2021-2022 ANNUAL REPORT

NGL WASTE SERVICES LLC

North Ranch Landfill (NM1-66)

3/12/2023

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SUMMARY OF OPERATIONS 2021-2022

The NGL Waste Services LLC North Ranch SWMF (NM1-66) was under construction for the July 1, 2021 to June 30, 2022 time period, and did not begin operations until July 20, 2022. Landfill operations will therefore be addressed in the 2022-2023 Annual Report.

Due to the belated submission of this annual report, and as per discussions with Brad Jones, NMOCD, the required Closure/Post Closure update and associated Financial Assurance update will be reported on the 2022-2023 Annual Report submission, due September 1, 2023.

INSPECTIONS

The North Ranch SWMF was under construction, and not operating for the 2021-2022 reporting year. Please find the construction CQA report attached at the end of this document.

ANALYTICAL RESULTS

The North Ranch SWMF was under construction, and not operating for the 2021-2022 reporting year. No analytical results are available for this time period.

HYDROGEN SULFIDE MONITORING RESULTS

The North Ranch SWMF was under construction, and not operating for the 2021-2022 reporting year. No hydrogen sulfide monitoring results are available for this time period.

PROCESS PIPING INTEGRITY TEST RESULTS

The North Ranch SWMF was under construction, and not operating for the 2021-2022 reporting year. Please see the attached CQA report for construction documentation of piping. No operational inspection reports are available for this time period.

TRAINING RECORDS

The North Ranch SWMF was under construction, and not operating for the 2021-2022 reporting year. No employee training records are available for this time period.

COMPLAINT LOGS & RESOLUTIONS

The North Ranch SWMF was under construction, and not operating for the 2021-2022 reporting year. There are no complaints for this time period.

REPORTABLE RELEASES

The North Ranch SWMF was under construction, and not operating for the 2021-2022 reporting year. There are no reportable releases for this time period.

FINANCIAL ASSURANCE

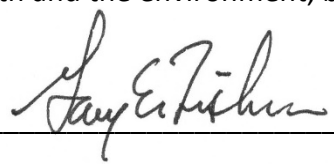
As per discussions with Brad Jones, NMOCD, the Closure Cost Estimate of $2,663,463 and Post-Closure Cost Estimate of $2,341,483 as submitted in Attachment A of the North Ranch SWMF application will remain in place, to be reevaluated at the time of the 2022-2023 Annual Report submission, due September 1, 2023.

CONCLUSIONS & RECOMMENDATIONS

The North Ranch SWMF has been constructed in accordance with the permit and CQA requirements. There are no construction related issues that preclude safe operation of this SWMF going forward.

ANNUAL CERTIFICATION

NGL Waste Services, LLC certifies that operation of the newly constructed North Ranch SWMF (NM1-66) will not cause property damage, contamination of USDWs, or otherwise threaten public health and the environment, based on geologic, engineering, and construction data.

Signature  for NGL Waste Services LLC. Date 3/12/2023

Name Gary Fisher Title VP Operations

APPENDIX

Construction Certification Report

North Ranch Surface Waste Management Facility:
Cell E-1 and Operational Infrastructure Construction Certification Report

Lea County, New Mexico

Prepared for:

High Roller - EPC
1008 Southview Circle
Center, TX 75935

Prepared by:

SCS ENGINEERS

01222034.00 | July 15, 2022
SCS Engineers
6100 South Maple Ave, Ste
Tempe, AZ, 85283

CQA Solutions, Ltd
723A Phillips Ave, Suite 201
Toledo, OH 43612

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Appendices

SECTION 1 INTRODUCTION

1.0 PURPOSE

This Construction Quality Assurance (CQA) Certification Report has been prepared by SCS Engineers and CQA Solutions, Ltd. for the NGL Waste Services, LLC North Ranch Surface Waste Management Landfill Cell E-1 and Operational Infrastructure construction project located in Lea County, New Mexico.

The purpose of this report is to present documentation illustrating the following:

- The Work has been performed in substantial compliance with the Contract Documents, approved submittals, and the design intent of the portion of Work relating to earthwork, geosynthetic and concrete components of the facility.
- The required CQA program of documentation and verification was complete and accurate.
- General compliance with New Mexico Administrative Code Title 19, Chapter 15, Part 36 and the Surface Waste Management Facility Permit Conditions NM1-66 (and associated permit modifications)

1.1 PROJECT ORGANIZATION

1.1.1 Owner & Project Manager

The North Ranch Surface Waste Management Facility (NRSWMF) Cell E-1 and associated operational infrastructure components are owned by NGL Waste Services, LLC of Denver, Colorado who has complete responsibility for the project.

The General Contractor and Project Manager for the construction acting as the owner's representative was High Roller EPC

- High Roller's project manager was Ravi Vemulapalli.
- High Roller's on-site superintendent was Travis Clarke.

For the purposes of this report High Roller shall be referred to as the Owner's Representative and is located at 1008 Southview Circle, Center, TX 75935.

1.1.2 CQA Consultant

1.1.2.1 Design Engineer, CQA Certifying Engineer, and Manager

The Design Engineer of Record, CQA Certifying Engineer and Manager for all project components except for structural concrete design and construction is Michael Bradford, P.E (NM# 19240). Mr. Bradford is an engineer for SCS Engineers and was responsible for design of the project, addressing design related requests for information, material submittal review and approval, managing the CQA program, providing direct oversight of onsite CQA Monitoring activities, and project certification. Mr. Bradford and SCS Engineers assumes all duties and responsibilities, and had the rights and authority assigned to those roles as defined in the Contract Documents in connection with the completion of the Work not including structural concrete engineering, design, and certification in accordance with the Contract Documents.

The Design Engineer and Engineer of Record for all structural components is Ravi Vemulapalli, P.E. (NM# 24730). Mr. Vemulapalli is an engineer with High Roller EPC. Mr. Vemulapalli and High Roller EPC assumes all duties and responsibilities, and had the rights and authority assigned to those roles as defined in the Contract Documents in connection with the completion on only structural concrete engineering, design, and certification Work in accordance with the Contract Documents.

For the purposes of this report SCS Engineers shall be referred to as the Engineer (or SCS) and is located at 6100 South Maple Ave, Suite 118, Tempe, AZ, 85283. Mr. Vemulapalli will be referred to as the Structural Engineer.

1.1.2.2 CQA Monitor

CQA Solutions, Ltd. (CQAS) was contracted by SCS as the Construction Quality Assurance (CQA) Monitor for the earthwork, geosynthetics and concrete portions of the Work. The CQA Monitor was responsible for implementing the CQA program of construction verification procedures. The CQA Monitor provided a full time CQA technician on site during relevant Work. All CQA Documentation for the project was reviewed, evaluated, and approved by SCS.

The site CQA inspector for this project was Xavier Smith. The CQAS Project Manager was Brent Duganiero. Resumes for the CQA personnel are in Appendix A: Resumes.

For purposes of this report, CQAS shall be referred to as the CQA Monitor and is located at: 723A Phillips Avenue, Toledo, OH 43612

1.1.2.3 CQA Laboratories

During the course of the project, three different third-party laboratories were utilized;

1. Pettigrew & Associates (Pettigrew) performed pre-qualification testing for soil components at the onset of the project. Pettigrew is located at 100 E Navajo Dr, Hobbs, NM 88240.
2. Beyond Engineering & Testing (Beyond) performed pre-qualification testing for soil and aggregate components, assisted with on-site soil moisture/density testing and performed all concrete field and laboratory testing. Beyond is located at 706 North Main Street, Carlsbad, NM 88220.
3. TRI Environmental, Inc. (TRI) performed conformance testing of the geosynthetic materials and the destructive seam sample testing. TRI is located at 9063 Bee Caves Rd, Austin, TX 78733.

Resumes for Beyond personnel performing site construction observation and testing are found in Appendix A: Resumes.

Material pre-construction conformance testing is in Appendix B: Pre-Construction Material Testing.

1.1.2.4 CQA Surveyor

The surveying was completed by Trans Global Services, LLC (TGS). TGS is located at 201 West Wall St Suite 325 Midland, TX 79701

The field as-built drawings show approximate panel location, panel numbers and repair locations.

Survey data submitted by TGS was reviewed and approved by SCS. As-built Record Drawings and Survey data relevant to the scope of the report is provided within Appendix C: Survey Data.

1.1.3 Earthworks Contractor

High Roller EPC contracted T5 Construction (T5) as the Soil Contractor responsible for the earthworks and piping in accordance with the Contract Documents.

For the purposes of this report T5 shall be referred to as the Contractor and is located at 23977 N Farm to Market 95, Garrison, TX 75946.

1.1.4 Geosynthetics Installer

High Roller EPC contracted liner installer for the Work was Mustang Extreme Environmental Services (Mustang) and was contracted by High Roller to install the geosynthetic portion(s) of the Work in accordance with the Contract Documents and approved submittals.

For the purposes of this report Mustang shall be referred to as the Installer and is located at 5049 Edwards Ranch Road, Suite 240, Fort Worth, Texas 76109.

1.1.5 Geosynthetics Manufacturer

All liner materials (GCL, Geomembrane, Geocomposite and Geotextile) was manufactured by Solmax.

2.0 PROJECT LOCATION & DESCRIPTION

2.1 PROJECT LOCATION

North Ranch Disposal Facility is located approximately 16 miles west of Jal, New Mexico and consists of two standalone tracts. The NRSWMF is approximately 303 acres in size and is located within Section 9 and 10 of T25S, R34E. This project was specifically to construct Disposal Cell E-1, the leachate evaporation pond, concrete waste management areas, and supporting infrastructure.

2.2 SCOPE OF WORK

The project goals for the Project were to construct landfill Cell E-1 and operational infrastructure.

The 2022 construction scope of the Work was as follows:

- Cell E-1 (approximately 3.6 acres)
- Drying Pad West: (approximately 0.4 acres)
- Drying Pad East: (approximately 0.4 acres)
- Truck Wash: (approximately 0.2 acres)
- Leachate Pond (approximately 1.2 acres)

The focus of this report is based solely on the earthwork, concrete and geosynthetics installation phase(s) for each of the above components excluding the access roads.

T5 mobilized for construction in January 2022 (prior to CQA Monitor mobilization, to perform activities not requiring CQA certification and therefore not included within the scope of this Report). Full-time CQA presence at the site commenced on February 3, 2022 and continued in multiple phases throughout construction until completion of the Work ended on June 7, 2022. It should be noted that other construction activities continued on-site after the CQA Monitor demobilized. These activities did not require CQA certification and are not included within the scope of this report.

2.3 CONTRACT DOCUMENTS

The following documents were used for the installation and for the support of information for the construction and creation of this Report:

- Drawings for the Cell E-1 and Operational Infrastructure Construction, Issued for Construction, dated February 16, 2022
- Construction Quality Assurance Plan, dated September 2019 and amended March 2022 to include provisions for concrete CQA
- Technical Specifications, dated August 2021

SECTION 2 DOCUMENTATION

1.0 CONSTRUCTION MONITORING AND OVERSIGHT

All relevant construction and related activities were monitored, documented and/or audited to verify compliance with the Contract Documents. A full time CQA Monitor was on site at all times during the earthwork, concrete construction, and geosynthetics installation portions of the Work. Daily duties performed on site included:

- Construction activity observation, monitoring, and reporting.
- Photographic records documentation.
- Material inventory documentation.
- Product installation observation, inspection, and documentation.
- Construction and Installation verification testing and reporting.

The CQA Monitor verified all installation materials were approved by the certifying engineer prior to use, construction methods and practices were performed in accordance with the specifications, and third-party CQA testing was performed in accordance with the specifications and/or CQA Plan. The CQA Monitor also provided all related field documentation as outlined and contained in this report.

2.0 DOCUMENTATION

2.1 CQA DAILY FIELD REPORTS

Daily Field Reports (DFR) were prepared daily by the CQA Monitor. These reports organized and summarized all construction activities, CQA verification procedures, CQA testing, and quality control completed during the day. The daily summary reports contained the following information:

- Title block containing the project name, project location, date, and summary report number.
- Description of weather conditions including range of temperature readings, cloud cover, and precipitation.
- Summary of the day's on-going construction activities including equipment, personnel, and subcontractors utilized and identification of areas in which the construction was taking place.
- Summary of CQA verification procedures implemented during construction. This summary included construction monitoring, construction verification testing, and the Contractor's and Installer's quality control procedures.
- Summary of CQA product verification testing results.
- Problems identified (if any) and resolutions.

- Areas of non-conformance for substandard work and corrective action measures.
- Summary of off-site materials received.
- Record of site visitors, if any.
- Photographs with descriptions.

Daily Summary Reports that document all construction activity are found in Appendix D: CQA Daily Field Reports.

2.2 CQA TRACKING, TESTING AND VERIFICATION FIELD RECORDS

Construction activities, CQA procedures, laboratory testing, and construction testing were recorded on appropriate tracking, testing, and summary forms. CQA Monitors used the following field construction and laboratory testing forms for this project:

Earthwork:

1. Density Test Log
2. Lift Maps

Geosynthetics:

1. Pre-project Geosynthetic Materials Inventory Form
2. Subgrade Acceptance For
3. Geomembrane Deployment Record
4. Geomembrane Trial Welding Record
5. Geomembrane Seaming Record
6. Geomembrane Destructive Seam Sample Record
7. Geomembrane Repair Record
8. Geomembrane Non-destructive Seam Test Record
9. Post-project Geosynthetic Materials Inventory Record

The complete set of CQA field documentation are in Appendix H: CQA Field Reports.

