SOLID WASTE DISPOSAL FACILITY

MSWLF/ILF/CCR UNIT PERMIT APPLICATION PACKAGE

January 16, 2018

MEMORANDUM

TO: Applicants Seeking a Permit for Solid Waste Facilities

FROM: Stephen A. Cobb, Chief
Land Division
Alabama Department of Environmental Management

RE: Processing Solid Waste Permits by ADEM

Any permit issued by ADEM must be in accordance with §22-27-48 and §22-27-48.1 Code of Alabama. This section indicates that ADEM may not consider an application for a new or modified permit unless such application has received approval by the affected unit of local government having an approved plan. ADEM, therefore, will require the following before it can process a new or modified permit application:

1. The local government having jurisdiction must approve the permit application in accordance with §22-27-48 and §22-27-48.1 Code of Alabama.

2. Local governments should follow the procedures outlined in §22-27-48 and §22-27-48.1. Code of Alabama and the siting standards included in the local approved plan in considering approval of a facility.

This procedure applies to applications for new or modified permits. ADEM cannot review an application unless it includes approval from the affected local government. This procedure shall not apply to exempted industrial landfills receiving waste generated on site only by the permittee.

Please contact the Solid Waste Branch of ADEM at (334) 274-4201 if there are any questions.

SAC/sss/abj

SOLID WASTE APPLICATION

PERMIT APPLICATION
SOLID WASTE DISPOSAL FACILITY
ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
(Submit in Triplicate)

1. Facility type:
   - X Municipal Solid Waste Landfill (MSWLF)
   - X Industrial Landfill (ILF)
   - ____ CCR Landfill (CCRLF)
   - ____ CCR Surface Impoundment (CCRSI)
   - X Other (explain) Construction and Demolition (C&D)

2. Facility Name Axis Industrial Landfill

3. Applicant:

   Name: EcoSouth Services of Mobile, LLC

   Address: 12945 Highway 43 N, Axis, AL 36505

   Telephone: (251) 675-9800 or (251) 747-3210

4. Location: (include county highway map or USGS map)

   Township 1 South Range 1 East
   Section 1 and 18 County Mobile

5. Land Owner:

   Name: EcoSouth Services of Mobile, LLC

   Address: 12945 Highway 43 N, Axis, AL 36505

   Telephone: (251) 675-9800 or (251) 747-3210

   (Attach copy of agreement from landowner if applicable.)

6. Contact Person:

Name Jeff Claunch

Position or
Affiliation President

Address: 12945 Highway 43 N, Axis, AL 36505

Telephone: (251) 747-3210 or (251) 675-9800

7. Size of Facility: 70.3 Acres

Size of Disposal Area(s): 46.8 Acres

8. Identify proposed service area or specific industry that waste will be received from:

Alabama – Baldwin, Clarke, Conecuh, Covington, Dale, Escambia, Houston, Mobile, Monroe, and Washington Counties

Florida – Escambia, Okaloosa, Bay, Santa Rosa, and Walton Counties

Mississippi – Jackson, Harrison, and Hancock Counties

9. Proposed maximum average daily volume to be received at landfill (choose one):

5000 Tons/Day _____ Cubic Yards/Day

10. List all waste streams to be accepted at the facility (i.e., household solid waste, wood boiler ash, tires, trees, limbs, stumps, etc.):

Municipal solid waste, construction, demolition, and rubbish waste, as defined by ADEM, and industrial waste streams approved by ADEM; including waste building materials packaging and rubbish resulting from construction, repair or demolition operations including masonry, sheet rock, insulation, scrap metal, wood, wood products, concrete, soil, brick, asphalt, ash from unrelated materials brush, land clearing debris, disaster debris, approved wastewater sludges, total petroleum hydrocarbons, automobile fluff from SA Recycling located in Mobile County and Remediation Waste from South Alabama Utilities Citronelle Lagoon Closure Project.

SIGNATURE 10/5/20 DATE

ADDITIONAL REQUIRED INFORMATION

Applicants seeking to obtain a permit to construct and/or continue to operate a municipal solid waste (MSW) landfill, industrial landfill, coal combustion residuals (CCR) landfill, or CCR surface impoundment are required to submit additional information as part of the Solid Waste Disposal Facility Permit Application. These additional information requirements vary depending on the facility type.

For new and existing landfill units, refer to ADEM Admin Code 335-13-5-.02 for a list of additional information to be submitted in the permit application. Some requirements apply only to MSW landfills and CCR landfills, while other requirements apply to industrial landfills. You need only to address the requirements that pertain to your type landfill. For new and existing CCR surface impoundments, refer to ADEM Admin Code 335-13-15-.09 for additional information to be submitted in the permit application.

Each rule that is applicable to your type landfill or surface impoundment must be addressed in detail in the operational narrative and/or engineering drawings before the review process can be completed. All operational narratives, engineering drawings, survey maps and legal descriptions are to be prepared by licensed engineers or surveyors registered in the State of Alabama and with their stamp or seal on each drawing/map and cover of the narrative.

Act No. 89-824 Section 9(a) states "The department may not consider an application for a new or modified permit for a facility unless such application has received approval by the affected unit of local government having an approved plan." This document must be received by the Department prior to processing the application.

The referenced rules are covered in greater detail in ADEM's Administrative Code, Division 13. Clarification can be obtained by reviewing the regulations. Copies of the ADEM Administrative Code, Division 13 regulations, can be obtained for a fee by contacting ADEM's Permits and Services Division. If the Department can answer any questions, please contact the Solid Waste Branch at (334) 274-4201.

DATA TO BE SUBMITTED ON ALL LANDFILLS REQUIRING A GEOLOGICAL EVALUATION

The following items must be submitted along with the permit application. This data is necessary for ADEM to determine if the proposed landfill site is suitable from a geological standpoint.

a. Conduct a water well survey to a minimum of 1 mile from the perimeter of the proposed landfill or expansion.

   1. Locate water wells on a USGS 7.5 minute topographic map.

   2. Provide corresponding names and addresses of well owners.

   3. Determine the depth of the well and the static water level. Specify whether these data were determined by measurement or interview.

b. Conduct borings and/or pit excavations to establish site geology and hydrology at least to the mean annual water table or bedrock.

   1. Locate soil borings or excavation pits on a USGS 7.5 minute topographic map.

   2. Provide a log of excavation which includes the following:

      Foot by foot soil classification by the Unified Soil Classification System (USCS).

      Elevation at which groundwater or bedrock was observed.

      Elevation of groundwater after 24 hours.

c. Sample soil material from test borings or pit excavations for the following tests:

   1. Proctor density 90%-95% for liner material, 85%-90% for cover material.

   2. Permeability in cm/sec at the item (1) densities.

d. Construct the following maps:

   1. Potentiometric map using general elevations established after 24 hours.

   2. Regional map to a minimum of 1 mile from the perimeter indicating geology, structural features such as faults, etc.

   3. Cross sections using borings and/or excavation pits of site.

e. Any additional information deemed necessary to properly evaluate the site.

November 6, 2020

Mr. Scott Story, Chief
Solid Waste Branch
Land Division
Alabama Department of Environmental Management
PO Box 301463
Montgomery, Alabama 36130-1463

RE: Solid Waste Permit Renewal/Modification Addendum
Axis Industrial Landfill
Permit No. 49-21

Dear Mr. Story,

On October 5, 2020, EcoSouth Services LLC (EcoSouth), submitted a permit renewal application for its Landfill located in Axis Alabama. As part of the October 5, 2020, submittal, EcoSouth also requested to modify its existing permit to allow for the disposal of Municipal Solid Waste and to increase the volume of waste accepted at the landfill. This submittal is intended to provide additional documentation to support the proposed renewal and modification of EcoSouth's solid waste permit. This package includes ADEM Form 439, documentation of local approval, updates to the facility Operations Plan, Groundwater Monitoring Plan, Control Program for Unauthorized Waste, and Closure/Post-Closure Plan, drawings depicting updated disposal areas, a list of adjacent landowners, and cost estimates for financial assurance.

In addition, LaBella requests to continue the existing variances that have been previously approved by ADEM for Permit No. 49-21. These variances include the following:

1. A variance from Rule 335-13-4-.22(1)(b) allowing the operation of an additional working face at the Axis Industrial Landfill. One working face will be allowed in Phase I and a second working face will be allowed in Phase II due to the differentiation in liner systems in each phase. (See Section 111.E.)

2. A variance from Rule 335-13-4-.12(2)(f) requiring a 100 foot buffer zone.

3. A variance allowing the use of autofluff as an alternative cover material. The alternate cover material should be mixed with sand or other soils in the ratio of 50% soil: 50% autofluff. Additionally, the Permittee is required to cover with six inches of earthen material at conclusion of each month's operation. (See Section III.E.)

4. A variance allowing the use of Residual Short Fiber (RSF) as an alternative cover material. The alternate cover material should be mixed with sand or other soils in the ratio of 50% soil: 50% RSF. Additionally, the Permittee is required to cover with six inches of earthen material at conclusion of each month's operation. (See Section III.E.)

5. A variance from Rule 335-13-4-.23(1)(c) defining slopes not to exceed 4 to 1 (25%). The permittee is approved to operate working slopes of 3 to 1 (33%) (Section III.E).

EcoSouth also requests to update the variance from Rule 335-13-4-.23(1)(c) to allow 3 to 1 (33%) grades for all slopes. In support of this request, slope stability calculations have been provided with this package.

The required fees for this permit modification have been sent to ADEM. Please let me know if you have any questions or need additional information regarding this matter. I can be reached by email at DThornock@labellapc.com or by phone at (804) 980-7458.

Respectfully submitted,
LaBella Associates

Darrell Thornock, PE
Technical Consultant

Attachments

A – ADEM Form 439 Application
B – Documentation of Local Approval
C – List of Adjacent Landowners
D – Operations Plan
E – Groundwater Monitoring Plan
F – Control Program for Unauthorized Waste
G – Closure/Post-Closure Plan
H – Financial Assurance Estimates
I – Slope Stability Calculations
J – Site Drawings

Attachment A

ADEM Form 439 Application

SOLID WASTE DISPOSAL FACILITY

MSWLF/ILF/CCR UNIT PERMIT APPLICATION PACKAGE

January 16, 2018

MEMORANDUM

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FROM: Stephen A. Cobb, Chief
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SAC/sss/abj

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SOLID WASTE DISPOSAL FACILITY
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   Address: 12945 Highway 43 N, Axis, AL 36505

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4. Location: (include county highway map or USGS map)

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Name Jeff Claunch

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9. Proposed maximum average daily volume to be received at landfill (choose one):

5000 Tons/Day _____ Cubic Yards/Day

10. List all waste streams to be accepted at the facility (i.e., household solid waste, wood boiler ash, tires, trees, limbs, stumps, etc.):

Municipal solid waste, construction, demolition, and rubbish waste, as defined by ADEM, and industrial waste streams approved by ADEM; including waste building materials packaging and rubbish resulting from construction, repair or demolition operations including masonry, sheet rock, insultation, scrap metal, wood, wood products, concrete, soil, brick, asphalt, ash from unrelated materials brush, land clearing debris, disaster debris, approved wastewater sludges, total petroleum hydrocarbons, automobile fluff from SA Recycling located in Mobile County and Remediation Waste from South Alabama Utilities Citronelle Lagoon Closure Project.

SIGNATURE 10/5/20 DATE

ADDITIONAL REQUIRED INFORMATION

Applicants seeking to obtain a permit to construct and/or continue to operate a municipal solid waste (MSW) landfill, industrial landfill, coal combustion residuals (CCR) landfill, or CCR surface impoundment are required to submit additional information as part of the Solid Waste Disposal Facility Permit Application. These additional information requirements vary depending on the facility type.

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   2. Regional map to a minimum of 1 mile from the perimeter indicating geology, structural features such as faults, etc.

   3. Cross sections using borings and/or excavation pits of site.

e. Any additional information deemed necessary to properly evaluate the site.

Attachment B

Documentation of Local Approval

LaBella
Powered by partnership.

July 7, 2020

Mr. Jay Ross, Esq.
Mobile County Attorney
205 Government Street
Mobile Government Plaza
Mobile, AL. 36644

Mr. Eddie Kerr
Deputy County Administrator
205 Government Street
Mobile Government Plaza
Mobile, AL. 36644

RE: Mobile County Solid Waste Plan Jurisdiction
Permit Application for Solid Waste Facility
Axis Industrial Landfill, Permit No. 49-21
LaBella Project No. 2192290

Dear Mr. Ross and Mr. Kerr,

On behalf of EcoSouth Services of Mobile, LLC, please find the enclosed Solid Waste Permit Application for the Axis Industrial Landfill. The application fee of $6,000 payable to the Mobile County Commission will be sent under separate cover.

The proposed modifications at the existing Axis Industrial Landfill are the addition of Municipal Solid Waste (MSW) as an accepted waste stream and increasing the volume of solid waste received at the landfill from an average of 1,500 cubic yards per day to 5,000 tons per day. In addition, the design of existing Phases 1 & 2 will be modified and the waste disposal footprint will increase approximately 25 acres into the Phase 3 area. The total acreage and service area of the landfill, as previously approved by the Mobile County Commission, will not change as a result of the proposed modifications.

In determining whether to recommend approval of the proposed modification to the permit for EcoSouth Services of Mobile, LLC, Alabama Code g 22-24-48 requires the Commission to consider six factors. EcoSouth Services of Mobile, LLC's response to each of the factors stipulated in Alabama Code g 22-24-48 is detailed in Attachment M of this application package.

The Axis Industrial Landfill is an existing facility that also falls under the regulatory oversight of the Alabama Department of Environmental Management (ADEM). Therefore, EcoSouth Services of Mobile, LLC requests a variance to the requirement that a commercial site plan, approved by the County Engineer's office, be submitted with this application package. Many of the commercial site plan elements required by the Mobile County Commission are identical to what is required during the permitting process with ADEM. EcoSouth Services of Mobile, LLC is planning to submit a commercial site plan to the Mobile County Engineer's office for approval in concert with the submittal of ADEM's required applications for modification of its existing Solid Waste Permit (49-21).

P.O. Box 264 | Opelika, AL 36803 | p (334) 332-8402 | f (585) 454-3066
www.labellapc.com

Should you need any additional information or have any questions, please feel free to call me at (334) 332-8402 or contact me via email at esanderson@labellapc.com.

Respectfully submitted,

Eric Sanderson, P.E.
Regional Manager
LaBella Associates

Enclosure

Cc Jeff Claunch, President and CEO, EcoSouth Services of Mobile, LLC.

PERMIT APPLICATION

FOR

SOLID WASTE FACILITY

MOBILE COUNTY SOLID WASTE PLAN JURISDICTION

1. FACILITY TYPE: ___TRASH LANDFILL

____X_____C & D LANDFILL

____X_____SANITARY LANDFILL

__X (Industrial)__OTHER (Explain)

2. APPLICANT:

Name EcoSouth Services of Mobile, LLC

Address 12945 Hwy 43 N. Axis, AL 36505

Telephone (251) 675-9800

If applicant is a Corporation, please list:

Officers: Jeff Claunch, President and CEO

Principal Stockholders: Jeff Claunch and Bluewater Holdings

If applicant is a Partnership, please list principals:

3. CONTACT PERSON(S): (if different from No. 2)

Name (1) Jeff Claunch, President (2) Eric Stephens, Environmental Manager

Address Same as above Same as above

Telephone (251) 675-9800 (251) 675-9800

4. LANDOWNER: (if different from No. 2)

Name EcoSouth Services of Mobile, LLC

Address Same as above

Telephone (251) 675-9800

Attach copy of agreement from landowner giving permission to use site for the intended purpose.

EcoSouth Services of Mobile, LLC is the owner of the landfill and the property.

5. ADJACENT LANDOWNERS:

a. Submit a list of all adjacent landowners including name and current mailing address. See Attachment A

b. Submit a map identifying the proposed disposal site and all adjacent landowners listed in (a) above. State the source of your information. See Attachment B and G

6. WASTE DESCRIPTION:

a. _X_ Household Solid Waste

_X_ Industrial Solid Waste

____ Other (Specify)

b. Chemical Analysis (when required)

Waste Approvals will be obtained in accordance with ADEM Admin. Code r. 335-4

c. Describe and list all waste streams to be accepted at facility. Be specific (household solid waste, wood boiler ash, foundry sand, discarded tires, dried sludge, limbs and stumps, etc.)

Non-Hazardous putrescible and non-putrescible wastes including but not limited to household garbage, industrial waste, construction and demolition waste, commercial waste, rubbish, special waste approved by ADEM, and wastes listed in EcoSouth's Solid Waste Permit Number 49-21 (See Attachment C)

d. What is the estimated maximum daily volume of waste to be received at the facility? 5,000 tons/day (indicate tons/day or yd*/day)

e. What geographic area or specific industry will waste be accepted from? (be specific) The Service Area listed on EcoSouth's Solid Waste Permit 49-21 (See Attachment C)

f. Haulage of waste to the facility will be by whom?

Company Owned and third party vehicles

g. Describe the principle type of transportation vehicle to be used to transport waste: Various sizes and types of waste collection vehicles including but not limited to: Roll off containers, dump trucks and dump trailers

h. Approximately 50 vehicles per day (max.) will be generated as additional traffic on the main collector road to this solid waste facility.

i. Specify all proposed environmental monitoring systems (i.e.

groundwater, explosive gas, leachate collection, liner systems). All dirt pits proposed for c&d landfills (others if required by the Environmental Director) are required to have explosive gas and ground water monitoring systems. Monitoring plans and the constituents monitored must be approved by the Environmental Director.

See Attachment D

7. SITE DESCRIPTION:

a. Attach location map with the site clearly identified. Acceptable maps include a USGS 7.5 or 15 minute series, a county highway map published by the State DOT, or approved equivalent.

See Attachment E

b. Location:

County Mobile

_____ of Section 1-18

Township 1 South Range 1 East

c. Attach a legal property description and boundary plat of the disposal facility prepared by a land surveyor.

See Attachment F

d. Size of disposal facility (actual area to be utilized) See Attachment B

e. Total area of property (if different from d.) See Attachment B

8. SITING STANDARDS:

Note: When siting C&D landfills, preference will be given to existing dirt pits.

a. Is the facility located within the 100-year flood plain?

YES ___ NO X

See Attachment K

Provide a current flood insurance rate map with the site identified.

See Attachment H

b. Is the facility located so as to protect surface and groundwater?

YES X NO___

Explain on an attached sheet.
See Attachment I

c. Is a discharge to surface water proposed that may require an NPDES Permit?

YES X NO___

Explain on an attached sheet.

See Attachment J

d. Is a discharge of dredged material or fill material into waters of the state proposed which may require a permit under Section

YES___ NO X

e. The bottom elevation of solid waste shall be a minimum of five feet above the seasonal high groundwater table or bedrock. The minimum depth to(CIRCLE ONE: Bedrock groundwater) at this site is 5 feet. (Attach map showing location)

See Attachment I

f. Are any sinkholes, ponds, springs, swamps, streams, or drainage courses located within the disposal area?

YES_____ NO _____

See Attachment K

g. If the answer to (f) is YES, explain.

_____

_____

h. For any type facility, identify any airport runway located within 10,000 feet of the site?

No

i. How many landfills (or similar type facility) are within a ten (10) mile radius of this proposed facility? 1

j. Does the entrance to the facility meet current standards for sight distance? Yes

Note: a commercial site plan approved by the County Engineer's office will be required.

k. Will any stormwater runoff be directed to a road right-of-way? No

9. GENERAL:

a. Describe how the property boundaries will be clearly and permanently marked.

Concrete markers and fencing

b. Describe and/or show your planned progression of fill from

See Attachment L

c. The life expectancy of the facility is a minimum of 10 years.

d. How will indiscriminate dumping be prevented (gates, fencing, etc)

Gates, fencing, and trained personnel to monitor incoming loads

e. Describe what equipment will be utilized in the disposal operation.

Bulldozers, track hoes, articulated dump trucks, tractors, waste compactors, and a water truck for dust control

f. Describe what personnel will be utilized in the disposal operation.

General Manager, Scale Operators, Equipment Operators, Administrative, Safety, and Compliance Personnel

g. The applicant is responsible for compliance with all other requirements identified by applicable statutes and the ADEM Administrative Code.

h. Special requirements for existing dirt pits proposed for c&d landfills:

1. Groundwater monitoring plan.
2. Explosive gas monitoring plan.
3. No air space is allowed. The top elevation cannot exceed natural adjacent ground elevation.
4. Final grading plan.
5. Closure plan.

10. Alabama Code § 22-27-48:

A legal ad publication in the Mobile Press is one of the requirements of holding a host community approval public hearing and this ad will be handled by the Approving Jurisdiction.

Additionally, Act Nos. 86-480 and 87-500, Acts of Alabama Regular Sessions 1986 and 1987 provide certain requirements for the public hearing regarding a request for host community approval of any solid waste facility in Mobile County. These two Local Acts require that at least two competent representatives of the business entity that is to serve as the primary contractor for the solid waste facility project shall be present at the public hearing.

Finally, the Approving Jurisdiction will consider your proposal and will determine whether to approve or disapprove the site based on all information provided including the following considerations set forth in Alabama Code § 22-27-48:

1. The consistency of the proposal with the jurisdiction's solid waste management needs as identified in the Mobile County Solid Waste Management Plan;

2. The relationship of the proposal to local plans or existing development, or the absence thereof, to major transportation arteries and to existing state primary and secondary roads;

3. The location of the proposed facility in relationship to existing industries in the state that generate large volumes of solid waste, or the relationship to the areas projected for development of industries that will generate solid waste;

4. Cost and availability of public services, facilities and improvements required to support the proposed facility and protect public health, safety, and the environment;

5. The impact of proposed facility on public safety and provisions made to minimize the impact on public health and safety; and

6. The social and economic impacts of the proposed facility on the affected community, including changes in property values, and social or community perception.

The applicant is required to complete all the information and submit the package with the $6,000.00 fee payable to the Approving Jurisdiction with a formal written request for host community approval to locate a solid waste facility within the legal boundaries of the Approving Jurisdiction.

Please be reminded that the information you submit will be the criteria used to judge the merits of approval. The burden of satisfying the Approving Jurisdiction as to each of the above criteria falls squarely on the applicant. Failure to so satisfy the Approving Jurisdiction regarding each of these criteria may result in denial of your request for approval of the solid waste facility site.

CERTIFICATION:

I, Jeff Claunch, certify under penalty of law that this document and all attachments submitted are to the best of my knowledge and belief, true, accurate, and complete.

SIGNATURE (Corporate Officer, Partner, Mayor, Chairman, etc.):

CEO

TITLE

ATTACHMENT A

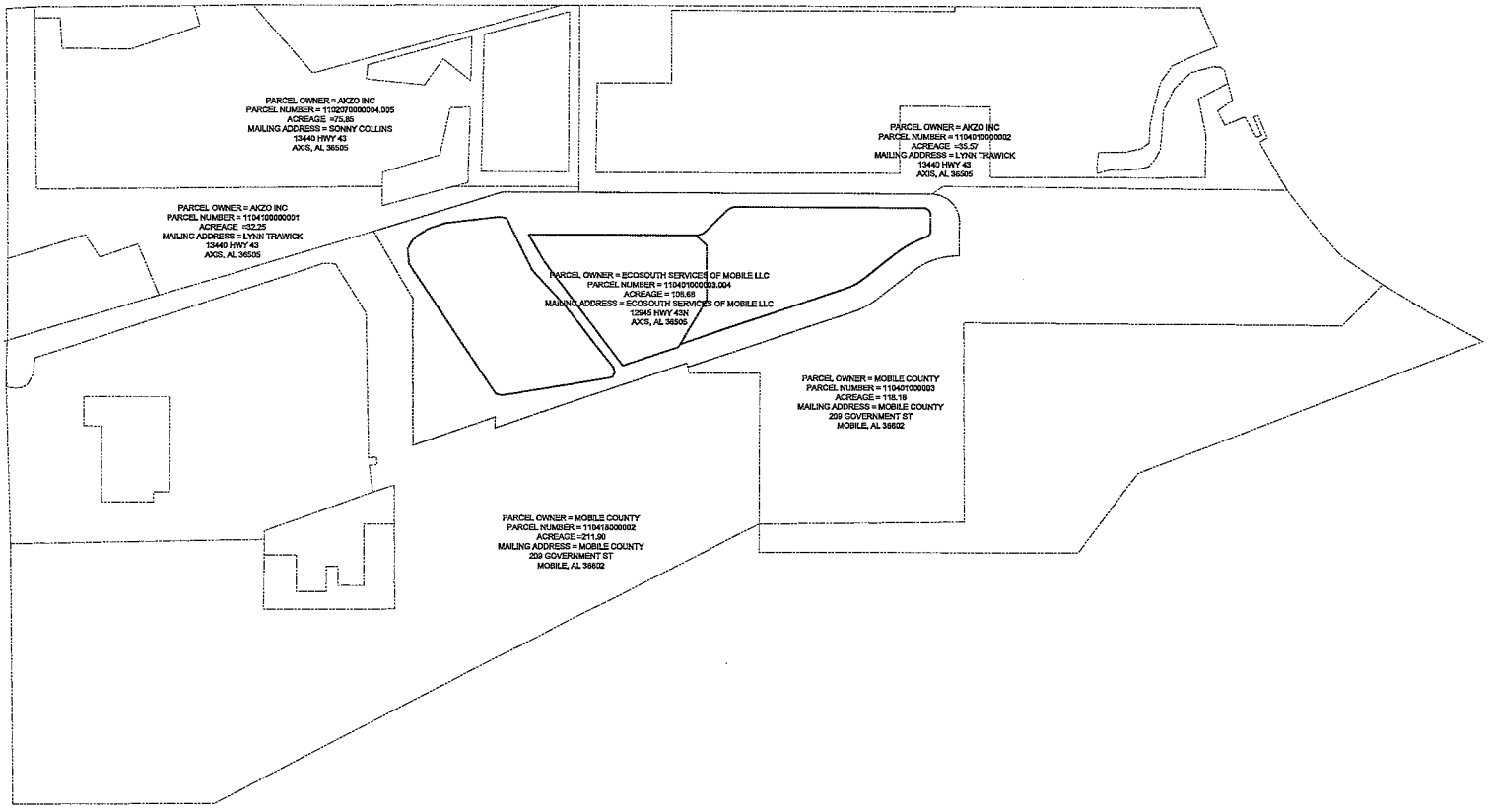
ADJACENT LANDOWNERS

Akzo, Inc.
13440 Hwy 43
Axis AL 36505

Mobile County Commission
205 Government Street
Mobile AL. 36602

ATTACHMENT B

DISPOSAL SITE/ADJACENT LANDOWNER MAP



1. PROPERTY AND PARCEL DATA OBTAINED FROM mobilepropertytax.com/interactive-map/.

LaBella
Powered by partnership.
1604 Ownby Lane
Richmond, VA 23220
804-355-4520
labellapc.com

NOT FOR CONSTRUCTION

ECOSOUTH ENVIROMENTAL
AXIS, ALABAMA

AXIS LANDFILL
AXIS, ALABAMA

NO:	DATE:	DESCRIPTION:
Revisions		

PROJECT NUMBER: 219Z290.01
DRAWN BY: -
REVIEWED BY: -
ISSUED FOR: ISSUED FOR
DATE: 3/10/2020
DRAWING NAME:

ADJACENT LANDOWNERS MAP

DRAWING NUMBER: 1

ATTACHMENT C

ADEM SOLID WASTE PERMIT 49-21

LANCE R. LEFLEUR
DIRECTOR

KAY IVEY
GOVERNOR

Alabama Department of Environmental Management
adem.alabama.gov
1400 Coliseum Blvd. 36110-2400 ▪ Post Office Box 301463
Montgomery, Alabama 36130-1463
(334) 271-7700 ▪ FAX (334) 271-7950

June 21, 2018

CERTIFIED MAIL 91 7199 9991 7038 0607 3963
RETURN RECEIPT REQUESTED

Mr. Jeff Claunch
EcoSouth Services of Mobile, LLC
P. O. Box 639
Creola, Alabama 36525

Re: Permit Modification
Axis Industrial Landfill
Permit 49-21
Mobile County, Alabama

Dear Mr. Claunch:

Enclosed is the Solid Waste Disposal Facility Permit for the Industrial Waste Landfill known as Axis Industrial Landfill. The modified permit is effective as of June 21, 2018 and the permit expiration date will remain April 4, 2021.

If you should have any questions, please contact Mr. Blake Holden of the Solid Waste Branch at (334) 274-4248.

Sincerely,

S. Scott Story, Chief
Solid Waste Engineering Section
Land Division

SSS/bh

Birmingham Branch
110 Vulcan Road
Birmingham, AL 35209-4702
(205) 942-6168
(205) 941-1603 (FAX)

Decatur Branch
2715 Sandlin Road, S.W.
Decatur, AL 35603-1333
(256) 353-1713
(256) 340-9359 (FAX)

Mobile Branch
2204 Perimeter Road
Mobile, AL 36615-1131
(251) 450-3400
(251) 479-2593 (FAX)

Mobile-Coastal
3664 Dauphin Street, Suite B
Mobile, AL 36608
(251) 304-1176
(251) 304-1189 (FAX)

FINAL DETERMINATION

PERMIT MAJOR MODIFICATION

EcoSouth Services of Mobile, LLC
P. O. Box 639
Creola, Alabama 36525

Axis Industrial Landfill
Permit No. 49-21

June 21, 2018

CDG Engineers & Associates, Inc., on behalf of EcoSouth Services of Mobile, LLC, has submitted to the Alabama Department of Environmental Management (ADEM) an application for modification of the Solid Waste Disposal Permit (Permit No. 49-21) for the Axis Industrial Landfill. The modification requests expanding the service area, according to local host government approval, to include Baldwin, Clarke, Conecuh, Covington, Dale, Escambia, Houston, and Monroe Counties in Alabama; Escambia, Okaloosa, Bay, Santa Rosa, and Walton Counties in Florida; and Jackson, Harrison, and Hancock Counties in Mississippi. Additionally, the modification will update the groundwater monitoring plan. The Axis Industrial Landfill is described as being located in the Sections 1 and 18, Township 1 South, and Range 1 East in Mobile County, Alabama. The permitted facility consists of approximately 70.3 acres with 46.8 acres approved for disposal. All previously approved variances shall remain in the permit.

