DBS&A
a Geo-Logic Company

December 23, 2023

Ms. Rosa Romero
Environmental Bureau Chief
Oil Conversation Division
Energy, Minerals, and Natural Resources Department
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: Application for Minor Modification to Surface Waste Management Facility
Sundance Services, Inc.
NMOCD Surface Waste Management Facility Permit No. NM-01-003
Lea County New Mexico

Dear Ms. Romero:

Daniel B. Stephens & Associates, Inc. (DBS&A) has prepared this application on behalf of Sundance Services, Inc. (SSI) to update the approved Closure/Post-Closure (C/PC) Plan dated September 2016 for the facility located in east of Eunice, New Mexico in Lea County.

SSI continues their efforts to close the legacy facility and have complied with the conditions that modified permit NM-01-003. Specifically, Milestones 1 though 5 have been completed, documented and approved by the Energy, Minerals, and Natural Resources Department (EMNRD) Oil Conservation Division (OCD).

This Minor Modification application (Attachment 1) requests modification of the closure of the evaporation ponds and landfill. In the September 2016 C/PC Plan, it was proposed that the pond sediments be solidified and consolidated in the active eastern landfill. The updated C/PC Plan (Attachment 2) proposes that the evaporation ponds be dewatered, that the pond sediments be solidified/stabilized, and that the ponds be closed in-place. The remaining tasks to final closure include the following:

- Ponds dewatered and sediments solidified/stabilized
- Additional general soil fill placed in ponds and landfill areas to achieve design grades for drainage
- Final cover placed on ponds and landfill areas
- All closed areas seeded for vegetative cover
- Stormwater management system construction

The revised facility final grading plan and stormwater management system are presented in the SSI Surface Waste Management Facility Closure Engineering Drawings in

6020 Academy Road NE, Suite 100
Albuquerque, New Mexico 87109
(505) 822-9400
www.dbstephens.com

Appendix H of the Updated C/PC Plan (Attachment 2). Additionally, a Surface Water Management Plan for the closed facility was developed to demonstrate control and conveyance of runoff from a 25-year, 24-hour storm event, and is provided as Appendix E of the Updated C/PC Plan (Attachment 2).

In the September 2016 C/PC Plan, Milestone 6 was to be completed by December 31, 2022. SSI is requesting an extension of five years from the date of this submittal to December 31, 2028. As outlined in OCD's approval of the 2016 C/PC Plan, the following was a condition for time extension
(emphasis added):

> Causes of delay, disruption, or interference that may give rise to an adjustment in milestone dates include but are not limited to severe and unavoidable natural catastrophes such as fire, floods, ***epidemics***, and earthquakes; abnormal weather conditions; and acts of war or terrorism.

Due to impacts from the COVID-19 pandemic and resulting labor, demand, and supply chain issues which continue to impact the industry, this additional time will allow for proper closure of the facility.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.

Gundar Peterson, P.E.
Vice President/Principal Engineer

Kelly Jayne, P.E.
Project Engineer

GP/KJ/rpf
Attachments
cc: Tariq Mussani, Sundance Services, Inc.
Hon. Andrew L. Wambsganss, Esq.

Attachment 1

Application for Minor Modification to Surface Waste Management Facility

DBS&A a Geo-Logic Company

The application/form must be submitted via OCD's Online Permitting System at https://wwwapps.emnrd.nm.gov/OCD/OCDPermitting/Default.aspx along with any associated permit fee.

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

For State Use Only:

Form C-137A
Revised October 11, 2022

APPLICATION FOR MINOR MODIFICATION TO SURFACE WASTE MANAGEMENT FACILITY

1. Operator: Sundance Services, Inc.

Address: 42 Sundance Lane, Eunice, NM

Contact Person: Joe Carrillo Phone: 575-394-2511, 575-390-0342

2. Location: /4 /4 Section 29 Township 21 South Range 38 East

3. Provide permit number NM-01-0003

4. Attach a description of the proposed minor modification(s) to the surface waste management facility.

5. If the Minor Modification involves changes to a treatment, remediation, or disposal method, attach engineering designs, certified by a registered professional engineer, including technical data on the design elements of each applicable treatment, remediation, and disposal method and detailed designs of surface impoundments.

6. If the Minor Modification will affect the closure and post-closure plan, attach an updated closure and post closure plan, including a responsible third party contractor's cost estimate, sufficient to close the surface waste management facility in a manner that will protect fresh water, public health, and the environment (the closure and post closure plan shall comply with the requirements contained in 19.15.36.18 NMAC).

7. If the Minor Modification will affect the contingency plan, attach an updated contingency plan that complies with the requirements of Subsection N of 19.15.36.13 NMAC and with NMSA 1978, Sections 12-12-1 through 12-12-30, as amended (the Emergency Management Act).

8. If the Minor Modification will affect the control of run-on or run-off water at the site, attach an updated plan to control run-on water onto the site and run-off water from the site that complies with the requirements of Subsection M of 19.15.36.13 NMAC.

9. If the Minor Modification will affect the best management practice plan, attach a best management practice plan to ensure protection of fresh water, public health, and the environment.

10. The division may require additional information to demonstrate that the surface waste management facility's operation will not adversely impact fresh water, public health, or the environment and that the surface waste management facility will comply with division rules and orders.

11. CERTIFICATION

I hereby certify that the information submitted with this application is true, accurate, and complete to the best of my knowledge and belief.

Name: Misty Pratt Title: Attorney-in-fact

Signature: Misty Pratt Date: 12/22/2023

E-mail Address: mpratt@brownpruitt.com

Attachment 2

Updated Closure/ Post-Closure Plan

DBS&A a Geo-Logic Company

Updated Closure/Post-Closure Plan Sundance Services, Inc.

Prepared for

Sundance Services, Inc.
Eunice, New Mexico

Prepared by

DBS&A a Geo-Logic Company
6020 Academy NE, Suite 100
Albuquerque, New Mexico 87109
www.dbstephens.com
DB18.1209

December 2023

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1. Introduction

Daniel B. Stephens & Associates, Inc. (DBS&A) has prepared this updated closure/post-closure plan (C/PC plan) for the Sundance Services, Inc. (SSI) Surface Waste Management Facility (the facility), a facility that operated pursuant to its permit (NM-01-0003) issued by the Energy, Minerals, and Natural Resources Department (ENMRD) Oil Conservation Division (OCD) as last modified on February 18, 2002. The original C/PC plan was submitted September 29, 2016 and approved July 31, 2017. The facility was privately operated by SSI and accepted liquid and solid oil field waste from oil and gas exploration and production operations in southeastern New Mexico and west Texas for well over 30 years.

1.1 Site Location

The SSI facility is located approximately 3 miles east of Eunice, New Mexico, 18 miles south of Hobbs, New Mexico, and approximately 0.5 mile west of the Texas/New Mexico state line in unincorporated Lea County, New Mexico. The SSI site consists of a 320-acre ± tract of land located in the south ½ of Section 29, Township 21 south, Range 38 east, Lea County, New Mexico. Site access will continue to be provided via New Mexico Highway 18 (NM 18) and Wallach Lane. Access may also be provided via replacement access through the proposed Sundance Services West, Inc. (SSWI) Surface Waste Management Facility. A site location map is provided in Drawing G-0 of Appendix H.

1.2 Facility Description

The SSI facility commercial surface waste management facility that is no longer in service and originally included the following components, which are identified in Drawing C-1 of Appendix H:

- Liquid oil field waste processing area (80 acres±)
  - Produced water facility (closed)
  - Drilling fluids (closed)
  - Basic sediment and water (BS&W) (closed)
  - Jet-out facility (SSI and public) (closed)
  - Oil recycling facility (closed)

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- Oil field waste landfill (80 acres±, old and current)
- Landfarm (closed)

1.3 Facility Permit History and Closure Provisions

The SSI facility initiated operations prior to specific OCD regulation of surface waste management facilities. Once OCD established surface waste management facility regulations, SSI was originally permitted for continued operation under "Rule 711" (19.15.9.711 NMAC). The closure provision of the original permit requires that the permittee develop a closure plan for submission to the OCD for their approval prior to implementation. In accordance with the Rule 711 requirements of the prevailing permit, this closure plan must be submitted within six months after discontinuing operation of the facility or within 30 days of deciding to dismantle the facility. The requirement to submit a closure plan tracks the requirements of 19.15.9.711(D) NMAC, the portion of Rule 711 section relating to facility closure. Rule 711 requires that the permittee must also notify OCD 30 days prior to its intent to cease accepting wastes and close the facility.

The current SSI permit (issued February 18, 2002) includes a closure provision (i.e., Provision 2.g.) that states "Closure will be pursuant to all OCD requirements in effect at the time of closure." This Permit condition appears to tie the closure requirements to the current Part 36 Rule, in particular 19.15.36.18(A) NMAC. This section requires that "The operator shall notify the division's environmental bureau at least 60 days prior to cessation of operations and provide a proposed schedule for closure." In consideration of this permit condition, the OCD approved September 2016 plan was developed subject to regulation under the New Mexico Oil and Gas Rules, specifically 19.15.36 NMAC, administered by the OCD.

While the current permit requires that "The operator must complete cleanup of constructed facilities and restoration of the facility site within six (6) months of receiving the closure plan approval, unless an extension of time is granted by the Director," the current Part 36 Rule (19.15.36.18 NMAC) does not include a time frame to complete closure. The OCD Director approved an extension of five years from the plan approval date of July 2017. SSI has completed a number of the closure tasks listed in the September 2016 plan with the remaining closure phase being grading for stormwater control and placement of the final evapotranspiration (ET) cover.

In light of the modifications to the grading plan presented in this Minor Permit Modification and the quantity of earthwork required, SSI hereby requests a modification to Condition 3, which

states "Closure of the facility must be completed and commencement of the post-closure care period must begin on or before December 31st, 2022." and approval of a period of five years, until December 31, 2028, to complete the proposed closure efforts outlined in this updated plan.

1.4 Purpose

The purpose of this updated plan is to comply with the requirements of 19.15.36.8.C(9) and 19.15.36.18 NMAC. This plan describes the proposed procedures for closure and post-closure of the SSI facility, including a closure/post-closure cost estimate sufficient to close the facility in a manner that will protect fresh water, public health, safety, and the environment.

The oil field waste processing and disposal infrastructure that existed at the SSI facility consisted of the following permitted features:

- Evaporation ponds (Ponds 1, 4, 5 [closed], 6 [closed], and 9).
- Landfill operations (closed landfill and current landfill, former Ponds 7 and 8).
- Below grade solids receiving (SSI and public jet-out facilities) (closed).
- Landfarm (closed): The landfarm was never officially operated. In 2005, a single load consisting of 37 cubic yards (CY) of material was inadvertently deposited in this area. The material was immediately removed to the landfill for permanent on-site disposal as documented by OCD in a letter dated December 2, 2005. The materials were completely removed, soil sample results were provided to OCD (November 3, 2005 letter to OCD) upon removal, confirming the absence of remaining materials. The site was graded, vegetated, and routinely observed since closure. Any remaining levees were also removed.
- Drilling fluids solidification and stabilization area (Ponds 2 and 3).
- Oil treatment plant (produced water facility [closed] and oil recycling facility).

These site features are identified in Drawing C-1 of Appendix H. Closure activities began prior to the December 31, 2017 date as required in the Modified Permit No. NM 1-3 conditions, and are summarized as follows:

- Milestone #1: Installation of required groundwater monitor wells and their initial sampling was completed on November 20, 2017.

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- Milestone #2: Removal of all produced water tanks, associated berms, and sumps was completed on December 31, 2018 and consisted of the following:
  - Sumps identified
  - Tanks removed
  - Berms/sumps excavated
  - Confirmation testing
  - Closure confirmation report
- Milestone #3: Removal of all jet-out pits was completed on December 31, 2019 and consisted of the following:
  - Design efforts for new jet-out structure in the Sundance West facility
  - Replacement construction of the new jet-out structure
  - Sumps located
  - Tanks removed
  - Concrete demolished
  - Berms/sumps excavated
  - Confirmation testing
  - Closure confirmation report
- Milestone #4: Draining of all process liquids, closure of the produced water facility, and decommissioning of facility Ponds 5 and 6 was completed on December 31, 2020.
- Milestone #5: East Landfill Slopes at final grades was completed on December 31, 2021.

The final milestone to close the facility is Milestone #6, which consists of the following:

- Pond sediments solidified and stabilized
- Additional general fill placed in ponds and landfill areas to achieve design grades for drainage
- Final cover placed on ponds and landfill areas
- All closed areas seeded for vegetative cover
- Stormwater management system construction
- Miscellaneous building and structure removal

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2. Closure Plan

2.1 Construction Schedule

Upon receipt of OCD's approval of the updated C/PC plan, SSI will commence with the final closure phase described herein and complete the closure activities within the five-year closure period extension to December 31, 2028 being requested as a result of the nearly 3 million cubic yards of earthwork that needs to be completed. SSI has prepared a schedule with completion dates for each task and/or subtask that addresses post-closure initiation (Appendix I).

The remaining closure activities are summarized as follows:

- Pond and solid waste disposal areas:
  - Pond dewatering and sediment stabilization/solidification
  - Pond and landfill general soil fill placement to bottom of final cover grades
  - Final cover placement
  - Stormwater management system construction
  - Vegetation
  - Landfill closure documentation
- Miscellaneous building and structure removal
- Final land use

2.2 Final Site Closure: Containment-in-Place Areas

The areas identified for containment in place will require special handling to provide a stable and environmentally secure closure. The evaporation ponds that will be closed and contained in place will require remediation prior to closure. This effort will require the removal of free liquids prior to solidifying and stabilizing the remaining sediments. Once stabilized, the remaining solidified sediments will be compacted and encapsulated with additional fill material from the SSI facility property to create slopes to divert stormwater from the surface. The areas proposed for containment-in-place include the following:

- Evaporation Ponds 1, 2, 3, 4, 5, 6, and 9
- Oilfield waste landfill (formerly Ponds 7 and 8)

- Closed oilfield waste landfill

The final cover proposed for these areas includes a performance-based "alternative cover" (i.e., ET cover) configuration in accordance with Paragraph (9) of Subsection C of 19.15.36.14 NMAC that meets the requirements of 19.15.36.18 C(2)(b) NMAC for landfill cell closure. The proximity of the areas proposed for containment-in-place and other engineering and design constraints result in an integrated final cover system as show on in Drawing C-2 of Appendix H. No oil field waste will be used in as ET cover material.

A NORM Survey (in compliance with 20.3.14 NMAC) will be conducted for all of the ponds (Ponds 1, 2, 3, 4, 5, 6, and 9) when evaporation has been completed as required by the Permit. The site will be sampled in accordance with the procedures specified in chapter nine of EPA publication SW-846, test methods for evaluating solid waste, physical/chemical methods for TPH, BTEX, metals and other inorganics listed in Subsections A and B of 20.6.2.3103 NMAC, in accordance with a gridded plat of the site containing at least four equal sections that the division has approved. Additionally, solidification will be confirmed complete by the paint filter test (EPA method 9095A).

EPA's HELP model was used to demonstrate that the proposed alternative final cover will prevent the "bathtub effect" as outlined in the regulations by showing no leakage through the cover system. The alternative cover soils used in the HELP model are derived from averaged values from laboratory analysis of near-surface soils (10 to 20 feet deep) and are represented by HELP model default soil characteristics, soil texture Class 9. Soil texture Class 9 defines a soil with the following characteristics:

- Unified Soil Classification System (USCS): ML
- Saturated hydraulic conductivity: 1.9×10^{-4} centimeters per second (cm/s)
- Total porosity: 0.501 vol/vol
- Field capacity: 0.284 vol/vol
- Wilting point: 0.135 vol/vol

Weather data used in the HELP model are derived from Hobbs, New Mexico (ET), Roswell, New Mexico (precipitation), and Midland, Texas (temperature). The ET cover will consist of a 24-inch soil erosion layer and a 6-inch infiltration layer as shown on Figure 1. This cover is the same as the approved ET cover in the current plan.

The integrated final cover systems for each of the three areas proposed for containment in place have differing final closure slope configurations and associated HELP model inputs. Evaporation Ponds 1, 5, and 6 have three discrete slope configurations, and therefore three HELP model outputs—North Saddle Slope, South Saddle Slope l0 percent, and South Saddle Slope 2 percent. Similarly, oilfield waste landfill area (formerly Ponds 7 and 8) HELP model outputs are East Top and East Side Slopes, and oilfield waste landfill (old) HELP model outputs are West Top and West Side Slopes. Model results are provided in Appendix B and summarized in Table 1.

Table 1. HELP Model Summary, Alternate Final Cover System

Simulation	Vegetative (Erosion) Layer 1			Barrier (Infiltration) Layer 2			HELP Model Results
	HELP Model Soil Texture Type	Layer Thickness (inches)	Hydraulic Conductivity (cm/s)	HELP Model Soil Texture Type	Layer Thickness (inches)	Hydraulic Conductivity (cm/s) [a]	Percolation Leakage Through Layer 2 (inches)
Landfills and Ponds 1 and 5 (North Side)							
Crown 5%	9	24	1.9×10^{-4}	9	6	1.9×10^{-4}	0.0000
Landfill, Closed and Current							
Side Slopes 25%	9	24	1.9×10^{-4}	9	6	1.9×10^{-4}	0.0000
South Side of Ponds 1 and 5							
South Side Slope	9	24	1.9×10^{-4}	9	6	1.9×10^{-4}	0.0000
West Side Slopes	9	24	1.9×10^{-4}	9	6	1.9×10^{-4}	0.0000

[a] Soils with a hydraulic conductivity of 1.9×10^{-4} centimeters per second (cm/s) are available on-site within the OAG surficial formation.

Final slopes will be constructed in accordance with the final grading plan (Drawing C-2 of Appendix H). The side slopes will be regraded to no greater that 25 percent (4 horizontal to 1 vertical) and the top crown will be graded at a design slope that promotes stormwater runoff to conveyance channels. The final cover, as well as other disturbed areas of the site, will be seeded with native vegetation. Vegetation on the site will be planted during the optimum planting period whenever possible. Examples of seed types identified and recommended by the NRCS as acceptable cover for the local climate and precipitation include, but are not limited to, the recommendations outlined in Table 2.

If vegetation cannot adequately be established, SSI will consult with OCD to identify practical stabilization alternatives (e.g., desert pavement, organic mulch, etc.). The closure documentation record (Appendix A) or a similar template will be used to record the field activities specific to final site closure. A licensed New Mexico professional engineer will supervise closure construction and certify completion of closure activities.

Table 2. NRCS Recommended Seed Mix

Grass Species	% of Mix	Rate (PLS/acre)	Pounds PLS/acre
Bluegrama (native)	40	1.5	1.2
Buffalograss (burs)	10	16	3.2
Green sprangletop	10	1.7	0.34
Sand droopseed	10	0.5	0.1
Sideoats (Vaughn)	20	4.5	1.8
Western wheatgrass (native)	10	8	1.6
Total	100	32.2	8.24

Note: Lea County recommends doubling the seeding rate on critical area plantings. These grasses are fairly shallow rooted, well adapted to Lea County, available from area growers, and will aid in erosion control once established. NRCS recommends that seeding a cover crop occur in the spring at 8 pounds per acre to stabilize the site initially. These recommendations are subject to change based on changes in NRCS requirements, new technology, etc.

PLS = Pure live seed

2.3 Miscellaneous Building and Structure Removal

At this time, it is anticipated that closed portions of the SSI facility site will revert to open space around the vehicle maintenance and operational offices that will remain on the facility to support maintenance and affiliated activities. Should an alternative land use be identified that could use the other remaining structures and buildings, they will be cleaned and left in place. If not, other buildings and miscellaneous structures will be dismantled and, where practical, recycled or reused. The tanks and centrifuge for the oil treatment plant will be decontaminated and removed.

Non-recyclable materials will be disposed of in the Sundance West landfill, or other OCD-approved landfill. When any buildings and structures are removed, the areas will be inspected for contamination. Should contamination be discovered, the area will be excavated and disposed of in the solid waste disposal unit, and the area will be tested until confirmed to meet regulatory standards for oil treatment processing areas. Any remaining materials requiring

removal will be removed from the facility and disposed of in an OCD-approved surface waste management facility.

Compliance with the closure performance standards will be demonstrated by collecting and analyzing samples in accordance with Subsection F of 19.15.36.15 NMAC.

The concentration of constituents listed in Subsections A and B of 20.6.2.3103 NMAC will be determined by EPA SW-846 methods 6010B or 6020 or other methods approved by OCD. If the concentration of those constituents exceeds the PQL or background concentration, SSI will perform a site specific risk assessment using EPA approved methods and will propose closure standards based upon individual site conditions that protect fresh water, public health, and the environment, which shall be subject to OCD approval or removal pursuant to Paragraph (2) of Subsection G of 19.15.36.15 NMAC.

2.4 Final Land Use

At this time, SSI has not established a use for the facility after closure beyond reverting to open pasture. Should a specific use be determined later, SSI will notify OCD and request approval to be released from the post-closure activities outlined in Section 3 provided there has not been a release to the vadose zone or groundwater pursuant to 19.15.30 and 19.15.29 NMAC.

2.5 Final Site Closure: Waste Excavation and Removal Areas

Upon confirmation that contamination levels have been remediated below regulatory thresholds, the areas proposed for excavation and removal of waste will be regraded (i.e., crowned or contoured) for their intended final use and to promote drainage. Activities to be conducted during this period include the following:

- Submittal of notice of intent (NOI) to the EPA for a construction general permit (COP) and stormwater pollution prevention plan (SWPPP) implementation
- Evaporation and sedimentation pond berm removal and backfilling
- Stabilization and solidification area containment berm removal and grading
- Site grading and recontouring
- Site revegetation

Revegetation of the SSI site (i.e., equal to 70 percent of the nature perennial vegetative cover) will be conducted during the optimum planting period whenever possible [per 19.15.36.18 A(6) NMAC]. Examples of seed types identified and recommended by the Natural Resource Conservation Service (NRCS) as acceptable cover for the local and are described in Table 2. If vegetation cannot adequately be established, SSI will consult with OCD to identify practical stabilization alternatives (e.g., desert pavement, organic mulch, etc.). The closure documentation record (Appendix A) or a similar template will be used to record the field activities specific to final site closure. A licensed New Mexico professional engineer experienced in applicable environmental engineering will supervise closure construction and certify completion of closure activities.

3. Post-Closure Plan

3.1 Post-Closure Maintenance

3.1.1 Oil Treatment Plant

SSI will conduct post-closure monitoring of the oil treatment plant for a period of no less than 3 years. This inspection will include all areas previously occupied by oil recycling facility and produced water facility. During the post-closure care period, SSI proposes to inspect and maintain the site at least quarterly, and immediately after a documented 24-hour, 25-year storm event, whichever is more frequent as defined on the site inspection checklist (Appendix C). Should deficiencies or discrepancies be discovered during the site inspections in these areas, SSI will conduct corrective measures. If there has been a documented release to the groundwater, SSI will comply with the requirements of 19.15.30 and 19.15.29 NMAC.

3.1.2 Landfill Area

SSI will monitor and provide post-closure maintenance for the legacy site that was closed by placement of an evapotranspiration final cover for a period of not less than 30 years. During the post-closure care period, SSI proposes to inspect and maintain the final cover at least quarterly, and immediately after a documented 24-hour, 25-year storm event, whichever is more frequent as defined on the site inspection checklist (Appendix C). Upon successful revegetation efforts resulting in at least 70 percent coverage or other approved erosion control methods (desert pavement, mulch, etc.), SSI plans to reduce the inspection frequency subject to OCD approval. Post-closure care inspections will typically include the following:

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- Vegetative growth observation
- Erosion
- Differential settlement
- Vegetative stress (i.e., potential gas migration)

In addition, water quality monitoring will be performed and repeated on a quarterly basis for the post-closure period as shown in Appendix C.

3.2 Post-Closure Monitoring

SSI will immediately begin abandonment of existing wells and the installation of the new vadose zone monitor wells specified in the closure/post-closure plan. In addition to those wells specified in the plan, two additional vadose zone monitor wells are installed along the southern property boundary between VZ-2 and VZ-3 and between VZ-4 and VZ-5. These additional wells are subjected to the same monitoring schedule and parameters as the other wells. At the beginning of the post-closure period, SSI will undertake quarterly rather than annual monitoring events upon the vadose zone wells as well as after significant precipitation events (i.e., 24 hour, 25-year storms). This frequency may be reduced if it can be demonstrated there is a lack of recoverable groundwater in the wells or if the water quality data does not indicate contamination.

3.3 Reporting

Reports of post-closure activities including, but not limited to, site inspection data and maintenance procedures will be submitted to OCD within 45 days from the end of each calendar year, or as otherwise required.

4. Financial Assurance

4.1 Closure/Post-Closure Cost Estimate

The cost estimate (Appendix F) for the closure and post-closure activities described in this plan is presented in current dollars; and was updated in September 2023 by DBS&A. The costs conservatively assume that third-party contractors will perform closure and post-closure activities at the site, as required by 19.15.36.8.C(9) NMAC. Preparation of the closure/post-closure cost estimate further assumes that no contamination or remedial activities are required

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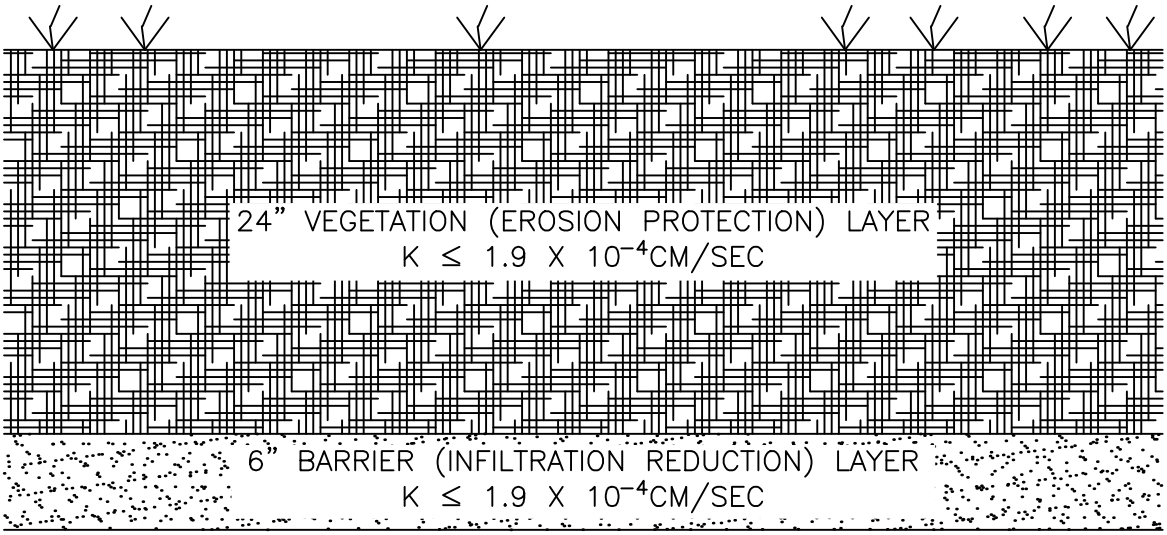
due to releases into the environment. The current estimate of SSI closure construction and post-closure operations costs is provided as Appendix F. Based on Appendix F, SSI proposes $6,696,394 of financial assurance.

