



Inert Waste Monofill Permit Application

Alaska Department of Environmental Conservation
Solid Waste Program

ADEC Office Only:

Facility Name:

Authorization #:

Instructions:

This application is for a new permit or permit renewal for an inert waste monofill.

In the application, the term **“facility”** refers to all land, structures, other appurtenances, and improvements on land used for treatment, storage, or disposal of solid waste.

If a required item is not applicable, please explain why. Include all the applicable information for each item regardless if it has been previously submitted. The specific location of information within each submitted document or attachment must also be noted for each item.

The application must be stamped and signed by a registered engineer, in accordance with 18 AAC 60.210(c).

For a new facility or significant change to an existing facility, prepare a draft application with a list of questions and schedule a meeting with the ADEC Solid Waste Program.

Section 1. Property Information

Facility Name: Eklutna Sand and Gravel

Facility Address: 13950 Eklutna Park Drive

Facility City: Eagle River

Facility Zip: 99577

Legal Property Description:

Tract 38, Eagle River Powder Reserve (B)

Section: 35

Township: 15 North

Range: 2 West

Meridian: Seward

General Property Description:

on west edge of Tract 38 (see appended map)

Latitude: 61D20'27"

Longitude: -149D36'13"

Landowner: Eklutna Inc.

Contact Name: Kyle Foster

Address: 16515 Centerfield Drive, Suite 201

City: Eagle River

State: AK

Zip: 99577

Email: kfoster@eklutnainc.com

Phone: 907/396-2828

Section 2. Contact Information**Permit Applicant** (Co. or Entity): Eklutna Land Services, LLC

Contact Name: Bryce Hattenburg

Address: 16515 Centerfield Drive, Suite 201 City: Eagle River State: AK Zip: 99577

Email: bhattanburg@eklutnainc.com Phone: 907/223-4344

Type of Entity: ☐ Government ☒ Corporation ☐ Other:

State of Incorporation or Registration: Alaska Alaska Business License Number: 309018

IRS Tax ID Number: 76-0777933

Facility Owner (if different than applicant):

Contact Name:

Address: City: State: Zip:

Email: Phone:

Facility Operator (if different than applicant):

Contact Name:

Address: City: State: Zip:

Email: Phone:

Agent/Consultant: Big City Engineers

Contact Name: Melissa A. Branch

Address: P.O. Box 92946 City: Anchorage State: AK Zip: 99509

Email: mbranch@bigcityak.com Phone: 907/360-0985

Section 3. Fees

A check or money order for the appropriate fee [listed in 18 AAC 60.700(a) Table E-2] must be submitted with the permit application. If not included, the application will be returned to the applicant.

Submit payment for the first year's annual fee with the initial application for a facility. No fee is required for permit renewal applications; annual fees will be billed each year.

You will be billed separately for time spent reviewing waiver requests.

This application is for a: ☒ New Permit ☐ Permit renewal

Section 4. Cover Letter and Certifications

Submit a cover letter with the following information and signature.

- | | |
|----|--|
| 1. | A statement indicating you wish to obtain a permit for an Inert Waste Monofill. |
| 2. | Evidence showing that the proposed facility meets the requirements for an Inert Waste Monofill. |
| 3. | A brief general description of the topography, geology, climate, surface hydrology and groundwater hydrology of the area of the facility. |
| 4. | A statement that you are aware of all applicable local ordinances and zoning requirements and a list of any other necessary permits or authorizations. |
| 5. | The applicant must sign the cover letter. |
| 6. | The applicant must submit the following signed statement, which may be added exactly as shown in the box below to the cover letter, or the applicant may sign this sheet and submit it as an attachment to the cover letter. |

I certify, under penalty of perjury, that all of the information and exhibits in this cover letter and application are true, accurate, and complete.

Printed Name: **Bryce Hattenburg**

Title:

Signature:

Date:

All applications must be signed as follows per 18 AAC 15.030:

- **Corporations:** A principal executive officer, an officer that is no lower than the level of vice president, or a duly authorized representative who is responsible for the overall management of the project or operation.
- **Municipal, state, federal, or other public entity:** A principal executive officer, ranking elected official, or duly authorized employee.
- **Partnerships:** A general partner.
- **Sole proprietorship:** The proprietor

Section 5. Waste Handling and Processing Information [18 AAC 60.210]

1. List the approximate quantities and types of waste you expect to receive at the facility each year:

Quantity ☐ Tons ☒ Cubic yds.		Waste
30,000.0		Construction & Demolition Waste
10,000.0		Non-Regulated Asbestos Containing Material (Non-RACM)
		Other:
		Other:
		Other:
		Other:
40,000.0		TOTAL

2. Check the type(s) of waste processing done at the facility before waste is disposed:

☐ Baling	☒ Separation/Segregation
☒ Shredding	☐ Composting
☐ Salvage/Reuse	☐ Dewatering
☐ Other:	☐ Other:

Section 6. Location Information

Please identify the attachment that addressed each requested item

1. **Property Ownership and Location Information** [18 AAC 60.210] **Identify Attachment**

a. Attach a copy of the deed or another legal document that identifies the landowner(s) of the facility.	Deed
b. If the applicant is not the landowner, attach a written and notarized statement or a copy of any lease agreement signed by the landowner showing that the landowner consents to the facility and placement of a notation to the deed of the property as required by 18 AAC 60.490.	Owner Statement

2. **Surface Water Information** [18 AAC 60.210; 18 AAC 60.225; 18 AAC 60.315, 18 AAC 60.410]

a. Distance to nearest surface water body:	1,000 feet
b. Provide information on potential for surface water (storm water or ponds, streams, etc.) to run-on to the facility.	Narrative pg 2
c. Provide information on the potential for sediment carried by run-off from the facility to impact nearby surface waters.	Narrative pg 2
d. If the facility is located in a floodplain, attach documentation to demonstrate the facility will not restrict the flow of the flood, reduce the temporary storage capacity of the floodplain, and is designed to protect against washout of the solid waste.	Not in a floodplain
e. For new facilities or lateral expansion, attach a Wetlands Determination from the U.S. Army Corps of Engineers or information from the National Wetlands Inventory documenting that the facility location is not designated as wetlands. Note: If the new facility or lateral expansion is located in a wetland, you must also complete a ADEC Additional Wetlands Information Form.	Not in wetlands (see attached AWMP map)

Section 6. Location Information (continued)

3.	Groundwater Information [18 AAC 60.040; 18 AAC 60.210; 18 AAC 60.217]	<u>Identify Attachment</u>
	a. Attach information documenting the highest measured level of groundwater at the facility.	narrative, pg 2 and attachment 5
	b. Annual precipitation: 14.7 inches	
	c. Source used to determine annual precipitation: Western Regional Climate Center (see attached)	
4.	Permafrost Information [18 AAC 60.210; 18 AAC 60.227; 18 AAC 60.315; 18 AAC 60.410]	
	a. If the facility is located on permafrost, provide details on why there is not a practical alternative to the location.	N/A
	b. If the facility is located in discontinuous permafrost, provide details of what is known regarding the permafrost (e.g. total depth, depth of active zone, areal extent, temperature, etc.).	N/A
5.	Maps Attach maps and/or aerial photographs as needed to show the following. You may submit maps that show more than one of the required items. For example, one map can show property boundaries, wetland and surface water locations, etc. [18 AAC 60.210; 18 AAC 60.315; 18 AAC 60.320, 18 AAC 60.410]	<u>Identify Attachment</u>
	a. Location of the facility property boundaries.	site plan
	b. Location and flow direction of surface water bodies, streams, and containment or diversion structures, within 500 feet of the facility property boundaries.	site plan
	c. Location of all drinking water sources within one-half mile of the facility property boundary. There should be no drinking water sources within 500 feet of the facility property boundary.	WELTS map
	d. Location of the boundary of any wetlands within 500 feet of the facility property boundary.	wetlands map
	e. Location of the known or inferred boundaries of permafrost or discontinuous permafrost within 500 feet of the facility property boundaries.	N/A
	f. Location of the boundary of any 100-year floodplain in the area.	floodplain map
	g. Location of any documented earthquake faults or unstable areas within 200 feet of the facility property boundary.	N/A

Section 7. Facility Design

A complete set of design drawings with the following information must be submitted. Please ensure that the documentation represents the current conditions for the entire facility.

1.	Facility map(s) which show site conditions, including: [18 AAC 60.210; 18 AAC 60.220; 18 AAC 60.410; 18 AAC 60.420; 18 AAC 60.450]	<u>Identify Attachment</u>
	a. All previous, existing and planned disposal areas. The drawings should demonstrate all waste will remain at least 50 feet from the facility property boundary.	narrative pg 2 site plan 
	b. Fences, gates, berms and other access control devices.	narrative pg 2
	c. Access roads to and within the facility.	narrative pg 2
	d. Storage area(s) for equipment, cover material, etc.	narrative pg 2

Section 7. Facility Design (continued)		Identify Attachment
2.	Plan view drawings with contour lines <u>and</u> cross section drawings that show: [18 AAC 60.210]	
	a. All planned excavations before facility construction	no excavation
	b. All roads, ditches, trenches and berms associated with the facility.	narr pg 2 and site plan
	c. Any planned liquid or leachate collection piping system, including manholes, sumps, and pump stations.	N/A
	d. Any planned gas venting or gas collection piping system.	N/A
3.	Construction detail drawings <u>and</u> cross sections that show: [18 AAC 60.210; 18 AAC 60.225]	
	a. Any liner construction details, including liner anchors, liner penetrations, etc.	N/A
	b. Storm water drainage structures, culverts and other surface water control devices.	N/A
4.	Permafrost Design Requirements [18 AAC 60.227]	
	a. Engineering properties of each earthen layer of ground beneath the facility, including grain size distribution, thaw strain properties, and water content.	N/A
	b. An estimation of maximum thaw depth that is likely to occur beneath the facility and an estimation of the ground deformation that will occur based on thawing	N/A
	c. Design of engineering features that will be incorporated at the facility to prevent thawing of the ground.	N/A
5.	Design calculations, data and documentation must include the following with supporting calculations. [18 AAC 60.210; 18 AAC 60.227; 18 AAC 60.410]	
	a. Printouts of inputs, assumptions and outputs from any computer model used to support the facility design.	
	b. Information and calculations of the maximum inventory of wastes that will be disposed onsite over the usable life of the facility, including the maximum design capacity of the facility.	narrative page 3
	c. An explanation (including calculations) of the expected usable life of the facility.	narrative page 3
	d. Information and calculations showing how the facility will be protected from any reasonably anticipated natural event such as aufeis, floods, earthquakes, thawing of unstable permafrost, and the effects of freezing and thawing.	narrative page 3
	e. If located on permafrost, documentation showing that the permafrost will remain frozen to the greatest extent practical, including relevant modeling and literature or case studies.	N/A
	f. If located in an unstable area, attach information and calculations for engineering measures to ensure the integrity of the structural components will be protected.	N/A
	g. If located in a seismic impact zone, attach documentation showing how the requirements of 18 AAC 60.320(a)(1) and (2) will be met.	N/A
6.	Facility Closure Drawings [18 AAC 60.210; 18 AAC 60.490]	
	a. Conceptual drawings of the facility after closure is completed.	civil drawings

Section 8. Operations Plan

The operations plan should be a separate document that provides sufficient detail and information that the operator could use it to perform all necessary tasks for day-to-day operation of the facility.

The operations plan is a flexible document that should be reviewed annually and updated as necessary. The following table represents the minimum requirements which must be included. Additional information should be added, as needed, to ensure the facility operates in compliance with all applicable State and Federal and Local Regulations. A copy of the operations plan must be kept at the operating facility.

Please include a reference page and section of the Operations Plan where each item is addressed.

1.	Access control [18 AAC 60.210; 18 AAC 60.220]	<u>page/section</u>
	a. Access to the facility will be controlled, including gates, fences, berms or other means of preventing access; hours of operation; signage; and other control measures.	att 8, pg 1
	b. Access and onsite roads for facility will be kept passable and safe for vehicles during operating months.	att 8, pg 1
	c. Prohibited activities, such as target practice or off road vehicle use will be prevented.	att 8, pg 1
	d. Salvaging practices, if allowed, will not interfere with facility operations, create a safety hazard, or cause pollution.	att 8, pg 1
2.	Waste acceptance and handling policy [18 AAC 60.210; 18 AAC 60.240; 18 AAC 60.420]	
	a. Waste screening procedures to ensure that no prohibited wastes are accepted at the facility.	att 8, pg 2
	b. Any signage placed at the facility entrance.	att 8, pg 2
	c. Any waste processing procedures that will be applied prior to disposal.	att 8, pg 2
3.	Waste placement plan [18 AAC 60.210; 18 AAC 60.225]	
	a. Waste placement methods.	att 8, pg 3
	b. The planned progression of the working face, including facility development over the life of the facility (diagrams are acceptable).	att 8, pg 3
	c. How unstable slopes will be avoided.	att 8, pg 3
4.	Waste cover plan - Type of cover material(s) that will be used and for each type of cover describe: [18 AAC 60.210; 18 AAC 60.420]	
	a. Where the cover material will be obtained and stored	att 8, pg 3
	b. The frequency with which the cover will be applied to control litter, odor, and nuisances.	att 8, pg 3
	c. The depth of cover that will be applied	att 8, pg 3
5.	Non-RACM waste placement plan [18 AAC 60.210; 18 AAC 60.450]	
	a. Procedures for identifying any RACM or non-RACM in the waste, including any required paperwork (building survey, sampling report).	att 8, pg 3
	b. How non-RACM will be inspected while still in the container to ensure it has not been crushed or crumbled to cause possible release of fibers, rendering it RACM.	att 8, pg 3
	c. Waste placement methods to ensure non-RACM will not become friable during handling or placement, including no compaction until the non-RACM has been completely covered with at least 6 inches of cover.	att 8, pg 3
	d. Placement, frequency and type of cover material. NOTE: Non-RACM must be covered within 24 hours of placement.	att 8, pg 3

Section 8. Operations Plan (continued)		
6.	Surface & Storm Water Control Plan [18 AAC 60.225]	
	a. Describe how run-off from the facility will be controlled and monitored to ensure that all waste and leachate remains onsite and does not pollute any surface water.	att 8, pg 3
	b. Describe how run on water will be controlled to reduce production of leachate.	att 8, pg 3
7.	Litter, vector and nuisance control plan [18 AAC 60.210; 18 AAC 60.230; AS 46.06.080]	
	a. Describe procedures to ensure wildlife and domestic animals do not endanger the public or facility staff, are not harmed by contact with the waste, and do not become a nuisance.	att 8, pg 4
	b. Explain how dust, noise, traffic, litter, disease vectors and other effects will be controlled so they do not become a nuisance or hazard outside of the facility boundary.	att 8, pg 4
8.	Corrective action plan – Describe the actions for: [18 AAC 60.210; 18 AAC 60.800]	
	a. Cleaning up any improper or unauthorized waste.	att 8, pg 4
	b. Repairing any damage to the facility or structures.	att 8, pg 4
	c. Addressing any violations of regulations or permit conditions.	att 8, pg 4
	d. Responding to combustion or a fire within the waste.	att 8, pg 4
9.	Operator training [18 AAC 60.235; 18 AAC 60.240]	
	a. Identify any training that will be required for an operator, including on-the-job training.	att 8, pg 4
	b. Describe how that training will be documented and filed in the operating record.	att 8, pg 4
10.	Operating record [18 AAC 60.235, 18 AAC 60.240; 18 AAC 60.450]	
	a. The operating record include all the elements listed in 18 AAC 60.235, as well as any other documentation specific to the facility and operation.	att 8, pg 4
	b. The plan must state where the operating record will be located.	att 8, pg 4

Section 9. Monitoring Plan

The monitoring plan must include sufficient detail to allow all monitoring to be completed in full compliance with the applicable regulations and permit conditions. It must include the following information and a statement for each monitoring type that explains why the monitoring is being performed.

1.	Visual monitoring plan [18 AAC 60.210; 18 AAC 60.800]	<u>page/section</u>
	a. Description of the procedures for visual monitoring of the facility.	att 8, pg 4
	b. Checklist or visual monitoring form including all applicable items in 18 AAC 60.800(a).	att 8, pg 4
2.	Surface water monitoring plan (if required by ADEC) [18 AAC 60.210; 18 AAC 60.810]	
	a. Information about topography and surface water flow at the facility.	att 8, pg 5
	b. A detailed map showing permanent sampling site locations and surface water flow direction.	att 8, pg 5
	c. Identification of and information about background and compliance sampling sites, including an explanation of why each site was chosen.	att 8, pg 5
	d. Specific information about sampling frequency and schedules.	att 8, pg 5
	e. A list of constituents for which samples will be analyzed.	att 8, pg 5
	f. Detailed monitoring procedures as outlined in 18 AAC 60.810(e).	att 8, pg 5
	g. A Quality Assurance and Quality Control Plan providing specific details about sampling and testing methodology.	att 8, pg 5
	h. A statement that monitoring reports will be submitted to ADEC within 90 days of the sampling event or by the date(s) stipulated in the permit.	att 8, pg 5
3.	Groundwater monitoring plan (if required by ADEC) [18 AAC 60.210; 18 AAC 60.217; 18 AAC 60.820-860]	
	a. Information about groundwater hydrology at the facility including depth to groundwater, direction and velocity of flow, with supporting documentation.	att 8, pg 5
	b. A detailed map showing well locations and groundwater flow direction and rate.	
	c. Well drilling logs, soil boring logs and well installation information for all background and compliance wells.	
	d. An explanation of how each groundwater monitoring well location was selected, including documentation such as geophysical reports, survey data or maps and any other data used to evaluate subsurface conditions at the facility and to determine monitoring well placement.	
	e. Specific information about sampling frequency and schedules.	
	f. A list of constituents for which samples must be analyzed.	
	g. Information about statistical methods that will be used in statistical analysis of the analytical data.	
	h. A Quality Assurance and Quality Control Plan providing specific details about sampling and testing methodology.	
	i. A statement that monitoring reports will be submitted to ADEC within 90 days of the sampling event or by the date(s) stipulated in the permit, and the reports will comply with the Groundwater Monitoring Checklist on the ADEC website.	
4.	Other Required Monitoring Plan [18 AAC 60.215]	
	For any other monitoring required by ADEC at the facility, include a plan that provides specific information on the process, procedures, equipment, and quality assurance procedures required for the monitoring process.	att 8, pg 5

Section 10. Closure Plan and Cost Estimate

It is understood that the closure plan submitted with the permit application will be conceptual and may change throughout the active life of the facility. If the facility is within 1 year of closure, a detailed closure plan must be submitted and approved by ADEC. The conceptual closure plan must include the following information.

1.	Description of the closure process [18 AAC 60.210; 18 AAC 60.245; 18 AAC 60.460; 18 AAC 60.490]	Section or Attachment
	a. A description of the final cover and appearance of the facility meeting the standards of 18 AAC 60.460(e).	narr, pg 4
	b. A description of the methods and procedures for final cover installation.	narr, pg 4
	c. A timeline or schedule for all activities needed to complete closure.	narr, pg 4
	d. A description of the anticipated post closure (future) use of the property.	narr, pg 4
	e. A description and map of proposed survey monuments or permanent markers.	narr, pg 4
	f. A statement of how ADEC will be notified that the requirements of 18 AAC 60.490 have been met.	narr, pg 4
	g. A description of how the post-closure care requirements of 18 AAC 60.490(c) will be met and when a post-closure care plan will be submitted to ADEC for approval.	narr, pg 4
2.	Financial information [18 AAC 60.210; 18 AAC 60.265]	
	A Facility Closure/Post-Closure Cost Estimate Worksheet in Excel is available online at https://www.deq.virginia.gov/home/showpublisheddocument/2525 to assist you in calculating costs. Please note that you need to complete both tabs (CEW-01 and CEW-02), but only sections relevant to closure of your facility. <i>Courtesy of the State of Virginia</i>	
	a. The total present-day equivalent cost estimate for an independent contractor (do not assume onsite use of any material or machinery) to close the facility. A quote from a consultant or calculation showing all relevant operations for closure is required.	attached worksheets
	b. The total present-day equivalent cost estimate for an independent contractor to perform post-closure care of the facility.	attached worksheets
	c. Demonstration of the mechanism of financial responsibility to cover the cost of closing the facility and post-closure care. Proof of financial responsibility may be demonstrated by self-insurance, insurance, or other guarantee approved by ADEC.	attached worksheets

Section 11. Waiver Requests and Justification

18 AAC 60.900 allows ADEC to grant a waiver from a regulation not required by federal law. The applicant will be billed separately for time spent reviewing waiver requests at the rate in 18 AAC 60.700(e).

1.	Waiver requests must include the specific regulation for which you are requesting a waiver, and for each requested waiver, a detailed justification that meets the criteria of 18 AAC 60.900 by demonstrating that: [18 AAC 60.210]	
	a. The proposed alternative action will provide equal or better environmental protection, reduction in public health risk, and control of nuisance factors than compliance with the identified provision; or	
	b. Compliance with the identified provision would cost significantly more than the value of the environmental benefit, public health risk reduction, and nuisance avoidance that could be achieved through that compliance.	

Additional information

Attach any additional information necessary to accurately reflect the location, construction, and operations of the facility.

Narrative

Eklutna Services, LLC
Inert Waste Monofill
DEC Permit Application
Revised January 2025

Project Location

The proposed project is located at the west terminus of Eklutna Park Drive on Tract 38, Eagle River Powder Reserve (B). The property is bounded by the railroad on its north and west sides. See the attached location map.

Project Description

The proposed work includes fill operations on a portion of Tract 38. Fill already accepted on the site includes concrete, stumps, and organic soils removed from other construction sites. The proposed use would increase the variety of materials the site can accept to include building materials (windows, rebar, wood, masonry products). No asbestos or friable material will be accepted at this time. No contaminated soils or chemically-treated wood will be accepted, in keeping with current operational standards.

When the fill operations are completed, the land will be reclaimed like the existing gravel extraction use. An open space of some sort is anticipated. Restoration will include re-contouring and, at a minimum, placing topsoil and re-seeding and re-planting with native and non-invasive trees and shrubs.

Tract 38 is 15,207,231 SF (349.11 acres) in size. It is known as Eklutna's Site 4 and is currently being used for several approved uses – natural resource extraction, MOA's snow storage facility, asphalt recycling and sale, and backfill of concrete, stumps, and organic soils removed from other construction sites.

The monofill use is located on a separate portion of the site, west of the existing uses. The proposed monofill use increases the used area by approximately 35 acres.

The proposed work will not change noise, air, or traffic to and from the site. No excavation work is being completed. An existing low spot on the property will be used to backfill with the construction debris and then reclaimed similar to the gravel extraction use. Drainage will be kept on-property.

History

The Municipality of Anchorage conditional use for the natural resource extraction permit located northeast of the proposed monofill was completed in 2007. There have been multiple amendments to that original approval.

Property Ownership and Adjacent Developments

The property is zoned TR, a transition district, which is designated as DR, a development reserve district, in the Chugach-Eagle River area. Eklutna, Inc. owns the property.

The adjacent properties are also zoned TR. There are residences (Powder Ridge development) located more than 2,000 feet south of the property (more than 3,000 feet from the portion of the property currently being used).

See attached Deed and Authorization Letter (Attachments No. 2 and 3).

Schedule

The goal is to begin fill operations after the DEC review is approved (summer 2024).

1. Surface Water Information

The nearest water body is Clune Lake, which is roughly 1,000 feet to the west and downstream of the property. Storm water from upslope is in a vegetated (forested) area and largely infiltrates before it reaches the project area.

There are no mapped streams or waterways in the project area; see the attached MOA watershed sign-off. The on-property drive runs the ridge. The project area drains southeast to northwest through an on-site vegetative buffer.

The project is not located within a floodplain. The nearest mapped floodplain is Fire Creek which is east of the project property and downstream of the project area.

The project site does not contain wetlands. It is adjacent to wetlands that will be retained and not impacted by the proposed monofill.

See Attachment No. 4 (Site Maps).

2. Groundwater Information

Per the DOWL geotechnical investigation work completed in 2005 and 2005, 16 test pits were excavated to depths from 12 to 22 feet below the ground surface. The pits excavated in the undisturbed wooded areas contain a surface level of peat followed by silty gravel with sand and silty sand with gravel. In 5 of the test pits, the silty gravels were underlain by clayey gravels.

Potential groundwater sources will also be separated by over 30 feet of glacial till and clay at the closest point. Both glacial till and clay have low permeability characteristics, which will prevent surface water from transferring to that potential groundwater source.

