50	>50	>50	>50	>50	

APPENDIX E

Leak Detection System Certifications

E.1. Leachate Pipe and Riser Pipe Parts Certification

UNITED POLY SYSTEMS

W A T E R L I N E

Applications include:

- Municipal and Industrial
- Potable water - NSF
- Sewer Line - AWWA/F714
- Force Main Sewer- AWWA/F714
- Slip Lining/Pipe Bursting
- Etc.

- Product may be striped for different indicators:
  Blue stripe - Water or Potable
  Green stripe - Sewer
  Purple stripe - Reclaim Water

- IPS/DIPS-Gray Pipe with or without stripe also offered for slip lining, pipe bursting, etc. (Gray Pipe Cell Classification 445574E)

- Product is manufactured in IPS (iron pipe size) and DIPS (ductile iron pipe size 4" and up).

- United Poly Systems Pressure Pipe is used in oil and gas piping systems (D2513), industrial & mining, force main sewer (AWWA/F714), potable water (NSF), & landfill.

- The material requirements for PE pressure pipe shall meet or exceed ASTM Standard D 3350 requirements. Materials produced for water application shall meet or exceed ASTM D3035.

PE4710 Typical Physical Properties

*nominal values

Property	Typical Value	Units	Test Method
Density with minimum 2% carbon black	.960	g/cc	ASTM D 792 or 1505
High Load Melt Index	8.5	g/10 minutes	ASTM D 1238
Melt Index	0.08	g/10 minutes	ASTM D 1238
Flexural Modulus	110,000<160,000	Psi	ASTM D 790
Tensile Strength @ yield (2 in/min)	3600	Psi	ASTM D 638
Tensile Elongation @ Break	740%	%	ASTM D 638
Thermal expansion	1.0 x 10-4	in/in/°F	ASTM D 696
HDB 73.4° F (23°C)	1600	Psi	ASTM D 2837
HDB 140° F (60°C)	1000	Psi	ASTM D 2837
PENT	>500	Hrs	ASTM F1473
Brittleness Temperature	<-103°F (-75°C)	°F	ASTM D 746
Cell Classification	445574C(black only)		ASTM D 3350

***Nominal values are to be used as guidelines only; this is not a product specification and does not indicate minimum or maximum values.**

4707 E. Kearney, Springfield, MO 65803 • 417.708.9887 • www.unitedpolysystems.com

* Revised 9/15/2016

APPENDIX F

EMNRD Correspondence

F.1. Conformation of Compliance: Sundance West, Inc. Surface Waste Management Facility

August 2, 2017

Mr. Charles W Fiedler, P.E.
Gordon Environmental/PSC
213 S. Camino del Pueblo
Bernalillo, NM 87004

Reference: Confirmation of Compliance
Sundance West, Inc. Surface Waste Management Facility
Construction Plans for the Landfill and Evaporation Ponds

Dear Mr. Fiedler:

The OCD received Construction Plans in accordance with Permit Condition 6.A on August 1, 2017 from Sundance West, Inc. for the development of specific components (i.e. the landfill and evaporation ponds) of the Sundance West Surface Waste Management Facility, NM-1-62. This condition requires the Permittee to "At least 30 days prior to the start of construction of the landfill, evaporation ponds, stabilization and solidification area, or process area the operator shall furnish OCD with a complete set of construction drawings including a major milestone schedule for construction. These construction drawings must substantially comply with the engineering design provided with the application and show the location of pond discharge for the purposes of identifying the location of the sacrificial liner. The major milestone schedule shall be updated throughout construction activities."

The Department has completed their review of the submitted documents relative to the construction of the landfill and evaporation components referenced in the permit documents and find them to be in substantial compliance with the engineering design provided in the approved application. Specifically, the evaporation pond design shows the pond discharges, identifying the location of required sacrificial liners in compliance with the Rule. This submittal also included a major milestone schedule for the proposed construction in compliance with the Condition.