2.3 PHOTOGRAPHIC RECORD

Photographs of construction activities were taken daily by the CQA Monitor

A comprehensive photo record is contained within the Daily Field Reports in Appendix D: CQA Daily Field Reports.

2.4 RECORD CONTROL

Construction activity documentation was recorded in the field on hard copy forms/logs and then scanned to digital pdf files. Original hard copies were secured in a temporary field binder and later sent back to the home office for reproduction and distribution. Original project submittals were submitted electronically directly to the Engineer for review and approval.

2.5 RECORD ARCHIVES

Hard copy documentation generated during the project was delivered back to the CQA Monitor's home office for the project archives. Electronic documentation generated for the project was saved on a local hard drive then uploaded to a secure cloud sharing hard drive via the internet. These files were downloaded by the home office and saved to the company's secured network. Printed copies were then generated and filed in the project archives. All relevant documents were distributed with this Certification Report to the appropriate organizations involved with this project.

SECTION 3 CONSTRUCTION QUALITY ASSURANCE PROGRAM

1.0 PROGRAM OBJECTIVES

The following are the Construction Quality Assurance (CQA) program objectives:

Review and Approve.

Review and approve submittals to verify construction materials, procedures and personnel complied with the Contract Documents and approved submittals. This task was performed by the Engineer. Approved submittals and other data were forwarded to the CQA Monitor for use in the field during construction.

On-site Presence.

Providing on site personnel with real-time construction monitoring, inspecting, and verification testing were performed during all phases relevant to the certification of the project. This task was performed by the CQA Monitor throughout the course of the project. At times, Beyond assisted in various tasks as needed. The Engineer also visited the site at the completion of major milestones to observe progress and inspect complete work to help ensure quality assurance.

Documentation.

Providing a high-quality program of verification procedures, checks and reviews to facilitate the goals outlined in the Contract Documents and CQA Plan to ensure design objectives were fulfilled. This task was performed in the field during construction by the CQA Monitor. The documentation was quality checked prior to submittal to The Engineer who then performed the final full review of the documentation.

1.1 MATERIAL SUBMITTALS

Material submittal review and archiving was the responsibility of the Engineer. They were reviewed by the Engineer and when requested reviewed by the CQA Monitor for compliance/concurrence with the Contract Documents listed in this Report. Submittals are located within Appendix E: Submittals.

1.2 REQUEST FOR INFORMATION (RFI)

At various times during the project, RFIs were generated by the contractor and submitted to the Engineer to clarify questions related to the design or Contract Documents. RFIs were reviewed and responded to by The Engineer.

Final approved RFIs are in Appendix F: Request for Information (RFI).

1.3 VERIFICATION

1.3.1 Construction Testing

Construction verification testing was performed on installed or constructed components to verify compliance with the Contract Documents. Construction verification testing was performed by the Installer, the CQA Monitor, or by off-site testing laboratories as required by the Contract Documents. Construction testing data was recorded on CQA field forms appropriate for the task and can be found in Appendix H: CQA Field Reports.

1.3.2 Equipment Calibrations

The nuclear densitometer for the earthwork construction and the tensiometer for the geosynthetics installation both required calibrations.

Nuclear Densitometer

There were two different densitometers (portable nuclear density gauge) used on this project to test the in-place soil moisture content and density during construction.

1. Manufacturer: CPN, Model: MC1 DRP, Serial #: 8825: This densitometer was used by the CQA Monitor and was calibrated by InstroTek, Inc. on January 01, 2022. Next calibration was due on January 28, 2023 (after the completion of the Project). A copy of the calibration certificate is in Appendix G: Equipment Calibrations.

Tensiometer

A tensiometer with a single calibrated load cell was used by Mustang to perform on-site field testing of peel and shear samples for both trial welds and destructive seam samples throughout the geomembrane installation. Although one tensiometer was used, there were two load cells.

1. Load Cell Model Number: M2405-750#, Serial Number: 666584: This load cell was calibrated on April 23, 2021, by DemTech Services, Inc. This calibration expired on April 23, 2022, during the project however was replaced prior to expiration by the load cell mentioned in #2 below. A copy of the calibration certificate is in Appendix G: Equipment Calibrations.

2. Load Cell Model Number: M2404-750#, Serial Number: 688141 was calibrated by DemTech Services, Inc. on January 28, 2022, and was used throughout the remainder of the project. A copy of the calibration certificate is found in Appendix G: Equipment Calibrations.

SECTION 4: CONSTRUCTION MATERIALS

1.0 INTRODUCTION

This section describes the materials used for the construction of the project:

- Soil
- Aggregate
- Geomembrane
- Geosynthetic Clay Liner (GCL)
- Geocomposite
- Geotextile
- HDPE embedment strips / PolyLock
- Structural Concrete

1.1 SOILS & AGGREGATES:

On site-soil borrow areas (from areas requiring cut) were utilized for all the fill material throughout the project.

1.1.1 Sampling:

The CQA Monitor arrived on site on February 18, 2022, to collect soil material samples to ship to a third-party laboratory for pre-construction conformance testing. There were three main soil types to be used for this project:

1. General Fill (2 samples collected)
2. Structural Fill (3 samples collected)
3. Protective Cover (3 samples collected)
4. Collection Stone (1 sample collected)

At the on-set of the project, Pettigrew & Associates performed the third-party laboratory however due to scheduling issues the lab was changed to Beyond Engineering & Testing part-way through the project.

1.1.2 General Fill

General Fill (samples identified with a "GF" prefix) is material that is to be used for fill to bring areas up to design grade, but does not require structural strength (i.e. will not supporting waste, liquid, concrete pad, roadway, etc.). This material consisted of relatively native excavated soils that are free of debris, foreign objects, large rock fragments, roots, and organics and no materials larger than six inches was allowed.

The following laboratory tests were performed on the general fill material:

1. ASTM D698 Standard Proctor
2. ASTM D698 Atterberg

Laboratory test results were reviewed and approved by the Engineer and are in Appendix B: Pre-Construction Material Testing.

1.1.3 Structural Fill

Structural Fill (samples identified with a "SF" prefix) is material used for fill to bring areas up to design grade and will be structural support for another material and/or component, (i.e. will not supporting waste, liquid, concrete pad, roadway, etc.).

These areas include:

- The perimeter berm of Cell E-1 and the Contact Pond.
- Fill used to create the supporting subgrade for the Concrete Pad
- Fill that will support the delineated Caliche Road, especially at the entrance way and ramp into the cell (not within the scope of this Report)
- Fill under the area that will hold the scales and scale house (not within the scope of this Report)

The structural fill material consisted of relatively homogeneous, natural soils that are free of debris, foreign objects, large rock fragments, roots, and organics, particle size of 3-inch minus, and classified according to the Unified Soil Classification System (USCS) as SP, SW, SM, SC, ML, CL, CH, or MH material.

The following laboratory tests were performed on the general fill material:

1. ASTM D2487 USCS Classification
2. ASTM D4318 Atterbergs
3. ASTM 422 Gradations
4. ASTM D698 Standard Proctor

5. ASTM D1557 Modified Proctor

Laboratory test results were reviewed and approved by the Engineer and are in Appendix B: Pre-Construction Material Testing.

1.1.4 Protective Cover

Protective cover (samples identified with a "PC" prefix) is the drainage aggregate to be placed over the geosynthetic layer within Cell E-1.

The Protective Cover material is screened to a 3-inch maximum diameter with all vegetative/organic materials and debris removed.

The following laboratory tests were performed on the Protective Cover:

1. ASTM D422 Gradation
2. ASTM D2487 USCS Classification

The requirement for ASTM D2434 Hydraulic Conductivity testing of the protective cover material was removed per NRSWMF Permit NM1-66 Condition 6.L, and is in general compliance with minor permit modification approved by the New Mexico Energy, Minerals and Natural Resources Department – Oil Conservation Division dated June 15, 2022.

Laboratory test results were reviewed and approved by the Engineer and are in Appendix B: Pre-Construction Material Testing.

1.1.5 Collection Stone (Aggregate)

Collection Stone materials were sourced and provided by the Geosynthetics Installer. Collection Stone (samples identified with a "CS" prefix) is the aggregate used within the leachate collection trenches and leachate collection and leak detection sumps of Cell E-1, and the leak detection sumps of the Leachate Pond, drying pads and truck wash pad.

The following laboratory tests were performed on the collection stone:

1. ASTM D2487 USCS Classification
2. ASTM D422 Gradation
3. ASTM D437 Calcium Carbonate Content
4. ASTM D2434 Hydraulic Conductivity

Laboratory test results were reviewed and approved by the Engineer and are in Appendix B: Pre-Construction Material Testing. Note that the collection stone material used did not pass the minimum requirements for Calcium Carbonate Content. However, due to limited availability of a rock which would meet these criteria within a reasonable economic distance to the project this variance was waived by the Engineer.

1.2 GEOSYNTHETICS

This project installed geosynthetic materials equivalent to the geosynthetics materials prescribed in the NRSWMF Permit document. Namely geosynthetic clay liner (or GCL), 60-mil double sided textured high density polyethylene (HDPE) membrane (or geomembrane), and 200-mil double-sided geonet/geotextile drainage composite (or geocomposite). These materials were installed at the permit prescribed locations in the prescribed cross-section.

1.2.1 Geosynthetic Clay Liner (GCL)

Prior to GCL installation, the Engineer performed CQA verification and approval of the following:

- GCL material submittals verifying compliance with the Contract Documents. The Manufacturer product information sheets are available within Appendix B: Pre-Construction Material Testing.
- GCL manufacturer's quality control (MQC) testing. The MQC certificates are available within Appendix B: Pre-Construction Material Testing.
- Material Conformance Testing as described within the construction documents were performed by the Geosynthetics Laboratory. Laboratory test results are included within Appendix B: Pre-Construction Material Testing.

GCL was delivered to the site beginning on April 04, 2022 and continuing periodically as needed. Material was offloaded from the flatbed trucks by the Earthworks Contractor and stockpiled on site according to the manufacturer's recommendations. Observation of the offloading and stockpiling was performed by the CQA Monitor. An inventory list of delivered materials was developed by the CQA Monitor which was cross checked against the list of approved materials provided by the Engineer.

1.2.2 Geomembrane

The geomembrane used for construction was 60-mil HDPE with double sided texturing and smooth welding strips along the machine edges. Prior to geomembrane installation, the Engineer performed CQA verification and approval of the following:

- Reviewed geomembrane submittals verifying compliance with the Contract Documents. The Manufacturer product information sheets are available within Appendix B: Pre-Construction Material Testing.
- Geomembrane manufacturer's quality control (MQC) testing. The MQC certificates are available within Appendix B: Pre-Construction Material Testing.

- Material Conformance Testing as described within the construction documents were performed by the Geosynthetics Laboratory. Laboratory test results are included within Appendix B: Pre-Construction Material Testing.
- An inventory list of delivered materials was developed by the CQA Monitor which was cross checked against the list of approved materials provided by the Engineer.

1.2.3 Geocomposite

Prior to geomembrane installation, the Engineer performed CQA verification and approval of the following:

- Reviewed geocomposite submittals verifying compliance with the Contract Documents. The Manufacturer product information sheets are available within Appendix B: Pre-Construction Material Testing.
- Geocomposite manufacturer's quality control (MQC) testing. The MQC certificates are available within Appendix B: Pre-Construction Material Testing.
- Material Conformance Testing as described within the construction documents were performed by TRI. Laboratory test results are included within Appendix B: Pre-Construction Material Testing.

  An inventory list of delivered materials was developed by the CQA Monitor which was cross checked against the list of approved materials provided by the Engineer.

1.3 CONCRETE

Concrete was used as the primary containment barrier for both the Drying Pads and the Truck Wash. The concrete mix design was provided by Lea County Concrete and was reviewed and accepted by the Structural Engineer prior to use. During concrete pouring, the concrete laboratory (Beyond) supplied a technician to perform field slump and air content testing, and to collect cylinder samples for laboratory strength testing. Beyond provided field and laboratory testing results to the Structural Engineer for review and approval. Laboratory test results are included within Appendix I: Concrete Laboratory Testing Results.

SECTION 5: CONSTRUCTION COMPONENTS

1.0 CONCRETE DRYING PADS AND TRUCK WASH PAD

1.1 INTRODUCTION

The East and West Drying Pads, (each approximately 17,000 square feet) and the Truck Wash Pad (approximately 11,000 SF) are located at the southeastern corner of the work area. These pads are comprised of the following layers: (from the bottom up):

1. Existing native soil
2. Added fill (6" of which was a prepared subgrade for the geosynthetic layers)
3. 8 oz Geotextile for Drying Pads (replaces reinforced GCL design per RFI #3); Reinforced GCL for the Truck Wash
4. Secondary geomembrane (60-mil HDPE)
5. Geocomposite
6. Primary geomembrane (60-mil HDPE)
7. Geotextile
8. Drainage layer with leachate collection pipe
9. Concrete pad

1.2 EARTHWORK CONSTRUCTION

Prior to fill operations, the in-situ (existing) material was proof rolled. The proof roll was performed with a loaded articulating truck and was observed by the CQA Monitor. No areas of non-conforming materials were observed.