Central Environmental, Inc. dug 4 test holes in August 2020 to a depth of 19 feet in the monofill area. No water was found and perforated PVC pipes were installed to monitor the water depth. The locations selected were spread across the lowest points of the site. The PVC pipes were checked on March 20, 2021, July 14, 2021, August 19, 2022, and June 27, 2024. No water was observed in any of the monitoring tubes at any of the inspections. See attached map for locations of the monitoring tubes (Attachment No. 5)

Annual precipitation is 14.7 inches based on Western Regional Climate Center data (screenshots appended).

3. Permafrost Information

No permafrost was encountered in the geotechnical investigation work and is not anticipated in the project area.

4. Maps

See attached.

5. Facility Design

As stated previously, there are several existing uses on the Eklutna property - natural resource

extraction, MOA's snow storage facility, asphalt recycling and sale, and backfill of concrete, stumps, and organic soils removed from other construction sites. See attached Site Activity Map (Attachment No. 6).

The proposed monofill use is located west of these uses on a separate portion of the property. The Municipality requires a 30-foot landscape buffer/undisturbed area at the perimeter of the property adjacent to the use. Changes to existing slopes start in-board of that buffer. All waste will remain at least 50 feet from the property boundary, as required by DEC.

The entire property is fenced and has controlled access through a single gate off Eklutna Park Drive. There are existing access roads through the facility and will be used to access the monofill. Eklutna has dedicated storage areas for the equipment that will be used already on the property. They will, as the monofill is established, dedicate an area for cover material. See Site 4 Operations Map (Attachment No. 9A).

There is a single access road with gates to the property. The existing topography creates a natural barrier from the neighboring properties. The railroad borders the property to the north and west. A berm/vegetated slope protects the south and east. A single access road channels traffic to the property with check stops within.

The access road is compacted gravel for easy ingress and egress and to minimize rutting. There is signage throughout the property designating areas and routing traffic. Additional signage will be added with the monofill activity. See Attachment No. 9B (Sign Photos).

The facility is designed with 3:1 max side slopes so that they can be vegetated for final stabilization. The surface of the monofill will be sloped to prevent ponding.

A stability analysis has been completed by HDL Engineering Consultants and is attached (Attachment No. 10).

6. Plan View Drawings

There is no excavation planned before the facility construction. Material will be placed on existing topography.

No liquid or leachate collection piping system is anticipated to be installed. Nor is any gas venting or gas collection piping system. The proposed materials should not generate liquids, leachates, or gas.

See Attachment No. 7.

7. Construction Detail Drawings and Cross Sections

No liners will be installed. They are not required for the materials being placed in the monofill. Drainage will be addressed largely by ditches and topography; no stormwater drainage structures are anticipated.

See Attachment No. 7.

8. Permafrost Design Requirements

Not applicable. There is no permafrost in the project area or on the larger property it is part of.

9. Design Calculations, Data, and Documentation

Approximately 40,000 cubic yards of fill material are anticipated to be imported each season. This is based on market projections. Eklutna estimates maybe 5,000 cubic yards in winter at most (for winter demolition projects that occur). The project area can take a total of 2,000,000 cubic yards over the entire life of the location (50-year life). The anticipated project life is 50 years based on estimated yearly fill quantities and the area available to fill in the project area.

This location is elevated roughly 200 feet above sea level and the closest creek. Flooding is not anticipated to be an issue. Earthquakes aren't anticipated to be an issue. If things shift as the result of an earthquake, the equipment and staff are on-property to address it. Natural site drainage and containment berms will prevent any negative effects of freezing and thawing.

10. Facility Closure Drawings

As part of our permitting work with the Municipality of Anchorage, we had to show a reclamation plan – what the site would look like at project closeout. We have attached the civil and landscape drawings from that submittal to show the proposed topography and surface stabilization. See Attachment No. 7.

11. Operations Plans

See Attachment No. 8 (Operations Plan).

12. Monitoring Plan

See Attachment No. 8 (Operations Plan).

13. Closure Plan and Cost Estimate

a. Description of Closure Process

As stated earlier, once the monofill use is complete, a final layer of topsoil will be provided. The site will then be vegetated in some manner, with topsoil and seed at a minimum. This tract of land is slated for an open space use in the future – park or such. Topography will be reviewed to ensure it provides appropriate drainage pathway on property. The Municipality of Anchorage requires that Eklutna submit the final reclamation plan and show proof of completion. We will use the same record information to close out the project with DEC.

Eklutna will know when the facility is close to being closed. They will begin procedures in advance of permanent stabilization to coordinate with DEC. They will, once stabilized, provide documentation for the facility closure.

b. Financial Information

See attached estimates (Attachment No. 11).

Waiver Requests and Justifications

Additional Information

Attachment 1

DEC Cover Letter



16515 Centerfield Drive, Suite 201
Eagle River, AK 99577
P: 907.696.2828
F: 907.696.2845
www.eklutnainc.com

October 18, 2024

Annemieke Powers
Solid Waste Disposal
State of Alaska
Department of Environmental Conservation
555 Cordova Street
Anchorage, Alaska 99501

Subject: Inert Waste Application
Revised Cover Letter

Dear Ms. Powers.

We wish to obtain a permit for an inert waste monofill. Please see the appended permit application package to show how the proposed facility meets the requirements for an inert waste monofill.

Description of topography, geology, climate, surface hydrology, groundwater hydrology.

The topography in the property area slopes from east to west. Elevations vary by 80 feet from 270 feet on west side down to roughly 190 feet along the property boundary. The property is bounded by a railroad track with drainage ditches on both sites. West of the railroad tracks is Clunie Lake.

The project area is located within Kenai-Chugach Mountains section of the Coastal Trough physiographic province of Alaska. The section consists of heavily-glaciated mountains 3,000 to 6,000 feet in altitude characterized by u-shaped valleys and passes, cirques, rock-basin lakes, and aretes.

The project is located in an area of moderate seismicity and large-scale earthquakes with the potential for ground ruptures in some areas. Based on the USGS earthquake catalog, there were 129 events above Richter Magnitude 5 within 100 miles of the site from 1889 to 2023, 25 of which were above Richter Magnitude 6.

The project area is located in a transitional climatic zoning varying between continental and maritime climates. The zone is characterized by pronounced annual temperature variations, moderate annual precipitation, and moderate surface winds. The average January temperatures in the area range between 4.6 degrees and 18.3 degrees Fahrenheit, with July temperatures ranging



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between 48.8 degrees and 69.3 degrees. Average annual precipitation is 14.7 inches and average annual snowfall is 66 inches.

Surface drainage follows site topography, shedding east to west. This area has previously been cleared; there are a few areas where slopes are flatter and runoff can infiltrate. Little to no surface water leaves the project area.

Groundwater was observed 20 feet or more below the surface. The nearest water body, Clunie Lake, is more than 700 feet away and its surface is at an elevation more than 20 feet lower than the lowest elevation in the project area. Monitoring tubes placed in August 2020 have shown no signs of groundwater (see response No. 7 for more information).

We are aware of the local applicable ordinances and zoning requirements. We have processed and obtained approval for a conditional use permit application through the Municipality of Anchorage, as required.

Describe type of material the facility is proposing to accept.

The proposed monofill use would accept building materials (windows, rebar, wood, masonry products). No friable material will be accepted at this time; only non-RACM materials will be reviewed and possibly accepted. No contaminated soils or chemically-treated wood will be accepted. No trash will be accepted; it will be routed to the Anchorage Municipal landfill.

If you have any questions or require additional information, please contact me at 907/223-4344 or bhattenburg@eklutnainc.com.

Sincerely,

Bryce Hattenburg
Eklutna Services, LLC

Attachment 2

Owner Authorization Letter



Attachment No. 2

16515 Centerfield Drive, Suite 201
Eagle River, AK 99577
P: 907.696.2828
www.eklutnainc.com

September 5, 2024

Ms. Annemieke Powers
Environmental Program Specialist III
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, Alaska 99501

Subject: Letter of Authorization/Delegation of Authority
Tract 38, T15N, R2W, Section 35, Eagle River Powder Reserve

Dear Ms. Powers:

By my signature below, I certify that I have the authority to sign this application under 18 AAC 15.030 and that the project is owned by a corporation of which I am a principal executive officer at least at the level of vice-president.

I hereby designate Bryce Hattenburg as my authorized representative for the overall permitting of the monofill project on Tract 38, Township 15 North, Range 2 West, Section 35, Eagle River Powder Reserve in Eagle River, Alaska, including the signing of permit documents.

If you have any questions, please contact me at 907-396-2828 or kfoster@eklutnainc.com.

Thank you,

Kyle Foster
Chief Executive Officer



16515 Centerfield Dr, Ste 201
Eagle River, AK 99577
Phone: 907-696-2828
Fax: 907-696-2845
www.eklutnainc.com

October 7, 2024

Bryce Hattenburg, Director
Eklutna Services, LLC
16515 Centerfield Dr. Ste 201
Eagle River, AK 99577

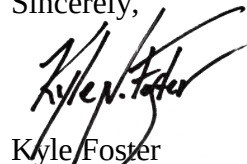
Dear Mr. Hattenburg,

Please consider this letter as notice of Eklutna, Inc.'s authorization for Eklutna Services, LLC to conduct operations on Eklutna, Inc. land on a 35-acre portion of Powder Reserve (B) Tract 38 as an inert fill site for disposal of construction debris and other associated materials.

This authorization includes the right to access the property for the purpose of dumping and disposing of the aforementioned materials and develop the sites for the disposal purposes. I understand that all activities will comply with all local and state regulations and environmental guidelines.

Please ensure that the site is maintained in a safe and responsible manner. Any violations of local laws or damage to the property may result in the review of this authorization.

Sincerely,



Kyle Foster
CEO

Attachment 3
Deed/Conveyance Document

Form 1860-9
(January 1988)

The United States of America

To all to whom these presents shall come, Greeting:

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AA-6661-D

WHEREAS

Eklutna, Inc.

is entitled to a patent pursuant to Sec. 14(a) of the Alaska Native Claims Settlement Act of December 18, 1971, 43 U.S.C. 1601, 1613(a), of the surface estate in the following-described lands, which are described in Interim Conveyance Nos:

002, June 13, 1974;	1388, July 7, 1988;
071, December 7, 1977;	1411, September 28, 1988;
073, December 28, 1977;	1425, March 31, 1989;
163, March 1, 1979;	1426, March 31, 1989;
622, February 28, 1983;	1427, April 3, 1989;
949, September 28, 1984;	1428, April 4, 1989; and
1263, September 30, 1986;	1512, August 23, 1991;
1287, October 31, 1986;	

Seward Meridian, Alaska

T. 16 N., R. 1 E.,
 Sec. 1, lots 1, 2, 3, 4, 7, 8, and 10;
 Sec. 2, lots 1, 3, 4, 7, and 8;
 Sec. 11, lots 1, 6, and 9;
 Sec. 12, lots 1, 3, 5, 6, 7, and 8;
 Sec. 13, lots 9 and 11, S½S½;
 Sec. 14, lots 1, 3, 4, 5, 6, and 8;
 Sec. 17, lots 1 and 2;
 Sec. 18, lot 2;
 Sec. 19, N½NE¼NE¼NW¼, W½NE¼NW¼.

Containing 1,966.22 acres, as shown on plats of survey approved June 26, 1914, and August 22, 1916, and plats of survey accepted May 26, 1919, and February 28, 1979.

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T. 15 N., R. 2 E.,
 Sec. 8, lot 12.

Containing 20.00 acres, as shown on supplemental plat of survey officially filed February 8, 1989.

T. 16 N., R. 2 E.,
 Sec. 4, lots 3 and 4;
 Sec. 5, lots 1, 3, and 4;
 Sec. 6, lots 1, 3, 4, 5, 6, and 7;
 Sec. 7, lots 1, 3, and 4;
 Sec. 8, lots 2 to 7, inclusive;
 Sec. 9, lots 2 and 3;
 Sec. 10, lot 2;
 Sec. 18, lots 15, 16, and 17;
 Sec. 19, lot 4.

Containing 1,612.84 acres, as shown on plat of survey accepted February 28, 1979, and supplemental plats of survey officially filed January 19, 1989.

T. 15 N., R. 1 W.,
 Tracts 37 and 38;
 Sec. 9, lots 152, 155, 159, 160, 163, and 165;
 Sec. 17, lots 17, 18, 25, and 27;
 Sec. 19, lots 5, 6, and 7, E $\frac{1}{2}$ SW $\frac{1}{4}$;
 Sec. 20, lots 33, 46, and 48.

Containing 425.08 acres, as shown on plat of survey accepted June 16, 1917, supplemental plat of survey accepted May 1, 1978, supplemental plats of survey officially filed January 16, 1980, and January 16, 1988, and plat of survey officially filed November 21, 1991.

T. 16 N., R. 1 W.,
 Sec. 23, lots 6, 7, and 8, SE $\frac{1}{4}$ SW $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$;
 Sec. 24, lots 6, 8, 10, 11, 12, 13, 14, and 15, S $\frac{1}{2}$ S $\frac{1}{2}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$,
 W $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$;
 Sec. 25, SW $\frac{1}{4}$;

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Sec. 26, lots 1 to 12, inclusive, N $\frac{1}{2}$ NE $\frac{1}{4}$, SW $\frac{1}{4}$ NE $\frac{1}{4}$,
 SE $\frac{1}{4}$ NW $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$, S $\frac{1}{2}$ SE $\frac{1}{4}$;
 Sec. 27, lots 5 to 9, inclusive;
 Sec. 32, lots 6 and 7;
 Sec. 33, lots 5 to 10, inclusive, NE $\frac{1}{4}$ SE $\frac{1}{4}$, S $\frac{1}{2}$ SE $\frac{1}{4}$;
 Sec. 34, lots 1, 2, and 3, NE $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$, SE $\frac{1}{4}$.

Containing 1,996.24 acres, as shown on plat of survey accepted June 16, 1917, plats of survey approved June 25, 1914, and February 28, 1934, and plats of survey officially filed November 21, 1991.

T. 15 N., R. 2 W.,
 Tracts 37, 38, and 40.

Containing 1,292.53 acres, as shown on plat of survey officially filed November 10, 1992.

Aggregating 7,312.91 acres.

NOW KNOW YE, that there is, therefore, granted by the UNITED STATES OF AMERICA, unto the above-named corporation the surface estate in the lands above described; TO HAVE AND TO HOLD the said lands with all the rights, privileges, immunities, and appurtenances, of whatsoever nature, thereunto belonging, unto the said corporation, its successors and assigns, forever:

EXCEPTING AND RESERVING TO THE UNITED STATES from the lands so granted:

1. The subsurface estate therein, and all rights, privileges, immunities, and appurtenances, of whatsoever nature, accruing unto said estate pursuant to the Alaska Native Claims Settlement Act of December 18, 1971, 43 U.S.C. 1601, 1613(f); and
2. Pursuant to Sec. 17(b) of the Alaska Native Claims Settlement Act of December 18, 1971, 43 U.S.C. 1601, 1616(b), the following public easements, referenced by Easement Identification Number (EIN) on the easement maps, a copy of which can be found in the Bureau of Land Management's public land records, are reserved

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to the United States. All easements are subject to applicable Federal, State, or Municipal corporation regulation. The following is a listing of uses allowed for each type of easement. Any uses which are not specifically listed are prohibited.

25-foot Trail -- The uses allowed on a twenty-five (25) foot wide trail easement are: travel by foot, dogsleds, animals, snowmobiles, two- and three-wheeled vehicles and small All-Terrain Vehicles (ATV's) (less than 3,000 lbs. Gross Vehicle Weight (GVW)).

60 Foot Road -- The uses allowed on a sixty (60) foot wide road easement are: travel by foot, dogsleds, animals, snowmobiles, two- and three-wheeled vehicles, small and large All-Terrain Vehicles (ATVs), tracked vehicles, four-wheel-drive vehicles, automobiles, and trucks.

100 Foot Road--The uses allowed on a one hundred (100) foot wide road easement are: travel by foot, dogsleds, animals, snowmobiles, two- and three-wheeled vehicles, small and large All-Terrain Vehicles (ATVs), tracked vehicles, four-wheel-drive vehicles, automobiles, and trucks.

- a. (EIN 3 C1, D1, D9, L) An easement twenty-five (25) feet in width for the historic Iditarod Trail, as it crosses lands in Secs. 9, 17, 19, and 20, T. 15 N., R. 1 W., Seward Meridian. The alignment of this trail is within the right-of-way for the old Glenn Highway, between Eagle River and Eklutna. The uses allowed are those listed above for a twenty-five (25) foot wide trail easement.
- b. (EIN 22 D2, L) An easement twenty-five (25) feet in width for an existing access trail from road easement EIN 20 B, D1, D2, D9, in Sec. 8, T. 15 N., R. 2 E., Seward Meridian, northerly to public lands. The uses allowed are those listed above for a twenty-five (25) foot wide trail easement.

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- c. (EIN 54 C4, D1) An easement for the existing Birchwood Loop Road from the old Glenn Highway in Sec. 30, T. 15 N., R. 1 W., Seward Meridian, easterly to the new Glenn Highway and then northerly and southeasterly, looping back to the old Glenn Highway in Sec. 9, T. 15 N., R. 1 W., Seward Meridian. This easement is one hundred (100) feet wide as it crosses the lands herein conveyed within Sec. 19, T. 15 N., R. 1 W., Seward Meridian, and is centered on the existing road alignment. In Tract 38, T. 15 N., R. 1 W., Seward Meridian, the easement is sixty (60) feet wide. The uses allowed are those listed above for both a one hundred (100) foot wide road easement and a sixty (60) foot wide road easement, as appropriate.
- d. (EIN 56 C4) An easement seventy-five (75) feet in width, thirty-seven and one-half (37½) feet each side of the centerline, for an existing 115 KV power transmission line from the Eklutna Powerplant in Sec. 17, T. 16 N., R. 2 E., Seward Meridian, southerly to the Anchorage Substation, located at 4700 East Northern Lights Boulevard. The uses allowed are those activities associated with the construction, operation, and maintenance of the powerline facility.
- e. (EIN 63 C4) An easement one hundred (100) feet in width for an existing powerline, beginning in Sec. 17, T. 16 N., R. 2 E., Seward Meridian, northerly into the Matanuska Valley. The uses allowed are those activities associated with the construction, operation, and maintenance of the powerline facility.
- f. (EIN 66 C8) An easement sixty (60) feet in width, thirty (30) feet each side of the centerline, for an existing road from the Eklutna Powerplant, located in Sec. 17, T. 16 N., R. 2 E., Seward Meridian, southwesterly to Eklutna Lake Road in Sec. 19, T. 16 N., R. 1 E., Seward Meridian. The uses allowed are those listed above for a sixty (60) foot wide road easement.

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- g. (EIN 100 K) An easement sixty (60) feet in width for an existing access road from the SE $\frac{1}{4}$, Sec. 34, T. 15 N., R. 2 W., Seward Meridian, westerly to military lands. The uses allowed are those listed above for a sixty (60) foot wide road easement. This easement is restricted to government use only.
- h. (EIN 104 C4) An easement sixty (60) feet in width for the existing Birchwood Airport Road, adjacent to and paralleling the eastern boundary of the SW $\frac{1}{4}$, Sec. 5, T. 15 N., R. 1 W., Seward Meridian. The uses allowed are those listed above for a sixty (60) foot wide road easement.
- i. (EIN 109 C4) An easement sixty (60) feet in width for the existing road from Birchwood Airport Road (EIN 104 C4), west and northerly to the railroad facilities. The uses allowed are those listed above for a sixty (60) foot wide road easement.
- j. (EIN 115 H) An easement restricting use and occupancy of the lands to be conveyed within an 850-foot radius of the powder magazine/cap house, located in Sec. 24, T. 16 N., R. 1 W., Seward Meridian. The uses and restrictions for this easement are subject to the Alaska Department of Labor, Occupational Safety and Health Standards. The specific uses allowed include those associated with the construction, reconstruction, operation, and maintenance of the powder magazine/cap house facility. There will be no uses allowed within the easement which might interfere with the use of the facility nor any use that will interfere with the enforcement of measures designed to provide for public safety. This easement may be terminated pursuant to the criteria in 43 CFR 2650.4-7(a)(13).
- k. (EIN 116 C4) An easement sixty (60) feet in width for an existing road, known locally as JK Lane, which runs from Birchwood Loop Road (EIN 54 C4, D1) in a westerly direction, adjacent to and paralleling the southern boundary of the SE $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 8, T. 15 N., R. 1 W., Seward

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Meridian. The uses allowed are those listed above for a sixty (60) foot wide road easement.

1. (EIN 118 C4) An easement fifty (50) feet in width for an existing underground natural gas pipeline, extending from the new Glenn Highway in the SE $\frac{1}{4}$ NW $\frac{1}{4}$, Sec. 36, T. 15 N., R. 2 W., Seward Meridian, southwesterly through the SE $\frac{1}{4}$ SE $\frac{1}{4}$, Sec. 35, T. 15 N., R. 2 W., Seward Meridian. The uses allowed are those activities associated with the construction, operation, and maintenance of the natural gas pipeline.

THE GRANT OF THE ABOVE-DESCRIBED LANDS IS SUBJECT TO:

1. Valid existing rights therein, if any, including, but not limited to those created by any lease (including a lease issued under Sec. 6(g) of the Alaska Statehood Act of July 7, 1958, 48 U.S.C. Ch. 2, Sec. 6(g)), contract, permit, right-of-way, or easement, and the right of the lessee, contractee, permittee, or grantee to the complete enjoyment of all rights, privileges, and benefits thereby granted to him. Further, pursuant to Sec. 17(b)(2) of the Alaska Native Claims Settlement Act of December 18, 1971 (ANCSA), 43 U.S.C. 1601, 1616(b)(2), any valid existing right recognized by ANCSA shall continue to have whatever right of access as is now provided for under existing law;
2. An easement for highway purposes, including appurtenant protective, scenic, and service areas, extending one hundred fifty (150) feet each side of the centerline of the Glenn Highway, as established by Public Land Order 1613, 23 F.R. 2376, pursuant to the Act of August 1, 1956, 43 U.S.C. 971a, and transferred to the State of Alaska pursuant to the Alaska Omnibus Act, Public Law 86-70, 73 Stat. 141, as to:

Seward Meridian, Alaska

T. 16 N., R. 1 E.,
 Sec. 13, lots 11 and 19, S $\frac{1}{2}$ S $\frac{1}{2}$;
 Sec. 14, lot 5.

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T. 16 N., R. 2 E.,
Sec. 18, lot 15.