Sundance West requested the Division confirm that the submitted construction drawings conform to 19.15.36.17. B.11 and 12 which specifies three (3) foot of freeboard and a limitation of ten (10) acres feet size of ponds. The design provided in the construction drawing show a cascading pond system through a series of weirs in each pond. The liner system, that complies with the rule, is extended beyond each pond to the perimeter berm approximately twenty feet beyond and surrounds the pond system. This perimeter berm provides both over spray protection and satisfies the 3-foot freeboard requirement. In addition, each pond is designed with a maximum 10-acre foot capacity. In reading 19.15.36.17 NMAC the rule was written in anticipation of pump system being utilized to move water from one pond to another which this design eliminates (ie. weirs). The Division confirms that this design complies with the intent of the Rule. Sundance West will comply with 19.15.36.17.C(5) concerning traps at each weir.

If you have any questions, please contact Jim Griswold, OCD Environmental Bureau Chief at (505) 476-3465 or by email at jim.griswold@state.nm.us. On behalf of the Oil Conservation Division, I wish to thank you and your staff for your cooperation during this review process.

Respectfully,

David Catanach,
Director

APPENDIX G

Resumés

G.1. Charles W. Fiedler, P.E., Associate, Gordon/PSC

CHARLES W. FIEDLER, P.E., LEED AP

Associate

Fields of Expertise

Environmental and Civil Engineering;
Solid Waste Facility Siting, Design, Permitting, Construction
Solid Waste Facility Community Involvement
Solid Waste Landfill Cell Design and Construction
Solid Waste Gatehouse and Maintenance Facilities
Solid Waste Municipal and Regional Planning
Oilfield Waste Processing and Disposal Facilities
Landfill Gas Collection System Design, Development, Permit
Landfill Gas Collection System Construction/Commissioning
Landfill Gas Beneficial Use; Composting System Design
Transfer/Collection Station and Material Recovery Facilities
Regulatory Compliance and Litigation Support
Expert Witness for Environmental Engineering Issues

- New Mexico Environment Department
- Texas Department of Health
- Texas Commission on Environmental Quality
- Texas Legislative Committees
- Texas State District Court
- Arkansas State District Court

Registrations

Professional Engineer: New Mexico 19731
Professional Engineer: Texas 52247
LEED Accredited Professional-USGBC-2009

Education

Bachelors of Science Civil Engineering
Texas A&M University, 1978
Master of Science Civil Engineering
Texas A&M University, 1982

Professional Summary

A proven record of expertise and leadership in the management of waste materials focused primarily on the design and development of containment systems for liquid and solid wastes. Significant experiences over the last 39 years bridging between the technical issues of a consultant's design and the practical implementation of that design in a landfill or pond. Routinely responsible for interacting between consultants, owners, employees and contractors, translating between different levels of technical competency in the successful implementation of the project. Highly motivated and creative problem solver. Natural ability to manage relationships with all levels of an organization, as well as with the project community. Experiences in both the public and private sector as the regulator and regulated entity.

Professional Affiliations

National Society of Professional Engineers
New Mexico Society of Professional Engineers
Solid Waste Association of North America
Landfill and Landfill Gas Divisions
SWANA-Roadrunner Chapter
National Solid Waste Management Association-NM Chapter
New Mexico Recycling Coalition
US Green Building Council-New Mexico Chapter

Select Project Experience

Sundance West
Lea County, NM 2015
Developed permit documents and plans for an OCD Part 36 Surface Waste Management Facility. This project includes a 124-acre landfill design that utilized a double composite liner composed of a Geosynthetic Clay Liner (GCL) overlain with a 60-mil HDPE Flexible Membrane Liner (FML), a 200-mil HDPE Geonet leak detection layer, a primary 60-mil HDPE FML, a 200-mil HDPE Geonet leachate collection layer and two feet of protective soil. Additionally, this facility included a produced water management facility composed of twelve, 2-acre ponds that were designed with a double composite liner composed of a secondary 60-mil HDPE FML overlain with a 200-mil Geonet leak detection layer and a primary 60-mil HDPE FML. Also designed for this facility was a 5-acre stabilization and solidification facility that included a double composite liner system that utilized the landfill liner configuration.