This estimate will be revised accordingly should unforeseen conditions arise. Upon OCD approval of this plan, SSI will elect a financial assurance mechanism pursuant to 19.15.36.11.E NMAC, and will submit the appropriate documentation to OCD based on the estimates provided in this plan. Documentation of the selected financial assurance mechanism will be included as Appendix G.

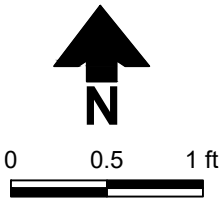
4.2 Release of Financial Assurance

Upon successful completion of closure activities for the entire facility, or portions of the operation (i.e., the jet-outs, ponds, solidification and stabilization area, the landfill grading; components of the process that have ceased operation), and after OCD concurrence that the closure activities are complete, OCD will release the financial assurance mechanism in-place for that component of closure of the facility. After the post-closure periods have expired, SSI will request release from the remaining financial assurance requirements for portions of the facility for which OCD has provided concurrence that closure is complete. SSI will request release from financial assurance requirements in compliance with Paragraphs (2) and (3) of 19.15.36.18.B NMAC.

Figure



FINAL COVER DETAIL



S:\PROJECTS\DB18.1209_SUNDANCE_WEST\CAD\PRODUCTION\FINAL DESIGN EAST SUNDANCE\PRODUCTION\FIGURES\FIGURE 4 - FINAL COVER PROFILE.DWG

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10/30/2023 Project 18.1209

SUNDANCE SERVICES INC
SURFACE WASTE MANAGEMENT FACILITY

Final Cover Profile

Figure 1

Appendix A

Closure Documentation Record (Typical)

APPENDIX A
Closure Documentation Record (Typical)
Sundance Services, Inc.

Pond or Tank	Location		Location Closure				Revegetation			
			Liner		Tank					
Number	Lat. (Northing)	Lon. (Easting)	Removed	Tested	Cleaned	Removed	Installed	Date	Certified	Date

Date: _____ Recorded By: _____

Inspected By: _____ Certified By: _____

Comments: _____

Appendix B

HELP Model Results

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**
 **                HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
 **                  HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
 **                    DEVELOPED BY ENVIRONMENTAL LABORATORY
**
 **                     USAE WATERWAYS EXPERIMENT STATION
**
 **               FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
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 PRECIPITATION DATA FILE:     C:\sun\attchb.1\RAINFC1.D4
 TEMPERATURE DATA FILE:       C:\sun\attchb.1\TEMPFC1.D7
 SOLAR RADIATION DATA FILE:   C:\sun\attchb.1\SOLARFC1.D13
 EVAPOTRANSPIRATION DATA:     C:\sun\attchb.1\EVAPFC1.D11
 SOIL AND DESIGN DATA FILE:   C:\sun\attchb.1\CROWN.D10
 OUTPUT DATA FILE:            C:\sun\attchb.1\CROWN.OUT


 TIME:  10:32     DATE:   9/ 9/2016


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      TITLE:  SSI Landfill Final Cover - Crown 5%

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NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 9

THICKNESS	=	24.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1362	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03	CM/SEC

NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 2.01 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

LAYER 2

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 9

THICKNESS	=	6.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.5010	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 5.% AND A SLOPE LENGTH OF 252. FEET.

SCS RUNOFF CURVE NUMBER	=	87.70	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	46.300	ACRES
EVAPORATIVE ZONE DEPTH	=	24.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	3.268	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	12.024	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	3.240	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	6.274	INCHES
TOTAL INITIAL WATER	=	6.274	INCHES

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TOTAL SUBSURFACE INFLOW = 0.00 INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Hobbs New Mexico

STATION LATITUDE	=	32.26 DEGREES
MAXIMUM LEAF AREA INDEX	=	1.20
START OF GROWING SEASON (JULIAN DATE)	=	67
END OF GROWING SEASON (JULIAN DATE)	=	317
EVAPORATIVE ZONE DEPTH	=	24.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	9.20 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	40.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	27.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	46.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	48.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR ROSWELL NEW MEXICO

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
0.46	0.46	0.54	0.79	1.93	1.85
2.16	2.37	2.54	1.54	0.55	0.55

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR MIDLAND TEXAS

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
42.20	46.90	53.40	62.20	70.60	78.30
80.30	79.10	72.70	62.80	51.00	43.50

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR MIDLAND TEXAS
AND STATION LATITUDE = 32.40 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.67	2129434.000	100.00
RUNOFF	0.231	38839.867	1.82
EVAPOTRANSPIRATION	11.939	2006536.500	94.23
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	0.500	84057.344	3.95
SOIL WATER AT START OF YEAR	6.274	1054408.870	
SOIL WATER AT END OF YEAR	6.774	1138466.120	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.331	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	18.56	3119360.500	100.00
RUNOFF	0.364	61254.465	1.96
EVAPOTRANSPIRATION	17.767	2986005.000	95.72
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	0.429	72101.023	2.31
SOIL WATER AT START OF YEAR	6.774	1138466.120	
SOIL WATER AT END OF YEAR	7.203	1210567.120	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.040	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	17.16	2884064.000	100.00
RUNOFF	0.224	37591.539	1.30
EVAPOTRANSPIRATION	15.687	2636453.750	91.41
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	1.250	210018.453	7.28
SOIL WATER AT START OF YEAR	7.203	1210567.120	
SOIL WATER AT END OF YEAR	8.370	1406659.370	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.083	13926.198	0.48
ANNUAL WATER BUDGET BALANCE	0.0000	0.293	0.00

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ANNUAL TOTALS FOR YEAR 4

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	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.25	2226914.250	100.00
RUNOFF	0.478	80371.937	3.61
EVAPOTRANSPIRATION	14.000	2352907.750	105.66
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	-1.228	-206365.594	-9.27
SOIL WATER AT START OF YEAR	8.370	1406659.370	
SOIL WATER AT END OF YEAR	7.225	1214220.000	
SNOW WATER AT START OF YEAR	0.083	13926.198	0.63
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.418	0.00

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ANNUAL TOTALS FOR YEAR 5

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	INCHES	CU. FEET	PERCENT
PRECIPITATION	17.23	2895829.500	100.00
RUNOFF	0.489	82139.234	2.84
EVAPOTRANSPIRATION	17.044	2864526.500	98.92
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	-0.302	-50837.547	-1.76
SOIL WATER AT START OF YEAR	7.225	1214220.000	
SOIL WATER AT END OF YEAR	6.922	1163382.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	1.282	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

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	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	0.33	0.28	0.60	0.56	1.97	1.29
	2.59	2.09	2.42	1.23	1.40	1.01
STD. DEVIATIONS	0.37	0.07	0.51	0.45	1.86	1.57
	1.22	1.44	1.54	1.42	1.70	0.70
RUNOFF						
TOTALS	0.001	0.000	0.000	0.000	0.089	0.072
	0.070	0.013	0.040	0.065	0.008	0.000
STD. DEVIATIONS	0.001	0.000	0.000	0.000	0.167	0.128
	0.069	0.018	0.089	0.146	0.012	0.001
EVAPOTRANSPIRATION						
TOTALS	0.639	0.364	0.691	0.524	2.207	1.176
	2.282	2.495	1.794	1.216	1.078	0.822
STD. DEVIATIONS	0.542	0.094	0.565	0.407	1.821	1.734
	1.087	1.318	1.296	0.685	0.315	0.183
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	15.77	(2.637)	2651120.5	100.00
RUNOFF	0.357	(0.1282)	60039.41	2.265
EVAPOTRANSPIRATION	15.287	(2.3591)	2569285.75	96.913
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.00000	(0.00000)	0.000	0.00000
AVERAGE HEAD ON TOP OF LAYER 2	0.000	(0.000)		
CHANGE IN WATER STORAGE	0.130	(0.9368)	21794.73	0.822

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	2.03	341180.062
RUNOFF	0.377	63438.6289
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.000000	0.00000
AVERAGE HEAD ON TOP OF LAYER 2	0.000	
SNOW WATER	1.33	223721.8280

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.2714
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1350

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	3.9162	0.1632
2	3.0060	0.5010
SNOW WATER	0.000	

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 ** HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
 ** HELP MODEL VERSION 3.07 (1 NOVEMBER 1997)
**
 ** DEVELOPED BY ENVIRONMENTAL LABORATORY
**
 ** USAE WATERWAYS EXPERIMENT STATION
**
 ** FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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PRECIPITATION DATA FILE: C:\sun\attchb.1\RAINFC1.D4
TEMPERATURE DATA FILE: C:\sun\attchb.1\TEMPFC1.D7
SOLAR RADIATION DATA FILE: C:\sun\attchb.1\SOLARFC1.D13
EVAPOTRANSPIRATION DATA: C:\sun\attchb.1\EVAPFC1.D11
SOIL AND DESIGN DATA FILE: C:\sun\attchb.1\SOUTHSS.D10
OUTPUT DATA FILE: C:\sun\attchb.1\southss.OUT

TIME: 10:34 DATE: 9/ 9/2016

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TITLE: SSI Landfill Final Cover - South Sideslope 10%

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NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 9

THICKNESS	=	24.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1361	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03	CM/SEC

NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 2.01 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

LAYER 2

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 9

THICKNESS	=	6.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.5010	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 10.% AND A SLOPE LENGTH OF 400. FEET.

SCS RUNOFF CURVE NUMBER	=	87.60	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	17.400	ACRES
EVAPORATIVE ZONE DEPTH	=	24.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	3.267	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	12.024	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	3.240	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	6.273	INCHES
TOTAL INITIAL WATER	=	6.273	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

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EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Hobbs New Mexico

STATION LATITUDE	=	32.26 DEGREES
MAXIMUM LEAF AREA INDEX	=	1.20
START OF GROWING SEASON (JULIAN DATE)	=	67
END OF GROWING SEASON (JULIAN DATE)	=	317
EVAPORATIVE ZONE DEPTH	=	24.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	9.20 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	40.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	27.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	46.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	48.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR ROSWELL NEW MEXICO

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
0.46	0.46	0.54	0.79	1.93	1.85
2.16	2.37	2.54	1.54	0.55	0.55

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR MIDLAND TEXAS

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
42.20	46.90	53.40	62.20	70.60	78.30
80.30	79.10	72.70	62.80	51.00	43.50

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR MIDLAND TEXAS
AND STATION LATITUDE = 32.40 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.67	800262.437	100.00
RUNOFF	0.224	14151.144	1.77
EVAPOTRANSPIRATION	11.921	752955.375	94.09
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	0.525	33155.988	4.14
SOIL WATER AT START OF YEAR	6.273	396196.469	
SOIL WATER AT END OF YEAR	6.798	429352.469	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.026	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	18.56	1172286.620	100.00
RUNOFF	0.354	22385.635	1.91
EVAPOTRANSPIRATION	17.801	1124346.500	95.91
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	0.405	25554.270	2.18
SOIL WATER AT START OF YEAR	6.798	429352.469	
SOIL WATER AT END OF YEAR	7.202	454906.719	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.222	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	17.16	1083859.870	100.00
RUNOFF	0.215	13573.433	1.25
EVAPOTRANSPIRATION	15.676	990149.250	91.35
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	1.269	80137.398	7.39
SOIL WATER AT START OF YEAR	7.202	454906.719	
SOIL WATER AT END OF YEAR	8.388	529810.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.083	5233.604	0.48
ANNUAL WATER BUDGET BALANCE	0.0000	-0.160	0.00

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ANNUAL TOTALS FOR YEAR 4

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	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.25	836896.562	100.00
RUNOFF	0.468	29568.730	3.53
EVAPOTRANSPIRATION	14.023	885727.000	105.83
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	-1.241	-78399.234	-9.37
SOIL WATER AT START OF YEAR	8.388	529810.500	
SOIL WATER AT END OF YEAR	7.230	456644.906	
SNOW WATER AT START OF YEAR	0.083	5233.604	0.63
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.088	0.00

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ANNUAL TOTALS FOR YEAR 5

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	INCHES	CU. FEET	PERCENT
PRECIPITATION	17.23	1088281.500	100.00
RUNOFF	0.480	30311.012	2.79
EVAPOTRANSPIRATION	17.059	1077498.500	99.01
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	-0.309	-19528.504	-1.79
SOIL WATER AT START OF YEAR	7.230	456644.906	
SOIL WATER AT END OF YEAR	6.921	437116.406	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.456	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

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	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	0.33	0.28	0.60	0.56	1.97	1.29
	2.59	2.09	2.42	1.23	1.40	1.01
STD. DEVIATIONS	0.37	0.07	0.51	0.45	1.86	1.57
	1.22	1.44	1.54	1.42	1.70	0.70
RUNOFF						
TOTALS	0.001	0.000	0.000	0.000	0.087	0.070
	0.067	0.012	0.039	0.064	0.007	0.000
STD. DEVIATIONS	0.001	0.000	0.000	0.000	0.165	0.125
	0.067	0.018	0.087	0.143	0.011	0.000
EVAPOTRANSPIRATION						
TOTALS	0.641	0.364	0.691	0.528	2.213	1.176
	2.283	2.497	1.795	1.215	1.071	0.823
STD. DEVIATIONS	0.542	0.093	0.567	0.407	1.820	1.728
	1.092	1.322	1.294	0.689	0.310	0.184
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	15.77	(2.637)	996317.4	100.00
RUNOFF	0.348	(0.1274)	21997.99	2.208
EVAPOTRANSPIRATION	15.296	(2.3738)	966135.31	96.971
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.00000	(0.00000)	0.000	0.00000
AVERAGE HEAD ON TOP OF LAYER 2	0.000	(0.000)		
CHANGE IN WATER STORAGE	0.130	(0.9489)	8183.99	0.821

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	2.03	128218.852
RUNOFF	0.373	23578.9277
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.000000	0.00000
AVERAGE HEAD ON TOP OF LAYER 2	0.000	
SNOW WATER	1.33	84076.8906

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.2720
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1350

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	3.9147	0.1631
2	3.0060	0.5010
SNOW WATER	0.000	

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 **                HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**
 **                  HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)
**
 **                    DEVELOPED BY ENVIRONMENTAL LABORATORY
**
 **                     USAE WATERWAYS EXPERIMENT STATION
**
 **               FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
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 PRECIPITATION DATA FILE:     C:\sun\attchb.1\RAINFC1.D4
 TEMPERATURE DATA FILE:       C:\sun\attchb.1\TEMPFC1.D7
 SOLAR RADIATION DATA FILE:   C:\sun\attchb.1\SOLARFC1.D13
 EVAPOTRANSPIRATION DATA:     C:\sun\attchb.1\EVAPFC1.D11
 SOIL AND DESIGN DATA FILE:   C:\sun\attchb.1\SSLOPES.D10
 OUTPUT DATA FILE:            C:\sun\attchb.1\SSlopes.OUT


 TIME:  10:33     DATE:   9/ 9/2016


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      TITLE:  SSI Landfill Final Cover - Side Slopes 25%

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NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 9

THICKNESS	=	24.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1362	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03	CM/SEC

NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 2.01 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

LAYER 2

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 9

THICKNESS	=	6.00	INCHES
POROSITY	=	0.5010	VOL/VOL
FIELD CAPACITY	=	0.2840	VOL/VOL
WILTING POINT	=	0.1350	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.5010	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.190000006000E-03	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 9 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 25.% AND A SLOPE LENGTH OF 200. FEET.

SCS RUNOFF CURVE NUMBER	=	88.40	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	24.800	ACRES
EVAPORATIVE ZONE DEPTH	=	24.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	3.268	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	12.024	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	3.240	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	6.274	INCHES

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TOTAL INITIAL WATER	=	6.274	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Hobbs New Mexico

STATION LATITUDE	=	32.26 DEGREES
MAXIMUM LEAF AREA INDEX	=	1.20
START OF GROWING SEASON (JULIAN DATE)	=	67
END OF GROWING SEASON (JULIAN DATE)	=	317
EVAPORATIVE ZONE DEPTH	=	24.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	9.20 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	40.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	27.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	46.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	48.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR ROSWELL NEW MEXICO

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
0.46	0.46	0.54	0.79	1.93	1.85
2.16	2.37	2.54	1.54	0.55	0.55

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR MIDLAND TEXAS

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
42.20	46.90	53.40	62.20	70.60	78.30
80.30	79.10	72.70	62.80	51.00	43.50

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR MIDLAND TEXAS
AND STATION LATITUDE = 32.40 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	12.67	1140604.000	100.00
RUNOFF	0.286	25773.869	2.26
EVAPOTRANSPIRATION	11.887	1070153.870	93.82
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	0.496	44676.441	3.92
SOIL WATER AT START OF YEAR	6.274	564780.125	
SOIL WATER AT END OF YEAR	6.770	609456.562	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.239	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	18.56	1670845.370	100.00
RUNOFF	0.443	39843.648	2.38
EVAPOTRANSPIRATION	17.681	1591742.620	95.27
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	0.436	39259.082	2.35
SOIL WATER AT START OF YEAR	6.770	609456.562	
SOIL WATER AT END OF YEAR	7.206	648715.625	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.011	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	17.16	1544811.750	100.00
RUNOFF	0.294	26484.334	1.71
EVAPOTRANSPIRATION	15.620	1406207.870	91.03
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	1.245	112119.445	7.26
SOIL WATER AT START OF YEAR	7.206	648715.625	
SOIL WATER AT END OF YEAR	8.369	753375.687	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.083	7459.389	0.48
ANNUAL WATER BUDGET BALANCE	0.0000	0.119	0.00

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ANNUAL TOTALS FOR YEAR 4

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	INCHES	CU. FEET	PERCENT
PRECIPITATION	13.25	1192818.000	100.00
RUNOFF	0.554	49871.777	4.18
EVAPOTRANSPIRATION	13.960	1256744.500	105.36
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	-1.264	-113798.227	-9.54
SOIL WATER AT START OF YEAR	8.369	753375.687	
SOIL WATER AT END OF YEAR	7.187	647036.812	
SNOW WATER AT START OF YEAR	0.083	7459.389	0.63
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.050	0.00

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ANNUAL TOTALS FOR YEAR 5

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	INCHES	CU. FEET	PERCENT
PRECIPITATION	17.23	1551113.750	100.00
RUNOFF	0.570	51308.441	3.31
EVAPOTRANSPIRATION	16.923	1523502.620	98.22
PERC./LEAKAGE THROUGH LAYER 2	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 2	0.0000		
CHANGE IN WATER STORAGE	-0.263	-23697.777	-1.53
SOIL WATER AT START OF YEAR	7.187	647036.812	
SOIL WATER AT END OF YEAR	6.924	623339.062	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.531	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 5

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	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	0.33	0.28	0.60	0.56	1.97	1.29
	2.59	2.09	2.42	1.23	1.40	1.01
STD. DEVIATIONS	0.37	0.07	0.51	0.45	1.86	1.57
	1.22	1.44	1.54	1.42	1.70	0.70
RUNOFF						
TOTALS	0.001	0.000	0.000	0.000	0.102	0.085
	0.087	0.018	0.049	0.075	0.012	0.001
STD. DEVIATIONS	0.003	0.000	0.000	0.000	0.187	0.149
	0.082	0.024	0.107	0.165	0.018	0.002
EVAPOTRANSPIRATION						
TOTALS	0.628	0.368	0.713	0.524	2.179	1.151
	2.267	2.490	1.793	1.215	1.068	0.818
STD. DEVIATIONS	0.541	0.097	0.548	0.407	1.784	1.720
	1.075	1.316	1.302	0.683	0.311	0.179
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 5

	INCHES		CU. FEET	PERCENT
PRECIPITATION	15.77	(2.637)	1420038.5	100.00
RUNOFF	0.429	(0.1362)	38656.41	2.722
EVAPOTRANSPIRATION	15.215	(2.3352)	1369670.37	96.453
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.00000	(0.00000)	0.000	0.00000
AVERAGE HEAD ON TOP OF LAYER 2	0.000	(0.000)		
CHANGE IN WATER STORAGE	0.130	(0.9447)	11711.79	0.825

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 5

	(INCHES)	(CU. FT.)
PRECIPITATION	2.03	182748.719
RUNOFF	0.419	37694.3750
PERCOLATION/LEAKAGE THROUGH LAYER 2	0.000000	0.00000
AVERAGE HEAD ON TOP OF LAYER 2	0.000	
SNOW WATER	1.33	119833.7270

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.2709
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.1350

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	3.9182	0.1633
2	3.0060	0.5010
SNOW WATER	0.000	

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Appendix C

Site Inspection Checklist (Typical)

Post-Closure Site Inspection Checklist (Typical)
Sundance Services, Inc.

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Date: _____

Time: _____

Inspector(s): _____

_____

Weather:

Temperature _____ deg. F

Precipitation (last 24 hours) _____ inches

Skies _____

Wind Speed _____ mph

Wind Direction _____ *(direction blowing from)*

NOTES:
"X" indicates that a Deficiency has been noted. "P" indicates that a Photograph has been taken. "S" indicates that a Sample has been collected. Complete descriptions of Deficiencies, Photographs, and Samples are provided on attached pages. Items are referenced by Location.

Vegetation Condition

Location	Item			
	Vegetation Stress	Vegetation Dieback	Vectors	Sample

Surface Water Management System

Location	Deficiency			Sample
	Erosion/ Siltation	Structural Defect	Flow Obstruction	

NOTES: _____

_____

Corrective Actions Taken

Date	Deficiency		Sample
	Location	Corrective Actions	

Appendix D

Vadose Zone Monitoring Plan

DBS&A a Geo-Logic Company

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Table of Contents

List of Figures

List of Tables

List of Attachments

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1. Introduction

Sundance Services, Inc. (SSI Facility) is an operational Surface Waste Management Facility for oil field waste processing and disposal services. The proposed SSI Facility is subject to regulation under the New Mexico Oil and Gas Rules, specifically Part 36 and Permit NM-01-0003, administered by the Oil Conservation Division (OCD). The Facility is owned by, and will be constructed and operated by, Sundance Services, Inc.

1.1 Purpose

The purpose of this Vadose Zone Monitoring Plan (the Plan) is to provide SSI plans for the monitoring, recordkeeping, and reporting procedures for the site's vadose zone monitoring system during a subsequent to closure. The Plan, as presented herein, is based, in part, on the proposed Closure and Post-Closure Plan to which this plan is appended. This Plan identifies the locations of up to seven vadose zone monitoring points that are positioned appropriately to provide for early detection of potential fluid releases at the site; and provides additional guidance for monitoring point installation.

1.2 Site Location

The SSI Facility is located approximately 3 miles east of Eunice, New Mexico, 18 miles south of Hobbs, New Mexico, and approximately 0.5 mile west of the Texas-New Mexico state line in unincorporated Lea County, New Mexico. The SSI site consists of a 320-acre ± tract of land located in the South ½ of Section 29, Township 21 South, Range 38 East, Lea County, New Mexico. Site access will continue to be provided via NM 18 and Wallach Lane. Access may also be provided via replacement access through the proposed Sundance West, Inc. Surface Waste Management Facility (Sundance West). A site location map is provided as Figure 1.

1.3 Facility Description

The SSI Facility is an existing commercial Surface Waste Management Facility that includes the following components, which are also identified on Figure 2:

- Liquid Oil Field Waste Processing Area (80 acres±)
  - Produced Water Facility
  - Drilling Fluids

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- Basic Sediment and Water (BS&W)
- Jet Out Facility (SSI and Public)
- Oil Recycling Facility

- Oil Field Waste Landfill (80 acres±, old and current)
- Landfarm (Previously closed with OCD)

2. Vadose Zone Monitoring Network

The proposed vadose zone monitoring system for the SSI Facility is designed to provide for earliest possible detection of potential fluid releases from the closed Landfill and Ponds. The hydrogeologic setting lies near the boundary between the Southern High Plains Section and the Pecos Valley Section of the Great Plains Physiographic Province. The physiographic province is characterized by mildly deformed Triassic and Permian sedimentary rocks capped by the late Miocene-Pliocene Ogallala Formation. The local site region is underlain primarily by the Late Tertiary/Quaternary-aged pedogenic caprock caliche that developed on all pre-Quaternary formations on the Southern High Plains. Young windblown sands of the Blackwater Draw Formation (BDF) overlie the caprock caliche. Unconsolidated to semi-consolidated sands and gravels of the Ogallala, Antlers, and Gatuna Formations (locally referred to as OAG) lie between the caprock and underlying red beds of the Dockum Group (Chinle Group). In summary, the vadose zone monitor wells will be positioned such that downgradient wells are located downslope on the mapped redbed surface (i.e., Chinle Formation) to the east, south, and west of the facility. No upgradient wells are proposed considering that the OAG has been excavated, exposing the redbed surface north of the SSI Facility (Figure 2). The redbed structure map provided as Figure 3 presents a detailed depiction of the terrain on the redbed surface at the facility, as well as a high confidence level that the proposed downgradient vadose zone monitor wells are positioned directly downslope from the closed waste disposal areas in the zone most appropriate for detection of a potential release.

2.1 Monitor Well Locations

Figure 3 depicts the location of the vadose zone monitoring network designed specifically to address both the known slope of the redbed surface relative to the closed landfills and ponds.

The monitoring network strategy consists of the following elements, which are designed to correlate with the closed landfills and ponds shown in Figure 3:

- Well VZ-1 is an existing well that was installed in 2009, east of and downgradient of the landfills eastern boundary. This installation meets the specifications referenced in Section 2.2.
- Wells VZ-2, VZ-3, VZ-4, VZ-5, VZ-6, and VZ-7 are installed to evaluate ambient conditions, and were constructed in accordance with the specifications listed in Section 2.2. Wells VZ-2, VZ-3, VZ-4, VZ-5, VZ-6, and VZ-7 are positioned as "sentinel" downgradient wells around the remainder of the closed perimeter and are specifically located in proximity to identified depressions in the redbed interface (Figure 3) where liquids would be expected to accumulate.

2.2 Well Drilling and Completion

Prior to installation of the vadose zone monitor wells, drilling permits were obtained from the New Mexico Office of the State Engineer (NMOSE). The vadose zone monitor wells were installed using hollow-stem auger drilling methods, and no fluids were introduced into the borings during drilling. Undisturbed, depth-referenced samples of penetrated sediments were collected on at least 5-foot intervals using split-spoon sampling equipment. Drive blow counts will be logged during each sampling interval to allow precise determination of the upper redbed surface in each boring, which has typically been well-defined during other subsurface investigations. A qualified hydrogeologist was present on-site during drilling activities, and will prepare detailed descriptions of the lithology, texture, sorting, rounding, color, and degree of lithification and moisture content of each sample and stratigraphic unit that is penetrated.