Fill material was placed on top of the existing native soil within the various Pads as needed to bring it up to the required elevations. A total of three (3) lifts were constructed and tested at the East and West Drying Pads; and a total of two (2) lifts were constructed and tested at the Truck Wash Pad.

During fill operations, approved material was hauled via articulating haul trucks from the borrow area. The designated borrow area was from within Cell E-1 as it was excavated to reach design elevations. The fill material was spread within the East Drying Pad with a CAT D6 bulldozer equipped with GPS to maintain lift control into approximate 10-inch loose lifts. The material was then moisture conditioned and compacted by a CAT CP56B Compactor.

Upon completion of the compaction, each lift was tested via a calibrated portable nuclear density gauge (CPN Model MCI-DRP) at a frequency of twelve (12) tests per acre per constructed lift. The calibration certificate is in Appendix: Equipment Calibrations.

To meet the specified requirements, a combination of modified and standard proctors was utilized. For tests utilizing the Standard Proctor, a minimum compaction of 95% Maximum Dry Density (MDD) and a moisture range of +/- 2% of the Optimum Moisture (OM) was required. For tests utilizing the Modified Proctor, a minimum compaction of 92% Maximum Dry Density (MDD) and a moisture range of +/-3% of the Optimum Moisture (OM) was required.

Density Test Logs and corresponding Lift Map Sketch from each respective Pad can be found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad

Laboratory proctor data is located within Appendix B: Pre-Construction Material Testing.

1.3 PREPARED SUBGRADE

Upon completion of the earthwork activities, the subgrade for the geosynthetics was prepared by scarifying the top 6-inches, moisture conditioning as needed and smooth drum rolling to prepare a smooth layer for the geosynthetics to lay on. No density testing was required on the 6-inch prepared subgrade.

The prepared subgrade was surveyed by the CQA Surveyor, and the elevations were approved by the Engineer.

The prepared subgrade was visually inspected by the CQA Monitor prior to any geosynthetic material placement. Any identified conditions that did not conform to the Contract Documents were corrected by the Earthworks Contractor.

Upon completion of the subgrade inspection, a Subgrade Acceptance Form was signed by the CQA Monitor and the Geosynthetics Installer. All parties visually examined the subgrade surface to ensure no deleterious materials or materials that would potentially damage the geomembrane system were present in the areas to be covered. This included a visual inspection for rocks, yielding soils, moisture content, structural abnormalities, or any deleterious materials on the geosynthetic lining surface. Subgrade surface approval was made before any geosynthetics were deployed over any surface.

The signed Subgrade Acceptance Forms for the three Pads can be found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad, respectively.

1.4 GEOSYNTHETIC CLAY LINER (GCL)

Per original design (see Detail A:9PL) GCL was to be installed directly on top of the prepared subgrade however per RFI 3, the GCL was replaced with an 8-oz geotextile. This revision applies only to the East and West Drying Pads.

RFI 3 can be found in Appendix F: Request for Information (RFI).

At the Truck Wash Pad only, the reinforced GCL was installed directly on top and in intimate contact with the prepared subgrade within the Truck Wash Pad. The GCL was deployed via a spreader bar attached to a skid steer with an overlap of 6-inches on the machined edges and 24-inches on the cross-machine edges. Bentonite was applied to the seam area prior to overlapping. Seams were heat bonded using a hot air gun.

Repairs to the GCL were performed as needed using a GCL patch which was a minimum of twelve (12) inches overlapped beyond the damage and hot air bonded to the parent sheet.

No CQA field data sheets were required for the GCL installation.

1.5 GEOTEXTILE

At the East and West Drying Pads, an 8-oz non-woven, needle-punched geotextile was installed directly on top of the prepared subgrade within the footprint of the drying pad.

During geotextile installation, the CQA Monitor performed the following general construction quality assurance verification procedures:

- Verified geotextile was installed in accordance with the Contract Documents.
- Verified geotextile was installed with sufficient tension to prevent excessive wrinkles and folds.

The geotextile was overlapped and stitched together. All repairs were heat-bonded with a hot-air device.

No CQA field documentation forms were required for the installation of the geotextile.

1.6 SECONDARY 60-MIL HDPE GEOMEMBRANE

1.6.1 Deployment

All Secondary (bottom) geomembrane panels were deployed with a spreader bar attached to a skid-steer stationed off the geotextile and pulled by hand and were installed directly on top of and with intimate contact with the geotextile. Upon deployment, each panel was labeled with an identification number with the prefix of “S” (secondary).

Deployment of the Secondary geomembrane occurred on March 27, 2022.

Panels were deployed with an approximate overlap of approximately four (4) to six (6) inches to accommodate thermal fusion welding.

During geomembrane deployment operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Verified rolls were unloaded, handled, and transported in a way that did not cause damage to the geomembrane or the protective coverings.
- Verified underlying surface preparation was complete and acceptable before geomembrane installation.
- Monitored and documented geomembrane deployment operations. Monitored and obtained the following documentation: panel numbers, roll numbers, panel dimensions, panel areas, and field sketches of daily panel layout drawings.
- Verified panels were overlapped with a minimum of approximately 4 to 6 inches required for fusion welding machines.
- Verified any damaged geomembrane was either repaired or removed entirely.
- Verified excessive wrinkling of the geomembrane did not occur and compensation for stress bridging was added during deployment operations when necessary. Verified excessive wrinkles and stress bridging were repaired or removed entirely.

In total, approximately 17,000 SF of Secondary Geomembrane was deployed within the East and West Drying Pads, and ~11,000 SF of Secondary Geomembrane was deployed within the Truck Wash Pad.

Deployment of the geomembrane panels was recorded on the Geomembrane Deployment Log and a field sketch was drawn for each pad which can be found respectively in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

1.6.2 Trial Welds

During geomembrane trial weld (pre-welding) operations, CQA Monitor performed the following construction quality assurance verification procedures:

- Verified that the tensiometer had a valid calibration certificate.
- Verified each operator and machine combination was tested for each interface (smooth/smooth, textured/textured, and textured/smooth) and frequency as required by the Contract Documents.
- Recorded ambient temperatures to verify they were within the range specified in the Contract Documents.

- Monitored, documented, and verified that each fusion and extrusion welding machine completed trial welds and met the criteria for peel and shear strength testing in accordance with the Contract Documents and approved submittals.

The Geomembrane Trial Welding Record and Tensiometer Calibration Certificate(s) for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

1.6.3 Fusion Seaming

All secondary production seams were thermally welded using a dual-track fusion machine.

During geomembrane welding operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Monitored and documented geomembrane welding operations, geomembrane seam numbers, welding operators, welding machine numbers, and seam lengths.
- Verified welding operations took place only when the ambient temperature was between 40°F and 104 °F.
- Visually verified welding surfaces were thoroughly cleaned prior to welding operations to remove dust and dirt.
- Verified seams were welded at the same machine settings speed used to prepare the trial weld samples.
- Verified the welding operators and machine numbers, times, and dates on each seam welded.
- Verified each operator and machine combination was tested for each interface (smooth/smooth, textured/textured, and textured/smooth) and frequency as required by the Contract Documents.

A total of approximately 658, 650, and 329 lineal feet of panel seaming was fusion welded at the East Drying Pad, West Drying Pad, and Truck Wash Pad, respectively. There was no secondary extrusion welding for panel seaming at either of the Drying Pads.

All field documentation for the secondary seaming activities was recorded on the Seam Log for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

1.6.4 Non-Destructive Seam Testing:

All field fusion welds were continuity tested by the air pressure test method. This process involved sealing both ends of the air channel and the insertion of a gauged needle into one end of the air channel. A minimum air pressure of 30-psi was applied to the air channel and after a minimum period

of five (5) minutes, the gauge was observed for pressure loss. Per the Construction Documents, a maximum pressure loss of 3-psi was permitted for a passing result.

During non-destructive testing verification the CQA Monitor monitored and verified the following procedures:

- Verified air testing was completed for all fusion welds.
- Verified all leaks identified were repaired in accordance with the contract documents.

All non-destructive testing was documented on the Non-destructive Seam Test Record for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

1.6.5 Destructive Seam Test

Destructive seam samples were obtained at a minimum of 500-foot intervals for fusion and extrusion welded seams. The purpose of destructive testing was to verify that the finished seams met the specified strengths provided within the Contract Documents. Each destructive sample consisted of three sections: field test, laboratory test and owner archive. The field and laboratory sections were destructively tested for peel and shear.

A total of 4 destructive samples were marked on the secondary welding in each of the Drying Pads, and 2 destructive samples were marked on the secondary welding in the Truck Wash Pad.

The locations of these samples were recorded on the Destructive Seam Test Log for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

Field samples were tested on-site by the Installer with a calibrated tensiometer. All field-tested samples exceeded the minimum requirements provided within the Contract Documents.

Laboratory samples were shipped to and tested by TRI. All laboratory tested samples exceeded the minimum requirements provided within the Contract Documents.

Laboratory test results for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

1.6.6 Repairs

During geomembrane repair operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Monitored and documented geomembrane extrusion welding operations.

- Recorded repair numbers, welding operators, welding machine numbers and repair/patch sizes.
- Verified welding operations took place only when the ambient temperature was between 40°F and 104°F.
- Visually verified that welding surfaces were thoroughly cleaned prior to welding operations.
- Verified the repair operators recorded welding machine numbers, operator ID, machine settings, times, and dates on each repair welded.
- Verified each operator and machine combination performed a passing trial weld as required by the Contract Documents and were welded at the same machine settings used to prepare the trial weld samples.
- Verified field-fabrication of geomembrane boots around pipe penetrations. There was one (1) pipe boot installed at the East and West Drying Pads. This was a temporary boot until the concrete was poured. After the concrete pour, this was replaced with a permanent boot. The final permanent boot was non-destructively tested via the Holiday Spark test method. At the Truck Wash Pad both the secondary and primary HDPE layers were booted around the 4" HDPE SDR-9 leak detection riser pipe in accordance with Contract Documents. The boots were extrusion welded to the geomembrane layers and non-destructively tested.

All production repairs were thermally welded using extrusion fillet welds.

All field documentation for the secondary repair activities was recorded on the Repair Log which can be found in Appendix H-1: CQA Field Records - East Drying Pad.

1.6.7 Vacuum Test

Each extrusion welded repair was non-destructively tested with a vacuum box. This method involved the application of a soapy water placed over the extrusion weld and the application of a vacuum pressure of 1 to 4 psi via a vacuum-chamber box with a clear viewing window. Once the required vacuum pressure was achieved, a minimum dwell time of 10 seconds was achieved. During that time, the testing technician observed the testing area through the viewing window. No leaks were observed.

The vacuum-test data was documented on the Repair Log for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

1.6.8 Sump Test

The CQA Plan Section 2.7.3, Second Paragraph Bullet #4 discusses the requirement of a sump test. Per RFI-9, this requirement was waived in lieu of the appropriate non-destructive air-testing and vacuum testing as well as destructive seam testing on the secondary and primary geomembrane layers.

RFI-9 can be found in Appendix F: Request for Information (RFI).

1.7 GEOCOMPOSITE

Geocomposite was installed on top of and within the footprint of the Secondary geomembrane and was deployed by hand.

The geocomposite panels were overlapped and the geonet components were joined together with cable ties spaced every five (5) feet along the machine edges, six (six) inches within the anchor trenches and six (6) inches along the cross-machine edges.

The top geotextile components of the geocomposite panels were stitched together.

No CQA field documentation forms were required for the installation of the geocomposite.

1.8 DRAINAGE AGGREGATE

A drainage aggregate consisting of a washed, 0.5-inch minus rounded stone was installed within the sump, on top of the geocomposite.

Pre-construction laboratory testing results can be found in Appendix B: Pre-Construction Material Testing.

The aggregate was delivered to the sump with a low ground pressure 4-wheeled ATV and was hand-shoveled into the sump.

No CQA field documentation forms were required for the placement of the drainage aggregate.

1.9 GEOTEXTILE

An 8-oz non-woven, needle-punched geotextile was installed by hand directly on top of the Drainage Aggregate within the sump.

During geotextile installation, the CQA Organization performed the following general construction quality assurance verification procedures:

- Verified geotextile was installed in accordance with the Contract Documents.
- Verified geotextile was installed with sufficient tension to prevent excessive wrinkles and folds.

The textile completely overlapped the underlying drainage aggregate and was heat tacked to the underlying geocomposite.

No CQA field documentation forms were required for the installation of the geotextile.

1.10 PRIMARY HDPE GEOMEMBRANE

A 60-mil HDPE was installed directly on top of the geocomposite (or on top of the geotextile over the sump).

1.10.1 Deployment

All Primary (top layer) geomembrane panels were deployed by hand, pulling from a roll attached to a skid steer stationed off the geomembrane. Upon deployment, each panel was labeled with an identification number with the prefix of "P" (Primary).

Panels were deployed with an approximate overlap of approximately four (4) to six (6) inches to accommodate thermal fusion welding.