The waste stream for the Axis Industrial Landfill will be construction, demolition and rubbish waste, as defined by ADEM, and industrial waste streams approved by ADEM; including waste building materials, packing, and rubbish resulting from construction, repair or demolition operations including masonry, sheet rock, insulation, scrap metal, wood, wood products, concrete, soil, brick, asphalt, ash from untreated materials, brush, land clearing debris, disaster debris, approved wastewater sludges, total petroleum hydrocarbons, automobile fluff (solid waste from automobile shredding) from Alter Metal Recycling located in Mobile County and Remediation Waste from South Alabama Utilities Citronelle Lagoon Closure Project. The facility must keep a copy of approved Solid/Hazardous Waste Determination Forms for all the Industrial Wastes disposed and any associated Department correspondence in the facility operating record. The maximum average daily volume of waste disposed at the Axis Industrial Landfill will remain 1500 cubic yards per day.

A public comment period was announced by the Department on May 11, 2018 and ended on June 14, 2018. The draft permit and application were accessible for inspection at the Alabama Department of Environmental Management. The Department received no comments during the comment period.

The Solid Waste Branch has decided that the permit application complies with the requirements of ADEM's Administrative Code Division 13 regulations for an industrial waste landfill.

Technical Contact:
Blake Holden
Solid Waste Engineering Section
Land Division
(334)274-4248

ADEM
Alabama Department of Environmental Management

ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

SOLID WASTE DISPOSAL FACILITY PERMIT

PERMITTEE:	EcoSouth Services of Mobile, LLC
FACILITY NAME:	Axis Industrial Landfill
FACILITY LOCATION:	Sections 1 and 18, Township 1 South, Range 1 East in Mobile County near Highway 43. The permitted facility consists of 70.3 acres with 46.8 permitted for disposal.
PERMIT NUMBER:	49-21
PERMIT TYPE:	Industrial
WASTE APPROVED FOR DISPOSAL:	Construction, demolition and rubbish waste, as defined by the Department, and industrial waste streams approved by the Department; including waste building materials packaging and rubbish resulting from construction, repair or demolition operations including masonry, sheet rock, insulation, scrap metal, wood, wood products, concrete, soil, brick, asphalt, ash from untreated materials, brush, land clearing debris, disaster debris, approved wastewater sludges, total petroleum hydrocarbons, automobile fluff (solid waste from automobile shredding) from Alter Metal Recycling located in Mobile County and Remediation Waste from South Alabama Utilities Citronelle Lagoon Closure Project.
AVERAGE WASTE VOLUME:	Maximum Average Daily Volume of waste is 1500 cubic yards per day
SERVICE AREA:	Baldwin, Clarke, Conecuh, Covington, Dale, Escambia, Houston, Mobile, Monroe, and Washington Counties in Alabama; Escambia, Okaloosa, Bay, Santa Rosa, and Walton Counties in Florida; and Jackson, Harrison, and Hancock Counties in Mississippi.

In accordance with and subject to the provisions of the Alabama Solid Wastes & Recyclable Materials Management Act, as amended, Code of Alabama 1975, SS 22-27-1 to 22-27-27 ("SWRMMA"), the Alabama Environmental Management Act, as amended, Code of Alabama 1975, SS 22-22A-1 to 22-22A-15, and rules and regulations adopted thereunder, and subject further to the conditions set forth in this permit, the Permittee is hereby authorized to dispose of the above-described solid wastes at the above-described facility location.

ISSUANCE DATE:	April 5, 2016
EFFECTIVE DATE:	April 5, 2016
MODIFICATION DATE:	March 31, 2017, January 23, 2018, June 21, 2018
EXPIRATION DATE:	April 4, 2021

Alabama Department of Environmental Management

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
SOLID WASTE PERMIT

Permittee:	EcoSouth Services of Mobile, LLC P. O. Box 639 Creola, AL 36525
Landfill Name:	Axis Industrial Landfill
Landfill Location:	Sections 1 and 18, Township 1 South, Range 1 East located near US Highway 43 in Mobile County, Alabama
Permit Number:	49-21
Landfill Type:	Industrial

Pursuant to the Alabama Solid Wastes and Recyclable Materials Management Act, Code of Alabama 1975, Section 22-27-1, *et seq.*, as amended, and attendant regulations promulgated thereunder by the Alabama Department of Environmental Management (ADEM), this permit is issued to EcoSouth Services of Mobile, LLC (hereinafter called the Permittee), to operate a solid waste disposal facility, known as the Axis Industrial Landfill.

The Permittee must comply with all terms and conditions of this permit. This permit consists of the conditions set forth herein (including those in any attachments), and the applicable regulations contained in Chapters 335-13-1 through 335-13-14 of the ADEM Administrative Code (hereinafter referred to as the "ADEM Admin. Code"). Rules cited are set forth in this document for the purpose of Permittee reference. Any rule that is cited incorrectly in this document does not constitute grounds for noncompliance on the part of the Permittee. Applicable ADEM Admin. Codes are those that are in effect on the date of issuance of this permit or any revisions approved after permit issuance.

This permit is based on the information submitted to the Department on January 11, 2016, for permit renewal and on March 29, 2017, June 2, 2017, and October 18, 2017 for modification, and as amended (hereby incorporated by reference and hereinafter referred to as the Application). Any inaccuracies found in this information could lead to the termination or modification of this permit and potential enforcement action. The Permittee must inform the Department of any deviation from or changes in the information in the Application that would affect the Permittee's ability to comply with the applicable ADEM Admin. Code or permit conditions.

This permit is effective as of April 5, 2016, modified on March 31, 2017, January 23, 2018, **and June 21, 2018** and shall remain in effect until April 4, 2021 unless suspended or revoked.

Alabama Department of Environmental Management

6/21/18
Date Signed

SECTION I. STANDARD CONDITIONS.

A. Effect of Permit

The Permittee is allowed to dispose of nonhazardous solid waste in accordance with the conditions of this permit and ADEM Admin. Code Division 13. Issuance of this permit does not convey property rights of any sort or any exclusive privilege, nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of state or local laws or regulations. Except for actions brought under Code of Alabama 1975, Section 22-27-1 *et seq.*, as amended, compliance with the conditions of this permit shall be deemed to be compliance with applicable requirements in effect as of the date of issuance of this permit and any future revisions.

B. Permit Actions

This permit may be suspended, revoked or modified for cause. The filing of a request for a permit modification or the notification of planned changes or anticipated noncompliance on the part of the Permittee, and the suspension or revocation does not stay the applicability or enforceability of any permit condition.

C. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

D. Definitions

For the purpose of this permit, terms used herein shall have the same meaning as those in ADEM Admin. Code Division 13, unless this permit specifically provides otherwise; where terms are not otherwise defined, the meaning associated with such terms shall be as defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

1. "EPA" for purposes of this permit means the United States Environmental Protection Agency.

2. "Permit Application" for the purposes of this permit, means all permit application forms, design plans, operational plans, closure plans, technical data, reports, specifications, plats, geological and hydrological reports, and other materials which are submitted to the Department in pursuit of a solid waste disposal permit.

E. Duties and Requirements

1. Duty to Comply

The Permittee must comply with all conditions of this permit except to the extent and for the duration such noncompliance is authorized by a variance granted by the Department. Any permit noncompliance, other than noncompliance authorized by a variance, constitutes a violation of Code of Alabama 1975, Section 22-27-1 *et seq.*, as amended, and is grounds for enforcement action, permit suspension, revocation, modification, and/or denial of a permit renewal application.

2. Duty to Reapply

If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must apply for and obtain a new permit. The renewal application must be submitted to the Department at least 180 days before this permit expires.

3. Permit Expiration

This permit and all conditions therein will remain in effect beyond the permit's expiration date if the Permittee has submitted a timely, complete application as required by Section I.,E.,2., and, through no fault of the Permittee, the Department has not made a final decision regarding the renewal application.

4. Need to Halt or Reduce Activity Not A Defense

It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the conditions of this permit.

5. Duty to Mitigate

In the event of noncompliance with this permit, the Permittee shall take all reasonable steps to minimize releases to the environment, and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment.

6. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain all facilities and systems of control (and related appurtenances) that are installed or used by the Permittee to achieve compliance with the conditions of this permit.

7. Duty to Provide Information

If requested, the Permittee shall furnish to the Department, within a reasonable time, any information that the Department may reasonably need to determine whether cause exists for denying, suspending, revoking, or modifying this permit, or to determine compliance with this permit. If requested, the Permittee shall also furnish the Department with copies of records kept as a requirement of this permit.

8. Inspection and Entry

Upon presentation of credentials and other documents as may be required by law, the Permittee shall allow the employees of the Department or their authorized representative to:

a. Enter at reasonable times the Permittee's premises where the regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit.

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit.

c. Inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit.

d. Sample or monitor, at reasonable times, any substances or parameters at any location for the purposes of assuring permit compliance or as otherwise authorized by Code of Alabama 1975, Section 22-27-1 *et seq.*

9. Monitoring, Corrective Actions, and Records.

a. Samples and measurements taken for the purpose of monitoring or corrective action shall be representative of the monitored activity. The methods used to obtain representative samples to be analyzed must be the appropriate method from 335-13-4 or the methods as specified in the Application attached hereto and incorporated by reference. Laboratory methods must be those specified in Standard Methods for the Examination of Water and Wastewater (American Public Health Association, latest edition), Methods for Chemical Analysis of Water and Wastes (EPA-

600/4-79-020), Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA Publication SW-846, latest edition), other appropriate EPA methods, or as specified in the Application. All field tests must be conducted using approved EPA test kits and procedures.

b. The Permittee shall retain records, at the location specified in Section I.,I., of all monitoring, or corrective action information, including all calibration and maintenance records, copies of all reports and records required by this permit, and records of all data used to complete the application for this permit for a period of at least three years from the date of the sample, measurement, report or record or for periods elsewhere specified in this permit. These periods may be extended by the request of the Department at any time and are automatically extended during the course of any unresolved enforcement action regarding this facility.

c. Records of monitoring and corrective action information shall include.

i. The exact place, date, and time of sampling or measurement.

ii. The individual(s) and company who performed the sampling or measurements.

iii. The date(s) analyses were performed.

iv. The individual(s) and company who performed the analyses.

v. The analytical techniques or methods used.

vi. The results of such analyses.

d. The Permittee shall submit all monitoring and corrective action results at the interval specified elsewhere in this permit.

10. Reporting Planned Changes

The Permittee shall notify the Department, in the form of a request for permit modification, at least 90 days prior to any change in the permitted service area, increase in the waste received, or change in the design or operating procedure as described in this permit, including any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

11. Transfer of Permit

This permit may be transferred to a new owner or operator. All requests for transfer of permits shall be in writing and shall be submitted on forms provided by the Department. Before transferring ownership or operation of the facility during its operating life, the Permittee shall notify the new owner or operator in writing of the requirements of this permit.

12. Certification of Construction

The Permittee may not commence disposal of waste in any new cell or phase until the Permittee has submitted to the Department, by certified mail or hand delivery, a letter signed by both the Permittee and a professional engineer stating that the facility has been constructed in compliance with the permit.

The Department must inspect the constructed cells or phases before the owner or operator can commence waste disposal unless the Permittee is notified that the Department will waive the inspection.

13. Compliance Schedules

Reports of compliance or noncompliance with or any progress reports on interim and final requirements contained in any compliance schedule required and approved by the Department shall be submitted no later than 14 days following each schedule date.

14. Other Noncompliance

The Permittee shall report all instances of noncompliance with the permit at the time monitoring reports are submitted.

15. Other Information

If the Permittee becomes aware that information required by the Application was not submitted or was incorrect in the Application or in any report to the Department, the Permittee shall promptly submit such facts or information. In addition, upon request, the Permittee shall furnish to the Department, within a reasonable time, information related to compliance with the permit.

F. Design and Operation of Facility

The Permittee shall maintain and operate the facility to minimize the possibility of a fire, explosion, or any unplanned sudden or nonsudden release of contaminants (including leachate and explosive gases) to air, soil, groundwater, or surface water, which could threaten human health or the environment.

G. Inspection Requirements.

1. The Permittee shall comply with all requirements of ADEM Admin. Code Division 13.

2. The Permittee shall conduct random inspections of incoming loads.

3. Records of all inspections shall be included in the operating record.

H. Recordkeeping and Reporting.

1. The Permittee shall maintain a written operating record at the location specified in Section I.,I. The operating record shall include:

   a. Documentation of inspection and maintenance activities.

   b. Daily Volume reports.

   c. Personnel training documents and records.

   d. Solid/Hazardous Waste Determination Forms for Industrial Wastes, and associated Department disposal approval correspondence for industrial waste and special waste.

   e. Groundwater monitoring records.

   f. Explosive gas monitoring records.

   g. Surface water and leachate monitoring records. Monitoring is subject to applicable conditions of Section VI. of the permit.

   h. Copies of this Permit and the Application.

i. Copies of all variances granted by the Department, including copies of all approvals of special operating conditions.

2. Quarterly Volume Report

Beginning with the effective date of this permit, the Permittee shall submit, within thirty (30) days after the end of each calendar quarter, a report summarizing the daily waste receipts for the previous (just ended) quarter. Copies of the quarterly reports shall be maintained in the operating record.

3. Monitoring and Corrective Action Reports

The Permittee shall submit reports on all monitoring and corrective activities conducted pursuant to the requirements of this permit, including, but not limited to, groundwater, surface water, explosive gas and leachate monitoring. The groundwater monitoring shall be conducted in March and September of each year, or as directed by the Department, and the reports shall be submitted at least semi-annually, or as directed by the Department. The reports should contain all monitoring results and conclusions from samples and measurements conducted during the sampling period. Explosive gas monitoring must be submitted on a quarterly basis, and the reports should be submitted to the Department and placed in the operating record within 30 days of the monitoring event. Copies of the groundwater and explosive gas monitoring reports shall be maintained in the operating record.

4. Availability, Retention, and Disposition of Records.

a. All records, including plans, required under this permit or Division 13 must be furnished upon request, and made available at reasonable times for inspection by any officer, employee, or representative of the Department.

b. All records, including plans, required under this permit or Division 13 shall be retained by the Permittee for a period of at least three years. The retention period for all records is extended automatically during the course of any unresolved enforcement action regarding the facility, or as requested by the Department.

c. A copy of records of waste disposal locations and quantities must be submitted to the Department and local land authority upon closure of the facility.

I. Documents to be Maintained by the Permittee

The Permittee shall maintain, at the EcoSouth Services of Mobile, LLC office, the following documents and amendments, revisions and modifications to these documents until an engineer certifies closure of the permitted landfill.

1. Operating record.

2. Closure Plan.

J. Mailing Location. All reports, notifications, or other submissions which are required by this permit should be sent via signed mail (i.e. certified mail, express mail delivery service, etc.) or hand delivered to:

1. Mailing Address.
Chief, Solid Waste Branch, Land Division
Alabama Department of Environmental Management
P.O. Box 301463
Montgomery, AL 36130-1463

2. Physical Address.
Chief, Solid Waste Branch, Land Division
Alabama Department of Environmental Management
1400 Coliseum Blvd.
Montgomery, Alabama 36110-2059

K. Signatory Requirement

All applications, reports or information required by this permit, or otherwise submitted to the Department, shall be signed and certified by the owner as follows:

1. If an individual, by the applicant.

2. If a city, county, or other municipality or governmental entity, by the ranking elected official, or by a duly authorized representative of that person.

3. If a corporation, organization, or other legal entity, by a principal executive officer, of at least the level of Vice President, or by a duly authorized representative of that person.

L. Confidential Information

The Permittee may claim information submitted as confidential if the information is protected under Code of Alabama 1975 §§22-39-18, as amended.

M. State Laws and Regulations

Nothing in this permit shall be construed to preclude the initiation of any legal action or to relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation.

SECTION II. GENERAL OPERATING CONDITIONS.

A. Operation of Facility

The Permittee shall operate and maintain the disposal facility consistent with the Application, this permit, and ADEM Admin. Code Division 13.

B. Open Burning

The Permittee shall not allow open burning without prior written approval from the Department and other appropriate agencies. A burn request should be submitted in writing to the Department outlining why that burn request should be granted. This request should include, but not be limited to, specifically what areas will be utilized, types of waste to be burned, the projected starting and completion dates for the project, and the projected days and hours of operation. The approval, if granted, shall be included in the operating record.

C. Prevention of Unauthorized Disposal

The Permittee shall follow the approved procedures for the detecting and preventing the disposal of free liquids, regulated hazardous waste, PCB's, and medical waste at the facility.

D. Unauthorized Discharge

The Permittee shall operate the disposal facility in such a manner that there will be no water pollution or unauthorized discharge. Any discharge from the disposal facility or practice thereof may require a National Pollutant Discharge Elimination System permit under the Alabama Water Pollution Control Act.

E. Industrial Waste Disposal

The Permittee shall dispose of industrial waste as required by ADEM Admin. Code 335-13-4-.21(1)(c), and as specified in the Application. The Axis Industrial Landfill must keep a copy of approved Solid/Hazardous Waste Determination Forms for all the Industrial Wastes disposed and any associated Department correspondence in the facility operating record.

F. Boundary Markers

The Permittee shall ensure that the facility is identified with a sufficient number of permanent boundary markers that are at least visible from one marker to the next.

G. Certified Operator

The Permittee shall be required to have an operator certified by the Department on-site during hours of operation, in accordance with the requirements of ADEM Admin. Code 335-13-12.

SECTION III. SPECIFIC REQUIREMENTS FOR INDUSTRIAL WASTE LANDFILLS.

A. Waste Identification and Management.

1. Subject to the terms of this permit, the Permittee may dispose of the nonhazardous solid wastes listed in III.,B. Disposal of any other wastes is prohibited, except waste granted a temporary or one time waiver by the Director.

2. The total permitted area for the Axis Industrial Landfill is approximately 70.3 acres, with 46.8 acres permitted for disposal.

3. The maximum average daily volume of waste disposed at the facility, as contained in the permit application, shall not exceed 1500 cubic yards/day. Should the average daily volume exceed this value by 20% or 100 tons/day, whichever is less, for two (2) consecutive quarters the permittee shall be required to modify the permit in accordance with 335-13-5-.06(2)(a)5. An increase in maximum average daily volume shall not be approved by the Department unless the Permittee has received local approval for the increased maximum average daily volume. The average daily volume shall be computed as specified by 335-13-5-.06(2)(a)5.(i).

B. Waste Streams

The Permittee may accept for disposal construction, demolition and rubbish waste, as defined by the Department, and industrial waste streams approved by the Department; including waste building materials packaging and rubbish resulting from construction repair or demolition operations including masonry, sheet rock, insulation, scrap metal, wood, wood products, concrete, soil, brick, asphalt, ash from untreated materials, brush, land clearing debris, disaster debris, approved wastewater sludges, total petroleum hydrocarbons, automobile fluff (solid waste from automobile shedding) from Alter Metal Recycling located in Mobile County and may temporarily dispose of Remediation Waste from South Alabama Utilities Citronelle Lagoon Closure Project.

C. Service Area

The service area for this landfill, as contained in the permit application is Baldwin, Clarke, Conecuh, Covington, Dale, Escambia, Houston, and Monroe Counties in Alabama; Escambia, Okaloosa, Bay, Santa Rosa, and Walton Counties in Florida; and Jackson, Harrison, and Hancock Counties in Mississippi. A change in service area shall not be approved by the Department unless the Permittee has received local approval.

D. Special Waste

1. Petroleum Contaminated Waste

The Permittee shall dispose of petroleum contaminated waste in accordance with Rule 335-13-4-.26. All petroleum contaminated waste shall be disposed of in the composite-lined cells in Phase II.

E. Waste Placement, Compaction, and Cover

All waste shall be confined to an area as small as possible and placed onto an appropriate slope not to exceed 4 to 1 (25%) or as approved by the Department. The permittee is granted a variance allowing working slopes of 3 to 1 (33%). (See Section VIII.7.) All waste shall be spread in layers two feet or less in thickness and thoroughly compacted weekly with adequate landfill equipment prior to placing additional layers of waste or placing the weekly cover. A minimum of six inches of compacted earth or other alternative cover material approved by the Department shall be added at the conclusion of each week's operation. These are minimum requirements for waste placement, compaction and cover unless a variance is granted in Section VIII. The Permittee is granted a variance which will allow the facility to operate two working faces. (See Section VIII.1.) In areas where Remediation Waste from South Alabama Utilities Citronelle Lagoon Closure Project is disposed, adequate cover must be placed daily. (See Section VIII.4.) The permittee is granted a variance to allow autofluff and residual short fiber (RSF) as alternative cover material. (See Section VIII.5. and VIII.6.) The permittee shall cover at the end of each month's operation with earthen material.

F. Liner Requirements

The Permittee shall install a composite liner system as described in the Application that meets requirements of ADEM Admin. Code 335-13-4-.18, and that consists of 24 inches of clay with hydraulic conductivity of 1 x 10^{-7} cm/sec. The base of the liner system shall be a minimum of five (5) feet above the temporal fluctuation of the groundwater table.

The Permittee is granted approval to lower the base grade in Phase II Cells 9, 10, and 11 by ten feet. The facility currently has 2 permitted phases. Phase I consists of a clay liner with leachate collection. In Phase II, the Permittee shall install a composite liner system as described in the Application that meets the requirements of ADEM Admin. Code 335-13-4-.18. The base of the composite liner system shall be a minimum of five (5) feet above the temporal fluctuation of the groundwater table.

G. Security

The Permittee shall provide artificial and/or natural barriers, which prevent entry of unauthorized vehicular traffic to the facility.

H. All Weather Access Roads

The Permittee shall provide an all-weather access road to the dumping face that is wide enough to allow passage of collection vehicles.

I. Adverse Weather Disposal

The Permittee shall provide for disposal activities in adverse weather conditions.

J. Personnel

The Permittee shall maintain adequate personnel to ensure continued and smooth operation of the facility.

K. Environmental Monitoring and Treatment Structures

The Permittee shall provide protection and proper maintenance of environmental monitoring and treatment structures.

L. Vector Control

The Permittee shall provide for vector control as required by ADEM Admin. Code Division 13.

M. Bulk or Noncontainerized Liquid Waste

The Permittee shall not dispose of bulk or noncontainerized liquid waste, or containers capable of holding liquids, unless the conditions of 335-13-4-.23(1)(j) are met.

N. Empty Containers

Empty containers larger than 10 gallons in size must be rendered unsuitable for holding liquids prior to disposal in the landfill unless otherwise approved by the Department.

O. Other Requirements

The Department may enhance or reduce any requirements for operating and maintaining the landfill as deemed necessary by the Land Division.

P. Other Permits

The Permittee shall operate the landfill according to this and any other applicable permits.

Q. Scavenging and Salvaging Operations

The Permittee shall prevent scavenging and salvaging operations, except as part of a controlled recycling effort. Any recycling operation must be in accordance with plans submitted and approved by the Department.

R. Signs

If the landfill is available to the public or commercial haulers, the Permittee shall provide a sign outlining instructions for use of the site. The sign shall be posted and have the information required by 335-13-4-.23(1)(f).

S. Litter Control

The Permittee shall control litter.

T. Fire Control

The Permittee shall provide fire control measures.

SECTION IV. GROUNDWATER MONITORING REQUIREMENTS.

A. The Permittee shall install and/or maintain a groundwater monitoring system, as specified below.

1. The permittee shall maintain the groundwater monitoring wells and piezometers identified in Table IV.1. at the locations specified in the Application, and any other groundwater monitoring wells which are added (Section IV.,A.,3.) during the active life and the post closure care period.

2. **The Permittee shall maintain groundwater monitoring well MW-7 as the background groundwater monitoring wells for the entire facility.**

3. The Permittee shall install and maintain additional groundwater monitoring wells as necessary to assess changes in the rate and extent of any plume of contamination or as otherwise deemed necessary to maintain compliance with 335-13.

4. Prior to installing any additional groundwater monitoring wells, the Permittee shall submit a report to the Department with a permit modification request specifying the design, location and installation of any additional monitoring wells. This report shall be submitted within ninety (90) days prior to the installation which, at a minimum, shall include.

   a. Well construction techniques including proposed casing depths, proposed total depth, and proposed screened interval of well(s);

   b. Well development method(s);

   c. A complete analysis of well construction materials;

   d. A schedule of implementation for construction; and

   e. Provisions for determining the lithologic characteristics, hydraulic conductivity and grain-size distribution for the applicable aquifer unit(s) at the location of the new well(s).

B. Groundwater Monitoring Requirements

1. The Permittee shall determine the groundwater surface elevation at each monitoring well and piezometer identified in Table IV.1. each time the well or piezometer is sampled and at least semi-annually throughout the active life and post-closure care period.

2. The Permittee shall determine the groundwater flow rate and direction in the first zone of saturation at least annually or each time groundwater is sampled and submit as required by ADEM Admin. Code Division 13.

3. Prior to the initial receipt of waste at the facility, the Permittee shall sample, and analyze for the parameters listed in Appendix I of 335-13-4-.27, and/or any other parameters specified by the Department in Table IV. 2., all monitoring wells identified in Section IV.,A.,2. to establish background water quality and/or as directed by 335-13-4-.27(2)(j) and 335-13-4-.27(2)(a)(1). The records and results of this sampling and analysis activity shall be submitted to the Department, within sixty (60) days of the date of sampling.

4. The Permittee shall sample, and analyze all monitoring wells identified in Table IV.1 for the parameters listed in Appendix I of 335-13-4-.27(3), and/or any other parameters specified by the Department in Table IV.3, on a semi-annual basis throughout the active life of the facility and the post-closure care period in accordance with 335-13-4-.27(3). Sampling shall be conducted during March and September of each year, beginning with the effective date of this permit.

5. In addition to the requirements of Section IV., B.,1., B.,2., B.,3. and B.,4., the Permittee shall record water levels, mean sea level elevation measuring point, depth to water, and the results of field tests for pH and specific conductance at the time of sampling for each well.

C. Sampling and Analysis Procedures

The Permittee shall use the following techniques and procedures when obtaining and analyzing samples from the groundwater monitoring wells described in Section IV.,A. to provide a reliable indication of the quality of the groundwater.

1. Samples shall be collected, preserved, and shipped (when shipped off-site for analysis) in accordance with the procedures specified in the Application. Monitoring wells shall be bailed or pumped to remove at least four times the well volume of water. Slow recharge wells shall be bailed until dry. Wells shall be allowed to recharge prior to sampling.

2. Samples shall be analyzed according to the procedures specified of the Application, Standard Methods for the Examination of Water and Wastewater (American Public Health Association, latest edition), Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020), Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA Publication SW-846, latest edition), or other appropriate methods approved by this Department. All field tests must be conducted using approved EPA test kits and procedures.

3. Samples shall be tracked and controlled using the chain-of-custody and QA/QC procedures specified of the Application.

D. Recordkeeping and Reporting Requirements

1. Recording of Results

For each sample and/or measurement taken pursuant to the requirements of this permit, the Permittee shall record the information required by Section I.,E.,9.,c.

2. Recordkeeping

Records and results of all groundwater monitoring, sampling, and analysis activities conducted pursuant to the requirements of this permit shall be included in the operating record required by Section I.,I.,1.

E. Permit Modification

If at any time the Permittee or the Department determines that the groundwater monitoring system no longer satisfies the requirements of 335-13-4-.14 or Section IV.,A. of this permit, the Permittee must, within 90 days, submit an application for a permit modification to make any necessary and/or appropriate changes to the system.

TABLE IV.1.
GROUNDWATER MONITORING WELLS.

Monitoring Well Number	Top of Casing (feet msl)	Monitoring Part
UPGRADIENT/BACKGROUND MONITORING WELLS		
MW-7	49-26	Entire Landfill
DOWNGRADIENT MONITORING WELLS		
MW-1	38.28	Entire Landfill
MW-2	46.17	Entire Landfill
MW-4	47.30	Entire Landfill
MW-6	47.60	Entire Landfill

*ft-bls = Depth in feet below land surface

TABLE IV.2.
BACKGROUND GROUNDWATER MONITORING

NOTE: The parameters in this Table are those listed in Appendix I of 335-13-4.

NOTE: The Permittee shall conduct a minimum of four independent sampling events as the initial sampling event, and analyze for the parameters listed above, in order to establish background water quality. Following the four independent events, the Permittee can submit a request, with justification, for the deletion of or change in these parameters.

TABLE IV.3.
SEMI-ANNUAL GROUNDWATER MONITORING PARAMETERS

NOTE: The parameters to be monitored for in this Table are those listed in Appendix I of 335-13-4 , and/or any other waste stream specific parameters.

SECTION V. GAS MONITORING REQUIREMENTS

A. The permittee shall design, construct, and operate the facility so as to control and monitor the generation and emission of explosive gases (such as methane), and so as to prevent said gases from collecting in, or around structures at concentrations exceeding the limits imposed by this permit.

B. Systems and Equipment

The Permittee shall provide, install, and maintain gas monitoring and/or recovery systems and equipment.

C. Concentration Limits

The Permittee shall prevent explosive gases from exceeding:

1. The lower explosive limit at the facility boundary.

2. Twenty-five percent (25%) of the lower explosive limit in any facility structure other than those that are components of the gas control and/or recovery system.

D. Gas Monitoring Program.

1. The Permittee shall monitor explosive gases at the facility. The gas monitoring program shall monitor explosive gas concentrations in the atmosphere, in the soil, and inside all structures at the facility, including but not limited to buildings, under bridges, and any other location which is conducive to gas accumulation. Gas monitoring data shall be included in the operating record and be made available to the Department during inspections and at other times upon request.

2. The Permittee shall conduct the gas monitoring at least once in each calendar year. The Permittee shall submit a report to the Department within thirty (30) days after each monitoring event documenting the levels of explosive gases measured at the facility.