Although split-spoon sampling offers ample opportunity to identify saturated sediments with a high degree of confidence, each boring was further evaluated for the presence of free water. Upon reaching total depth, the drilling rig will be placed on standby for a minimum of two hours, during which time the inside of the augers will be sounded to check for the potential for accumulating fluid.

The vadose zone monitor wells were constructed in accordance with the following specifications and the well detail sheet provided as Attachment 1:

- The well borehole will be drilled a minimum of 4 inches larger than the casing diameter to allow for the emplacement of the well casing and annular space materials.
- Each boring will be advanced approximately 3 feet into the indurated Chinle Formation (redbed).

- Care will be taken not to introduce contamination to the well (i.e., all tools will be decontaminated prior to drilling the borehole).
- Each well will be constructed with 4-inch-inside-diameter (I.D.) Schedule 40 (SCH 40) polyvinylchloride (PVC) flush-joint casing equipped with a threaded end cap.
- The well casing will extend from the bottom of the borehole to at least 3 feet above ground surface.
- The well casing will be constructed with a 10-foot length of 0.010-inch slotted well screen. The well screen will be positioned with the lowermost portion extending approximately 3 feet below the detected upper redbed surface and the upper portion extending approximately 7 feet into the overlying alluvium. Casing centralizers will be placed at the top and bottom of the screened interval as shown on Figure 4.
- The remaining well casing will be constructed with solid 4-inch-I.D. SCH 40 PVC flush-joint casing equipped with a venting cap.
- The annular space from the bottom of the borehole to 2 feet above the top of the well screen will be packed with 10/20 grade silica sand.
- A minimum of 1 foot of the annular space above the upper surface of the silica sand will be sealed with hydrated granular bentonite or bentonite chips.
- The annular space above the bentonite seal to 3 feet below ground surface (bgs) will be sealed with bentonite-cement grout (minimum 2 to 5 percent bentonite).
- The upper 3 feet of the annular space will be filled with concrete to anchor a steel protective shroud.
- The steel protective shroud shall be minimum 6-inch I.D. and will be equipped with a two-piece cast locking protective cover. The locking protective cover shall be positioned a minimum of 6 inches from the top of the PVC well casing to allow for easy access for removal of the PVC vent cap.
- A 4-foot by 4-foot by 6-inch-thick concrete pad will be poured around the steel protective shroud. The pad will be radially sloped away from the well to promote stormwater drainage away from the well, and will be protected on each corner by a steel, concrete-filled bollard.
- The top of PVC casing, top of steel shroud, and top of concrete pad of the new monitor well will be surveyed, referenced to a standard horizontal grid and elevations relative to the site control, and will be subsequently mapped by a licensed surveyor. The location of the well

will be determined to within 0.1 foot, and the height above sea level at the top of the casing will be determined to within 0.01 foot.

- Well completion data, NMOSE drilling permits and well records, and survey location information will be submitted to OCD in a well completion report.

3. Vadose Zone Monitoring Program

Evidence of fluids in the vadose zone monitor wells should not necessarily be attributed to impacts from the landfill, and the fluid's origin must be interpreted correctly. For example, reconfiguration of facility stormwater controls may alter surface water recharge to the subsurface, eliminating the source water. In addition, it is possible that some liquids may accumulate in a monitor well from condensation within the well casing. The following subsections describe the planned monitoring protocol for the SSI facility vadose zone monitoring network.

3.1 Monitoring Schedule

The proposed vadose zone monitoring program will initially include inspection of each well for the presence of fluid. After the initial inspection, each vadose zone monitor well will be monitored for the presence of free liquids on a quarterly basis as required by 19.15.36.18.C (3)(b) NMAC and Condition 6 approved by OCD on July 31, 2017.

3.2 Monitoring Assessment

Monitoring for the presence of liquid will be performed by lowering a calibrated electronic tape (i.e., water level indicator) that emits an audible signal when a water surface is penetrated. Total well depth measurements will also be recorded with the same electronic tape. Attachment 2 is a typical field information form that may be used for routine vadose zone monitoring purposes.

If the water level indicator shows that free liquids are present in the well casing, an attempt will be made to evacuate the liquid to investigate its origin by lowering a 2-inch PVC or Teflon bailer to remove the liquid from the well for sampling/testing purposes. A low flow or "micro-purge" technique may also be used in-lieu of the bailer. If a sufficient liquid sample cannot be retrieved, the quantity of liquid in the well will be considered de minimus, and likely the result of condensation. The same procedures will be used to check for liquid and evacuate (as necessary or if possible) for each subsequent monitoring event.

If a sufficient quantity of liquid is available to allow sample collection, the liquid will be field screened for specific conductance (SC), pH, and temperature (i.e., field parameters). In addition, initial sampling will include independent qualified commercial laboratory analysis for the parameters identified in Table 1. The initial field and laboratory data will be evaluated to determine if the water encountered is the result of surface water infiltration or potential impacts from the closed landfills or ponds. The data collected will be compared to regulatory groundwater standards established by the OCD and the New Mexico Water Quality Control Commission (NMWQCC).

If the initial analyses indicate that no impact from the closed Landfills or Ponds is evident (based on a comparison to the regulatory groundwater standards previously identified), routine monitoring of the available groundwater will continue on a semiannual basis, as applicable for wells with a measurable (recoverable) water column. If subsequent monitoring indicates elevated readings (i.e., above the regulatory groundwater standards) relative to the initial analysis (i.e., greater than the OCD and NMWQCC standards), additional samples will be collected for laboratory analyses, and the data will be evaluated in accordance with the following section to determine if a release from the closed landfills or ponds is possible.

3.3 Monitoring Data Evaluation

If the groundwater analysis indicates that a groundwater sample exceeds the regulatory groundwater standards, OCD will be notified within 48 hours and well verification resampling (VRS) for the parameters listed in Table 2 will be conducted within 2-weeks. If the VRS analytical results indicate that a potential release may have occurred, the SSI facility will provide notification of the discovery to the OCD Hobbs district office following the release notification procedures outlined in 19.15.29 NMAC.

Within 60 days of the receipt of notice from the OCD that an abatement plan is required, the SSI facility will submit an abatement plan proposal (in accordance with 19.15.30.13) detailing the proposed course of action to investigate further the potential release and/or complete any mitigation measures as appropriate.

If this further evaluation indicate that the release is contained, and no impacts have occurred, the monitoring data will be maintained as part of the Facility Operating Record and submitted with quarterly vadose zone monitoring data for the facility.

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Table 1. Vadose Zone Monitoring Parameters

Field Parameters	
▪ Specific conductance ▪ pH ▪ Total well depth	▪ Temperature ▪ Depth to water
Major Cations	
▪ Calcium ▪ Magnesium ▪ Sodium	▪ Iron ▪ Potassium
Major Anions	
▪ Fluoride ▪ Nitrate as N ▪ Sulfate	▪ Chloride ▪ Phosphorous
RCRA Metals	
▪ Arsenic ▪ Barium ▪ Cadmium ▪ Chromium	▪ Lead ▪ Mercury ▪ Selenium ▪ Silver
Organic Compounds	
▪ Benzene ▪ Toluene	▪ Ethylbenzene ▪ Xylenes
Additional Parameters	
▪ Total dissolved solids (TDS)	▪ Total petroleum hydrocarbons (TPH)

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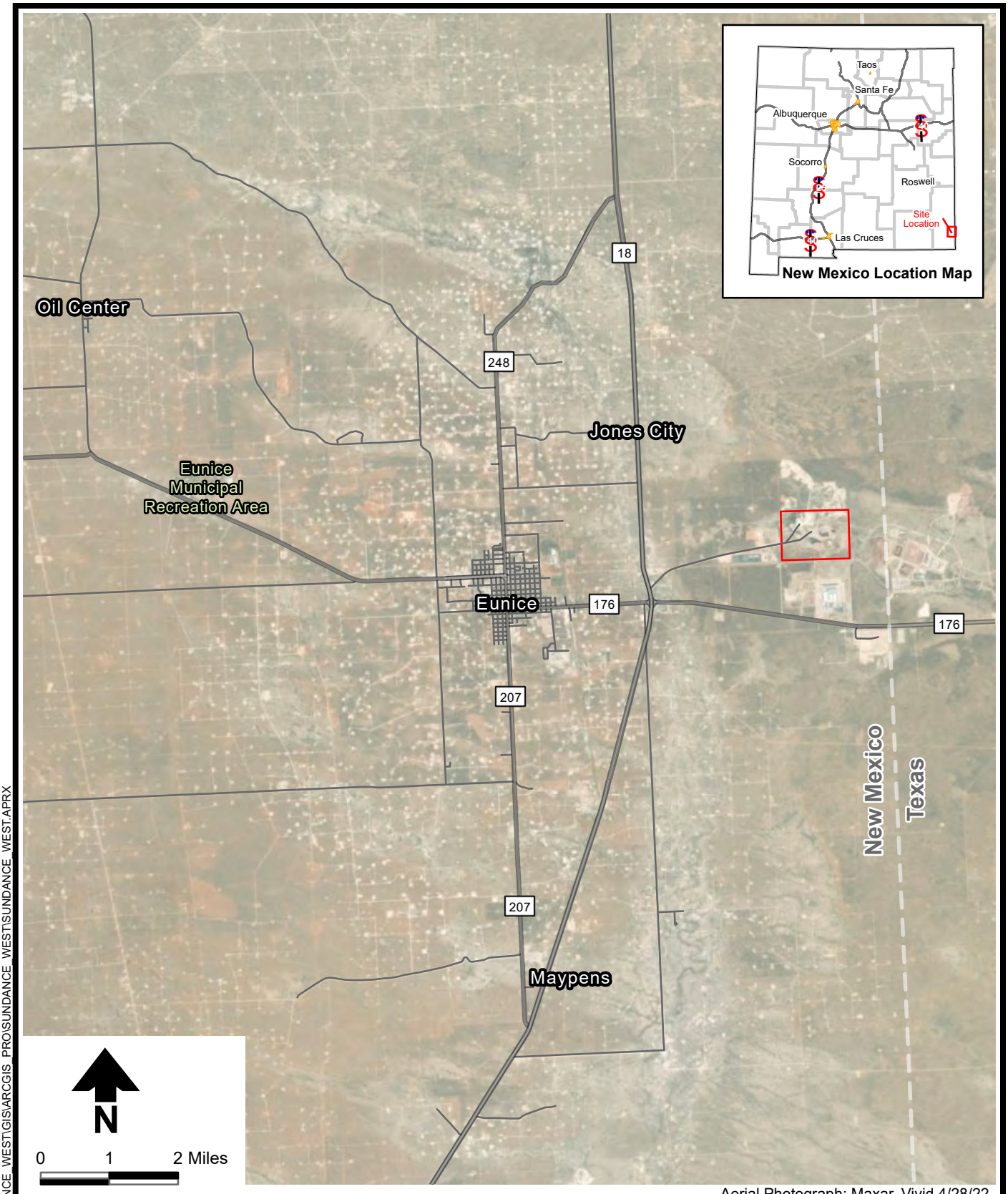
Figures



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SUNDANCE WEST
Area Map

Figure 1

Aerial photograph: Google Earth Pro, 2/20/2019

Explanation

Site Feature

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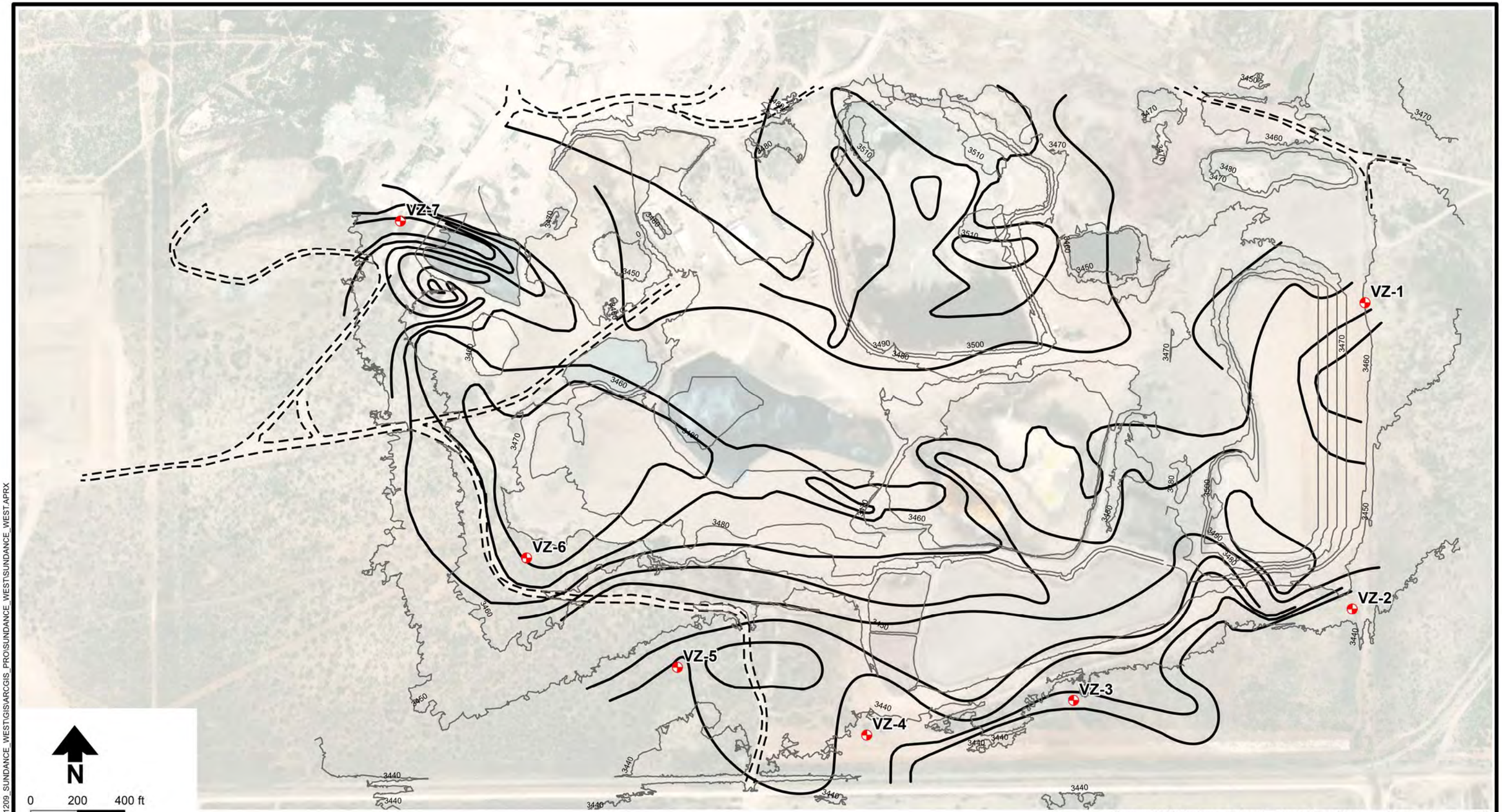
6/21/2023 DB18.1209

SUNDANCE WEST

Site Map

Figure 2



Source: 2018 Contours and roads adapted from Sundance Services Inc. Figure 3

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6/22/2023 DB18.1209

SUNDANCE WEST

Chinle Formation (Redbed) Surface

Figure 3

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Attachment 1

Vadose Zone Monitor Well Construction Detail

DBS&A a Geo-Logic Company

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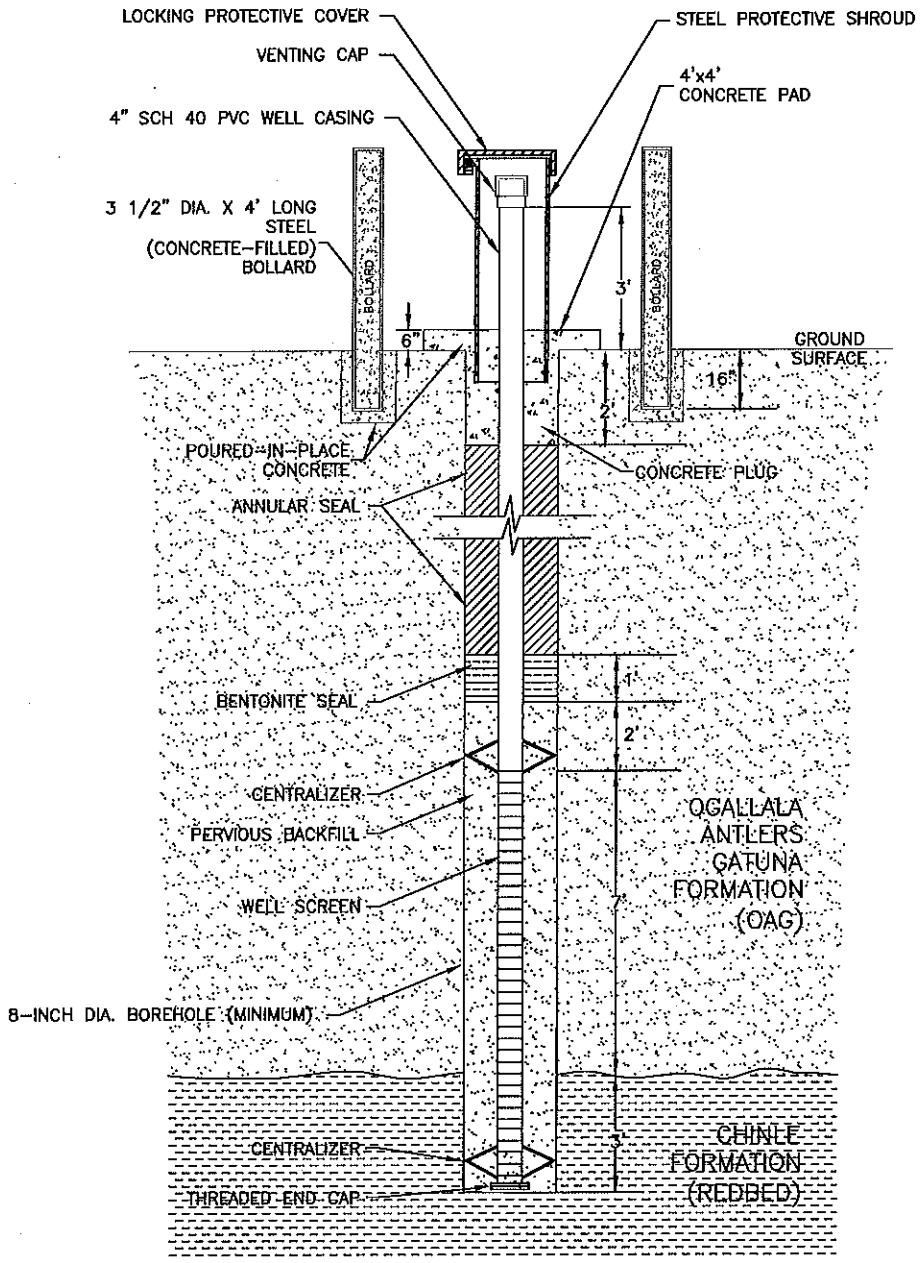

TYPICAL VADOSE ZONE MONITORING WELL

NOT TO SCALE

LEGEND

CASING: 4" DIA. SCH 40 PVC

SCREEN: 4" DIA. 0.010" MACHINE SLOT SCH 40 PVC

PERVIOUS BACKFILL: 10-20 COLORADO® SILICA SAND OR EQUIVALENT

ANNULAR SEAL: NEAT CEMENT WITH 2% TO 5% BENTONITE

NOTE:

SPECIFIC VERTICAL DIMENSIONS FOR EACH NEW WELL WILL BE INCLUDED IN OSE AND OCD SUBMITTALS.

DRAFT

VADOSE ZONE MONITORING WELL CONSTRUCTION DETAIL

SUNDANCE SERVICES, INC.
SURFACE MANAGEMENT FACILITY
LEA COUNTY, NEW MEXICO

Gordon Environmental, Inc.
Consulting Engineers
213 S. Camino del Pueblo
Bernalillo, New Mexico, USA
Phone: 505-867-6990
Fax: 505-867-6991

DATE: 05/26/2016	CAD: VADOSE MW .dwg	PROJECT #: 530.05.01
DRAWN BY: DMI	REVIEWED BY: CWF	FIGURE 4
APPROVED BY: IKG	gei@gordonenvironmental.com	

Drawing:P:\acad 2003\530.05.01\PERMIT FIGURES\2016-Draft 2 (Draft 1 OCD Comments)\UPDATED VADOSE MW.dwg
Date/Time:May. 27, 2016-08:16:21
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Attachment 2

Vadose Zone Monitoring Form (Typical)

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Appendix A
Vadose Zone Monitoring Form (Typical)
Sundance Services, Inc.

Sampling Personnel: _____

Weather Information:

Date and Amount of Last Precipitation: _____

Temp: _____ ^{O}F

Wind Speed: _____ mph

Wind Direction: _____

Barometric Pressure: _____ inches mercury (Hg)

Weather Conditions: _____

Equipment Information:

Monitoring Equipment Used: _____ Monitoring Equipment Used: _____

Date and Time Last Calibrated: _____ Date and Time Last Calibrated: _____

Well I.D.	Monitoring Date (dd/mm/yy)	Total Well Depth (fbtoc)	Depth of Water (fbtoc)	Field Parameter Measurement			Water Volume Removed (gallons)	Sample Collected?		Observations (e.g., color, odor, clarity, etc.)
				Temperature (^{O}c)	pH (Standard Units)	Specific Conductance (mS/cm)		Y	N	

fbtoc : feet below top of PVC casing

Appendix E

Surface Water Management Plan

DBS&A a Geo-Logic Company

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1. Introduction

This report has been prepared to describe the analysis of stormwater run-off management at closure for the Sundance Services, Inc. (SSI) site east of Eunice, New Mexico. For this analysis, it is assumed that there is no run-on from the surrounding watershed, and the proposed stormwater management system will manage on-site runoff only. Current and closure grading for the site mitigate the potential for run-on by generally maintaining the natural grade, where surface water moves away from the site. This report describes the applicable design storm, site-specific basin delineation and characteristics, and the design analysis demonstrating the effectiveness of the proposed surface water management system.

2. Design Storm

From Natural Resources Conservation Service (NRCS) TR-55 Figure B-2, it was determined that the SCS Type II rainfall distribution is appropriate for New Mexico (SCS, 1986). This section of TR-55 is included in Attachment 1. Autodesk's Storm and Sanitary Analysis 2016 software (SSA) was used to create the design rainfall distribution by generating the 25-year, 24-hour precipitation rate and applying it to the Type II distribution using 6-minute intervals.

3. Drainage Basin Delineation and Characteristics

The total area contributing to runoff at the site is approximately 200 acres. For the purposes of this analysis, the watershed was subdivided into six subbasins (Table 1). Runoff from all five subbasins is retained in on-site ponds. The basin delineations are presented in Figure 1.

An NRCS soils map for the adjacent watersheds was compiled to determine the watershed's hydrologic soils groups (Attachment 2). The borrow area used for final cover was found to be Group B. The subbasins were assigned a curve number of 86, consistent with newly graded areas in hydrogeologic soils Group B.

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Table 1. Subbasins

Subbasin	Area		25-Year Maximum Runoff (cfs)	25-Year Total Runoff (cf)	100-Year Maximum Runoff (cfs)	100-Year Total Runoff (cf)
	square feet	acres				
SB-1	2,824,404	64.84	144	781,500	204	1,119,000
SB-2	533,392	12.25	55	149,000	77	212,500
SB-3	1,917,319	44.02	171	534,500	239	764,500
SB-4	2,903,405	66.65	248	809,000	349	1,156,000
SB-5	430,009	9.87	41	120,000	58	171,500
SB-6	535,132	12.29	55	149,000	77	213,500

cfs = Cubic feet per second
cf = Cubic feet

4. Hydrologic and Hydraulic Modeling

The hydrologic analysis described herein was conducted using SSA—a combined hydrology and hydraulics analysis program frequently used in hydrology and the design of culvert and channel stormwater management systems. The primary aim of the analysis is to design stormwater infrastructure capable of conveying flow to on-site stormwater ponds with adequate capacity. Stormwater runoff calculations were performed in SSA using the curve number method outlined in NRCS TR-55 to determine total run-off quantities and peak runoff flows. The portion of TR-55 used to determine the post-closure runoff curve number is included in Attachment 1.

The storage capacity of the stormwater ponds designed to store the total runoff volume was calculated using the Stage Storage extension in Autodesk Civil 3D 2018. The dimensions and capacity of each pond are presented in Table 2.

Table 2. Stormwater Ponds

Pond Name	Top of Pond Elevation (feet msl)	Pond Side Slope (H:V)	Pond Depth (feet)	Contributing Subbasins	Pond Volume (cf)	25-Year Runoff Volume (cf)	Water Elevation (feet msl)	Freeboard (feet)
NW Pond	3,452	3	6	SB-2	600,252	149,000	3,448.0	4.0
NE Pond	3,458	3	8	SB-3	864,826	534,500	3,454.9	3.1
SW Pond	3,446	3	8	SB-1, SB-5	1,557,015	901,500	3,441.5	4.5
SE Pond	3,438	3	8	SB-4, SB-6	1,203,263	958,000	3,434.1	3.9

msl = Above mean sea level
cf = Cubic feet

Open-channel flow conditions were analyzed using Bentley FlowMaster—an analysis program frequently used to analyze and design channels for conveying surface water flow. Calculation reports generated by FlowMaster are included in Attachment 3. Routing calculations were performed in FlowMaster using Manning's Formula to compute normal depth for a given flow rate. Channel slopes used for modeling in FlowMaster represent the minimum slope throughout the length of the channel. The channels were sized according to maximum flow depths that occur at low velocities. The channels will be lined with PYRAMAT turf reinforcement mat (TRM); therefore, erosion due to higher velocities is not a concern and overtopping is the design parameter.

5. Proposed Stormwater Infrastructure

5.1 Stormwater Ponds

Stormwater runoff will be detained in four ponds within the site (Figure 2). Ponds are sized to provide a minimum of 1.5 feet of freeboard for the 25-year, 24-hour design storm.

Subbasin SB-1 is composed of the central or interior portion of the site and contributes flow to a central channel which conveys the flow to the SW Pond. SB-5 is composed of the western exterior slope and also contributes flow to the SW Pond via a culvert which conveys flow under the site access road.

Subbasin SB-2 is composed of the interior slopes north of the site access road and contributes flow to West Channel 1, which conveys the flow to the NW Pond.

Subbasin SB-3 is composed of the northeast portion of the site. Runoff from SB-3 flows to a low area central to the subbasin designated as the NE Pond.