During geomembrane deployment operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Verified rolls were unloaded, handled, and transported in a way that did not cause damage to the geomembrane or the protective coverings.
- Verified underlying surface preparation was complete and acceptable before geomembrane installation.
- Monitored and documented geomembrane deployment operations. Monitored and obtained the following documentation: panel numbers, roll numbers, panel dimensions, panel areas, and field sketches of daily panel layout drawings.
- Verified panels were overlapped with a minimum of approximately 4 to 6 inches required for fusion welding machines.
- Verified any damaged geomembrane was either repaired or removed entirely.
- Verified excessive wrinkling of the geomembrane did not occur and compensation for stress bridging was added during deployment operations when necessary. Verified excessive wrinkles and stress bridging were repaired or removed entirely.
- Verified field-fabrication of geomembrane boots around pipe penetrations.
- Verified attachments to and around structures were completed.

In total, approximately 17,000 SF of Primary Geomembrane was deployed within the East and West Drying Pads, and ~11,000 SF of Primary Geomembrane was deployed within the Truck Wash Pad.

Deployment of the geomembrane panels was recorded on the Geomembrane Deployment Log for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

1.10.2 Trial Welds

During geomembrane trial weld (pre-welding) operations, The CQA Monitor performed the following construction quality assurance verification procedures:

- Verified that the tensiometer had a valid calibration certificate
- Verified each operator and machine combination was tested for each interface (smooth/smooth, textured/textured, and textured/smooth) and frequency as required by the Contract Documents.
- Recorded ambient temperatures to verify they were within the range specified in the Contract Documents.
- Monitored, documented, and verified that each fusion and extrusion welding machine completed trial welds and met the criteria for peel and shear strength testing in accordance with the Contract Documents and approved submittals.

The Geomembrane Trial Welding Record for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

The Tensiometer Calibration Certificate(s) are found in Appendix G: Equipment Calibrations.

1.10.3 Fusion Seaming

All primary production seams were thermally welded using a dual-track fusion machine. All Secondary to Primary seams were extrusion fillet welded.

During geomembrane welding operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Monitored and documented geomembrane welding operations. geomembrane seam numbers, welding operators, welding machine numbers, and seam lengths.
- Verified welding operations took place only when the ambient temperature was between 40°F and 104°F.
- Visually verified welding surfaces were thoroughly cleaned prior to welding operations to remove dust and dirt.
- Verified seams were welded at the same machine settings speed used to prepare the trial weld samples.

- Verified the welding operators and machine numbers, times, and dates on each seam welded.
- Verified each operator and machine combination was tested for each interface (smooth/smooth, textured/textured, and textured/smooth) and frequency as required by the Contract Documents.

A total of approximately 659 lineal feet of panel seaming was fusion welded in the East Drying Pad, 650 lineal feet in the West Drying Pad, and 329 lineal feet in the Truck Wash Pad.

A total of approximately 492 lineal feet of panel seaming (primary to secondary welds) was extrusion fillet welded in the East Drying Pad, 503 lineal feet in the West Drying Pad, and ~424 lineal feet in the Truck Wash Pad.

All field documentation for the secondary seaming activities was recorded on the Seam Log for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

1.10.4 Non-Destructive Seam Testing:

All field fusion welds were continuity tested by the air pressure test method. This process involved sealing both ends of the air channel and the insertion of a gauged needle into one end of the air channel. A minimum air pressure of 30-psi was applied to the air channel and after a minimum period of five (5) minutes, the gauge was observed for pressure loss. Per the Construction Documents, a maximum pressure loss of 3-psi was permitted for a passing result.

Each extrusion welded seam (primary to secondary welds) was non-destructively tested with a vacuum box. This method involved the application of a soapy water placed over the extrusion weld and the application of a vacuum pressure via a vacuum-chamber box with a clear viewing window. Once the required vacuum pressure was achieved, a dwell time of 10 seconds was achieved. During that time, the testing technician observed the testing area through the viewing window. No leaks were observed.

The extrusion welding for the pipe boots was non-destructively tested using the Holiday Spark Test Method.

During non-destructive testing verification the CQA Monitor monitored and verified the following procedures:

- Verified air testing was completed for all fusion welds.
- Verified vacuum chamber and/or spark testing was completed for all extrusion welds and repairs.
- Verified all leaks identified by the above test methods were repaired in accordance with the contract documents.

All non-destructive testing is recorded on the Non-destructive Seam Test Record for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

1.10.5 Destructive Seam Test

Destructive seam samples were obtained at a minimum of 500 -foot intervals for fusion and extrusion welded seams. The purpose of destructive testing was to verify that the finished seams met the specified strengths provided within the Contract Documents. Each destructive sample consisted of three sections: field test, laboratory test and owner archive. The field and laboratory sections were destructively tested for peel and shear.

The locations of these samples were recorded on the Destructive Seam Test Log for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

Field samples were tested on-site by the Installer with a calibrated tensiometer. All field-tested samples exceeded the minimum requirements provided within the Contract Documents.

Laboratory samples were shipped to and tested by TRI. All laboratory tested samples exceeded the minimum requirements provided within the Contract Documents.

Laboratory test results for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

1.10.6 Repairs

During geomembrane repair operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Monitored and documented geomembrane extrusion welding operations.
- Recorded repair numbers, welding operators, welding machine numbers and repair/patch sizes.
- Verified welding operations took place only when the ambient temperature was between 40°F and 104 °F.
- Visually verified that welding surfaces were thoroughly cleaned prior to welding operations.
- Verified the repair operators recorded welding machine numbers, operator ID, machine settings, times, and dates on each repair welded.

- Verified each operator and machine combination performed a passing trial weld as required by the Contract Documents and were welded at the same machine settings used to prepare the trial weld samples.

All production repairs were thermally welded using extrusion fillet welds.

All field documentation for the primary repair activities was recorded on the Repair Log for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

1.10.7 Vacuum Test

Each extrusion welded repair was non-destructively tested with a vacuum box. This method involved the application of a soapy water placed over the extrusion weld and the application of a vacuum pressure via a vacuum-chamber box with a clear viewing window. Once the required vacuum pressure was achieved, a dwell time of 10 seconds was achieved. During that time, the testing technician observed the testing area through the viewing window. No leaks were observed.

The vacuum-test data was documented on the Repair Log for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

1.11 GEOTEXTILE

An 8-oz non-woven, needle-punched geotextile was installed directly on top of the Primary geomembrane layer.

The textile was deployed by hand (with the roll attached to a skid steer via a spreader bar which was stationed off the geomembrane. The geotextile was overlapped as necessary to join panels. Panels were joined via stitching. The installed panels and completed panel connections were visually inspected by the CQA Monitor. Geotextile patches (repairs) were thermally fused using a hot air gun.

During geotextile installation, the CQA Monitor performed the following general construction quality assurance verification procedures:

- Verified geotextile was installed in accordance with the Contract Documents.
- Verified geotextile was installed with sufficient tension to prevent excessive wrinkles and folds.

The textile completely overlapped the underlying drainage aggregate and was heat tacked to the underlying geocomposite.

No CQA field documentation forms were required for the installation of the geotextile.

1.12 HDPE PIPE

A perforated 4-inch SDR-9 HDPE leachate collection pipe was welded and installed into the leak detection layer sump and into the primary leachate collection sump over geotextile. The pipes were aligned per plan, and grades were verified via survey by TGS.

No CQA field documentation forms were required for the installation of the HDPE pipes.

1.13 CAST IN PLACE CONCRETE

1.13.1 Material

A concrete mix was submitted on April 4, 2022 by Lea County Concrete and approved by the Structural Engineer.

1.13.2 Placement

A concrete pad was placed on top of the drainage rock layer which had been placed over top of the primary geotextile. Concrete placement occurred on May 21, 2022.

1.13.3 Construction Quality Control

SCS submitted RFI 16 - Concrete Quality Control Specifications on April 27, 2022, which contained a summary of the quality control requirements for the concrete work.

Beyond ET performed the concrete quality control testing in accordance with ACI 301 at a rate of one sample per 50 cubic yards of concrete placed. For each sample taken, the following tests were performed:

1. Strength (7- and 28-day compressive strength)
2. Slump
3. Temperature
4. Air Content

Concrete test reports can be found in Appendix I: Concrete Laboratory Testing Data.

1.13.4 Concrete / Geomembrane Attachment:

Detail D:9TW shows a mechanical attachment of the geomembrane to the cast in place concrete via batten strip, however on March 23, 2022, the Engineer approved the use of Solmax Concrete PolyLock embedment strips in response to Submittal #17.

PolyLock embedment strips were installed by Lea County Concrete during the concrete pour. The secondary and primary HDPE geomembranes were extrusion welded to the PolyLock on June 02, 2022.

On May 31, 2022, the Engineer approved not non-destructively testing the extrusion weld joining the geomembrane sheet to the PolyLock embedment strip.

1.14 COMPLETION OF WORK:

CQA activities related to the West Drying Pad, East Drying Pad, and Truck Wash pertaining to the scope of this Report concluded on June 1, 2022, June 2, 2022, and July 2, 2022 respectively.

1.15 LEACHATE PUMP STATION

The waste water pumps for the truck wash station as per Detail D on drawing 10DET was submitted by the Contractor (Submittal #8) and approved by the Engineer in compliance with the specifications. Due to long vendor lead times the approved leachate pump had not arrived and been installed at the time the preparation of this report. It is the understanding of the CQA Team leachate levels will be monitored by the Operator daily and pumped manually using portable pumps until the permanent approved pumps arrive and are installed per plan. Documentation and verification of this is not within the scope of the CQA certification documentation of this report.

2.0 CELL E-1

2.1 INTRODUCTION

Cell E-1, approximately 10 acres in lined area, lies at the western half of the overall work area, is comprised of the following layers (from the bottom up):

1. Existing native soil
2. Prepared subgrade for the geosynthetic layers
3. Reinforced GCL
4. Secondary geomembrane (60-mil HDPE)
5. Geocomposite leak detection layer
6. Primary geomembrane (60-mil HDPE)
7. Geocomposite primary drainage layer with gravel and leachate collection pipe
8. 2-feet of onsite native soil as protective cover

2.2 EARTHWORK CONSTRUCTION

Fill material was placed on top of the existing native soil within Cell E-1 as needed to bring it up to the required elevations. Prior to fill operations, the in-situ (existing) material was proof rolled. The proof roll was performed with a loaded articulating truck and was observed by the CQA Monitor. No areas of non-conforming materials were observed.

The soil material above the floor of Cell E-1 was cut and removed to attain the design elevations; however, fill material was placed to construct the upper elevations of the Cell E-1 containment berms to bring them up to the required elevations. A total of fifteen (15) lifts were constructed and tested within the above grade containment berm construction. Below grade in-situ surfaces were contoured, scarified, recompacted, and rolled, however no testing was required on in-situ surfaces.

During fill operations, approved material from within the Cell E-1 excavation was hauled via articulating haul trucks and placed where required to meet design grades. Structural fill material for the containment berms was spread with a CAT D6 bulldozer with GPS into approximate 8-inch loose lifts. The material was then moisture conditioned and compacted by a CAT CP56B compactor.

Upon completion of compaction, each lift of structural fill was tested via a portable nuclear density gauge at a frequency of twelve (12) tests per acre per constructed lift. The Modified Proctor was used for all testing performed for the Cell E-1 Berms. For tests utilizing the Modified Proctor, a minimum compaction of 92% Maximum Dry Density (MDD) and a moisture range of +/-2% of the Optimum Moisture (OM) was required. Density testing on below grade cut and rolled surfaces was not required

Density testing on the Cell E-1 berms was performed on March 24, 2022, through April 8, 2022.

Density Test Logs and Lift Map Field Sketches for Cell E-1 can be found in Appendix H-4: CQA Field Records Cell E-1.

The proctor data can be found in Appendix B: Pre-Construction Material Testing.

2.3 PREPARED SUBGRADE

In general, the prepared liner subgrade was constructed, prepared and tested as needed as discussed in the previous section. The final surface was smooth rolled and inspected. The prepared subgrade was surveyed by the CQA Surveyor, and the elevations were approved by the Engineer.

The prepared subgrade was visually inspected by the CQA Monitor on April 18, 2022 through April 28, 2022, prior to any geosynthetic material placement. Any identified conditions that did not conform to the Contract Documents were corrected by the Earthworks Contractor. The prepared subgrade was surveyed by the CQA Surveyor, and the elevations were approved by the Engineer.

Upon completion of the subgrade inspection, a Subgrade Acceptance Form was signed by the CQA Monitor and the Geosynthetics Installer. All parties visually examined the subgrade surface to ensure no deleterious materials or materials that would potentially damage the geomembrane system were present in the areas to be covered. This included a visual inspection for rocks, yielding soils, moisture content, structural abnormalities, or any deleterious materials on the geosynthetic lining surface. Subgrade surface approval was made before any geosynthetics were deployed over any surface.

The signed Subgrade Acceptance Form(s) for Cell E-1 can be found in Appendix H-4: CQA Field Records - Cell E-1.

2.4 GEOSYNTHETIC CLAY LINER (GCL)

The reinforced GCL was installed directly on top of the prepared subgrade and was deployed via spreader bar on a skid steer with an overlap of 6-inches on the machined edges and 24-inches on the cross-machined edges. Bentonite was applied to the seam area prior to overlapping. Seams were heat bonded using a hot air gun.