3. In the event that explosive gas levels exceed, at any time, the limits specified in this permit, the Permittee shall:

   a. Immediately take all necessary steps to ensure immediate protection of human health and property.

b. Immediately notify the Department of the explosive gas levels detected and the immediate steps taken to protect human health and property.

c. Within twenty (20) days, submit to the Department for approval a remedial plan for the explosive gas releases. This plan shall describe the nature and extent of the problem and the proposed remedy. The plan shall be implemented upon approval by the Department, but within sixty (60) days of detection. Within the sixty (60) days the plan shall be placed in the operating record of the facility and the Department notified that the plan has been implemented.

4. Monitoring points for the measurement of explosive gas concentrations in the soil and/or atmosphere shall be located along the landfill boundaries and shall be spaced no more than 300 feet apart. In areas where the landfill boundary is within 1000 feet of a structure, the monitoring points shall be not more than 100 feet apart.

SECTION VI. LEACHATE AND SURFACE WATER MANAGEMENT REQUIREMENTS.

The Permittee must collect and dispose of the leachate that is generated at the facility. The Permittee shall install a leachate collection system designed to maintain less than 12 inches (30 cm) depth of leachate over the liner. Prior to initial disposal, the permittee shall provide the Department with a letter from the receiving publicly or privately owned treatment works, approving the acceptance of the leachate. Discharges to publicly or privately owned treatment works may be subject to the requirements of the ADEM Water Division's State Indirect Discharge (SID) Program. The permittee shall construct and maintain run-on and run-off control structures. Surface water discharges from drainage control structures shall be permitted through the ADEM Water Division's National Pollutant Discharge Elimination System (NPDES) Program

The Permittee shall install a leachate collection system designed to maintain less than 12-inch depth of leachate over the liner in the new expansion area, Phase II. Each cell shall be designed to collect leachate using a 6" HDPE perforated collection line and sump as described in the Application. Leachate collected in Phase II will be pumped and transferred through the force main to the existing leachate manhole associated with existing Phase I-Cell 8. From there, the leachate will be pumped off-site to a waste water treatment plant.

SECTION VII. CLOSURE AND POST-CLOSURE REQUIREMENTS.

The Permittee shall close the landfill and perform post-closure care of the landfill in accordance with 335-13.

A. Final Cover

The Permittee shall grade final soil cover such that surface water does not pond over the permitted area as specified in the Application. The final cover system shall comply with ADEM Admin. Code Division 13.

B. Vegetative Cover

The Permittee shall establish a vegetative or other appropriate cover within 90 days after completion of final grading requirements in the Application. Preparation of a vegetative cover shall include, but not be limited to, the placement of seed, fertilizer, mulch, and water.

C. Notice of Intent

The Permittee shall place in the operating record and notify the Department of their intent to close the landfill prior to beginning closure.

D. Completion of Closure Activities

The Permittee must complete closure activities of each landfill unit in accordance with the Closure Plan within 180 days of the last known receipt of waste.

E. Certification of Closure

Following closure of each unit, the Permittee must submit to the Department a certification, signed by an engineer, verifying the closure has been completed according to the Closure Plan.

F. Post-Closure Care Period

Post-closure care activities shall be conducted after closure of each unit throughout the life of this permit and continuing for a period of thirty (30) years following closure of the facility. The Department may shorten or extend the post-closure care period applicable to the solid waste disposal facility. The Permittee shall reapply in order to fulfill the post-closure care requirements of this permit.

G. Post-Closure Maintenance

The Permittee shall provide post closure maintenance of the facility to include regularly scheduled inspections. This shall include maintenance of the cover, vegetation, monitoring devices and pollution control equipment and correction of other deficiencies that may be observed by the Department. Monitoring requirements shall continue throughout the post closure period as determined by the Department unless all waste is removed and no unpermitted discharge to waters of the State have occurred.

H. Post-Closure Use of Property

The Permittee shall ensure that post closure use of the property never be allowed to disturb the integrity of the final cover, liner, or any other component of the containment system. This shall preclude the growing of deep-rooted vegetation on the closed area.

I. Certification of Post-Closure

Following post-closure of each unit, the Permittee must submit to the Department a certification, signed by an engineer, verifying the post-closure has been completed according to the Post-Closure Plan.

J. Notice in Deed to Property

The Permittee shall record a notation onto the land deed containing the property utilized for disposal within 90 days after permit expiration, revocation or when closure requirements are achieved as determined by the Department as stated in the Application. This notation shall state that the land has been used as a solid waste disposal facility, the name of the Permittee, type of disposal activity, location of the disposal facility and beginning and closure dates of the disposal activity.

K. Recording Instrument

The Permittee shall submit a certified copy of the recording instrument to the Department within 120 days after permit expiration, revocation, or as directed by the Department as described in the Application.

L. Removal of Waste

If the Permittee, or any other person(s), wishes to remove waste, waste residues, or any liner or contaminated soils, the owner must request and receive prior approval from the Department.

SECTION VIII. VARIANCES AND SPECIAL CONDITIONS.

1. The Permittee is granted a variance from Rule 335-13-4-.22(1)(b) allowing the operation of an additional working face at the Axis Industrial Landfill. One working face will be allowed in Phase I and a second working face will be allowed in Phase II due to the differentiation in liner systems in each phase. (See Section III.E.)

2. The Permittee is granted a variance from Rule 335-13-4-.12(2)(f) requiring a 100 foot buffer zone.

3. The Permittee is granted permission to stage solidification operations within the Phase I disposal footprint. Solidification shall take place on a lined containment pad, surrounded by a two foot berm. Solidification operations shall take place as described in the Application.

4. The Permittee may temporarily accept for disposal Remediation Waste from South Alabama Utilities Citronelle Lagoon Closure Project for a period of two years beginning March 31, 2017 and ending on March 31, 2019. The remediation waste shall be disposed of in the lined portion of the landfill. Additionally, the Permittee is required to cover the remediation waste with six inches of earthen material at conclusion of each day in which the remediation waste is disposed at the landfill.

5. The Permittee is granted a variance allowing the use of autofluff as an alternative cover material. The alternate cover material should be mixed with sand or other soils in the ratio of 50% soil: 50% autofluff. Additionally, the Permittee is required to cover with six inches of earthen material at conclusion of each month's operation. (See Section III.E.)

6. The Permittee is granted a variance allowing the use of Residual Short Fiber (RSF) as an alternative cover material. The alternate cover material should be mixed with sand or other soils in the ratio of 50% soil: 50% RSF. Additionally, the Permittee is required to cover with six inches of earthen material at conclusion of each month's operation. (See Section III.E.)

7. The Permittee is granted a variance from Rule 335-13-4-.23(1)(c) defining working slopes not to exceed 4 to 1 (25%). The permittee is approved to operate working slopes of 3 to 1 (33%). (See Section III.E)

Any variance granted by the Department may be terminated by the Department whenever the Department finds, after notice and opportunity for hearing, that the petitioner is in violation of any requirement, condition, schedule, limitation or any other provision of the variance, or that operation under the variance does not meet the minimum requirements established by state and federal laws and regulations or is unreasonably threatening the public health.

ATTACHMENT D

ENVIRONMENTAL MONITORING SYSTEMS

The proposed landfill expansion will include surface water monitoring, groundwater monitoring, gas monitoring, and a leachate collection system as required by ADEM Admin. Code 335-4. The proposed environmental monitoring systems will be submitted to ADEM for approval. EcoSouth will also update its existing operations manual for approval by ADEM to include the expanded landfill area. The operations manual details policies and procedures to be followed to ensure permit and/or regulatory requirements will be met.

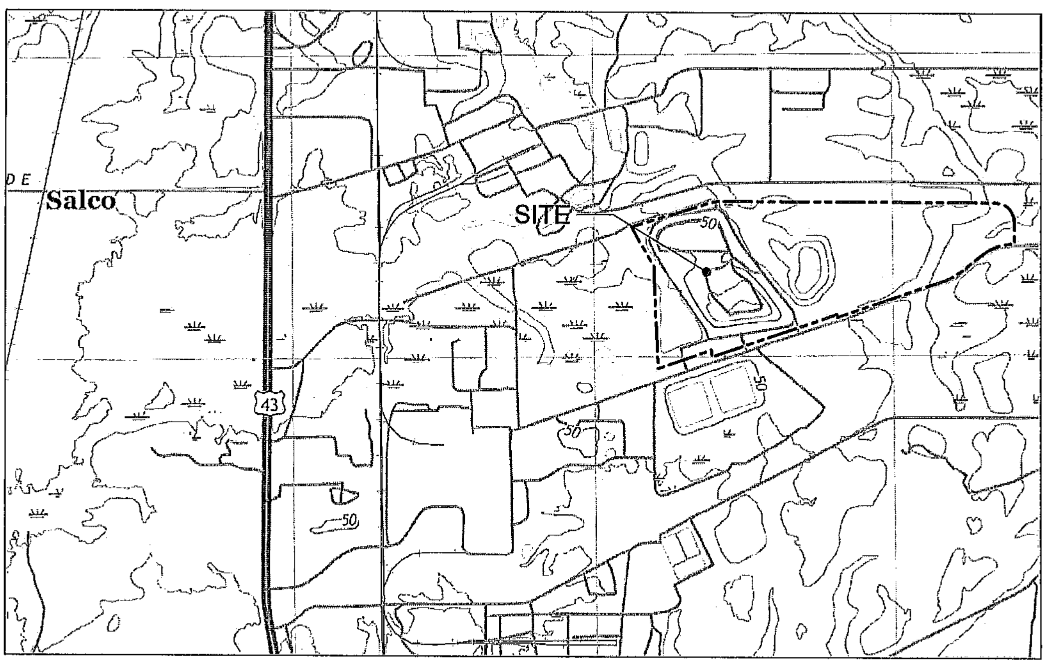
ATTACHMENT E

LOCATION MAP

ALABAMA

COUNTY LOCATION MAP

N.T.S.



USGS MAP SOURCE
7.5 MIN QUADRANGLES
CREOLA, PHOTOREVISED 2018

VICINITY MAP

1"=2000'

GRAPHIC SCALE

0 1000 2000 4000

(FEET)

LaBella
Powered by partnership.

1604 Ownby Lane
Richmond, VA 23220
804-355-4520

labellapc.com

DRAWING NAME:	ISSUED FOR:		
SITE LOCATION MAP	ISSUED FOR		
	DRAWN BY: IWW	DATE: 03/11/2020	PROJECT NO.: 2192290.01
PROJECT NAME: AXIS LANDFILL AXIS, ALABAMA	DRAWING NUMBER: 1		

ATTACHMENT F

LEGAL PROPERTY DESCRIPTION AND BOUNDARY PLAT

	LINE	LENGTH	BEARING
(ACT)	L1	242.36'	S 00°-05'-28" W
(REC)	L1	242.38'	S 00°-05'-29" W
(ACT)	L2	29.48'	S 87°-23'-54" W
(REC)	L2	29.48'	S 87°-26'-04" W
(ACT)	L3	317.34'	S 51°-49'-44" W
(REC)	L3	317.45'	S 51°-48'-48" W
(REC) (ACT)	L4	29.98'	N 18°-42'-50" W
(ACT)	L5	78.94'	N 00°-36'-04" W
(DEED)	L5	78.94'	N 00°-27'-12" W
(DEED)(ACT)	L6	3.23'	N 00°-27'-05" W
(REC) (ACT)	L7	31.34'	N 30°-28'-41" W

	CURVE	RADIUS	LENGTH	DELTA	CHORD	BEARING
(ACT)	C1	200.00'	321.24'	91°-50'-32"	287.81'	S 45°-55'-16" E
(REC)	C1	200.00'	314.00'	89°-57'-11"	282.73'	S 44°-53'-06" E
(ACT)	C2	533.68'	331.72'	35°-36'-49"	326.41'	S 69°-36'-48" W
(REC)	C2	533.88'	331.75'	35°-36'-59"	326.43'	S 69°-37'-18" W
(ACT)	C3	565.05'	192.13'	19°-28'-53"	191.20'	S 61°-33'-18" W
(REC)	C3	565.05'	191.96'	19°-27'-52"	191.04'	S 61°-32'-43" W

NOTES:

1.) Minimum Technical Standards require that "the horizontal position of physical features must be plotted to 1/20th inch of final map scale". Dimensions "snapped" from the electronic version of this map should be considered to be no more accurate than 1/20th of the map scale noted. Critical clearance dimensions must be field checked.

2.) Bearing Basis: Referenced to Alabama State Plane Coordinate System West Zone (102) NAD 83(2011) established by RTK GPS utilizing ALDOT Net as a continuously operating reference station.

3.) Type of Survey: ALTA/NSPS Land Title Boundary Survey.

4.) Field Date(s): February & March of 2020.

5.) All corners are as noted.

6.) Setback lines shown on this plat (if any) are taken from the recorded plat of the subdivision. Setback lines established by statute, ordinances or restrictive covenants are not shown.

7.) Property Address: 12950 U.S. Highway 43 North
Axis, AL 36505

8.) Gross Land Area: 108.7± AC (4,733,848± SF)

9.) Parking Spaces: N/A

10.) There is no division or party wall with respect to adjoining properties.

11.) Location of utilities serving the surveyed property are from observed evidence.

12.) This drawing does not reflect an easement or title search by the surveyor. Easements or Claims of easements may exist.

12.) This drawing does not reflect an easement or title search by the surveyor. Easements or Claims of easements may exist.

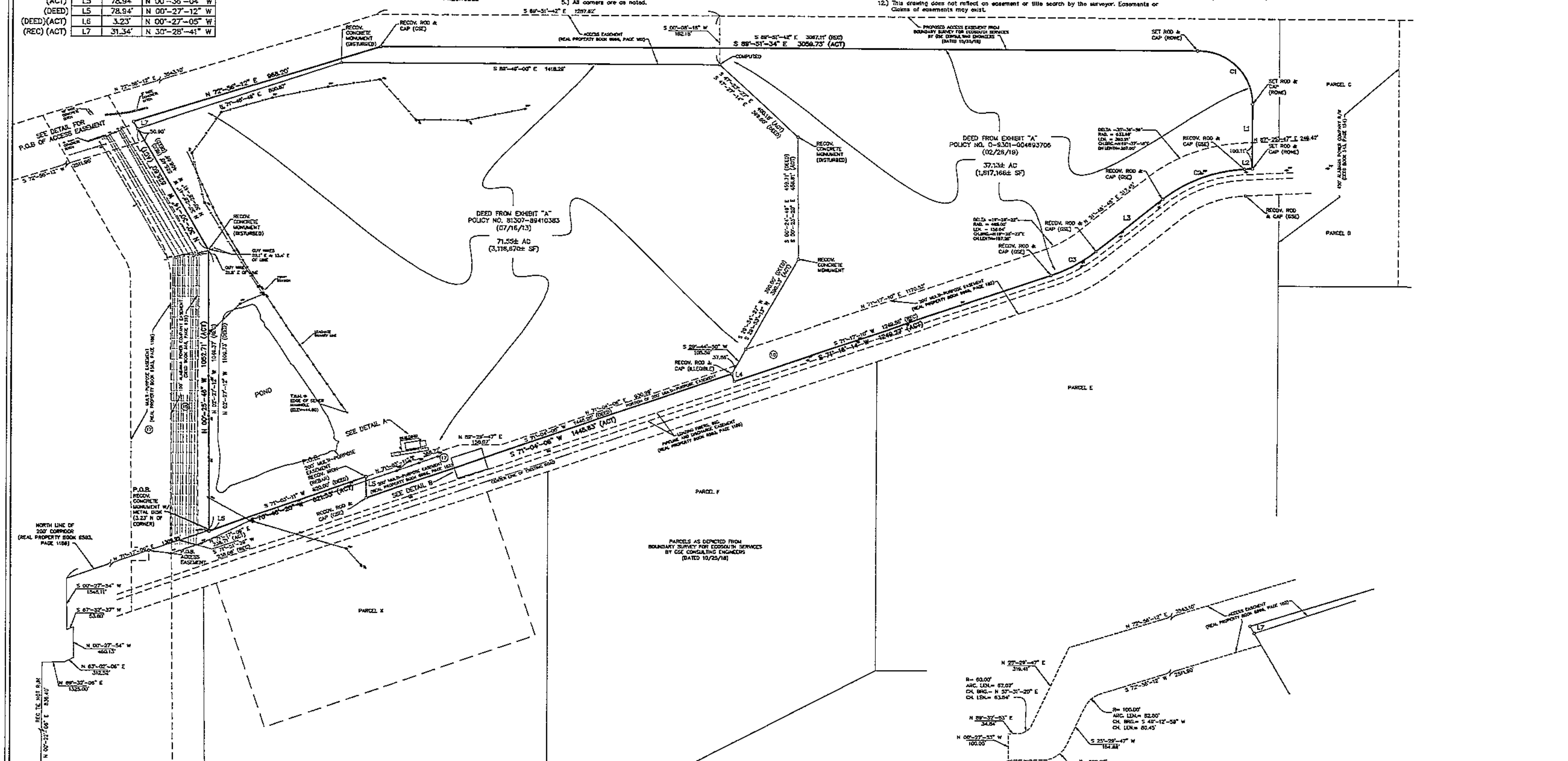
13.) There are no improvements within offsite easements or servitudes benefiting the surveyed property that are disclosed in record documents.

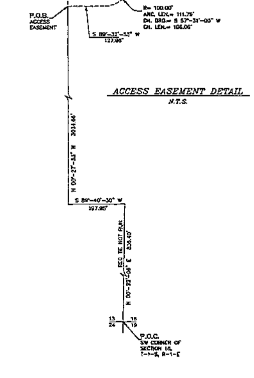
14.) Elevations on this plat are referenced to NAVD 88, established by RTK GPS utilizing ALDOT Net as a continuously operating reference station.

15.) No Zoning Report was provided to the surveyor.

16.) Not all interior improvements shown.

17.) Easement descriptions shown are from recorded documents.



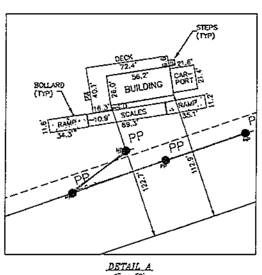


ACCESS EASEMENT DETAIL
N.T.S.

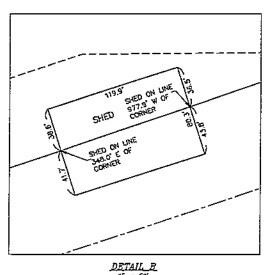
LEGEND

R/W	RIGHT-OF-WAY
(REC)	RECORD
(ACT)	ACTUAL
	RIGHT-OF-WAY-LINE
	CENTER LINE
	OVERHEAD POWER LINE
LP	LIGHT POLE
SP	SERVICE POLE
PP	POWER POLE
	GUY WIRE
	TEMPORARY BENCH MARK
	BOLLARD
SS	SANITARY SEWER LINE
WV	WATER VALVE
	FORESHORTENED LINE
	STORM DRAIN LINE
	STORM DRAIN MANHOLE
	SANITARY SEWER MANHOLE
	PUMP STATION
35	GROUND CONTOUR
MW	MONITORING WELL
EB	ELECTRIC BOX
RCP	REINFORCED CONCRETE PIPE
STP	STEEL PIPE
	CONCRETE

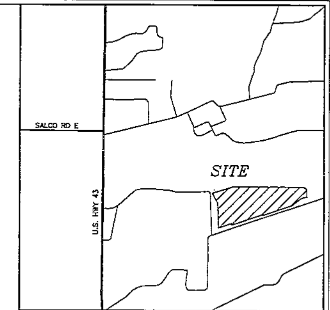
200 0 200 400
SCALE: 1" = 200'



DETAIL A
1" = 50'



DETAIL B
1" = 50'



VICINITY MAP

LEGAL DESCRIPTION

STATE OF ALABAMA)
COUNTY OF MOBILE)
AS SURVEYED:

Commencing at the Southwest corner of Section 18, Township 1 South, Range 1 East, Mobile County, Alabama, run North 00°-22'-06" East and along the West line of said Section 18, a distance of 838.40 feet; thence North 89°-32'-06" East, 1325.00 feet; thence North 63°-02'-06" East, 312.52 feet; thence North 00°-27'-54" West, 460.13 feet; thence South 67°-52'-37" West, 53.08 feet; thence North 00°-27'-54" East, 1548.11 feet to the North line of a 200.00 foot multipurpose easement; thence North 71°-17'-09" East and along said North line, 1309.99 feet to the Point of Beginning of the property herein described; thence North 00°-23'-46" West, 1052.71 feet; thence North 30°-30'-14" West, 525.60 feet; thence North 30°-28'-41" West, 31.34 feet; thence North 72°-56'-12" East, 968.20 feet; thence South 89°-51'-34" East, 3058.73 feet to the PC of a 200 foot radius curve to the right; thence Southwardly and Eastwardly along the arc of said curve (chord bears South 45°-55'-16" East, 287.81 feet), a distance of 321.24 feet; thence South 00°-05'-28" West, 242.36 feet; thence South 87°-23'-54" West, 29.48 feet to the PC of a 533.68 foot radius curve to the left; thence Southwardly and Westwardly along the arc of said curve (chord bears South 69°-36'-48" West, 326.41 feet), a distance of 331.72 feet; thence South 51°-49'-44" West, 317.34 feet to the PC of a 565.05 foot radius curve to the right; thence Southwardly and Westwardly along the arc of said curve (chord bears South 61°-33'-18" West, 191.20 feet), a distance of 192.13 feet; thence South 71°-18'-14" West, 1249.27 feet; thence North 18°-42'-50" West, 29.98 feet; thence South 71°-04'-08" West, 1445.83 feet; thence North 00°-36'-04" West, 78.94 feet; thence South 70°-46'-20" West, 621.53 feet; thence North 00°-27'-05" West, 3.23 feet to the Point of Beginning.

The Southern portion of the aforementioned parcel being subject to a portion of a 200-foot multipurpose easement recorded in Real Property Book 6583, Page 1189, Mobile County Records, said portion being more particularly described as follows:

Commencing at the Southwest corner of Section 18, Township 1 South, Range 1 East, Mobile County, Alabama; thence North 00°-22'-06" East along the West line of said section, a distance of 838.40 feet to a point; thence North 89°-32'-06" East, a distance of 1325.00 feet to a point; thence North 63°-02'-06" East, a distance of 312.52 feet to a point; thence North 00°-27'-54" West, a distance of 460.13 feet to a point on the South line of Parcel "A" (Wastewater Treatment Facility Site); thence South 67°-52'-37" West, a distance of 53.80 feet to the Southwest corner of said Parcel "A"; thence North 00°-27'-54" West, along the West line of said Parcel "A" and the extension thereof, a distance of 1548.11 feet to a point on the North line of a 200 foot corridor recorded in Real Property Book 6583, Page 1189, Mobile County Records; thence North 71°-17'-09" East, a distance of 1309.99 feet to a found capped rod; thence South 00°-27'-05" East, a distance of 3.23 feet to a concrete monument; thence North 71°-01'-11" East, a distance of 620.00 feet to the Point of Beginning of the property herein described; thence continue North 71°-03'-11" East, a distance of 368.72 feet to a concrete monument; thence North 89°-29'-47" East, a distance of 158.07 feet to a concrete monument; thence North 71°-04'-08" East, a distance of 930.99 feet to a concrete monument; the previous 5 courses being coincident with said North line of a 200 foot multi-purpose easement; thence South 29°-44'-50" West, a distance of 37.88 feet; thence South 71°-04'-08" West, a distance of 1446.26 feet; thence North 00°-27'-12" West, a distance of 78.94 feet to the Point of Beginning.

Together with an easement more particularly described as follows:

Commencing at the Southwest corner of Section 18, Township 1 South, Range 1 East, Mobile County, Alabama; thence North 00°-22'-26" East, along the West line of said Section, a distance of 836.40 feet to a point; thence South 89°-40'-30" West, a distance of 197.95 feet to the East margin of a Norfolk Southern Railroad right of way; thence North 00°-27'-33" West, along said East margin, a distance of 3034.86 feet to the point of beginning of the easement herein described; thence continuing North 00°-37'-53" West, along said East margin, a distance of 100 feet to a point; thence North 89°-32'-53" East, a distance of 34.84 feet to the point of curvature of a 60 feet radius curve concave to the left; thence along said curve, a distance of 67.07 feet (chord bears North 57°-31'-20" East, 63.84 feet) to a point; thence North 25°-29'-47" East, a distance of 319.41 feet to a point on the South line of Akzo Nobel Property; thence along said South line North 72°-56'-12" East, a distance of 3543.10 feet to a concrete monument found; thence continuing along said South line South 89°-51'-42" East, a distance of 1287.82 feet to a point; thence South 00°-08'-18" West, a distance of 182.18 feet to a concrete monument; thence North 89°-49'-00" West, a distance of 1418.29 feet to a concrete monument; thence South 71°-48'-49" West, a distance of 800.87 feet to a concrete monument; thence South 30°-28'-41" East, a distance of 50.90 feet to a point; thence South 72°-56'-12" West, a distance of 2511.80 feet to the point of curvature of a 100 foot radius curve concave to the left; thence along said curve, a distance of 82.80 feet (chord bears South 49°-12'-59" West, 80.45 feet) to the point of tangency; thence South 25°-29'-47" West, a distance of 154.88 feet to the point of curvature of a 100 foot radius curve concave to the right; thence along said curve a distance of 111.79 feet (chord bears South 57°-31'-00" West, 106.06 feet) to the point of tangency; thence South 89°-32'-53" West, a distance of 127.96 feet to the Point of Beginning.

TOGETHER WITH AND BEING SUBJECT TO a 200-foot multi-purpose easement recorded in Real Property Book 6583, at Page 1189, Mobile County Records, said portion being more particularly described as follows:

Commencing at the Southwest corner of Section 18, Township 1 South, Range 1 East, Mobile County, Alabama; thence North 00°-02'-06" East, along the West line of said Section, a distance of 836.40 feet to a point; thence North 89°-32'-06" East, a distance of 1325.00 feet to a point; thence North 63°-02'-06" East, a distance of 312.52 feet to a point; thence North 00°-27'-54" West, a distance of 460.13 feet to a point; thence South 67°-52'-37" West, a distance of 53.80 feet to a point; thence North 00°-27'-54" West, a distance of 1348.11 feet to a point on the South line of a 200 feet corridor recorded in Real Property Book 6583, at Page 1189, Mobile County Records; thence North 71°-17'-10" East, along the South line of said 200 foot corridor, a distance of 3418.43 feet to a point; thence North 18°-42'-50" West, a distance of 100.00 feet to a capped rebar set, said capped rebar being the Point of Beginning of the property herein described; thence North 18°-42'-50" West, a distance of 29.98 feet to a capped rebar found; thence North 29°-44'-50" East, a distance of 37.88 feet to a concrete monument; thence North 29°-44'-50" East, a distance of 67.73 feet to a capped rebar found; North 71°-17'-10" East, a distance of 1170.53 feet to a capped rebar found, said capped rebar being a point of curvature of a 465 foot radius curve concave to the left; thence along said curve, a distance of 157.97 feet (chord bears North 61°-32'-40" East) to a capped rebar found; thence North 51°-48'-48" East, a distance of 317.45 feet to a capped rebar found; said capped rebar being the point of curvature of a 633.68 foot radius curve concave to the right; thence along said curve, a distance of 393.81 feet (chord bears North 69°-37'-18" East) to a capped rebar found; thence North 87°-26'-04" East, a distance of 34.13 feet to a capped rebar set; thence South 00°-05'-29" West, a distance of 100.11 feet to a capped rebar set; thence South 87°-26'-04" West, a distance of 29.48 feet to a capped rebar set, said capped rebar being the point of curvature of a 533.88 foot radius curve concave to the left; thence along said curve, a distance of 331.75 feet (chord bears South 69°-37'-18" West) to a capped rebar set; thence South 51°-48'-48" West, a distance of 317.45 feet to a capped rebar set, said capped rebar being the point of curvature of a 565.05 foot radius curve concave to the right; thence along said curve, a distance of 191.96 feet (chord bears South 61°-32'-43" West) to a capped rebar set; thence South 71°-17'-10" West, a distance of 1249.56 feet to the Point of Beginning.

The surveyor has reviewed Commitment for Title Insurance issued by Stewart Title Guarantee Company, being File No. 3733-28800, dated February 26, 2019 at 1:44 p.m. The following numbers refer to survey related items within Schedule B, Part II of said commitment:

(14) Substitution easement granted Gulf Fibers, Inc. by instrument dated May 21, 1991 and recorded in Real Property Book 3763, Page 431 does not affect the subject property.

(15) Easement granted to Alabama Power Company by Courtaulds, dated August 4, 1952 and recorded in Real Property Book 568, Page 635 is shown herein.

(16) Two hundred foot multipurpose easement as contained in instrument recorded in Real Property Book 6583, Page 1189 and Plat Book 122, Page 97 affects the subject property and is shown herein.

(17) Easement granted to Alabama Power by instrument recorded in Real Property Book 7585, Page 314 and Real Property Book 7175, Page 139 does not affect the subject property but is shown herein.

(18) Easement granted to Alabama Power by Courtaulds North America, Inc. by instrument recorded in Real Property Book 1277, Page 124 does not affect the subject property.

(19) Deed in favor of the State of Alabama by John Ladd, as recorded in Real Property Book 543, Page 154 is now extinguished.

TO: Axis Environmental, LLC

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2016 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1, 2, 3, 4, 6(b), 7(a), 7(b)(1), 7(c), 8, 9, 11, 13, 14, 16, 17, and 20 of Table A thereof. The field work was completed on March 30, 2020.

I hereby state that all parts of this survey and drawing have been completed in accordance with the current requirements of the Standards of Practice for Surveying in the State of Alabama to the best of my knowledge, information and belief.

This is to state that I have consulted the Federal Insurance Administration Flood Hazard Boundary Map No. 01097C0325 K, and dated March 17, 2010, and found that the above described property now is located in Flood Hazard Area "X-Unshaded" as determined by graphic scaling.