Subbasin SB-4 is composed of the east and south exterior slopes of the site and contributes to flow on the southeast side of the landfill which is conveyed to the SE Pond.

5.2 Stormwater Conveyance Channels

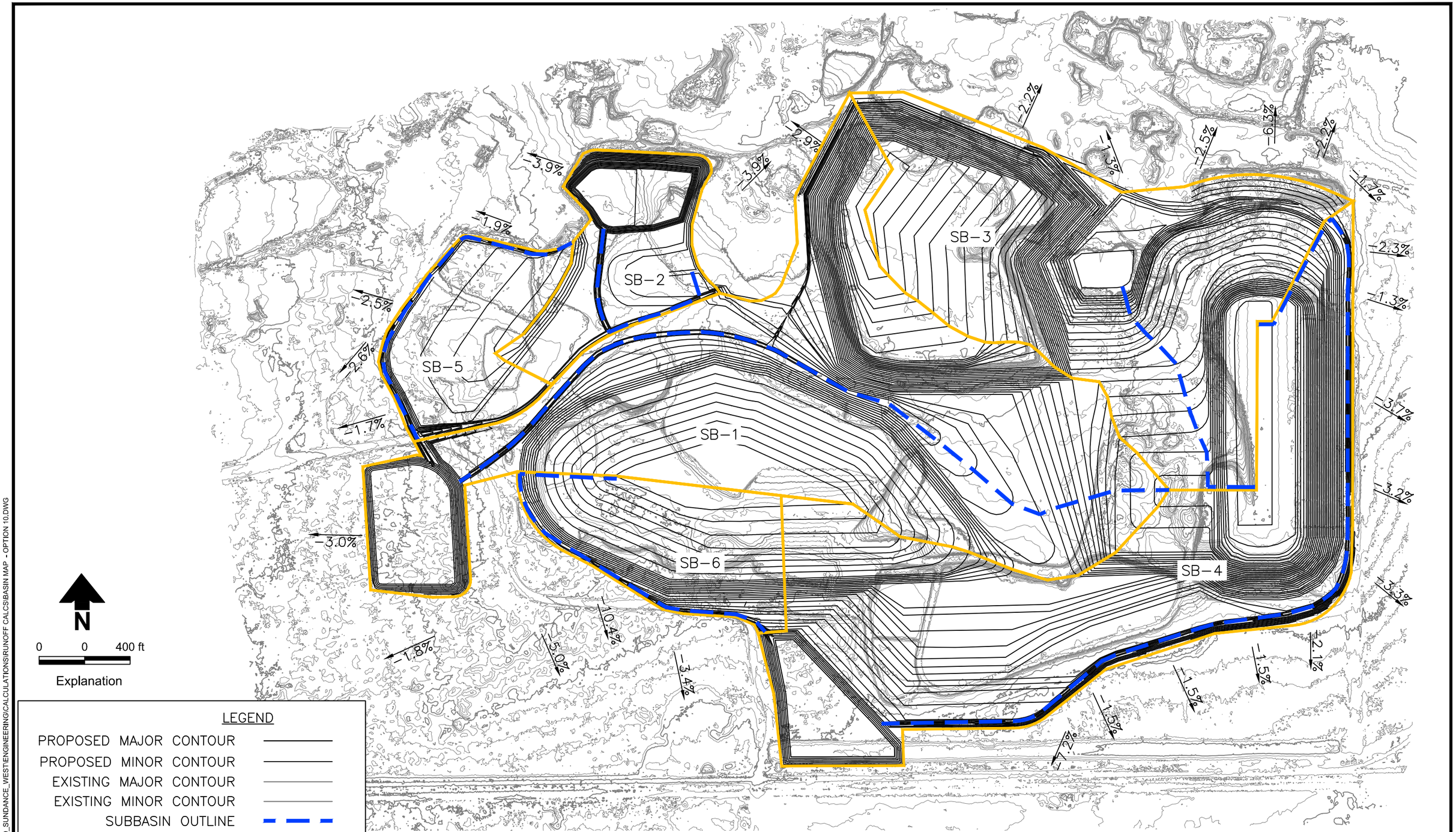
All channels will be lined with TRM or an engineer-approved equal. TRM technical specifications are provided in Attachment 4. The cross-sectional geometry and longitudinal slope of each of the five channels is presented in Table 3. All channels have a minimum of 0.5 foot of freeboard for the 25-year, 24-hour design storm. The location of each channel is presented in Figure 2.

Table 3. Stormwater Conveyance Channels

Channel	Contributing Subbasin	Total Length (feet)	Slope [a] (ft/ft)	Total Depth (feet)	Bottom Width (feet)	Side Slopes (H:V)	Peak Discharge (cfs)	Maximum Velocity (fps)	Normal Depth (feet)	Minimum Freeboard (feet)
West Channel 1	SB-5	1,625	0.015	3	0	2	41	5.8	1.9	1.1
West Channel 2	SB-2	1,990	0.005	3	5	2	55	4.0	1.7	1.4
Center Channel	SB-1	1,809	0.002	4	5	2	144	3.7	3.3	0.7
East Channel	SB-4	3,700	0.005	5	0	2	248	6.0	4.5	0.5
South Channel	SB-6	1,260	0.005	4	0	2	55	4.1	2.6	1.4

cfs = Cubic feet per second
fps = Feet per second

Figures



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SUNDANCE SERVICES SUNDANCE SERVICES INC.
SURFACE WASTE MANAGEMENT CLOURE

Hydrologic Subbasin Map

Figure 1

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10/31/2023 DB18.1209

SUNDANCE SERVICES SUNDANCE SERVICES INC.
SURFACE WASTE MANAGEMENT CLOURE

Stormwater Management Site Layout

Figure 2

Attachment 1

Excerpts From NRCS TR-55

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United States
Department of
Agriculture

**Natural
Resources
Conservation
Service**

**Conservation
Engineering
Division**

Technical
Release 55

June 1986

Urban Hydrology for Small Watersheds

TR-55

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Figure 2-2 Flow chart for selecting the appropriate figure or table for determining runoff curve numbers.

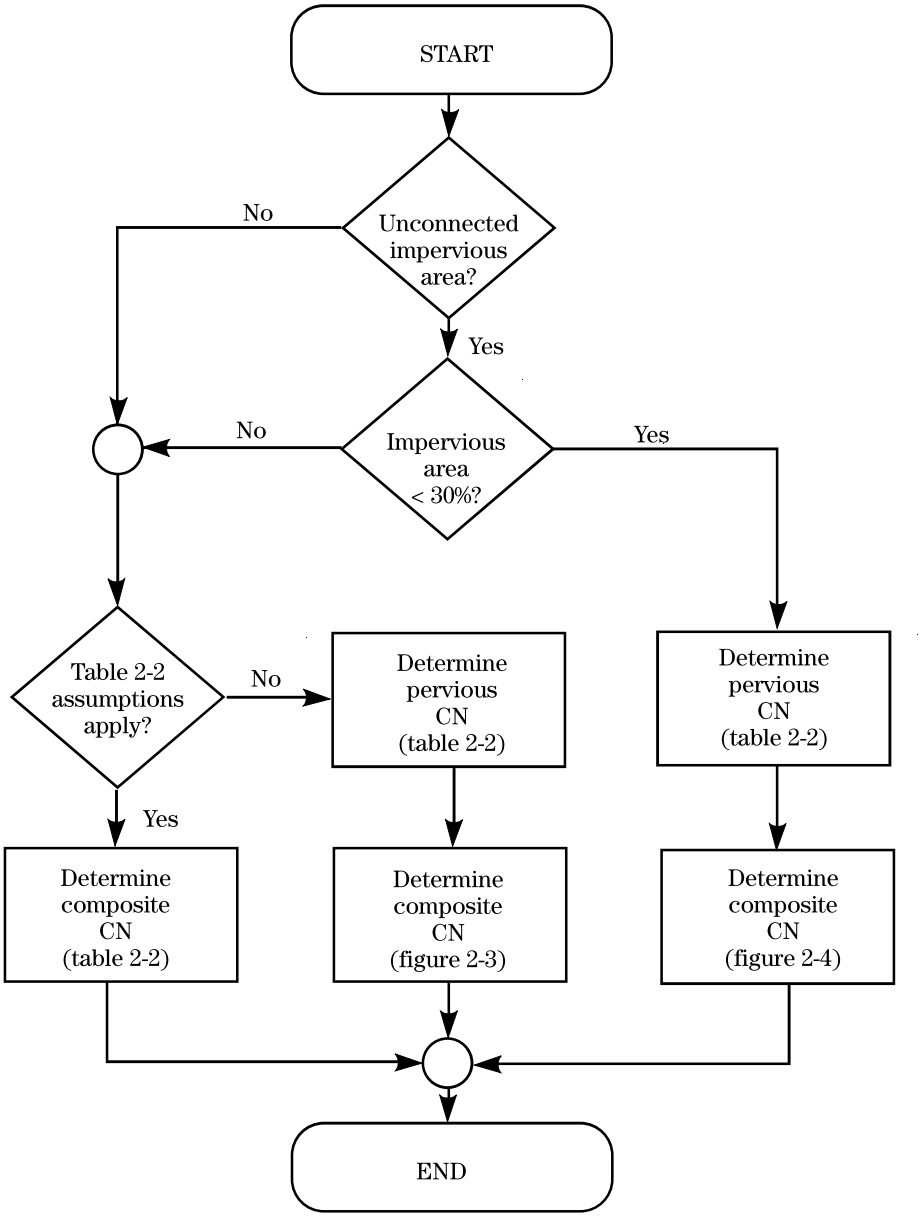

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Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2/]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

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Table 2-2b Runoff curve numbers for cultivated agricultural lands [1/]

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment [2/]	Hydrologic condition [3/]	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+ CR	Poor	65	73	79	81
		Good	61	70	77	80
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
	C&T+ CR	Poor	60	71	78	81
		Good	58	69	77	80
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

[1] Average runoff condition, and I_a=0.2S

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good ≥ 20%), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

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Table 2-2c Runoff curve numbers for other agricultural lands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2/]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3/]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4/]	48	65	73
Woods—grass combination (orchard or tree farm). [5/]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6/]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4/]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor*: <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

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Table 2-2d Runoff curve numbers for arid and semiarid rangelands [1/]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition [2/]	A [3/]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

1 Average runoff condition, and I_a, = 0.2S. For range in humid regions, use table 2-2c.
2 Poor: <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: > 70% ground cover.
3 Curve numbers for group A have been developed only for desert shrub.

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Appendix B Synthetic Rainfall Distributions and Rainfall Data Sources

The highest peak discharges from small watersheds in the United States are usually caused by intense, brief rainfalls that may occur as distinct events or as part of a longer storm. These intense rainstorms do not usually extended over a large area and intensities vary greatly. One common practice in rainfall-runoff analysis is to develop a synthetic rainfall distribution to use in lieu of actual storm events. This distribution includes maximum rainfall intensities for the selected design frequency arranged in a sequence that is critical for producing peak runoff.

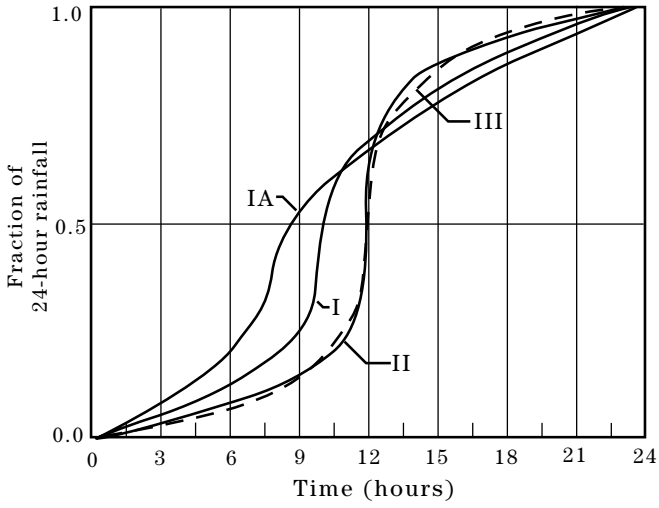
Synthetic rainfall distributions

The length of the most intense rainfall period contributing to the peak runoff rate is related to the time of concentration (T_c) for the watershed. In a hydrograph created with NRCS procedures, the duration of rainfall that directly contributes to the peak is about 170 percent of the T_c. For example, the most intense 8.5-minute rainfall period would contribute to the peak discharge for a watershed with a T_c of 5 minutes. The most intense 8.5-hour period would contribute to the peak for a watershed with a 5-hour T_c.

Different rainfall distributions can be developed for each of these watersheds to emphasize the critical rainfall duration for the peak discharges. However, to avoid the use of a different set of rainfall intensities for each drainage area size, a set of synthetic rainfall distributions having “nested” rainfall intensities was developed. The set “maximizes” the rainfall intensities by incorporating selected short duration intensities within those needed for longer durations at the same probability level.

For the size of the drainage areas for which NRCS usually provides assistance, a storm period of 24 hours was chosen the synthetic rainfall distributions. The 24-hour storm, while longer than that needed to determine peaks for these drainage areas, is appropriate for determining runoff volumes. Therefore, a single storm duration and associated synthetic rainfall distribution can be used to represent not only the peak discharges but also the runoff volumes for a range of drainage area sizes.

Figure B-1 SCS 24-hour rainfall distributions



The intensity of rainfall varies considerably during a storm as well as geographic regions. To represent various regions of the United States, NRCS developed four synthetic 24-hour rainfall distributions (I, IA, II, and III) from available National Weather Service (NWS) duration-frequency data (Hershfield 1061; Frederick et al., 1977) or local storm data. Type IA is the least intense and type II the most intense short duration rainfall. The four distributions are shown in figure B-1, and figure B-2 shows their approximate geographic boundaries.

Types I and IA represent the Pacific maritime climate with wet winters and dry summers. Type III represents Gulf of Mexico and Atlantic coastal areas where tropical storms bring large 24-hour rainfall amounts. Type II represents the rest of the country. For more precise distribution boundaries in a state having more than one type, contact the NRCS State Conservation Engineer.

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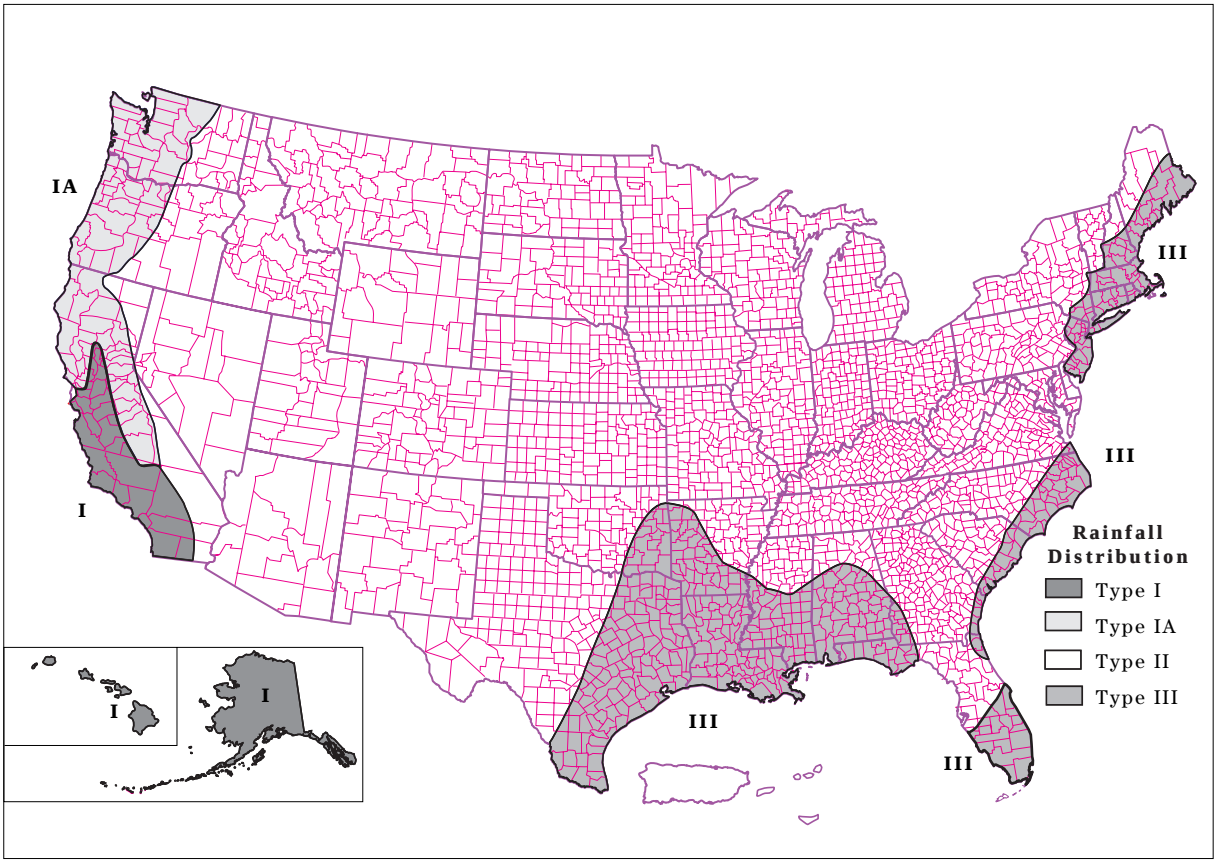
Figure B-2 Approximate geographic boundaries for NRCS (SCS) rainfall distributions



Rainfall data sources

This section lists the most current 24-hour rainfall data published by the National Weather Service (NWS) for various parts of the country. Because NWS Technical Paper 40 (TP-40) is out of print, the 24-hour rainfall maps for areas east of the 105th meridian are included here as figures B-3 through B-8. For the area generally west of the 105th meridian, TP-40 has been superseded by NOAA Atlas 2, the Precipitation-Frequency Atlas of the Western United States, published by the National Ocean and Atmospheric Administration.

East of 105th meridian

Hershfield, D.M. 1961. Rainfall frequency atlas of the United States for durations from 30 minutes to 24 hours and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 40. Washington, DC. 155 p.

West of 105th meridian

Miller, J.F., R.H. Frederick, and R.J. Tracey. 1973. Precipitation-frequency atlas of the Western United States. Vol. I Montana; Vol. II, Wyoming; Vol III, Colorado; Vol. IV, New Mexico; Vol V, Idaho; Vol. VI, Utah; Vol. VII, Nevada; Vol. VIII, Arizona; Vol. IX, Washington; Vol. X, Oregon; Vol. XI, California. U.S. Dept. of Commerce, National Weather Service, NOAA Atlas 2. Silver Spring, MD.

Alaska

Miller, John F. 1963. Probable maximum precipitation and rainfall-frequency data for Alaska for areas to 400 square miles, durations to 24 hours and return periods from 1 to 100 years. U.S. Dept. of Commerce, Weather Bur. Tech. Pap. No. 47. Washington, DC. 69 p.

Hawaii

Weather Bureau. 1962. Rainfall-frequency atlas of the Hawaiian Islands for areas to 200 square miles, durations to 24 hours and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 43. Washington, DC. 60 p.

Puerto Rico and Virgin Islands

Weather Bureau. 1961. Generalized estimates of probable maximum precipitation and rainfall-frequency data for Puerto Rico and Virgin Islands for areas to 400 square miles, durations to 24 hours, and return periods from 1 to 100 years. U.S. Dept. Commerce, Weather Bur. Tech. Pap. No. 42. Washington, DC. 94 P.

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Attachment 2

Watershed Hydrologic Soils Groups

DBS&A a Geo-Logic Company

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Lea County, New Mexico

Sundance_East_boundary

August 24, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lea County, New Mexico
Survey Area Data: Version 18, Sep 10, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 18, 2020—Feb 17, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BO	Brownfield-Springer association	77.7	24.1%
BS	Brownfield-Springer association, hummocky	74.5	23.1%
GP	Gravel pit	33.2	10.3%
KM	Kermit soils and Dune land, 0 to 12 percent slopes	25.6	7.9%
KO	Kimbrough gravelly loam, dry, 0 to 3 percent slopes	61.2	19.0%
KU	Kimbrough-Lea complex, dry, 0 to 3 percent slopes	11.3	3.5%
PG	Portales and Gomez fine sandy loams	6.2	1.9%
SR	Simona-Upton association	4.7	1.5%
TF	Tonuco loamy fine sand, 0 to 3 percent slopes	27.4	8.5%
Totals for Area of Interest		**321.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a

given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Lea County, New Mexico

BO—Brownfield-Springer association

Map Unit Setting

National map unit symbol: dmpj
Elevation: 3,500 to 4,400 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 58 to 60 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Brownfield and similar soils: 60 percent
Springer and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brownfield

Setting

Landform: Plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 22 inches: fine sand
Bt - 22 to 60 inches: sandy clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R077DY046TX - Sandy 12-17" PZ
Hydric soil rating: No

Description of Springer

Setting

Landform: Plains

Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 14 inches: loamy fine sand
Bt - 14 to 60 inches: fine sandy loam
Bk - 60 to 79 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R077DY046TX - Sandy 12-17" PZ
Hydric soil rating: No

Minor Components

Patricia

Percent of map unit: 4 percent
Ecological site: R077CY056NM - Sandy Plains
Hydric soil rating: No

Amarillo

Percent of map unit: 4 percent
Ecological site: R077CY035TX - Sandy 16-21" PZ
Hydric soil rating: No

Gomez

Percent of map unit: 1 percent
Ecological site: R077CY056NM - Sandy Plains
Hydric soil rating: No

Tivoli

Percent of map unit: 1 percent
Ecological site: R077DY046TX - Sandy 12-17" PZ
Hydric soil rating: No

BS—Brownfield-Springer association, hummocky

Map Unit Setting

National map unit symbol: dmpk
Elevation: 3,500 to 4,400 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 58 to 60 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Brownfield and similar soils: 65 percent
Springer and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brownfield

Setting

Landform: Plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 22 inches: fine sand
Bt - 22 to 60 inches: sandy clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R077DY046TX - Sandy 12-17" PZ
Hydric soil rating: No

Description of Springer

Setting

Landform: Plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 7 inches: loamy fine sand
Bt - 7 to 60 inches: fine sandy loam
Bk - 60 to 79 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R077DY046TX - Sandy 12-17" PZ
Hydric soil rating: No

Minor Components

Amarillo

Percent of map unit: 4 percent
Ecological site: R077CY035TX - Sandy 16-21" PZ
Hydric soil rating: No

Arvana

Percent of map unit: 3 percent
Ecological site: R077CY035TX - Sandy 16-21" PZ
Hydric soil rating: No

Tivoli

Percent of map unit: 2 percent
Ecological site: R077DY046TX - Sandy 12-17" PZ
Hydric soil rating: No

Dune land

Percent of map unit: 1 percent
Hydric soil rating: No

GP—Gravel pit

Map Unit Setting

National map unit symbol: 1n9fh
Elevation: 3,600 to 4,400 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 58 to 60 degrees F
Frost-free period: 195 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, gravel: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Gravel

Setting

Landform: Plains
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Calcareous alluvium and/or calcareous lacustrine deposits derived from sedimentary rock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: A
Hydric soil rating: No

KM—Kermit soils and Dune land, 0 to 12 percent slopes

Map Unit Setting

National map unit symbol: dmpx
Elevation: 3,000 to 4,400 feet
Mean annual precipitation: 10 to 15 inches
Mean annual air temperature: 60 to 62 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Kermit and similar soils: 46 percent
Dune land: 44 percent

Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kermit

Setting

Landform: Dunes
Landform position (two-dimensional): Shoulder, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex
Parent material: Calcareous sandy eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 8 inches: fine sand
C - 8 to 60 inches: fine sand

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very high (20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 3 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R042XC022NM - Sandhills
Hydric soil rating: No

Description of Dune Land

Setting

Landform: Dunes
Landform position (two-dimensional): Shoulder, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex
Parent material: Sandy eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 6 inches: fine sand
C - 6 to 60 inches: fine sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Pyote
Percent of map unit: 3 percent
Ecological site: R042XC003NM - Loamy Sand
Hydric soil rating: No

Palomas
Percent of map unit: 3 percent
Ecological site: R042XC003NM - Loamy Sand
Hydric soil rating: No

Wink
Percent of map unit: 2 percent
Ecological site: R042XC003NM - Loamy Sand
Hydric soil rating: No

Maljamar
Percent of map unit: 2 percent
Ecological site: R042XC003NM - Loamy Sand
Hydric soil rating: No

KO—Kimbrough gravelly loam, dry, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2tw43
Elevation: 2,500 to 4,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition
Kimbrough, dry, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kimbrough, Dry

Setting
Landform: Playa rims, plains
Down-slope shape: Convex, linear
Across-slope shape: Concave, linear
Parent material: Loamy eolian deposits derived from sedimentary rock

Typical profile
A - 0 to 3 inches: gravelly loam
Bw - 3 to 10 inches: loam
Bkkm1 - 10 to 16 inches: cemented material
Bkkm2 - 16 to 80 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 4 to 18 inches to petrocalcic
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 95 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R077DY049TX - Very Shallow 12-17" PZ
Hydric soil rating: No

Minor Components

Eunice

Percent of map unit: 10 percent
Landform: Plains
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R077DY049TX - Very Shallow 12-17" PZ
Hydric soil rating: No

Spraberry

Percent of map unit: 6 percent
Landform: Playa rims, plains
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R077DY049TX - Very Shallow 12-17" PZ
Hydric soil rating: No

Kenhill

Percent of map unit: 4 percent
Landform: Plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R077DY038TX - Clay Loam 12-17" PZ
Hydric soil rating: No

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KU—Kimbrough-Lea complex, dry, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tw46
Elevation: 2,500 to 4,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Kimbrough and similar soils: 45 percent
Lea and similar soils: 25 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kimbrough

Setting

Landform: Playa rims, plains
Down-slope shape: Convex, linear
Across-slope shape: Concave, linear
Parent material: Loamy eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 3 inches: gravelly loam
Bw - 3 to 10 inches: loam
Bkkm1 - 10 to 16 inches: cemented material
Bkkm2 - 16 to 80 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 4 to 18 inches to petrocalcic
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 95 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R077DY049TX - Very Shallow 12-17" PZ

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Hydric soil rating: No

Description of Lea

Setting

Landform: Plains
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Calcareous, loamy eolian deposits from the blackwater draw formation of pleistocene age over indurated caliche of pliocene age

Typical profile

A - 0 to 10 inches: loam
Bk - 10 to 18 inches: loam
Bkk - 18 to 26 inches: gravelly fine sandy loam
Bkkm - 26 to 80 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 22 to 30 inches to petrocalcic
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 90 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 3.0
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R077DY047TX - Sandy Loam 12-17" PZ
Hydric soil rating: No