Approximately 441,000 SF of GCL was installed from April 18, 2022, through April 28, 2022.

Repairs to the GCL were performed as needed using a GCL patch which was a minimum of twelve (12) inches overlapped beyond the damage and hot air bonded to the parent sheet.

No CQA field data sheets were required for the GCL installation.

2.5 SECONDARY 60-MIL HDPE GEOMEMBRANE

2.5.1 Deployment

All Secondary (bottom) geomembrane panels were deployed with a spreader bar attached to a skid-steer stationed off the geotextile and pulled by hand and were installed directly on top of and with intimate contact with the geotextile. Upon deployment, each panel was labeled with an identification number with the prefix of “S” (secondary).

Deployment of the Secondary geomembrane occurred on April 18, 2022, through April 28, 2022.

Panels were deployed with an approximate overlap of approximately four (4) to six (6) inches to accommodate thermal fusion welding.

During geomembrane deployment operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Verified rolls were unloaded, handled, and transported in a way that did not cause damage to the geomembrane or the protective coverings.

- Verified underlying surface preparation was complete and acceptable before geomembrane installation.
- Monitored and documented geomembrane deployment operations. Monitored and obtained the following documentation: panel numbers, roll numbers, panel dimensions, panel areas, and field sketches of daily panel layout drawings.
- Verified panels were overlapped with a minimum of approximately 4 to 6 inches required for fusion welding machines.
- Verified any damaged geomembrane was either repaired or removed entirely.
- Verified excessive wrinkling of the geomembrane did not occur and compensation for stress bridging was added during deployment operations when necessary. Verified excessive wrinkles and stress bridging were repaired or removed entirely.

In total, approximately 441,000 SF of Secondary Geomembrane was deployed within Cell E-1.

Deployment of the geomembrane panels was recorded on the Geomembrane Deployment Log and a field sketch was drawn which are in Appendix H-4: CQA Field Records - Cell E-1.

2.5.2 Trial Welds

During geomembrane trial weld (pre-welding) operations, CQA Monitor performed the following construction quality assurance verification procedures:

- Verified that the tensiometer had a valid calibration certificate.
- Verified each operator and machine combination was tested for each interface (smooth/smooth, textured/textured, and textured/smooth) and frequency as required by the Contract Documents.
- Recorded ambient temperatures to verify they were within the range specified in the Contract Documents.
- Monitored, documented, and verified that each fusion and extrusion welding machine completed trial welds and met the criteria for peel and shear strength testing in accordance with the Contract Documents and approved submittals.

The Geomembrane Trial Welding Record and Tensiometer Calibration Certificate(s) are found in Appendix H-4: CQA Field Records - Cell E-1.

2.5.3 Fusion Seaming

All secondary production seams were thermally welded using a dual-track fusion machine from April 18, 2022, through April 28, 2022.

During geomembrane welding operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Monitored and documented geomembrane welding operations, geomembrane seam numbers, welding operators, welding machine numbers, and seam lengths.
- Verified welding operations took place only when the ambient temperature was between 40°F and 104 °F.
- Visually verified welding surfaces were thoroughly cleaned prior to welding operations to remove dust and dirt.
- Verified seams were welded at the same machine settings speed used to prepare the trial weld samples.
- Verified the welding operators and machine numbers, times, and dates on each seam welded.
- Verified each operator and machine combination was tested for each interface (smooth/smooth, textured/textured, and textured/smooth) and frequency as required by the Contract Documents.

A total of approximately 21,595 lineal feet of panel seaming was fusion welded. There was no secondary extrusion welding for panel seaming.

All field documentation for the secondary seaming activities was recorded on the Seam Log which can be found in Appendix H-4: CQA Field Records - Cell E-1.

2.5.4 Non-Destructive Seam Testing:

All field fusion welds were continuity tested by the air pressure test method from April 19, 2022, through April 30, 2022. This process involved sealing both ends of the air channel and the insertion of a gauged needle into one end of the air channel. A minimum air pressure of 30-psi was applied to the air channel and after a minimum period of five (5) minutes, the gauge was observed for pressure loss. Per the Construction Documents, a maximum pressure loss of 3-psi was permitted for a passing result.

During non-destructive testing verification the CQA Monitor monitored and verified the following procedures:

- Verified air testing was completed for all fusion welds.
- Verified all leaks identified were repaired in accordance with the contract documents.

All non-destructive testing is recorded on the Non-destructive Seam Test Record which can be found in Appendix H-4: CQA Field Records - Cell E-1.

2.5.5 Destructive Seam Test

Destructive seam samples were obtained at a minimum of 500-foot intervals for fusion and extrusion welded seams. The purpose of destructive testing was to verify that the finished seams met the specified strengths provided within the Contract Documents. Each destructive sample consisted of three sections: field test, laboratory test and owner archive. The field and laboratory sections were destructively tested for peel and shear.

A total of 54 destructive samples were marked on the secondary welding from April 25 through April 30, 2022.

The locations of these samples were recorded on the Destructive Seam Test Log which is in Appendix H-4: CQA Field Records - Cell E-1.

Field samples were tested on-site by the Installer with a calibrated tensiometer. All field-tested samples exceeded the minimum requirements provided within the Contract Documents.

Laboratory samples were shipped to and tested by TRI. All laboratory tested samples except two (2) exceeded the minimum requirements provided within the Contract Documents.

Destructive Sample CSDS29 failed laboratory testing and was bounded with CSDS29-A and CSDS29-B, both of which passed laboratory testing. All welding within the failing zone between the two bounding samples were capped.

Destructive Sample CSDS39 failed laboratory testing and was bounded with CSDS39-A and CSDS39-B, both of which passed laboratory testing. All welding within the failing zone between the two bounding samples were capped.

Laboratory test results are located within Appendix H-4: CQA Field Records - Cell E-1.

2.5.6 Repairs

Secondary geomembrane repairs were performed on April 22, 2022 through April 30, 2022. During geomembrane repair operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Monitored and documented geomembrane extrusion welding operations.
- Recorded repair numbers, welding operators, welding machine numbers and repair/patch sizes.
- Verified welding operations took place only when the ambient temperature was between 40°F and 104°F.
- Visually verified that welding surfaces were thoroughly cleaned prior to welding operations.

- Verified the repair operators recorded welding machine numbers, operator ID, machine settings, times, and dates on each repair welded.
- Verified each operator and machine combination performed a passing trial weld as required by the Contract Documents and were welded at the same machine settings used to prepare the trial weld samples.
- Verified field-fabrication of geomembrane boots around pipe penetrations. There was one (1) pipe boot installed. This was a temporary boot until the concrete was poured. After the concrete pour, this was replaced with a permanent boot. The final permanent boot was non-destructively tested via the Holiday Spark test method.

All production repairs were thermally welded using extrusion fillet welds.

All field documentation for the secondary repair activities was recorded on the Repair Log which can be found in Appendix H-4: CQA Field Records - Cell E-1.

2.5.7 Vacuum Test

Each extrusion welded repair was non-destructively tested with a vacuum box from April 22, 2022, through April 30, 2022. This method involved the application of a soapy water placed over the extrusion weld and the application of a vacuum pressure of 1 to 4 psi via a vacuum-chamber box with a clear viewing window. Once the required vacuum pressure was achieved, a minimum dwell time of 10 seconds was achieved. During that time, the testing technician observed the testing area through the viewing window. No leaks were observed.

The vacuum-test data was documented on the Repair Log which can be found in Appendix H-4: CQA Field Records - Cell E-1.

2.5.8 Sump Test

The CQA Plan Section 2.7.3, Second Paragraph Bullet #4 discusses the requirement of a sump test. Per RFI-9, this requirement was waived in lieu of the appropriate non-destructive air-testing and vacuum testing as well as destructive seam testing on the secondary and primary geomembrane layers.

RFI-9 can be found in Appendix F: Request for Information (RFI).

2.6 GEOCOMPOSITE

2.7 GEOCOMPOSITE (SECONDARY LEAK DETECTION)

Geocomposite was installed on top of and within the footprint of the Secondary geomembrane and was deployed by hand.

The geocomposite panels were overlapped and the geonet components were joined together with cable ties spaced every five (5) feet along the machine edges, six (six) inches within the anchor trenches and six (6) inches along the cross-machine edges.

The top geotextile components of the geocomposite panels were stitched together.

No CQA field documentation forms were required for the installation of the geocomposite.

2.8 DRAINAGE AGGREGATE

A drainage aggregate consisting of a washed, 0.5-inch minus rounded stone was installed within the sump approximately 2-feet deep, on top of the geocomposite. The top layer of the aggregate was also overlain by geocomposite to act as a cushion for the primary geomembrane to be installed above. All rock was wrapped with an 8-oz/sy non-woven needle punched geotextile to provide a cushion to the primary geomembrane and act as a filter to prevent clogging of the drainage rock.

Pre-construction laboratory testing results can be found in Appendix B: Pre-Construction Material Testing.

The aggregate was delivered to the sump with a low ground pressure 4-wheeled ATV and was hand-shoveled into the sump.

No CQA field documentation forms were required for the placement of the drainage aggregate.

2.9 PRIMARY HDPE GEOMEMBRANE

A 60-mil HDPE was installed directly on top of the geocomposite (or on top of the geotextile over the sump).

2.9.1 Deployment

All Primary (top layer) geomembrane panels were deployed by hand, pulling from a roll attached to a skid steer stationed off the geomembrane. Upon deployment, each panel was labeled with an identification number with the prefix of “P” (Primary).

Deployment of the Primary geomembrane occurred on May 4, 2022, through May 17, 2022

Panels were deployed with an approximate overlap of approximately four (4) to six (6) inches to accommodate thermal fusion welding.

During geomembrane deployment operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Verified rolls were unloaded, handled, and transported in a way that did not cause damage to the geomembrane or the protective coverings.
- Verified underlying surface preparation was complete and acceptable before geomembrane installation.
- Monitored and documented geomembrane deployment operations. Monitored and obtained the following documentation: panel numbers, roll numbers, panel dimensions, panel areas, and field sketches of daily panel layout drawings.
- Verified panels were overlapped with a minimum of approximately 4 to 6 inches required for fusion welding machines.
- Verified any damaged geomembrane was either repaired or removed entirely.
- Verified excessive wrinkling of the geomembrane did not occur and compensation for stress bridging was added during deployment operations when necessary. Verified excessive wrinkles and stress bridging were repaired or removed entirely.
- Verified field-fabrication of geomembrane boots around pipe penetrations.
- Verified attachments to and around structures were completed.

In total, approximately 17,000 SF of Primary Geomembrane was deployed within the East and West Drying Pads, and ~11,000 SF of Primary Geomembrane was deployed within the Truck Wash Pad.

In total, approximately 450,684 SF of Primary Geomembrane was deployed within Cell E-1.

Deployment of the primary geomembrane panels was recorded on the Geomembrane Deployment Log for each pad, respectively, which can be found in Appendix H-14: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

2.9.2 Trial Welds

During geomembrane trial weld (pre-welding) operations, The CQA Monitor performed the following construction quality assurance verification procedures:

- Verified that the tensiometer had a valid calibration certificate
- Verified each operator and machine combination was tested for each interface (smooth/smooth, textured/textured, and textured/smooth) and frequency as required by the Contract Documents.

- Recorded ambient temperatures to verify they were within the range specified in the Contract Documents.
- Monitored, documented, and verified that each fusion and extrusion welding machine completed trial welds and met the criteria for peel and shear strength testing in accordance with the Contract Documents and approved submittals.

The Geomembrane Trial Welding Record for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.
The Geomembrane Trial Welding Record is in Appendix H-4: CQA Field Records - Cell E-1.

The Tensiometer Calibration Certificate(s) are found in Appendix G: Equipment Calibrations.

2.9.3 Fusion Seaming

All primary production seams were thermally welded using a dual-track fusion machine. All Secondary to Primary seams were extrusion fillet welded between May 4, 2022, through May 17, 2022.

During geomembrane welding operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Monitored and documented geomembrane welding operations. geomembrane seam numbers, welding operators, welding machine numbers, and seam lengths.
- Verified welding operations took place only when the ambient temperature was between 40°F and 104°F.
- Visually verified welding surfaces were thoroughly cleaned prior to welding operations to remove dust and dirt.
- Verified seams were welded at the same machine settings speed used to prepare the trial weld samples.
- Verified the welding operators and machine numbers, times, and dates on each seam welded.
- Verified each operator and machine combination was tested for each interface (smooth/smooth, textured/textured, and textured/smooth) and frequency as required by the Contract Documents.

A total of approximately 659 lineal feet of panel seaming was fusion welded in the East Drying Pad, 650 lineal feet in the West Drying Pad, and 329 lineal feet in the Truck Wash Pad.

A total of approximately 492 lineal feet of panel seaming (primary to secondary welds) was extrusion fillet welded in the East Drying Pad, 503 lineal feet in the West Drying Pad, and ~424 lineal feet in the Truck Wash Pad.

A total of approximately 23,507 lineal feet of panel seaming was fusion welded.