Date: MARCH 30, 2020

Cecil T. Hudson, PLS
Alabama Licensed Professional
Land Surveyor No. 29983-S
Prints not valid unless they bear an original seal

REVISIONS:

ALTA/NSPS LAND TITLE SURVEY

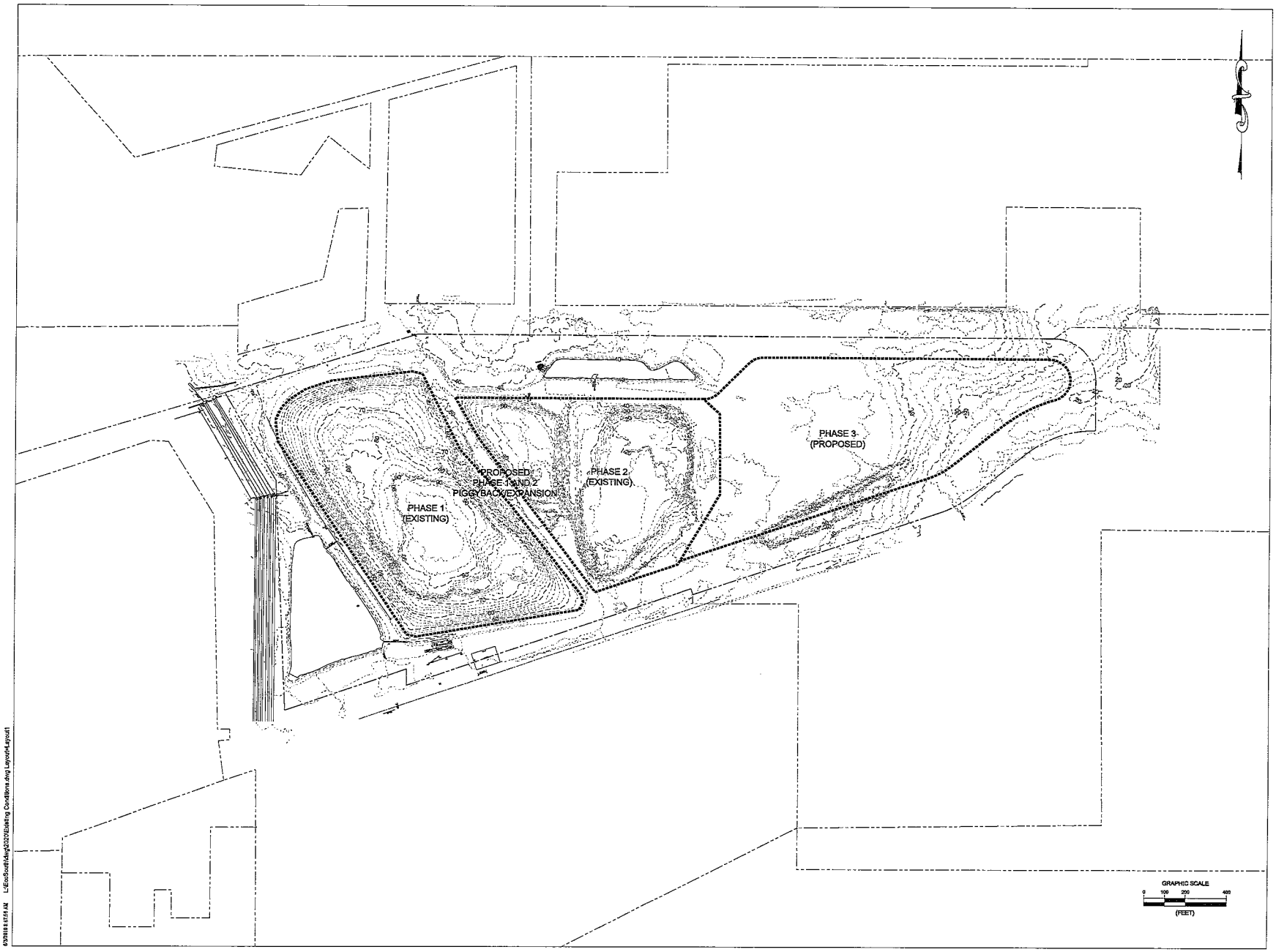
PREPARED FOR
ECOSOUTH SERVICES OF MOBILE

ROWE
ENGINEERING & SURVEYING
CONSULTING ENGINEERS
3502 LAUGHLIN DR • SUITE B • MOBILE, AL 36693
PHONE 251-666-2766 • FAX 251-660-1040

DRAWING: 51040.dwg DRAWN BY: BWL CHECKED BY: CTH	JOB: 51040 FB: 1993 / 34-35 1940 / 47-48	PLAT DATE: March 31, 2020	SCALE: 1" = 200'	SHEET NO. 1 OF 1

ATTACHMENT G

EXISTING/EXPANSION DISPOSAL MAPS & SITE PLAN



LaBella
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1604 Ownby Lane
Richmond, VA 23220
804-355-4520
labellapc.com

NOT FOR CONSTRUCTION

ECOSOUTH ENVIROMENTAL
AXIS, ALABAMA

AXIS LANDFILL
AXIS, ALABAMA

NO:	DATE:	DESCRIPTION:
Revisions		

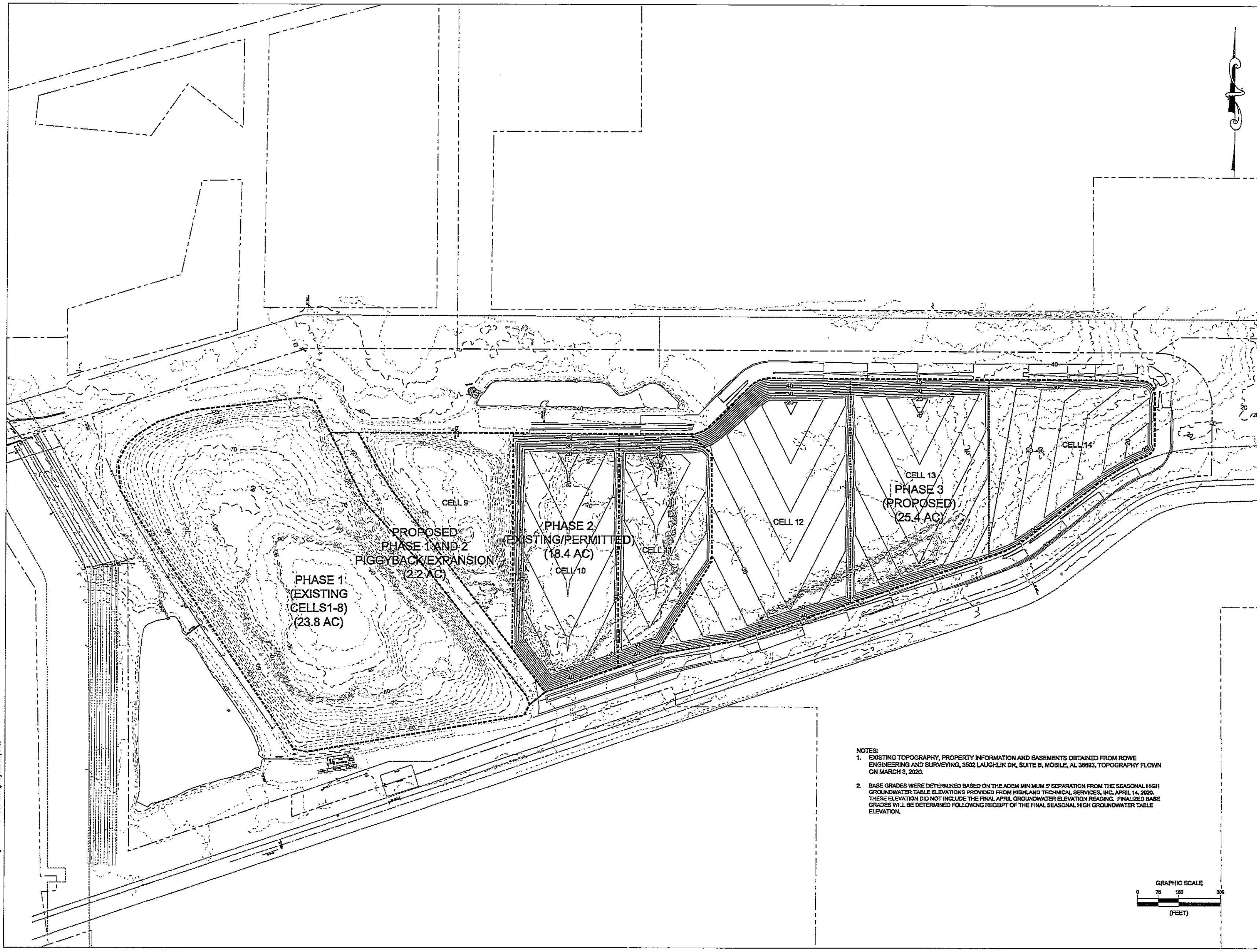
PROJECT NUMBER: 2192290.01
DRAWN BY: --
REVIEWED BY: --
ISSUED FOR: ISSUED FOR
DATE: 3/10/2020
DRAWING NAME:

EXISTING TOPO
MARCH 3, 2020

DRAWING NUMBER:

1

6/3/2020 8:47:51 AM L:\EcoSouth\Axis\2020\Existing Conditions.dwg Layout:Layout1



NOTES:
1. EXISTING TOPOGRAPHY, PROPERTY INFORMATION AND EASEMENTS OBTAINED FROM ROWE ENGINEERING AND SURVEYING, 3502 LAUGHLIN DR, SUITE B, MOBILE, AL 36693, TOPOGRAPHY FLOWN ON MARCH 3, 2020.

2. BASE GRADES WERE DETERMINED BASED ON THE ADEM MINIMUM 5' SEPARATION FROM THE SEASONAL HIGH GROUNDWATER TABLE ELEVATIONS PROVIDED FROM HIGHLAND TECHNICAL SERVICES, INC. APRIL 14, 2020. THESE ELEVATION DID NOT INCLUDE THE FINAL APRIL GROUNDWATER ELEVATION READING. FINALIZED BASE GRADES WILL BE DETERMINED FOLLOWING RECEIPT OF THE FINAL SEASONAL HIGH GROUNDWATER TABLE ELEVATION.

GRAPHIC SCALE
0 75 150 300
(FEET)

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ECOSOUTH ENVIRONMENTAL
AXIS, ALABAMA

AXIS LANDFILL
AXIS, ALABAMA

NO:	DATE:	DESCRIPTION:

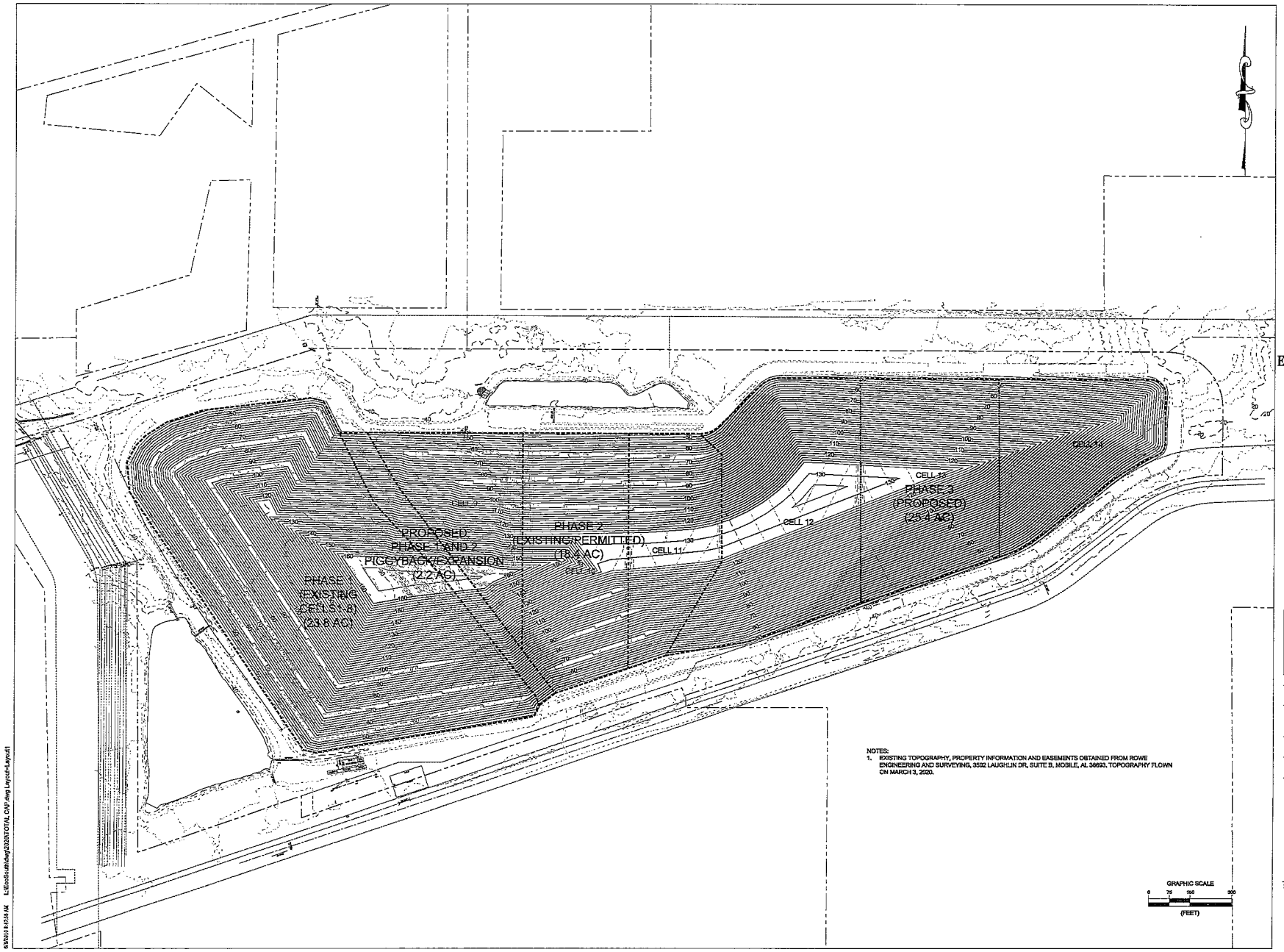
Revisions

PROJECT NUMBER: 2192290.01
DRAWN BY: -
REVIEWED BY: -
ISSUED FOR:
DATE: 4/15/2020
DRAWING NAME:

PRELIMINARY BASE GRADING PLAN

DRAWING NUMBER:
1

6/3/2020 8:47:55 AM L:\EcoSouth\dwg\2020\TOTAL BASE.dwg Layout-Layout1



NOTES:
1. EXISTING TOPOGRAPHY, PROPERTY INFORMATION AND EASEMENTS OBTAINED FROM ROWE ENGINEERING AND SURVEYING, 3502 LAUGHLIN DR, SUITE B, MOBILE, AL 36693, TOPOGRAPHY FLOWN ON MARCH 3, 2020.

GRAPHIC SCALE
0 75 150 300
(FEET)

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ECOSOUTH ENVIRONMENTAL
AXIS, ALABAMA

AXIS LANDFILL
AXIS, ALABAMA

NO:	DATE:	DESCRIPTION:
Revisions		

PROJECT NUMBER: 2192290.01
DRAWN BY: --
REVIEWED BY: --
ISSUED FOR:
DATE: 4/15/2020
DRAWING NAME:

PRELIMINARY FINAL
GRADING PLAN

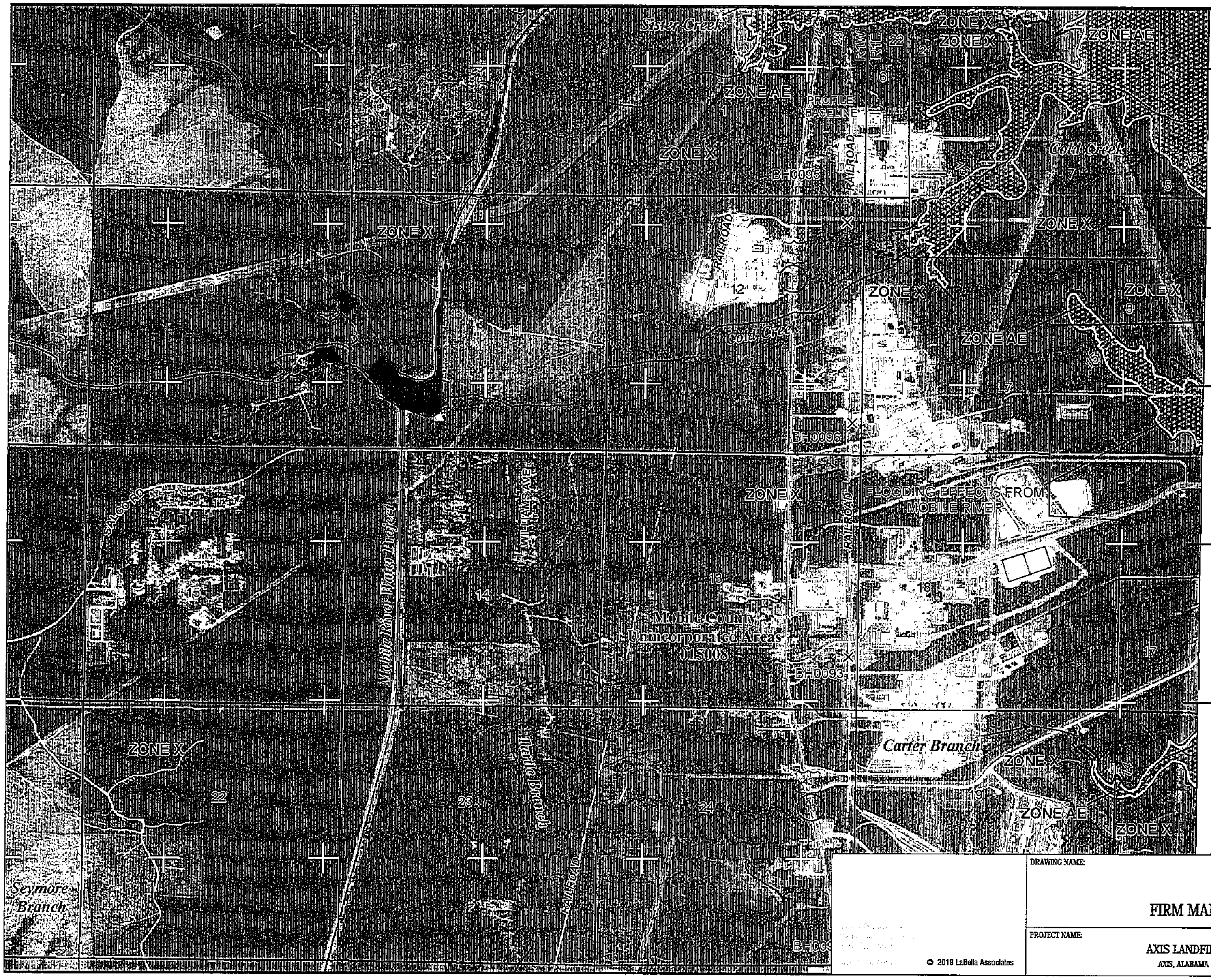
DRAWING NUMBER:

2

4/15/2020 8:47:54 AM L:\EcoSouth\dwg\2020\TOTAL CAP dwg Layout=Layout1

ATTACHMENT H

FLOOD RATE INSURANCE MAP



MAP SCALE 1" = 2000'

0 2000 4000 FEET

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0325K

FIRM
FLOOD INSURANCE RATE MAP

MOBILE COUNTY, ALABAMA
AND INCORPORATED AREAS

PANEL 325 OF 1018
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MOBILE COUNTY	015008	0325	K

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP REVISED
MARCH 17, 2010

MAP NUMBER
01097C0325K

State of Alabama
Federal Emergency Management Agency

DRAWING NAME:	ISSUED FOR:		
FIRM MAP	ISSUED FOR		
	DRAWN BY: –	DATE: 03/12/2020	PROJECT NO.: 2192290.01
PROJECT NAME: AXIS LANDFILL, AXIS, ALABAMA	DRAWING NUMBER: 1		

VERSION 19.0
6/3/2010 8:47:56 AM

ATTACHMENT I

SURFACE & GROUNDWATER PROTECTION

The following is a summary of the Surface and Groundwater Protections currently being utilized at EcoSouth and proposed for the landfill expansion:

- Groundwater
  - Hydrology Review
    - ADEM Admin. Code r. 335-13-4-.11 requires that the base of the composite liner system be a minimum of five feet above the temporal fluctuation of the groundwater table. EcoSouth will update its current hydrological study, per the requirements of ADEM Admin. Code r. 335-13-4-.11, to include the landfill expansion area to demonstrate the five feet of separation standard is met. EcoSouth will submit this updated hydrological study to ADEM for approval.
  - Composite Liner System
    - ADEM Admin. Code r. 335-13-4-.18 requires that landfills accepting municipal solid waste be lined and meet certain specifications. The composite liner system at EcoSouth will be designed and installed to create an impermeable layer between the waste and the underlying groundwater features. EcoSouth will design and implement a composite liner system as described above, for ADEM approval, which meets the requirements of the ADEM Admin. Code r. 335-13-4-.18.
  - Groundwater Monitoring System
    - ADEM Admin. Code r. 335-13-4-.27 requires that a groundwater monitoring system be installed that consists of a sufficient number of wells at the appropriate location and depth to represent the quality of the background water quality has not been affected by the landfill unit. EcoSouth will update its groundwater monitoring plan to include the landfill expansion

for ADEM approval. The plan will be designed and implemented to meet the requirements of ADEM Admin. Code r. 335-13-4-.27.

- Leachate Collection System
  - ADEM Admin. Code r. 335-13-4-.18 requires a leachate collection system be utilized to collect water which has the potential to come into contact with solid waste. The collected wastewater from current operations is collected and transported to Liquid Environmental Services for treatment. EcoSouth's current leachate collection system plan will be updated to include the landfill expansion. EcoSouth will design a leachate collection system for the expanded landfill, for ADEM approval, which meets the requirements of ADEM Admin. Code r. 335-13-4-.18.

- Surface Water
  - ADEM 335-13-4-.17 requires a drainage system be design and constructed to control run-on during the peak discharge of a 25 year storm, and run-off which controls water volume resulting from a 24 hour, 25 year storm. ADEM regulations require that the drainage system be routed to a settling basin or other sediment control structures to remove sediment prior to release onto adjacent properties or waters. EcoSouth will update its current stormwater management design to include the landfill expansion area and submit to ADEM for approval. EcoSouth will design and implement a stormwater control system that will meet the requirements of ADEM Admin. Code. 335-4-.17.

- Groundwater & Surface Water
  - ADEM Admin. Code r. 335-13-4-.01 details landfill unit siting standards which in part are in place for the protection of surface and groundwater. EcoSouth will prepare a report for the landfill expansion for ADEM approval, which details how each of the siting standards specified in ADEM Admin. Code r. 335-13-4-.01 will be met.

ATTACHMENT J

NPDES SURFACE WATER PERMIT

EcoSouth will submit an application to ADEM requesting to modify its current General NPDES Permit (ALG160189) to include the area and activities encompassing the proposed landfill expansion.

LANCE R. LEFLEUR
DIRECTOR

ROBERT J. BENTLEY
GOVERNOR

Alabama Department of Environmental Management
adem.alabama.gov
1400 Coliseum Blvd. 36110-2400 ▪ Post Office Box 301463
Montgomery, Alabama 36130-1463
(334) 271-7700 ▪ FAX (334) 271-7950

January 31, 2017

ERIC STEPHENS, GENERAL MANAGER
AXIS LANDFILL
PO BOX 220
AXIS AL 36505

RE: Axis Landfill
12950 Highway 43
Axis, AL 36505
Mobile County (097)

Dear Mr. Stephens:

Based on your request (as evidenced by the submittal of a Notice of Intent), coverage under **General NPDES Permit Number ALG160189** is granted. The effective date of reissuance coverage is February 1, 2017.

Coverage under this permit does not authorize the discharge of any pollutant or wastewater that is not specifically identified in the permit and by the Notice of Intent which resulted in the granting of coverage. **DSN004-1 has been removed from the permit.** Those discharges identified in the NOI are:

Discharges	**Receiving Waters**
*DSN001-1	Unnamed Tributary to Cold Creek
DSN001-2	Unnamed Tributary to Cold Creek
DSN003-1	Unnamed Tributary to Cold Creek

As indicated in the Notice of Intent, the discharge denoted by an asterisk (*) has been designated as the facility's representative outfall. DSN001-1 is the representative outfall for DSN001-2.

You are responsible for compliance with all provisions of the permit including but not limited to, the performance of any monitoring, the submittal of any reports, and the preparation and implementation of any plans required by the permit.

Discharge Monitoring Reports (DMRs) must be submitted electronically via the Department's E2 Reporting System in accordance with Permit Condition I. C. To participate in this program, the Permittee Participation Package and registration forms may be downloaded online at https://e2.adem.alabama.gov/npdes. ADEM will not provide paper DMR forms due to the electronic reporting requirements.

If you discharge to an impaired waterway, additional Best Management Practices (BMPs) will be required. The Alabama Department of Environmental Management encourages you to exercise pollution prevention practices and alternatives at your facility. Pollution prevention will assist you in complying with effluent limitations and permit regulations.

A copy of the General NPDES Permit under which coverage of your discharges has been granted is enclosed. If you have any questions concerning this permit, please contact Dodi Moseley by email at dbmoseley@adem.alabama.gov or by phone at (334) 271-7725.

Sincerely,

Glenda L. Dean

Glenda L. Dean
Chief
Water Division

Enclosure: Permit

File: NOI/22352

Birmingham Branch
110 Vulcan Road
Birmingham, AL 35209-4702
(205) 942-6168
(205) 941-1603 (FAX)

Decatur Branch
2715 Sandlin Road, S.W.
Decatur, AL 35603-1333
(256) 353-1713
(256) 340-9359 (FAX)

Mobile Branch
2204 Perimeter Road
Mobile, AL 36615-1131
(251) 450-3400
(251) 479-2593 (FAX)

Mobile-Coastal
4171 Commanders Drive
Mobile, AL 36615-1421
(251) 432-6533
(251) 432-6598 (FAX)

ADEM

ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM GENERAL PERMIT

DISCHARGE AUTHORIZED:	STORM WATER RUNOFF, **NOT** CONTAINING LEACHATE, FROM ACTIVE AND INACTIVE LANDFILLS; FROM TRANSFER STATIONS INCLUDING STORM WATER RUNOFF FROM LAND DISTURBANCE ACTIVITIES ASSOCIATED WITH OPENING AND CLOSING CELLS AT LANDFILLS; EXTERIOR VEHICLE AND EQUIPMENT WASH WATER; AND STORM WATER FROM FUELING, PETROLEUM STORAGE, AND HANDLING, EQUIPMENT STORAGE, AND MAINTENANCE AREAS
AREA OF COVERAGE:	THE STATE OF ALABAMA
PERMIT NUMBER:	ALG160189
RECEIVING WATERS:	ALL WATERS OF THE STATE NOT DESIGNATED OUTSTANDING NATIONAL RESOURCE WATER OR OUTSTANDING ALABAMA WATER

In accordance with and subject to the provisions of Federal Water Pollution Control Act, as amended, 33 U.S.C. §§1251-1388 (the "FWPCA"), the Alabama Water Pollution Control Act, as amended, ***Code of Alabama 1975,*** *§§22-22-1 to 22-22-14 (the "AWPCA"), the Alabama Environmental Management Act, as amended,* ***Code of Alabama 1975****, §§22-22A-1 to 22-22A-17, and rules and regulations adopted thereunder, and subject further to the terms and conditions set forth in this permit, the dischargers covered by this permit are hereby authorized to discharge into the above receiving waters.*

ISSUANCE DATE:	September 9, 2016
EFFECTIVE DATE:	February 1, 2017
EXPIRATION DATE:	January 31, 2022

Glenda L. Dean

Alabama Department of Environmental Management

LANDFILL GENERAL PERMIT

TABLE OF CONTENTS

PART I

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the permittee is authorized to discharge from the following point source(s) outfall(s), described more fully in the permittee's application:

DSN001: All storm water discharges which do not contain leachate from active or inactive landfills, from transfer stations; including land disturbance activities associated with opening and closing cells at landfills.

Such discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	UNITS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS 1/ 2/ 3/	
		Daily Minimum	Daily Maximum	Measurement Frequency	Sample Type
Rainfall	inches	-	Monitor	1/6 months	4/
pH	s.u.	Monitor	Monitor	1/6 months	Grab
Biochemical Oxygen Demand, 5-day	mg/l	-	Monitor	1/6 months	Grab
Chemical Oxygen Demand	mg/l	-	Monitor	1/year	Grab
Cadmium, Total	mg/l	-	Monitor	1/6 months	Grab
Chromium, Total	mg/l	-	Monitor	1/6 months	Grab
Copper, Total	mg/l	-	Monitor	1/6 months	Grab
Oil and Grease	mg/l	-	15	1/6 months	Grab
Settleable Solids 5/7/	ml/l	-	Monitor	1/6 months7/	Grab
Total Dissolved Solids	mg/l	-	Monitor	1/6 months	Grab
Total Suspended Solids	mg/l	-	Monitor	1/6 months	Grab
Downstream Turbidity 5/ 6/7/	ntus	-	6/	1/6 months7/	Grab
Upstream Turbidity 5/ 6/7/	ntus	-	Monitor	1/6 months7/	Grab

THERE SHALL BE NO DISCHARGE OF A VISIBLE OIL SHEEN, FLOATING SOLIDS, OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

1/ Samples collected to comply with the monitoring requirements specified above shall be collected at the following location: At the nearest accessible location just prior to discharge and after final treatment.

2/ Semiannual monitoring shall be performed during the first complete January – June or July – December period following authorization under this permit and during each subsequent six (6) month period. The annual parameter may be taken during the first or second six months of the monitoring period, but must be taken if there is a full six month period or more remaining in the monitoring period. The annual parameter result is reported on the semiannual form that is applicable to the date the annual parameter sample was taken. For the six months period that the facility did not sample the annual parameter, the facility must code the annual parameter on the semiannual electronic report as *9 or on the semiannual hardcopy report as "NODI=9" (monitoring is conditional not required this period). Quarterly monitoring shall be performed during the first complete January – March, April-June, July-September, or October – December period following authorization under this permit and during each subsequent three (3) month period. Monitoring reports shall be submitted semiannually so that they arrive at the Department no later than the 28th day of the month following the six (6) month monitoring period (no later than January 28 and July 28).