Minor Components

Douro

Percent of map unit: 12 percent
Landform: Plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R077DY047TX - Sandy Loam 12-17" PZ
Other vegetative classification: Unnamed (G077DH000TX)
Hydric soil rating: No

Kenhill

Percent of map unit: 12 percent
Landform: Plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R077DY038TX - Clay Loam 12-17" PZ
Hydric soil rating: No

Spraberry

Percent of map unit: 6 percent
Landform: Playa rims, plains
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R077DY049TX - Very Shallow 12-17" PZ
Other vegetative classification: Unnamed (G077DH000TX)
Hydric soil rating: No

PG—Portales and Gomez fine sandy loams

Map Unit Setting

National map unit symbol: dmqm
Elevation: 3,600 to 4,400 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 58 to 60 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Portales and similar soils: 46 percent
Gomez and similar soils: 44 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Portales

Setting

Landform: Plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous alluvium and/or calcareous eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 8 inches: fine sandy loam
Bk - 8 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Calcium carbonate, maximum content: 50 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R077CY035TX - Sandy 16-21" PZ
Hydric soil rating: No

Description of Gomez

Setting

Landform: Plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous alluvium and/or calcareous lacustrine deposits derived from sedimentary rock

Typical profile

A - 0 to 6 inches: fine sandy loam
Bk1 - 6 to 22 inches: fine sandy loam
Bk2 - 22 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 50 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: A
Ecological site: R077CY035TX - Sandy 16-21" PZ
Hydric soil rating: No

Minor Components

Lea

Percent of map unit: 5 percent
Ecological site: R077CY028TX - Limy Upland 16-21" PZ
Hydric soil rating: No

Arvana

Percent of map unit: 3 percent
Ecological site: R077CY035TX - Sandy 16-21" PZ
Hydric soil rating: No

Amarillo

Percent of map unit: 2 percent
Ecological site: R077CY056NM - Sandy Plains
Hydric soil rating: No

SR—Simona-Upton association

Map Unit Setting

National map unit symbol: dmr3
Elevation: 3,000 to 4,400 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 58 to 62 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Simona and similar soils: 50 percent
Upton and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Simona

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Calcareous eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 8 inches: gravelly fine sandy loam
Bk - 8 to 16 inches: fine sandy loam
Bkm - 16 to 26 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 7 to 20 inches to petrocalcic
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 50 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R042XC002NM - Shallow Sandy
Hydric soil rating: No

Description of Upton

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Calcareous eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 8 inches: gravelly loam
Bkm - 8 to 18 inches: cemented material
BCk - 18 to 60 inches: very gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 7 to 20 inches to petrocalcic
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 75 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R042XC025NM - Shallow
Hydric soil rating: No

Minor Components

Kimbrough

Percent of map unit: 6 percent

Ecological site: R077CY037TX - Very Shallow 16-21" PZ
Hydric soil rating: No

Stegall

Percent of map unit: 5 percent
Ecological site: R077CY028TX - Limy Upland 16-21" PZ
Hydric soil rating: No

Slaughter

Percent of map unit: 4 percent
Ecological site: R077CY028TX - Limy Upland 16-21" PZ
Hydric soil rating: No

TF—Tonuco loamy fine sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tw3c
Elevation: 3,280 to 4,460 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Tonuco and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tonuco

Setting

Landform: Ridges, plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy eolian deposits

Typical profile

A - 0 to 12 inches: loamy fine sand
Bw - 12 to 17 inches: loamy sand
Bkkm - 17 to 39 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 12 to 20 inches to petrocalcic
Drainage class: Excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R077DY048TX - Shallow 12-17" PZ
Hydric soil rating: No

Minor Components

Simona

Percent of map unit: 15 percent
Landform: Ridges, plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R042XC002NM - Shallow Sandy
Hydric soil rating: No

Berino

Percent of map unit: 10 percent
Landform: Ridges, plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R042XC003NM - Loamy Sand
Hydric soil rating: No

Cacique

Percent of map unit: 5 percent
Landform: Ridges, plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R042XC004NM - Sandy
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Attachment 3

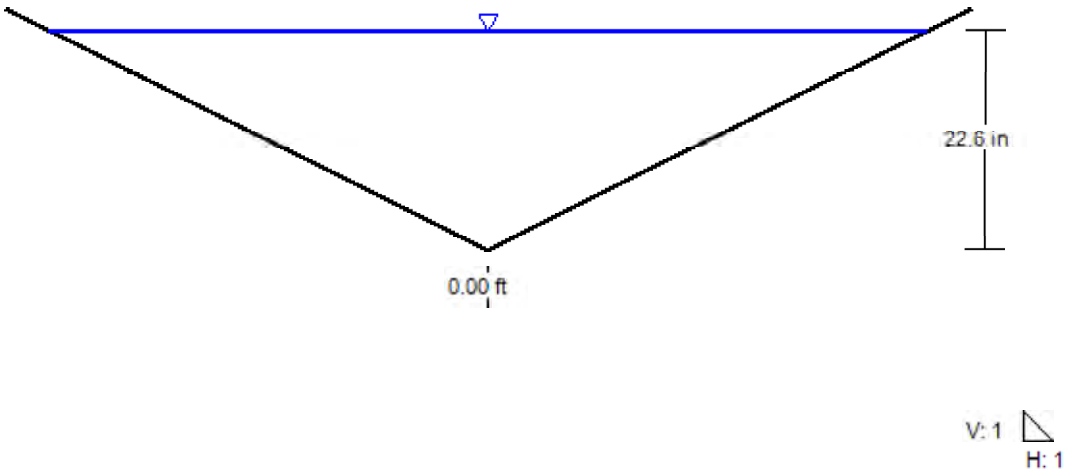
FlowMaster Calculation Reports

DBS&A a Geo-Logic Company

Cross Section for West Channel 1 - 25yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.028
Channel Slope	0.015 ft/ft
Normal Depth	22.6 in
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Bottom Width	0.00 ft
Discharge	41.00 cfs



Worksheet for West Channel 1 - 25yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.028	
Channel Slope	0.015	ft/ft
Left Side Slope	2.000	H:V
Right Side Slope	2.000	H:V
Bottom Width	0.00	ft
Discharge	41.00	cfs

Results		
Normal Depth	22.6	in
Flow Area	7.1	ft²
Wetted Perimeter	8.4	ft
Hydraulic Radius	10.1	in
Top Width	7.52	ft
Critical Depth	23.0	in
Critical Slope	0.013	ft/ft
Velocity	5.79	ft/s
Velocity Head	0.52	ft
Specific Energy	2.40	ft
Froude Number	1.053	
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	22.6	in
Critical Depth	23.0	in
Channel Slope	0.015	ft/ft
Critical Slope	0.013	ft/ft

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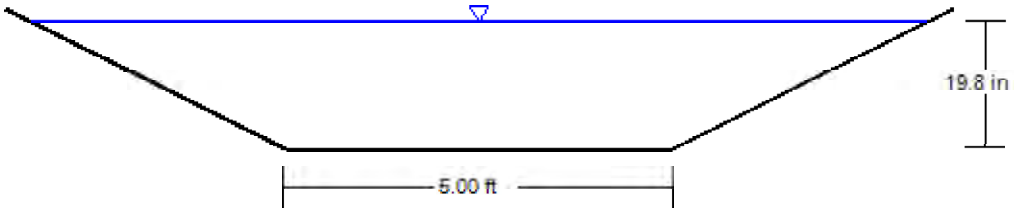
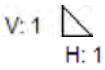
Cross Section for West Channel 2 - 25yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.028	
Channel Slope	0.005	ft/ft
Normal Depth	19.8	in
Left Side Slope	2.000	H:V
Right Side Slope	2.000	H:V
Bottom Width	5.00	ft
Discharge	55.00	cfs





Worksheet for West Channel 2 - 25yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.028	
Channel Slope	0.005	ft/ft
Left Side Slope	2.000	H:V
Right Side Slope	2.000	H:V
Bottom Width	5.00	ft
Discharge	55.00	cfs

Results		
Normal Depth	19.8	in
Flow Area	13.7	ft²
Wetted Perimeter	12.4	ft
Hydraulic Radius	13.3	in
Top Width	11.60	ft
Critical Depth	15.6	in
Critical Slope	0.012	ft/ft
Velocity	4.02	ft/s
Velocity Head	0.25	ft
Specific Energy	1.90	ft
Froude Number	0.651	
Flow Type	Subcritical	

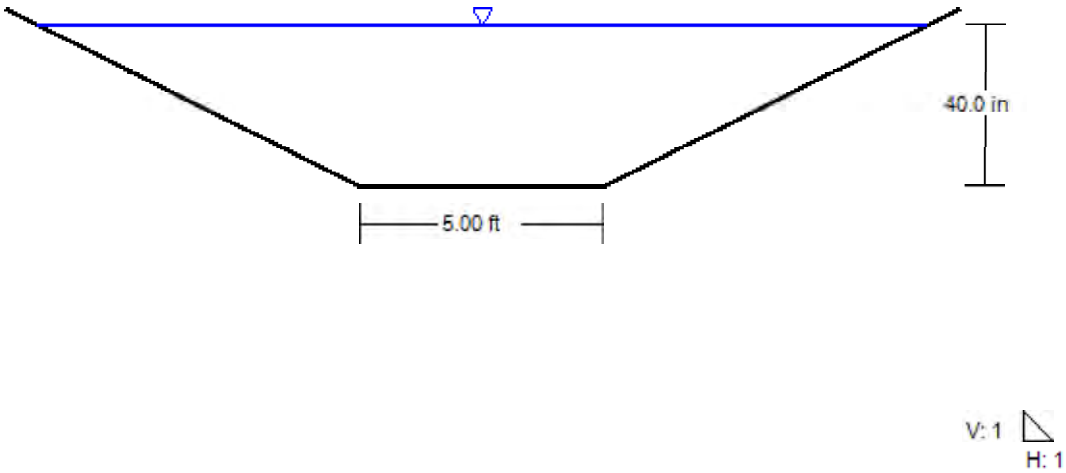
GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	19.8	in
Critical Depth	15.6	in
Channel Slope	0.005	ft/ft
Critical Slope	0.012	ft/ft

Cross Section for Center Channel - 25yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.028	
Channel Slope	0.002	ft/ft
Normal Depth	40.0	in
Left Side Slope	2.000	H:V
Right Side Slope	2.000	H:V
Bottom Width	5.00	ft
Discharge	144.00	cfs



Worksheet for Center Channel - 25yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.028	
Channel Slope	0.002	ft/ft
Left Side Slope	2.000	H:V
Right Side Slope	2.000	H:V
Bottom Width	5.00	ft
Discharge	144.00	cfs

Results		
Normal Depth	40.0	in
Flow Area	38.8	ft²
Wetted Perimeter	19.9	ft
Hydraulic Radius	23.4	in
Top Width	18.32	ft
Critical Depth	26.4	in
Critical Slope	0.011	ft/ft
Velocity	3.71	ft/s
Velocity Head	0.21	ft
Specific Energy	3.54	ft
Froude Number	0.449	
Flow Type	Subcritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	40.0	in
Critical Depth	26.4	in
Channel Slope	0.002	ft/ft
Critical Slope	0.011	ft/ft

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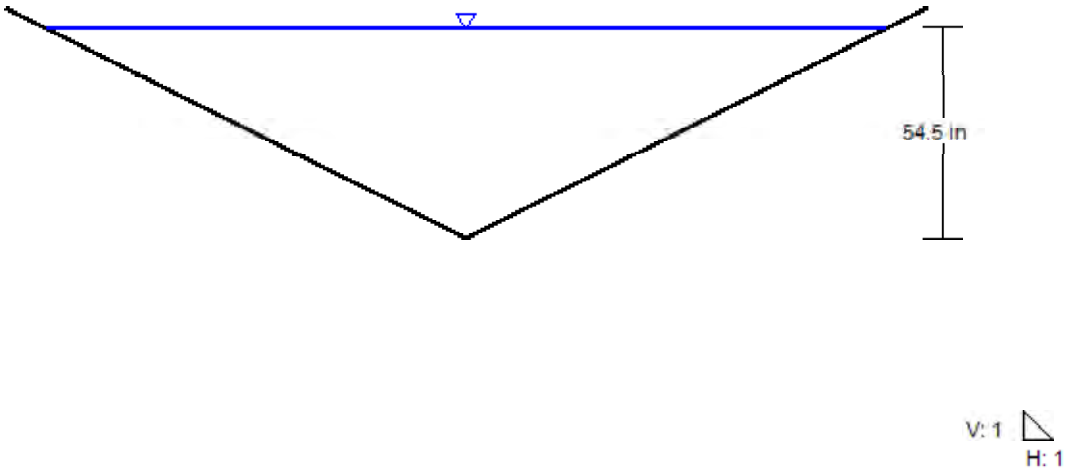
Cross Section for East Channel - 25 yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.028	
Channel Slope	0.005	ft/ft
Normal Depth	54.5	in
Left Side Slope	2.000	H:V
Right Side Slope	2.000	H:V
Discharge	248.00	cfs



Worksheet for East Channel - 25 yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.028
Channel Slope	0.005 ft/ft
Left Side Slope	2.000 H:V
Right Side Slope	2.000 H:V
Discharge	248.00 cfs

Results	
Normal Depth	54.5 in
Flow Area	41.2 ft²
Wetted Perimeter	20.3 ft
Hydraulic Radius	24.4 in
Top Width	18.16 ft
Critical Depth	47.3 in
Critical Slope	0.011 ft/ft
Velocity	6.02 ft/s
Velocity Head	0.56 ft
Specific Energy	5.10 ft
Froude Number	0.704
Flow Type	Subcritical

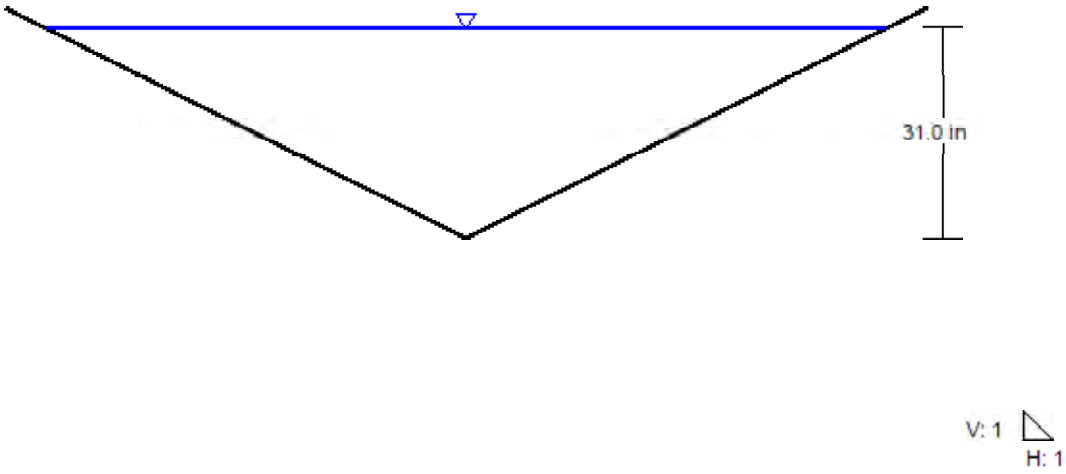
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	54.5 in
Critical Depth	47.3 in
Channel Slope	0.005 ft/ft
Critical Slope	0.011 ft/ft

Cross Section for South Channel - 25yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.028	
Channel Slope	0.005	ft/ft
Normal Depth	31.0	in
Left Side Slope	2.000	H:V
Right Side Slope	2.000	H:V
Discharge	55.00	cfs



Worksheet for South Channel - 25yr

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data		
Roughness Coefficient	0.028	
Channel Slope	0.005	ft/ft
Left Side Slope	2.000	H:V
Right Side Slope	2.000	H:V
Discharge	55.00	cfs

Results		
Normal Depth	31.0	in
Flow Area	13.3	ft²
Wetted Perimeter	11.5	ft
Hydraulic Radius	13.9	in
Top Width	10.32	ft
Critical Depth	25.9	in
Critical Slope	0.013	ft/ft
Velocity	4.13	ft/s
Velocity Head	0.26	ft
Specific Energy	2.85	ft
Froude Number	0.641	
Flow Type	Subcritical	

GVF Input Data		
Downstream Depth	0.0	in
Length	0.0	ft
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	in
Profile Description	N/A	
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	31.0	in
Critical Depth	25.9	in
Channel Slope	0.005	ft/ft
Critical Slope	0.013	ft/ft

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Attachment 4

TRM Cut Sheet

DBS&A
a Geo-Logic Company

PYRAMAT®

Product Data

PYRAMAT® 25 TRM

PYRAMAT® 25 turf reinforcement mat (TRM) is a three-dimensional, lofty, woven polypropylene geotextile that is available in green which is specially designed for erosion control applications on steep slopes and vegetated waterways. The matrix is composed of polypropylene monofilament yarns featuring X3® technology woven into a uniform configuration of resilient pyramid-like projections. The material exhibits very high interlock and reinforcement capacity with both soil and root systems, demonstrates superior UV resistance, and enhances seedling emergence. The expected design life of PYRAMAT® 25 is up to 25 years because of its superior UV resistance, resistance to corrosion, strength, and durability in the most demanding environments.

PYRAMAT® 25 conforms to the property values listed below[1] and is manufactured at a Propex facility having achieved ISO 9001:2008 certification. Propex performs internal Manufacturing Quality Control (MQC) tests that have been accredited by the Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP).

PROPERTY	TEST METHOD	ENGLISH	METRIC
ORIGIN OF MATERIALS			
% U.S. Manufactured Inputs		100%	100%
% U.S. Manufactured		100%	100%
PHYSICAL			
Mass/Unit Area [4]	ASTM D-6566	8.0 oz/yd²	271 g/m²
Thickness [2]	ASTM D-6525	0.25 in	6.4 mm
Light Penetration (% Passing) [3]	ASTM D-6567	35%	35%
Color	Visual	Green or Tan	
MECHANICAL			
Tensile Strength [2]	ASTM D-6818	2000 x 1800 lbs/ft	29.2 x 26.3 kN/m
Elongation [2]	ASTM D-6818	20 x 20 %	20 x 20 %
Resiliency [2]	ASTM D-6524	70%	70%
Flexibility [4]	ASTM D-6575	0.195 in-lb	225,000 mg-cm
ENDURANCE			
UV Resistance % Retained at 1,000 hrs [4]	ASTM D-4355	90%	90%
UV Resistance % Retained at 3,000 hrs [4]	ASTM D-4355	90%	90%
PERFORMANCE			
Velocity (Vegetated) [4, 5]	Large Scale	20 ft/sec	6.1 m/sec
Shear Stress (Vegetated) [4, 5]	Large Scale	12 lb/ft²	575 Pa
Manning's n (Unvegetated) [4, 6]	Calculated	0.028	0.028
Seedling Emergence [4]	ASTM D-7322	255%	255%
ROLL SIZES		8.5 ft x 120 ft	2.6 m x 36.6 m

NOTES:

1. The property values listed above are effective 03/09/2018 and are subject to change without notice. Values represent testing at time of manufacture.
2. Minimum average roll values (MARV) are calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any samples taken from quality assurance testing will exceed the value reported.
3. Maximum Average Roll Value (MaxARV), calculated as the typical plus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any sample taken during quality assurance testing will meet to the value reported.
4. Typical Value.
5. Maximum permissible velocity and shear stress has been obtained through vegetated testing programs featuring specific soil types, vegetation classes, flow conditions, and failure criteria. These conditions may not be relevant to every project nor are they replicated by other manufacturers. Please contact Propex for further information.
6. Calculated as typical values from large-scale flexible channel lining test programs with a flow depth of 6 to 12 inches.

Propex GEOSOLUTIONS

ENGINEERED EARTH ARMORING SOLUTIONS™

www.propexglobal.com

Propex Operating Company, LLC · 4019 Industry Drive · Chattanooga, TN 37416 · ph 800 621 1273 · ph 423 855 1466

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Appendix F

Closure/Post-Closure Cost Estimates

DBS&A a Geo-Logic Company

CLOSURE COST ESTIMATE TASK SUMMARY
(Updated October 2023)
SUNDANCE SERVICES, INC.

Task	Cost Estimate
1.0 LANDFILL CLOSURE CONSTRUCTION	$3,635,977
2.0 LANDFILL MAINTENANCE (Post-Closure)	$367,094
3.0 ENVIRONMENTAL MONITORING (Post-Closure)	$1,453,902
4.0 POND AND PROCESSING AREA CLOSURE CONSTRUCTION	$1,211,064
5.0 PROCESS AREA MAINTENANCE (Post-Closure)	$28,358
Total cost	**$6,696,394**

TASK 1.0 - LANDFILL CLOSURE CONSTRUCTION
CLOSURE COST ESTIMATE
(Updated October 2023)
SUNDANCE SERVICES, INC.

Task 1.0	Unit	Unit Quantity	Unit Cost	Total Cost
1.0 Waste Relocation (Current Landfill COMPLETED)	CY	0	$1.21	$0
1.1 Final Cover Installation				
1.1.1 Final Grading & Contouring				
1.1.1.1 Current Landfill (Completed w/waste relocation)	AC	30.8	$0.00	$0
1.1.1.2 Closed Landfill & adjacent Area	AC	42.2	$1,210.99	$51,043
1.1.1.3 Containment Ponds 1, 5, & 6 (Completed with relocation) & adjacent area	AC	49.7	$0.00	$0
1.1.1.4 Containment Ponds 2, 3, 4, & 9	AC	48.4	$1,210.99	$58,588
1.1.1.5 Fill to achieve design grades (all areas)	CY	1,652,500	$0.72	$1,192,101
1.1.2 Install and compact 6" Infiltration (Barrier) Layer				
1.1.2.1 Current Landfill	CY	25,000	$2.42	$60,609
1.1.2.2 Closed Landfill & adjacent Area	CY	34,500	$2.42	$83,640
1.1.2.3 Containment Ponds 1, 5, & 6 & adjacent Area	CY	40,500	$2.42	$98,186
1.1.2.4 Containment Ponds 2, 3, 4 & 9	CY	39,500	$2.42	$95,762
1.1.3 Install 24" Erosion (Vegetative) Layer				
1.1.3.1 Current Landfill	CY	99,500	$2.42	$241,223
1.1.3.2 Closed Landfill & adjacent Area	CY	136,500	$2.42	$330,924
1.1.3.3 Containment Ponds 1, 5, & 6 & adjacent Area	CY	160,500	$2.42	$389,108
1.1.3.4 Containment Ponds 2, 3, 4 & 9	CY	156,500	$2.42	$379,411
1.1.4 Vegetative Layer Seeding (Class A)				
1.1.4.1 Current landfill	AC	30.8	$1,818	$55,966
1.1.4.2 Closed Landfill & adjacent Area	AC	42.2	$1,818	$76,615
1.1.4.3 Containment Ponds 1, 5, & 6 & adjacent Area	AC	49.7	$1,818	$90,302
1.1.4.4 Containment Ponds 2, 3, 4 & 9	AC	48.4	$1,818	$87,939
			Task Subtotal	**$3,291,418**
1.2 Final Cover Construction Quality Assurance (CQA)				
1.2.1 Inspection and Testing	LS	1	$42,404	$42,404
1.2.2 Certification	LS	1	$6,845	$6,845
			Task Subtotal	**$49,249**
1.3 Stormwater Ponds & Channels				
1.3.1 Excavation	CY	359,000	$0.72	$258,980
1.3.2 Final Grading & Contouring	AC	30	$1,210.99	$36,330
			Task Subtotal	**$295,310**
			TOTAL COST	**$3,635,977**

Notes:

1. Closure costs are based on contracting with a qualified third party to complete and certify closure. The activities included in this cost estimate are based on current dollars, previous experience with landfills located in arid climates, and current subcontractor costs.
2. Final cover installation costs assume that:
   The greatest area requiring final cover is 88.5 acres +/-.
   All soils necessary for closure construction are available on-site.
3. Costs include taxes.
4. CY = Cubic yard
   AC = Acre
   LS = Lump sum

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TASK 2.0 - LANDFILL MAINTENANCE
POST-CLOSURE COST ESTIMATE
(Updated October 2023)
SUNDANCE SERVICES, INC.

Task 2.0	Unit Quantity	Unit	Unit Cost	Total Cost per Year	Total Cost for 30 Years
2.1 Final Cover Inspection and Reporting					
2.1.1 Inspection	4	events/yr	$605	$2,422	$72,659.60
2.1.2 Recordkeeping and Reporting	4	events/yr	$605	$2,422	$72,659.60
			Task Subtotals	**$4,844**	**$145,319**
2.2 Final Cover Maintenance					
2.2.1 Cover Maintenance	1	AC/yr	$1,818	$1,818	$54,530.18
2.2.2 Vegetation	2	AC/yr	$1,818	$3,635	$109,060.36
			Task Subtotals	**$5,453**	**$163,591**
2.3 Surface Water Management System					
2.3.1 Inspection/Repairs	1	events/yr	$970	$970	$29,092.22
			Task Subtotals	**$970**	**$29,092**
2.4 Fencing					
2.4.1 Inspection/Repairs	1	events/yr	$970	$970	$29,092.22
			Task Subtotals	**$970**	**$29,092**
			TOTAL COST	**$12,236**	**$367,094**

Notes:

1. Post-closure maintenance costs are based on contracting with a qualified third party to conduct post-closure care for the landfill. The activities included in this cost estimate are based on current dollars, previous experience with landfills located in arid climates, and current subcontractor costs.
2. Costs include taxes
3. AC = Acre

TASK 3.0 - ENVIRONMENTAL MONITORING
POST-CLOSURE COST ESTIMATE
(Updated October 2023)
SUNDANCE SERVICES, INC.

Task 3.0	Unit Quantity	Unit	Unit Cost	Total Cost per Year	Total Cost for 30 Years
3.1 Vadose Zone Monitoring					
3.1.1 Field Services/Lab Analysis/Reporting	4	events/yr	$12,116	$48,463.39	$1,453,902
			Task Subtotal	**$48,463**	**$1,453,902**
			TOTAL COST	**$48,463**	**$1,453,902**

Notes:

1. Post-closure environmental monitoring costs are based on contracting with a qualified third party to conduct post-closure monitoring for the landfill. The activities included in this cost estimate are based on current dollars, previous experience with landfills located in arid climates, and current subcontractor costs.
2. Assume monitoring 5 wells (i.e. sampling and analysis costs).
3. Costs include taxes.

TASK 4.0 - POND AND PROCESSING AREA CLOSURE CONSTRUCTION
CLOSURE COST ESTIMATE
(Updated October 2023)
SUNDANCE SERVICES, INC.