All field documentation for the secondary primary seaming activities was recorded on the Seam Log for each pad, respectively, which can be found in Appendix H-14: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

2.9.4 Non-Destructive Seam Testing:

All field fusion welds were continuity tested by the air pressure test method. from May 4, 2022, through May 17, 2022. This process involved sealing both ends of the air channel and the insertion of a gauged needle into one end of the air channel. A minimum air pressure of 30-psi was applied to the air channel and after a minimum period of five (5) minutes, the gauge was observed for pressure loss. Per the Construction Documents, a maximum pressure loss of 3-psi was permitted for a passing result.

Each extrusion welded seam (primary to secondary welds) was non-destructively tested with a vacuum box. This method involved the application of a soapy water placed over the extrusion weld and the application of a vacuum pressure via a vacuum-chamber box with a clear viewing window. Once the required vacuum pressure was achieved, a dwell time of 10 seconds was achieved. During that time, the testing technician observed the testing area through the viewing window. No leaks were observed.

The extrusion welding for the pipe boots was non-destructively tested using the Holiday Spark Test Method.

During non-destructive testing verification the CQA Monitor monitored and verified the following procedures:

- Verified air testing was completed for all fusion welds.
- Verified vacuum chamber and/or spark testing was completed for all extrusion welds and repairs.
- Verified all leaks identified by the above test methods were repaired in accordance with the contract documents.

All non-destructive testing was recorded on the Non-destructive Seam Test Record for each pad, respectively, which can be found in Appendix H-14: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

2.9.5 Destructive Seam Test

Destructive seam samples were obtained at a minimum of 500 -foot intervals for fusion and extrusion welded seams. The purpose of destructive testing was to verify that the finished seams met the specified strengths provided within the Contract Documents. Each destructive sample consisted of

three sections: field test, laboratory test and owner archive. The field and laboratory sections were destructively tested for peel and shear.

The locations of these samples were recorded on the Destructive Seam Test Log for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.
Destructive seam samples were obtained at a minimum of 500 -foot intervals for fusion and extrusion welded seams. The purpose of destructive testing was to verify that the finished seam met the specified strengths provided within the Contract Documents. Each destructive sample consisted of three sections: field test, laboratory test and owner archive. Each section was destructively tested for peel and shear.

A total of 63 destructive samples, including 4 failure tracking destructs, were marked on the primary welding from May 5 through May 21, 2022

The locations of these samples were recorded on the Destructive Seam Test Log which is found in Appendix H-4: CQA Field Records - Cell E-1.

Field samples were tested on-site by the Installer with a calibrated tensiometer. All field-tested samples exceeded the minimum requirements provided within the Contract Documents.

Laboratory samples were shipped to and tested by TRI. All laboratory tested samples exceeded the minimum requirements provided within the Contract Documents. All laboratory tested samples except one, CPDS-45 failed to meet the minimum requirements provided within the Contract Documents. CPDS-45 was tracked in both the “before” (B) direction and the “after” (A) direction resulting in two new samples, CPDS-45-B and CPDS-45-A - both of which failed. The tracking in both the before and after directions resulting in samples CPDS-45-B1 and CPDS-45-A1, both which passed. The seam(s) between CPDS-45-B1 and CPDS-45-A1 were capped, thus concluding the bounding of failed CPDS-45.

Laboratory test results for each pad respectively are found in Appendix H-1: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.
Laboratory test results are located within Appendix H-4: CQA Field Records - Cell E-1.

2.9.6 Repairs

Primary geomembrane repairs were performed between May 09, 2022, through May 21, 2022. During geomembrane repair operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Monitored and documented geomembrane extrusion welding operations.

- Recorded repair numbers, welding operators, welding machine numbers and repair/patch sizes.
- Verified welding operations took place only when the ambient temperature was between 40°F and 104 °F.
- Visually verified that welding surfaces were thoroughly cleaned prior to welding operations.
- Verified the repair operators recorded welding machine numbers, operator ID, machine settings, times, and dates on each repair welded.
- Verified each operator and machine combination performed a passing trial weld as required by the Contract Documents and were welded at the same machine settings used to prepare the trial weld samples.

All production repairs were thermally welded using extrusion fillet welds.

All field documentation for the primary repair activities was recorded on the Repair Log for each pad, respectively, which can be found in Appendix H-14: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

2.9.7 Vacuum Test

Each extrusion welded repair was non-destructively tested with a vacuum box. This method involved the application of a soapy water placed over the extrusion weld and the application of a vacuum pressure via a vacuum-chamber box with a clear viewing window. Once the required vacuum pressure was achieved, a dwell time of 10 seconds was achieved. During that time, the testing technician observed the testing area through the viewing window. No leaks were observed.

Each extrusion welded repair was non-destructively tested with a vacuum box from May 9, 2022, through May 21, 2022. This method involved the application of a soapy water placed over the extrusion weld and the application of a vacuum pressure via a vacuum-chamber box with a clear viewing window. Once the required vacuum pressure was achieved, a dwell time of 10 seconds was achieved. During that time, the testing technician observed the testing area through the viewing window. No leaks were observed.

The vacuum-test data was documented on the Repair Log for each pad, respectively, which can be found in Appendix H-14: CQA Field Records - East Drying Pad; Appendix H-2: CQA Field Records - West Drying Pad; Appendix H-3: CQA Field Records – Truck Wash Pad.

2.9.8 Geotextile

2.9.9 Sump Test

The CQA Plan Section 2.7.3, Second Paragraph Bullet #4 discusses the requirement of a sump test. Per RFI-9, this requirement was waived in lieu of the appropriate non-destructive air-testing and vacuum testing as well as destructive seam testing on the secondary and primary geomembrane layers.

RFI-9 can be found in Appendix F: Request for Information (RFI).

2.10 GEOCOMPOSITE (PRIMARY LEACHATE DRAINAGE)

An 8-oz non-woven, needle-punched geotextile was installed directly on top of the Primary geomembrane layer.

The textile was deployed by hand (with the roll attached to a skid steer via a spreader bar which was stationed off the geomembrane. The geotextile was overlapped as necessary to join panels. Panels were joined via stitching. The installed panels and completed panel connections were visually inspected by the CQA Monitor. Geotextile patches (repairs) were thermally fused using a hot air gun.

During geotextile installation, the CQA Monitor performed the following general construction quality assurance verification procedures:

- Verified geotextile was installed in accordance with the Contract Documents.
- Verified geotextile was installed with sufficient tension to prevent excessive wrinkles and folds.

The textile completely overlapped the underlying drainage aggregate and was heat tacked to the underlying geocomposite.
Geocomposite was installed on top of and within the footprint of the Primary geomembrane and was deployed by hand.

The geocomposite panels were overlapped and the geonet components were joined together with cable ties spaced every five (5) feet along the machine edges, six (six) inches within the anchor trenches and six (six) inches along the cross-machine edges.

The top geotextile components of the geocomposite panels were stitched together.

No CQA field documentation forms were required for the installation of the geotextile or geocomposite.

2.11 DRAINAGE AGGREGATE

A drainage aggregate consisting of a washed, 0.5-inch minus rounded stone was installed within the sump and the main leachate collection trench around the collection piping, on top of the

geocomposite. The top layer of the aggregate was also overlain by geocomposite to act as a cushion for the primary geomembrane to be installed above. This layer of aggregate was installed to a height of ~1-ft above the top of the protective soil cover layer to allow for direct connectivity to the primary geocomposite. All rock was wrapped with an 8-oz/sy non-woven needle punched geotextile to provide a cushion to the primary geomembrane and act as a filter to prevent clogging of the drainage rock.

Pre-construction laboratory testing results can be found in Appendix B: Pre-Construction Material Testing.

The aggregate was delivered to the sump with a low ground pressure 4-wheeled ATV and was hand-shoveled into the sump.

No CQA field documentation forms were required for the placement of the drainage aggregate.

2.12 HDPE PIPE

A perforated 4-inch SDR-9 HDPE leachate collection pipe was welded and installed into the leak detection layer sump and into the primary leachate collection sump over geotextile. The pipes were aligned per plan, and grades were verified via survey by TGS.
High Density Polyethylene (HDPE) pipes were installed within Cell E-1 for leachate collection and conveyance.

12-inch HPDE pipes were installed sitting on top of the secondary geocomposite located within the sump and running up the side-slopes. Within the sump, pipes were perforated, transitioning to solid on the side slopes. All pipes were thermally fusion welded. The perforated pipes were then "burrito-wrapped" with drainage aggregate and 8-oz non-woven, needle-punched geotextile. The geotextile was overlapped but not thermally joined.

6-inch HDPE pipes were installed within the Cell E-1 primary layer flow line running into the sump and then up the side slope. Within the flow line and into the sump, the pipes were perforated transitioning to solid on the side slope. They were installed sitting on top of an 8-oz non-woven, needle-punched geotextile which was later used to wrap the pipe and drainage aggregate. All pipes were thermally fusion welded. Pipes were then "burrito-wrapped" with drainage aggregate and geotextile. The geotextile was overlapped but not thermally joined. From the sump and up the side slope, the 6-inch and 18-inch pipes were burrito-wrapped together.

18-inch HDPE pipes were installed within the Cell E-1 primary sump, running up the side slope. Within the sump, the pipes were perforated, transitioning to solid up the side slope. They were installed sitting on top of an 8-oz non-woven, needle-punched geotextile which was later used to wrap the pipe and drainage aggregate. All pipes were thermally fusion welded. Pipes were then "burrito-wrapped"

with drainage aggregate and geotextile. The geotextile was overlapped but not thermally joined. From the sump and up the side slope, the 6-inch and 18-inch pipes were burrito-wrapped together.

No CQA field CQA documentation forms was required for the installation of the HDPE pipe work.

2.13 CAST IN PLACE CONCRETE

2.13.1 Material

A concrete mix was submitted on April 4, 2022 by Lea County Concrete and approved by the Structural Engineer.

2.13.2 Placement

A concrete pad was placed on top of the drainage rock layer which had been placed over top of the primary geotextile. Concrete placement occurred on May 21, 2022.

2.13.3 Construction Quality Control

SCS submitted RFI 16 - Concrete Quality Control Specifications on April 27, 2022, which contained a summary of the quality control requirements for the concrete work.

Beyond ET performed the concrete quality control testing in accordance with ACI 301 at a rate of one sample per 50 cubic yards of concrete placed. For each sample taken, the following tests were performed:

5. Strength (7- and 28-day compressive strength)
6. Slump
7. Temperature
8. Air Content

Concrete test reports can be found in Appendix I: Concrete Laboratory Testing Data.

2.13.4 Concrete / Geomembrane Attachment:

Detail D:9TW shows a mechanical attachment of the geomembrane to the cast in place concrete via batten strip, however on March 23, 2022, the Engineer approved the use of Solmax Concrete PolyLock embedment strips in response to Submittal #17.

PolyLock embedment strips were installed by Lea County Concrete during the concrete pour. The secondary and primary HDPE geomembranes were extrusion welded to the PolyLock on June 02, 2022.

On May 31, 2022, the Engineer approved not non-destructively testing the extrusion weld joining the geomembrane sheet to the PolyLock embedment strip.

2.14 COMPLETION OF WORK:

CQA activities related to the Cell E-2 pertaining to the scope of this Report concluded on June 1, 2022, June 2, 2022, and June 7, 2022 respectively.

2.15 ANCHOR TRENCH BACKFILL

The geomembrane extending past the outside corner of the floor of the anchor trench was trimmed by Mustang prior to backfill. The anchor trenches were backfilled in 12-inch-thick lifts with General Fill and the top lift was density tested.

Results for the lift maps and the anchor trench density tests are found within Appendix H-4: Cell E-1.

2.16 PROTECTIVE COVER (PROTECTIVE SOIL LAYER, OR PSL)

Protective cover material consisted of native material from the Cell E-1 excavation and did not require testing per NRSWMF Permit NM1-66 Condition 6.L, and is in general compliance with minor permit modification approved by the New Mexico Energy, Minerals and Natural Resources Department – Oil Conservation Division dated June 15, 2022. Suitable PSL material was stockpiled to the south of the excavation area and hauled back into the finished/lined cell from the southwest corner via the as-designed cell ramp that was also constructed out of protective cover material. Thickened sections over the liner were constructed within the cell out of protective cover material so that articulating haul trucks had a "road" and could further haul material into the cell. After all the material was hauled into the cell, the haul roads were spread out by a light ground pressure bulldozer to an approximate thickness of 24-inches using dozer-equipped GPS for grade control. On the slopes, the protective cover was pushed up-slope.

Please note that the one-foot of protective cover over top of the perimeter berm and anchor trench did not need to be density tested as shown on Detail C-7PR per waiver from the Engineer. PSL Placement was completed on June 2, 2022.

2.17 LEACHATE PUMP STATION

The Cell E-1 leachate pump riser pipes concrete headwall is per Detail G on drawing 7PR and the clarified dimensions provided on RFI 17. The Cell E-1 leachate transfer pump was submitted by the Contractor (Submittal #8) and approved by the Engineer in compliance with the specifications. Due to long vendor lead times the approved leachate pump had not arrived and been installed at the time the preparation of this report. It is the understanding of the CQA Team leachate levels will be monitored by the Operator daily and pumped manually using portable pumps until the permanent

approved pumps arrive and are installed per plan. Documentation and verification of this is not within the scope of the CQA certification documentation of this report.