T. 15 N., R. 1 W.,
Secs. 9, 17, and 20.

T. 16 N., R. 1 W.,
Secs. 25, 26, and 34.

3. Any right-of-way interest in Birchwood Loop Road (FAS Route No. 559), transferred to the State of Alaska by the quitclaim deed dated June 30, 1959, executed by the Secretary of Commerce under the authority of the Alaska Omnibus Act, Public Law 86-70, 73 Stat. 141, located in Tract 38, T. 15 N., R. 1 W., Seward Meridian;
4. Any right-of-way interest in the Eklutna Lake Road (FAS Route No. 5561), transferred to the State of Alaska by the quitclaim deed dated June 30, 1959, executed by the Secretary of Commerce under the authority of the Alaska Omnibus Act, Public Law 86-70, 73 Stat. 141, located in Sec. 8, T. 15 N., R. 2 E., Seward Meridian;
5. Any right-of-way interest in the Birchwood Spur Road (FAS Route No. 5591), transferred to the State of Alaska by the quitclaim deed dated June 30, 1959, executed by the Secretary of Commerce under the authority of the Alaska Omnibus Act, Public Law 86-70, 73 Stat. 141, located in Tract 38, T. 15 N., R. 1 W., Seward Meridian;
6. An easement and right-of-way, AA-6187, to operate, maintain, repair, and patrol an overhead open wire and underground communication line or lines, and appurtenances thereto, in, on, over, and across a strip of land fifty (50) feet in width, lying twenty-five (25) feet each side of the centerline of the Alaska Communication System's open wire or pole line and/or buried

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communication cableline, conveyed to RCA Alaska Communications, Inc., by easement deed dated January 10, 1971, pursuant to the Alaska Communications Disposal Act of November 14, 1967, 40 U.S.C. 771-792, as to:

Seward Meridian, Alaska

- T. 16 N., R. 1 E.,
 Sec. 13, lots 9 and 11, S $\frac{1}{2}$ S $\frac{1}{2}$;
 Sec. 14, lot 5.
- T. 16 N., R. 2 E.,
 Sec. 18, lots 15, 16, and 17.
- T. 15 N., R. 1 W.,
 Sec. 9, lots 152, 155, 159, 160, 163, and 165;
 Sec. 17, lots 17, 18, 25, and 27;
 Sec. 20, lots 33, 46, and 48.
- T. 16 N., R. 1 W.,
 Sec. 25, SW $\frac{1}{4}$;
 Sec. 26, lot 6, SE $\frac{1}{4}$ SE $\frac{1}{4}$;
 Sec. 34, S $\frac{1}{2}$ SE $\frac{1}{4}$.
- T. 15 N., R. 2 W.,
 Sec. 36, SW $\frac{1}{4}$.
- 7. A right-of-way, A-015987, fifteen (15) feet each side of the centerline for a transmission line, granted to Matanuska Electric Association, under the Act of February 15, 1901, 43 U.S.C. 959 (1970), and located in Secs. 25, 26, and 34, T. 16 N., R. 1 W., Seward Meridian;
- 8. A right-of-way, A-021429, ten (10) feet each side of the centerline for an electrical distribution line granted to Matanuska Electric Association, Inc., under the Act of February 15, 1901, as amended, 43 U.S.C. 959 (1970), and located in:

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 AA-6661-C
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Seward Meridian, Alaska

T. 15 N., R. 1 W.,
 Tract 38;
 Sec. 9, lots 152, 155, and 160;
 Sec. 17, lot 17;
 Sec. 20, lots 33 and 46.

9. A right-of-way, A-038111, twenty (20) feet each side of the centerline of a distribution line granted to Matanuska Electric Association, Inc., under the Act of February 15, 1901, as amended, 43 U.S.C. 959 (1970), and located in lot 15, Sec. 24, T. 16 N., R. 1 W., Seward Meridian;
10. A right-of-way, A-050466, fifty (50) feet each side of the centerline for a transmission line granted to Matanuska Electric Association, Inc., under the Act of February 15, 1901, 43 U.S.C. 959 (1970), and located in:

Seward Meridian, Alaska

T. 15 N., R. 1 W.,
 Tract 38;
 Sec. 19, lot 5.

T. 16 N., R. 1 W.,
 Sec. 25, SW $\frac{1}{4}$;
 Sec. 26, lots 6, 8, 10, 12, SE $\frac{1}{4}$ SW $\frac{1}{4}$;
 Sec. 27, lots 8 and 9;
 Sec. 33, lots 7 and 10, NE $\frac{1}{4}$ SE $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$;
 Sec. 34, lots 1 and 3, NE $\frac{1}{4}$, SE $\frac{1}{4}$ NW $\frac{1}{4}$, NW $\frac{1}{4}$ SW $\frac{1}{4}$.

T. 15 N., R. 2 W.,
 Tracts 38 and 40.

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11. A right-of-way, A-050814, for a Federal aid material site granted to the State of Alaska, under the Act of August 27, 1958, as amended, 23 U.S.C. 317, and located in lot 5 and E $\frac{1}{2}$ SW $\frac{1}{4}$, Sec. 19, T. 15 N., R. 1 W., Seward Meridian;
12. A right-of-way, A-057949, fifteen (15) feet each side of the centerline for a telephone pole line granted to Matanuska Telephone Association, Inc., under the Act of February 15, 1901, as amended, 43 U.S.C. 959 (1970), and located in lots 6 and 7, E $\frac{1}{2}$ SW $\frac{1}{4}$, Sec. 19, T. 15 N., R. 1 W., Seward Meridian;
13. A right-of-way, A-063653, ten (10) feet each side of the centerline for a buried telephone cable granted to Matanuska Telephone Association, under the Act of February 15, 1901, as amended, 43 U.S.C. 949 (1970), and located in Tract 40, T. 15 N., R. 2 W., Seward Meridian, Alaska;
14. A right-of-way, AA-2559, for a Federal aid highway granted to the State of Alaska, under the Act of August 27, 1958, as amended, 23 U.S.C. 317, and located in:

Seward Meridian, Alaska

T. 15 N., R. 1 W.,
 Sec. 19, lot 7, E $\frac{1}{2}$ SW $\frac{1}{4}$.

T. 15 N., R. 2 W.,
 Tract 40.
15. A right-of-way, AA-5611, for a Federal aid highway granted to the State of Alaska under the Act of August 27, 1958, as amended, 23 U.S.C. 317, and located in E $\frac{1}{2}$ SW $\frac{1}{4}$, Sec. 19, T. 15 N., R. 1 W., Seward Meridian;
16. A right-of-way, AA-8997, for a Federal Aid highway, granted to the State of Alaska under the Act of August 27, 1958, 23 U.S.C. 317, and located in Secs. 25 and 26, T. 16 N., R. 1 W., Seward Meridian.

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 AA-6661-C
 AA-6661-D

17. Those rights for construction and pipeline purposes as have been granted to Alaska Pipeline Company for the public lands involved, subject to the terms and conditions of the grant dated October 5, 1983, AA-51054, pursuant to Sec. 28 of the Mineral Leasing Act of 1920, as amended, 30 U.S.C. 185, located in:

Seward Meridian, Alaska

T. 15 N., R. 1 W.,
 Sec. 9, lots 152 and 155.

T. 16 N., R. 1 W.,
 Sec. 25, SW $\frac{1}{4}$;
 Sec. 26, SE $\frac{1}{4}$ SE $\frac{1}{4}$;
 Sec. 34, SE $\frac{1}{4}$ SE $\frac{1}{4}$.

18. Those rights for the Eklutna water pipeline and related facilities as have been granted to the Municipality of Anchorage for the public lands involved, subject to the terms and conditions of the grant dated March 6, 1984, as amended (serial No. AA-51163), pursuant to the Act of October 21, 1976, 43 U.S.C. 1761-1771, located in:

Seward Meridian, Alaska

T. 15 N., R. 2 E.,
 Sec. 8, lot 12.

T. 16 N., R. 1 W.,
 Sec. 25, SW $\frac{1}{4}$;
 Sec. 26, lot 6, S $\frac{1}{2}$ SE $\frac{1}{4}$;
 Sec. 34, SW $\frac{1}{4}$, SE $\frac{1}{4}$.

19. A right-of-way, AA-53565, fifteen (15) feet each side of the centerline, for an access road and utility lines, granted to the Municipality of Anchorage, under the Act of October 21, 1976, 43 U.S.C. 1761-1771, and located in lot 10, Sec. 33, T. 16 N., R. 1 W., Seward Meridian;

AA-6661-A
 AA-6661-B
 AA-6661-C
 AA-6661-D

20. The following third-party interests, if valid, created and identified by the State of Alaska, as provided by Sec. 14(g) of the Alaska Native Claims Settlement Act of December 18, 1971, 43 U.S.C. 1601, 1613(g):

Right-of-Way Permits

- a) ADL 37265, for Federal aid highway project No. F-042-1(1), that portion located in Secs. 9, 17, and 19, T. 15 N., R. 1 W., Seward Meridian; and
 - b) ADL 35136, for a controlled access public highway, located within Sec. 19, T. 15 N., R. 1 W., Seward Meridian.
21. The following third-party interests, if valid, identified by the Alaska Railroad, as provided by Sec. 14(g) of the Alaska Native Claims Settlement Act of December 18, 1971, 43 U.S.C. 1601, 1613(g). These interests are located within Tracts 37, 38, and 40, T. 15 N., R. 2 W., Seward Meridian:
- a. Contract No. 14-25-0003-2891, issued October 21, 1965, as amended, to the Matanuska Telephone Association, for a period of 20 years, for an underground communication cable; and
 - b. Contract No. 69-25-0003-5700, issued November 30, 1984, to the Municipality of Anchorage, for a period of 35 years, for the Eklutna Water Project.
22. Requirements of Sec. 14(c) of the Alaska Native Claims Settlement Act of December 18, 1971, 43 U.S.C. 1601, 1613(c), as modified by Sec. 1426 of the Alaska National Interest Lands Conservation Act of December 2, 1980, 94 Stat. 2371, 2518, that the grantee hereunder convey those portions, if any, of the lands hereinabove granted, as are prescribed in said section;

Patent Number **50-93-0601**

Form 1860-10
(April 1988)

AA-6661-A
AA-6661-B
AA-6661-C
AA-6661-D

23. The terms and conditions of the North Anchorage Land Agreement of March 15, 1982, as amended, entered into pursuant to Sec. 1425 of the Alaska National Interest Lands Conservation Act of December 2, 1980, 43 U.S.C. 1611 n. This agreement is located in Bureau of Land Management case file AA-50585, and is recorded in the Anchorage Recording District, Book 708, Pages 295-456, and in the Palmer Recording District, Book 290, Pages 396-557; and
24. The terms and conditions of the Agreement of Alaska Railroad Corporation and Eklutna Inc. Settling Claims of Valid Existing Rights to Rail Properties of the Alaska Railroad and Providing for Conveyances Pursuant to the Alaska Native Claims Settlement Act and the Alaska Railroad Transfer Act of 1982, dated January 8, 1987, and the order of the Interior Board of Land Appeals, Adoption of Joint Motion of the Parties; IBLA 85-883 dismissed, dated April 29, 1987 (IBLA 85-875 to 85-883). A copy of the agreement and the order are located in Bureau of Land Management case file AA-64418.

IN TESTIMONY WHEREOF, the undersigned authorized officer of the Bureau of Land Management, in accordance with the provisions of the Act of June 17, 1948 (62 Stat. 476), has, in the name of the United States, caused these letters to be made Patent, and the Seal of the Bureau to be hereunto affixed.

(SEAL)

GIVEN under my hand, in ANCHORAGE, ALASKA
the TWENTY-EIGHTH day of SEPTEMBER
in the year of our Lord one thousand nine hundred and
NINETY-THREE and of the Independence of the
United States the two hundred and EIGHTEENTH.

By _____
Margaret J. McDaniel
Acting Chief, Branch of Cook Inlet
and Ahna Adjudication

Patent Number

60-08-0601

Attachment 5

CEI Groundwater Information



2000 ft

First Test pit at low point 1/2 way between the small knob and the edge of clearing. Then others can be placed off-set 100 yds or so, as shown if water is found.

small knob near west edge of the clearing

Area for first cell

4,795,848 sf

[illegible]

Melissa Branch

From: Bryce Hattenburg <bhattenburg@eklutnainc.com>
Sent: Tuesday, August 27, 2024 9:48 AM
To: Melissa Branch
Subject: FW: Fill Site investigation
Attachments: Tract 38 Map (2020 PDF) (2).pdf; QC Daily Report 08-14-2020.pdf

Here is the water monitoring information from CEI.

-Bryce

From: Shane Durand <sdurand@bsnc.net>
Sent: Thursday, August 15, 2024 12:19 PM
To: Bryce Hattenburg <bhattenburg@eklutnainc.com>
Subject: Fill Site investigation

Bryce

Looking back in the files for the Tract 38 site that had been identified for a potential Monofill I found the attached information.

We dug 4 test holes in August of 2020 to a depth of 19' No water was found, and perforated PVC pipes were installed to monitor the water depth. These locations were selected as they were spread at the lowest points of the site.

March 20, 2021 tubes were checked and dry

July 14, 2021 tubes were checked and dry

On August 19, 2022 after we had the rain season we went out and checked the monitoring tubes again and found them all dry.

On June 27, 2024 after our meeting I rechecked the tubes and they were still dry.

Let me know if you need anything else.

Shane Durand
Chief Operating Officer
Central Environmental Inc.
229 E. Whitney Road |Anchorage, AK 99501
Main (907)561-0125 |Mobile (907)350-6062
sdurand@bsnc.net |www.cei-alaska.com
<https://beringstraits.com/bering-central-holding/>
Follow us on Instagram at www.instagram.com/centralenvironmentalinc



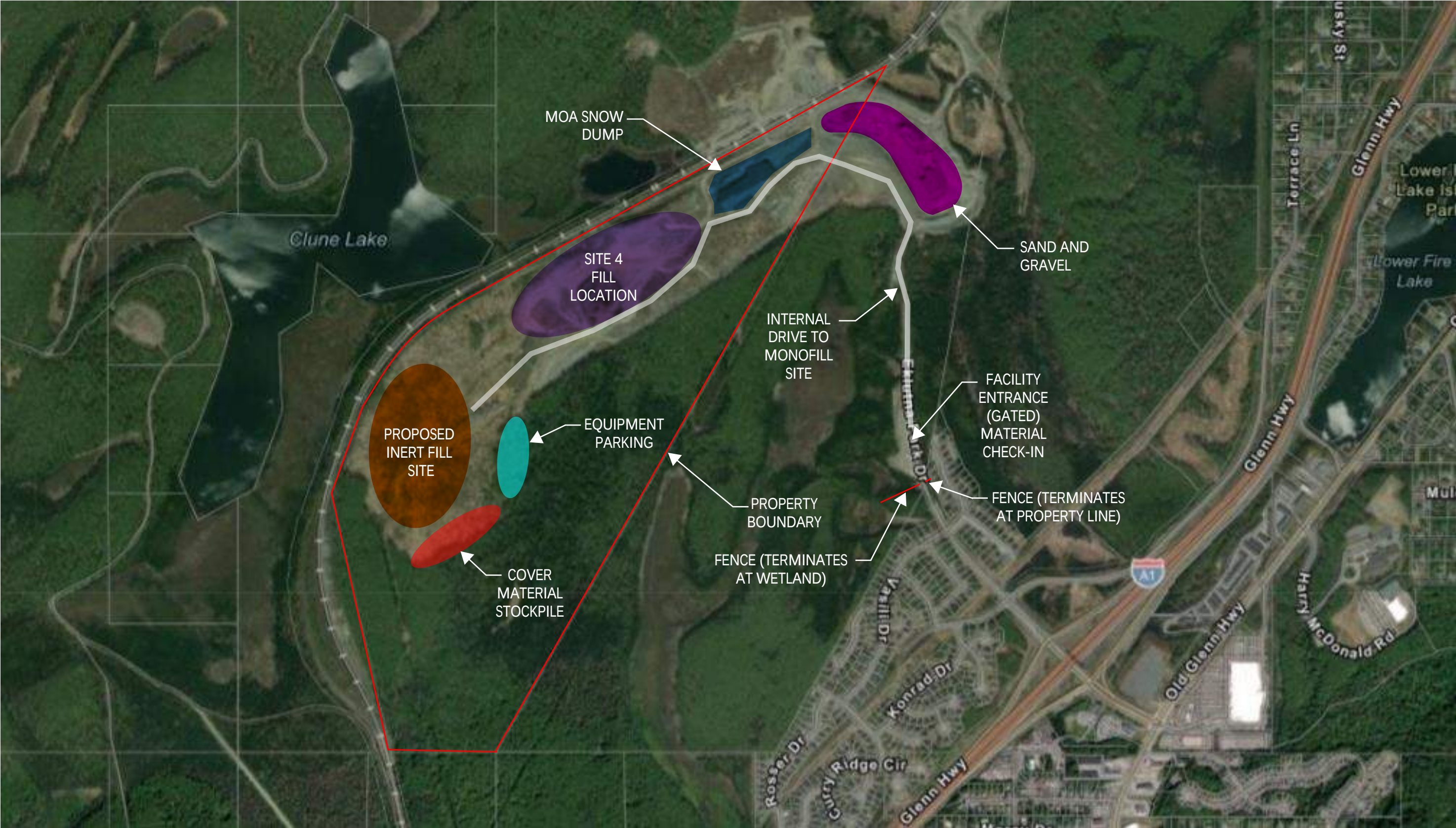
CENTRAL
ENVIRONMENTAL INC.
A BERING STRAITS NATIVE CORP. COMPANY

The Solutions Company

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Attachment 6

Site Activity Map



Eklutna Inc.
Tract 38, Eagle River Powder Reserve (B)
Site Map



Attachment 7

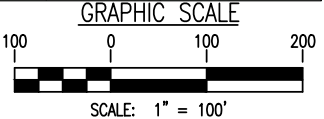
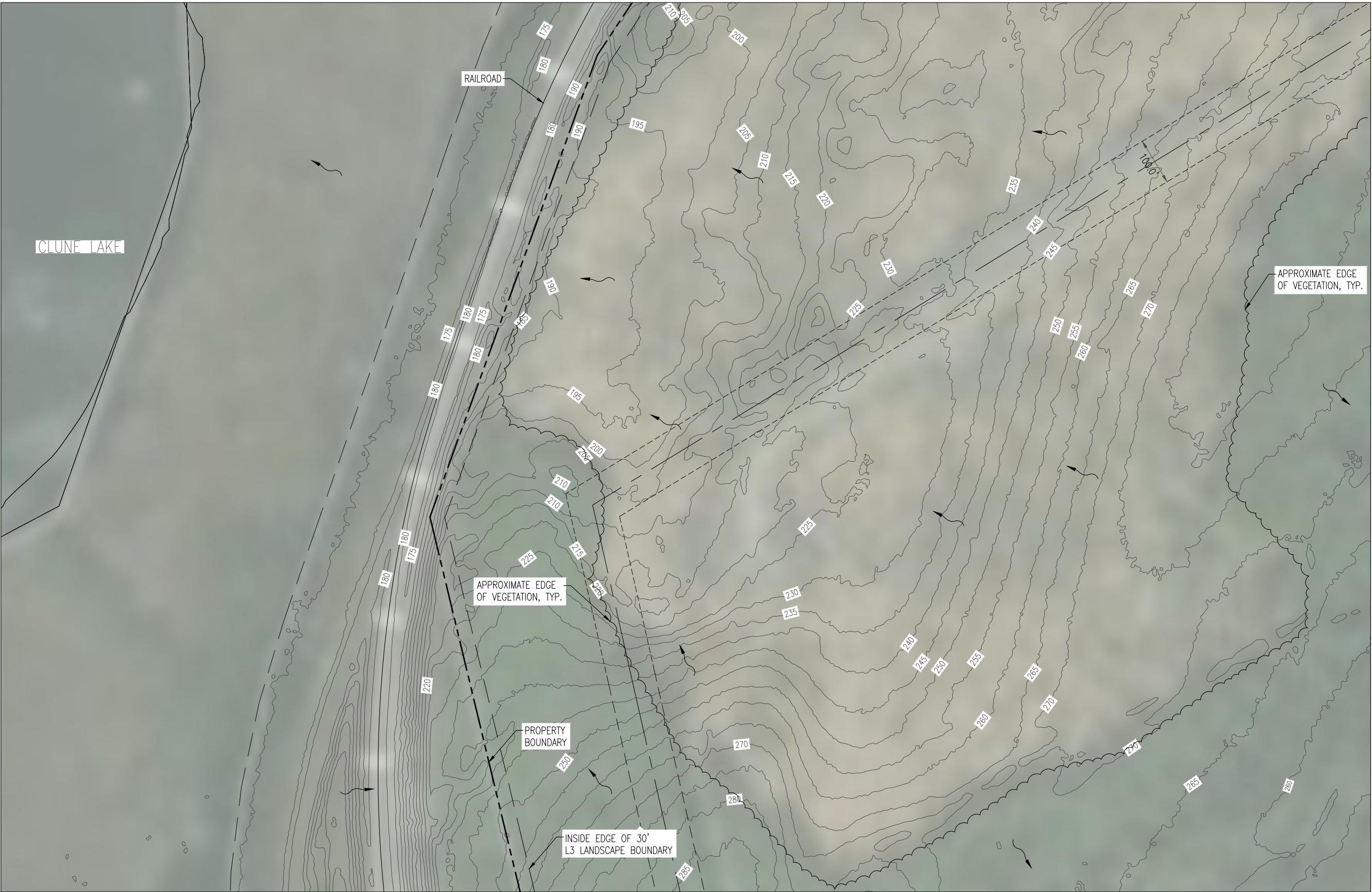
Site Drawings

EKLUNDA, INC.
INERT FILL SITE
TRACT 38, EAGLE RIVER POWDER RESERVE (B)

[illegible]

DATE	1.10.2024
NAME	TBD
REF ID	NW0550
SCALE	AS SHOWN
ENGINEER	MAB
DRAWN BY	MAB

C1.0



P.O. BOX 92946
ANCHORAGE, ALASKA 99509
907/360-0985
LICENSE # 102525

EKLUTNA, INC.
INERT FILL SITE

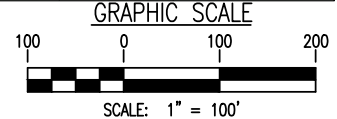
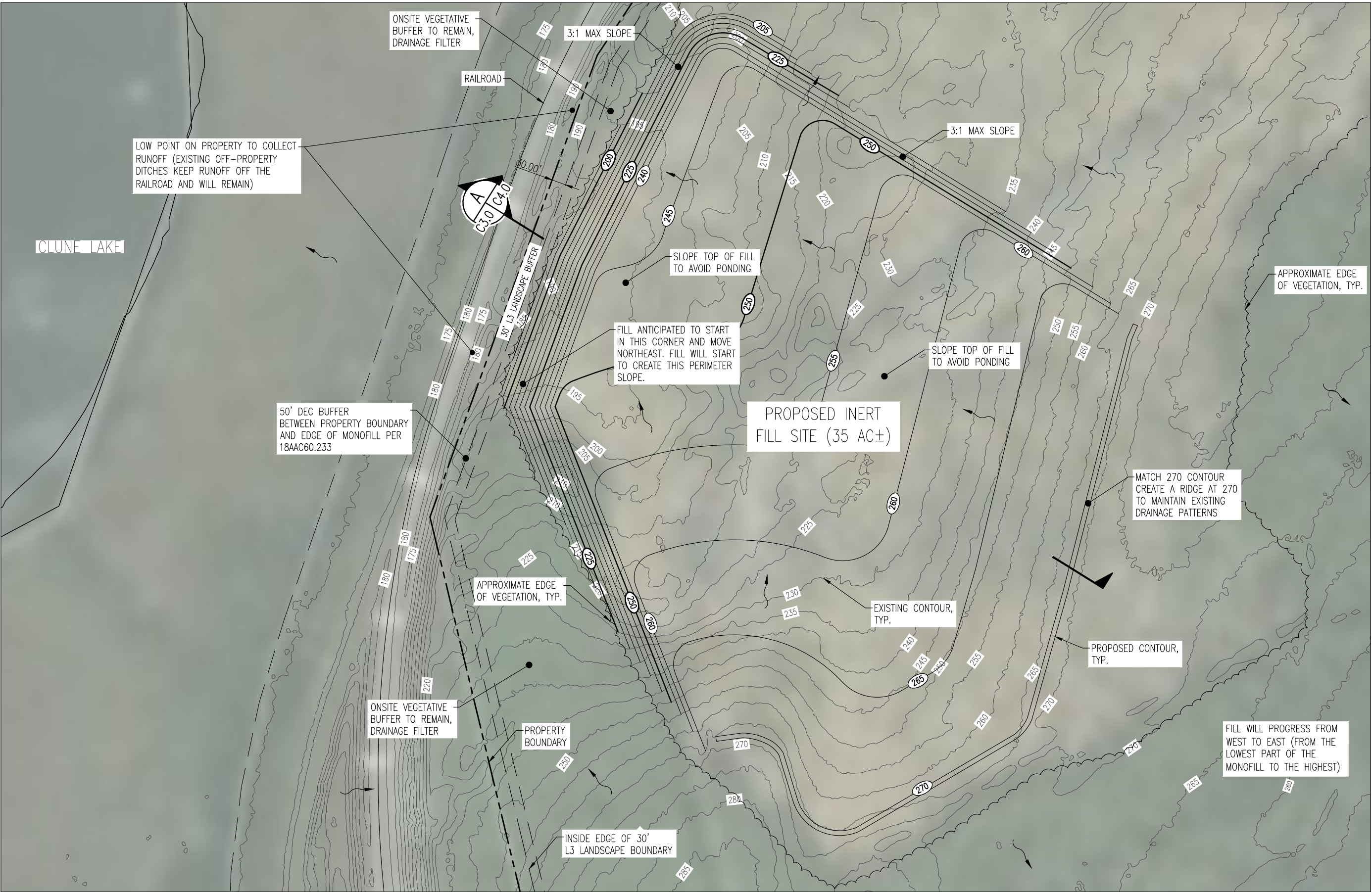
TRACT 38, EAGLE RIVER POWDER RESERVE (B)

										BY
										DESCRIPTION
										DATE
										REVISION

DATE	1.10.2024
PN	TBD
GRID	NW0550
SCALE	AS SHOWN
ENGINEER	MAB
DRAFTER	MAB

SHEET TITLE
EXISTING CONDITIONS PLAN

SHEET NUMBER
C2.0
2 OF 7



P.O. BOX 92946
ANCHORAGE, ALASKA 99509
907/360-0985
LICENSE # 102525

EKLUTNA, INC.
INERT FILL SITE

TRACT 38, EAGLE RIVER POWDER RESERVE (B)