Task 4.0	Units	Unit Cost	Quantity	Total Cost
4.1 Evaporation Pond				
4.1.1 Liquids Transport/Disposal				
4.1.1.1 Transport Liquid	BBL	$0.04	100,000	$ 3,548
4.1.1.2 Disposal Liquids	BBL	$0.72	100,000	$ 72,139
4.1.1.3 Remove/Transport Sludge (included w/Pond Excavation)	CY	$3.03	0	$ -
4.1.1.4 Sludge Solidification	CY	$1.51	250,000	$ 378,435
			Task Subtotal	**$454,123**
4.1.2 Sampling	EA	$1,211	500	$ 605,497
			Task Subtotal	**$ 605,497**
Pond Closure Subtotal:				**$1,059,619**
4.2 Site Work				
4.2.1 Tank Removal	LS		$	30,289
4.2.2 Building Removal	LS		$	30,289
4.2.3 Process Equipment Removal	LS		$	30,289
4.2.4 Earthwork	LS		$	12,116
Site Work Subtotal:			**$**	**102,983**
4.3 Engineering				
4.3.1 CQA/Certification	LS		$	48,462
Engineering Subtotal:			**$**	**48,462**
Total:				**$1,211,064**

Notes:

1. Phase I and Phase II Assessment costs are based on contracting with a qualified third party to conduct the activities outlined above. The activities included in this cost estimate are based on current dollars, previous experience with landfills located in arid climates, and current subcontractor costs.
2. Assumes remaining, unevaporated capacity of ponds is remediated onsite.
3. Assumes remaining solids in each pond at closure are soldified and disposed onsite.
4. Site sampling is conducted to a depth confirmed clean.
5. Costs include taxes.
6. CY = Cubic Yard
   AC = Acre
   LS = Lump Sum
   EA = Each Acre
   BBL = Barrell (US)

TASK 5.0 - POND AND TREATMENT PLANT MAINTENANCE
POST-CLOSURE COST ESTIMATE
(Updated October 2023)
SUNDANCE SERVICES, INC.

Task 5.0	Unit Quantity	Unit	Unit Cost	Total Cost per Year	Total Cost for 3 Years
5.1 Surface Inspection and Reporting					
5.1.1 Inspection	4	events/yr	$485	$1,939	$5,818.44
5.1.2 Recordkeeping and Reporting	4	events/yr	$485	$1,939	$5,818.44
			Task Subtotals	**$3,879**	**$11,637**
5.2 Surface Maintenance					
5.2.1 Cover Maintenance	1	AC/yr	$1,211	$1,211	$3,632.98
5.2.2 Vegetation	2	AC/yr	$1,818	$3,635	$10,906.04
			Task Subtotals	**$4,846**	**$14,539**
5.3 Fencing					
5.3.1 Inspection/Repairs	1	events/yr	$727	$727	$2,181.92
			Task Subtotals	**$727**	**$2,182**
			TOTAL COST	**$9,453**	**$28,358**

Notes:

1. Pond (Ponds 2, 3, 4, & 9) and Treatment Plant closure maintenance costs are based on contracting with a qualified third party to conduct post-closure care maintenance. The activities included in this cost estimate are based on current dollars, previous experience with closures located in arid climates, and current subcontractor costs.
2. Costs include taxes

Appendix G

Financial Assurance Documentation

This appendix will be provided upon closure plan approval.

Appendix H

SSI Surface Water Management Facility Closure Engineering Drawings

DBS&A a Geo-Logic Company

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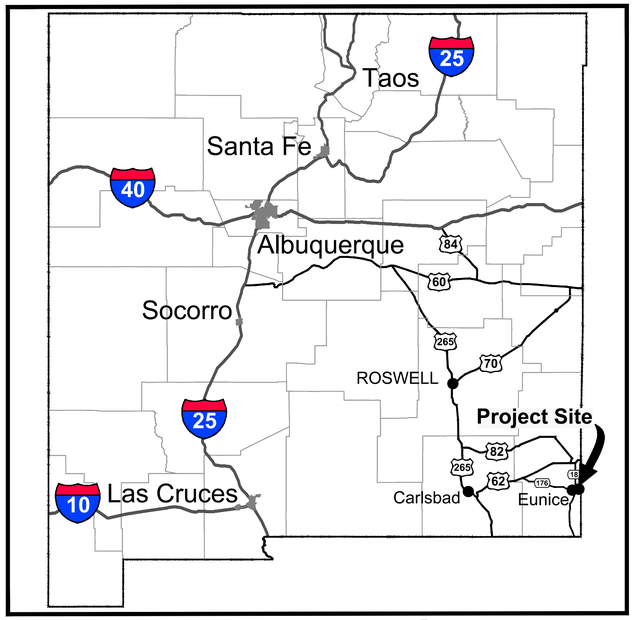

VICINITY MAP
NTS
NORTH

SITE MAP
NTS
NORTH

SUNDANCE SERVICE INC.
SURFACE WASTE MANAGEMENT FACILITY CLOSURE
(OCD PERMIT # NM 01-0003)

EUNICE, NEW MEXICO
PREPARED FOR SUNDANCE SERVICES INC.

INDEX OF DRAWINGS — **REVISION**

DRAFT FOR REVIEW

REV. NO.	DATE	DESCRIPTION	APPROVED BY

DATE OF ISSUE: 10/16/2023
DESIGNED BY: GP
DRAWN BY: JA, RT, CK
CHECKED BY: GP
APPROVED BY: GP

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SUNDANCE SERVICES INC
42 SUNDANCE LANE
EUNICE, NM 88231

SUNDANCE SERVICES INC. SURFACE WASTE MANAGEMENT CLOSURE

COVER SHEET AND INDEX

SHEET 1 OF 10
DWG NO. G-0

JOB NO.
DB18.1209.00

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Received by OCD: 12/22/2023 4:25:33 PM

GENERAL CONSTRUCTION NOTES:

A. ALL WORK ON THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL LAWS, ORDINANCES, AND REGULATIONS CONCERNING CONSTRUCTION SAFETY AND HEALTH.

B. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED CONSTRUCTION PERMITS AND APPROVALS OF LIKE KIND PRIOR TO START OF CONSTRUCTION.

C. PROJECT DOCUMENTS CONSIST OF THESE PLAN SHEETS, PROJECT SPECIFICATIONS, PROJECT BIDDING INFORMATION, PROJECT CONTRACTS, AND ANY AND ALL SUBSEQUENT EXECUTED PROJECT DOCUMENTATION ISSUED AS, OR WITH, CHANGE ORDERS, AND RFI'S (REQUEST FOR INFORMATION.) THE CONTRACTOR SHALL REVIEW ALL PROJECT DOCUMENTS AND VERIFY ALL DIMENSIONS, QUANTITIES, AND FIELD CONDITIONS. ANY CONFLICTS OR OMISSIONS WITH THE DOCUMENTS SHALL BE REPORTED TO THE ENGINEER/PROJECT MANAGER FOR CLARIFICATION PRIOR TO PERFORMANCE OF ANY WORK IN QUESTION. IN THE EVENT THE CONTRACTOR DOES NOT NOTIFY THE ENGINEER/PROJECT MANAGER, THE CONTRACTOR ASSUMES FULL RESPONSIBILITY AND ANY AND ALL EXPENSE FOR ANY REVISIONS NECESSARY OR CORRECTIONAL WORK REQUIRED.

D. THE LOCATION OF BURIED UTILITIES ARE BASED UPON INFORMATION PROVIDED TO THE ENGINEER BY OTHERS AND MAY NOT REFLECT ACTUAL FIELD CONDITIONS. EXISTING BURIED UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL USE ANY MEANS APPROVED BY THE ENGINEER/PROJECT MANAGER TO LOCATE UNDERGROUND UTILITIES INCLUDING, BUT NOT LIMITED TO, ELECTRONIC LOCATING EQUIPMENT AND/OR POT HOLING. ANY DAMAGE TO ANY OTHER UTILITIES AND/OR COLLATERAL DAMAGE CAUSED BY THE CONTRACTOR SHALL BE THE FULL RESPONSIBILITY OF THE CONTRACTOR.

E. EXISTING FENCING THAT IS NOT DESIGNATED FOR REMOVAL SHALL NOT BE DISTURBED. ANY FENCING THAT IS DISTURBED OR ALTERED BY THE CONTRACTOR SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE. IF THE CONTRACTOR DESIRES TO REMOVE FENCING TO ACCOMMODATE CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL OBTAIN THE OWNER'S WRITTEN PERMISSION BEFORE FENCE IS REMOVED. CONTRACTOR SHALL RESTORE THE FENCE TO ITS ORIGINAL CONDITION AT THE EARLIEST OPPORTUNITY TO THE SATISFACTION OF THE OWNER. WHILE ANY FENCING IS REMOVED, THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR SECURITY OF THE SITE UNTIL THE FENCE IS RESTORED.

F. AT THE END OF EACH WORK DAY, THE CONTRACTOR SHALL CLEAN AND PICK UP THE WORK AREA TO THE SATISFACTION OF THE ENGINEER/PROJECT MANAGER. AT NO TIME SHALL THE WORK BE LEFT IN A MANNER THAT COULD ENDANGER THE WORKERS OR THE PUBLIC.

G. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO PROJECT SPECIFICATIONS AND PLANS, AS AMENDED AND REVISED BY THE ENGINEER. ALL INSTALLATION DETAILS ARE TYPICAL AND MAY BE CHANGED TO BETTER FIT EXISTING LOCAL CONDITIONS UPON APPROVAL BY THE ENGINEER/PROJECT MANAGER.

H. ONLY THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFETY OF ALL WORK. ALL WORK, INCLUDING WORK WITHIN TRENCHES, SHALL BE IN ACCORDANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA).

I. THE CONTRACTOR SHALL NOT INSTALL ITEMS AS SHOWN ON THESE PLANS WHEN IT IS OBVIOUS THAT FIELD CONDITIONS ARE DIFFERENT THAN SHOWN IN THE PLANS. SUCH CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IN A TIMELY MANNER. IN THE EVENT THE CONTRACTOR DOES NOT NOTIFY THE ENGINEER IN A TIMELY MANNER, THE CONTRACTOR ASSUMES FULL RESPONSIBILITY AND EXPENSE FOR ANY REVISIONS NECESSARY, INCLUDING ENGINEERING DESIGN FEES.

J. EXISTING SITE IMPROVEMENTS WHICH ARE DAMAGED OR DISPLACED BY THE CONTRACTOR SHALL BE REMOVED AND REPLACED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE. REPAIRS SHALL BE APPROVED BY THE OWNER PRIOR TO CONSTRUCTION OF THE REPAIRS. REPAIRS SHALL BE ACCEPTED BY THE OWNER PRIOR TO FINAL PAYMENT.

WORK WITHIN ADJACENT RIGHT-OF-WAY

K. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES WITHIN ADJACENT RIGHT-OF-WAYS OR WITHIN PROPERTY NOT OWNED BY THE OWNER OF THE PROJECT SITE, THE CONTRACTOR SHALL ASSURE THAT ALL PERMITS AND PERMISSIONS REQUIRED HAVE BEEN OBTAINED IN WRITING.

SURVEY MONUMENTS, PROPERTY CORNERS, BENCHMARKS

L. THE CONTRACTOR SHALL NOTIFY THE OWNER AT LEAST SEVEN (7) DAYS BEFORE BEGINNING ANY CONSTRUCTION ACTIVITY THAT COULD DAMAGE OR DISPLACE SURVEY MONUMENTS, PROPERTY CORNERS, OR PROJECT BENCHMARKS SO THESE ITEMS MAY BE RELOCATED.

M. ANY SURVEY MONUMENTS, PROPERTY CORNERS, OR BENCHMARKS THAT ARE NOT IDENTIFIED FOR RELOCATION ARE THE RESPONSIBILITY OF THE CONTRACTOR TO PRESERVE AND PROTECT. RELOCATION OR REPLACEMENT OF THESE ITEMS SHALL BE DONE BY THE OWNER'S SURVEYOR AT THE EXPENSE OF THE CONTRACTOR.

DESIGN SURVEY

N. TOPOGRAPHY AND IMAGERY ARE FROM AERIAL SURVEY BY ATKINS ENGINEERING ASSOCIATES INC., 2904 W 2ND ST. ROSWELL, NM, 88201, ACQUIRED APRIL 23, 2021. SEE TECHNICAL PROJECT REPORT FOR DETAILS, AVAILABLE ON REQUEST FROM ENGINEER.

O. PROJECT COORDINATE SYSTEM: NEW MEXICO STATE PLANE EAST ZONE NAD 83 (2011).

CONSTRUCTION LIMITS

P. THE CONTRACTOR SHALL WORK WITHIN RIGHT-OF-WAY, ON THE PROPERTY, OR WITHIN EASEMENTS DEFINED ON TEMPORARY CONSTRUCTION PERMITS. EQUIPMENT TRAFFIC OUTSIDE THESE LIMITS SHALL NOT BE PERMITTED WITHOUT WRITTEN PERMISSION OF THE OWNER, CONSTRUCTION MANAGER, OR ENGINEER.

UTILITIES

Q. UTILITY LINES, PIPELINES, OR UNDERGROUND UTILITY LINES SHOWN ON THESE DRAWINGS ARE SHOWN IN AN APPROXIMATE LOCATION ONLY BASED ON THE INFORMATION PROVIDED TO THE ENGINEER BY OTHERS. THIS INFORMATION MAY BE INACCURATE OR INCOMPLETE. ADDITIONALLY, UNDERGROUND LINES MAY EXIST THAT ARE NOT SHOWN. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ANY UTILITY LINE, PIPELINE, OR UNDERGROUND UTILITY LINE IN OR NEAR THE AREA OF THE WORK.

R. THE CONTRACTOR SHALL CONTACT THE STATEWIDE UTILITY LOCATOR SERVICE AT 811 AT LEAST TWO WORKING DAYS BEFORE BEGINNING CONSTRUCTION. AFTER THE UTILITIES ARE SPOTTED, THE CONTRACTOR SHALL EXPOSE ALL PERTINENT UTILITIES TO VERIFY THEIR VERTICAL AND HORIZONTAL LOCATION. IF A CONFLICT EXISTS BETWEEN EXISTING UTILITIES AND PROPOSED CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH MINIMAL DELAY.

S. THE CONTRACTOR SHALL EXERCISE DUE CARE TO AVOID DISTURBING ANY EXISTING UTILITIES, ABOVE OR BELOW GROUND. UTILITIES THAT ARE DAMAGED BY CARELESS CONSTRUCTION SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE.

T. EXISTING WATER VALVES SHALL ONLY BE OPERATED BY THE SYSTEM OPERATOR. CONTRACTOR SHALL NOTIFY THE OWNER OF THE UTILITY, A MINIMUM OF FIVE (5) WORKING DAYS BEFORE ANY VALVE, NEW OR EXISTING, NEEDS TO BE OPERATED.

U. THE CONTRACTOR SHALL MAINTAIN A RECORD DRAWING SET OF PLANS AND PROMPTLY LOCATE ALL UTILITIES, EXISTING OR NEW, IN THEIR CORRECT LOCATION, HORIZONTAL AND VERTICAL. THIS RECORD SET OF DRAWINGS SHALL BE MAINTAINED ON THE PROJECT SITE AND SHALL BE AVAILABLE TO THE OWNER AND ENGINEER AT ANY TIME DURING CONSTRUCTION. RECORD INFORMATION SHALL INCLUDE HORIZONTAL AND VERTICAL COORDINATE CALLOUTS, LINE SIZES, LINE TYPES, BURIAL DEPTHS, AND ALL OTHER PERTINENT INSTALLATION INFORMATION. IN ADDITION ALL ITEMS THAT ARE INSTALLED EXACTLY AS DESIGNED SHALL BE NOTED AS SUCH.

EROSION CONTROL, ENVIRONMENTAL PROTECTION, AND STORM WATER POLLUTION PREVENTION PLAN

V. THE CONTRACTOR SHALL CONFORM TO ALL CITY, COUNTY, STATE AND FEDERAL DUST AND EROSION CONTROL REGULATIONS. THE CONTRACTOR SHALL PREPARE AND OBTAIN ANY DUST CONTROL OR EROSION CONTROL PERMITS FROM THE APPROPRIATE REGULATORY AGENCIES.

W. THE CONTRACTOR SHALL PROMPTLY REMOVE OR STABILIZE ANY MATERIAL EXCAVATED WITHIN THE RIGHT-OF-WAY OR ADJACENT PROPERTY TO KEEP IT FROM WASHING OFF THE PROJECT SITE.

X. THE CONTRACTOR SHALL ENSURE THAT NO SOIL ERODES FROM THE SITE ONTO ADJACENT PROPERTY BY CONSTRUCTION OF TEMPORARY EROSION CONTROL BERMS OR INSTALLING SILT FENCES AT THE PROPERTY LINES (OR LIMITS OF CONSTRUCTION WHERE DESIGNATED) AND WETTING SOIL TO PREVENT IT FROM BLOWING.

Y. WATERING, AS REQUIRED FOR CONSTRUCTION DUST CONTROL, SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION AND NO MEASUREMENT OR PAYMENT SHALL BE MADE. CONSTRUCTION AREAS SHALL BE WATERED FOR DUST CONTROL IN COMPLIANCE WITH CITY, COUNTY AND STATE ORDINANCES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE SYSTEM OPERATOR, FOR AVAILABILITY AND USE OF WATER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING ALL EQUIPMENT AND MATERIALS NECESSARY FOR OBTAINING WATER.

Z. THE CONTRACTOR SHALL PROPERLY HANDLE AND DISPOSE OF ALL ASPHALT REMOVED ON THE PROJECT BY HAULING TO AN APPROVED DISPOSAL SITE IN ACCORDANCE WITH THE REQUIREMENTS OF THE STATE OF NEW MEXICO.

AA. WASTE PRODUCTS FROM THE CONSTRUCTION SITE, INCLUDING ITEMS DESIGNED FOR REMOVAL, CONSTRUCTION WASTE, GARBAGE, GRUBBING, EXCESS CUT MATERIAL, VEGETATIVE DEBRIS, ETC. SHALL BE APPROPRIATELY DISPOSED OF AT THE LANDFILL WORKING FACE.

AB. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEANUP AND REPORTING OF SPILLS OF HAZARDOUS MATERIALS ASSOCIATED WITH THE CONSTRUCTION SITE. HAZARDOUS MATERIALS INCLUDES GASOLINE, DIESEL FUEL, MOTOR OIL, SOLVENTS, CHEMICALS, PAINT, ETC. WHICH MAY BE A THREAT TO THE ENVIRONMENT. THE CONTRACTOR SHALL REPORT THE DISCOVERY OF PAST OR PRESENT SPILLS TO THE NEW MEXICO HAZARDOUS WASTE BUREAU AT 866-428-6535 AND THE ENGINEER/PROJECT MANAGER.

AC. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE REGULATIONS CONCERNING SURFACE AND UNDERGROUND WATER. CONTACT WITH SURFACE WATER BY CONSTRUCTION EQUIPMENT AND PERSONNEL SHALL BE MINIMIZED. EQUIPMENT MAINTENANCE AND REFUELING OPERATIONS SHALL BE PERFORMED IN AN ENVIRONMENTALLY SAFE MANNER IN COMPLIANCE WITH CITY, COUNTY, STATE AND EPA REGULATIONS.

AD. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE REGULATIONS CONCERNING CONSTRUCTION NOISE AND HOURS OF OPERATION AS STATED IN THE SPECIFICATIONS OR IMPOSED BY THE OWNER OR CITY, COUNTY, OR STATE AUTHORITIES.

TRAFFIC CONTROL

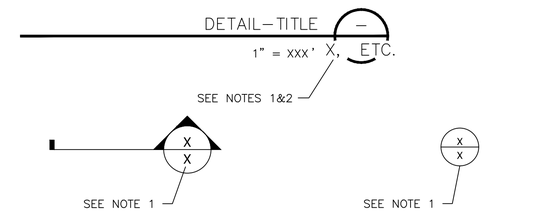
AE. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED TRAFFIC CONTROL PLANS AND TRAFFIC CONTROL EQUIPMENT. ALL SIGNS, BARRICADES, CHANNELIZATION DEVICES, SIGN FRAMES AND ERECTION OF SUCH DEVICES SHALL CONFORM TO THE REQUIREMENTS OF "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" LATEST EDITION. TRAFFIC CONTROL PLANS SHALL BE APPROVED BY THE CITY, COUNTY AND NMDOT PRIOR TO CONSTRUCTION.

MISCELLANEOUS SYMBOLS:

NOTE: SYMBOLS ARE NOT SHOWN TO SCALE ON PLAN OR PROFILE DRAWINGS, AND INDICATE APPROXIMATE LOCATION ONLY.

- 3180 — EXISTING MAJOR CONTOUR LINE AND ELEVATION DESIGNATION
- EXISTING MINOR CONTOUR LINE
- 3180 — FINAL MAJOR CONTOUR AND ELEVATION DESIGNATION
- FINAL MINOR COVER CONTOUR LINE
- LINER LIMITS
- LANDFILL GROUNDWATER MONITORING WELLS
- CENTERLINE CHANNEL/V-DITCH
- COMMON FILL/PROTECTIVE SOIL LAYER
- COMPACTED FILL OR SUBGRADE
- IN-SITU SOIL
- AGGREGATE
- RIP-RAP

LEGEND:



NOTES:

1. IF SECTION, DETAIL, SCHEMATIC, OR DIAGRAM IS DRAWN ON THE SAME SHEET THAT IT IS TAKEN FROM, THE SHEET NUMBER SHALL BE REPLACED WITH A HYPHEN.
2. IF THE SECTION, DETAIL, SCHEMATIC, OR DIAGRAM IS REFERENCED ON MULTIPLE SHEETS, ALL SHEETS SHOULD BE LISTED TO THE OUTSIDE RIGHT OF THE DETAIL-TITLE BUBBLE, AND SEPARATED WITH A COMMA.

ABBREVIATIONS:

AGS	ABOVE GROUND SURFACE
ADMIN.BLDG.	ADMINISTRATION BUILDING
APWA	AMERICAN PUBLIC WORKS ASSOCIATION
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
BGS	BELOW GROUND SURFACE
BOP	BOTTOM OF POND
CHDPE	CORRUGATED HIGH DENSITY POLYETHYLENE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
D_{50}	MEDIAN ROCK DIAMETER
DIA	DIAMETER
ELEV	ELEVATION
EXIST	EXISTING
FG	FINISHED GRADE
FT	FEET
H	HEIGHT
H:V	HORIZONTAL TO VERTICAL
HOR	HORIZONTAL
INV	INVERT ELEVATION
LF	LINEAR FEET
MIN	MINIMUM
MSL	MEAN SEA LEVEL
N/A	NOT APPLICABLE
NMED	NEW MEXICO ENVIRONMENTAL DEPARTMENT
NTS	NOT TO SCALE
OC	ON CENTER
OCD	OIL CONSERVATION DIVISION
P/L	PROPERTY LINE
ROW	RIGHT OF WAY
SDR	STANDARD DIMENSION RATIO
SPEC	SPECIFICATION
STA	STATION
STD	STANDARD
TP	TOP OF PIPE
TOP	TOP OF POND
TYP	TYPICAL
VERT	VERTICAL
W	WIDTH
W/	WITH
WL	WATER LINE
WSE	WATER SURFACE ELEVATION

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SUNDANCE SERVICES INC. SURFACE WASTE MANAGEMENT CLOSURE

GENERAL NOTES AND LEGEND

SHEET 2 OF 10
DWG NO. G-1

JOB NO. DB18.1209.00

S:\PROJECTS\DB18.1209_SUNDANCE_WEST\CAD\PRODUCTION\FINAL DESIGN EAST SUNDANCE\PRODUCTION_G-0 CVR SHT & IDX - G-1 GEN NTS & LGND.DWG July 6, 2023 - 2:14 PM BY: ARELLANO, JEFFREY

Released to Imaging: 3/11/2024 9:46:10 AM

EXISTING SITE PLAN (1 / -)

SCALE: 1"=200'

200' 0' 100' 200'

SCALE: 1" = 200'

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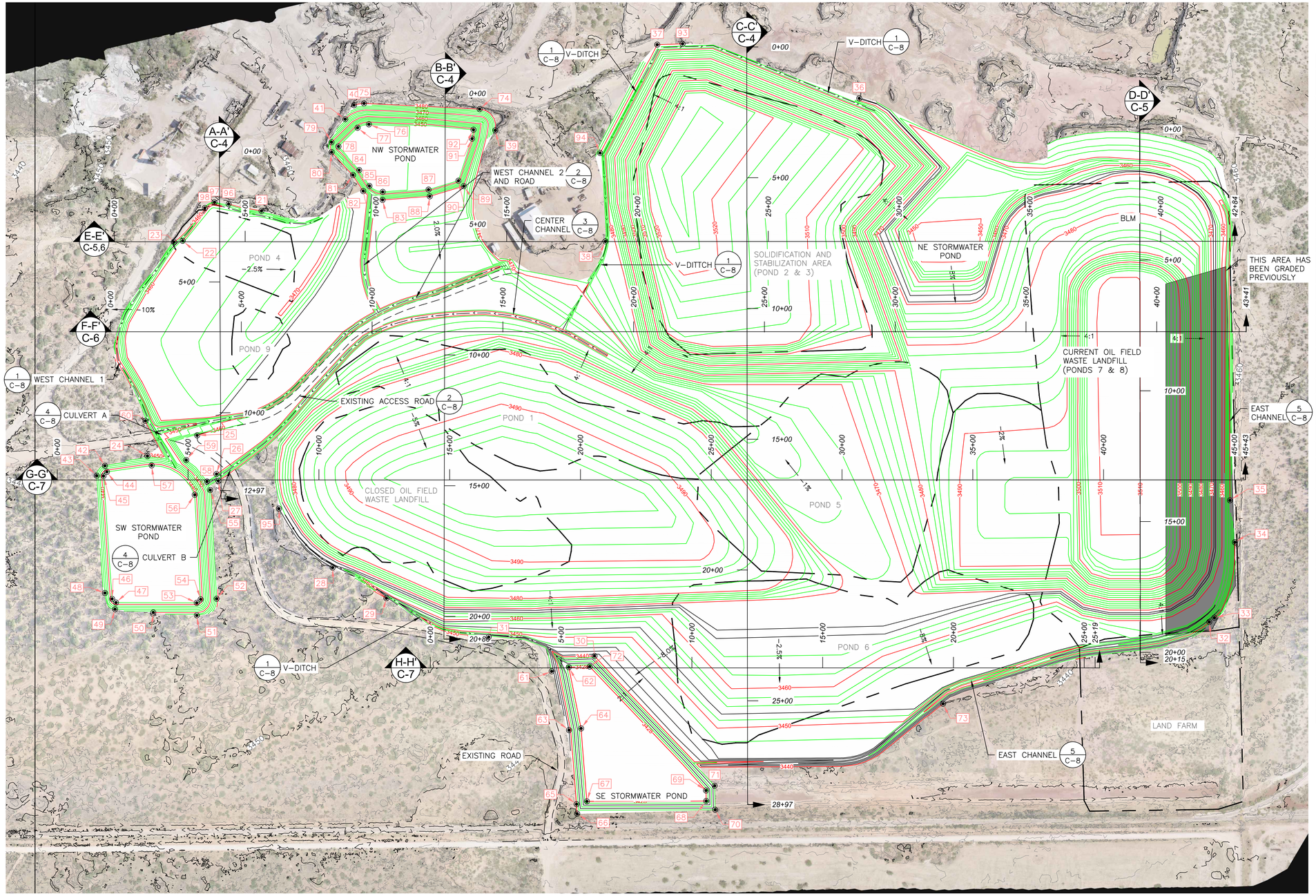
SUNDANCE SERVICES INC. SURFACE WASTE MANAGEMENT CLOSURE