2.18 COMPLETION OF WORK

CQA activities related to Cell E-1 within the scope of this report concluded when on June 7, 2022. Introduction:

3.0 LEACHATE POND

3.1 INTRODUCTION

Leachate Pond, approximately 2.5 acres in size, lies within the western half of the work area. It is comprised of the following layers: (from the bottom up):

1. Existing native soil
2. Prepared subgrade for the geosynthetic layers
3. Reinforced GCL
4. Secondary geomembrane (60-mil HDPE)
5. Geocomposite leak detection layer
6. Primary geomembrane (60-mil HDPE)

3.2 EARTHWORK CONSTRUCTION

Fill material was placed on top of the existing native soil within the leachate pond as needed to bring it up to the required elevations. Prior to fill operations, the in-situ (existing) material was proof rolled. The proof roll was performed with a loaded articulating truck and was observed by the CQA Monitor. No areas of non-conforming materials were observed.

The soil material above the floor of the leachate pond was cut and removed to attain the design elevations; however, fill material was placed to construct the upper elevations of the leachate pond containment berms to bring them up to the required elevations. A total of six (6) lifts were constructed and tested within the above grade containment berm construction. Below grade in-situ surfaces were contoured, scarified, recompacted, and rolled, however no testing was required on in-situ surfaces.

During fill operations, approved material from within the Cell E-1 excavation was hauled via articulating haul trucks and placed where required to meet design grades. Structural fill material for the containment berms was spread with a CAT D6 bulldozer with GPS into approximate 8-inch loose lifts. The material was then moisture conditioned and compacted by a CAT CP56B compactor.

Upon completion of compaction, each lift of structural fill was tested via a portable nuclear density gauge at a frequency of twelve (12) tests per acre per constructed lift. The Modified Proctor was used for all testing performed for the Cell E-1 Berms. For tests utilizing the Modified Proctor, a minimum compaction of 92% Maximum Dry Density (MDD) and a moisture range of +/-2% of the Optimum Moisture (OM) was required. Density testing on below grade cut and rolled surfaces was not required

Density testing on the Leachate Pond berms was performed on April 23, 2022 through May 03, 2022.

Density Test Logs and Lift Map Field Sketches for the Leachate Pond can be found in Appendix H-5: CQA Field Records - Leachate Pond.

The proctor data can be found in Appendix B: Pre-Construction Material Testing.

3.3 PREPARED SUBGRADE

In general, the prepared liner subgrade was constructed, prepared and tested as needed as discussed in the previous section. The final surface was smooth rolled and inspected. The prepared subgrade was surveyed by the CQA Surveyor, and the elevations were approved by the Engineer.

The prepared subgrade was visually inspected by CQAS from May 20, 2022, through May 23, 2022, prior to any geosynthetic material placement. Any identified conditions that did not conform to the Contract Documents were corrected by the Earthworks Contractor. The prepared subgrade was surveyed by the CQA Surveyor, and the elevations were approved by the Engineer.

Upon completion of the subgrade inspection, a Subgrade Acceptance Form was signed by the CQA Monitor and the Geosynthetics Installer. All parties visually examined the subgrade surface to ensure no deleterious materials or materials that would potentially damage the geomembrane system were present in the areas to be covered. This included a visual inspection for rocks, yielding soils, moisture content, structural abnormalities, or any deleterious materials on the geosynthetic lining surface. Subgrade surface approval was made before any geosynthetics were deployed over any surface.

The signed Subgrade Acceptance Form(s) for the Leachate Pond can be found in Appendix H-5: CQA Field Records - Leachate Pond.

3.4 GEOSYNTHETIC CLAY LINER (GCL)

The reinforced GCL was installed from May 20, 2022, through May 23, 2022 directly on top of the prepared subgrade and was deployed via spreader bar on a skid steer with an overlap of 6-inches on the machined edges and 24-inches on the cross-machined edges. Bentonite was applied to the seam area prior to overlapping. Seams were heat bonded using a hot air gun.

Approximately 109,500 SF of GCL was installed from May 20, 2022, through May 23, 2022.

Repairs to the GCL were performed as needed using a GCL patch which was a minimum of twelve (12) inches overlapped beyond the damage and hot air bonded to the parent sheet.

No CQA field data sheets were required for the GCL installation.

3.5 SECONDARY 60-MIL HDPE GEOMEMBRANE

3.5.1 Deployment

All Secondary (bottom) geomembrane panels were deployed with a spreader bar attached to a skid-steer stationed off the geotextile and pulled by hand and were installed directly on top of and with intimate contact with the geotextile. Upon deployment, each panel was labeled with an identification number with the prefix of "S" (secondary).

Deployment of the Secondary geomembrane occurred between May 20, 2022, through May 23, 2022.

Panels were deployed with an approximate overlap of approximately four (4) to six (6) inches to accommodate thermal fusion welding.

During geomembrane deployment operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Verified rolls were unloaded, handled, and transported in a way that did not cause damage to the geomembrane or the protective coverings.
- Verified underlying surface preparation was complete and acceptable before geomembrane installation.
- Monitored and documented geomembrane deployment operations. Monitored and obtained the following documentation: panel numbers, roll numbers, panel dimensions, panel areas, and field sketches of daily panel layout drawings.
- Verified panels were overlapped with a minimum of approximately 4 to 6 inches required for fusion welding machines.
- Verified any damaged geomembrane was either repaired or removed entirely.
- Verified excessive wrinkling of the geomembrane did not occur and compensation for stress bridging was added during deployment operations when necessary. Verified excessive wrinkles and stress bridging were repaired or removed entirely.

In total, approximately 109,479 SF of Secondary Geomembrane was deployed within Leachate Pond.

Deployment of the geomembrane panels was recorded on the Geomembrane Deployment Log and a field sketch was drawn which is in Appendix H-5: CQA Field Records - Leachate Pond.

3.5.2 Trial Welds

During geomembrane trial weld (pre-welding) operations, CQA Monitor performed the following construction quality assurance verification procedures:

- Verified that the tensiometer had a valid calibration certificate.
- Verified each operator and machine combination was tested for each interface (smooth/smooth, textured/textured, and textured/smooth) and frequency as required by the Contract Documents.
- Recorded ambient temperatures to verify they were within the range specified in the Contract Documents.
- Monitored, documented, and verified that each fusion and extrusion welding machine completed trial welds and met the criteria for peel and shear strength testing in accordance with the Contract Documents and approved submittals.

The Geomembrane Trial Welding Record and Tensiometer Calibration Certificate(s) are in Appendix H-5: CQA Field Records - Leachate Pond.

3.5.3 Fusion Seaming

All secondary production seams were thermally welded using a dual-track fusion machine from May 20, 2022, through May 23, 2022.

During geomembrane welding operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Monitored and documented geomembrane welding operations, geomembrane seam numbers, welding operators, welding machine numbers, and seam lengths.
- Verified welding operations took place only when the ambient temperature was between 40°F and 104 °F.
- Visually verified welding surfaces were thoroughly cleaned prior to welding operations to remove dust and dirt.
- Verified seams were welded at the same machine settings speed used to prepare the trial weld samples.
- Verified the welding operators and machine numbers, times, and dates on each seam welded.
- Verified each operator and machine combination was tested for each interface (smooth/smooth, textured/textured, and textured/smooth) and frequency as required by the Contract Documents.

A total of approximately 5,470 lineal feet of panel seaming was fusion welded. There was no secondary extrusion welding for panel seaming.

All field documentation for the secondary seaming activities was recorded on the Seam Log which can be found in Appendix H-5: CQA Field Records - Leachate Pond.

3.5.4 Non-Destructive Seam Testing:

All field fusion welds were continuity tested by the air pressure test method on May 23, 2022. This process involved sealing both ends of the air channel and the insertion of a gauged needle into one end of the air channel. A minimum air pressure of 30-psi was applied to the air channel and after a minimum period of five (5) minutes, the gauge was observed for pressure loss. Per the Construction Documents, a maximum pressure loss of 3-psi was permitted for a passing result.

During non-destructive testing verification the CQA Monitor monitored and verified the following procedures:

- Verified air testing was completed for all fusion welds.
- Verified all leaks identified were repaired in accordance with the contract documents.

All non-destructive testing Non-destructive Seam Test Record can be found in Appendix H-5: CQA Field Records - Leachate Pond.

3.5.5 Destructive Seam Test

Destructive seam samples were obtained at a minimum of 500-foot intervals for fusion and extrusion welded seams. The purpose of destructive testing was to verify that the finished seams met the specified strengths provided within the Contract Documents. Each destructive sample consisted of three sections: field test, laboratory test and owner archive. The field and laboratory sections were destructively tested for peel and shear.

A total of 14 destructive samples were marked on the secondary welding from May 21, 2022, through May 24, 2022.

The locations of these samples were recorded on the Destructive Seam Test Log which is in Appendix H-5: CQA Field Records - Leachate Pond.

Field samples were tested on-site by the Installer with a calibrated tensiometer. All field-tested samples exceeded the minimum requirements provided within the Contract Documents.

Laboratory samples were shipped to and tested by TRI.

All laboratory tested samples exceeded the minimum requirements provided within the Contract Documents.

Laboratory test results are located within Appendix H-5: CQA Field Records - Leachate Pond.

3.5.6 Repairs

Secondary geomembrane repairs were performed on May 21, 2022, through May 24, 2022. During geomembrane repair operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Monitored and documented geomembrane extrusion welding operations.
- Recorded repair numbers, welding operators, welding machine numbers and repair/patch sizes.
- Verified welding operations took place only when the ambient temperature was between 40°F and 104°F.
- Visually verified that welding surfaces were thoroughly cleaned prior to welding operations.
- Verified the repair operators recorded welding machine numbers, operator ID, machine settings, times, and dates on each repair welded.
- Verified each operator and machine combination performed a passing trial weld as required by the Contract Documents and were welded at the same machine settings used to prepare the trial weld samples.
- Verified field-fabrication of geomembrane boots around pipe penetrations. There was one (1) pipe boot installed. This was a temporary boot until the concrete was poured. After the concrete pour, this was replaced with a permanent boot. The final permanent boot was non-destructively tested via the Holiday Spark test method.

All production repairs were thermally welded using extrusion fillet welds.

All field documentation for the secondary repair activities was recorded on the Repair Log which can be found in Appendix H-5: CQA Field Records - Leachate Pond.

3.5.7 Vacuum Test

Each extrusion welded repair was non-destructively tested with a vacuum box from May 21, 2022, through May 24, 2022. This method involved the application of a soapy water placed over the extrusion weld and the application of a vacuum pressure of 1 to 4 psi via a vacuum-chamber box with a clear viewing window. Once the required vacuum pressure was achieved, a minimum dwell time of 10 seconds was achieved. During that time, the testing technician observed the testing area through the viewing window. No leaks were observed.

The vacuum-test data was documented on the Repair Log which can be found in Appendix H-5: CQA Field Records - Leachate Pond.

3.5.8 Sump Test

The CQA Plan Section 2.7.3, Second Paragraph Bullet #4 discusses the requirement of a sump test. Per RFI-9, this requirement was waived in lieu of the appropriate non-destructive air-testing and vacuum testing as well as destructive seam testing on the secondary and primary geomembrane layers.

RFI-9 can be found in Appendix F: Request for Information (RFI).

3.6 GEOCOMPOSITE (SECONDARY LEAK DETECTION)

Geocomposite was installed on top of and within the footprint of the Secondary geomembrane and was deployed by hand.

The geocomposite panels were overlapped and the geonet components were joined together with cable ties spaced every five (5) feet along the machine edges, six (six) inches within the anchor trenches and six (6) inches along the cross-machine edges.

The top geotextile components of the geocomposite panels were stitched together.

No CQA field documentation forms were required for the installation of the geocomposite.

3.7 DRAINAGE AGGREGATE

A drainage aggregate consisting of a washed, 0.5-inch minus rounded stone was installed 2-feet deep up to the rim of the leak detection sump. All rock was wrapped with an 8-oz/sy non-woven needle punched geotextile to provide a cushion to the primary geomembrane and act as a filter to prevent clogging of the drainage rock.

Pre-construction laboratory testing results can be found in Appendix B: Pre-Construction Material Testing.

The aggregate was delivered to the sump with a low ground pressure 4-wheeled ATV and was hand-shoveled into the sump.

No CQA field documentation forms were required for the placement of the drainage aggregate.

3.8 PRIMARY HDPE GEOMEMBRANE

A 60-mil HDPE was installed directly on top of the geocomposite (or on top of the geotextile over the sump).

3.8.1 Deployment

All Primary (top layer) geomembrane panels were deployed by hand, pulling from a roll attached to a skid steer stationed off the geomembrane. Upon deployment, each panel was labeled with an identification number with the prefix of "P" (Primary).

Deployment of the Primary geomembrane occurred on May 26, 2022, through May 27, 2022.

Panels were deployed with an approximate overlap of approximately four (4) to six (6) inches to accommodate thermal fusion welding.