3/ A storm event is defined as 0.1 inch or greater rainfall and at least 72 hours from the previously measureable (greater than 0.1 inch rainfall) storm event. Monitoring shall be performed during the first thirty minutes of discharge (or as soon thereafter as practicable).

4/ See Part IV.A. of the permit.

5/ To be monitored only when land disturbance activities (associated with opening and closing cells at landfills) are occurring. These land disturbance activities may include digging for cover material within the permitted landfill area, but not outside of that permitted area. If no such land disturbance activities are occurring, then the landfill must code the discharge monitoring report (DMR) for that period as "NODI=9" (monitoring is conditional not required this period).

6/ Downstream turbidity shall not exceed 50 NTUs above the upstream turbidity.

7/ If the permittee discharges to impaired waters as identified by an EPA-approved or EPA established TMDL and/or on the State of Alabama's 303(d) list, then settleable solids, downstream turbidity, and upstream turbidity must be monitored quarterly instead of semi-annually. ADEM reserves the right to require the permittee to obtain an individual permit for any of the reasons listed in Part II. F. 5. a. (1) through (9) of the permit.

LANDFILL GENERAL PERMIT LIMITS
GENERAL NPDES PERMIT ALG160000
PART I

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the permittee is authorized to discharge from the following point source(s) outfall(s), described more fully in the permittee's application:

DSN002: Storm water runoff from petroleum storage and fueling areas. 7/

Such discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	UNITS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS 1/	
		Daily Minimum	Daily Maximum	Measurement Frequency	Sample Type
Rainfall	inches	-	Monitor	1/quarter	2/
pH	s.u.	Monitor	Monitor	1/quarter	Grab
Benzene 3/	µg/l	-	15.5	1/quarter	Grab
Ethylbenzene 4/	µg/l	-	1,244	1/quarter	Grab
Toluene 5/	µg/l	-	8,723	1/quarter	Grab
Xylene	µg/l	-	Monitor	1/quarter	Grab
Naphthalene 6/	µg/l	-	620	1/quarter	Grab
Oil and Grease	mg/l	-	15	1/quarter	Grab
MTBE (Methyl Tertiary Butyl Ether)	µg/l	-	Monitor	1/quarter	Grab

THERE SHALL BE NO DISCHARGE OF DEBRIS. THE DISCHARGE SHALL HAVE NO SHEEN, AND THERE SHALL BE NO DISCHARGE OF VISIBLE OIL, FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS

1/ Samples collected to comply with the monitoring requirements specified above shall be collected at the following location: At the nearest accessible location just prior to discharge and after final treatment.
2/ See Part IV.A.
3/ The limit for benzene shall be 1.12 µg/l if the discharge is to a body of water which is designated as a public water supply (PWS) or within a 24 hour travel time to a body of water designated as a PWS.
4/ The limit for ethylbenzene shall be 448 µg/l if the discharge is to a body of water which is designated as a PWS or within a 24 hour travel time to a body of water designated as a PWS.
5/ The limit for toluene shall be 1,206 µg/l if the discharge is to a body of water which is designated as a PWS or within a 24 hour travel time to a body of water designated as a PWS.
6/ To be monitored only at facilities which handle diesel fuel, aviation fuel, or jet fuel.
7/ If fueling operations are the only industrial activities occurring within the drainage area, then DSN003 applies for the discharge, unless the Department deems it necessary to require monitoring under DSN002 in addition to DSN003.

PART I

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the permittee is authorized to discharge from the following point source(s) outfall(s), described more fully in the permittee's application:

DSN003: Uncontaminated storm water from equipment maintenance and storage, fueling, petroleum storage and handling areas.

Such discharges shall be limited and monitored by the permittee as specified below:

1. The facility will have a valid Spill Prevention, Control, and Countermeasures (SPCC) plan pursuant to 40 CFR Part 112.

2. Best Management Practices (BMP) will be used to prevent pollution of storm water by spillage or leakage during petroleum handling and fueling operations and from equipment maintenance and storage areas. The BMP shall include as a minimum:

    a. Twice per week inspections of the area and removal of any leaked petroleum product;
    b. Immediate cleanup of spilled or leaked petroleum product during handling operations, including fueling; and
    c. All cleanup activities shall be conducted using dry sweep or other approaches that do not result in the creation of polluted wastewater or storm water runoff.

3. Records shall be maintained in the form of a log and shall contain the following information, as a minimum:

    a. Date and time of twice per week inspections;
    b. Any cleanup accomplished as a result of the inspections;
    c. Time the cleanup was initiated and the time it was completed;
    d. Initials of person making visual inspection and performing any cleanup; and
    e. Description of any spillage occurring during petroleum handling, which shall include the date and time of the spill, estimated volume of spill, name of the person observing the spill, date and time the spill was cleaned up, and name of the person cleaning up the spill.

4. Best Management Practices (BMP) are used in draining the diked area. BMP is defined as use of a portable oil skimmer or similar device or the use of an absorbant material to remove oil and grease (as indicated by the presence of a sheen) immediately prior to draining.

5. Monitoring records for dike drainage shall be maintained in the form of a log and shall contain the following information, as a minimum:

    a. Date and time of discharge;
    b. Estimated volume of discharge;
    c. Initials of person making visual inspection and authorizing the discharge.

6. The discharge shall have no sheen, and there shall be no discharge of visible oil, floating solids or visible foam in other than trace amounts.

7. The permittee shall submit an **ANNUAL CERTIFICATION** by January 28th that all discharges, during the preceding year, associated with the above were in accordance with the conditions of the permit.

PART I

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the expiration date of this permit, the permittee is authorized to discharge from the following point source(s) outfall(s), described more fully in the permittee's application.

DSN004: Exterior vehicle and equipment washing operations that DO NOT use solvents and have NOT come in direct contact with solid waste at the landfill facility. 3/

Such discharge shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTIC	UNITS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS 1/	
		Daily Minimum	Daily Maximum	Measurement Frequency	Sample Type
Flow	gal/day	-	Monitor	1/week	Instantaneous 2/
pH	s.u.	6.0	8.5	1/month	Grab
Oil and Grease	mg/l	-	15	1/month	Grab
Phosphorus, Total	mg/l	-	1.0	1/month	Grab
Total Suspended Solids	mg/l	-	50	1/month	Grab

THERE SHALL BE NO DISCHARGE OF DEBRIS. THE DISCHARGE SHALL HAVE NO SHEEN, AND THERE SHALL BE NO DISCHARGE OF VISIBLE OIL, FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS

1/ Samples collected to comply with the monitoring requirements specified above shall be collected at the following location: At the nearest accessible location just prior to discharge and after final treatment.
2/ If flows are intermittent the flow volume may be estimated.
3/ This permit does not allow for the discharge of landfill wastewater as defined by 40 CFR Part 445.2 (f).

PART I

A. DISCHARGE MONITORING REQUIREMENTS APPLICABLE TO ALL DISCHARGES

Monitoring of one storm water outfall within designed drainage area as representative of the remaining outfalls, may be allowed if the applicant submits certification that the discharges are essentially the same. If at a later date the discharges are determined to be dissimilar or if pollutant concentrations are such that water quality standards are contravened, then monitoring of all discharges may be required.

This permit does not allow for the discharge of landfill wastewater as defined by 40 CFR Part 445.2 (f).

B. DISCHARGE MONITORING AND RECORD KEEPING REQUIREMENTS

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge and shall be in accordance with the provisions of this permit.

2. Test Procedures

For the purpose of reporting and compliance, permittees shall use the Minimum Level (ML) as established by EPA. All analytical values at or above the ML shall be reported as the measured value. Values below the ML shall be reported as "0". Test procedures for the analysis of pollutants shall conform to 40 CFR Part 136 and guidelines published pursuant to Section 304(h) of the FWPCA, 33 U.S.C. Section 1314(h). If more than one method for analysis of a substance is approved for use, a method having a minimum level lower than the permit limit shall be used. If the minimum level of all methods is higher than the permit limit, the method having the lowest minimum level shall be used and a report of less than the minimum level shall be reported as zero and will constitute compliance, however should EPA approve a method with a lower minimum level during the term of this permit the permittee shall use the newly approved method.

For pollutant parameters without an established ML, an interim ML may be utilized. The interim ML shall be calculated as 3.18 times the Method Detection Level (MDL) calculated pursuant to 40 CFR Part 136, Appendix B.

Permittees may develop an effluent matrix-specific ML, where an effluent matrix prevents attainment of the established ML. However, a matrix specific ML shall be based upon proper laboratory method and technique. Matrix-specific MLs must be approved by the Department, and may be developed by the permittee during permit issuance, reissuance, modification, or during compliance schedule.

When an EPA approved test procedure for analysis of a pollutant does not exist, the Director shall approve the procedure to be used.

3. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The facility name and location, point source number, date, time and exact place of sampling;

b. The name(s) of person(s) who obtained the samples or measurements;

c. The dates and times the analyses were performed;

d. The name(s) of the person(s) who performed the analyses;

e. The analytical techniques or methods used, including source of method and method number; and

f. The results of all required analyses.

4. Records Retention and Production

a. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the above reports or the application for this permit, for a period of at least three years from the date of the sample measurement, report or application. This period may be extended by request of the Director at any time. If litigation or other enforcement action, under the AWPCA and/or the FWPCA, is ongoing which involves any of the above records, the records shall be kept until the litigation is resolved. Upon the written request of the Director or his designee, the

permittee shall provide the Director with a copy of any record required to be retained by this paragraph. Copies of these records shall not be submitted unless requested.

b. All records required to be kept for a period of three years shall be kept at the permitted facility or an alternate location approved by the Department in writing and shall be available for inspection. A complete copy of the permit, the Best Management Practices (BMP) Plan, most recent BMP inspection records, and, if applicable, a Spill Prevention Control and Countermeasures (SPCC) Plan shall be maintained at the facility. The past three years of DMRs, laboratory records, and historical BMP inspection and training records may be kept at an alternate Alabama location if approved by the Department.

5. Monitoring Equipment and Instrumentation

All equipment and instrumentation used to determine compliance with the requirements of this permit shall be installed, maintained, and calibrated in accordance with the manufacturer's instructions or, in the absence of manufacturer's instructions, in accordance with accepted practices. At a minimum, flow measurement devices shall be calibrated at least once every 12 months.

C. DISCHARGE REPORTING REQUIREMENTS

1. Reporting of Monitoring Requirements

a. This permit requires twice monthly, monthly, quarterly, and semiannual self monitoring. The permittee shall conduct the required monitoring in accordance with the following schedule:

MONITORING REQUIRED MONTHLY AND MORE FREQUENTLY THAN MONTHLY shall be conducted during the first full month following the effective date of initial coverage under this permit and every month thereafter.

QUARTERLY MONITORING shall be conducted at least once during each calendar quarter. Calendar quarters are the periods of January through March, April through June, July through September, and October through December. The permittee shall conduct the quarterly monitoring during the first full quarter following the effective date of initial coverage and each quarter thereafter.

SEMI-ANNUAL MONITORING shall be conducted at least once during the period of January through June and at least once during the period of July through December. The permittee shall conduct the semi-annual monitoring during the first complete six-month period following the effective date of initial coverage and each six-month period thereafter.

ANNUAL MONITORING shall be conducted at least once during the period of January through December. The Permittee shall conduct annual monitoring during the first complete calendar annual period following the effective date of coverage and is required to monitor once during each annual period thereafter.

b. The permittee shall submit discharge monitoring reports (DMRs) in accordance with the following schedule:

REPORTS OF MORE FREQUENTLY THAN MONTHLY, MONTHLY, QUARTERLY, AND SEMI-ANNUAL MONITORING shall be submitted on a semiannual basis. The semiannual reports shall be submitted so that they are received by the Department no later than the 28th day of July and the 28th day of January, unless otherwise directed by the Department. Each submittal shall report results of all testing performed during the six month period preceding the reporting month. For example, the semiannual report due on January 28 should report the results of testing conducted during the months of July through December.

REPORTS OF ANNUAL TESTING shall be submitted on an annual basis. The annual reports shall be submitted so that they are received by the Department no later than the 28th day of January, unless otherwise directed by the Department. Each submittal shall report results of all annual testing performed during the twelve month period preceding the reporting month. For

example, the annual report due on January 28 should report the results of testing conducted during the previous months of January through December.

c. Except as allowed by Provision I.C.1.c.(1) or (2), the permittee shall submit all Discharge Monitoring Reports (DMRs) required by Provision I.C.1.b. by utilizing the Department's web-based Electronic Environmental (E2) Reporting System.

(1) If the permittee is unable to complete the electronic submittal of DMR data due to technical problems originating with the Department's E2 Reporting System (this could include entry/submittal issues with an entire set of DMRs or individual parameters), the permittee is not relieved of their obligation to submit DMR data to the Department by the date specified in Provision I.C.1.b., unless otherwise directed by the Department.

If the E2 Reporting System is down on the 28th day of the month in which the DMR is due or is down for an extended period of time, as determined by the Department, when a DMR is required to be submitted, the permittee may submit the data in an alternate manner and format acceptable to the Department. Preapproved alternate acceptable methods include faxing, e-mailing, mailing, or hand-delivery of data such that they are received by the required reporting date. Within five calendar days of the E2 Reporting System resuming operation, the permittee shall enter the data into the E2 Reporting System, unless an alternate timeframe is approved by the Department. An attachment should be included with the E2 DMR submittal verifying the original submittal date (date of the fax, copy of dated e-mail, or hand-delivery stamped date), if applicable.

(2) The permittee may submit a request to the Department for a temporary electronic reporting waiver for DMR submittals. The waiver request should include the permit number; permittee name; facility/site name; facility address; name, address, and contact information for the responsible official or duly authorized representative; a detailed statement regarding the basis for requesting such a waiver; and the duration for which the waiver is requested. Approved electronic reporting waivers are not transferrable.

Permittees with an approved electronic reporting waiver for DMRs may submit hard copy DMRs for the period that the approved electronic reporting waiver request is effective. The permittee shall submit the Department-approved DMR forms to the address listed in Provision I.C.1.e.

(3) If a permittee is allowed to submit a hard copy DMR, the DMR must be legible and bear an original signature. Photo and electronic copies of the signature are not acceptable and shall not satisfy the reporting requirements of this permit.

(4) If the permittee, using approved analytical methods as specified in Provision I.B.2, monitors any discharge from a point source for a limited substance identified in Provision I.A. of this permit more frequently than required by this permit, the results of such monitoring shall be included in the calculation and reporting of values on the DMR and the increased frequency shall be indicated on the DMR.

(5) In the event no discharge from a point source identified in Provision I.A. of this permit and described more fully in the permittee's application occurs during a monitoring period, the permittee shall report "No Discharge" for such period on the appropriate DMR.

d. All reports and forms required to be submitted by this permit, the AWPCA and the Department's Rules and Regulations, shall be electronically signed (or, if allowed by the Department, traditionally signed) by a "responsible official" of the permittee as defined in ADEM Administrative Code Rule 335-6-6-.09 or a "duly authorized representative" of such official as defined in ADEM Administrative Code Rule 335-6-6-.09 and shall bear the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and

belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

e. Discharge Monitoring Reports required by this permit, the AWPCA, and the Department's Rules that are being submitted in hard copy shall be addressed to:

Alabama Department of Environmental Management
Permits and Services Division
Environmental Data Section
Post Office Box 301463
Montgomery, Alabama 36130-1463

Certified and Registered Mail containing Discharge Monitoring Reports shall be addressed to:

Alabama Department of Environmental Management
Permits and Services Division
Environmental Data Section
1400 Coliseum Boulevard
Montgomery, Alabama 36110-2400

f. All other correspondence and reports required to be submitted by this permit, the AWPCA, and the Department's Rules shall be addressed to:

Alabama Department of Environmental Management
Water Division
Post Office Box 301463
Montgomery, Alabama 36130-1463

Certified and Registered Mail shall be addressed to:

Alabama Department of Environmental Management
Water Division
1400 Coliseum Boulevard
Montgomery, Alabama 36110-2400

2. Noncompliance Notification

a. If for any reason, the permittee's discharge (1) does not comply with any daily minimum or maximum discharge limitation for an effluent characteristic specified in Provision I. A. of this permit which is denoted by an "(X)", (2) threatens human health or welfare, fish or aquatic life, or water quality standards, (3) does not comply with an applicable toxic pollutant effluent standard or prohibition established under Section 307(a) of the FWPCA, 33 U.S.C. Section 1317(a), (4) contains a quantity of a hazardous substance which has been determined may be harmful to public health or welfare under Section 311(b)(4) of the FWPCA, 33 U.S.C. Section 1321(b)(4), (5) exceeds any discharge limitation for an effluent characteristic as a result of an unanticipated bypass, upset, (6) is an unpermitted direct or indirect discharge of a pollutant to a water of the state (unpermitted discharges properly reported to the Department under any other requirement are not required to be reported under this provision), the permittee shall orally report the occurrence and circumstances of such discharge to the Director within 24-hours after the permittee becomes aware of the occurrence of such discharge. In addition to the oral report, the permittee shall submit to the Director electronically a report (or if acceptable to the Department a written report) as provided in Provision I. C. 2. c. no later than five (5) days after becoming aware of the occurrence of such discharge.

b. If for any reason, the permittee's discharge does not comply with any limitation of this permit, the permittee shall submit to the Director a report as provided in Provision I. C. 2. c. below, such report shall be submitted with the next Discharge Monitoring Report required to be submitted by Provision I. C. 1. of this permit after becoming aware of the occurrence of such noncompliance.

c. Any electronic report (or if acceptable to the Department a written report) required to be submitted to the Director by Provision I. C. 2 a. or b. shall be submitted using a copy of the Department's Noncompliance Notification Form provided with this permit and shall include the following information:

(1) A description of the discharge and cause of noncompliance;

(2) The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and

(3) A description of the steps taken and/or being taken to reduce or eliminate the noncomplying discharge and to prevent its recurrence.

D. OTHER REPORTING AND NOTIFICATION REQUIREMENTS

1. Anticipated Noncompliance

The permittee shall give the Director written advance notice of any planned changes or other circumstances regarding a facility, which may result in noncompliance with permit requirements. This information must be submitted electronically unless acceptable to the Department to submit otherwise.

2. Termination of Discharge

The permittee shall notify the Director, in writing, when any point source discharges authorized by this permit have permanently ceased. This notification shall serve as sufficient cause for instituting procedures for termination of the permittees authority to discharge under this General Permit.

3. Updating Information

a. The permittee shall inform the Director of any change in the permittee's mailing address or telephone number or in the permittee's designation of a facility contact or office having the authority and responsibility to prevent and abate violations of the AWPCA, the Department's Rules and the terms and conditions of this permit, in writing, no later than ten (10) days after such change. Upon request of the Director or his designee, the permittee shall furnish the Director with an update of any information provided in the Notice of Intent.

b. If the permittee becomes aware that it failed to submit any relevant facts in the Notice of Intent, or submitted incorrect information in the Notice of Intent; or in any report to the Director, it shall promptly submit such facts or information with a written explanation for the mistake and/or omission. This information must be submitted electronically unless acceptable to the Department to submit otherwise.

4. Duty to Provide Information

a. Any permittee shall furnish to the Director, within a reasonable time, any information which the Director or his designee may request to determine whether cause exists for suspending or revoking the permittee's authorization to discharge under this General Permit, in whole or in part, or to determine compliance with this permit or to determine if the permittee should be required to apply for an individual permit.

b. Any or all permittees shall furnish to the Director, within a reasonable time, any information which the Director or his designee may request to determine whether cause exists for modifying or terminating this permit.

5. New or Increased Discharges

If there is an increase in pollution potential of the discharges from the permittee's facility the permittee must notify the Director in writing. The Director may at his discretion determine under Part II.F. of this permit what action if any will be taken.

E. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the discharge limitations specified in Provision I. A. in accordance with the following schedule:

COMPLIANCE SHALL BE ACHIEVED
ON THE EFFECTIVE DATE OF COVERAGE UNDER THIS PERMIT

If required, no later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement. This information must be submitted electronically unless acceptable to the Department to submit otherwise.

PART II

A. REQUIREMENTS FOR COVERAGE UNDER THIS GENERAL PERMIT

1. Notice of Intent

Any person wishing to be permitted to discharge under this General Permit shall submit a Notice of Intent to be covered by this General Permit at least 30 days prior to the date of desired coverage. No discharge authorized under this General Permit may commence until the discharger receives the Director's acknowledgement of the Notice of Intent and approval of the coverage of the discharge by this General Permit. The Director's acknowledgement shall include a copy of this General Permit and the appropriate discharge monitoring report forms. **The permittee must complete and submit all Departmental forms available electronically, including the E-NOI, unless the permittee submits in writing valid justification as to why the electronic submittal process cannot be utilized and the Department approves in writing utilization of hard copy submittals.** Departmental forms are available on ADEM's webpage at http://www.adem.state.al.us/DeptForms/ .

Any person discharging to a municipal storm sewer, sanitary sewer or combination sewer must notify the municipality by letter of the discharge.

2. Content of Notice of Intent

a. A description of the process generating the discharge for which coverage is desired. This description shall be in sufficient detail to allow the Director to determine that the discharge is included in the category permitted by this General Permit;

b. The latitude and longitude of the discharge points for each discharge and the name of the waterbody receiving each discharge for which coverage under this General Permit is desired; and

c. A contact person, address and phone number for the facility or activity to be covered under this General Permit;

(1) A Notice of Intent shall be electronically signed (or if acceptable to the Department, traditionally signed) by a person meeting the requirements for signatories to permit application under ADEM Administrative Code Rule 335-6-6-.09 and the person signing the Notice of Intent shall make the certification required for submission of documents under ADEM Administrative Code Rule 335-6-6.09.

(2) Signatories to reports, discharge monitoring reports and any other submissions required by this General Permit shall be signed in accordance with the requirements of ADEM Administrative Code Rule 335-6-6.09.

B. OPERATIONAL AND MANAGEMENT REQUIREMENTS

1. Facilities Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of the permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities only when necessary to achieve compliance with the conditions of the permit.

2. Best Management Practices

a. Dilution water shall not be added to achieve compliance with discharge limitations except when the Director or his designee has granted prior written authorization for dilution to meet water quality requirements.

b. The permittee shall prepare, implement, and maintain a Spill Prevention, Control and Countermeasures (SPCC) Plan in accordance with 40 CFR Part 112 if required thereby.

c. The permittee shall prepare and implement a Best Management Practices (BMP) Plan according to Part IV of this permit.

3. Spill Prevention, Control, and Management

The permittee shall provide spill prevention, control, and/or management sufficient to prevent any spills of pollutants from entering a water of the state or a publicly or privately owned treatment works. Any containment system used to implement this requirement shall be constructed of materials compatible with the substance(s) contained and which shall prevent the contamination of groundwater and such containment system shall be capable of retaining a volume equal to 110 percent of the capacity of the largest tank for which containment is provided.

C. OTHER RESPONSIBILITIES

1. Duty to Mitigate Adverse Impacts

The permittee shall promptly take all reasonable steps to mitigate and minimize or prevent any adverse impact on human health or the environment resulting from noncompliance with any discharge limitation of this permit, including such accelerated or additional monitoring of the discharge and/or the receiving waterbody as necessary to determine the nature and impact of the noncomplying discharge.

2. Right of Entry and Inspection

The permittee shall allow the Director, or an authorized representative, upon the presentation of proper identification to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under the permit; and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the AWPCA, any substances or parameters at any location.

D. BYPASS AND UPSET

1. Bypass

a. Any bypass is prohibited except as provided in b. and c. below:

b. A bypass is not prohibited if:

(1) It does not cause any discharge limitation specified in Provision I. A. of this permit to be exceeded;

(2) It is necessary for essential maintenance of a treatment or control facility or system to assure efficient operation of such facility or system; or

(3) It is part of the storm water control system when the intention of the design, as approved by the Director, is to contain the first flush only.

c. A bypass is not prohibited and need not meet the discharge limitations specified in Provision I. A. of this permit if:

(1) It is unavoidable to prevent loss of life, personal injury, or severe property damage;

(2) There are no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime (this condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance); and

(3) The permittee submits a written request for authorization to bypass to the Director at least ten (10) days prior to the anticipated bypass (if possible), the permittee is granted such authorization, and the permittee complies with any conditions imposed by the Director to minimize any adverse impact on human health or the environment resulting from the bypass. This request must be submitted electronically unless acceptable to the Department to submit otherwise.

d. The permittee has the burden of establishing that each of the conditions of Provision II. D. 1. b. or c. have been met to qualify for an exception to the general prohibition against bypassing contained in a. and an exemption, where applicable, from the discharge limitations specified in Provision I. A. of this permit.

2. Upset

a. A discharge which results from an upset need not meet the discharge limitations specified in Provision I. A. of this permit if:

(1) No later than 24-hours after becoming aware of the occurrence of the upset, the permittee orally reports the occurrence and circumstances of the upset to the Director or his designee; and

(2) No later than five (5) days after becoming aware of the occurrence of the upset, the permittee furnishes the Director with evidence, including properly signed, contemporaneous operating logs, or other relevant evidence, demonstrating that (i) an upset occurred; (ii) the permittee can identify the specific cause(s) of the upset; (iii) the permittee's facility was being properly operated at the time of the upset; and (iv) the permittee promptly took all reasonable steps to minimize any adverse impact on human health or the environment resulting from the upset.

b. The permittee has the burden of establishing that each of the conditions of Provision II D. 2. a. of this permit have been met to qualify for an exemption from the discharge limitations specified in Provision I. A. of this permit.

E. DUTY TO COMPLY WITH PERMIT, RULES, AND STATUTES

1. Duty to Comply

a. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the AWPCA and the FWPCA and is grounds for: enforcement action, termination, or suspension of authorization under this permit; denial of a permit renewal application; a requirement that permittee submit an application for an individual NPDES permit.

b. The necessity to halt or reduce production or other activities in order to maintain compliance with the conditions of the permit shall not be a defense for a permittee in an enforcement action.

c. The discharge of a pollutant from a source not specifically identified in the Notice of Intent to be covered under this General Permit and not specifically included in the description of an outfall in this permit is not authorized and shall constitute noncompliance with this permit.

d. The permittee shall take all reasonable steps, including cessation of production or other activities, to minimize or prevent any violation of this permit or to minimize or prevent any adverse impact of any permit violation.

2. Removed Substances

Solids, sludges, filter backwash, or any other pollutant or other waste removed in the course of treatment or control of storm waters and/or process water shall be disposed of in a manner that complies with all applicable Department Rules.

3. Loss or Failure of Treatment Facilities

Upon the loss or failure of any treatment facility, including but not limited to the loss or failure of the primary source of power of the treatment facility, the permittee shall, where necessary to maintain compliance with the discharge limitations specified in Provision I. A. of this permit, or any other terms or conditions of this permit, cease, reduce, or otherwise control production and/or all discharges until treatment is restored.

4. Compliance With Statutes and Rules

a. This permit has been issued under ADEM Administrative Code, Chapter 335-6-6. All provisions of this chapter, that are applicable to this permit, are hereby made a part of this permit. A copy of this chapter may be obtained for a small charge from the Office of General Counsel, Alabama Department of Environmental Management, 1400 Coliseum Boulevard, Montgomery, AL 36110.

b. This permit does not authorize the noncompliance with or violation of any Laws of the State of Alabama or the United States of America or any regulations or rules implementing such laws. FWPCA, 33 U.S.C. Section 1319, and Code of Alabama 1975, Section 22-22-14.

F. PERMIT TRANSFER, MODIFICATION, SUSPENSION, REVOCATION, REISSUANCE, AND TERMINATION

1. Duty to Reapply or Notify of Intent to Cease Discharge

a. The permittee authorized to discharge under this General Permit, who wishes to continue to discharge upon the expiration of this permit, shall submit an E-NOI or Notice of Intent to be covered by the reissued General Permit. Such Notice of Intent shall be submitted at least 90 days prior to the expiration date of this General Permit.

b. Failure of the permittee to submit the appropriate application material for reauthorization under this permit at least 90 days prior to the permit's expiration will void the automatic continuation of the authorization to discharge under this permit as provided by ADEM Administrative Code Rule 335-6-6-.06. Should the permit not be reissued for any reason prior to its expiration date, permittees who failed to meet the 90-day submittal deadline will be illegally discharging without a permit after the expiration date of the permit.

2. Change in Discharge

a. The permittee shall give notice to the Director at least 180 days in advance of any facility expansion, production increase, process change, or other action that could result in:

(1) The discharge of additional pollutants;

(2) The increase in the quantity of any discharge such that existing permit limitations would be exceeded;

(3) Or that could result in an additional discharge point.

This requirement applies to pollutants that are or that are not subject to discharge limitations in this permit. No new or increased discharge may begin until the Director has reviewed the information and taken appropriate action to authorize the discharge under this General Permit, or until such time as an appropriate action has been taken to authorize the discharge under an individual permit.

b. The permittee shall notify the Director as soon as it is known or there is reason to believe:

(1) That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis, of any toxic pollutant which is not limited in this permit, if that discharge will exceed the highest of the following notification levels:

(a) One hundred micrograms per liter;

(b) Two hundred micrograms per liter for acrolein and acrylonitrile; five hundred micrograms per liter for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter for antimony;

(c) Five times the maximum concentration value reported for that pollutant in the permit application; or

(2) That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following notification levels:

(a) Five hundred micrograms per liter;

(b) One milligram per liter for antimony;

(c) Ten times the maximum concentration value reported for that pollutant in the permit application.

3. Transfer of Permit

This permit may not be transferred or the name of the permittee changed without notice to the Director and subsequent modification or revocation and reissuance of the permit to identify the new permittee and to incorporate any other changes as may be required under the FWPCA or AWPCA. In the case of a change in name, ownership or control of the permittee's premises only, a request for permit modification in a format acceptable to the Director is required at least 30 days prior to the change. In the case of a change in name, ownership or control of the permittee's premises accompanied by a change or proposed change in effluent characteristics, a complete permit application is required to be submitted to the Director at least 180 days prior to

the change. Whenever the Director is notified of a change in name, ownership or control, he may decide not to modify the existing permit and require the submission of a new permit application.