EXISTING SITE PLAN

SHEET 3 OF 10
DWG NO. C-1

JOB NO. DB18.1209.00

S:\PROJECTS\DB18.1209_SUNDANCE_WEST\CAD\PRODUCTION\FINAL DESIGN EAST SUNDANCE\PRODUCTION\C-1 SITE PLAN.DWG October 12, 2023 - 2:14 PM BY: ARELLANO, JEFFREY



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21	529463.22	926141.64	3460.00
22	529348.82	925840.35	3460.00
23	529344.24	925806.79	3460.00
24	528525.95	925705.46	3450.00
25	528604.96	925895.40	3460.00
26	528456.84	925969.61	3460.00
27	528430.88	925976.64	3460.00
28	528099.31	926413.38	3470.00
29	527982.34	926619.22	3460.00
30	527761.30	927414.69	3440.00
31	527833.74	927010.26	3450.00
32	527891.56	929765.06	3450.00
33	527907.57	929784.45	3450.00
34	528196.20	929862.82	3450.00
35	528356.51	929844.16	3460.00
36	529893.53	928426.82	3470.00
37	530098.68	927654.55	3480.00
38	529346.41	927456.26	3478.00
39	529771.11	927035.37	3480.00
40	529867.38	926495.51	3480.00
41	529813.86	926461.72	3470.00
42	528488.68	925542.89	3446.00
43	528450.53	925511.91	3446.00
44	528465.36	925550.51	3438.00
45	528449.43	925537.63	3438.00
46	527979.63	925570.44	3438.00
47	527965.61	925585.38	3438.00
48	528002.25	925543.20	3446.00
49	527940.15	925581.67	3446.00
50	527927.49	925727.95	3450.00
51	527916.54	925894.24	3454.00
52	527980.33	925970.36	3458.00
53	527964.48	925893.97	3438.00
54	527977.86	925908.83	3438.00
55	528395.73	925945.54	3458.00
56	528377.60	925886.28	3438.00
57	528489.93	925721.40	3438.00
58	528428.25	925933.25	3458.00
59	528510.61	925853.86	3458.00
60	528660.59	925697.88	3450.00

Point Table			
Point #	Northing	Easting	Elevation
61	527702.47	927250.92	3448.00
62	527718.52	927316.55	3430.00
63	527477.81	927317.05	3442.00
64	527484.26	927363.37	3430.00
65	527194.54	927346.23	3440.00
66	527158.62	927348.63	3440.00
67	527205.56	927385.54	3430.00
68	527206.86	927841.86	3430.00
69	527246.97	927841.14	3430.00
70	527173.54	927875.89	3438.00
71	527264.83	927874.13	3438.00
72	527720.82	927396.14	3430.00
73	527578.68	928747.24	3440.00
74	529852.31	926975.55	3480.00
75	529874.12	926533.64	3480.00
76	529794.09	926552.34	3446.00
77	529781.04	926508.78	3446.00
78	529709.58	926436.01	3446.00
79	529725.80	926409.19	3460.00
80	529687.74	926409.83	3460.00
81	529600.29	926491.15	3460.00
82	529538.88	926530.61	3460.00
83	529505.30	926604.37	3460.00
84	529619.10	926515.14	3446.00
85	529558.46	926554.12	3446.00
86	529535.80	926605.08	3446.00
87	529544.59	926780.05	3448.00
88	529518.99	926784.78	3460.00
89	529557.68	926914.88	3460.00
90	529578.62	926894.47	3448.00
91	529739.57	926946.96	3448.00
92	529773.35	926951.89	3448.00
93	530101.78	927751.40	3480.00
94	529684.40	927436.28	3480.00
95	528325.01	926207.92	3470.00
96	529489.34	926016.01	3460.00
97	529495.77	925961.94	3462.00
98	529474.27	925924.72	3462.00

FINAL PROTECTIVE COVER GRADING PLAN

SCALE: 1"=200' (1 / -)

200' 0' 100' 200'

SCALE: 1" = 200'

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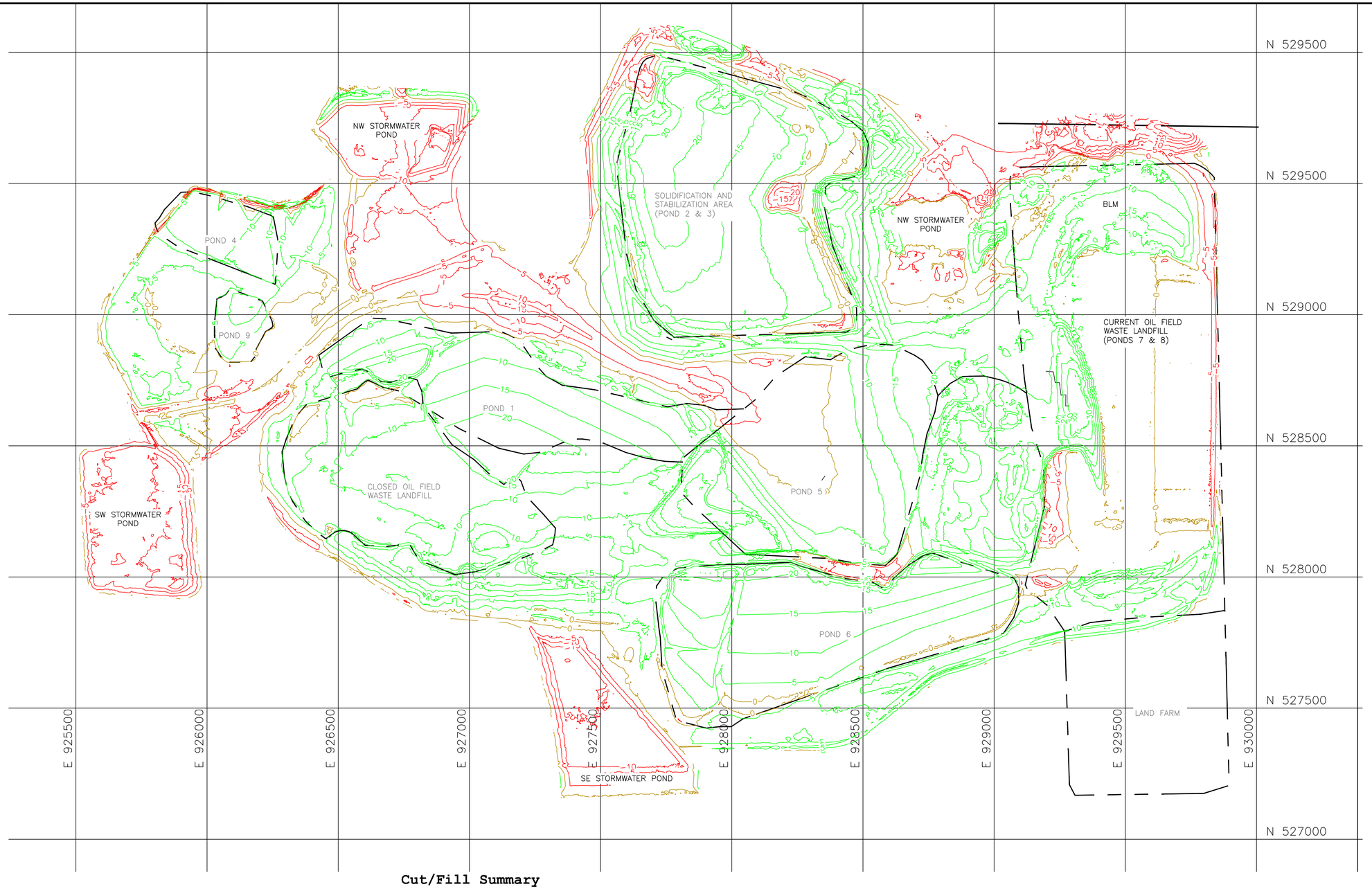
SUNDANCE SERVICES INC. SURFACE WASTE MANAGEMENT CLOSURE

FINAL PROTECTIVE COVER GRADING PLAN

SHEET 4 OF 10
DWG NO. C-2

JOB NO. DB18.1209.00

S:\PROJECTS\DB18.1209_SUNDANCE_WEST\CAD\PRODUCTION\FINAL DESIGN EAST SUNDANCE\PRODUCTION\C-2 PROTECTIVE COVER PLAN.DWG November 1, 2023 - 2:14 PM BY: ARELLANO, JEFFREY



Cut/Fill Summary

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Totals			8459386.79 Sq. Ft.	540264.95 Cu. Yd.	2285609.35 Cu. Yd.	1745344.40 Cu. Yd.<Fill>

200' 0' 100' 200'

SCALE: 1" = 200'

ISOPACH WITH VOLUMES

SCALE: 1"=200' (1 -)

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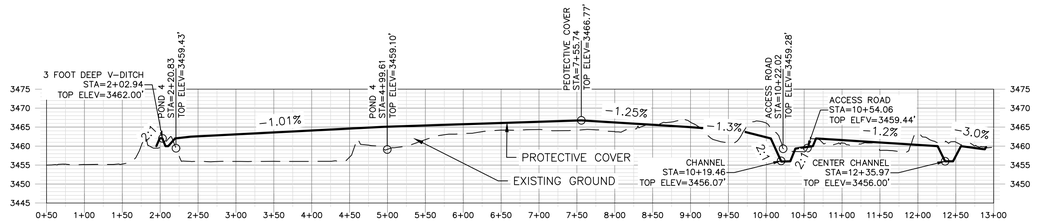
SUNDANCE SERVICES INC. SURFACE WASTE MANAGEMENT CLOSURE

ISOPACH WITH VOLUMES

SHEET 5 OF 10
DWG NO. C-3

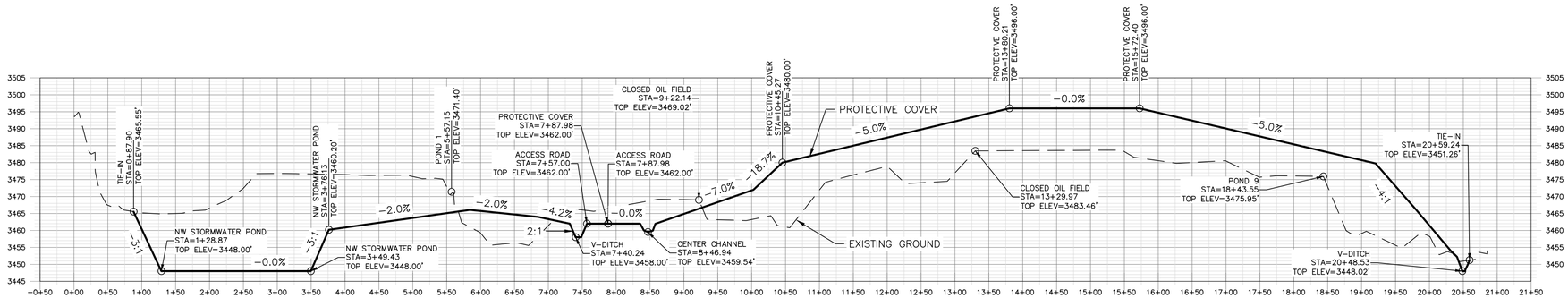
JOB NO. DB18.1209.00

S:\PROJECTS\DB18.1209_SUNDANCE_WEST\CAD\PRODUCTION\FINAL DESIGN EAST SUNDANCE\PRODUCTION\ISO-PACH OPTION_1.DWG October 11, 2023 - 2:14 PM BY: ARELLANO, JEFFREY



SECTION A-A' C-2

HORIZONTAL SCALE = 1" = 100'
VERTICAL SCALE = 1" = 5"



SECTION B-B' C-2

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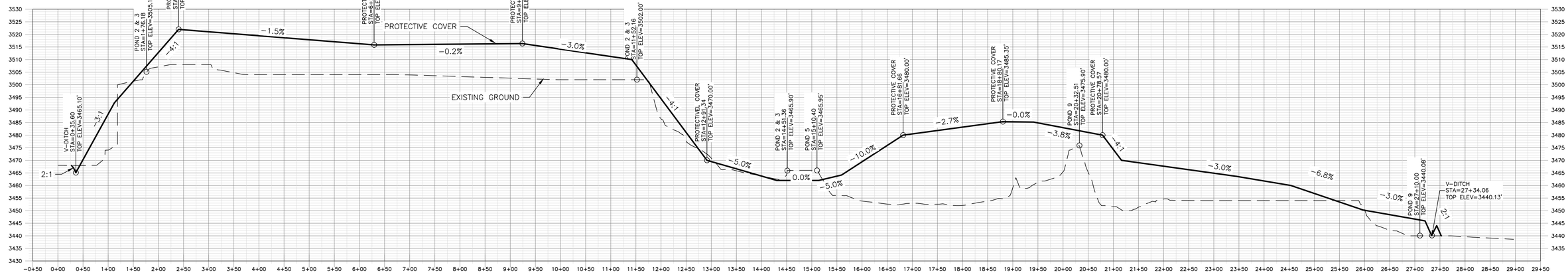
VERTICAL SCALE = 1" = 5"



SECTION C-C' C-2

HORIZONTAL SCALE = 1" =100'
VERTICAL SCALE = 1" = 5"

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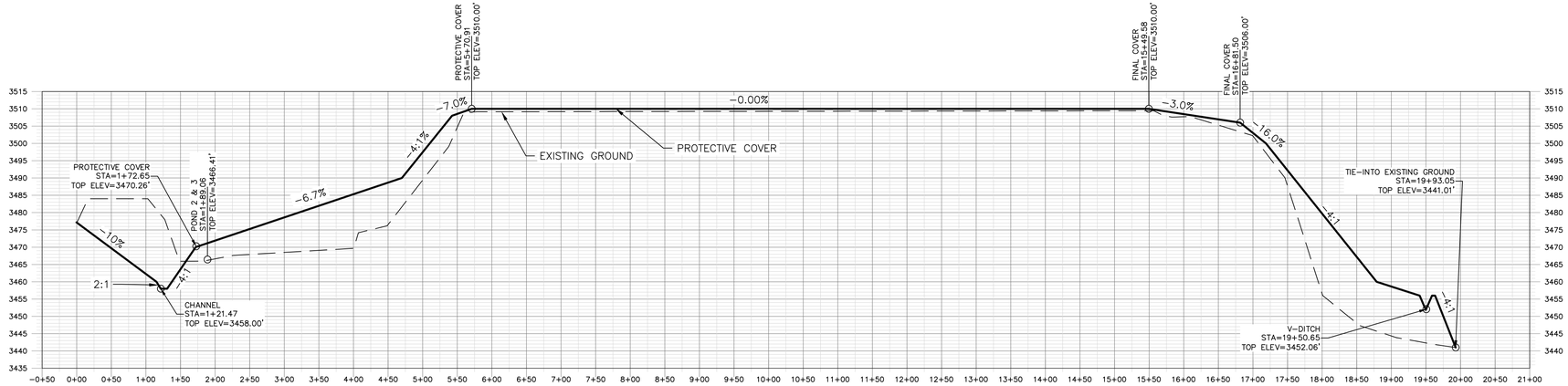
SUNDANCE SERVICES INC. SURFACE WASTE MANAGEMENT CLOSURE

CROSS SECTION 1

SHEET 6 OF 10
DWG NO. C-4

JOB NO. DB18.1209.00

S:\PROJECTS\DB18.1209_SUNDANCE_WEST\CAD\PRODUCTION\FINAL DESIGN EAST SUNDANCE\PRODUCTION\C-5 CROSS SECTIONS.DWG October 13, 2023 - 2:14 PM BY: ARELLANO, JEFFREY



SECTION D-D' C-2

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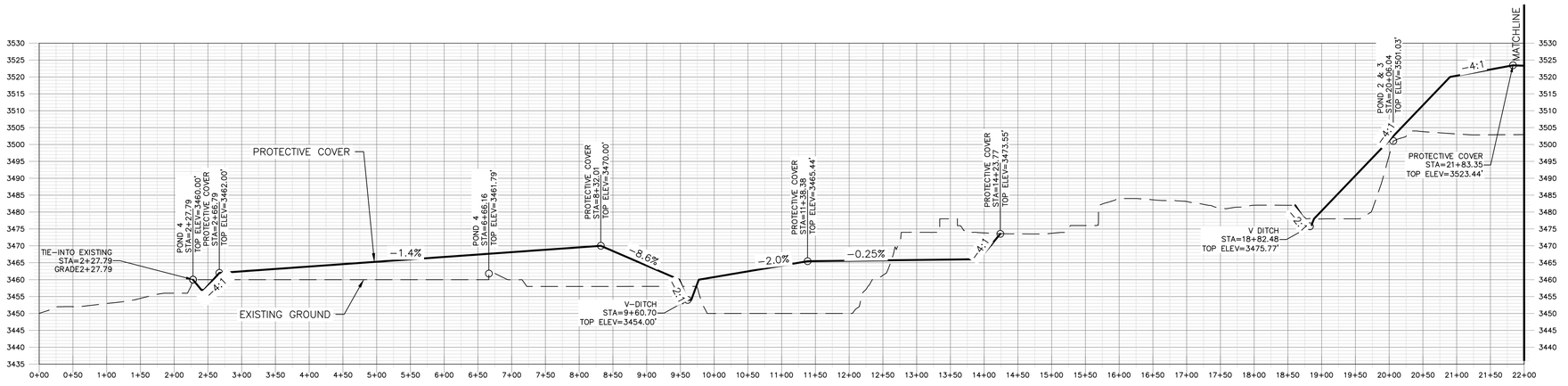

SECTION E-E' C-2

HORIZONTAL SCALE = 1" =100'
VERTICAL SCALE = 1" = 5"

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SUNDANCE SERVICES INC. SURFACE WASTE MANAGEMENT CLOSURE

CROSS SECTIONS 2

SHEET 7 OF 10
DWG NO. C-5

JOB NO. DB18.1209.00

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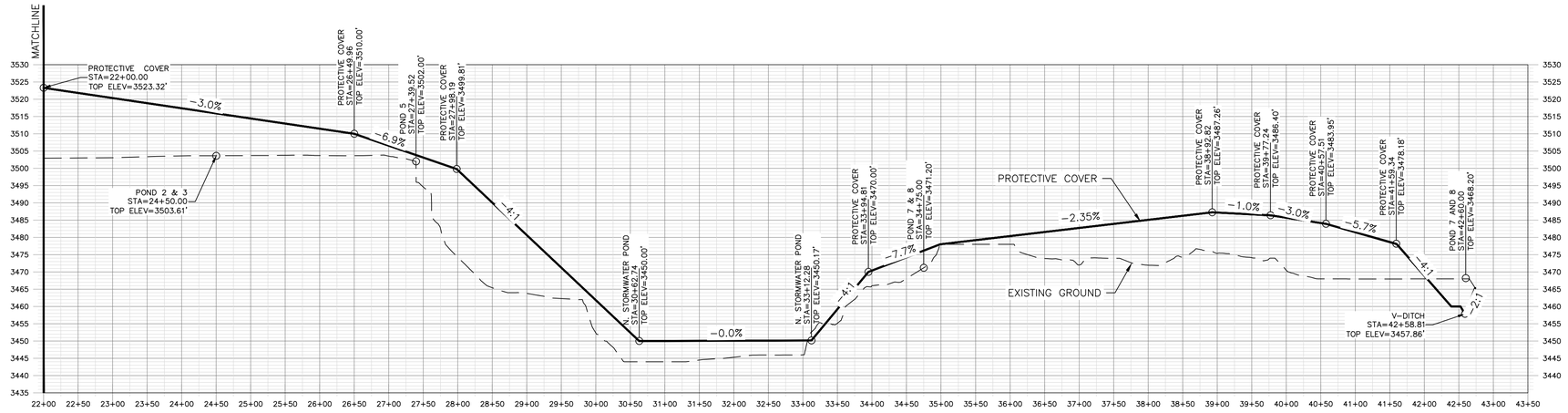
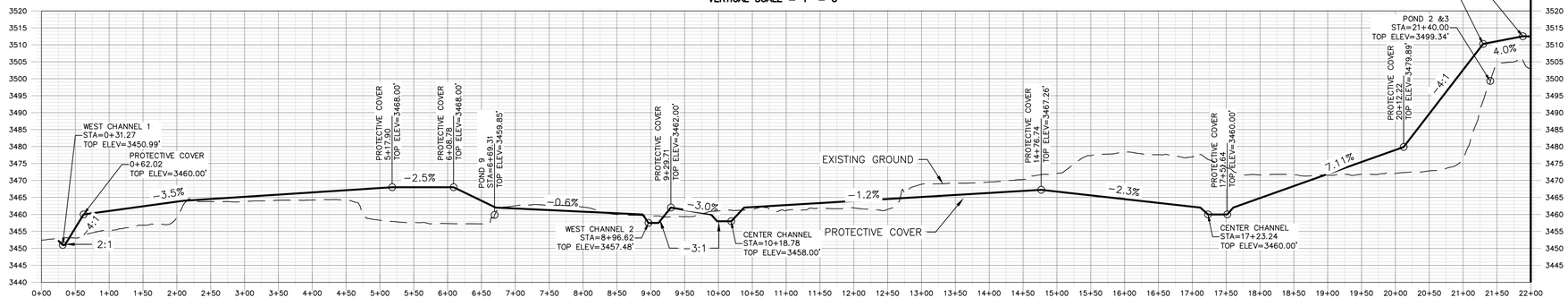


SECTION E-E' C-2
HORIZONTAL SCALE = 1" =100'
VERTICAL SCALE = 1" = 5"



SECTION F-F' C-2
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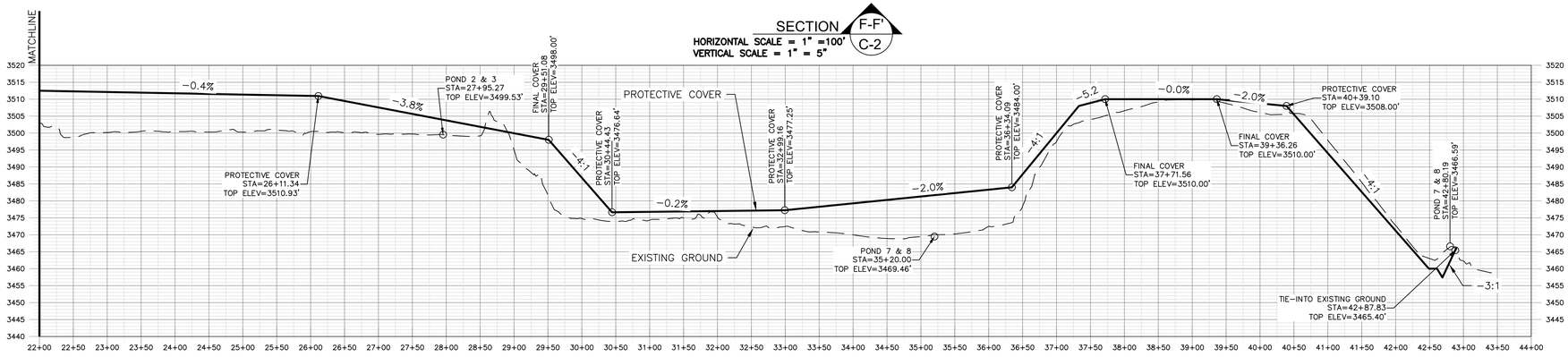
VERTICAL SCALE = 1" = 5"



SECTION F-F' C-2
HORIZONTAL SCALE = 1" =100'
VERTICAL SCALE = 1" = 5"

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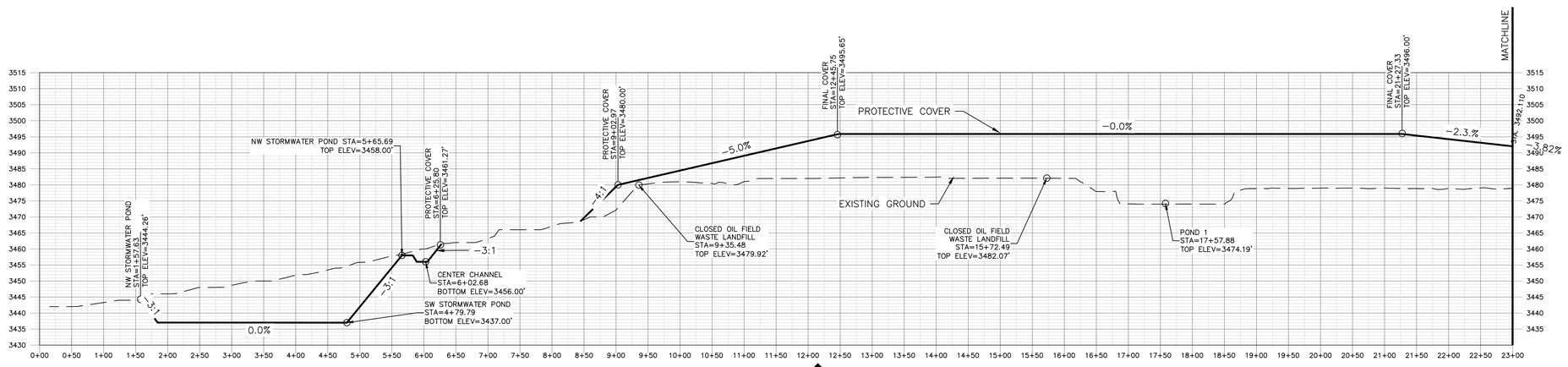
SUNDANCE SERVICES INC. SURFACE WASTE MANAGEMENT CLOSURE

CROSS SECTIONS 3

SHEET 8 OF 10
DWG NO. C-6

JOB NO. DB18.1209.00

S:\PROJECTS\DB18.1209_SUNDANCE_WEST\CAD\PRODUCTION\FINAL DESIGN EAST SUNDANCE\PRODUCTION\C-5 CROSS SECTIONS.DWG October 13, 2023 - 2:14 PM BY: ARELLANO, JEFFREY