During geomembrane deployment operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Verified rolls were unloaded, handled, and transported in a way that did not cause damage to the geomembrane or the protective coverings.
- Verified underlying surface preparation was complete and acceptable before geomembrane installation.
- Monitored and documented geomembrane deployment operations. Monitored and obtained the following documentation: panel numbers, roll numbers, panel dimensions, panel areas, and field sketches of daily panel layout drawings.
- Verified panels were overlapped with a minimum of approximately 4 to 6 inches required for fusion welding machines.
- Verified any damaged geomembrane was either repaired or removed entirely.
- Verified excessive wrinkling of the geomembrane did not occur and compensation for stress bridging was added during deployment operations when necessary. Verified excessive wrinkles and stress bridging were repaired or removed entirely.
- Verified field-fabrication of geomembrane boots around pipe penetrations.
- Verified attachments to and around structures were completed.

In total, approximately 109,500 SF of Primary Geomembrane was deployed within the Leachate Pond.

Deployment of the primary geomembrane panels was recorded on the Geomembrane Deployment Log which is in Appendix H-5: CQA Field Records - Leachate Pond.

3.8.2 Trial Welds

During geomembrane trial weld (pre-welding) operations, The CQA Monitor performed the following construction quality assurance verification procedures:

- Verified that the tensiometer had a valid calibration certificate

- Verified each operator and machine combination was tested for each interface (smooth/smooth, textured/textured, and textured/smooth) and frequency as required by the Contract Documents.
- Recorded ambient temperatures to verify they were within the range specified in the Contract Documents.
- Monitored, documented, and verified that each fusion and extrusion welding machine completed trial welds and met the criteria for peel and shear strength testing in accordance with the Contract Documents and approved submittals.

The Geomembrane Trial Welding Record is in Appendix H-5: CQA Field Records - Leachate Pond.

The Tensiometer Calibration Certificate(s) are found in Appendix G: Equipment Calibrations.

3.8.3 Fusion Seaming

All primary production seams were thermally welded using a dual-track fusion machine between May 26, 2022, through May 27, 2022.

During geomembrane welding operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Monitored and documented geomembrane welding operations. geomembrane seam numbers, welding operators, welding machine numbers, and seam lengths.
- Verified welding operations took place only when the ambient temperature was between 40°F and 104°F.
- Visually verified welding surfaces were thoroughly cleaned prior to welding operations to remove dust and dirt.
- Verified seams were welded at the same machine settings speed used to prepare the trial weld samples.
- Verified the welding operators and machine numbers, times, and dates on each seam welded.
- Verified each operator and machine combination was tested for each interface (smooth/smooth, textured/textured, and textured/smooth) and frequency as required by the Contract Documents.

A total of approximately 5,110 lineal feet of panel seaming was fusion welded.

In the Leachate Pond, the primary and secondary layers were not welded together - instead both layers terminated within the anchor trench.

3.8.4 Non-Destructive Seam Testing:

All field fusion welds were continuity tested by the air pressure test method from May 26, 2022, through May 27, 2022. This process involved sealing both ends of the air channel and the insertion of a gauged needle into one end of the air channel. A minimum air pressure of 30-psi was applied to the air channel and after a minimum period of five (5) minutes, the gauge was observed for pressure loss. Per the Construction Documents, a maximum pressure loss of 3-psi was permitted for a passing result.

Each extrusion welded seam (primary to secondary welds) was non-destructively tested with a vacuum box. This method involved the application of a soapy water placed over the extrusion weld and the application of a vacuum pressure via a vacuum-chamber box with a clear viewing window. Once the required vacuum pressure was achieved, a dwell time of 10 seconds was achieved. During that time, the testing technician observed the testing area through the viewing window. No leaks were observed.

The extrusion welding for the pipe boots was non-destructively tested using the Holiday Spark Test Method.

During non-destructive testing verification the CQA Monitor monitored and verified the following procedures:

- Verified air testing was completed for all fusion welds.
- Verified vacuum chamber and/or spark testing was completed for all extrusion welds and repairs.
- Verified all leaks identified by the above test methods were repaired in accordance with the contract documents.

All non-destructive testing was recorded on the Non-destructive Seam Test Record which can be found in Appendix H-5: CQA Field Records - Leachate Pond.

3.8.5 Destructive Seam Test

Destructive seam samples were obtained at a minimum of 500-foot intervals for fusion and extrusion welded seams. The purpose of destructive testing was to verify that the finished seam met the specified strengths provided within the Contract Documents. Each destructive sample consisted of three sections: field test, laboratory test and owner archive. Each section was destructively tested for peel and shear.

A total of 15 destructive samples, including 4 failure tracking destructs, were marked on the primary welding from May 27, 2022, through May 28, 2022.

The locations of these samples were recorded on the Destructive Seam Test Log which is in Appendix H-5: CQA Field Records - Leachate Pond.

Field samples were tested on-site by the Installer with a calibrated tensiometer. All field-tested samples exceeded the minimum requirements provided within the Contract Documents.

Laboratory samples were shipped to and tested by TRI. All samples passed both the field and laboratory testing.

Laboratory test results are located within Appendix H-5: CQA Field Records - Leachate Pond.

3.8.6 Repairs

Primary geomembrane repairs were performed on May 28, 2022. During geomembrane repair operations, the CQA Monitor performed the following construction quality assurance verification procedures:

- Monitored and documented geomembrane extrusion welding operations.
- Recorded repair numbers, welding operators, welding machine numbers and repair/patch sizes.
- Verified welding operations took place only when the ambient temperature was between 40°F and 104 °F.
- Visually verified that welding surfaces were thoroughly cleaned prior to welding operations.
- Verified the repair operators recorded welding machine numbers, operator ID, machine settings, times, and dates on each repair welded.
- Verified each operator and machine combination performed a passing trial weld as required by the Contract Documents and were welded at the same machine settings used to prepare the trial weld samples.

All production repairs were thermally welded using extrusion fillet welds.

All field documentation for the primary repair activities was recorded on the Repair Log which can be found in Appendix H-5: CQA Field Records - Leachate Pond.

3.8.7 Vacuum Test

Each extrusion welded repair was non-destructively tested with a vacuum box on May 28, 2022. This method involved the application of a soapy water placed over the extrusion weld and the application of a vacuum pressure via a vacuum-chamber box with a clear viewing window. Once the required vacuum pressure was achieved, a dwell time of 10 seconds was achieved. During that time, the testing technician observed the testing area through the viewing window. No leaks were observed.

The vacuum-test data was documented on the Repair Log which can be found in Appendix H-4: CQA Field Records - Cell E-1.

3.9 VENTS

Fifty (50) vents were installed on the primary layer of geomembrane at the top of slope, spaced at approximately 25 feet. To create each vent, a one-inch diameter hole was cut into both the secondary and primary geomembrane layers. An HDPE "patch" was then placed on top of the primary geomembrane and welded on three sides (the downslope side was left unwelded).

3.10 TOE-LINE BALLASTS

Detail C-6PR calls out 8" diameter, 4-foot long 45-mil reinforced Polypropylene sand tubes placed along the toe of slope at however RFI #18 permitted the field fabrication of these tubes utilizing leftover 60-mil HDPE. RFI #18 can be found in Appendix F: Request for Information (RFI).

The sand tubes were field-fabricated and were placed by hand while the CQA Monitor was on site while the remaining 7 tubes could not be properly positioned (due to standing water in the immediate area) while the CQA Monitor was on-site. These were repositioned to the correct spacing along the toe of slope after the CQA Monitor demobilized from the jobsite and observed by the Owner. Sand tubes were spaced out along the toe with an approximate spacing of 22-feet (center of every slope panel).

3.11 HDPE PIPE

High Density Polyethylene (HDPE) pipes were installed within Leachate Pond for the leak detection system.

A 12-inch HDPE SDR 17 perforated pipe was installed within the sump between the secondary and primary layers. The perforated pipe was then covered with washed gravel which was wrapped with geocomposite.

The perforated leak detection pipe was capped at the downslope (sump) termination and transitioned to a solid riser pipe running up the slope where it exits the pond.

All pipes were thermally fusion welded.

No field CQA documentation was required for the pipe work.

3.12 ANCHOR TRENCH BACKFILL

The geomembrane extending past the outside corner of the floor of the anchor trench was trimmed by Mustang prior to backfill. The anchor trenches were backfilled in 12-inch-thick lifts with General Fill and the top lift was density tested.

Results for the lift maps and the anchor trench density tests are found within Appendix H-5: Leachate Pond.

3.13 COMPLETION OF WORK

CQA activities related to Leachate Pond within the scope of this report concluded when on June 7, 2022.

4.0 LEACHATE FORCEMAIN

Construction of the leachate forcemain as designed and shown on drawings 10PL and 10DET did not require CQA Monitoring oversight or documentation and was completed after CQA Monitor demobilized from the facility. During final project walkthrough on July 7, 2022, Engineer noted that all piping installed to date was dual contained piping when outside the liner system areas and the discharge pipe into the leachate evaporation pond was changed to have the pipe daylight prior to the berm and placed over the upper rim of the pond to eliminate the pipe boot/penetration connection as shown on Detail B on Drawing 10PL. Engineer also noted that the pipe appeared to be in general conformance with the Drawings 10PL and 10DET based on observable locations of valve boxes and junctions. Owner surveyed the as built alignment of the leachate forcemain which can be provided upon request.

SECTION 6: INDEMNIFICATION

It should be noted that the test specimens and test samples used for this report are believed to be representative of the Work performed. The testing herein is based upon accepted industry practices for construction QA/QC and Laboratory procedures as well as the test methods listed. However, these results are indicative of only the specimens that were actually tested. It should also be noted that observed, monitored, and performed CQA testing to the limitations of one person and cannot be responsible for operational and maintenance performance of the liner system.

The findings and professional opinions contained in this report were prepared in accordance with generally accepted professional principles and practices for waste containment construction.

The CQA Consultant (as defined in Section 1.0, Part 1.1.2 of this Report) make no warranty expressed, written or implied.

SECTION 7: AS-BUILT CERTIFICATION

I, Michael P. Bradford, P.E (NM #19240), hereby certify the completed construction of portions of the North Ranch Surface Waste Management Facility: Cell E-1 and Operational Infrastructure which require a licensed professional engineer's certification as required by New Mexico Administrative Code Title 19, Chapter 15, Part 36 and the Surface Waste Management Facility Permit Conditions NM1-66 and associated permit modifications as approved by the New Mexico Energy, Minerals and Natural Resources Department – Oil Conservation Division. This certification is based upon third party on-site observation, material testing, documentation, and reporting conducted by me or by a third-party representative under my direct supervision. This Certification is contingent on the belief that all information supplied by other parties as of the date of this certification, used by the Certifying Engineer to certify, was generated using accepted industry practices and procedures and are to my knowledge accurate and provided in good faith.

Seal and Signature of Certifying Engineer
Michael Paul Bradford, P.E. (NM #19240)

Application C+A1:B22-137 Form Preface
19.15.36 NMAC - Surface Waste Management Facilities
New Mexico Energy, Minerals, and Natural Resources Department
Oil Conservation Division

19.15.36.8.C NMAC states the application requirements for new facilities, major modifications, and permit renewals. An applicant or operator shall file an application, Form C-137, for a permit for a new surface waste management facility (SWMF) or for permit renewal with the Oil Conservation Division's (OCDs) Environmental Bureau.

The OCD will only process applications that provide the information required by the C-137 Form and in the order specified by form. The application must be submitted via OCD's Online Permitting System at https://wwwapps.emnrd.nm.gov/OCD/OCDPermitting/Default.aspx along with the associated permit fee.

Provide engineering designs, certified by a registered New Mexico Professional Engineer (NMPE), including technical data on the design elements of each applicable treatment, remediation and disposal method and detailed designs of surface impoundments.

Application Purpose:	Subsequent information submission
Type of SWMF:	Landfill

***Engineering designs and drawings, certified by a registered NMPE, must take into account the specific requirements applicable to the SWMF type. The following must be included as applicable:**

- The specific requirements applicable to landfills as specified in 19.15.36.14 NMAC; see Attachment A.
- The specific requirements applicable to land farms as specified in 19.15.36.15 NMAC; see Attachment B.
- The specific requirements applicable to evaporation, storage, treatment, and skimmer ponds as specified in 19.15.36.17 NMAC; see Attachment C.

Facility Status	Commercial
Location	
Lat/Long:	32.144696, -103.462574
Quarter Sections:	Multiple
Section:	9 & 10
Township:	25S
Range:	34E

Operator Name:	NGL Waste Services LLC
Email:	gfisher@popmidstream.com
Phone:	720-315-8035
Address:	1008 Southview Circle
	Center, TX 75935

Facility Contact Name:	Daniel Schindler
Email:	dschindler@nglwasteservices.com
Phone:	575-631-8309
Address:	476 Battle Axe Rd
	Jal, NM 88252

Submission of 2021-2022 Annual Report

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State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 195946

CONDITIONS

Operator:	OGRID:
NGL Waste Services, LLC 1008 Southview Circle Center, TX 75935	329268
	Action Number: 195946
	Action Type: [C-137] Non-Fee SWMF Submittal (SWMF NON-FEE SUBMITTAL)

CONDITIONS

Created By	Condition	Condition Date
bjones	OCD hereby accepts the 2021-2022 Annual Report into the administrative record for permit NM1-66. If you have any questions, please contact me.	11/1/2023