DNCS Environmental Services
Lea County, NM 2014
Developed permit documents and plans for an OCD Part 36 Surface Waste Management Facility. This project includes a 318-acre landfill design that utilized a double composite liner composed of a Geosynthetic Clay Liner (GCL) overlain with a 60-mil HDPE Flexible Membrane Liner (FML), a 200-mil HDPE Geonet leak detection layer, a primary 60-mil HDPE FML, a 200-mil HDPE Geonet leachate collection layer and two feet of protective soil. Additionally, this facility included a produced water management facility composed of twelve, 2-acre ponds that were designed with a double composite liner composed of a secondary 60-mil HDPE FML overlain with a 200-mil Geonet leak detection layer and a primary 60-mil HDPE FML. Also designed for this facility was a 5-acre stabilization and solidification facility that included a double composite liner system that utilized the landfill liner configuration.

Sandoval County Landfill
Rio Rancho, NM 2014
Developed plans, specifications and procurement documents for the construction of Cell 4C, 5B, 6B and 7, comprising 32.3 acres lined with a GCL/FML composite liner on a compacted subgrade that included a geonet drainage layer. Managed procurement to select a contractor. Oversaw construction that included the liner and a leachate collection system with sump and pump. Managed the CQA and compiled documentation required for approval by the State.

Camino Real Landfill
Sunland Park, NM 2014
Developed plans, specifications and procurement documents for Cell 9BA, a 5-acre GCL/FML composite lined excavation on a compacted subgrade. Managed procurement to select a contractor. Project was placed on hold by the Owner due to capital issues within the company.

Valencia Landfill and Recycling Facility
Valencia County, NM 2014
Developed plans, specifications and procurement documents for Cell 5A, a 6-acre GCL/FML composite lined excavation on a compacted subgrade. Managed procurement to select a contractor. Oversaw the construction that included the liner and the development of the leachate collection system. Managed the CQA and compiled the documentation required for approval by the State.

Lea County Landfill
Eunice, NM 2011
Developed plans, specifications and procurement documents for the construction of Cell 4, a 9.5-acre excavation with a GCL/FML composite liner on a compacted subgrade. Managed procurement to select a contractor. Oversaw construction that included the liner and a leachate collection system with sump and pump. Managed the CQA and compiled documentation required for approval by the State.

Camino Real Landfill
Sunland Park, NM 2010
Developed plans, specifications and procurement documents for Cell 10A, a 6-acre GCL/FML composite lined excavation on a compacted subgrade. Managed procurement to select a contractor. Oversaw the construction that included the liner and the extension of the leachate collection from the previous cells. Managed the CQA and compiled the documentation required for approval by the State.

City of Tucumcari Landfill
Tucumcari, NM 2010
Developed plans, specifications and procurement documents for Cell 2B, a 4-acre GCL/FML composite lined excavation on a compacted subgrade. Managed procurement to select a contractor. Oversaw the construction that included the liner and the installation of a leachate collection and temporary sump. Managed the CQA and compiled the documentation required for approval by the State.

Sandoval County Landfill
Rio Rancho, NM 2010
Developed plans, specifications and procurement documents for the construction of Cell 5A, a 10-acre excavation with a GCL/FML composite liner on a compacted subgrade. Managed procurement to select a contractor. Oversaw construction that included the liner and a leachate collection system with sump and pump. Managed the CQA and compiled documentation required for approval by the State.

City of Denton Landfill
Denton, Texas 2002 and 2004
Managed the design and construction of the second and third FML composite lined cells, including bidding, CQA, survey control, leachate recirculation and documentation. The liner system consisted of a compacted clay subgrade overlain with a 60-mil HDPE FML, a 200-mil HDPE Geonet and a two-foot protective soli layer.

Canyon Landfill
Canyon, Texas 1999
Engineer of record and principal designer for this 10-acre waste disposal cell containing a GCL/FML composite liner on a compacted subgrade. Developed plans, specifications and procurement documents. Managed procurement to select a contractor. Oversaw construction that included the liner and a leachate collection system with sump and pump. Managed the CQA and compiled documentation required for approval by the State.