SECTION G-G' C-2
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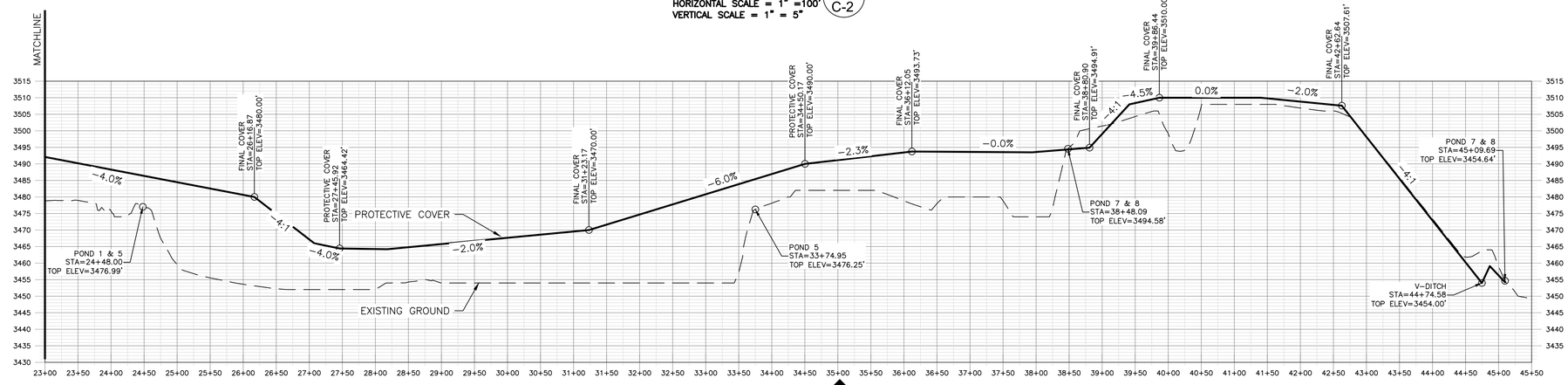
VERTICAL SCALE = 1" = 5"



SECTION G-G' C-2
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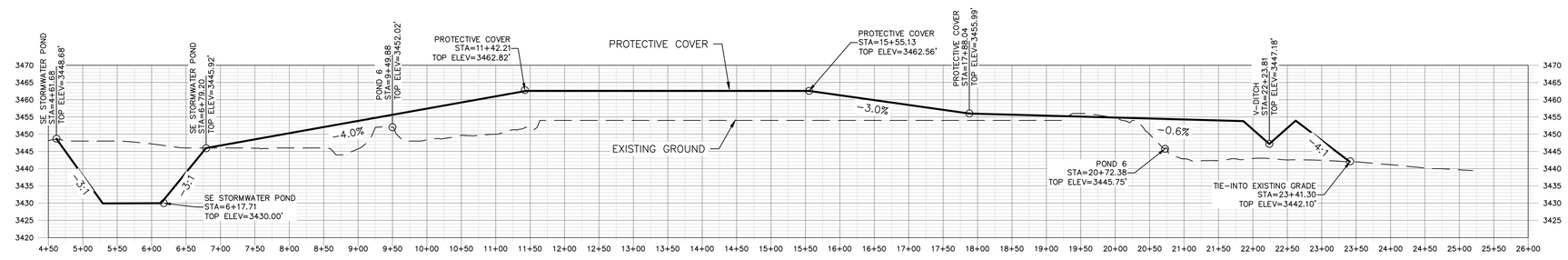

SECTION H-H' C-2
HORIZONTAL SCALE = 1" =100'
VERTICAL SCALE = 1" = 5"

DRAFT FOR REVIEW

REV. NO.	DATE	DESCRIPTION	APPROVED BY

DATE OF ISSUE: 10/16/2023
DESIGNED BY: GP
DRAWN BY: JA, RT, CK
CHECKED BY: GP
APPROVED BY: GP

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SUNDANCE SERVICES INC
42 SUNDANCE LANE
EUNICE, NM 88231

SUNDANCE SERVICES INC. SURFACE WASTE MANAGEMENT CLOSURE

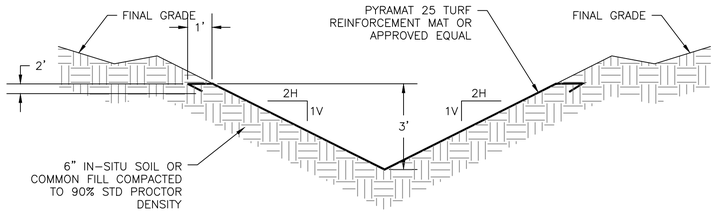
CROSS SECTIONS 4

SHEET 9 OF 10
DWG NO. C-7

JOB NO. DB18.1209.00

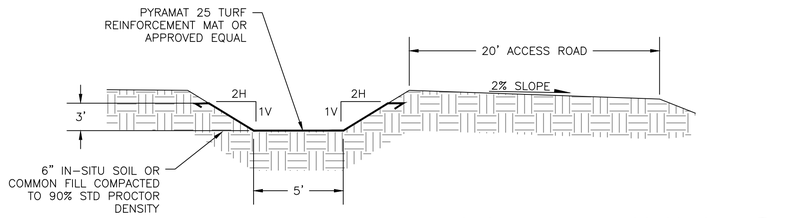
S:\PROJECTS\DB18.1209_SUNDANCE_WEST\CAD\PRODUCTION\FINAL DESIGN EAST SUNDANCE\PRODUCTION\C-5 GROSS SECTIONS.DWG October 13, 2023 - 2:14 PM BY: ARELLANO, JEFFREY

Received by OCD: 12/22/2023 4:25:33 PM



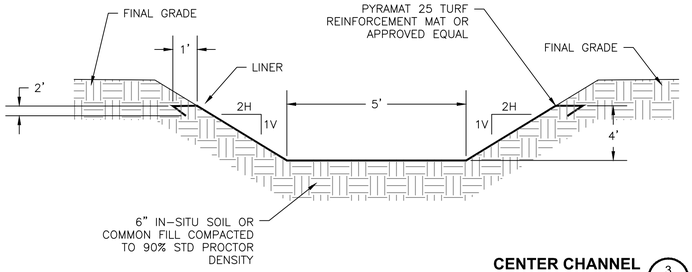
WEST CHANNEL 1 AND V-DITCH 1 / C-2

NTS



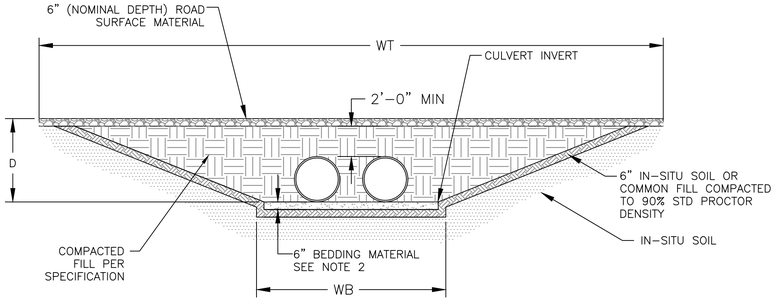
WEST CHANNEL 2 AND ACCESS ROAD 2 / C-2

NTS



CENTER CHANNEL 3 / C-2

NTS



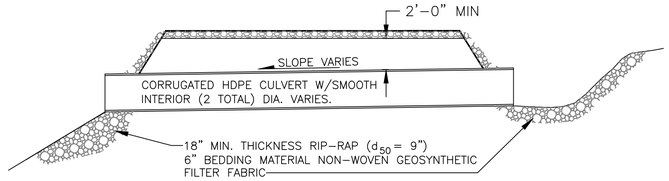
SECTION

SCHEDULE OF DIMENSIONS

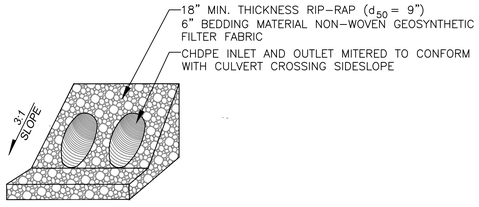
LABEL	CULVERT DIA (IN)	CULVERT LENGTH (FT)	WT (FT)	WB (FT)	D (FT)	SLOPE (FT/FT)	INVERT ELEV (FT MSL)	
							INLET	OUTLET
A	24	50	30	8.5	4.5	0.01	3445.00	3444.0
B	48	35	25	12.5	6.5	0.002	3455.87	3455.80

NOTES:

1. SEE SHEET C-2 FOR LOCATIONS OF CULVERT CROSSINGS.
2. BEDDING MATERIAL SHALL BE SHAPED TO PROVIDE UNIFORM CONTACT WITH THE BOTTOM OF THE CULVERTS.
3. ALL CULVERTS ARE 36" CORRUGATED HDPE WITH SMOOTH INTERIOR.
4. 18" MINIMUM SPACING BETWEEN EACH CULVERT PIPE, WALL TO WALL.



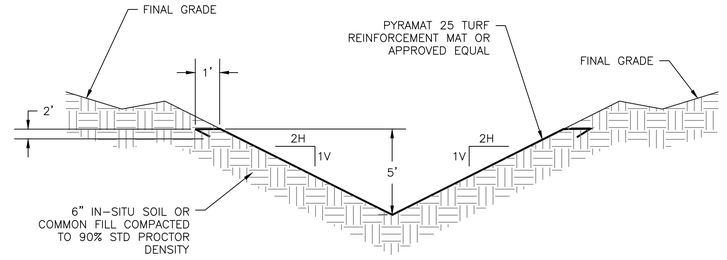
SIDE VIEW SECTION



TYPICAL CULVERT INLET AND OUTLET DETAIL

CULVERT ROAD CROSSING DETAILS 4 / C-2

NTS



EAST CHANNEL X-SEC 5 / C-2

NTS

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DATE OF ISSUE: 10/16/2023
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SUNDANCE SERVICES INC. SURFACE WASTE MANAGEMENT CLOSURE

CIVIL DETAILS 1

SHEET 10 OF 10
DWG NO. C-8

JOB NO. DB18.1209.00

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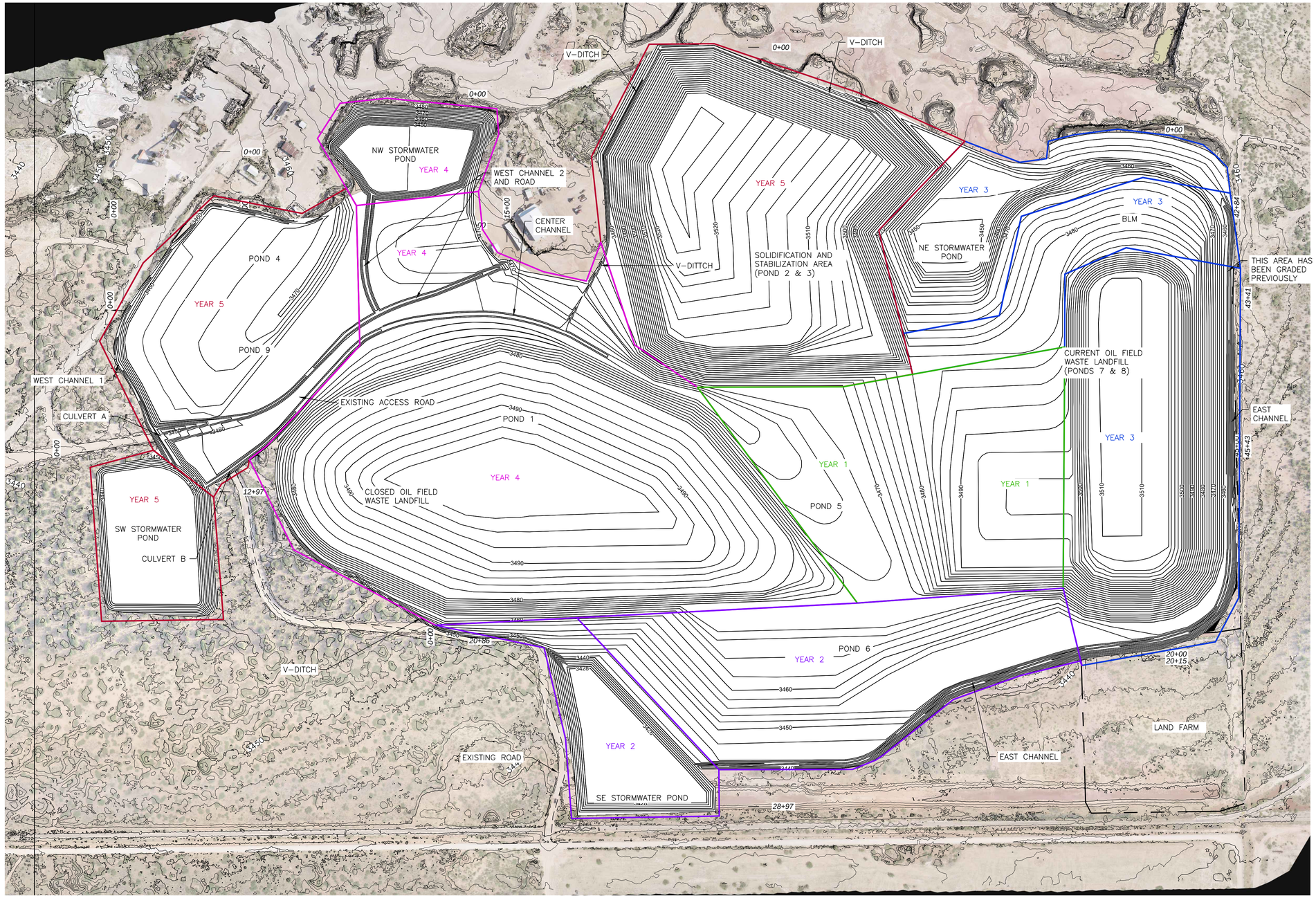
Appendix I

Closure Schedule

DBS&A a Geo-Logic Company

Closure Schedule

Area	Tasks	Year				
		Year 1 (CY)	Year 2 (CY)	Year 3 (CY)	Year 4 (CY)	Year 5 (CY)
Total Fill		322,000	269,500	289,000	786,000	624,500
Total Cut		23,000	89,500	122,500	159,000	146,500
Area between Pond 5, 7, 8 & Pond 5	Additional fill placed to achieve design grades for drainage	234,500				
	Final Cover (6") Placement	17,500				
	Vegetative cover (24") Placement	70,000				
	Cut Volume	23,000				
Pond 6	Additional fill placed to achieve design grades for drainage		185,500			
	Final Cover (6") Placement		15,500			
	Vegetative cover (24") Placement		62,000			
	Cut Volume		3,000			
SE Stormwater Pond	Excavation		86,500			
	Fill Volume		6,500			
Solidification and Stabilization Area (Pond 2 & 3)	Stabilization area graded to drain					385,500
	Final Cover (6") Placement					25,000
	Vegetative cover (24") Placement					100,000
	Cut Volume					23,500
NE Stormwater Pond	Excavation			97,000		
	Fill			25,500		
Area between Pond 7, 8, Pond 2,3 & NE Stormwater Pond	Additional fill placed to achieve design grades for drainage			61,500		
	Final Cover (6") Placement			7,000		
	Vegetative cover (24") Placement			26,500		
	Cut Volume			5,500		
Pond 7 & 8	Additional Fill Volume			168,500		
	Cut Volume			20,000		
Closed Oil Field Waste Landfill, Pond 1, Area between Pond 4, Pond 1, NW Stormwater Pond & Pond 2,3	Additional fill placed to achieve design grades for drainage				574,000	
	Final Cover (6") Placement				41,500	
	Vegetative cover (24") Placement				164,500	
	Cut Volume				89,500	
NW Stormwater Pond	Excavation				69,500	
	Fill Volume				6,000	
SW Stormwater Pond Pond 4 & 9	Excavation					106,000
	Stabilization area graded to drain					43,000
	Final Cover (6") Placement					14,500
	Vegetative cover (24") Placement					56,500
	Cut Volume					17,000
Total Fill		322,000	269,500	289,000	786,000	624,500
Total Cut		23,000	89,500	122,500	159,000	146,500



YEAR					
VOLUME	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
FILL (CY)	322,000	269,500	289,000	786,000	624,500
CUT (CY)	23,000	89,500	122,500	159,000	146,500

FINAL PROTECTIVE COVER GRADING PLAN

SCALE: 1"=200' (1 -)

200' 0' 100' 200'

SCALE: 1" = 200'

DRAFT FOR REVIEW

REV. NO.	DATE	DESCRIPTION	APPROVED BY

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EUNICE, NM 88231

SUNDANCE SERVICES INC. SURFACE WASTE MANAGEMENT CLOSURE

FINAL PROTECTIVE COVER GRADING PLAN

SHEET DWG NO.

JOB NO. DB18.1209.00

\\SS6480\DATA$\PROJECTS\DB18.1209_SUNDANCE_WEST\CAD\PRODUCTION\FINAL DESIGN EAST SUNDANCE\PRODUCTION\PROTECTIVE COVER PLAN FOR SCHEDULE.DWG October 17, 2023 - 2:14 PM BY: SERAJ, FARNAZ

Jones, Brad, EMNRD

From: Jones, Brad, EMNRD
Sent: Friday, March 8, 2024 2:10 PM
To: Tariq Mussani (tmussani@hotmail.com); 'Misty Pratt (mpratt@brownpruitt.com)'
Cc: Barr, Leigh, EMNRD
Subject: NM1-3 Sundance Services, Inc. - minor modification conditional approval letter
Attachments: 2024 0308 NM1-3 Sundance Services Inc minor mod conditional approval signed.pdf

Mr. Mussani,

The Oil Conservation Division has completed its review of the minor modification request. Please see the attached. A copy of this correspondence is being sent certified mail. If you have any questions regarding this matter, please feel free to contact me.

Sincerely,

Brad Jones

Brad A. Jones Environmental Scientist Specialist - Advanced
Environmental Bureau
EMNRD - Oil Conservation Division
1220 S. Saint Francis Drive | Santa Fe, New Mexico 87505
(505) 469-7486 | brad.a.jones@emnrd.nm.gov
www.emnrd.nm.gov

State of New Mexico
Energy, Minerals and Natural Resources Department

Michelle Lujan Grisham
Governor

Dylan M. Fuge
Deputy Secretary

Dylan Fuge, Division Director (Acting)
Oil Conservation Division

Certified Mail Receipt # 7018 0040 0000 3405 7496

March 8, 2024

Mr. Tariq Mussani
Sundance Services Inc.
42 Sundance Lane
Eunice, New Mexico 88231
tmussani@hotmail.com

RE: Conditional Approval of Permit Minor Modification Request
Sundance Services, Inc. (OGRID 149972), Permit NM1-3
SW/4 of Section 29, Township 21 South, Range 38 East, NMPM, Lea County, New Mexico

Dear Mr. Mussani:

The Oil Conservation Division (OCD) has reviewed the revised minor modification permit application, dated December 23, 2023, for Permit NM1-3. In this application, Sundance Services West, Inc. (SSI) has requested minor modifications to the September 29, 2016, Closure and Post-Closure Plan approved by the OCD on July 31, 2017. The requested minor modifications are as follows:

- SSI requests to modify Condition 3 to extend the closure due date from December 31, 2022, to December 31, 2028. Currently, Condition 3 states, "Closure of the facility must be completed and commencement of the post-closure care period must begin on or before December 31st, 2022."
- SSI also requests a modification to Milestone F. Currently, Milestone F requires that ponds 2, 3, and 9 be stabilized, all materials removed, the pond area appropriately remediated, and all remaining landfill slopes be at final grade on or before December 31, 2022. SSI wishes to modify Milestone F to allow the dewatering of ponds 2, 3, 4, and 9, the solidification and stabilization of pond sediments, in-place pond closures, and placement of the final landfill cover design over the ponds and landfill area.

The OCD grants SSI approval of the above minor modification requests to the Closure and Post-Closure Plan approved by the OCD on July 31, 2017. Therefore, Permit NM1-3 is hereby modified with the following conditions:

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1. SSI must comply with the following:

    - All applicable requirements of the Oil and Gas Act (Chapter 70, Article 2 NMSA 1978);
    - The updated Closure and Post-Closure Plan included in the minor modification permit application package submitted to the OCD on December 22, 2023;
    - The transitional provisions of 19.15.36.20 NMAC; and
    - All conditions specified in this approval letter.

2. SSI must complete the closure of the surface waste management facility (SWMF) and begin the commencement of the post-closure care period on or before December 31, 2028;

3. SSI must implement in-place closure for Ponds 1, 2, 3, 4, 5, 6, and 9. SSI must also confirm the stabilization/solidification process by conducting the paint filter test (EPA Method 9095A) and complete the NORM survey in compliance with 20.3.14.1403 NMAC to determine if regulated NORM must be removed and disposed off-site. Note, the pond closure sampling and analysis of 19.15.36.18.D(4) NMAC for waste excavation and removal is not required since the ponds will be closed in-place as part of the landfill area;

4. SSI must revegetate the landfill area in accordance with 19.15.36.18.C(2)(b) NMAC, by overlying the cell with native grass covering at least seventy percent of the landfill cover and surrounding areas, consisting of at least two grasses, and not including noxious weeds or deep-rooted shrubs or trees, and maintain that cover through the post-closure period. The revegetation required by 19.15.36.18.C(2)(b) NMAC must be applied to any area in which the landfill final cover installation is required;

5. Non-landfill areas of the SWMF must revegetate impacted areas in accordance with 19.15.36.18.A(6) NMAC. Re-vegetation shall consist of establishment of a vegetative cover equal to seventy percent of the native perennial vegetative cover (un-impacted by overgrazing, fire or other intrusion damaging to native vegetation) or scientifically documented ecological description consisting of at least three native plant species, including at least one grass, but not including noxious weeds, and maintenance of that cover through two successive growing seasons;

6. SSI must complete the closure of the oil treating plant in accordance with 19.15.36.18.C(1) NMAC. Note, SSI in error proposed to meet the closure performance standards of 19.15.36.15 NMAC which is specific to a landfarm. In the event after all equipment and/or infrastructure removal (i.e., tanks, above ground and buried piping, centrifuges, buildings, etc.), sample results determine an unauthorized release, SSI must comply with the applicable spill reporting and corrective action provisions of 19.15.29 NMAC and/or 19.15.30 NMAC. Note, the closure sampling and analysis required by 19.15.36.18.C(1)(b) NMAC is not optional and is required for closure. SSI must also submit to the OCD for approval, prior to any sampling, a grid sampling map of the oil treating plant area within 45-days of certified mail receipt of this approval;

7. SSI must provide finalized engineering drawings certified by a New Mexico licensed engineer to replace the drafts provided in Appendix H. SSI also needs to update and or include the following:

    - SSI needs to update DWG NO. C-2 to show the correct directional flow of West Channel 2 to the NW Stormwater Pond. The information provided in Table 2 of Appendix E, Surface Water Management Plan indicates that West Channel 2 is utilized to divert stormwater toward and not away from the NW Stormwater Pond.
    - SSI needs to provide a design engineering drawing for the new South Channel proposed in the Surface Water Management Plan (Appendix E).

    All finalized engineering drawings must be submitted to the OCD, for review, within 45-days of certified mail receipt of this approval;

8. OCD is unable to approve the updated closure and post-closure cost estimates due to the omission of necessary funds to conduct all closure and post-closure activities. SSI must update the cost estimates to address the following deficiencies and/or needed corrections:

    - SSI must update Task 1.3, Stormwater Ponds & Channels, in the Closure/Post-Closure Cost Estimates in Appendix F to include costs to purchase and install the turf reinforcement mats (TRM) proposed in Section 5.2 of the Surface Water Management Plan, Appendix E. Note, TRM is proposed for installation in all the stormwater channels, therefore, based upon using the provided channel lengths in Table 3 in Section 5.2, the OCD calculated that approximately 10,384 linear feet of TRM is required;
    - SSI must update Note 2 of Task 1.0 in Appendix F to include the total acreage of Ponds 1, 2, 3, 4, 5, 6, and 9 as part of the landfill that requires final cover due to the modification request for in-place closure for the ponds. Based upon Task 1.1.4, the acreage requiring final cover is 171.1 acres yet Note 2 references only 88.5 acres. SSI needs to update Note 2 to reflect actual acreage;
    - SSI must update Task 3 in Appendix F, to include and address the monitoring of the 2 additional vadose zone (VZ) monitoring wells required by Condition 5 in the Closure and Post-Closure Plan approved by the OCD on July 31, 2017. Note, SSI recognizes the installation of the 7 VZ monitoring wells (VZ-1 though VZ-7) in the Vadose Zone Monitoring Plan (Appendix D). Based on cost estimates provided in Task 3, the total cost per well per year is $9,692.80. Given there are 7 wells the annual cost would be $67,849.60 and $2,035,488 for a 30 year term. SSI must update Task 3 to reflect the cost of monitoring 7 wells.
    - SSI must update Task 4 in Appendix F to include all cost estimates required to complete closure of the oil treating plant. Cost estimates need to be included to meet the requirements of 19.15.36.18.C(1)(b) NMAC for closure sampling and analysis and 19.15.36.18.A(6) NMAC for revegetation of areas of the SWMF which have been impacted from operations and closure activities (except for the landfill area); and

- SSI must update Note 1 of Task 5 in Appendix F by omitting the reference to the ponds. Given the ponds are now proposed to be closed in-place, associated costs are addressed under the landfill closure and post-closure cost estimates.

An updated closure/post-closure plan, including all cost estimates, must be submitted to OCD for review within 45 days of certified receipt of this approval.

9. SSI must obtain written approval from the OCD prior to implementing any modifications to OCD's conditions of approval.

Please be advised that approval of this request does not relieve SSI of liability should operations result in pollution of surface water, groundwater, or the environment. Nor does approval relieve SSI of its responsibility to comply with any other applicable governmental authority's rules and regulations.

If SSI has questions regarding this conditional approval, the OCD encourages SSI to schedule a meeting with the OCD to discuss OCD's findings in further detail. For questions and/or to schedule a meeting please contact me at (505) 469-7486 or brad.a.jones@emnrd.nm.gov.

Respectfully,

Brad A. Jones
Environmental Specialist - Advanced

cc: Misty Pratt, Attorney in-fact, mpratt@brownpruitt.com

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

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

CONDITIONS

Action 297403

CONDITIONS

Operator: SUNDANCE SERVICES, INC. P.O. Box 1737 Eunice, NM 88231	OGRID: 149972
	Action Number: 297403
	Action Type: [C-137] SWMF Minor Modification (C-137A)

CONDITIONS

Created By	Condition	Condition Date
bjones	OCD mailed the conditional approval to Tariq Mussani (SSI) by certified mail return receipt (7018 0040 0000 3405 7496) and also emailed the conditional approval to Tariq Mussani (SSI), Mist Pratt, and Leigh Barr on March 8, 2024. The emailed conditional approval is attached to this request as OCD's Response. If you have any questions regarding this matter, please do not hesitate to contact me.	3/11/2024