REVISION	DATE	DESCRIPTION	BY
1	10/18/2024	RESPONSE TO DEC REVIEW COMMENTS	MAB

DATE	10.18.2024
PN	TBD
GRID	NW0550
SCALE	AS SHOWN
ENGINEER	MAB
DRAFTER	MAB

SHEET TITLE
SITE GRADING AND DRAINAGE PLAN

SHEET NUMBER
C3.0
3 OF 7

**EKLUTNA, INC.
INERT FILL SITE**

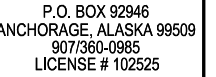
DATE	10.18.2024
PN	TBD
GRID	NW0550
SCALE	AS SHOWN
ENGINEER	MAB
DRAFTER	MAB

SHEET NUMBER

C4.0

4 OF 7





EKLUTNA, INC.
INERT FILL SITE

[illegible]

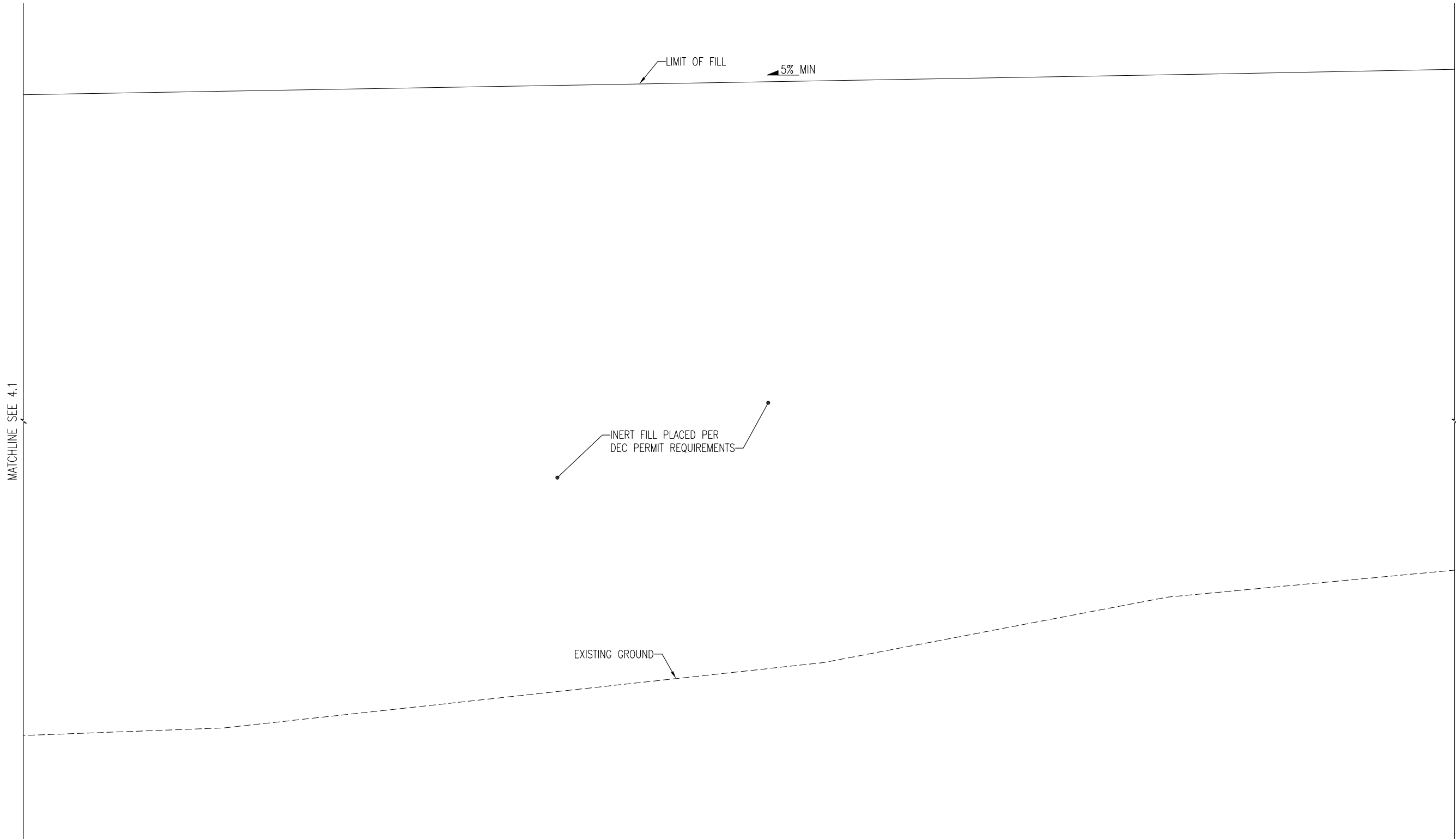
DATE	10.18.2024
PN	TBD
GRID	NW0550
SCALE	AS SHOWN
ENGINEER	MAB
DRAFTER	MAB

SHEET TITLE
SITE SECTIONS

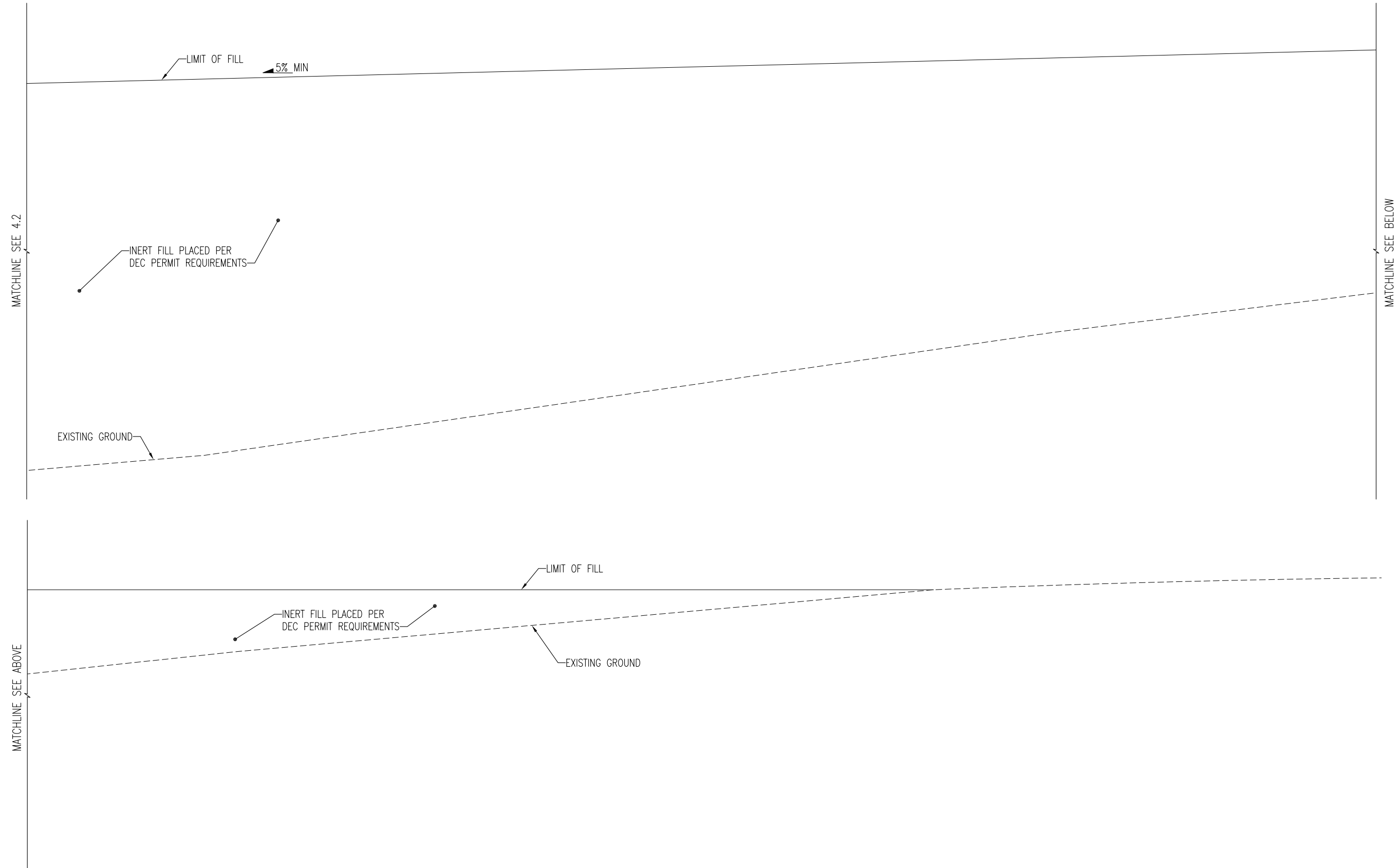
SHEET NUMBER

C4.2

6 OF 7



 NORTHWEST-SOUTHEAST SITE SECTION
SCALE: NTS



A NORTHWEST-SOUTHEAST SITE SECTION
C3.0 C4.0 SCALE: NTS



P.O. BOX 92946
ANCHORAGE, ALASKA 99509
907/360-0985
LICENSE # 102525

**EKLUTNA, INC.
INERT FILL SITE**

[illegible]

DATE	10.18.2024
PN	TBD
GRID	NW0550
SCALE	AS SHOWN
ENGINEER	MAB
DRAFTER	MAB

SHEET TITLE
SITE SECTIONS

SHEET NUMBER

C4.3

7 OF 7

Attachment 8
Operations Plan
(includes monitoring)

1. Operations Plans

a. Access Control

Eklutna's North Eagle River site is currently used for several different commercial purposes. Access to the property is controlled with a fence and sliding gate that is locked at the end of every shift. There is directional signage through the site to direct traffic; maps are provided to drivers, and additional signage will be added for the monofill operations. There are security cameras at the entrance of the facility as well. The measures will not change with the proposed monofill work.

The proposed hours of operation will be the same as the existing gravel fill site on the property. They are 7am to 6pm Monday through Saturday with no operations on Sundays or holidays. Specific hours and appointment-based scheduling for monofill disposal are being considered.

Truck drivers are already given specific dump locations and directions based on the material they are hauling. All trucks entering the site, including those carrying material for the monofill will be given their dump location by scale house staff before they continue into the site. Trucks are then monitored at the dump locations by field staff. The drivers will be rerouted if they are in the wrong location prior to dumping.

Roads are currently maintained with a motor-grader and water truck. Loaders and articulated off-road trucks are used to bring in additional material for major roadway repairs or improvements. During winter months, onsite roadways are cleared with on-site equipment to maintain passability.

Prohibited Activities. Access to this area is strictly prohibited; no permits for the general public will be issued. No trespassing signs will be posted along entry points to the facility. Access to the site is difficult with forest and wetland buffers, bordering JBER and railroad property, and persistent industrial presence in the area. Only industrial activities are allowed within the monofill operating area.

b. Waste Acceptance and Handling Policy

The materials to be used in the backfill operations include soils not meeting MOA classified material designations (organics, peat, etc.), stumps, and construction waste concrete. The concrete is already broken when it comes onto the property. Any exposed metal must be removed before it can be accepted on-site. Windows and masonry material from building demolition will have to show building surveys/proof of materials before they are accepted on the property.

Dimensional lumber that is not treated is accepted. Treated lumber will not be accepted; it will be sent to the Anchorage Landfill. Treated wood will be identified through the building survey and screening work.

In addition to the building/site surveys, all loads are visually inspected by staff when entering the property and at the monofill by field staff before placement. There are also cameras at the scale on-site to serve as backup monitoring.

Salvaging. The only salvaging that is anticipated is metal. Any metal will be removed and placed in a container for transport. Any metal salvaging that occurs will not interfere with the monofill operations, create a safety hazard, or cause pollution. Salvaging will not be allowed by the general public. ESL staff will segregate metal as part of the disposal process.

Any operator seeking to have fill materials placed must provide a Hazardous Building Materials Survey by an Asbestos Hazard Emergency Response Act (AHERA) certified building inspector and analysis by a certified laboratory to ensure that identification of any asbestos-containing materials (ACM) or other hazardous materials in the structure have been removed prior to demolition activities and transport to the monofill. Other documentation may be requested by Eklutna to ensure that hazardous materials are not being disposed of at this monofill. All Waste Acceptance Forms, building surveys, and analysis will be electronically scanned in and available for review.

If analysis for lead concentration exceeds 400mg/kg, the debris will not be accepted.

If contaminated or prohibited materials are identified, they will be removed from the site according to the specific handling requirements and transported to an approved disposal facility. If hazardous materials are disposed of at the monofill, the appropriate agencies will be contacted immediately and appropriate remediation measures will be taken.

See Attachment 1 for Acceptance Criteria and Disposal Authorization Form.

c. Waste Placement Plan

Backfill activities will occur as construction debris is brought to the site. Eklutna Land Services, LLC (ESL) staff will inspect loads before they are placed into a cell.

Fill will be consolidated and placed within cells before it is covered. Daily cover combined with the individual cells that consolidate material will prevent material from being scattered across the site.

Material will be placed in 8- to 10- foot lifts starting at the low point of the site. Upon completion of the base lift, intermediate cover will be placed. Operations will be on top of the preceding lift, where another lift will be placed. Each new lift will leave an approximate 20-foot band around the preceding lift perimeter for use as an equipment access route. This process will continue until the ground surface elevation is reached. The working face will be limited to 75 to 100 feet.

Each completed cell and non-RACM will be covered using intermediate cover material. Intermediate cover material is classified or unclassified fill material from the on-property mining operations. The fill will be placed and then track-walked with a compactor or bulldozer so that the materials will not be shredded.

Non-RACM materials will be covered within 24 hours of being received. General debris will be covered every 3-4 days (on average), unless weather conditions demand litter control.

Only active cells will be left uncovered during monofill construction and operations. No materials will be left uncovered longer than 90 days (excluding non-RACM which will be covered within 24 hours). If a temporary or seasonal shutdown is to occur for more than 90 days, at least one foot of cover material will be placed and compacting within seven days after waste is last deposited.

d. Waste Cover Plan

Each day, fill in each of the active monofill cells will receive a topsoil covering, with an average depth of 12 inches.

As the backfill operation work is completed in a cell, it will receive a final topsoil cover and be seeded to stabilize it.

Cover material will be placed on the outside of each lift, essentially sealing it in and stabilizing the slope. An access band will be placed, which reduces the potential for instability and provide a safe working area around the face of the fill.

Cover material will be obtained from the existing mining operation on the property. The material will be transported from the mining location and stockpiled for placement at the monofill location.

The site will be graded, during operations, and at final stabilization, so that water does not pond on top of the fill.

e. Non-RACM Waste Placement Plan

The site desires to add shredding in the future. At this time, they have no capability for it though. Non-RACM material will be segregated/separated from other fill and placed in a separate cell. If shredding is to be added, we will modify the permit with DEC.

Non-RACM materials will be inspected while still in the container to ensure it has not been crushed or crumbled. If it has, it will not be accepted.

Non-RACM materials will be covered within 24 hours of being received. Cover material is State of Alaska Type C material. Lifts will be a minimum of 12" of soil and compaction will not begin until a minimum of 6" of cover has been achieved. Material will be placed in a manner that will mitigate the generation of dust and prevent material from becoming friable.

Prior to bringing materials to the site, operators must provide a Hazardous Building Materials Survey by an Asbestos Hazard Emergency Response Act (AHERA) certified building inspector and analysis by a certified laboratory to ensure that identification of any asbestos-containing materials (ACM) or other hazardous materials in the structure have been removed prior to demolition activities. They will need to complete an authorization form to submit with the reports for review and approval.

f. Surface and Storm Water Control Plan

The proposed inert fill site work will be constructed and graded so that storm water and sediment remain on-property. There is a natural, undisturbed vegetated buffer on-property to provide treatment. The proposed slopes will be shallow enough to plant vegetation as part of the project closeout work. The proposed slope on the top of the fill will prevent ponding and infiltration will eliminate any potential runoff down the slopes. The surface in the project area is exposed soils right now; the reclamation work will reduce runoff since the surface will be stabilized with vegetation.

Containment berms along with natural topography and vegetative buffers will be used to contain any potential run-off. Given the nature of the fill allowed (non-hazardous and non-putrescible), there shouldn't be a potential for material to decompose and contaminate surrounding water sources.

The property, other than the snow disposal site, is not active during the winter months. Any snow plowing that occurs is kept on-property to meet MOA requirements. Snow, like rainfall drainage, is kept on-property by the shaping and working of the material.

The monofill will not be used for snow storage. Snow storage occurs at a designated and permitted location approximately 4,500 feet from the monofill location on the property.

g. Litter, Vector, and Nuisance Control Plan

This is an inert fill site that does not accept organic materials that have the potential to decompose or leach chemicals. Odors are generally created by the decomposition of those organic materials which will not be present. Without the decomposition and resulting odors, this site should not attract additional wildlife.

Daily cover will prevent material from being scattered across the site.

Noise levels will remain consistent with the existing site gravel operations. This monofill operation will be run utilizing the same type of equipment that is currently being used at this facility.

h. Corrective Action Plan

If unacceptable material is brought to the site, it will have to be removed as part of the screening process. If any improper or unauthorized waste is deposited on-property, it will be cleaned up per existing safety protocols and removed from the site and properly disposed of off-site.

Placement of the material will be made by trained personnel. If there is damage to the cells, work will be done to repair them appropriately.

If a violation of regulations or permit conditions does occur, Eklutna will contact DEC immediately to address and correct them.

If the waste gathers enough heat to combust or create a fire, appropriate action will be taken to stop the burning and coordinate as needed for corrective actions beyond that.

Daily inspections and corrective actions are anticipated to help mitigate any issues.

i. Operator Training

Operators are trained before beginning work on the property. Operators also receive regular on-site training as needed. Each operator has a record kept by the Eklutna staff that is regularly reviewed and updated.

Eklutna staff working the monofill will have the appropriate certifications, including Certified Asbestos Work, 40-hour HAZWPR, and Manager of Landfill Operations (MOLO) training. They will attend regular training to maintain their certifications and keep their training current.

j. Operating Record

The operating record will be kept at the property entrance building location, along with the operator records and other site information. This will be available upon request and the scale house on-site.

2. Monitoring Plan

a. Visual Monitoring Plan

Each day, at the start of each shift and throughout the day, the monofill will be visually inspected to ensure it is in operating order – that there is no debris, the cap is in place and is of adequate depth, and nothing has been disturbed. As fill is placed, visual

inspections will also occur so that material can be placed appropriately. See Attachment No. 2 for the daily inspection plan.

b. Surface Water Monitoring Plan

Operators will, as part of their daily visual inspections, note any surface water flow changes – either creating issues for the cells locations or if it has altered and is leaving the property so that corrective actions can be taken.

c. Groundwater Monitoring Plan

If groundwater monitoring is required, we will work with DEC to prepare the required plan.

d. Other Required Monitoring Plan

If DEC wants additional information and monitoring, we will work with them to provide it.

Eklutna Services, Inc.
Eagle River Monofill Site

Acceptance Criteria and Disposal Authorization Form

Date _____

REQUESTOR INFORMATION

Point of Contact _____
Company _____
Address _____
Phone _____
Email _____

PROJECT INFORMATION

Name _____
Project Number _____
Location _____
Address _____

Owner _____
Phone _____
Email _____

Material _____
Estimated Quantity (CY) _____
Requested Dates _____

HAZARDOUS MATERIAL SURVEY ATTACHED

Yes _____ No _____

LABORATORY ANALYSIS ATTACHED

Yes _____ No _____

CERTIFICATION STATEMENT

I certify that the material being shipped, transported, or received at the Eklutna Monofill site are non-RACM materials.

Name _____
Signature _____
Title _____
Company _____
Date _____

Eklutna Services, Inc.
Eagle River Monofill Site
Acceptance Criteria and Disposal Authorization Form

TO BE COMPLETED BY EKLUTNA SERVICES, INC.

Approved _____ Declined _____

By _____

Date _____

Rate _____

Notes:

Eklutna Services, LLC
Daily Inspection Form

Name:			Date:	
LANDFILL OPERATIONS	YES	NO	COMMENTS: Potential Issues	
No unpermitted storage activities:				
No indications of "prohibited/unauthorized" waste				
Inert and C&D wastes are properly segregated and designated areas specified in the Operations Plan areas specified in the Operations Plan				
Wastes placed, compacted, and covered as specified in the Operations Plan				
The surrounding area is free of loose C&D debris				
Cover material is properly placed to contain debris				
No indications of landfill settlement				
Erosion control elements inspected for structural integrity				
C&D/Non-RACM materials are not placed within 500 feet of active drinking water well				
No evidence of odors or steam in monofill materials				
No evidence of fire or combustion in monofill materials				
Safety devices checked for proper function				
Inventory, visual inspection, and operating records are complete and properly documented				
Other:				
WATER CONTROL ISSUES	YES	NO	COMMENTS: Potential Issues	
No accumulated water on landfilled material				
No indications of cover material erosion				
Integrity of site drainage control features				
No precipitation/ snowmelt runoff was observed within the monofill				
No indicates of landfill leachate				
Other:				
ENVIRONMENTAL IMPACT	YES	NO	COMMENTS	
Signs of stressed vegetation				
Other:				
SECURITY	YES	NO	COMMENTS	
Signs Posted and in good condition:				
No signs of unauthorized entry or vandalism:				
Fences are continuous, standing, and in good repair:				
Facility manned (if operating)				
Facility locked (if closed)				
Other:				
CORRECTIVE ACTIONS TAKEN:				
Completed by:	Title:		Date:	

**Attachment 9
Site Operations Map
and Existing Signage**

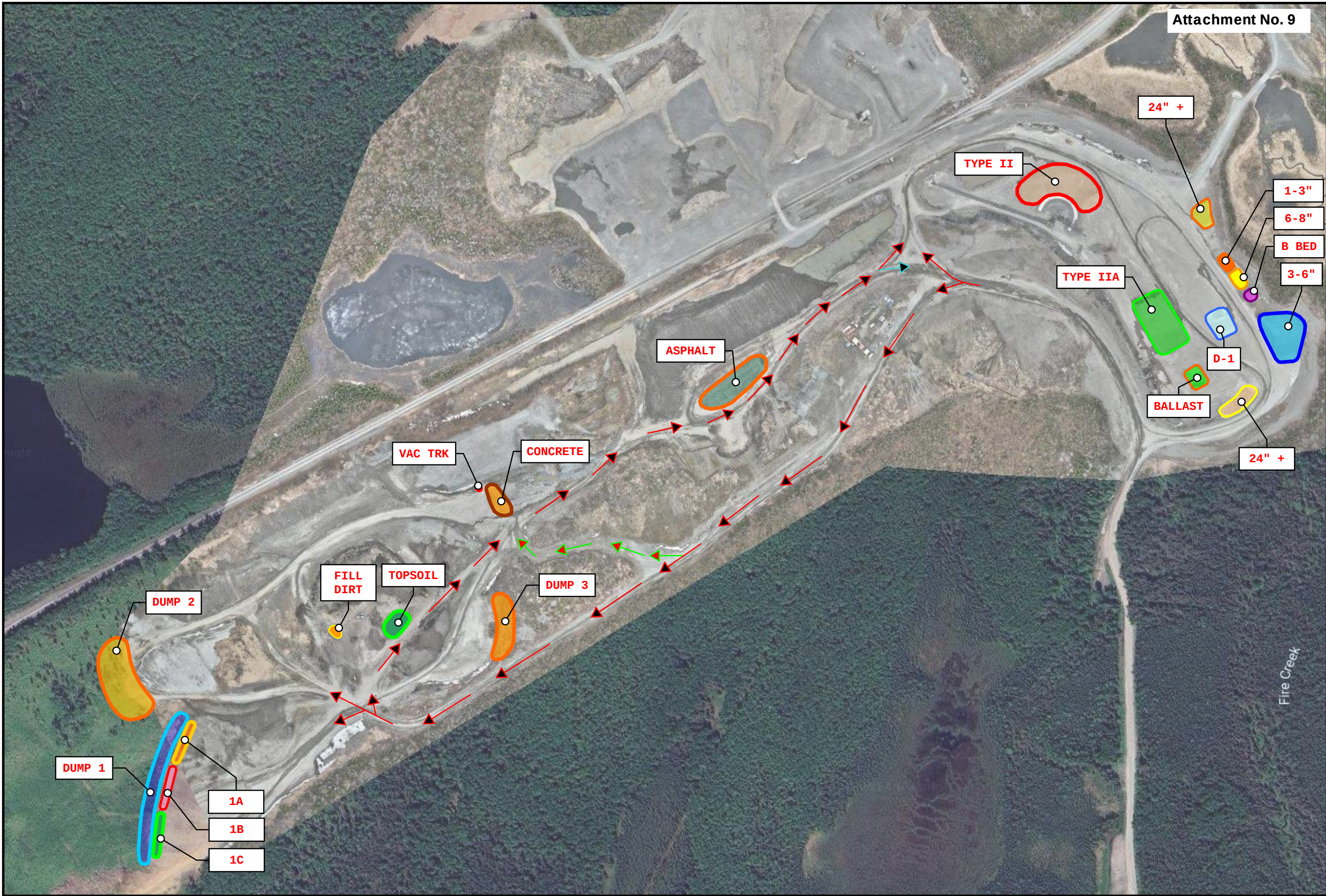


FIGURE TITLE:

PROJECT NAME:

PROJECT LOCATION:

EKLUTNA SERVICES, LLC

16515 CENTERFIELD DRIVE, STE 201
EAGLE RIVER, ALASKA 99577



Eklutna Services LLC



Main (Only) Entrance to Property



Sign of left side



Sign on right side



Check-In Sign at Entrance



Directional sign for existing
dump site locations

Attachment 10

Stability Analysis

January 10, 2025

Melissa Branch, P.E.
Big City Engineers, LLC
PO Box 92946
Anchorage, AK 99509

Civil
Engineering

Subject: Slope Stability Analysis
Eklutna Monofill

Geotechnical
Engineering

Transportation
Engineering

Aviation
Engineering

W/WW
Engineering

Environmental
Services

Surveying &
Mapping

Construction
Administration

Material
Testing

In accordance with the request of Big City Engineers, LLC (BCE), HDL Engineering Consultants, LLC (HDL) conducted a slope stability analysis for the proposed development in Eagle River, Alaska. This letter report (Report) provides the findings and conclusions that HDL derived from the slope stability analysis. This Report includes a description of the project, description of the slope stability analysis, and discussion of the stability under static and seismic conditions. This Report is subject to the attached limitations.