West Texas Region Landfill
Lubbock, Texas 1997
Engineer of record and principal designer for this 1,200 acre disposal facility for the City of Lubbock, Texas. Challenges included how and where to start the active development of this large a facility to minimize impact on the surrounding landowners. Once successfully permitted, developed construction plans and specifications to construct the initial infrastructure including gate house/offices with scales, heavy equipment maintenance and crew facilities, access roads and initial 20-acre cell excavation and GCL/FML composite liner. The facilities cost $450,000 to design and $6.5 million to construct.

Covel Gardens Landfill
San Antonio, Texas 1992
Manager responsible for the design and development of the earthwork, composite lined cell, roads and environmental controls relating to the initial construction of this facility. This was the first composite lined municipal solid waste landfill cell in Texas, utilizing a 60-mil HDPE FML. Planned development, negotiated construction contracts, coordinated consultants, orchestrated community relations, formulated schedules and budgeted expenditures. Intimately involved in delicate negotiations with City officials. Developed a significant knowledge of the market conditions and influences, including the significant individuals involved. This $5 million project was completed ahead of schedule and within budget.

APPENDIX G

Resumés

G.2. Carl R. King, P.E., Senior Project Manager, Gordon/PSC Site CQA Engineer

CARL R. KING, P.E.

Senior Project Manager

Fields of Expertise

Solid Waste Facility Siting, Design, Permitting
Solid Waste Landill Cell Design and Construction
Solid Waste Landfill Site Characterization
Solid Waste Facility Remediation and Closure
Transfer/Collection Station and Material Recovery Facilities
Waste-to-Energy Facilities
Acquisition review
Construction Quality Assurance and Quality Control
Regulatory Compliance and Litigation Support

Education

Bachlor of Arts Engineering Management
Hiram College, Ohio 1980
Master of Science Environmental Engineering
Cleveland State University, Ohio 1984

Registrations

Professional Engineer: Texas 67157
Professional Engineer: Nebraska E-7584

Professional Summary

Mr. King is a Senior Project Manager with Gordon Environmental/PSC. He has over 47 years of experience in environmental, mechanical and civil engineering and is well versed with regulations and guidelines in a number of states. His responsibilities include landfill permitting and design, construction specification writing, compliance reporting, environmental construction management and construction quality assurance.

Select Project Experience

Mr. King provided design services and served as Construction Quality Assurance (CQA) Manager for Valencia Regional Landfill Cell 5B; Northeastern New Mexico Regional Landfill Unit 1B; City of Tucumcari Landfill Cell 3, in New Mexico. Implemented compliance efforts to new federal rules for waste disposal. Provided HELP model support and sized leachate collection piping for the Butterfield Station Landfill in Arizona, developed design details for assuring protection of composite liner components from piping penetrations, sized the excavation and requirements for the anticipated daily capacity, prepared specifications for utility extensions, developed criteria for maintenance and operational facilities, and developed traffic flow, road layouts and signage requirements. Design included channelization of runoff waters with discharge into an existing natural wash. The discharge capacities and velocities required a complicated settling basin and energy dissipation system before final release.

Directed the complete siting, permitting and detail design for a combined recycling center and transfer station serving the community of Fremont, Nebraska. Design included an integrated process conveyor with picking stations and an automatic unloading system to discharge and load bypass waste streams directly into 100 cubic yard capacity transfer trailers.

Provided compliance review to Subtitle D regulations criteria and developed the technical component of state implementation programs. Project locations included NE, MO, AZ, NY, TX, AR, LA, GA, and NM (Otero County and Taos Municipal landfills) and involved existing landfills, expansions, and new facility evaluations. Responsibilities included permit application preparation, consent decree negotiations, design criteria and details, economic evaluations, alternative evaluations, and multi-municipality teaming agreements.

Responsible for site selection, drainage plans, waste characterization determination, heat balances, and power production estimates for the licensed Volund waste-to-energy technology. Responsible for permitting processes, public hearing preparation and support and power sales agreements. Projects include Broward County, FL, and Dakota County, MN. Responsibilities expanded to include landfill gas (methane) to energy projects throughout the country. Selected and appointed to the Florida Department of Environmental Regulations Rule Development Committee Roundtable Board by the director of that agency.