4. Permit Modification, Revocation and Reissuance (of Modified General or Individual), and Termination

a. During the term of this General Permit the Director may, for cause, and subject to the public notice procedure of ADEM Administrative Code, Rule 335-6-6-.21, modify or revoke and reissue this General Permit, or terminate it and require all those authorized under it to apply for individual NPDES permits. The causes for this action include but are not limited to the causes listed below:

(1) There are material and substantial alterations or additions to the facility or activity generating the discharges which occurred after permit issuance which justify the application of permit conditions that are different or absent in the existing permit;

(2) When the Director receives any information that was not available at the time of permit issuance and that would have justified the application of different permit conditions at the time of issuance;

(3) When the standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision after the permit was issued;

(4) Upon the failure of the state to notify, as required by Section 402(b)(3) of the FWPCA, another state whose waters may be affected by a discharge;

(5) When the level of discharge of any pollutant which is not limited in the permit exceeds the level which can be achieved by the technology based treatment requirements appropriate to discharge under 40 CFR 125.3(c);

(6) To correct technical mistakes, such as errors in calculation, clerical errors or mistaken interpretations of law made in determining permit conditions;

(7) If the permit limitations are found not to be protective of water quality standards;

(8) To incorporate an applicable 307(a) FWPCA toxic effluent standard or prohibition;

(9) When required by the reopener conditions in this permit, and

(10) For any applicable cause set forth in ADEM Administrative Code Rule 335-6-6-.17.

b. Subject to the public notice procedures of ADEM Administrative Code Rule 335-6-6-.21, the Director may terminate this General Permit during its term for any of the causes for modification listed in Part II.F.4.a.

c. The Director may terminate authorization to discharge under this General Permit for cause. Cause shall include but not be limited to:

(1) Noncompliance with the permit;

(2) Noncompliance with Department Rules;

(3) A finding that this General Permit does not control the discharges sufficiently to protect water quality or comply with treatment based limits applicable to the discharge;

(4) The permittee's misrepresentation or failure to disclose fully all relevant facts in the permit application or during the permit issuance process or the permittee's misrepresentation of any relevant facts at any time;

(5) Materially false or inaccurate statements or information in the permit application or the permit;

(6) A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge;

(7) The permittee's discharge threatens human life or welfare;

(8) Permanent closure of the facility generating the wastewater permitted to be discharged by this permit or permanent cessation of wastewater discharge; and

(9) New or revised requirements of any applicable standard or limitation that is promulgated under Sections 301(b)(2)(C),(D),(E),and (F), and 307(a)(2) of the FWPCA that the Director determines cannot be complied with by the permittee.

d. If the permittee believes that any past or planned activity would be cause for modification or revocation and reissuance of this General Permit under ADEM Administrative Code Rule 335-6-6-.23 (7), or termination and issuance of an individual permit under ADEM Administrative Code Rule 335-6-6-.23 (9) the permittee must report such information to the Permit Issuing Authority. The submittal of a new application may be required of the permittee. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned change, anticipated noncompliance or application for an individual permit, does not stay any permit condition.

5. Issuance by the Director of an Individual NPDES Permit to a Person Eligible for Coverage or Covered by This General Permit.

a. The Director may require any person, otherwise eligible for coverage under this General Permit, to apply for an individual NPDES permit by notifying that person that an application is required. Notification shall consist of a written description of the reason(s) for the decision, appropriate permit application forms and directions, a statement informing the person that upon issuance of the individual permit coverage by this General permit shall automatically terminate. Reasons for this requirement may be:

(1) Noncompliance with the General Permit;

(2) Noncompliance with Department Rules;

(3) A change has occurred in the availability of demonstrated technology or practices for the control or abatement of pollutants applicable to the wastewater being discharged;

(4) Effluent guidelines are promulgated for a point source(s) covered by the General Permit;

(5) A water quality management plan applicable to the wastewater being discharged under this General Permit;

(6) Circumstances have changed since the time of the request to be covered so that the discharger is no longer appropriately controlled under this General Permit or either a temporary reduction or permanent reduction or elimination of the authorized discharge is necessary;

(7) Standards for sewage sludge use or disposal have been promulgated for the sludge use or disposal practice covered by this General Permit;

(8) The discharge(s) is a significant contributor of pollutants. In making this decision the Director may consider:

(i) the location of the discharges with respect to waters of the state,

(ii) the size of the discharger, and

(iii) the quantity and nature of the pollutants discharged to waters of the state.

(9) A determination that the water of the state receiving the discharge is not meeting applicable water quality standards.

6. Request for an Individual NPDES Permit by a Person Covered Under This General Permit.

a. Any person covered by this General Permit may apply for termination of coverage by applying for an individual NPDES permit.

b. A permit application submitted voluntarily or at the direction of the Director for the purpose of termination of coverage by this General Permit shall be processed in accordance with the rules found in ADEM Administrative Code 335-6-6 applicable to individual permits.

c. Any person may petition the Director for withdrawal of this General Permit authority from a discharger. The Director shall consider the information submitted by the petitioner and any other information he may be aware of and may obtain additional information from the discharger and through inspections by Department staff and shall decide if coverage should be withdrawn. The petitioner shall be informed of the Director's decision and shall be provided a summary of the information considered.

7. Request for Permit Action Does Not Stay Any Permit Requirement

The filing of a request by the permittee for any permit action such as termination, or application for individual permit or any other action, does not stay any permit term or condition.

G. COMPLIANCE WITH TOXIC POLLUTANT STANDARD OR PROHIBITION

If any applicable effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the FWPCA, 33 U.S.C. Section 1317(a), for a toxic pollutant discharged by the permittee and such standard or prohibition is more stringent than any discharge limitation on the pollutant specified in Provision I. A. of this permit, or controls a pollutant not limited in Provision I. A. of this permit, this permit shall be modified to conform to the toxic pollutant effluent standard or prohibition and the permittee shall be notified of such modification. If this permit has not been modified to conform to the toxic pollutant effluent standard or prohibition before the effective date of such standard or prohibition, the permittee shall attain compliance with the requirements of the standard or prohibition within the time period required by the standard or prohibition and shall continue to comply with the standard or prohibition until this permit is modified or reissued.

H. DISCHARGE OF WASTEWATER GENERATED BY OTHERS

The discharge of wastewater, generated by any process, facility, or by any other means not under the operational control of the permittee or not identified in the application for this permit or not identified specifically in the description of an outfall in this permit is not authorized by this permit.

PART III

A. CIVIL AND CRIMINAL LIABILITY

1. Tampering

Any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained or performed under the permit shall, upon conviction, be subject to penalties as provided by the AWPCA.

2. False Statements

Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or

reports of compliance or noncompliance shall, upon conviction, be subject to penalties as provided by the AWPCA.

3. Permit Enforcement

a. Any NPDES permit issued or reissued by the Department is a permit for the purpose of the AWPCA and the FWPCA and as such any terms, conditions, or limitations of the permit are enforceable under state and federal law and as described under Rule 335-6-6-.18.

b. Any person required to have a NPDES permit pursuant to ADEM Administrative Code Chapter 335-6-6 and who discharges pollutants without said permit, who violates the conditions of said permit, who discharges pollutants in a manner not authorized by the permit, or who violates applicable orders of the Department or any applicable rule or standard of the Department, is subject to any one or combination of the following enforcement actions under applicable state statutes.

(1) An administrative order requiring abatement, compliance, mitigation, cessation, clean-up, and/or penalties;

(2) An action for damages;

(3) An action for injunctive relief; or

(4) An action for penalties.

4. Relief From Liability

Except as provided in Provision II. D. 1. (Bypass) and Provision II. D. 2. (Upset), nothing in this permit shall be construed to relieve the permittee of civil or criminal liability under the AWPCA or FWPCA for noncompliance with any term or condition of this permit.

B. OIL AND HAZARDOUS SUBSTANCE LIABILITY

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities or penalties to which the permittee is or may be subject under Section 311 of the FWPCA, 33 U.S.C. Section 1321.

C. PROPERTY AND OTHER RIGHTS

This permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to persons or property or invasion of other private rights, or any infringement of federal, state, or local laws or regulations, nor does it authorize or approve the construction of any physical structures or facilities or the undertaking of any work in any waters of the state or of the United States.

D. AVAILABILITY OF REPORTS

Except for data determined to be confidential under Code of Alabama 1975, Section 22-22-9(c), all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department. Effluent data shall not be considered confidential.

E. COMPLIANCE WITH WATER QUALITY STANDARDS

1. The permittee may be required by the Director to apply for an individual permit, if the Director determines that discharge under this General Permit causes a violation of a water quality standard or stream use classification.

2. Compliance with permit terms and conditions notwithstanding, if the permittee's discharge(s) from point sources identified in Provision I. A. of this permit cause or contribute to a condition in contravention of

state water quality standards, the Department may require the permittee to take abatement action or apply for an individual permit pursuant to the Department's Rules, or both.

3. If the Department determines, on the basis of a notice provided pursuant to this permit or any investigation, inspection or sampling, that a modification of this permit is necessary to assure maintenance of water quality standards or compliance with other provisions of the AWPCA or FWPCA, the Department may require such modification.

F. GROUNDWATER

Unless specifically authorized by a permit issued by the Department, the discharge of pollutants to groundwater is prohibited. Should a threat of groundwater contamination occur, the Director may require groundwater monitoring to properly assess the degree of the problem and the Director may require that the permittee undertake measures to abate any such discharge and/or contamination.

G. DEFINITIONS

1. Authorization – means granted the privilege of discharging under the terms of this General Permit.

2. Average monthly discharge limitation - means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month (zero discharge days shall not be included in the number of "daily discharges" measured and a less than detectable test result shall be treated as a concentration of zero if the most sensitive EPA approved method was used).

3. Average weekly discharge limitation - means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week (zero discharge days shall not be included in the number of "daily discharges" measured and a less than detectable test result shall be treated as a concentration of zero if the most sensitive EPA approved method was used).

4. AWPCA - means the Alabama Water Pollution Control Act.

5. Bypass - means the intentional diversion of waste streams from any portion of a treatment facility.

6. Daily discharge - means the discharge of a pollutant measured during any consecutive 24 hour period in accordance with the sample type and analytical methodology specified by the discharge permit.

7. Daily maximum - means the highest value of any individual sample result obtained during a day.

8. Daily minimum - means the lowest value of any individual sample result obtained during a day.

9. Day - means any consecutive 24-hour period.

10. Department - means the Alabama Department of Environmental Management.

11. Director - means the Director of the Department.

12. Discharge - means "[t]he addition, introduction, leaking, spilling or emitting of any sewage, industrial waste, pollutant or other waste into waters of the state". Code of Alabama 1975, Section 22-22-1(b)(8).

13. Discharge monitoring report (DMR) - means the form approved by the Director to accomplish reporting requirements of an NPDES permit.

14. EPA - means the United States Environmental Protection Agency.

15. FWPCA - means the Federal Water Pollution Control Act.

16. Landfill Wastewater as defined by 40 CFR Part 445.2 (f) means all wastewater associated with, or produced by, landfilling activities except for sanitary wastewater, non-contaminated storm water, contaminated ground water, and wastewater from recovery pumping wells. Landfill wastewater includes,

but is not limited to, leachate, gas collection condensate, drained free liquids, laboratory derived wastewater, contaminated storm water and contact washwater from washing truck, equipment, and railcar exteriors and surface areas which have come in direct contact with solid waste at the landfill facility.

17. Notice of Intent – means forms and additional information that are required by ADEM Administrative Code Rule 335-6-6-.23 and applicable permit fees.

18. Permit application - means forms and additional information that is required by ADEM Administrative Code Rule 335-6-6-.08 and applicable permit fees.

19. Point source - means "any discernible, confined and discrete conveyance, including but not limited to any pipe, channel, ditch, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged." Section 502(14) of the FWPCA, 33 U.S.C. Section 1362(14).

20. Pollutant - includes for purposes of this permit, but is not limited to, those pollutants specified in Code of Alabama 1975, Section 22-22-1(b)(3) and those effluent characteristics specified in Provision I. A. of this permit.

21. Qualified Credentialed Professional or QCP means a professional engineer (PE), or a Certified Professional in Erosion and Sediment Control (CPESC) as determined by CPESC, Inc. Other registered or certified professionals such as registered landscape architect, registered land surveyor, registered geologist, registered forester, Registered Environmental Manager as determined by the National Registry of Environmental Professionals (NREP), or Certified Professional and Soil Scientist (CPSS) as determined by ARCPACS, and other Department accepted professional designations, certifications, and/or accredited university programs that can document requirements regarding proven training, relevant experience, and continuing education, that can enable recognized individuals to prepare CBMPP's to makes sound professional judgments regarding Alabama NPDES rules, the requirements of this chapter, planning, design, implementation, maintenance, and inspection of construction sites, receiving waters, BMPs, remediation/cleanup of accumulated offsite pollutants from the regulated site, and reclamation or effective stormwater quality remediation of construction associated land disturbances, that meet or exceed recognized technical standards and guidelines, effective industry standard practices, and the requirements of this chapter. The QCP shall be in good standing with the authority granting the registration or designation. The design and implementation of certain structural BMPs may involve the practice of engineering and require the certification of a professional engineer pursuant to Alabama law.

22. Severe property damage - means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

23. Shock chlorination – means the periodic use of chlorine in cooling water systems as a biocide.

24. Upset - means an exceptional incident in which there is an unintentional and temporary noncompliance with technology-based permit discharge limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

25. Waters - means "[a]ll waters of any river, stream, watercourse, pond, lake, coastal, ground or surface water, wholly or partially within the state, natural or artificial. This does not include waters which are entirely confined and retained completely upon the property of a single individual, partnership or corporation unless such waters are used in interstate commerce." Code of Alabama 1975, Section 22-22-1(b)(2). Waters "include all navigable waters" as defined in Section 502(7) of the FWPCA, 22 U.S.C. Section 1362(7), which are within the State of Alabama.

26. Week - means the period beginning at twelve midnight Saturday and ending at twelve midnight the following Saturday.

H. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

PART IV

A. STORM WATER MEASUREMENT AND SAMPLING

1. Storm Water Measurement

   a. All storm water samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches.

   b. The storm water event must be monitored, including the date and rainfall (in inches) for the storm event(s) sampled. The duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event must be a minimum of 72 hours. This information must be recorded as part of the sampling procedure and records retained according to Part I.B.4.b. of this permit.

   c. During the sampling storm event, rainfall must be reported and may be measured using a rain guage. This information must be recorded as part of the sampling procedure and records retained according to Part I.B.4.b. of this permit.

2. Storm Water Sampling

   a. A grab sample, if required by this permit, shall be taken during the first thirty minutes of the discharge (or as soon thereafter as practicable); and a flow weighted composite sample, if required by this permit, shall be taken for the entire event or for the first three hours of the event.

   b. All test procedures will be in accordance with Part I.B.2. of this permit.

B. BEST MANAGEMENT PRACTICES (BMP) PLAN

1. Plan Content for Landfill Activities: The permittee shall prepare (or as required have a QCP prepare) and implement a best management practices (BMP) plan which shall:

   a. Provide control sufficient to prevent or control pollution of storm water by soil particles to the degree required to prevent violation of the turbidity water quality standard applicable to the waterbody receiving the discharge;

   b. Prevent the spillage or loss of fluids, oil, grease, gasoline, etc. from vehicle and equipment maintenance and repair activities and thereby prevent the contamination of storm water from these substances;

   c. Prevent or minimize the storm water contact with material stored on site;

   d. Designate by position or name the person or persons responsible for the day to day implementation of the BMP;

   e. Provide for at a minimum, two inspections a week, on days during which the facility is manned, of any structures that function to prevent storm water pollution or to remove pollutants from storm

water and of the facility in general to ensure that the BMP is continually implemented and effective;

f. If spillage is a factor during loading and unloading of bulk material, provide for prevention of the mixing of spillage with discharged storm water;

g. Include a diagram of the facility showing the direction of the storm water flow, the discharge point(s), and the locations of any structures or other mechanisms intended to prevent pollution of storm water or to remove pollutants from storm water, the locations of any collection and handling systems. The site map should also identify the location, size, and contents of any tanks.

h. Prevent the pollution of storm water by animal wastes;

i. Bear the signature of the landfill manager or corporate official;

j. The permittee must implement measures to ensure permanent revegetation or cover of all disturbed areas. The permittee shall perform regular clean-up and proper disposal of floating or submerged trash and garbage resulting from activities authorized by this permit;

k. The permittee shall implement, as necessary, a system for the collection, storage, treatment, and disposal of sewage and other putrescible wastes;

l. Appropriate measures must be taken to prevent the deposition of airborne pollutants such as spray paint, herbicides, excessive road dust, etc. from entering any waterbody.

2. Plan Content for Construction Activities

a. A Qualified Credentialed Professional must prepare the BMP Plan that addresses the land disturbance activities. Permittee shall implement a BMP Plan describing structural and non-structural practices which will be implemented and maintained to prevent/minimize the discharge of all sources of pollution (i.e., sediment, trash, garbage, debris, oil & grease, chemicals, materials, etc.) to State waters in storm water runoff. The Plan must be designed to address the following goals: (1) to divert upslope water around the site; (2) to limit the exposure of disturbed areas to precipitation to the shortest amount of time possible; (3) to minimize the amount of surface area that is disturbed; and (4) to remove sediment, nutrients, and other pollutants from the storm water before it leaves the site.

b. The BMP Plan means implementation and continued maintenance of effective structural and non-structural practices and management strategies to prevent and minimize the introduction of pollutants to stormwater and to treat stormwater to remove pollutants prior to discharge. The Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas, Alabama Soil and Water Conservation Committee (ASWCC) March 2009 edition and current industry standards shall be used as necessary to maintain compliance.

c. Dilution water shall not be added to achieve compliance with discharge limitations except when the Director or his designee has granted prior written authorization for dilution to meet water quality requirements.

d. The permittee must implement measures to ensure permanent revegetation or cover of all disturbed areas. The permittee shall perform regular clean-up and proper disposal of floating or submerged trash and garbage resulting from activities authorized by this permit.

e. The permittee shall implement, as necessary, a system for the collection, storage, treatment, and disposal of sewage and other putrescible wastes.

f. All construction and worker debris (e.g., trash, garbage, etc.) must be immediately removed and disposed on in an approved manner. No rubbish, trash garbage, refuse, or other such materials shall be discharged into waters of the State of Alabama.

g. Appropriate measures must be taken to prevent the deposition of airborne pollutants such as spray paint, herbicides, excessive road dust, etc. from entering any waterbody.

h. All materials used as fill for construction purposes must be non-toxic, non-acid forming and free of solid waste or other debris unless approved by the Department.

i. Include a diagram of the facility showing the direction of the storm water flow, the discharge point(s), and the locations of any structures or other mechanisms intended to prevent pollution of storm water or to remove pollutants from storm water, the locations of any collection and handling systems. The site map should also identify the location, size, and contents of any tanks.

j. Bear the signature of the landfill manager or corporate official.

3. Compliance Schedule: The permittee shall have prepared and fully implemented the BMP upon the date coverage is granted.

4. Department Review

a. When requested by the Director or his designee, the permittee shall make the BMP available for Department review.

b. The Director or his designee may notify the permittee at any time that the BMP is deficient and require correction of the deficiency.

c. The permittee shall correct any BMP deficiency identified by the Director or his designee within 30 days of receipt of notification and shall certify to the Department that the correction has been made and implemented.

5. Administrative Procedures

a. A copy of the BMP shall be maintained at the landfill and shall be available for inspection by representatives of the Department.

b. A log of the twice per week inspections required above shall be maintained at the landfill and shall be available for inspection by representatives of the Department. The log shall contain records of all inspections performed and any corrective actions taken for the last three years and each entry shall be signed by the person performing the inspection.

c. The permittee shall provide training for any personnel required to implement the BMP and shall retain documentation of such training at the facility. This documentation shall be available for inspection by representatives of the Department. Training shall be performed prior to the date that implementation of the BMP is required.

d. BMP Plan Modification. The permittee shall amend the BMP plan whenever there is a change in the facility or change in operation of the facility which materially increases the potential for the ancillary activities to result in a discharge of significant amounts of pollutants.

C. DISCHARGE(S) TO IMPAIRED WATERS REQUIREMENTS

1. Requirements Applicable to a Facility Eligible for Coverage, or Covered, under this Permit with Discharge(s) to 303(d) Listed Waters

This permit does not authorize new sources or new dischargers of pollutants of concern to impaired waters unless consistent with an EPA-approved or EPA-established Total Maximum Daily Load (TMDL) and applicable State law. Impaired waters are those that do not meet applicable water quality standards and are identified by an EPA-approved or EPA-established TMDL and/or on the State of Alabama's 303(d) list. Pollutants of concern are those pollutants for which the water body is listed as impaired and which contribute to the listed impairment.

a. The facility eligible for coverage, or covered, under this permit must determine whether its discharge(s) contributes directly or indirectly to a waterbody that is included on the latest 303(d) list or otherwise designated by the Department as impaired or is included in an EPA-approved or EPA-established TMDL. If the facility has discharges meeting this criterion, it must comply with Part IV.C., if its discharge does not meet this criterion, Part IV.C. does not apply to the facility.

b. Facilities that discharge into a receiving water which is listed on the State of Alabama's 303(d) list of impaired waters, and with discharges that contain the pollutant(s) for which the waterbody is impaired, must by April 30th of the following year or within 6 months of such approval of the 303(d) list or applicable TMDL or establishment of TMDL by EPA (whichever is longer), document in its BMP plan how the BMPs will control the discharge of the pollutant(s) of concern, and must ensure that there will be no increase of the pollutants of concern. A monitoring plan to assess the effectiveness of the BMPs in achieving the allocations must also be included in the BMP plan.

c. If the facility discharges to a waterbody described above, it must also determine whether a total maximum daily load (TMDL) has been developed and established or approved by EPA for the listed waterbody. If a TMDL is established or approved during this permit cycle by USEPA for any waterbody into which the facility discharges, the facility must review the applicable TMDL to see if it includes requirements for control of storm water discharges. By April 30th of the following year or within 6 months of such approval of the applicable TMDL or establishment of TMDL by EPA (whichever is longer), the facility must notify the Department on how it will modify its BMP plan to include best management practices specifically targeted to achieve the allocations prescribed by the TMDL. Revised BMP plans must be submitted to the Department for review. The facility must include a monitoring component in the BMP plan to assess the effectiveness of the BMPs in achieving the allocations. If the facility cannot ensure its discharges will not cause or contribute to impairment, then the facility must apply for and obtain permit coverage under an individual permit.

2. Requirements Applicable to a Facility Eligible for Coverage, or Covered, under this Permit with Discharges into Waters with EPA-Approved or EPA-Established TMDLs

a. The facility must determine whether the EPA-approved or EPA-Established TMDL is for a pollutant likely to be found in discharges from its facility.

b. The facility must determine whether the TMDL includes a pollutant allocation or other performance requirements specifically for discharges from its facility.

c. If, after the determinations above have been made and if it is determined that the facility must implement specific allocation provisions of the TMDL, then the facility must assess whether the allocations are being met through implementation of existing control measures or if additional control measures are necessary.

d. The facility must document all control measures currently being implemented or planned to be implemented, to include a schedule of implementation for all planned controls, and must document calculations or other evidence showing that the allocations will be met. Revised BMP plans must be submitted to the Department for review.

e. If a TMDL contains requirements for control of pollutants from the facility's discharges, then the BMP plan must include BMPs specifically targeted to achieve the allocations prescribed by the TMDL. A monitoring plan to assess the effectiveness of the BMPs in achieving the allocations must also be included in the BMP plan. Implementation of the monitoring plan in accordance with Part IV.C.2 will determine whether the controls are adequate to meet the TMDL allocations. If the facility cannot comply with the requirements of the TMDL, then the facility must apply for and obtain permit coverage under an individual permit.

f. If the evaluation shows that additional or modified controls are necessary, the facility must describe the type and schedule for the control additions/revisions in the BMP plan. The facility must also continue Paragraphs IV.C.2.d.-f. until two continuous monitoring cycles, as defined in

the monitoring plan in accordance with Part IV.C.2., show that the TMDL allocations are being met or that water quality (WQ) standards are being met.

3. Requirements for New or Revised BMP Plans

New or revised BMP plans developed in accordance with Parts IV.C.1 and IV.C.2 above must be submitted to the Department for review by April 30th of the year following EPA approval of the 303(d) list or applicable TMDL or within 6 months of such approval of the 303(d) list or applicable TMDL or establishment of TMDL by EPA (whichever is longer).

ATTACHMENT K

WATER FEATURES EVALUATION

ADEM Admin. Code r. 335-13-4-.01 details landfill unit siting standards which includes the evaluation of floodplains, sinkholes, ponds, springs, swamps, and drainage courses for the proposed area of the landfill expansion. Each of these features will be evaluated in accordance with ADEM Admin. Code r. 33-13-4-.01 and submitted to ADEM for approval. The evaluation and subsequent measures to address these potential water features may also fall under the jurisdiction of the U.S. Army Corps of Engineers. Any application and/or permit required by the U.S. Army Corps of Engineers as a result of EcoSouth's evaluation of ADEM Admin. Code r. 335-13-4 will be obtained by EcoSouth in accordance with Rules and Regulations of the U.S. Army Corps of Engineers.

ATTACHMENT L

PLANNED FILL PROGRESSION

The fill progression will be, in general, from west to east. Filling operations will continue in both Phases 1 and 2 during construction of the expansion/piggyback area between Phases 1 and 2, then filling will occur in the expansion/piggyback area between Phases 1 and 2, then filling will progress into Phase 3 (west to east) and continue on top of Phases 1, 2 and 3. See Attachment G for locations of Phases 1, 2 and 3

ATTACHMENT M

Alabama Code g 22-27-48 Discussion

The Approving Jurisdiction will consider the six factors as set forth in Alabama Code g 22-24-48 in the determination to approve or disapprove the proposed landfill expansion. EcoSouth's response to each of the six factors as listed in Alabama Code g 22-24-48 is provided below:

1. The consistency of the proposal with the jurisdiction's solid waste management need as identified in its plan.
    - The proposed landfill expansion is consistent with the jurisdiction's solid waste management need as identified in its plan. Mobile County currently has one Municipal Solid Waste Landfill. EcoSouth primarily services sources of Industrial Non-Hazardous Solid Waste. Expansion of EcoSouth's existing landfill will continue to allow this service to be provided, and thus, prolonging the life expectancy of landfills currently servicing the Solid Waste needs of Mobile County.
2. The relationship of the proposal to local planned or existing development or the absence thereof, to major transportation arteries and to existing state primary and secondary roads.
    - The proposed modification is expected to have negligible impacts to major transportation arteries and to existing state primary and secondary roads. In addition, EcoSouth has completed improvements (paving, etc.), at its own expense, to County Road which leads to the facility entrance.

3. The location of a proposed facility in relationship to existing industries in the state that generate large volumes of solid waste, or the relationship to the areas projected for development of industries that will generate solid waste.

    - EcoSouth is located on Hwy 43 neighboring a significant number of Chemical and Industrial plants. EcoSouth's primary service is the treatment and subsequent disposal of Industrial Non-Hazardous Solid Waste. The landfill expansion will continue to allow this service to be provided, and thus, keeping transportation costs for Hwy 43 customers minimal, and prolonging the life expectancy of landfills currently servicing the Solid Waste needs of Mobile County.

4. Costs and availability of public services, facilities and improvements required to support a proposed facility and protect public health, safety, and the environment.

    - No improvements or increase in costs for Mobile County are expected as a result of the landfill expansion. Improvements to the County Road leading to EcoSouth have been completed at EcoSouth's expense. Existing public services and facilities are expected to be sufficient to ensure protection of public health, safety, and the environment.

5. The impact of a proposed facility on public safety and provisions made to minimize the impact on public health and safety.

    - EcoSouth currently maintains ADEM permits to ensure human health and the environment is protected for its existing landfill. EcoSouth will obtain all required Local, State, and Federal permits to ensure the construction and operation of the expanded landfill will also be protective of human health and the environment.

    - The entrance to the facility meets current site distance requirements and is expected to continue to meet the site distance requirements upon completion of the landfill expansion.

6. The social and economic impacts of a proposed facility on the affected community, including changes in property values, and social or community perception.

    - EcoSouth's existing landfill is located in an area zoned for industrial use and is surrounded by industrial facilities. Therefore, the current property values, and social or community perception are not expected to change as a result of the landfill expansion. This expanded facility will provide needed long term disposal capacity for the industries located in this area of Mobile County. This fact will have positive economic impacts to the existing industrial property

values as well as enhance the economic value of these industries to Mobile County.

ecosouth services
An Environmental Services Company

Ecosouth Services of Mobile, LLC
12945 Highway 43 N
Axis, AL 36505
251-675-9800

BB&T
BRANCH BANKING AND TRUST COMPANY
ALABAMA

61-398/622

4022

07/07/2020

PAY
TO THE
ORDER OF

Mobile County Environmental Services

$ **6,000.00

Six thousand and 00/100********** DOLLARS

Mobile County Environmental Services
205 Government St
Mobile, AL 36644-1700

MEMO

AUTHORIZED SIGNATURE

Security features. Details on back.

⑈004022⑈ ⑆062203984⑆0000126974396⑈

Ecosouth Services of Mobile, LLC

07/07/2020	**Mobile County Environmental Services**		4022
	Solid Waste Permit Application		6,000.00

DELUXE CORPORATION 1-800-888-6327

1003 BB&T - Operating #4396 6,000.00

COPY

34)	APPROVE	construction, right-of-way use and franchise agreement with Telepak Networks, Inc., and its affiliate d/b/a C Spire for Mobile County rights-of-way.
35)	APPROVE	amendment of professional services agreement with Everyday IT, Inc. a/k/a IT3SI to make provision for additional services related to migration from the current payroll system, PETS, to Central Square, and further providing for a change in the payment structure and hourly rate, subject to final legal review.
36)	APPROVE	authorizing advertising for a public hearing to be held August 20, 2020, at the regularly scheduled Commission Conference, to receive comments from the public relating to the Commission providing Host Community Acceptance of the proposed modifications to the existing permitted landfill facility for EcoSouth Services of Mobile, LLC in Axis, Alabama.
37)	VOTED AT CONFERENCE	approving event space rental agreement with Abba Shrine Temple for use as a polling site on July 14, 2020, for the sum of $900.00, (increased rent results from COVID-19 requirements).
38)	APPROVE	CDP-313-20, contract with Lighthouse Community Development Corporation, in the amount of $4,322.23. Funds will be used to provide lighting for the community park, from District 3 funds.
39)	APPROVE	lease agreement with Bishop State Community College for space in the Theodore Oaks Shopping Center, for a term of three (3) years beginning on August 1, 2020 and ending July 31, 2023, and authorize Commission President to execute all documents necessary.