BACKGROUND

The proposed development is located southeast of Clune Lake and east of the Alaska Railroad on Tract 38 of the Eagle River Powder Reserve (B) in Eagle River, Alaska (Site). We understand Eklutna Inc. (Eklutna) Plans to construct a monofill to accept construction and demolition debris (C&D Material) such as wood, concrete, masonry, and rebar. The proposed monofill will also accept non-regulated asbestos-containing materials (non-RACM) such as flooring, shingles, drywall, and insulation.

HDL understands BCE is currently supporting Eklutna with permitting and design. During an initial review, the Alaska Department of Environmental Conservation (ADEC) requested a stability analysis of the proposed development under static and seismic conditions. Pending ADEC approval, Eklutna plans to begin accepting C&D Material in the spring of 2025.

EXISTING CONDITIONS

The Site is located southwest of Eklutna's Site 4 which serves as an existing gravel quarry, excavation disposal site, and snow storage. The approximately 35-acre Site is clear of trees but the organic mat remains. The grade at the Site generally rises to the south and east with the western boundary having an elevation ranging from 190 feet to 200 feet and the eastern and southern boundary having an elevation of approximately 270 feet. See the attached Existing Conditions Plan for more detailed topographic information.

PROPOSED DEVELOPMENT

We understand Eklutna will accept both typical C&D Material as well as non-RACM. Eklutna will separate the non-RACM from the remaining C&D Material and dispose of it in a separate cell. HDL understands that the non-RACM will be a relatively small portion of the material imported to the Site.

Eklutna will cover the imported waste with Intermediate Cover Material on a regular basis and at the completion of each lift. Eklutna generally anticipates covering non-RACM within 24 hours of receiving and C&D Material every 3 to 4 days. The Intermediate Cover Material will generally consist of classified or unclassified fill from Eklutna's Site 4 mining operation. We anticipate the Intermediate Cover Material to be granular and meet the Alaska Department of Transportation and Public Facilities (DOT&PF) Standard Specifications requirements for Selected Material, Type C, or better. We understand Eklutna will place the Intermediate Cover Material in 12-inch lifts and compact the lifts to a density of at least 90% of the maximum dry density as determined by AASHTO T 180.

HDL understands that C&D Material will be placed in 8-foot to 10-foot lifts beginning in the northwest portion of the Site where the existing elevation is the lowest. Eklutna will place Intermediate Cover Material over each lift of waste. Operations will continue on the top of the preceding lift. HDL understands that an approximately 20-foot wide perimeter will remain around each lift to facilitate equipment access. Eklutna will fill the space between cells with Intermediate Cover Material or other granular classified fill material. Eklutna will continue to place additional lifts in a similar manner until reaching the final proposed elevation.

The Site Grading and Drainage Plan, dated January 10, 2024, indicates the final elevation of the proposed monofill will be approximately 270 feet along the southern and eastern boundaries. The top of the final condition will generally have a 2% slope from southeast to northwest. The maximum fill thickness appears to be approximately 55 feet near the western boundary. The Site Grading and Drainage Plan and Site Sections indicate a maximum fill slope of 3 horizontal to 1 vertical (3H:1V). See the attached Site Grading and Drainage Plan and Site Sections for more detailed information.

HISTORICAL GEOTECHNICAL STUDIES

HDL reviewed geotechnical data available from previously completed evaluations at the Site. The following section summarizes the data reviewed.

■ *Central Environmental Inc. – August, 2020*

Central Environmental Inc. (CEI) performed 4 test pits at the Site in August of 2020 to evaluate the subsurface soil and groundwater conditions and install groundwater monitoring wells. The test pits ranged in depth from 18.5 feet to 19 feet below the existing ground surface (bgs). In general, the test pits encountered 1 foot of silty sand, interpreted to be topsoil, followed by gravelly sand with cobbles and boulders extending to the test pit termination depths. The test pits did not encounter

free groundwater at the time of the excavation. CEI installed perforated, 1.5-inch diameter PVC in the test pits to monitor groundwater conditions at the Site. CEI checked the monitoring wells in March and July of 2021, August of 2022, and June of 2024 and did not observe groundwater in the PVC. See the attached test pit records and groundwater monitoring information for more details.

STABILITY ANALYSIS

HDL used Seequent's SLOPE/W limit equilibrium slope stability software to analyze the stability of the proposed monofill under static and seismic conditions. HDL used the Morgenstern-Price limit equilibrium method for all analyses.

HDL modeled the stability of the proposed monofill in the final closed condition based on the proposed geometry shown in the attached Site Grading and Drainage Plan. HDL developed the model input conditions such as material properties, groundwater conditions, and seismic coefficients using site-specific information, empirical data, or estimated values based on engineering judgement. The following sections summarize the material properties used in the analysis.

Material Properties

HDL used four different materials in the development of the model based on the existing conditions described in the exploratory test pits and the proposed operations of the monofill. The materials included cover material, mixed C&D Material and cover material, and the existing shallow silty sand and underlying gravelly sand.

The three material properties used in the stability model are unit weight, friction angle, and cohesion. HDL used information from the exploratory test pits, engineering judgement, and experience with similar material to develop the material properties for the silty sand, gravelly sand, and cover material. The engineering properties of the C&D Material is more challenging to estimate due to the heterogeneous nature of the waste, large particle size, and varying structure. The presence of intermediate cover material within the matrix of the overall monofill also adds to the variability of the material properties. HDL used the limited publically available information and empirical data to estimate the material properties of the proposed mixture of C&D Material and cover material.

HDL modeled a range of values for each material in an effort to evaluate the sensitivity of the model to each material type and property. Table 1 summarizes the material property ranges evaluated.

Table 1: Material Property Ranges

Material	Properties		
	Unit weight (pcf)	Friction Angle (°)	Cohesion (psf)
Silty Sand	80-100	25-28	0-100
Gravelly Sand	110-130	30-34	0
Cover Material	100-135	25-34	50-500
Mixed C&D and Cover Material	90-120	30-40	0-300

The sensitivity analysis indicated that the stability of the monofill is most sensitive to changes to the C&D Material properties. HDL generally selected material properties on the conservative side of the range of values presented in Table 1. HDL generally used engineering properties from a 2013 paper published in the Bulletin of the Geological Society of Greece for the Mixed C&D and Cover Material (Konstantopoulou G., Spanou N., 2013). Table 2 summarizes the material properties used in the model.

Table 2: Modeled Material Properties

Material	Properties		
	Unit weight (pcf)	Friction Angle (°)	Cohesion (psf)
Silty Sand	80	25	0
Gravelly Sand	120	32	0
Cover Material	110	28	150
Mixed C&D and Cover Material	100	32	100

Groundwater

Test pits and groundwater monitoring performed by CEI did not encounter groundwater within 19 feet of the existing ground surface. HDL does not anticipate the proposed monofill to effect the static groundwater depths at the Site and did not include static groundwater in the stability due to the depth below the base of the monofill. However, perched groundwater within the monofill will increase the pore water pressure and decrease the overall stability. We understand Eklutna plans to manage surface water upslope of the monofill as well as compact the cover material at completion to reduce permeability. HDL recommends vegetating the monofill at closure to reduce the infiltration during rain events. In addition, HDL generally anticipates the C&D Material and intermediate cover material to be more permeable than traditional municipal solid waste and unlikely to hold water.

Seismic Parameters

Alaska Administrative Code 18 AAC 60.41 requires that a new monofill must comply with the requirements for seismic impact zones as detailed in 18 AAC 60.320. This section of code requires landfills constructed within seismic impact zones be designed to resist the maximum expected horizontal acceleration in lithified earth material, which is conservatively considered the peak ground acceleration

January 10, 2025

(PGA). A seismic impact zones is an area with a 10 percent or greater probability that the PGA, expressed as a decimal fraction of the earth's gravitational pull (g), will exceed 0.1 g in 250 years. This probability is equivalent to a 2 percent probability of exceedance in 50 years with a return period of 2,475 years.

HDL used the online USGS Unified Hazard Tool to determine the PGA anticipated for the 2,475-year return period for the Site based on the 2007 Alaska Seismic Hazard Model (v2.0.x). The resulting PGA of 0.68 indicates that the Site is located in a seismic impact zone. The US EPA (1995) recommends using the bedrock acceleration to represent the acceleration at the base of the monofill without any attenuation or amplification.

Modeled Conditions

Based on guidance from ADEC, HDL modeled the monofill at final closure. HDL used topographic information and final proposed grades provided by BCE, as shown on the attached Site Grading and Drainage Plan, to create a cross-section near the maximum proposed fill height. The modeled cross-section, shown in red, has a 2 percent grade across the top and a 3H:1V slope at the west edge with a maximum height of 55 feet. HDL modeled the full cross-section under both static and seismic conditions. The primary failure mechanism involved arc failures of the 3H:1V slope. We do not anticipate block failures or global failures extending further into the monofill to be the primary failure mechanisms.

The US EPA (1995) recommends that landfills achieve a minimum factor of safety of 1.5 under static conditions and 1.0 under non-static (seismic) conditions. If the factor of safety under seismic conditions is determined to be less than 1.0, the US EPA (1995) recommends re-running the analysis with one-half of the seismic coefficient ($0.5 \times 0.68 = 0.34g$). The US EPA (1995) notes that if the factor of safety is greater than or equal to 1.0 using this reduced seismic coefficient the deformations will be less than 1 foot and considered acceptable for solid waste landfills. Factors of safety of less than 1.0 require performing a separate deformation analysis.

RESULTS

Table 3 provides the calculated factors of safety for the western slope. See the attached SLOPE/W base model and output files corresponding to the analyses described in Table 3 for more details.

Table 3: SLOPE/W Results

Analysis	Factor of Safety
Circular Arc – Static	2.26
Circular Arc – Seismic	0.62*
Circular Arc – Seismic (1/2 PGA)	1.02**

* The seismic factor of safety is less than 1.0. HDL reduced PGA to half of its original value and reanalyzed the model.

** Indicates permanent deformations of less than 1 foot.

The factor of safety for the slope analyzed under static conditions exceeded the recommended minimum of 1.5, indicating the monofill is stable under static conditions. The factor of safety for the slope analyzed under seismic conditions did not exceed the recommended minimum of 1.0. HDL re-ran the analysis using one-half of the PGA, resulting in a factor of safety of 1.02, indicating permanent deformation of less than one foot, generally considered acceptable for landfills.

OPINION

The proposed monofill design is generally within the acceptable factors of safety under static and seismic conditions. HDL recommends vegetating or stabilizing exterior side slopes to prevent shallow surface failures. HDL recommends managing surface water, compacting the final cover material, and vegetating the monofill prior to closure to minimize infiltration and erosion. HDL did not analyze shallow failures resulting from temporary construction loading. Operators should take care when repairing or working on exterior side slopes as temporary construction loading may impact the stability of the slope and result in failures.

REFERENCES

- Alaska Department of Environmental Conservation. (2023) 18 AAC 60 Solid Waste Management. ADEC
- Gregory N. Richardson, et al. (1995) RCRA Subtitle D (258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities. United States Environmental Protection Agency.
- Konstantopoulou G. and Spanou N. (2013) Stability Analysis of Construction and Demolition Waste (CDW) Deposits in the Abandoned Quarry of Profitis Ilias, Konzani Greece. The Geologic Society of Greece.

January 10, 2025

LIMITATIONS

This Report is subject to the attached limitations.

We appreciate the opportunity to assist you with this important project. If you have any questions, please contact Jeremy Dvorak at jdvorak@hdlalaska.com or 907.564.2121.

Prepared by:
HDL Engineering Consultants, LLC

Reviewed by:
HDL Engineering Consultants, LLC

James Salter, EIT
Geotechnical Engineering Assistant
e: jsalter@HDLalaska.com | d: 907.564.2120

Jeremy Dvorak, PE
Geotechnical Services Manager
e: jdvorak@HDLalaska.com | d: 907.564.2121

Attach:

- Limitations – 2 Pages
- Existing Conditions Plan – 1 Page
- Site Grading and Drainage Plan – 1 Page
- Site Sections – 4 Pages
- Central Environmental Inc. Test Pit Records – 2 Pages
- CEI Groundwater Monitoring Data – 2 Pages
- Unified Hazard Tool – 2 pages
- SLOPE/W – Base Model – 1 Page
- SLOPE/W – Static Conditions – 6 pages
- SLOPE/W – Seismic Conditions – 6 pages
- SLOPE/W – Seismic (1/2 PGA) Conditions – 6 pages

GEOTECHNICAL LIMITATIONS

Use of Report

1. HDL Engineering Consultants, LLC (HDL) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to HDL.
2. If substantial time has elapsed between submission of this report and the start of work at the site, or if conditions have changed because of natural causes or construction operations at or adjacent to the site, we recommend that HDL be retained to review this report to determine the applicability of the conclusions considering the time lapse or changed conditions.

Standard of Care

3. HDL's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Proposal for Services and/or Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the design has been altered in any way, HDL shall be so notified and afforded the opportunity to revise the report, as appropriate, to reflect the unanticipated changed conditions.
4. HDL's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

Subsurface Conditions

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs.
6. Unanticipated soil conditions are commonly encountered and cannot be fully determined by merely taking soil samples or advancing borings. Such unexpected conditions frequently require additional expenditure to attain a properly constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs.
7. In preparing this report, HDL relied on certain information provided by the Client, state

and local officials, and other parties referenced therein which were made available to HDL at the time of our evaluation. HDL did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

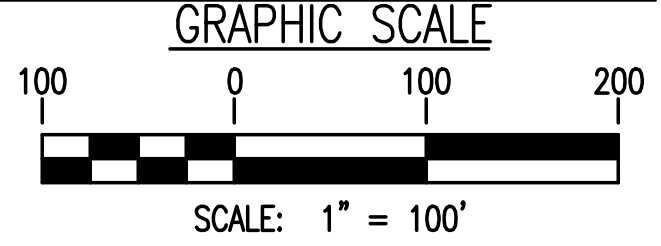
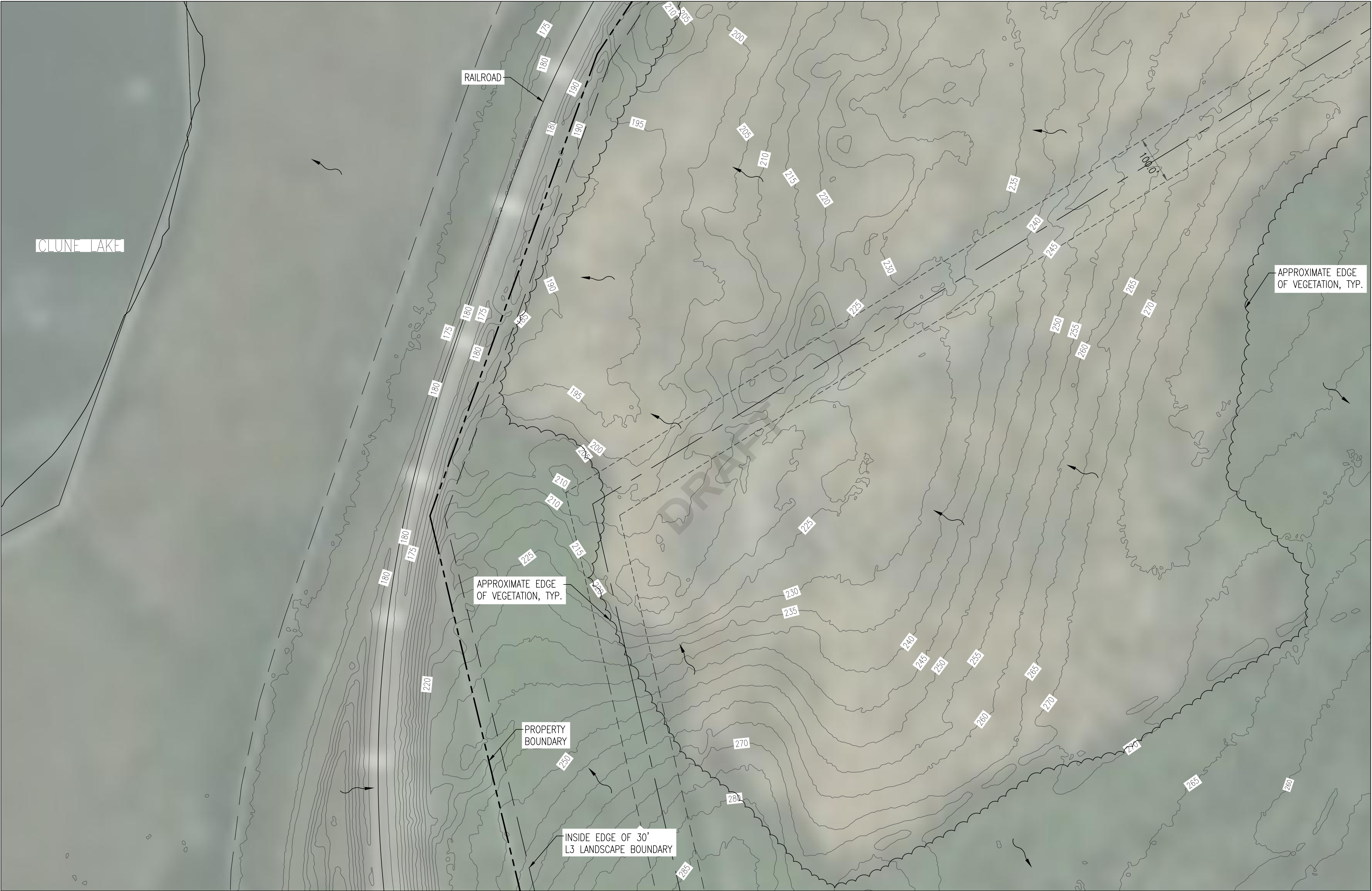
8. Water level readings have been made in test holes (as described in the Report) and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The water encountered in the course of the work may differ from that indicated in the Report.
9. HDL's services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on construction activities, or the use of structures on the property.
10. Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

Compliance with Codes and Regulations

11. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

Additional Services

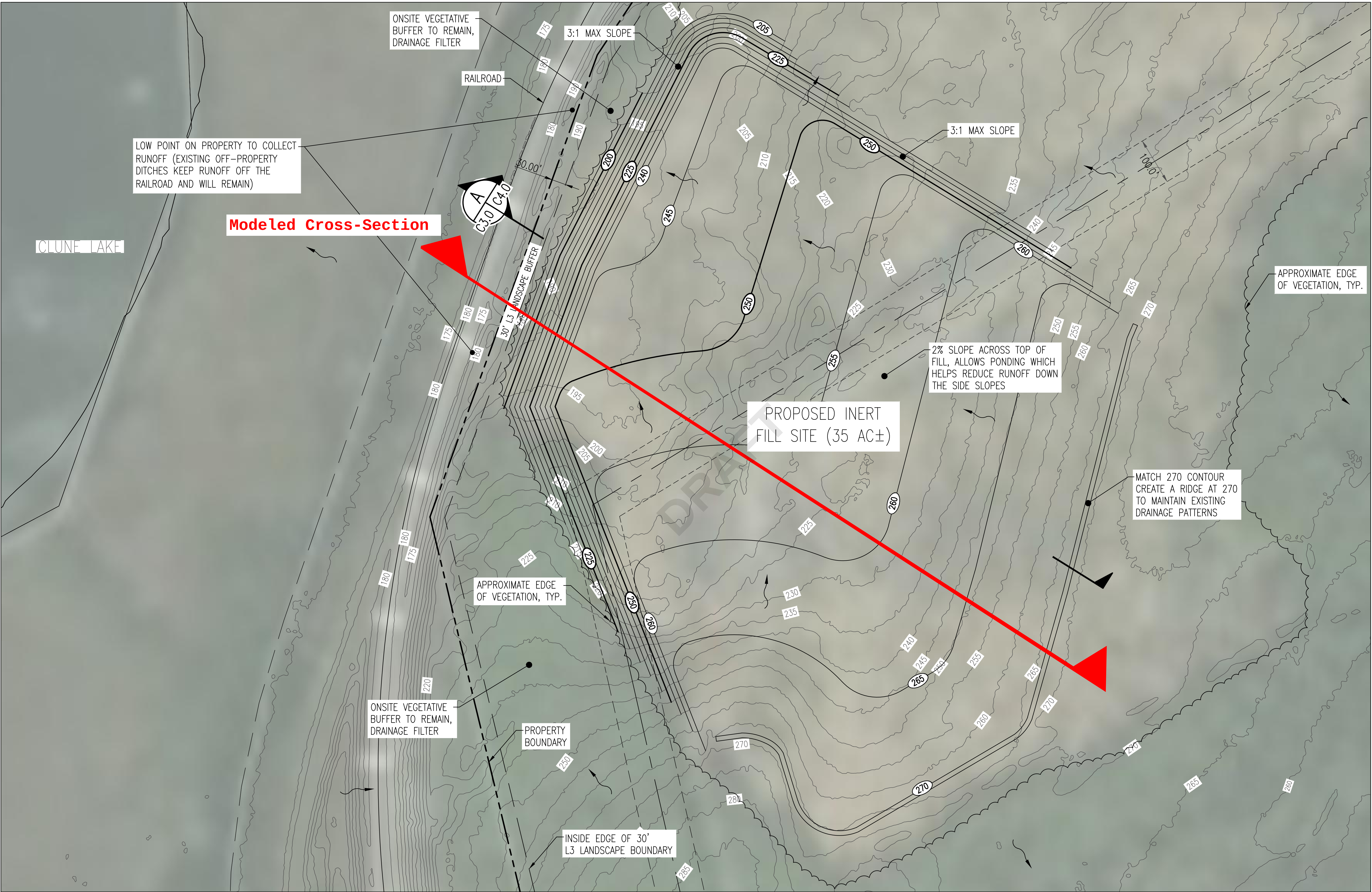
12. HDL recommends that we be retained to provide services during any future: site observations, design, implementation activities, construction and/or property development/redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.