Responsible for environmental and remedial projects involving design and construction management efforts for both new construction and corrective action efforts; regulatory agency interface and negotiations; risk assessments; remedial designs; contract administration and documentation; and field verification. Projects include Subtitle C and D composite liner designs, providing QAQC efforts and construction management for preparation of soil and synthetic liner evaluation reports.

Provide construction management implementation and engineer of record services for two cell expansions of the McCommas Road Landfill, Dallas, TX and new cell development of the Denton County Landfill, Denton, TX. Scope included final regulatory agency approvals; record design plans test report evaluations, and oversight of construction management and materials testing teams.

Provided engineer of record and material testing services for an expansion of a Subtitle D (hazardous materials) disposal cell of the Lone Mountain facility in Northwest OK.

Provide design and construction management implementation of the Hunter-Ferrell Road Municipal Landfill in Irving Texas. The multi phased expansion project included permit modifications and regulatory approvals through multiple agencies.

APPENDIX G

Resumés

G.3. Braden Belliveau, EIT, Gordon/PSC Site CQA Engineer/Manager

BRADEN S. BELLIVEAU

Civil Engineer

Fields of Expertise

Environmental engineering, landfill liner QA/QC, landfill waste excavation monitoring, waste classification, environmental sampling and monitoring, landfill engineering design calculations, solid waste facility permitting, and soil mechanics

Certifications

Construction QA/QC Inspector for Geosynthetics and Compacted Clay Liners.

OSHA Hazardous Waste Site Operations and Emergency Response Training (40-Hour), 7/11/2017

Nuclear Gauge Safety Certification: 07/21/2016

Red Cross First Aid/CPR/AED, 2008

Education

B.S., Environmental Engineering, The State University of New York at Buffalo, 2016

A.A.S., Mathematics and Science, Niagara County Community College College, 2013

Professional Summary

Mr. Belliveau serves as Civil Engineer III for Gordon Environmental/PSC. His assignments focus on landfill excavation monitoring, environmental sampling (groundwater, landfill gas, soils), landfill engineering calculations, and Solid Waste Facility Permits and Regulatory compliance.

Select Project Experience

Landfill Excavation Monitoring, Albuquerque, New Mexico: Field representative for the construction underground utilities on the former Nazareth Landfill site. Responsibilities included methane and hydrogen sulfide monitoring, health and safety oversight, waste identification, and excavation observation during waste removal.

Geotechnical Analysis, Various Projects in New Mexico: Classification and determination engineering properties of soils to be used in landfill cell construction using ASTM test methods for soil classification, grain size analyses, and Standard Proctor moisture/density relationships.

Solid Waste Facility Permitting, Various Facilities in New Mexico: Participate in developing permit, and permit renewals and modifications for MSW, C&D, and special waste landfills; and related public notification requirements. Responsibilities include calculations demonstration compliance with NMED and other EPA regulations (i.e., erosion control, slope stability, tensile stresses), regulatory agency communications, research, and site visits.

Landfill Gas Monitoring and Control, Various Locations, New Mexico: Field Technician for the monitoring of the presence of landfill gas (LFG) at closed and active landfills throughout the state of New Mexico. Responsibilities include site inspection for surface expression of the presence of LFG, surface expressions of settling, slumping or erosion that has the potential to expose waste on the final cover, and lead to the potential release of LFG off of the landfill site.

Groundwater Sampling and Field Parameter Testing, Various Locations, New Mexico: Field Technician for groundwater sample collection for more multiple monitoring wells at project locations throughout the State of New Mexico. Use of dedicated and submersible pumps driven by air or electricity, as well as no-purge and low-impact discrete interval sampling devices, resulting in a unique familiarity with varying sample collection techniques. Field services include depth to water measurements, optimization of discharge flow rate, recording of field measurements, and preparation of chain-of-custody documentation. Inter- and/or intra-well statistical analyses performed as necessary to fulfill Permit and regulatory requirements.

Stormwater Pollution Prevention Plans and Spill Prevention Control and Countermeasure Plans, Various Locations, New Mexico: Preparation of stormwater pollution prevention (SWPPP) plans and spill prevention, control, and countermeasures (SPCC) plans for several airports and landfills in New Mexico.