Legals Mobile

Untitled NOTICE OF HEARING TO ACCEPT PUBLIC COMMENTS CONCERNING APPROVAL OF MODIFICATIONS TO EXISTING INDUSTRIAL LANDFILL FOR ECOSOUTH SERVICES OF MOBILE, LLC IN AXIS, ALABAMA The Mobile County Commission shall accept public comment concerning approval of modifications to the existing industrial Landfill located in Axis, Alabama for EcoSouth Services of Mobile, LLC. The proposed modifications are the addition of Municipal Solid Waste (MSW) as an accepted waste stream and increasing the volume of solid waste received at the landfill from an average of 1,500 cubic yards per day to 5,000 tons per day. The landfill facility is located within Sections 1 and 18 of Township 1 South, Range 1 East in Mobile County, Alabama. In determining whether to recommend approval of the proposed modifications to the permit for the existing Industrial Landfill facility, the Commission shall consider each of the following: 1. The consistency of the proposal with the jurisdiction's solid waste management need as identified in the Mobile County Solid Waste Management Plan: 2. The relationship of the proposal to local planned or existing development or the absence thereof, to major transportation arteries and to existing state primary and secondary roads: 3. The location of the proposed facility in relationship to existing industries that generate large volumes of solid waste, or the relationship to the areas projected for development of industries that will generate solid waste: 4. Cost and availability of public services, facilities and improvements required to support the proposed facility and protect public health, safety, and the environment: 5. The impact of proposed facility on public safety and provisions made to minimize the impact on public health and safety: and: 6. The social and economic impacts of the proposed facility on the affected community, including changes in property values, and social or community perception. Interested persons are invited to comment at a Public Hearing to be held on August 20, 2020 at 10:00 am at the regularly scheduled Commission Conference Meeting held at Mobile Government Plaza, 205 Government Street, Mobile, Alabama 36644 PRESS REGISTER July 17, 24, 2020

Notices and Announcements - Legal Notice

MORE INFO›

Published in *The Press-Register/Mississippi Press* 7/17. Updated 7/17.

NOTICE

Commission Announces Special Meeting, Conference Change

The Mobile County Commission will hold a special meeting to receive comments from the public relating to the proposed modifications to the existing landfill facility for EcoSouth Services of Mobile LLC in Axis, Alabama. The public hearing will be held at 10:00 a.m., on Thursday, August 20, in the auditorium of Mobile Government Plaza.

Also note, the Commission conference scheduled for that day, has been cancelled. The Commission will hold a combined Conference and Meeting at 10:00 a.m., on Monday, August 24, in the auditorium of Mobile Government Plaza.

All Commission conferences and meeting are open to the public, however due to COVID-19, limited seating is available in the auditorium. The live stream of conferences/meetings can be watched on the monitors in the atrium and on the county's website, go to: https://www.mobilecountyal.gov/government/livestreaming/

AGENDA

REGULAR MEETING OF THE MOBILE COUNTY COMMISSION

10:00 A. M., September 28, 2020

1)	**APPROVE**	**minutes of the special meeting on August 20, 2020 and regular meeting of August 24, 2020.**
2)	**APPROVE**	**list of claims.**
3)	**HOLD**	**public hearing so any citizen of the County shall be given an opportunity to be heard, for or against any item related to the Statement of Revenues, Expenditures and Changes in Fund Balance Report, for the period ending August 31, 2020. (Act No. 86-414)**
4)	**ADOPT**	**Mobile County Budget for Fiscal Year October 1, 2020 through September 30, 2021.**
5)	**APPROVE**	**amending County Commission Conference and Meeting Schedule to change meeting from Monday, October 12, 2020, to Tuesday, October 13, 2020 at 9:30 A.M.**
6)	**APPROVE**	**renewal of Memorandum of Understanding with the Administrative Office of Courts (AOC) to provide funding for an employee in the Circuit Court Clerk's Office assigned to process matters related to incarcerated persons' to be paid from the Metro Jail's budget, for the period October 1, 2020 through September 30, 2021.**

7) APPROVE renewal of professional services agreement with Peter Rosten, to provide professional computer, networking, and IT services in the amount of $70,000.00, for the period October 1, 2020 through September 30, 2021, for the James T. Strickland Youth Center.

8) APPROVE agreement with Terracon Consultants, Inc. for professional environmental services pursuant to producing Environmental Review Records for the Community Development Block Grant (CDBG), Home Investment Partnerships Program (HOME), and other programs as may be funded with Federal and/or State funds requiring similar environmental review. This contract will be for a one (1) year term commencing on October 12, 2020 and shall expire on October 11, 2021; provided, however, the contract shall be automatically renewable for two (2) additional one (1) year terms for a total of not more than three (3) years.

9) AUTHORIZE advertisement for bids for Project CCP-007-20, 2020 Three Year Floor Covering Replacement/Installation at Mobile County Facilities.

10) APPROVE Change Order #1 for Project MFP-002-17, 2017 Elevator Maintenance and Service for Mobile County Facilities with ThyssenKrupp Elevator Corporation. If implemented, the change will decrease the contract by $9,041.51, and the new contract total will be $307,818.49.

11)	APPROVE	Amendment #1 with Mott McDonald for Project CIP-2019-001M, Renovation of Property at 355 N. Ann Street. This amendment will increase the contract amount by $46,300.00 for additional professional architectural services, and the new contract amount will be $76,300.00.
12)	APPROVE	Host Community Acceptance of the proposed modifications to the permitted landfill facility owned by EcoSouth Services of Mobile, LLC in Axis, Alabama, as recommended by the Mobile County Solid Waste Disposal Authority during their Board Meeting of September 9, 2020.
13)	APPROVE	issuance of request for proposals for part-time veterinarian and licensed veterinary technician for the Mobile County Animal Shelter.
14)	HOLD	public hearing to consider the recommendations from the Small Business Relief Grant Program Committee to award grants to four (4) local businesses that are experiencing financial hardship with the COVID-19 Public Health Crisis located within Mobile County, Alabama, for the purpose of promoting the economic and industrial development of the County in accordance with Amendment No. 772 of the Constitution of Alabama.

15) APPROVE **award of grant funds to the following four (4) businesses in the following amounts that are experiencing financial hardship with the COVID-19 Public Health Crisis within Mobile County, Alabama for the purpose of promoting the economic and industrial development of the County in accordance with Amendment No. 772 of the Constitution of Alabama:**

- **Coastal Hospitality Services, LLC in the amount of $7,500.00, to be used for payroll and rent expenses for three (3) employees for the next four (4) weeks.**

- **Curry's Service Inc. in the amount of $884.00, to be used for utilities expenses for one (1) employee for the next three (3) months.**

- **Pope Tax and Accounting, LLC in the amount of $2,302.00, to be used for payroll and rent expenses for ten (10) employees for the next two (2) months.**

- **Phoenix Forest Products, LLC in the amount of $2,560.00, to be used for payroll and rent expenses for one (1) employee for the next four (4) weeks.**

16) AUTHORIZE **amendment to the sub-recipient agreement with Goodwill Easter Seals of the Gulf Coast, Inc., for Project No. 21-07 of the Gulf of Mexico Energy Security Act (GOMESA) Expenditure Plan, Mobile County Recycle Center Program Support.**

17)	APPROVE	performance contract between the Mobile County Commission and The Bridge, Inc. for FY 20/21 for the provision of the Transitions Continuing Care Program and In-Home Counseling, in the amount of $986,000.00, contingent upon receipt of funding from the Alabama Department of Youth Services.
18)	VOTED AT CONFERENCE	County Commission at its conference on Thursday, September 24, 2020, adopted a Resolution and Order Authorizing the Issuance of General Obligation Refunding Bonds, Series 2020A.
19)	VOTED AT CONFERENCE	County Commission at its conference on Thursday, September 24, 2020, adopted a Resolution and Order Authorizing the Issuance of General Obligation Refunding Warrants, Series 2020B.
20)	VOTED AT CONFERENCE	County Commission at its conference on Thursday, September 24, 2020, adopted a Resolution and Order Authorizing the Issuance of General Obligation Refunding Warrants, Series 2020C.
21)	APPROVE	agency grant agreement with the Alabama Department of Youth Services for FY 20/21, in the amount of $1,025,440.00, for the development of a diversion program and provision of diversion services and authorize the President of the Commission to accept the grant award.

22) APPROVE contract with West, a Thomson Reuters business, to upgrade Legal Department's online/practice solutions/software program called Westlaw Edge to West Proflex, online/practice solutions/software program, which includes West LegalEdenter, professional development solution in the amount of $1,981.92 per month commencing November 1, 2020, for a term of thirty-six (36) months, ending October 31, 2023.

23) APPROVE EFP-234-20, contract with Board of School Commissioners of Mobile County to benefit Olive J. Dodge Elementary School in the amount of $14,700.00, from District 2 funds, to purchase technology equipment.

24) APPROVE CDP-141-20, contract with Restore Mobile, Inc. in the amount of $25,000.00, from District 1 funds, for the continuation of the acquisition and stabilization of brick-and-mortar restoration projects.

25) APPROVE CDP-241-20, contract with Mobile Regional Senior Community Center Foundation, Inc. in the amount of $14,370.00, from District 2 funds, for landscape maintenance.

26) APPROVE EFP-146-20, contract with Lillie B. Williamson High School Parent Teacher Association (PTA) in the amount of $10,000.00, from District 1 funds, to purchase technology equipment and cover the cost of the Parent University online program.

27) APPROVE EFP-321-20, contract with Griggs Elementary School Parent Teacher Association (PTA) in the amount of $54,000.00, from District 3 funds, for technology equipment and playground improvements.

28) APPROVE EFP-322-20, contract with Burroughs Elementary School Parent Teacher Organization (PTO) in the amount of $50,000.00, from District 3 funds, for playground equipment.

29) APPROVE EFP-323-20, contract with Anna F. Booth Elementary School Parent Teacher Association (PTA) in the amount of $2,000.00, from District 3 funds, to purchase audio transmitting equipment.

30) APPROVE EFP-324-20, contract with Dixon Elementary School Parent Teacher Organization (PTO) in the amount of $50,000.00, from District 3 funds, for a new playground.

31) APPROVE CDP-322-20, contract with Tillman's Corner Senior Center in the amount of $25,000.00, from District 3 funds, for operational expenses.

32) CONSIDER taking the following action on bids:

award Bid #46-20, 6-month toilet tissue, roll towels, and folded towels bid for the County Commission, to Bay Paper Company and Imperial Dade.

award Bid #47-20, 3-month groceries bid to be delivered to the James T. Strickland Youth Center, to American Wholesales Grocery d/b/a American Foods for their bid in the amount of $19,708.86, and The Merchants Company d/b/a Merchants Foodservice for their bid in the amount of $57,195.88.

award Bid #48-50, 3-month OEM Printer and fax supplies bid for Mobile County Commission, to Olensky Brothers and Sprot Printer Ribbon LLC.

award Bid #52-20, annual asphalt plant mix bid for the Public Works Department, to John G. Walton Construction Co., Mobile Asphalt Company LLC, and H.O. Weaver & Sons, Inc.

award Bid #56-20, annual dairy products bid for the James T. Strickland Youth Center, to Borden Dairy.

award Bid #63-20, annual traffic sign bid for the Public Works Department, to Vulcan Inc.

award Bid #71-20, annual grounds maintenance bid for Jon Archer Agriculture Center, to Industrial Mowing LLC for their bid in the amount of $1,900.00 per year.

award Bid #77-20, janitorial services bid for Mobile Government Plaza South Tower and Atrium, to Spencer Enterprise, Inc. for their thirty-six (36) month bid in the total amount of $435,705.76.

award Bid #94-20, 6-month recycled asphalt plant mix (RAP) bid for the Public Works Department, to H.O. Weaver & Sons Inc., and as an alternate, Mobile Asphalt Company LLC.

award Bid #105-20, annual janitorial services bid for the James T. Strickland Youth Center Annex, to Spencer's Enterprise Inc. for their bid in the amount of $18,800.00 per year.

award Bid #107-20, annual solar powered LED flashing warning signals and related components bid for the Public Works Department, to K&K Systems Inc.

award Bid #120-20, annual book binding bid for the Revenue Commissioner's Office, to Bob's Book Binding.

award Bid #126-20, annual janitorial services bid for the Building Maintenance Department, to Perfecting That Cleaning Service, LLC for their bid in the amount of $13,482.00 per year.

award Bid #127-20, annual janitorial services bid for Mobile County Sheriff's Office (MCSO) Southside Substation, to Spencer's Enterprise Inc. for their bid in the amount of $12,120.00 per year.

award Bid #128-20, grounds maintenance bid for the Building Inspection Office, to Get It Dunn for their bid in the amount of $1,720.00 per year.

award Bid #130-20, annual janitorial services bid for Mobile County Sheriff's Office (MCSO) Northside Substation, to Perfecting That Cleaning Service, LLC for their bid in the amount of $6,800.00 per year.

award Bid #131-20, grounds maintenance bid for the Building Maintenance Department, to Complete Management Group for their bid in the amount of $3,240.00 per year.

award Bid #132-20, grounds maintenance bid for the Bay Haas Office, to Williams Consultants, LLC for their bid in the amount of $1,780.00 per year.

reject award of Bid #62-20, annual janitorial services bid for the James T. Strickland Youth Center.

reject award of Bid #79-20, annual stripping and waxing of floors bid for the James T. Strickland Youth Center.

33) APPROVE renewal of contract with CDW Government in the amount of $5,335.40, for Symantec Endpoint Protection subscription license and support, for the County Commission.

34) APPROVE CDP-240-20, an allocation of $22,726.80, from District 2 funds toward the purchase of furnishings for the Semmes Senior Center Project MCD2-PF-16-001. The total cost is $52,726.80, and will be allocated as follows:

- Semmes Woman's Club, Inc. $30,000.00
- District 2 funds $22,726.80

Total $52,726.80

35) APPROVE purchase of JMS Database through Dell under the current purchasing Cooperative National Cooperative Purchasing Alliance NCPA Contract 01-42 utilizing drug forfeiture funds in the amount of $37,237.66, for the Sheriff's Office. (This will not require a County purchase order nor utilizing County Commission funding)

36) RECOMMEND 1E approve preliminary and final plat of John Morris Estates. (2 lots, Howells Ferry Road, District 2)

AND

approve preliminary and final plat of Addition To Holdiness Acres. (3 lots, Lockwood Drive and Beechwood Drive, District 3)

AND

approve preliminary and final plat of Kraft Addition to Three Notch Road. (1 lot, Three Notch Kroner Road, District 3)

AND

approve preliminary and final plat of Morris Cove. (4 lots, Winsor Road South, District 3)

AND

approve preliminary and final plat of Replat of Lot 2, William Pope Family Division. (1 lot, Baird Coxwell Road, District 3)

37) 2E **RECOMMEND** **authorize acquisition of property and acceptance of right-of-way deed from the following property owner, for the following project:**

McDonald Road, Project MCR-2016-001, Tract 14

Thomas G. Martin deed

38) 3E **RECOMMEND** **approve Hold Harmless/Indemnity Agreements FY 2020-2021, for the use of County equipment from the following:**

City of Bayou La Batre
City of Citronelle
City of Creola
City of Saraland

City of Satsuma
MOWA Band of Choctaw Indians
Town of Dauphin Island
Town of Mt. Vernon

39) RECOMMEND 4E

approve the below listed annual work orders to furnish labor, equipment and materials as needed for FY 2020-2021 for the following:

Citronelle Tower Radio Site – Work Order No. 24144

Bayou La Batre Radio Tower Site – Work Order No. 24145

Spring Hill Radio Tower Site – Work Order No. 24146

Wilmer Radio Tower Site – Work Order No. 24147

Salco Radio Tower Site – Work Order No. 24148

Seven Hills Radio Tower Site – Work Order No. 24149

Saraland Radio Tower Site – Work Order No. 24150

Burns Radio Tower Site - Work Order No. 24151

Bay Road Radio Tower Site - Work Order No. 24152

MOWA Radio Tower Site - Work Order No. 24153

Zeigler Radio Tower Site - Work Order No. 24154

Animal Shelter - Work Order No. 24155

Jeremiah Denton Airport - Work Order No. 24156

Environmental Enforcement - Work Order No. 24157

Government Plaza - Work Order No. 24158

Building Maintenance - Work Order No. 24159

Sheriff's Department (Other) - Work Order No. 24160

Garage #4 – Work Order No. 24161

Michael Square - Work Order No.24162

Eight Mile Shopping Center - Work Order No. 24163

Theodore Oaks Shopping Center - Work Order No. 24164

Strickland Youth Center - Work Order No. 24165

Bay Haas Building - Work Order No. 24166

Inspection Services - Work Order No. 24167

Food Stamp Office - Work Order No. 24168

Metro Jail - Work Order No. 24169

Sheriff's Barracks - Work Order No. 24170

Sheriff's Deputy Shooting Range - Work Order No. 24171

Sheriff's Dept. Substation/Hwy. 98 - Work Order No. 24172

Grand Bay Library - Work Order No. 24173

Brewer Center Property - Work Order No. 24174

Semmes Senior Center - Work Order No. 24175

Semmes Community Center - Work Order No. 24176

John Archer Center - Work Order No. 24177

Government Plaza Annex - Work Order No. 24178

Tillmans Corner Senior Center - Work Order No. 24179

Theodore Boys & Girls Club - Work Order No. 24180

Grand Bay Senior Center - Work Order No. 24181

GUS Board Property - Work Order No. 24182

County Property at Fallow Road - Work Order No. 24183

Fowl River Dredge Disposal - Work Order No. 24184

North Mobile County Industrial Park - Work Order No. 24185

Sheriff's Dept. Administration - Work Order No. 24186

Sheriff's Dept. Posse Arena - Work Order No. 24187

Signs for Various County Departments - Work Order No. 24188

Community Correction Center - Work Order No. 24189

Mobile Recycle Center Hitt Road - Work Order No. 24190

Bayou Coden Dredge Disposal - Work Order No. 24191

Wilmer Senior Center - Work Order No. 24192

Bay Front Park - Work Order No. 24193

Chickasabogue Park - Work Order No. 24194

John Archer Arena - Work Order No. 24195

River Delta Marina - Work Order No. 24196

West Mobile County Park - Work Order No. 24197

Chunchula Landfill – Work Order No. 24198

Kushla Landfill - Work Order No. 24199

Irvington Landfill - Work Order No. 24200

Mobile County Commission - Work Order No. 24201

Environmental Services - Work Order No. 24202

911 MCCD - Work Order No. 24203

Odd Fellows Park – Work Order No. 24204

Sheriff's Dept. Substation/Theodore - Work Order No. 24205

Various Voting Precinct Locations – Work Order No. 24206

Annual Pecan Festival – Work Order No. 24207

Semmes Athletic Fields – Work Order No. 24208

Semmes Community Area Sidewalks – Work Order No. 24209

Semmes Community Playground – Work Order No. 24210

Various Locations on County Property – Work Order No. 24211

Rosa Lott School – Work Order No. 24212

Grand Bay Volunteer Fire Department – Work Order No. 24213

Housing Authority Property – Work Order No. 24214

City of Bayou La Batre - Work Order No. 24215

City of Chickasaw – Work Order No. 24216

City of Citronelle - Work Order No. 24217

City of Creola - Work Order No. 24218

City of Prichard – Work Order No. 24219

City of Saraland - Work Order No. 24220

City of Satsuma - Work Order No. 24221

City of Semmes - Work Order No. 24222

MOWA Band of Choctaw Indians - Work Order No. 24223

Town of Dauphin Island - Work Order No. 24224

Town of Mt. Vernon - Work Order No. 24225

Volunteer Fire Departments – Work Order No. 24246

Escatawpa Hollow Camp Ground – Work Order No. 24248

Dawes Park – Work Order No. 24249

Voting Machine Warehouse – No. 24251

Mobile County Soccer Complex – No. 24252

40) 5E RECOMMEND approve final plat of Maxwell Meadows, Phase 6. (4 lots, Walter Lee Circle North (Private), District 3), authorize the County Engineer to sign the plat and updating Walter Lee Circle North (Private) in the private road inventory.

This street has been constructed to a paved private road standard and certified by the developer's professional engineer.

41) 6E RECOMMEND approve Project CDP-321-20, furnishing, delivering and placing 10 tons of #57 stone to the Coastal Response Center. The estimated cost is $661.26.

42) 7E RECOMMEND assign Neel-Schaffer, Inc. as the consultant engineering firm to perform preliminary design engineering services for Project MCP-006-20 and Project MCP-009-20, Improvements to Selected Curb Ramps throughout Mobile County's Urban Area to Conform to ADA Requirements.

43) 8E	RECOMMEND	approve right-of-way and/or easement agreements for Tract 4 in the amount of $8,342.00, and Tract 13 in the amount of $280.00 for Project MCR-2018-204, McDavid Road – Grade, Drain, Base and Pave.
44) 9E	RECOMMEND	approve right-of-way and/or easement agreement for Tract 52 in the amount of $250.00, for Project MCR-2018-307, Joyce Circle, Lloyd Road and Williams Road – Grade, Drain, Base and Pave.
45)		Commission announcements and/or comments.
46)	APPROVE	request for motion to adjourn until October 13, 2020.

Deposition of:

Mobile County Commission Hearing

August 20, 2020

In the Matter of:

County Commission Meeting

Veritext Legal Solutions
877.373.3660 | calendar-al@veritext.com | 800.808.4958

SPECIAL MEETING OF THE

MOBILE COUNTY COMMISSION

Mobile Government Plaza

205 Government Street

Mobile, Alabama

August 20, 2020

10:00 a.m.

REPORTED BY:

Jan A. Mann, CSR

Veritext Legal Solutions

260 North Joachim Street

Mobile, Alabama 36603

A P P E A R A N C E S

APPEARING ON BEHALF OF THE
MOBILE COUNTY COMMISSION:
Commissioner Jerry Carl
Commissioner Merceria Ludgood

APPEARING ON BEHALF OF MOBILE COUNTY:
ADAMS AND REESE, LLP
Mr. Jay M. Ross
11 North Water Street, Suite 23200
Mobile, Alabama 36602

ALSO PRESENT:
Mr. Glenn Hodge, County Administrator
Mr. Eddie Kerr, Deputy County Administrator
Mr. Bryan Kegley, County Engineer
Ms. Dena Pollard

August 20, 2020 10:00 a.m.

PROCEEDINGS

COMMISSIONER CARL: Good morning, everyone. Welcome to the planning session of the Mobile County Commission, August 20th, 2020. Dena, do we have any speakers?

MS. POLLARD: Good morning, Commissioners. No, we do not have any speakers.

COMMISSIONER CARL: All right. Fantastic. Glenn.

MR. HODGE: Number one, hold a public hearing to receive comments from the public relating to the Commission providing host community acceptance of the proposed modifications to the existing permitted landfill facility for EcoSouth Services of Mobile, LLC in Axis, Alabama.

COMMISSIONER CARL: So at this time, I would like to open the public hearing. Is there anyone here to speak against the EcoSouth request for the landfill in Axis, Alabama? Is there anyone here to speak for the EcoSouth request for the landfill in Axis, Alabama? We do have one. Come on down or up. I'm sorry.

MR. SANDERSON: Good morning. Thank you for letting me speak. My name is Eric Sanderson and I am with LaBella Associates and I'm representing EcoSouth.

And our consulting firm pulled together the local host approval application for EcoSouth requesting the Commission to approve the acceptance of municipal solid waste as a waste stream and also increase the potential amount of waste received at the landfill from fifteen hundred cubic yards per day to five thousand tons per day.

The local approval from the host government is required to be submitted with the ADEM permit application which handles all the environmental concerns from the site. So we appreciate your consideration of this. And if you have any questions, we would be happy to answer them.

COMMISSIONER CARL: I think we're good.

MR. SANDERSON: Thank you.

COMMISSIONER CARL: Thank you very much.

MR. HODGE: Number two, recommend approving purchase of electronic poll book system from Tenex Software Solutions to include hardware, software, printers, training and related peripherals for an amount up to five hundred and ninety-seven thousand six oh one

and the purchase of a two-year software maintenance and support agreement for years two and three for up to fifty-six thousand one twenty-five per year.

This purchase is made in conjunction with the consent of the Alabama Secretary of State for the November 3, 2020 General Election and anticipated reimbursement pursuant to Covid-19 funding sources.

COMMISSIONER CARL: So move.

COMMISSIONER LUDGOOD: Second.

MR. HODGE: Number three, recommend adopting Resolution Number 1, a resolution approving engineer's maps and reports containing preliminary details in connection with the construction and improvement of certain hard surfaced roads, hard surfaced bridges and surface water drainage facilities and specifying certain details respecting the improvements referred to in the said engineering reports for Mobile County Commission 2020 Transportation Pay-As-You-Go Program and the amount of bonds proposed to be issued therefore.

COMMISSIONER LUDGOOD: So move.

COMMISSIONER CARL: Second.

MR. HODGE: Number four, recommend adopting Resolution Number 2, a resolution to approve publication of notice pursuant to requirements of

Alabama law for the Mobile County Commission 2020 Transportation Pay-As-You-Go Program.

COMMISSIONER LUDGOOD: So move.

COMMISSIONER CARL: Second.

MR. HODGE: Number five, recommend adopting Resolution Number 3, a resolution calling a special election by the electors of Mobile County on the question of the issuance of fifty-eight million principal amount of Pay-As-You-Go road, bridge and drainage facilities bonds of the county and the levy of a tax for payment thereof for Mobile County Commission 2020 Transportation Pay-As-You-Go Program.

COMMISSIONER LUDGOOD: So move.

COMMISSIONER CARL: Second.

MR. HODGE: Number six, Commission announcements and/or comments.

COMMISSIONER CARL: Glenn, we don't have anything at this public hearing we held for the EcoSouth service, we don't have anything to vote on there? It's just a public meeting is all we're --

MR. HODGE: Ed can comment on that.

MR. KERR: No, sir. Per the solid waste management plan, the process that's established in there for host community acceptance, we have to hold the public hearing at least thirty days before action is

made so you will see an action come before the Commission.

MR. KEGLEY: The second regular meeting in September, we'll vote -- the Commission will vote on it then, I think.

COMMISSIONER CARL: All right. Thank you. Do you have anything?

COMMISSIONER LUDGOOD: No.

MR. HODGE: Number seven, approve request for motion to adjourn until August 24, 2020.

COMMISSIONER LUDGOOD: So move.

COMMISSIONER CARL: Second. Everyone have a great weekend.

END OF PROCEEDINGS

C E R T I F I C A T E

STATE OF ALABAMA)
MOBILE COUNTY)

I hereby certify that the above proceedings were taken down by me and transcribed by me and that the above is a true and correct transcript of the said proceedings.

I further certify that I am neither of counsel nor of kin to the parties nor in anywise financially interested in the outcome of this case.

JAN A. MANN
COMMISSIONER - NOTARY PUBLIC
ACCR NO. 321

OFFICE OF MOBILE COUNTY ATTORNEY

JAY M. ROSS
County Attorney
jross@mobile-county.net

MARTHA E. DURANT
Chief Staff Attorney
mdurant@mobile-county.net

JOHN W. ADAMS, JR.
Staff Attorney
jadams@mobile-county.net

November 3, 2020

LINDA D. BAKER
Legal Assistant
lbaker@mobile-county.net

Mr. Blake Holden
Alabama Department of Environmental Management
1400 Coliseum Boulevard
Montgomery, Alabama 36110-2400

RE: Local Approval of Host Community Acceptance of the Proposed Modifications to the Permitted Landfill Facility Owned by EcoSouth Services, LLC in Axis, Alabama

Dear Mr. Holden:

Please be advised that the Mobile County Solid Waste Disposal Authority and the Mobile County Commission have approved the proposed modifications to the permitted landfill facility owned by EcoSouth Services, LLC. The Mobile County Commission acknowledges that Section 22-27-48 of the Code of Alabama (1975), as amended, has been complied with.

Accordingly, the Mobile County Commission does not object to the applicant's request for approval to Alabama Department of Environmental Management. Should you have any questions or need further information regarding this matter, please do not hesitate to contact me.

Sincerely yours,

Jay M. Ross

JAY M. ROSS
County Attorney

Attachment C

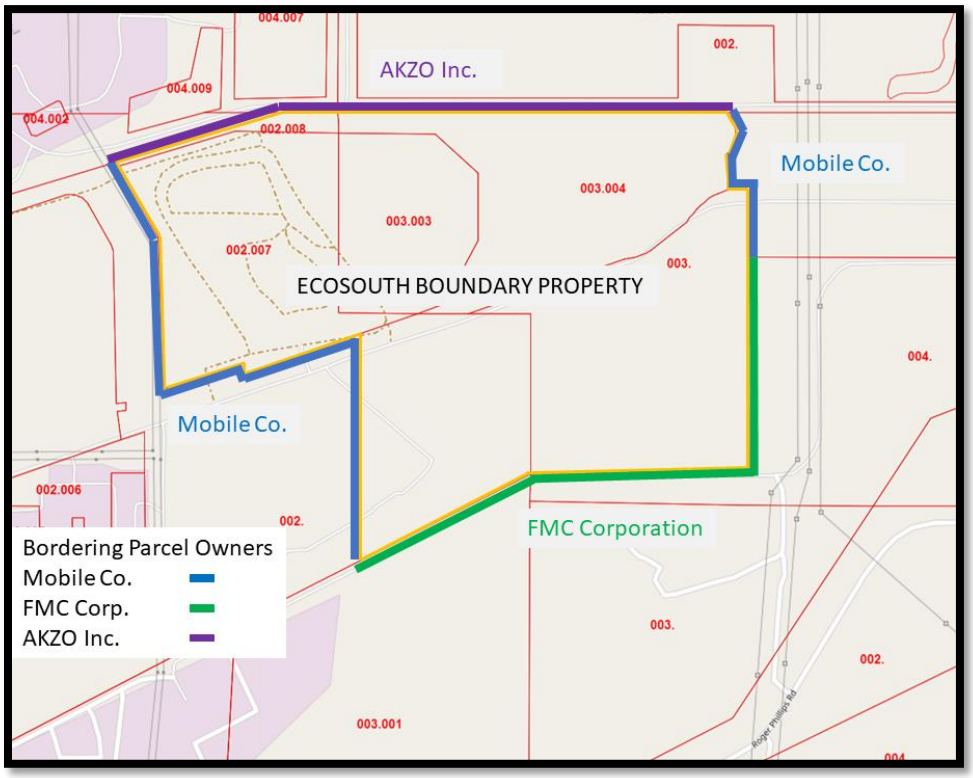
List of Adjacent Landowners

LIST OF ADJACENT PROPERTY OWNERS

AKZO INC
13440 HWY 43
AXIS, AL 36505

FMC CORPORATION C/O CORPORATE ACCOUNTING
2929 WALNUT ST
PHILADELPHIA, PA 98368

MOBILE COUNTY
209 GOVERNMENT ST
MOBILE, AL 36602



Attachment D

Operations Plan

Prepared For:
EcoSouth Services of Mobile, LLC
12945 Highway 43 N
Axis, Alabama 36505

Submitted by:
LaBella Associates
2201 Executive Park Drive, Suite 102
Opelika, Alabama 36801
(804)355-4520

LaBella
Powered by partnership.