REVISION	DATE	DESCRIPTION	BY

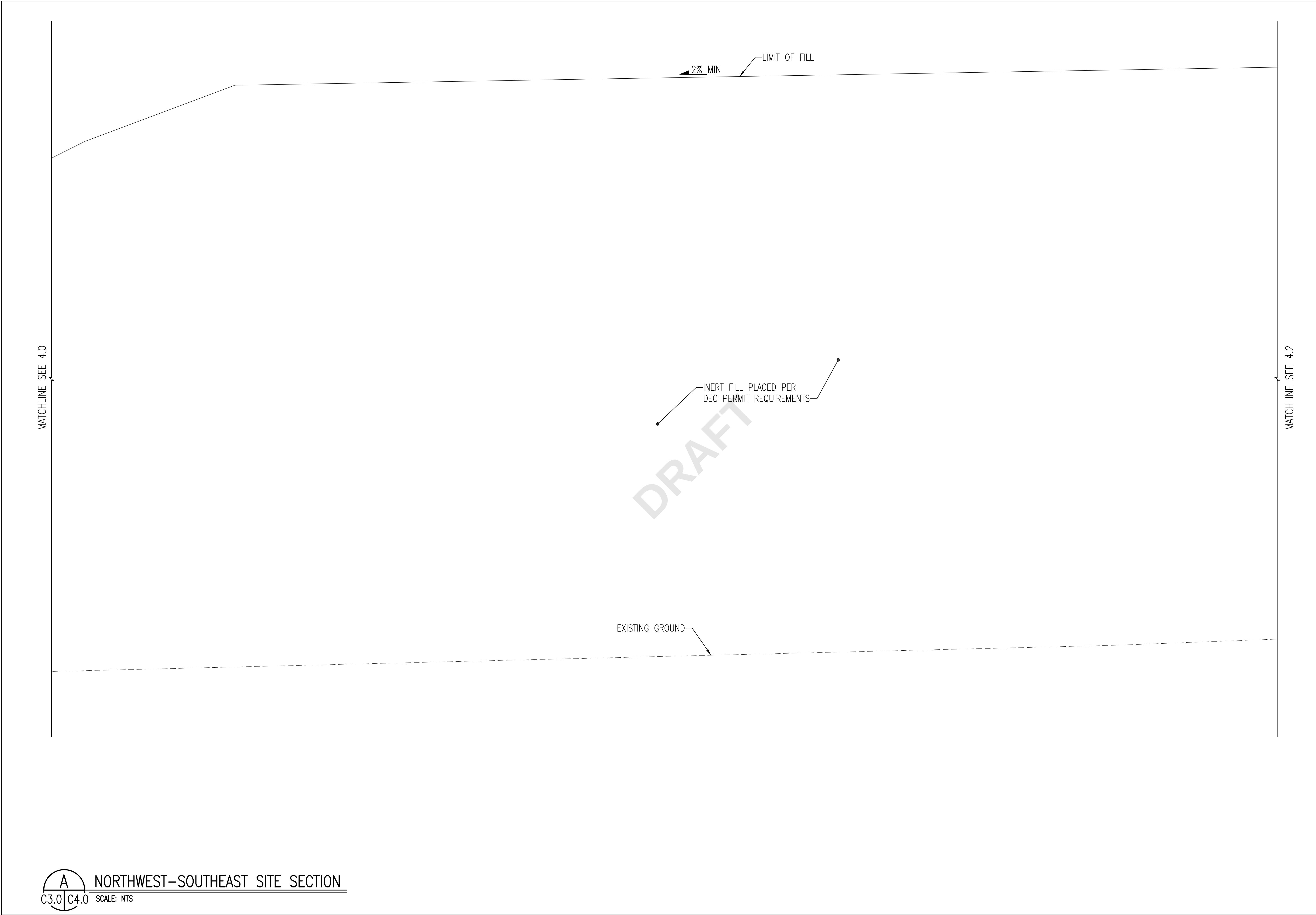
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PN	TBD
GRID	NW0550
SCALE	AS SHOWN
ENGINEER	MAB
DRAFTER	MAB

SHEET TITLE
EXISTING CONDITIONS PLAN



DATE	REVISION	DATE	DESCRIPTION	BY

DATE	1.10.2024
PN	TBD
GRID	NW0550
SCALE	AS SHOWN
ENGINEER	MAB
DRAFTER	MAB





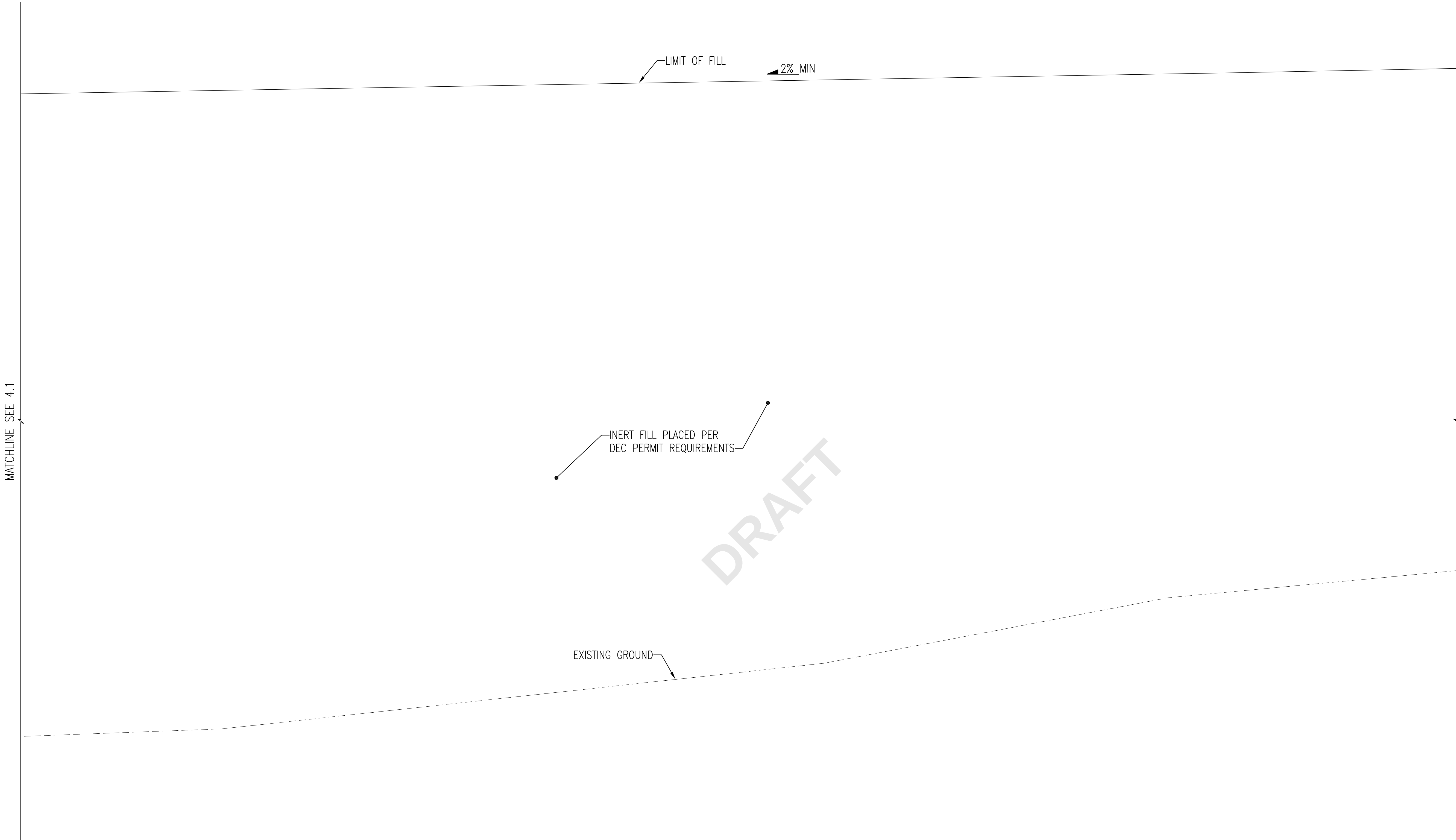
**BIG CITY
ENGINEERS**

P.O. BOX 92946
ANCHORAGE, ALASKA 99509
907/360-0985
LICENSE # 102525

**EKLUTNA, INC.
INERT FILL SITE**

TRACT 38, EAGLE RIVER POWDER RESERVE (B)

					BY
					DESCRIPTION
					DATE
					REVISION
DATE		1.10.2024			
PN		TBD			
GRID		NW0550			
SCALE		AS SHOWN			
ENGINEER		MAB			
DRAFTER		MAB			
SHEET TITLE					
SITE SECTIONS					
SHEET NUMBER					
C4.1					
5 OF 7					



P.O. BOX 92946
ANCHORAGE, ALASKA 99509
907/360-0985
LICENSE # 102525

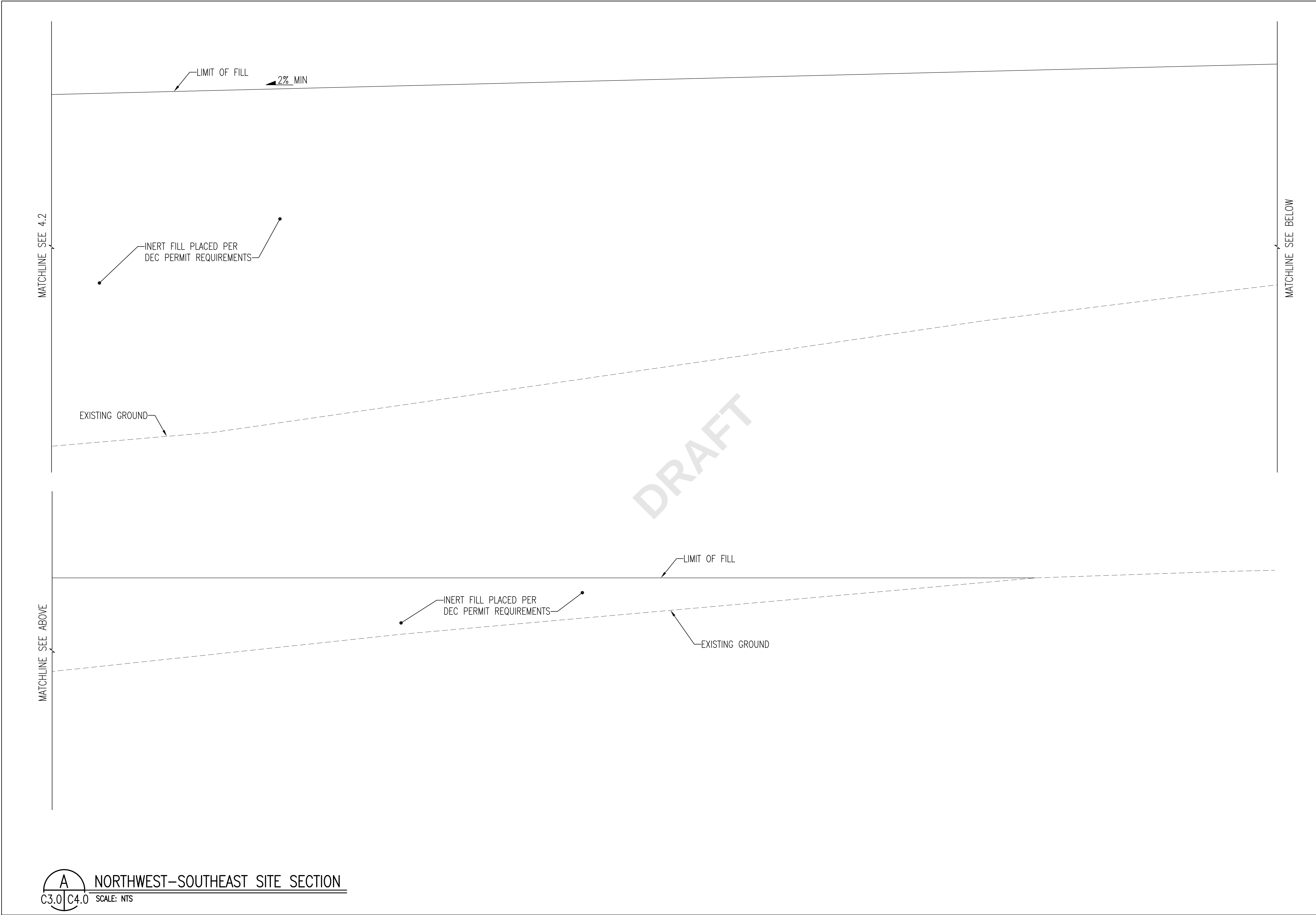
EKLUTNA, INC.
INERT FILL SITE

TRACT 38, EAGLE RIVER POWDER RESERVE (B)

									BY
									DESCRIPTION
									DATE
									REVISION

DATE	1.10.2024
PN	TBD
GRID	NW0550
SCALE	AS SHOWN
ENGINEER	MAB
DRAFTER	MAB

SHEET TITLE
SITE SECTIONS



BIG CITY ENGINEERS
P.O. BOX 92946
ANCHORAGE, ALASKA 99509
907/360-0985
LICENSE # 102525

**EKLUTNA, INC.
INERT FILL SITE**

TRACT 38, EAGLE RIVER POWDER RESERVE (B)

										BY
										DESCRIPTION
										DATE
										REVISION
DATE	1.10.2024									
PN	TBD									
GRID	NW0550									
SCALE	AS SHOWN									
ENGINEER	MAB									
DRAFTER	MAB									

SHEET TITLE

SITE SECTIONS

SHEET NUMBER

C4.3

7 OF 7

QUALITY CONTROL DAILY REPORT

[illegible]

Melissa Branch

From: Bryce Hattenburg <bhattenburg@eklutnainc.com>
Sent: Tuesday, August 27, 2024 9:48 AM
To: Melissa Branch
Subject: FW: Fill Site investigation
Attachments: Tract 38 Map (2020 PDF) (2).pdf; QC Daily Report 08-14-2020.pdf

Here is the water monitoring information from CEI.

-Bryce

From: Shane Durand <sdurand@bsnc.net>
Sent: Thursday, August 15, 2024 12:19 PM
To: Bryce Hattenburg <bhattenburg@eklutnainc.com>
Subject: Fill Site investigation

Bryce

Looking back in the files for the Tract 38 site that had been identified for a potential Monofill I found the attached information.

We dug 4 test holes in August of 2020 to a depth of 19' No water was found, and perforated PVC pipes were installed to monitor the water depth. These locations were selected as they were spread at the lowest points of the site.

March 20, 2021 tubes were checked and dry

July 14, 2021 tubes were checked and dry

On August 19, 2022 after we had the rain season we went out and checked the monitoring tubes again and found them all dry.

On June 27, 2024 after our meeting I rechecked the tubes and they were still dry.

Let me know if you need anything else.

Shane Durand
Chief Operating Officer
Central Environmental Inc.
229 E. Whitney Road |Anchorage, AK 99501
Main (907)561-0125 |Mobile (907)350-6062
sdurand@bsnc.net |www.cei-alaska.com
<https://beringstraits.com/bering-central-holding/>
Follow us on Instagram at www.instagram.com/centralenvironmentalinc



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ENVIRONMENTAL INC.
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DRAFT

Unified Hazard Tool



Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the [U.S. Seismic Design Maps web tools](#) (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Please also see the new [USGS Earthquake Hazard Toolbox](#) for access to the most recent NSHMs for the conterminous U.S. and Hawaii.

^ Input

Edition

Alaska 2007 (v2.0.x)

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

61.348

Time Horizon

Return period in years

2475

Longitude

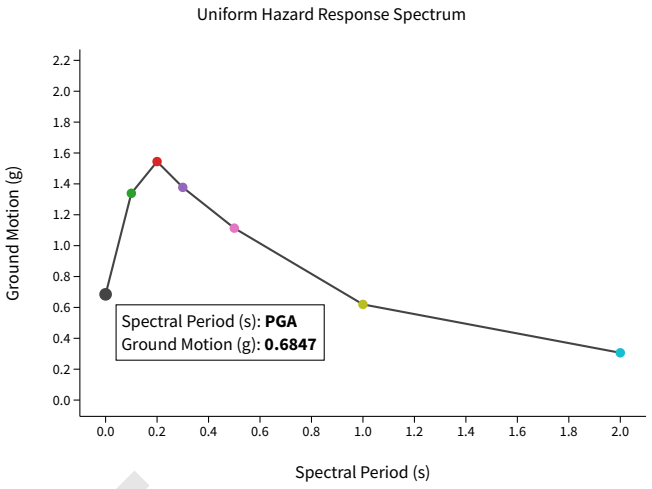
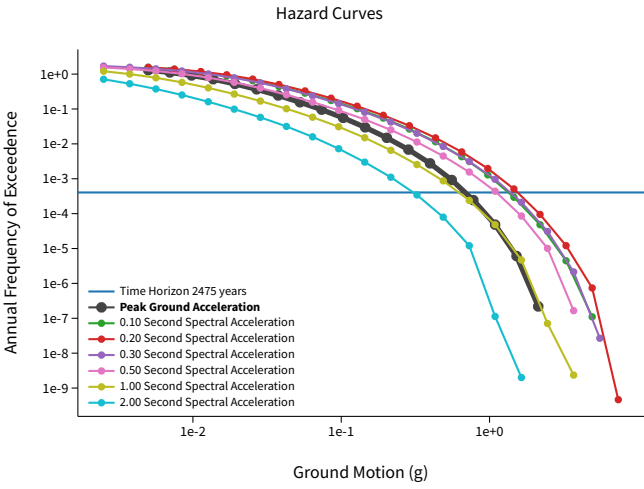
Decimal degrees, negative values for western longitudes

-149.608

Site Class

760 m/s (B/C boundary)

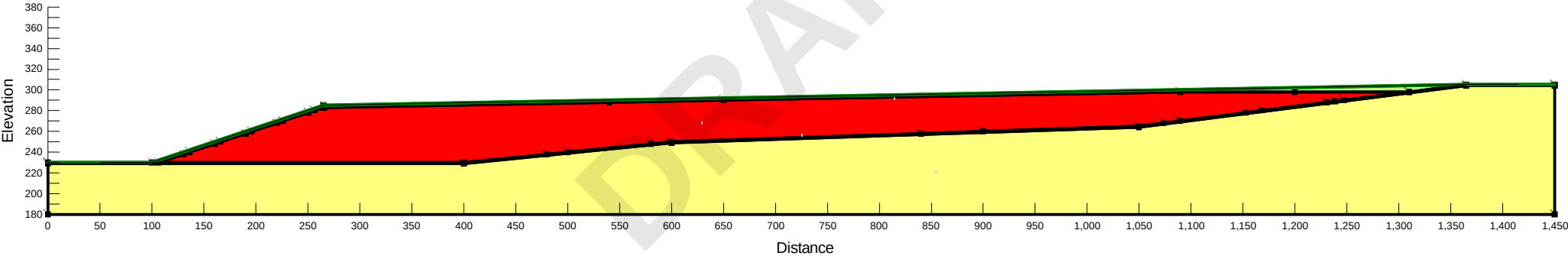
^ Hazard Curve



[View Raw Data](#)

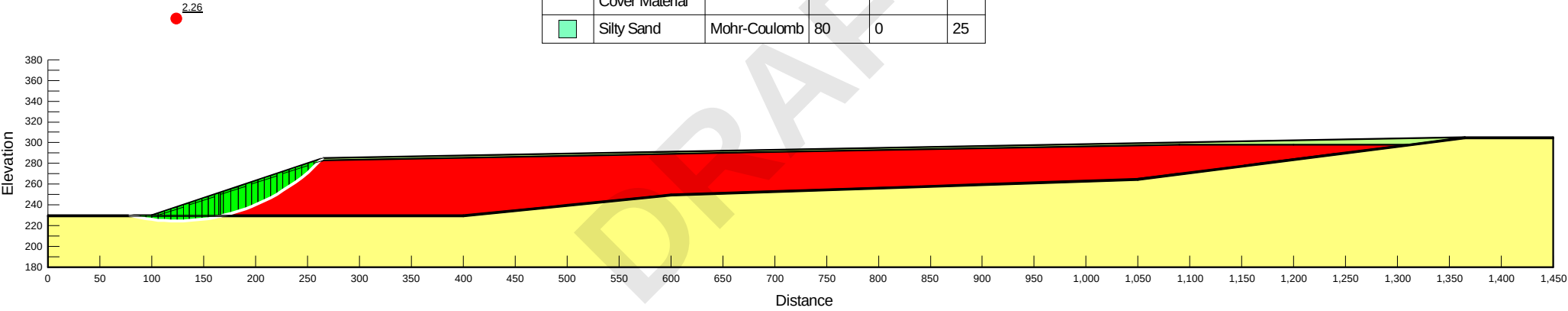
SLOPE/W - Base Model

Color	Name	Model	Unit Weight (pcf)	Cohesion ¹ (psf)	Phi ¹ (°)
	Cover Material	Mohr-Coulomb	110	150	28
	Gravelly Sand	Mohr-Coulomb	120	0	32
	Mixed C&D and Cover Material	Mohr-Coulomb	100	100	32
	Silty Sand	Mohr-Coulomb	80	0	25



SLOPE/W - Static Conditions

Color	Name	Model	Unit Weight (pcf)	Cohesion ¹ (psf)	Phi ² (°)
	Cover Material	Mohr-Coulomb	110	150	28
	Gravelly Sand	Mohr-Coulomb	120	0	32
	Mixed C&D and Cover Material	Mohr-Coulomb	100	100	32
	Silty Sand	Mohr-Coulomb	80	0	25



SLOPE/W Analysis

Report generated using GeoStudio 2019. Copyright © 1991-2019 GEOSLOPE International Ltd.

File Information

File Version: 10.00
Created By: James Salter
Last Edited By: James Salter
Revision Number: 154
Date: 01/10/2025
Time: 01:57:33 PM
Tool Version: 10.0.2.18035
File Name: SlopeStabilityAnalysis Mixed C&D.gsz
Directory: H:\jobs\24-119 Eklutna Monofill (Big City Engineers)\02-Geotechnical\04 Calcs\
Last Solved Date: 01/10/2025
Last Solved Time: 01:57:34 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W

Method: Morgenstern-Price

Settings

Side Function

Interslice force function option: Half-Sine

PWP Conditions from: (none)

Unit Weight of Water: 62.430189 pcf

Slip Surface

Direction of movement: Right to Left

Use Passive Mode: No

Slip Surface Option: Grid and Radius

Critical slip surfaces saved: 1

Optimize Critical Slip Surface Location: No

Tension Crack Option: (none)

Distribution

F of S Calculation Option: Constant

Advanced

Geometry Settings

Minimum Slip Surface Depth: 0.1 ft

Number of Slices: 30

Factor of Safety Convergence Settings

Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.001

Solution Settings

Search Method: Root Finder

Tolerable difference between starting and converged F of S: 3

Maximum iterations to calculate converged lambda: 20

Max Absolute Lambda: 2

Materials

Gravelly Sand

Model: Mohr-Coulomb

Unit Weight: 120 pcf

Cohesion': 0 psf

Phi': 32 °

Phi-B: 0 °

Cover Material

Model: Mohr-Coulomb

Unit Weight: 110 pcf

Cohesion': 150 psf

Phi': 28 °

Phi-B: 0 °

Mixed C&D and Cover Material

Model: Mohr-Coulomb

Unit Weight: 100 pcf

Cohesion': 100 psf

Phi': 32 °

Phi-B: 0 °

Silty Sand

Model: Mohr-Coulomb

Unit Weight: 80 pcf

Cohesion': 0 psf

Phi': 25 °

Phi-B: 0 °

Slip Surface Grid

Upper Left: (-73.4013, 629.22393) ft

Lower Left: (-128.4058, 295.00275) ft

Lower Right: (348.7261, 375.83764) ft

Grid Horizontal Increment: 8

Grid Vertical Increment: 8

Slip Surface Radius

Upper Left Coordinate: (21, 284.35917) ft

Upper Right Coordinate: (281, 284.35917) ft

Lower Left Coordinate: (16, 175.92308) ft

Lower Right Coordinate: (281, 175.92308) ft

Number of Increments: 20

Use Left Projection: No

Left Projection Angle: 135 °

Use Right Projection: No

Right Projection Angle: 45 °

Slip Surface Limits

Left Coordinate: (0, 230) ft

Right Coordinate: (1,450, 305) ft

Seismic Coefficients

Horz Seismic Coef.: 0

Points

	X	Y
Point 1	100 ft	230 ft
Point 2	400 ft	230 ft
Point 3	265 ft	285 ft
Point 4	1,365 ft	305 ft
Point 5	1,050 ft	265 ft
Point 6	600 ft	250 ft
Point 7	106.32 ft	230 ft