Hydraulic Conductivity Testing and Determination: Hydraulic conductivity testing using multiple methods including slug testing, pump testing, constant and falling head methods, and estimation from grain size.

APPENDIX G

Resumés

G.4. Don Gray., Engineering Technician, Gordon/PSC Project Technologist

DON L GRAY

Engineering Technician

Fields of Expertise

Construction observation; geosynthetic liner applications and testing; field sampling; quality assurance and quality control; physical property testing; field analysis; Stormwater Pollution Prevention (SWPPP) Plans and Spill Prevention Control and Countermeasures (SPCC) Plans. Use of Drones as an emerging technology, groundwater monitoring; site characterization and plan development.

Certifications

OSHA Hazardous Waste Site Operations and Emergency Response Training (40-Hour), 2007.
Response Training (8-Hour refresher) 2008, 2009, 2015, 2016, 2017
Nuclear Gauge Safety Training: June 2007
HAZMAT Certification (DOT IATA) 2007, 2015.

Education

A.A.S., Engineering Design Technology
A.A., Liberal Arts
A.A., Technology Management and Training,
Central New Mexico Community College, 2007

Professional Summary

Mr. Gray serves as Engineering Technician for Gordon/PSC. His is also responsible for implementing the use of emerging technologies such as Drones for survey and environmental monitoring., CQA oversight for various Landfill construction projects with a focus on composite liner installation, and compliance reporting.

Select Project Experience

Landfill/Pond Liner CQA,:
Construction Quality Assurance and project oversight for the installation of over 115 acres of composite liner. Installation includes:

- pre-installation materials qualification
- subgrade density testing
- sieve analysis testing
- material quality assurance documentation
- installation observation
- repair record keeping.

He provided field CQA assisted with the compilation of the required Engineering Certification Report for each of the following projects:

- Sandoval County Landfill Cells 6A/4B and 5A
- Southwest Landfill Cell 4B
- Lea County Landfill Cell 3 and 5
- Final Cover for Roswell Unit 2, Clayton LF, Vaughn LF, Raton LF, Truth or Consequences LF, and Southwest Regional LF
- Camino Real Landfill Cell 10A
- Basin Disposal Pond 2
- Valencia Regional Landfill Cell 3

Landfill Gas Monitoring and Control, Various Locations, New Mexico: Field representative for methane monitoring as well as health and safety oversight.

Groundwater/Vadose Zone Monitoring Well Installations, Various Locations, New Mexico: Oversight for the installation of numerous exploratory and sample collection wells for groundwater and landfill gas. Performed drilling observation and logging of drill cuttings. Made determinations as to appropriate screen and well installation depths, performed initial post-installation monitoring. Prepared as-built documentation and Summary Reports as needed.

Groundwater Sampling and Field Parameter Testing, Various Locations, New Mexico: Field Technician for groundwater sample collection for monitoring wells at project locations throughout the State of New Mexico. Use of dedicated and submersible pumps driven by air or electricity, as well as hand and mechanical bailers, resulting in a unique familiarity with varying sample collection techniques. Field services include depth to water measurements, optimization of discharge flow rate, recording of field measurements, and preparation of chain-of-custody documentation. Inter- and/or intra-well statistical analyses performed as necessary to fulfill Permit and regulatory requirements.

Stormwater Pollution Prevention Plans and Spill Prevention Control and Countermeasure Plans, Various Locations, New Mexico: Preparation of stormwater pollution prevention (SWPPP) plans and spill prevention control and countermeasures (SPCC) plans for several airports and landfills in New Mexico.

Development of Drone Technology within the organization: Team lead on the development of implementing the use of Drone Technology within the organization. This included selection of equipment and software, development of all aspects associated with drone activites in the field, and processing of field data to produce output consistent with applicable standards.

Additional Professional Training
Remote Pilot Certificate for UAS September 2016
Developer/Holder of US Patent 13/774,038, and European Patent No. 13275041.5-1656 – "Foamed Glass Hydroponic Substrate