Point 8	130.32 ft	238 ft
Point 9	265.34 ft	283.01 ft
Point 10	540.02 ft	288 ft
Point 11	136.32 ft	240 ft
Point 12	500 ft	240 ft
Point 13	480 ft	238 ft
Point 14	160.32 ft	248 ft
Point 15	166.32 ft	250 ft
Point 16	580 ft	248 ft
Point 17	196.32 ft	260 ft
Point 18	900 ft	260 ft
Point 19	226.32 ft	270 ft
Point 20	256.32 ft	280 ft
Point 21	1,168.12 ft	280 ft
Point 22	190.32 ft	258 ft
Point 23	840 ft	258 ft
Point 24	220.32 ft	268 ft
Point 25	1,073.62 ft	268 ft
Point 26	250.32 ft	278 ft
Point 27	650.02 ft	290 ft
Point 28	1,246.88 ft	290 ft
Point 29	1,200.02 ft	298 ft
Point 30	1,309.88 ft	298 ft
Point 31	1,231.12 ft	288 ft
Point 32	1,090.02 ft	298 ft
Point 33	0 ft	230 ft
Point 34	1,450 ft	305 ft
Point 35	0 ft	180 ft
Point 36	1,450 ft	180 ft
Point 37	1,152.375 ft	278 ft
Point 38	1,089.375 ft	270 ft
Point 39	1,450 ft	304 ft
Point 40	1,365 ft	304 ft
Point 41	1,050 ft	264 ft
Point 42	600 ft	249 ft
Point 43	400 ft	229 ft
Point 44	0 ft	229 ft
Point 45	1,309.875 ft	298 ft
Point 46	1,246.875 ft	290 ft
Point 47	1,239 ft	289 ft

Regions

	Material	Points	Area
Region 1	Cover Material	1,7,8,11,14,15,22,17,24,19,26,20,9,10,27,32,29,45,4,3	3,035.2 ft ²
Region 2	Gravelly Sand	35,36,39,40,41,42,43,44	1.0912e+05 ft ²
Region 3	Mixed C&D and Cover Material	10,9,20,26,19,24,17,22,15,14,11,8,7,2,13,12,16,6,23,18,5,25,38,37,21,31,47,46,45,29,32,27	41,302 ft ²
Region 4	Silty Sand	33,44,43,42,41,40,39,34,4,45,46,47,37,38,5,18,23,6,16,12,13,2,7,1	1,450 ft ²

Slip Results

Slip Surfaces Analysed: 860 of 1701 converged

Current Slip Surface

Slip Surface: 474

Factor of Safety: 2.26

Volume: 2,788.1107 ft³

Weight: 285,079.18 lbf

Resisting Moment: 35,799,918 lbf·ft

Activating Moment: 15,872,014 lbf·ft

Resisting Force: 171,626.01 lbf

Activating Force: 76,094.9 lbf

Slip Rank: 1 of 1,701 slip surfaces

Exit: (78.92546, 230) ft

Entry: (264.37554, 284.79185) ft

Radius: 194.25617 ft

Center: (123.91128, 418.97549) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	81.140469 ft	229.5 ft	0 psf	42.468836 psf	19.803544 psf	0 psf	0 psf	Silty Sand
Slice 2	86.129566 ft	228.44989 ft	0 psf	159.79485 psf	99.850902 psf	0 psf	0 psf	Gravelly Sand
Slice 3	91.67774 ft	227.43295 ft	0 psf	296.99837 psf	185.58518 psf	0 psf	0 psf	Gravelly Sand
Slice 4	97.225913 ft	226.58134 ft	0 psf	414.52848 psf	259.02614 psf	0 psf	0 psf	Gravelly Sand
Slice 5	103.16 ft	225.85702 ft	0 psf	643.38972 psf	402.03451 psf	0 psf	0 psf	Gravelly Sand
Slice 6	109.32 ft	225.29146 ft	0 psf	960.56483 psf	600.22752 psf	0 psf	0 psf	Gravelly Sand
Slice 7	115.32 ft	224.93263 ft	0 psf	1,229.6768 psf	768.38732 psf	0 psf	0 psf	Gravelly Sand
Slice 8	121.32 ft	224.75978 ft	0 psf	1,467.5964 psf	917.05604 psf	0 psf	0 psf	Gravelly Sand
Slice 9	127.32 ft	224.77241 ft	0 psf	1,672.0544 psf	1,044.8155 psf	0 psf	0 psf	Gravelly Sand
Slice 10	133.32 ft	224.97056 ft	0 psf	1,841.7407 psf	1,150.8473 psf	0 psf	0 psf	Gravelly Sand
Slice 11	139.32 ft	225.35479 ft	0 psf	1,976.3239 psf	1,234.9442 psf	0 psf	0 psf	Gravelly Sand
Slice 12	145.32 ft	225.92623 ft	0 psf	2,076.3827 psf	1,297.4679 psf	0 psf	0 psf	Gravelly Sand
Slice 13	151.32 ft	226.68655 ft	0 psf	2,143.2699 psf	1,339.2637 psf	0 psf	0 psf	Gravelly Sand
Slice 14	157.32 ft	227.63798 ft	0 psf	2,178.9289 psf	1,361.5459 psf	0 psf	0 psf	Gravelly Sand
Slice 15	162.39354 ft	228.5809 ft	0 psf	2,188.0161 psf	1,367.2242 psf	0 psf	0 psf	Gravelly Sand
Slice 16	165.39354 ft	229.20251 ft	0 psf	2,172.6436 psf	1,013.1203 psf	0 psf	0 psf	Silty Sand
Slice 17	167.60855 ft	229.70251 ft	0 psf	2,185.3981 psf	1,019.0679 psf	0 psf	0 psf	Silty Sand
Slice 18	172.46758 ft	230.92192 ft	0 psf	2,203.7119 psf	1,377.032 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 19	179.60855 ft	232.91264 ft	0 psf	2,169.2243 psf	1,355.4818 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 20	186.74952 ft	235.20233 ft	0 psf	2,109.4591 psf	1,318.1363 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 21	193.32 ft	237.57105 ft	0 psf	2,035.7394 psf	1,272.0712 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 22	199.32 ft	239.98279 ft	0 psf	1,952.5829 psf	1,220.1092 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 23	205.32 ft	242.63162 ft	0 psf	1,856.0859 psf	1,159.8112 psf	100 psf	0 psf	Mixed C&D and Cover Material

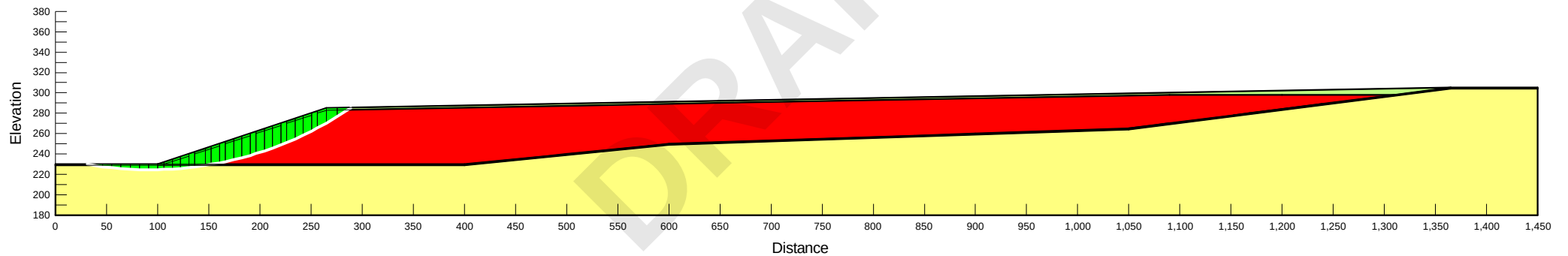
Slice 24	211.32 ft	245.52841 ft	0 psf	1,746.6208 psf	1,091.4098 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 25	217.32 ft	248.68585 ft	0 psf	1,624.0186 psf	1,014.7994 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 26	223.32 ft	252.11875 ft	0 psf	1,487.527 psf	929.51003 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 27	229.32 ft	255.84455 ft	0 psf	1,335.7574 psf	834.67386 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 28	235.32 ft	259.88388 ft	0 psf	1,166.6132 psf	728.98085 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 29	241.32 ft	264.26134 ft	0 psf	977.1901 psf	610.61614 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 30	247.32 ft	269.00665 ft	0 psf	763.63466 psf	477.1719 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 31	253.32 ft	274.1561 ft	0 psf	520.943 psf	325.52132 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 32	258.82299 ft	279.25369 ft	0 psf	268.92027 psf	168.04003 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 33	262.85076 ft	283.23118 ft	0 psf	38.953749 psf	20.712076 psf	150 psf	0 psf	Cover Material

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SLOPE/W - Seismic Conditions

0.62

Color	Name	Model	Unit Weight (pcf)	Cohesion ¹ (psf)	Phi ¹ (°)
	Cover Material	Mohr-Coulomb	110	150	28
	Gravelly Sand	Mohr-Coulomb	120	0	32
	Mixed C&D and Cover Material	Mohr-Coulomb	100	100	32
	Silty Sand	Mohr-Coulomb	80	0	25



SLOPE/W Analysis

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File Information

File Version: 10.00
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Last Edited By: James Salter
Revision Number: 153
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Tool Version: 10.0.2.18035
File Name: SlopeStabilityAnalysis Mixed C&D.gsz
Directory: H:\jobs\24-119 Eklutna Monofill (Big City Engineers)\02-Geotechnical\04 Calcs\
Last Solved Date: 01/10/2025
Last Solved Time: 01:56:27 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W

Method: Morgenstern-Price

Settings

Side Function

Interslice force function option: Half-Sine

PWP Conditions from: (none)

Unit Weight of Water: 62.430189 pcf

Slip Surface

Direction of movement: Right to Left

Use Passive Mode: No

Slip Surface Option: Grid and Radius

Critical slip surfaces saved: 1

Optimize Critical Slip Surface Location: No

Tension Crack Option: (none)

Distribution

F of S Calculation Option: Constant

Advanced

Geometry Settings

Minimum Slip Surface Depth: 0.1 ft

Number of Slices: 30

Factor of Safety Convergence Settings

Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.001

Solution Settings

Search Method: Root Finder

Tolerable difference between starting and converged F of S: 3

Maximum iterations to calculate converged lambda: 20

Max Absolute Lambda: 2

Materials

Gravelly Sand

Model: Mohr-Coulomb

Unit Weight: 120 pcf

Cohesion': 0 psf

Phi': 32 °

Phi-B: 0 °

Cover Material

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 150 psf
Phi': 28 °
Phi-B: 0 °

Mixed C&D and Cover Material

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion': 100 psf
Phi': 32 °
Phi-B: 0 °

Silty Sand

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion': 0 psf
Phi': 25 °
Phi-B: 0 °

Slip Surface Grid

Upper Left: (-73.4013, 629.22393) ft
Lower Left: (-128.4058, 295.00275) ft
Lower Right: (348.7261, 375.83764) ft
Grid Horizontal Increment: 8
Grid Vertical Increment: 8

Slip Surface Radius

Upper Left Coordinate: (21, 284.35917) ft
Upper Right Coordinate: (281, 284.35917) ft
Lower Left Coordinate: (16, 175.92308) ft
Lower Right Coordinate: (281, 175.92308) ft
Number of Increments: 20
Use Left Projection: No
Left Projection Angle: 135 °
Use Right Projection: No
Right Projection Angle: 45 °

Slip Surface Limits

Left Coordinate: (0, 230) ft
Right Coordinate: (1,450, 305) ft

Seismic Coefficients

Horz Seismic Coef.: 0.68

Points

	X	Y
Point 1	100 ft	230 ft
Point 2	400 ft	230 ft
Point 3	265 ft	285 ft
Point 4	1,365 ft	305 ft
Point 5	1,050 ft	265 ft
Point 6	600 ft	250 ft
Point 7	106.32 ft	230 ft

Point 8	130.32 ft	238 ft
Point 9	265.34 ft	283.01 ft
Point 10	540.02 ft	288 ft
Point 11	136.32 ft	240 ft
Point 12	500 ft	240 ft
Point 13	480 ft	238 ft
Point 14	160.32 ft	248 ft
Point 15	166.32 ft	250 ft
Point 16	580 ft	248 ft
Point 17	196.32 ft	260 ft
Point 18	900 ft	260 ft
Point 19	226.32 ft	270 ft
Point 20	256.32 ft	280 ft
Point 21	1,168.12 ft	280 ft
Point 22	190.32 ft	258 ft
Point 23	840 ft	258 ft
Point 24	220.32 ft	268 ft
Point 25	1,073.62 ft	268 ft
Point 26	250.32 ft	278 ft
Point 27	650.02 ft	290 ft
Point 28	1,246.88 ft	290 ft
Point 29	1,200.02 ft	298 ft
Point 30	1,309.88 ft	298 ft
Point 31	1,231.12 ft	288 ft
Point 32	1,090.02 ft	298 ft
Point 33	0 ft	230 ft
Point 34	1,450 ft	305 ft
Point 35	0 ft	180 ft
Point 36	1,450 ft	180 ft
Point 37	1,152.375 ft	278 ft
Point 38	1,089.375 ft	270 ft
Point 39	1,450 ft	304 ft
Point 40	1,365 ft	304 ft
Point 41	1,050 ft	264 ft
Point 42	600 ft	249 ft
Point 43	400 ft	229 ft
Point 44	0 ft	229 ft
Point 45	1,309.875 ft	298 ft
Point 46	1,246.875 ft	290 ft
Point 47	1,239 ft	289 ft

Regions

	Material	Points	Area
Region 1	Cover Material	1,7,8,11,14,15,22,17,24,19,26,20,9,10,27,32,29,45,4,3	3,035.2 ft ²
Region 2	Gravelly Sand	35,36,39,40,41,42,43,44	1.0912e+05 ft ²
Region 3	Mixed C&D and Cover Material	10,9,20,26,19,24,17,22,15,14,11,8,7,2,13,12,16,6,23,18,5,25,38,37,21,31,47,46,45,29,32,27	41,302 ft ²
Region 4	Silty Sand	33,44,43,42,41,40,39,34,4,45,46,47,37,38,5,18,23,6,16,12,13,2,7,1	1,450 ft ²

Slip Results

Slip Surfaces Analysed: 849 of 1701 converged

Current Slip Surface

Slip Surface: 1,209

Factor of Safety: 0.62

Volume: 3,277.9403 ft³

Weight: 335,557.68 lbf

Resisting Moment: 65,811,932 lbf·ft

Activating Moment: 1.0551602e+08 lbf·ft

Resisting Force: 179,466.9 lbf

Activating Force: 287,778.71 lbf

Slip Rank: 1 of 1,701 slip surfaces

Exit: (31.093189, 230) ft

Entry: (289.18174, 285.43967) ft

Radius: 351.2624 ft

Center: (91.772037, 575.98172) ft

Slip Slices

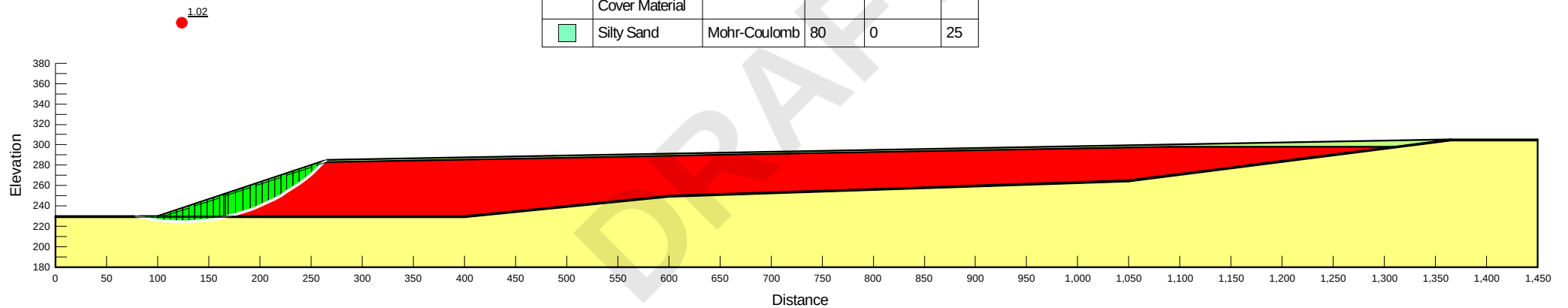
	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	34.096925 ft	229.5 ft	0 psf	46.452451 psf	21.661134 psf	0 psf	0 psf	Silty Sand
Slice 2	41.593472 ft	228.35149 ft	0 psf	201.23024 psf	125.74261 psf	0 psf	0 psf	Gravelly Sand
Slice 3	50.579092 ft	227.17239 ft	0 psf	398.08481 psf	248.751 psf	0 psf	0 psf	Gravelly Sand
Slice 4	59.564711 ft	226.22809 ft	0 psf	573.79345 psf	358.54594 psf	0 psf	0 psf	Gravelly Sand
Slice 5	68.550331 ft	225.51667 ft	0 psf	722.22126 psf	451.29393 psf	0 psf	0 psf	Gravelly Sand
Slice 6	77.535951 ft	225.03673 ft	0 psf	834.69511 psf	521.57539 psf	0 psf	0 psf	Gravelly Sand
Slice 7	86.52157 ft	224.78731 ft	0 psf	901.97396 psf	563.61588 psf	0 psf	0 psf	Gravelly Sand
Slice 8	95.50719 ft	224.76792 ft	0 psf	916.88513 psf	572.93342 psf	0 psf	0 psf	Gravelly Sand
Slice 9	103.16 ft	224.91821 ft	0 psf	1,025.3038 psf	640.68091 psf	0 psf	0 psf	Gravelly Sand
Slice 10	110.32 ft	225.23223 ft	0 psf	1,242.0659 psf	776.1289 psf	0 psf	0 psf	Gravelly Sand
Slice 11	118.32 ft	225.74696 ft	0 psf	1,413.609 psf	883.32097 psf	0 psf	0 psf	Gravelly Sand
Slice 12	126.32 ft	226.44552 ft	0 psf	1,524.0807 psf	952.3513 psf	0 psf	0 psf	Gravelly Sand
Slice 13	133.32 ft	227.19825 ft	0 psf	1,576.2954 psf	984.9787 psf	0 psf	0 psf	Gravelly Sand
Slice 14	141.38171 ft	228.27781 ft	0 psf	1,585.6568 psf	990.82835 psf	0 psf	0 psf	Gravelly Sand
Slice 15	149.44715 ft	229.5 ft	0 psf	1,358.8642 psf	633.6488 psf	0 psf	0 psf	Silty Sand
Slice 16	156.38544 ft	230.73636 ft	0 psf	1,659.328 psf	1,036.8632 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 17	163.32 ft	232.0969 ft	0 psf	1,617.1263 psf	1,010.4927 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 18	170.32 ft	233.63884 ft	0 psf	1,563.0397 psf	976.69562 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 19	178.32 ft	235.5736 ft	0 psf	1,497.0422 psf	935.4558 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 20	186.32 ft	237.7086 ft	0 psf	1,430.8596 psf	894.1003 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 21	193.32 ft	239.73261 ft	0 psf	1,375.9657 psf	859.79881 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 22	200.32 ft	241.93842 ft	0 psf	1,323.2871 psf	826.88153 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 23	208.32 ft	244.64524 ft	0 psf	1,267.5375 psf	792.04535 psf	100 psf	0 psf	Mixed C&D and Cover Material

Slice 24	216.32 ft	247.56921 ft	0 psf	1,214.6128 psf	758.97432 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 25	223.32 ft	250.29792 ft	0 psf	1,169.5844 psf	730.83745 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 26	230.32 ft	253.22672 ft	0 psf	1,122.1699 psf	701.20957 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 27	238.32 ft	256.78022 ft	0 psf	1,064.8307 psf	665.38009 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 28	246.32 ft	260.57665 ft	0 psf	1,000.6018 psf	625.2454 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 29	253.32 ft	264.09053 ft	0 psf	937.31528 psf	585.69959 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 30	260.66 ft	268.02453 ft	0 psf	858.56074 psf	536.48829 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 31	270.36683 ft	273.57417 ft	0 psf	632.3287 psf	395.12282 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 32	280.93049 ft	280.06567 ft	0 psf	263.57097 psf	164.69742 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 33	287.65453 ft	284.41365 ft	0 psf	-30.591526 psf	-16.265803 psf	150 psf	0 psf	Cover Material

DRAFT

SLOPE/W - Seismic (1/2 PGA) Conditions

Color	Name	Model	Unit Weight (pcf)	Cohesion ¹ (psf)	Phi ¹ (°)
	Cover Material	Mohr-Coulomb	110	150	28
	Gravelly Sand	Mohr-Coulomb	120	0	32
	Mixed C&D and Cover Material	Mohr-Coulomb	100	100	32
	Silty Sand	Mohr-Coulomb	80	0	25



SLOPE/W Analysis

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File Information

File Version: 10.00
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Last Edited By: James Salter
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Time: 01:55:01 PM
Tool Version: 10.0.2.18035
File Name: SlopeStabilityAnalysis Mixed C&D.gsz
Directory: H:\jobs\24-119 Eklutna Monofill (Big City Engineers)\02-Geotechnical\04 Calcs\
Last Solved Date: 01/10/2025
Last Solved Time: 01:55:02 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

SLOPE/W Analysis

Kind: SLOPE/W

Method: Morgenstern-Price

Settings

Side Function

Interslice force function option: Half-Sine

PWP Conditions from: (none)

Unit Weight of Water: 62.430189 pcf

Slip Surface

Direction of movement: Right to Left

Use Passive Mode: No

Slip Surface Option: Grid and Radius

Critical slip surfaces saved: 1

Optimize Critical Slip Surface Location: No

Tension Crack Option: (none)

Distribution

F of S Calculation Option: Constant

Advanced

Geometry Settings

Minimum Slip Surface Depth: 0.1 ft

Number of Slices: 30

Factor of Safety Convergence Settings

Maximum Number of Iterations: 100

Tolerable difference in F of S: 0.001

Solution Settings

Search Method: Root Finder

Tolerable difference between starting and converged F of S: 3

Maximum iterations to calculate converged lambda: 20

Max Absolute Lambda: 2

Materials

Gravelly Sand

Model: Mohr-Coulomb

Unit Weight: 120 pcf

Cohesion': 0 psf

Phi': 32 °

Phi-B: 0 °

Cover Material

Model: Mohr-Coulomb
Unit Weight: 110 pcf
Cohesion': 150 psf
Phi': 28 °
Phi-B: 0 °

Mixed C&D and Cover Material

Model: Mohr-Coulomb
Unit Weight: 100 pcf
Cohesion': 100 psf
Phi': 32 °
Phi-B: 0 °

Silty Sand

Model: Mohr-Coulomb
Unit Weight: 80 pcf
Cohesion': 0 psf
Phi': 25 °
Phi-B: 0 °

Slip Surface Grid

Upper Left: (-73.4013, 629.22393) ft
Lower Left: (-128.4058, 295.00275) ft
Lower Right: (348.7261, 375.83764) ft
Grid Horizontal Increment: 8
Grid Vertical Increment: 8

Slip Surface Radius

Upper Left Coordinate: (21, 284.35917) ft
Upper Right Coordinate: (281, 284.35917) ft
Lower Left Coordinate: (16, 175.92308) ft
Lower Right Coordinate: (281, 175.92308) ft
Number of Increments: 20
Use Left Projection: No
Left Projection Angle: 135 °
Use Right Projection: No
Right Projection Angle: 45 °

Slip Surface Limits

Left Coordinate: (0, 230) ft
Right Coordinate: (1,450, 305) ft

Seismic Coefficients

Horz Seismic Coef.: 0.34

Points

	X	Y
Point 1	100 ft	230 ft
Point 2	400 ft	230 ft
Point 3	265 ft	285 ft
Point 4	1,365 ft	305 ft
Point 5	1,050 ft	265 ft
Point 6	600 ft	250 ft
Point 7	106.32 ft	230 ft

Point 8	130.32 ft	238 ft
Point 9	265.34 ft	283.01 ft
Point 10	540.02 ft	288 ft
Point 11	136.32 ft	240 ft
Point 12	500 ft	240 ft
Point 13	480 ft	238 ft
Point 14	160.32 ft	248 ft
Point 15	166.32 ft	250 ft
Point 16	580 ft	248 ft
Point 17	196.32 ft	260 ft
Point 18	900 ft	260 ft
Point 19	226.32 ft	270 ft
Point 20	256.32 ft	280 ft
Point 21	1,168.12 ft	280 ft
Point 22	190.32 ft	258 ft
Point 23	840 ft	258 ft
Point 24	220.32 ft	268 ft
Point 25	1,073.62 ft	268 ft
Point 26	250.32 ft	278 ft
Point 27	650.02 ft	290 ft
Point 28	1,246.88 ft	290 ft
Point 29	1,200.02 ft	298 ft
Point 30	1,309.88 ft	298 ft
Point 31	1,231.12 ft	288 ft
Point 32	1,090.02 ft	298 ft
Point 33	0 ft	230 ft
Point 34	1,450 ft	305 ft
Point 35	0 ft	180 ft
Point 36	1,450 ft	180 ft
Point 37	1,152.375 ft	278 ft
Point 38	1,089.375 ft	270 ft
Point 39	1,450 ft	304 ft
Point 40	1,365 ft	304 ft
Point 41	1,050 ft	264 ft
Point 42	600 ft	249 ft
Point 43	400 ft	229 ft
Point 44	0 ft	229 ft
Point 45	1,309.875 ft	298 ft
Point 46	1,246.875 ft	290 ft
Point 47	1,239 ft	289 ft

Regions

	Material	Points	Area
Region 1	Cover Material	1,7,8,11,14,15,22,17,24,19,26,20,9,10,27,32,29,45,4,3	3,035.2 ft ²
Region 2	Gravelly Sand	35,36,39,40,41,42,43,44	1.0912e+05 ft ²
Region 3	Mixed C&D and Cover Material	10,9,20,26,19,24,17,22,15,14,11,8,7,2,13,12,16,6,23,18,5,25,38,37,21,31,47,46,45,29,32,27	41,302 ft ²
Region 4	Silty Sand	33,44,43,42,41,40,39,34,4,45,46,47,37,38,5,18,23,6,16,12,13,2,7,1	1,450 ft ²

Slip Results

Slip Surfaces Analysed: 859 of 1701 converged

Current Slip Surface

Slip Surface: 474

Factor of Safety: 1.02

Volume: 2,788.1107 ft³

Weight: 285,079.18 lbf

Resisting Moment: 33,041,803 lbf·ft

Activating Moment: 32,525,782 lbf·ft

Resisting Force: 159,981.7 lbf

Activating Force: 157,391.12 lbf

Slip Rank: 1 of 1,701 slip surfaces

Exit: (78.92546, 230) ft

Entry: (264.37554, 284.79185) ft

Radius: 194.25617 ft

Center: (123.91128, 418.97549) ft

Slip Slices

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Slice 1	81.140469 ft	229.5 ft	0 psf	45.618401 psf	21.27221 psf	0 psf	0 psf	Silty Sand
Slice 2	86.129566 ft	228.44989 ft	0 psf	179.82852 psf	112.36933 psf	0 psf	0 psf	Gravelly Sand
Slice 3	91.67774 ft	227.43295 ft	0 psf	341.37269 psf	213.31333 psf	0 psf	0 psf	Gravelly Sand
Slice 4	97.225913 ft	226.58134 ft	0 psf	486.51217 psf	304.00655 psf	0 psf	0 psf	Gravelly Sand
Slice 5	103.16 ft	225.85702 ft	0 psf	763.13146 psf	476.85746 psf	0 psf	0 psf	Gravelly Sand
Slice 6	109.32 ft	225.29146 ft	0 psf	1,143.3132 psf	714.42138 psf	0 psf	0 psf	Gravelly Sand
Slice 7	115.32 ft	224.93263 ft	0 psf	1,465.413 psf	915.6917 psf	0 psf	0 psf	Gravelly Sand
Slice 8	121.32 ft	224.75978 ft	0 psf	1,740.1947 psf	1,087.3943 psf	0 psf	0 psf	Gravelly Sand
Slice 9	127.32 ft	224.77241 ft	0 psf	1,958.26 psf	1,223.6567 psf	0 psf	0 psf	Gravelly Sand
Slice 10	133.32 ft	224.97056 ft	0 psf	2,114.3303 psf	1,321.1802 psf	0 psf	0 psf	Gravelly Sand
Slice 11	139.32 ft	225.35479 ft	0 psf	2,207.9088 psf	1,379.6545 psf	0 psf	0 psf	Gravelly Sand
Slice 12	145.32 ft	225.92623 ft	0 psf	2,243.0463 psf	1,401.6109 psf	0 psf	0 psf	Gravelly Sand
Slice 13	151.32 ft	226.68655 ft	0 psf	2,227.3627 psf	1,391.8107 psf	0 psf	0 psf	Gravelly Sand
Slice 14	157.32 ft	227.63798 ft	0 psf	2,170.6352 psf	1,356.3634 psf	0 psf	0 psf	Gravelly Sand
Slice 15	162.39354 ft	228.5809 ft	0 psf	2,100.0032 psf	1,312.2276 psf	0 psf	0 psf	Gravelly Sand
Slice 16	165.39354 ft	229.20251 ft	0 psf	1,902.8376 psf	887.30776 psf	0 psf	0 psf	Silty Sand
Slice 17	167.60855 ft	229.70251 ft	0 psf	1,886.3549 psf	879.62175 psf	0 psf	0 psf	Silty Sand
Slice 18	172.46758 ft	230.92192 ft	0 psf	2,005.7157 psf	1,253.3102 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 19	179.60855 ft	232.91264 ft	0 psf	1,879.3897 psf	1,174.373 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 20	186.74952 ft	235.20233 ft	0 psf	1,748.2587 psf	1,092.4333 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 21	193.32 ft	237.57105 ft	0 psf	1,628.9767 psf	1,017.8976 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 22	199.32 ft	239.98279 ft	0 psf	1,521.7422 psf	950.89006 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 23	205.32 ft	242.63162 ft	0 psf	1,416.8152 psf	885.32437 psf	100 psf	0 psf	Mixed C&D and Cover Material

Slice 24	211.32 ft	245.52841 ft	0 psf	1,313.1319 psf	820.53586 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 25	217.32 ft	248.68585 ft	0 psf	1,208.7624 psf	755.31859 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 26	223.32 ft	252.11875 ft	0 psf	1,101.0728 psf	688.02666 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 27	229.32 ft	255.84455 ft	0 psf	986.82411 psf	616.63614 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 28	235.32 ft	259.88388 ft	0 psf	862.20892 psf	538.76793 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 29	241.32 ft	264.26134 ft	0 psf	722.82749 psf	451.67274 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 30	247.32 ft	269.00665 ft	0 psf	563.60151 psf	352.17731 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 31	253.32 ft	274.1561 ft	0 psf	378.61953 psf	236.58774 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 32	258.82299 ft	279.25369 ft	0 psf	181.8457 psf	113.6298 psf	100 psf	0 psf	Mixed C&D and Cover Material
Slice 33	262.85076 ft	283.23118 ft	0 psf	-20.331762 psf	-10.810589 psf	150 psf	0 psf	Cover Material

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Attachment 11

Closure Estimates

Worksheet CEW-01: ESTIMATION OF CLOSURE COSTS

Soil Cap Components

I. Slope & Fill		Calculation or Conversion	
a. Area to be capped	35 acres	x 4,840yd ² /ac	169,400 yd ²
b. Depth of soil needed for slope and fill	6 inches	x 1yd/36in	0.17 yd
c. Quantity of soil needed		a x b	28,233 yd ³
d. Percentage of soil from off-site	0%		
e. Purchase unit cost for off-site material	/yd ³		
f. Percentage of soil from on-site	100	(1 - d)	100%
g. Excavation unit cost (on-site material)	\$0.50 /yd ³		3500
h. Total soil unit cost		(d x e) + (f x g)	\$0.50 /yd ³
i. Hauling, Placement and Spreading unit cost	\$2.00 /yd ³		3500
j. Compaction unit cost	\$2.00 /yd ³		
k. Total soil unit cost		h + i + j	\$4.50 /yd ³
l. Soil subtotal		k x b	\$127,050
m. Percent compaction	0%		
Total Slope & Fill Cost		l x (1 + m)	\$127,050

II. Infiltration Layer Soil

<i>Infiltration Soil Cost</i>			
a. Area to be capped	35 acres	x 4,840yd ² /ac	169,400 yd ²
b. Depth of infiltration soil needed	6 inches	x 1yd/36in	0.17 yd
c. Quantity of infiltration soil needed		a x b	28,233 yd ³
d. Percentage of soil from off-site			
e. Purchase unit cost for off-site material	/yd ³		
f. Percentage of soil from on-site	100	(1 - d)	100%
g. Excavation unit cost (on-site material)	\$0.50 /yd ³		
h. Total infiltration soil unit cost		(d x e) + (f x g)	\$0.50 /yd ³
i. Hauling, Placement and Spreading unit cost	\$2.00 /yd ³		
j. Compaction unit cost	\$2.00 /yd ³		
k. Total infiltration soil unit cost		h + i + j	\$4.50 /yd ³
l. Infiltration soil subtotal		k x b	\$127,050
m. Percent compaction	0%		
n. <i>Subtotal Infiltration Soil Cost</i>		l x (1 + m)	<i>\$127,050</i>

Soil Admixture Cost

o. Area to be capped	acres	x 4,840yd ² /ac	0 yd ²
p. Soil admixture unit cost	/yd ²		
q. <i>Subtotal admixture cost</i>		a x b	<i>\$0</i>

Soil Testing

r. Area to be capped	acres		
s. Testing unit cost	/acre		
t. <i>Subtotal soil testing cost</i>		a x b	<i>\$0</i>
Total Infiltration Soil Cost (soil, admixtures, and testing)		n + q + t	\$127,050

III. Erosion Control / Protective Cover Soil

a. Area to be capped		acres	x 4,840yd ² /ac	0 yd ²
b. Depth of soil needed		inches	x 1yd/36in	0.00 yd
c. Quantity of soil needed			a x b	0 yd ³
d. Percentage of soil from off-site				
e. Purchase unit cost for off-site material		/yd ³		
f. Percentage of soil from on-site			(1 - d)	100%
g. Excavation unit cost (on-site material)		/yd ³		
h. Total erosion/protective soil unit cost			(d x e) + (f x g)	\$0.00 /yd ³
i. Hauling, Placement and Spreading unit cost		/yd ³		
j. Compaction unit cost		/yd ³		
k. Total soil unit cost			h + i + j	\$0.00 /yd ³
l. Erosion/Protective soil subtotal			k x b	\$0
m. Percent compaction				
Total Erosion Control/Protective Cover Soil Cost			l x (1 + m)	\$0

IV. Vegetative support soil (Topsoil)

a. Area to be capped	35	acres	x 4,840yd ² /ac	169,400 yd ²
b. Depth of topsoil needed	4	inches	x 1yd/36in	0.11 yd
c. Quantity of topsoil needed			a x b	18,822 yd ³
d. Percentage of topsoil from off-site				
e. Purchase unit cost for off-site material		/yd ³		
f. Percentage of topsoil from on-site			(1 - d)	100%
g. Excavation unit cost (on-site material)	\$0.50	/yd ³		
h. Total topsoil unit cost			(d x e) + (f x g)	\$0.50 /yd ³
i. Hauling, Placement and Spreading unit cost	\$2.00	/yd ³		
j. Total soil unit cost			h + i	\$2.50 /yd ³
Total Topsoil Cost			c x j	\$47,056

V. Vegetative Cover

a. Area to be vegetated	35	acres		
b. Vegetative cover (seeding) unit cost	\$8	/acre		
c. Erosion control matting unit cost		/acre		
Total Vegetative Cover Cost			a x (b + c)	\$263

Soil Cap Component Subtotal (I + II + III + IV + V): \$301,418

Geosynthetic Barrier & Infiltration Layers**VI. Flexible Membrane Liner**

a. Quantity of FML needed		acres	<u>Calculation or Conversion</u> x 43,560ft ² /ac	0 ft ²
b. Purchase unit cost		/ft ²		
c. Installation unit cost		/ft ²		
d. Total FML unit cost			b + c	
Total FML cost			a x d	\$0

VII. Geosynthetic Clay Liner

a. Quantity of GCL needed		acres	x 43,560ft ² /ac	0 ft ²
b. Purchase unit cost		/ft ²		
c. Installation unit cost		/ft ²		
d. Total GCL unit cost			b + c	\$0.00 /ft ²
Total GCL Cost			a x d	\$0

Geosynthetic Layers Subtotal (VI + VII): \$0

Drainage Components**VIII. Sand or Gravel Drainage****Calculation or Conversion**

a. Area to be capped		acres	$\times 4,840 \text{ yd}^2/\text{ac}$	0 yd ²
b. Depth of sand or gravel needed		inches	$\times 1 \text{ yd}/36 \text{ in}$	0.00 yd
c. Quantity of drainage material needed			$a \times b$	0 yd ³
d. Percentage of media from off-site				
e. Purchase unit cost for off-site material		/yd ³		
f. Percentage of material from on-site			$(1 - d)$	100%
g. Excavation unit cost (on-site material)		/yd ³		
h. Total drainage material unit cost			$(d \times e) + (f \times g)$	\$0.00 /yd ³
i. Hauling, Placement and Spreading unit cost		/yd ³		
j. Compaction unit cost		/yd ³		
k. Total drainage material unit cost			$h + i + j$	\$0.00 /yd ³
l. Drainage material subtotal			$k \times b$	\$0.00
m. Percent compaction				
Total drainage material cost			$l \times (1 + m)$	\$0

IX. Geotextile

a. Quantity of geotextile needed		acres	$\times 43,560 \text{ ft}^2/\text{ac}$	0 ft ²
b. Purchase unit cost		/ft ²		
c. Installation unit cost		/ft ²		
d. Total geotextile unit cost			$b + c$	\$0.00 /ft ²
Total Geotextile Cost			$a \times d$	\$0

X. Geonet Composite

a. Quantity of geonet composite needed		acres	$\times 43,560 \text{ ft}^2/\text{ac}$	0 ft ²
b. Purchase unit cost		/ft ²		
c. Installation unit cost		/ft ²		
d. Total geonet composite unit cost			$b + c$	\$0.00 /ft ²
Total Geonet Composite Cost			$a \times d$	\$0

XI. Drainage Tile

a. Length of drainage tile needed		LF		
b. Purchase unit cost		/LF		
c. Trenching and backfilling cost		/LF		
d. Total drainage tile unit cost			$b + c$	\$0.00 /ft ²
Total Drainage Tile Cost			$a \times d$	\$0

XII. Drainage Channels (Stormwater Control)*Drainage benches and berms*

a. Size of drainage bench needed		LF		
b. Drainage bench unit cost		/LF		
c. Subtotal drainage bench cost			$a \times b$	\$0
d. Size of drainage swale/berm needed		LF		
e. Drainage swale/berm unit cost		/LF		
f. Subtotal drainage swale/berm cost			$d \times e$	\$0

Rip Rap

g. Quantity of Rip Rap needed		yd ²		
h. Rip rap unit cost		/yd ²		
i. Total rip rap cost			$g \times h$	\$0

Gabian Baskets

j. Quantity of gabian baskets needed		yd3		
k. Gabian basket unit cost		/yd3		
l. Subtotal gabian basket cost			$j \times k$	\$0

Total Stormwater Control $c + f + i + l$ \$0

Drainage Component Subtotal (VIII + IX + X + XI + XII): \$0

Landfill Gas and Groundwater Features**XIII. Landfill Gas Monitoring & Control Components**Calculation**Landfill Perimeter System**

a. Number of probes to be installed		probes		
b. LFG probe unit cost		/probe		
c. Subtotal LFG probe cost			$a \times b$	\$0

Landfill Control Systems

d. Area to be closed		acres		
e. Average number of vents per acre		vents / acre		
f. LFG vent unit cost		/vent		
g. Subtotal LFG vent cost			$d \times e \times f$	\$0
h. Length of header pipe needed		LF		
i. Header pipe unit cost		/LF		
j. Header pipe installation cost		/LF		
k. Subtotal LFG active vent hook-up			$h \times (i + j)$	\$0

Total Landfill Gas Management Cost $c + g + k$ \$0

XIV. Groundwater Monitoring Components

a. Hydrogeologic study cost				
b. Number of wells to be installed		wells		
c. GW Monitoring Well unit cost		/well		
d. Number of wells > 50 ft length		wells		
e. Additional well length over 50 ft		LF/well		
f. Unit cost for additional well length		/LF		
Total Groundwater Monitoring Well Cost			$a + (b \times c) + (d \times e \times f)$	\$0

Landfill Gas & Groundwater Features Subtotal (XIII + XIV): \$0

Miscellaneous**XV. Removal and Disposal of Stockpiled Material**Calculation

a. Quantity of stockpiled materials		yd3		
b. Loading and Hauling unit cost		/yd3		
c. Disposal unit cost		/yd3		
d. Total Removal/Disposal Cost			$a \times (b + c)$	\$0

XVI. Erosion/Sediment Control

a. Quantity of silt fence needed		LF		
b. Silt Fence unit cost		/LF		
Total Silt Fence Cost			$a \times b$	\$0

XVII. Landfill Access Road

a. Size of LF access road		yd2		
b. Depth of gravel needed		inches	$\times 1\text{yd}/36\text{in}$	0.0 yd
c. Depth of asphalt needed		inches	$\times 1\text{yd}/36\text{in}$	0.0 yd
d. Total material needed			$a \times (b + c)$	0 yd3
e. Road material unit cost		/yd3		
f. Placement/Spreading unit cost		/yd3		
Total access road cost			$c \times (d + e)$	\$0

XVIII. Site Security*Fencing*

- | | | | | |
|-----------------------------|----------------------|-----|-------|-----|
| a. Length of fencing needed | <input type="text"/> | ft | | |
| b. Fence unit cost | <input type="text"/> | /ft | | |
| c. Subtotal fencing cost | | | a x b | \$0 |

Gate or Barrier

- | | | | | |
|-----------------------------|----------------------|-------|-------|-----|
| d. Number of gates required | <input type="text"/> | | | |
| e. Gate unit cost | <input type="text"/> | /gate | | |
| f. Subtotal gate cost | | | d x e | \$0 |

Closed Sign

- | | | | | |
|---------------------------------|----------------------|-------|-----------|----------------|
| g. Number of signs required | <input type="text"/> | | | |
| h. Sign unit cost | <input type="text"/> | /gate | | |
| i. Subtotal sign cost | | | g x h | \$1,000 |
| Total site security cost | | | c + f + i | \$1,000 |

XIX. Mobilization / Demobilization

- | | | | | |
|---|----------------------|--|--|-----------------|
| a. Cost for mobilization/demobilization | <input type="text"/> | | | |
| Total mobilization/demobilization cost | | | | \$10,000 |

Miscellaneous Subtotal (XV + ... + XIX): \$11,000

Closure Cost Subtotal (CCS):	(I + ... + XIX)	\$312,418
-------------------------------------	-----------------	-----------

Engineering & Documentation:

- | | | |
|--|------------|----------------------|
| Construction QA/QC (1%) | CCS x 0.01 | \$3,124 |
| Closure Certification and CQA Report (1%) | CCS x 0.01 | \$3,124 |
| Survey and as-builts (2%) | CCS x 0.02 | \$6,248 |
| Cost for survey and deed notation | | <input type="text"/> |
| Total Engineering & Documentation Costs | | \$12,497 |

Total Closure Cost:	CCS + Engineering	\$324,915
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Worksheet CEW-02: ESTIMATION OF POST-CLOSURE COSTS

I. Groundwater Monitoring

		Calculation or Conversion	
a. Total number of monitoring wells			wells
b. Total number of sampling events/year		a x b	0 samples/yr
c. Quantity of additional samples (e.g. QA/QC)		b x c	0 samples/yr
d. Total samples per year		b + c	0 samples/yr
e. Analysis unit cost (Table 3.1 constituents)			/sample
f. <i>Total Analysis cost</i>		d x e	\$0.00 /yr
g. GW Monitoring unit cost			/event
i. <i>Total sampling cost</i>		f + (g x b)	\$0.00 /yr
j. Engineering fees & reports			/yr
Yearly Groundwater Monitoring Cost		i + j	\$0 /yr

II. Landfill Gas Monitoring, Maintenance, and Control

a. Frequency of LFG compliance monitoring			events/yr
b. LFG Monitoring unit cost			/event
c. <i>Total perimeter LFG monitoring cost</i>		a x b	\$0 /yr
d. Frequency of surface monitoring (air permit)			events/yr
e. Surface monitoring unit cost			/event
f. <i>Total surface monitoring cost</i>		d x e	\$0 /yr
g. Control system operating unit cost			/yr
h. Frequency of LFG control system inspections			events/yr
i. Control system inspection cost			/event
j. <i>Total control system cost</i>		g + (h x i)	\$0 /yr
Yearly Landfill Gas Monitoring, Maintenance, & Control Cost		c + f + j	\$0 /yr

III. Leachate Management

a. Quantity of leachate generated			gal/yr
<i>On-site Leachate Management or Pre-Treatment</i>			
b. On-site treatment operating unit cost			/gal
c. <i>Total on-site management cost</i>		a x b	\$0 /yr
<i>Leachate Disposal</i>			
d. Private disposal unit cost			/gal
e. POTW disposal unit cost			/gal
f. Direct discharge to POTW unit cost			/gal
g. Pump & Haul unit cost			/gal
h. Subtotal leachate disposal unit cost		d + e + f + g	\$0.00
i. <i>Total leachate disposal cost</i>		a x h	\$0 /yr
j. Leachate sampling & analysis unit cost			/sample
k. Frequency of leachate sampling & analysis			sample/yr
l. <i>Total leachate sampling & analysis cost</i>		j x k	\$0.00 /yr
Yearly Leachate Management Cost		c + i + l	\$0 /yr
<i>Closure of Leachate Storage Units</i>			
m. Total Cost to Decommission/Remove			
One-time Leachate Unit Closure Cost at end of PCC		m	\$0

IV. Cap Maintenance & Repair

a. Closed Landfill Area acres

Mowing & Fertilization

b. Mowing frequency visits/yr
 c. Mowing unit cost /acre/visit
 d. *Total mowing cost* $a \times b \times c$ \$0 /yr
 e. Fertilizer frequency visits/yr
 f. Fertilizer unit cost /acre/visit
 g. *Total fertilizer cost* $a \times e \times f$ \$0 /yr

Cap Erosion & Repair

h. Area to reseed/year 33% x a 11.7 acres
 i. Reseeding unit cost /acre $h \times i$ \$87.50 /yr
 j. *Total reseeding cost* 10% x a 3.5 acres
 k. Area of cap erosion/year
 l. Cap erosion repair unit cost /acre
 m. Mobilization/Demobilization /yr
 n. *Total cap erosion repair cost* $(k \times l) + m$ \$5,028 /yr

Yearly Cap Maintenance & Repair cost

$d + g + j + n$ **\$5,116 /yr**

V. Sediment Basin Maintenance & Repair

a. Sediment basin cleanout frequency, 1 per years $1 / a$ 0.33 event/yr
 b. Sediment basin cleanout unit cost /event
 c. Mobilization/Demobilization /event
 d. *Total sediment basin maintenance cost* $a \times (b + c)$ \$0 /yr
 e. Total number of stormwater sampling locations locations
 f. Stormwater sampling frequency events/yr
 g. Total number of stormwater samples $e \times f$ 0 samples/yr
 h. Analysis unit cost (VPDES permit parameters) /sample
 i. *Total Analysis cost* $g \times h$ \$0 /yr
 j. Mobilization unit cost /event
 k. Technician field unit cost /event
 l. *Total sampling cost* $f \times (j + k)$ \$0.00 /yr
 m. Engineering fees & reports /yr
 n. *Total Stormwater Sampling & Analysis cost* $i + l + m$ \$0 /yr

Yearly Sediment Basin Maintenance & Repair

$d + n$ **\$0 /yr**

VI. Vector & Rodent Control

a. Vector and rodent control unit cost /yr

Yearly Vector and Rodent Control Cost

a **\$0 /yr**

VII. Post-Closure Care General Inspections

a. General Inspection unit cost /inspection
 b. Number of inspections per year

Yearly Post-Closure Care General Inspection Cost

$a \times b$ **\$4,000 /yr**

**VIII. Underdrain Monitoring**

		Calculation or Conversion	
a. Total number of monitoring locations		wells	
b. Total number of sampling events/year		events/yr	a x b
c. Quantity of additional samples (e.g. QA/QC)		samples/event	b x c
d. Total samples per year		b + c	0 samples/yr
e. Analysis unit cost (leachate indicator parameters)		/sample	0 samples/yr
f. <i>Total Analysis cost</i>		d x e	\$0.00 /yr
g. Underdrain Monitoring unit cost		/event	
i. <i>Total sampling cost</i>		f + (g x b)	\$0.00 /yr
j. Engineering fees & reports		/yr	
Yearly Underdrain Monitoring Cost		i + j	\$0 /yr

Annual Post-Closure Care Cost (APCC)

I + ... + VIII \$9,116 /yr

Length of post-closure care (LPCC) 5 years**Post-Closure Care Cost**

(APCC x LPCC) + III.m. \$45,578

Engineering & Documentation

Post-Closure Care Evaluation

Post-Closure Care Certification \$5,000

Cost for survey and deed notation

(if not completed at time of landfill closure)

Engineering Sum \$5,000

FA Mechanism Maintenance Cost \$1,000 /yr

FA maintenance x LPCC \$5,000

Total Post-Closure Care CostPost-Closure Cost + Engineering + FA Maintenance **\$55,578**