OPERATIONS MANUAL
AXIS INDUSTRIAL LANDFILL
Permit No. 49-21

oCTOBER 2020

Project no. 2192290

AXIS LANDFILL

OPERATIONS MANUAL

TABLE OF CONTENTS

LIST OF APPENDICES

I. GENERAL

EcoSouth Services of Mobile, LLC (EcoSouth) currently operates a permitted landfill in Axis, Alabama and has been issued a solid waste permit of 49-21 from the Alabama Department of Environmental Management (ADEM). The landfill provides service to Counties in Florida – Escambia, Okaloosa, Bay, Santa Rosa, and Walton, Counties in Mississippi – Jackson, Harrison, and Hancock, Counties in Alabama – Baldwin, Clarke, Conecuh, Covington, Dale, Escambia, Houston, Mobile, Monroe, and Washington. The Axis Landfill is located on State Route 43 N, approximately 10 miles north of Mobile, Alabama. The existing portion of the facility has been in operation since 1983.

The Operations Manual will serve as the document to describe how the design and construction plan will be implemented throughout the active life of the Axis Landfill and the post-closure care period.

II. SERVICE INFORMATION

The landfill services the following counties: Florida – Escambia, Okaloosa, Bay, Santa Rosa, and Walton, Mississippi – Jackson, Harrison, and Hancock, Alabama – Baldwin, Clarke, Conecuh, Covington, Dale, Escambia, Houston, Mobile, Monroe, and Washington. The current waste stream from EcoSouth is approximately 720 tons/day per six day week with a maximum daily intake rate of 5,000 tons/day.

The landfill is centrally located in southern Alabama with access from State Route 43. The site is in a rural area and trucks transporting waste pass through few moderately populated areas. .

III. PERSONNEL

EcoSouth currently employs a full-time employees who are responsible for the day-to-day operation of the landfill. The equipment operator's duties include but are not limited to:

- Opening the gate across the lone access road to the landfill in the morning and locking the gate closed when he leaves the site at night;
- Inspection and logging random inspections of incoming loads for unauthorized waste;
- Spreading and compacting of wastes;
- Covering of wastes;
- Maintenance of sideslopes;
- Maintenance of erosion/sedimentation control facilities;
- Monitoring of visitors to the site;
- Policing the landfill property including the site entrance and access road; and
- Inspection of the leachate management system.

Volume fluctuations in the waste stream will likely impact the number and type of personnel needed to perform daily activities and operations. The table in Appendix II provides a list of the personnel required at various disposal rates.

Collection of groundwater samples from existing and future monitoring wells will continue to be accomplished on a contract basis with a firm experienced in the collection of such samples. Testing of the water samples will continue to be performed by a qualified laboratory. Reference is made to the Groundwater Monitoring Plan.

IV. OPERATIONAL CONDITIONS

A. SITE ACCESS

1. Hours of Operation

The Axis Landfill is open for business from 7:00 am to 4:30 pm Monday through Saturday. Hours may be extended on Monday through Saturday due to heavy traffic. The landfill operators will remain an additional 30 minutes after the last load of waste is deposited in order to complete the required daily cover and site cleanup. Cover and cleanup operators will remain longer until daily close out and clean up are completed.

Access to the site shall be limited by a lockable gate at the landfill entrance. Access shall be restricted to the hours stated above when an attendant is on duty. The attendant shall permit only those wastes listed in the Waste Control Plan to be disposed of at this site. The attendant should visually inspect wastes on a random basis and should inspect all loads coming from unfamiliar sources. Documentation of these inspections should be kept as specified in the Waste Control Plan.

Roads shall be maintained to insure access to the site by hauling vehicles during windy, wet, or cold weather conditions. Snow removal will occur such that daily operations are not hampered. Anti-skid materials, as appropriate, shall be applied to road surfaces. A separate inclement weather disposal area is not deemed necessary for this facility.

2. Traffic Routing

All traffic shall enter the landfill from State Route 43. The traffic will stop at the scale house for monitoring and recording. Visitor and employee parking is provided adjacent to the existing office and maintenance building.

Traffic shall be routed from the scale house along the access road shown on the drawings. This road shall be constructed and maintained in its original condition to provide access during inclement weather. The vehicles will proceed to the cell being filled or the solidification pad. Access into the cell will be from the main access road. Under no circumstances should traffic be allowed to drive on the side or back slopes of the liner system.

A good road system is a vital part of the smooth operation of a landfill. The goal is to get vehicles to the working face as quickly and safely as possible. The roads should be wide enough to handle two way traffic and sturdy enough to carry heavy trucks in all weather. As with other components of a landfill, proper advanced planning and construction, and maintenance are imperative to a good operation. Permanent roads should be located and constructed to last as long as possible yet minimize the need for temporary roads.

Recommended minimums for roads are 20 feet width. The soil should be placed and compacted with the moisture content close to optimum. A woven road fabric should be placed between the soil and the stone. If the subgrade is subjected to rain before placement of the stone, then the soil should be regraded and re-compacted. The stone should be compacted after placement. An ideal method of compaction is using the pan, or articulated dump truck, during the movement of daily cover. Crushed concrete rubble may be used whenever possible in place of expensive quarried stone. Incoming rubble should be stockpiled in a location far enough away from the working face so as to no create a problem when the fill advances. A good location would be just off of the current lined cell area.

Cleats on landfill compactors and construction tracks on loaders can quickly destroy the best of roads. Travel on the roads by this equipment should be kept to a minimum and totally avoided during wet weather.

Customer traffic entering the landfill must be controlled. Their vehicles must not be allowed to roam freely around the site. Any landfill is a construction site with heavy equipment, truck traffic (typically in a hurry), and drivers unsure of where to go. Several techniques can be used to control the flow of traffic.

a. **Eliminate traffic** which does not need to go to the working face of the landfill. Children must remain in vehicles at all times. The real purpose of controlling traffic is to keep small vehicles driven by inexperienced drivers out of the working face area.

b. **Screen incoming traffic.** The Gate Attendant is the logical person for this task. Incoming vehicles should stop at the scalehouse. The Attendant can screen out unauthorized vehicles and vehicles with unauthorized cargo. Those not permitted into the landfill should be turned away at that point. In addition, the vehicles which have waste requiring special handling, shall be directed to special unloading areas, like the solidification pad. If the Attendant cannot determine that a load is permitted, the vehicle shall park out of traffic until the lead operator or a supervisor can check and approve the load. Whatever the method, any enclosed load that the Gate Attendant does not recognize the hauler, or cannot determine the source of the waste, shall be visually inspected before the vehicle is allowed onto the landfill.

c. **An adequate number of directional signs** should be posted to control the flow of traffic. Signs should be large enough and brightly marked to attract the driver's attention. Signs should be regularly maintained so they can be read. Commercially manufactured reflectorized signs are recommended because they are quite durable and will last many years. Spares should be maintained to replace any signs which may be damaged.

d. **The operator can act as a spotter** when needed. Spotters may be used at the landfill working face during peak periods to direct traffic to the proper dumping area. Keeping the working face small is a technique which will be discussed in a later section of this manual. However, the spotter is important in keeping the working face small. He/she can keep traffic moving by positioning vehicles in the proper unloading area. This can help maintain the size of the face and minimize spreading. In addition the spotter can observe the waste being dumped for unauthorized items and direct that it be removed by the hauler that unloaded it. Also, the spotter can watch for "pickers" and scavengers and direct them away from the landfill. By keeping the unloading operation moving the spotter can set the pace for the entire operation.

The Axis Landfill will not need a full time spotter. However, in some situations, such as during and after heavy rains, it can be beneficial to have an employee act as a spotter to keep the traffic moving while the equipment operator concentrates on waste handling.

When unloading waste at the working face of the landfill there are a few simple "rules of thumb" to remember.

e. **Unload as close to the working face as possible** while still leaving room for the compactor/loader to operate. During periods of heavy traffic, unloading may be done adjacent to the working face by slow vehicles such as pick-up trucks with trailers. When the flow of traffic eases, the waste dumped by the slower vehicles can be pushed by the compactor or the loader to the working face.

f. **Keep pickup trucks and other small vehicles separated** from the larger compactor trucks. A compactor truck will spread its load for up to 5 or 6 feet on each side of the truck when it unloads.

g. **Have drivers pull away from the working face** if they are going to do a truck cleanup or secure covers or doors so as to avoid blocking a space needed by another truck.

h. **The area designated for unloading should be prepared and maintained**. The area should be dragged with a loader or compactor

blade periodically to remove debris and reduce tire punctures. By keeping the unloading area clean the drivers can maneuver more confidently and faster. During wet weather special attention should be given to maintaining the unloading area and providing a gravel turn around area.

3. Inclement Weather

During inclement weather conditions, landfill personnel will maintain all facility roads to be sure they are passable. The disposal area will be maintained so operations can continue during inclement weather conditions.

B. WASTE HANDLING

1. Types of Wastes

The Axis Landfill receives municipal solid waste (MSW), construction, demolition and rubbish waste, as defined by ADEM, industrial waste as approved by ADEM, waste building materials packaging and rubbish resulting from construction repair or demolition operations including masonry, sheet rock, insulation, scrap metal, wood, wood products concrete, soil brick, asphalt, as from untreated materials, brush, land clearing debris, disaster debris, approved wastewater sludges, total petroleum hydrocarbons, automobile fluff (solid waste from automobile shredding) from Alter Metal Recycling located in Mobile County and may temporarily dispose of Remediation Waste from South Alabama Utilities Citronelle Lagoon Closure Project.

If the landfill personnel are not sure if a waste can be accepted at this site, the landfill should refuse to dispose of any questionable wastes until the waste in question is approved by ADEM.

This landfill **specifically prohibits the acceptance and disposal of hazardous waste** as defined by ADEM.

2. Litter Control

Maintaining proper litter control is essential to the operation of a landfill. When working in areas below natural grade, litter is less likely to escape than when working above natural grade. Litter control procedures for the landfill are discussed below:

a. **Whenever possible, unload vehicles at the base of the working slopes** to use the working face itself as a wind screen.

b. **If possible, back vehicles into the wind** when unloading. Unloading against the wind can help to keep the load compacted until the loader can push the waste onto the working face.

c. **If necessary, sprinkle the compacted working face with daily cover** periodically throughout windy days. This will help keep the waste from blowing. Construction or demolition debris can be used on top of paper and light wastes instead of soil until the end of the day.

d. **Fences** can be used to catch some blowing litter. Short fencing such as snow fence is easily erected and moved. If fencing is used for litter control, it should be cleaned daily. Litter against the fence can block air flow through the fence and creating flow patterns over top.

3. Dust, Odor, and Vector Control

Excessive dust can be a nuisance and a hazard. Dust on the access roads can impair or obstruct vision of drivers, potentially leading to accidents. Dust can irritate eyes and lungs. Water can be used to control dust but only to the extent that no saturation or ponding occurs. Maintaining areas for use in wet weather and removing mud deposited on roads will also minimize dust generated.

Mud and dirt on paved roads should be removed daily if possible. A flusher truck or a tractor with a broom are two options to removing dirt. Obviously, water should not be used if freezing weather is occurring or anticipated.

Vectors are any animals that transmit disease. One of the prime functions of a sanitary landfill is to control this potential health threat. In landfills, the most common vectors are flies, rats, and birds. Fly larvae enter along with the waste. Rats and birds are attracted to open refuse. Odors are the result of gases generated during the decomposition of wastes.

The best control method for vectors and odors is the compaction and daily covering of wastes. Compacted cover of at least 6 inches of soil will prevent flies from emerging, provide less of an invitation to rats and birds, and slow the release of odors. The facility may also use alternate covers as approved by ADEM.

Bird control is difficult for most landfills. These are two basic control methods. First, blank cartridges can be fired to scare the birds away. Firing cartridges on this site will usually cause more problems than it can solve by bothering neighbors with the blasts.

The second method is to use artificial calls to frighten birds off. This method has been used to limited success. The artificial calls are of a predatory bird and are used against birds such as pigeons and gulls.

The best control method for vectors and odors is good daily cover and keeping the site policed for blown waste. This will control other vectors such as rodents that birds prey upon.

Surface cracks in daily cover shall be repaired as soon as possible and intermediate cover shall be applied to any area that will not be additionally filled upon for 30 days.

4. Placement of Wastes in State Waters

Placement of solid waste in State waters is prohibited. The facility operation will prevent wastes from being deposited or allowed to enter into State waters.

5. Filling Operations

In general, filling will advance from the high side of the disposal area to the low side: in other words, in a downgradient direction. This eliminates the possibility of trapping water behind the waste deposit in the initial operation of the lined area. Markers will be placed at the edge of the liner, in a manner such as to avoid puncturing the liner, so that filling operations do not extend outside the lined areas and adequate room is left to allow for application of the final cover.

Waste is compacted in lifts approximately 8 feet thick. Waste is dumped at the base of the working face and the material is then spread and compacted. The working face is built out, and six inches of cover material is spread and compacted on top of the fill daily.

The facility may have up to two working faces based on the approved variance from ADEM. The size of the working faces should be only as large as needed for efficient operation and to minimize the volume of soil needed for cover. The working face shall not be extended so far as to prevent completion of a full lift for daily cover application.

As the fill approaches final grade, the slopes shall be constructed to a grade of 3 to 1 prior to prepare for application of the intermediate cover. The table in Appendix II presents the maximum working face area at various disposal rates.

6. Periodic Cleanup

At the end of each week, the access road, drainage ditches, site entrance, and State Route 43 in the vicinity of the site entrance will be policed of any fugitive waste or debris and litter which may have fallen from hauling vehicles transporting wastes to the Axis Landfill.

7. Bird Hazard

This facility is not located within the bird zone of any airport runway. Special measures to reduce bird hazards are not needed.

C. EQUIPMENT

Volume fluctuations in the waste stream will likely impact the number and type of equipment needed to perform daily operations. The table in Appendix II provides a list of the equipment which will be utilized at various disposal rates. As the waste stream increases, additional equipment may be necessary. As the site expands, the access road and haul roads shall be shifted by use of the aforementioned equipment. Stockpiled areas for cover material are easily handled with the scraper pan.

D. COMPACTION AND COVER

1. Compaction

The landfill operator should always strive to achieve the best compaction possible. Compacted refuse, beyond the obvious savings of landfill space, reduces leachate generation, reduces the amount of daily cover needed, and reduces the differential settlement that occurs after the landfill is closed and may damage the final cap.

The objective is not to just push waste into a pile and cover it with dirt. It is to pack the trash as tightly as possible. To do this, the equipment used to compact the waste must be used properly. The slope on the working face should be 3:1. When a crawler tractor is used, greatest compaction occurs when the machine can climb the slope, shredding the waste as it climbs. When a landfill compactor is used, the slopes should be flattened to the order of 4:1 to 5:1 to take advantage of the weight of the machine for greater compaction and increased speed of passes over each lift of waste.

Weather will play a large role to determine if steeper slopes are obtainable. Wet wastes will be difficult for some equipment to climb. In such cases, the working slope should be flattened until operations can proceed.

When pushing the trash the loader operator should not attempt to push such a large amount that the machine bogs down. Full truck loads should be broken down into three bucket loads or two foot thick loose lift before compacting. The equipment should make four to six passes on each layer to achieve proper compaction. Beyond this number, the additional compaction benefit is usually outweighed by the operating expenses. Large bulky items should be crushed with the loader bucket before being worked into the base of the working face.

2. Lifts

Waste fill shall be spread in layers 2’ thick, before being compacted with a compactor or tracked equipment. A minimum of four to six passes shall be made immediately with the compaction equipment upon placement of each layer of refuse. Refuse shall be built up in lifts of 8' in thickness during each working day in order to avoid waste of cover material.

3. Daily Cover

Daily cover may consist of a six-inch layer of compacted soil or any approved alternate cover applied over all solid waste at the end of the work day. Any of the on-site or locally available soils are suitable for daily cover as long as they do not contain organic material. The purpose of the daily cover is to provide a layer of inert material which will prevent the passage of flies, rodents, other pests and odors. It also helps to decrease fires from spreading. Should a fire start on the landfill the amount of trash which can burn is limited to that which is uncovered.

Stockpile areas should be planned in advance to limit the number of times the material must be moved. At least three days of cover material should be available in the stockpiles. The stockpiles should be located adjacent to the current fill for efficient use of the equipment. If stockpiled off the landfill, soil stockpiles should be surrounded with proper erosion control measures to prevent loss of cover material. The cover material stockpiled should be used before the fill advances too far. This avoids leaving small piles scattered over the site. Before depleting the stockpile, the location for the next pile should be determined and stockpiling should begin for another three days' worth of daily cover material. After each stockpile is used the area shall be graded to drain. During periods of wet weather, cover may have to be moved by loader and trucks, from the main stockpile site.

4. Weekly Cover/Fire Breaks

Weekly cover is applicable for debris landfills and is not needed for this facility.

5. Intermediate Cover

Intermediate cover is applied to any part of the fill surface which will not be used for more than 30 days or has reached final elevations. Normally, this is the top surface of the waste in place in the area being worked. Intermediate cover consists of six inches of soil applied over the six inches of daily cover. Since the intermediate cover will usually be the travel surface for later lifts, it should be a material which can support vehicles in all sorts of weather. Intermediate cover may be placed with the daily cover or later depending on the operating circumstances. Intermediate cover should be inspected on a weekly basis and any eroded or cracked areas should be repaired. Temporary seeding is recommended if the intermediate cover area is not to be used in less than 30 days.

6. Final Cover

Final cover is placed over the finished fill after fill operations are completed and waste placement is not expected to occur and in accordance with ADEM Administrative Code Division 13.

Final cover consists of twelve inches of intermediate cover, a synthetic membrane, a geocomposite drainage layer, a minimum of eighteen inches of infiltration soil, and six inches of soil that will support vegetative growth on the cover and provide protection for the synthetic membrane. Placement of final cover should be monitored for compaction and to insure the correct material is used and placed to the correct depths. Placement of final cover will be in accordance with the approved closure plan that has been developed as a separate document.

7. Vegetative Cover

Vegetative cover will be applied to areas that have received final soil cover. The vegetative cover will be grasses that are locally available and common. No special landscaping for buffer, screening, or aesthetics is planned. Planting schedules will be in accordance with common practice in the area. The seed mixture will be in accordance with recommended mixes included in the Alabama Handbook for Erosion Control, Sediment Control and Stormwater on Construction Sites and Urban Areas and recommendations by the local agricultural extension office. Within four months of placement, the vegetative cover shall be established.

8. Stockpiles

A minimum of three days of cover soil shall be stockpiles adjacent to the working face. Since the borrow source for this landfill is adjacent to the landfill cells, and there is a significant surplus of cover material on site, maintaining cover soil near the working face should not be difficult. Ideally, these stockpiles should be within 100 feet of the working area and whenever possible, they should be on top of the currently active lift, requiring either a short hauling distance or just pushing the cover down the working face. The stockpiles should be surrounded by appropriate erosion control measures (silt fence) if located off the landfill.

The table in Appendix II projects the amount of daily cover soil material needed to be stockpiled at various disposal rates.

E. SAFETY

1. Safety Plan

Proper equipment operating instructions and techniques will be provided by the equipment manufacturer upon purchase of equipment. The following measures will be followed at the Axis Landfill to minimize the occurrence of injuries to personnel and damage to equipment.

a. The site will be accessible only to the EcoSouth personnel, authorized consultants, contractors, and customers, and State inspectors only when an authorized operator is on duty. At all other times, the entrance to the site will remain secured with a locked gate across the access road to preclude unauthorized vehicles from entering the site. All visitors to the site are required to check in at the scalehouse.

b. Personnel authorized to operate the site will be provided training regarding the characteristics of the waste, the requirements of the permit, this Operations Plan for the site, and the proper operation of equipment used at the site.

c. The site will be operated Monday through Saturday during the daylight hours only.

d. Equipment on site will be maintained and serviced on a routine basis.

e. A copy of this Operations Plan will be maintained at the site.

f. Drivers of incoming loads of waste will coordinate with the site operator for the disposal of each load.

g. The route from the entrance of the site to the working face of the fill area will be clearly marked.

h. Roads on the site to the leachate loadout, the sediment pond, and the working face will be maintained and passable in all weather.

i. A first-aid kit will be located in the scalehouse and shop areas.

j. Fire extinguishers will be located in the personnel shelter and on each piece of heavy equipment assigned to the site.

2. Fire Control Plan

Though no burning of waste should be permitted, fires can occasionally start through carelessness or when hot waste is brought into the landfill.

When an employee encounters a fire that is out of control, he/she shall inform the facility manager. If the facility manager is not available, some personal judgment by the most senior person available shall be required to determine whether to fight the fire with the available personnel and equipment. The possibility of toxic emissions should be considered. The Fire Department shall be contacted if there is any doubt that a fire has been extinguished.

Although open burning is not permitted on the landfill, fires can occasionally start in the disposal area. In preparation for the possible occurrence of small fires within the landfill disposal area, each piece of equipment should be fitted with at least two multi-purpose dry chemical 10 lb. fire extinguishers. Whenever smoke is noticed by landfill personnel or customers, the source should very carefully be investigated. If detected early, the hand held fire extinguishers should stop most small fires. Equipment should be parked off of the working cell and disposal activities should be halted while the fire is extinguished. The Fire Department can provide training in proper use of fire extinguishers. This training is highly recommended since proper fire extinguisher technique is not obvious and must be learned.

For fires too large to fight with hand held extinguishers, two techniques may be used. If the fire is relatively small and there are few vehicles around, the operator may attempt to put out the fire. Equipment used in this procedure must be free of hydraulic and fuel leaks and the belly pan must be fairly clean or the equipment may catch fire. All equipment used on the landfill should have built-in fire suppressant systems in the engine compartment. This includes earthmoving equipment as well as the actual waste handling equipment. To combat the fire, the burning waste must be pushed out of the working face. The operator must position himself between the fire and the waste and, using the blade, push to isolate the burning waste. Obviously, the quicker this is done, the smaller the pile will become. Once the burning waste is separated from the working face, the operator should spread out the waste into a thin lift. Dirt should be spread on the surface of the lift and, using the dirt as a cushion, the operator should walk his machine over the burning waste to smother the fire. Once the fire appears out the operator should check it by uncovering the waste. If the fire is still burning, the above procedure should be repeated until the fire is fully extinguished.

For larger fires, the Fire Department should be called. A coordinated effort by the landfill staff and the Fire Department can extinguish a landfill fire quickly. In this procedure, the waste is separated from the working face and spread into a thin lift as previously described. The loader operator should use the loader bucket to lift the waste a few feet as he passes over the waste. The Fire Department should then spray the waste with water as it is lifted. This allows the waste to be wetted thoroughly rather than only on the surface. Several passes will likely be required to extinguish the fire. It is recommended that the loader used in this circumstance have an enclosed cab. A compactor can also be used for this procedure, but will typically be slower.

Fires occurring in the operations area shall be extinguished with water or fire extinguishers. When an employee uses one of the fire extinguishers, he/she is responsible for reporting the incident to the facility manager so that the extinguisher may be refilled.

If fires are detected in the buildings on site, personnel should immediately evacuate the building and from a safe location telephone the fire department.

All landfill employees should be instructed in the fire fighting techniques. The facility manager should review the fire fighting procedures with the Fire Department to gain their cooperation and to avoid confusion when they arrive at the landfill.

In case of fires after hours when landfill personnel are not present, authorized representatives of the Fire Department should be provided keys to the entrance gate. They should also be given permission to cut the lock if necessary to gain entry to the facility.

3. Communications System

A telephone is located in the scalehouse building at the landfill entrance. If necessary, this phone can provide communications for an emergency.

V. INSPECTION PLAN

Maintenance inspections will be performed by the landfill personnel to ensure proper operation and compliance with regulations. Daily inspections will be performed for road conditions, cover conditions, operating equipment, and blowing litter. Weekly and monthly inspections will be performed as described in Appendix I of this manual. Any deficient item found during the inspection will be repaired to working condition or replaced in a timely manner.

The equipment operator/attendant will visually inspect waste loads for unauthorized materials prior to disposal and will be responsible for identifying loads from potentially questionable sources, as outlined in the Control Program for Unauthorized Waste provided in Appendix IV.

Equipment operators will be watchful for containers of suspicious nature at all times. Containers to be watched for are drums, barrels, cases of liquids, storage tanks or other containers capable of storing hazardous or toxic liquids.

Any person attempting to dispose of any of the above-listed items will be asked to stop and wait until the load is checked. The landfill supervisor or, in his absence, the person in charge will be notified. The load will be checked by the person in charge. Under no circumstance will it be landfilled without clearance. In all cases, obtain as much information as possible about the individual and the vehicle. Record such items as: vehicle description, license number, and company name, description of the individual, the date and time.

Any employee witnessing disposal of any questionable material will obtain as much information as possible and report it to the landfill supervisor or, in his absence, the person in

charge. Any person requesting information regarding the disposal of hazardous or toxic waste will be referred to the facility manager.

VI. CONTROL AND MONITORING OF LIQUIDS AND LANDFILL GAS

A. LEACHATE

Leachate will be collected by a network of perforated piping and will flow via said collection lateral pipes to collection headers. From the headers, the leachate will flow to a collection sump. The sump will be pumped to the load out manhole near the northeast corner of Phase 1. It is not anticipated that any treatment of the leachate will occur on-site but that these liquids will be transported off-site to an existing waste water treatment plant for disposal. Cleanouts are provided on the leachate collection pipes to afford access to this line for inspection as well as cleaning.

B. GROUNDWATER

Groundwater monitoring will be performed in accordance with the facility's groundwater monitoring plan. Landfill personnel will be aware of the location of all groundwater monitoring wells to avoid accidentally damaging them with equipment. The integrity of the groundwater monitoring wells and pads will be inspected once a month. Any damage will be repaired appropriately.

C. LANDFILL GAS

The Landfill Gas Management Plan developed for this site addresses the venting and control of decomposition gases necessary to protect the facility cap and to prevent migration into facility structures or beyond the facility boundary. Refer to "Landfill Gas Management Plan" for management details.

D. EROSION CONTROL SYSTEMS

Facility personnel will maintain all erosion and sediment control structures including, but not limited to, stormwater conveyance channels, pipes, drainage berms, slope drains, and the sediment basins. These structures will be inspected monthly and after severe storm events for signs of erosion, wash outs, excessive sediment buildup or other damage. Heavily eroded areas will be repaired and seeded. Excessive silt deposits will be removed.

VII. RECORDS

Records of the loads of solid waste brought to the facility for disposal will be kept at the landfill office. These records or files also will contain the records on groundwater monitoring and the analyses that are part of that. In addition, a record of leachate pumped from the site will be maintained.

VIII. CLOSURE AND POST-CLOSURE

For complete details regarding closure and post-closure activities, refer to the Closure Plan and Post-Closure Plan.

END OF OPERATIONS MANUAL

APPENDIX I

MAINTENANCE INSPECTION FORM

Maintenance Inspection Form

SYSTEM	COMPONENTS	FREQUENCY	TYPE OF INSPECTION
Leachate Management Facilities	Cleanouts	Monthly	Visual
	Leachate Laterals	As necessary	--
	Leachate Forcemain	Biannual	Visual
	Valves	Monthly	Visual
	Loading Area	Monthly	Visual
	Pump Stations and Components	Weekly	Visual/Mechanical
Groundwater Monitoring System	Monitoring Wells	Monthly/Quarterly	Visual/Mechanical
	Observation Wells	Monthly	Visual
Landfill Gas Monitoring System	Boundary Probes	Monthly	Visual
	Monitoring Equipment	Quarterly	Calibrate
Operating Equipment	Loaders	Daily/Weekly/Monthly	Visual/Mechanical
	Dozers	Daily/Weekly/Monthly	Visual/Mechanical
	Compactors	Daily/Weekly/Monthly	Visual/Mechanical
	Scrapers	Daily/Weekly/Monthly	Visual/Mechanical
	Portable Pumps	Monthly	Visual/Mechanical
Erosion and Sedimentation Control Facilities	Rock Lined Channels	Monthly/Storm Event	Visual
	Ditches	Monthly/Storm Event	Visual
	Culverts	Monthly/Storm Event	Visual
	Sedimentation Basins	Monthly	Visual
	Overflow Spillways	Monthly	Visual

	Discharge/Outlets	Monthly	Visual
	Terraces/Slopes	Monthly/Storm Event	Visual
Safety/Security Devices	Gate (Access)	Daily	Visual
	Fire Extinguisher	Monthly	Visual
	First Aid Kits	Monthly	Visual
	Communications	Daily	Mechanical

APPENDIX II

LANDFILL EQUIPMENT, PERSONNEL, WORKING FACE SIZE AND WEEKLY COVER SOIL NEEDS

Typical Landfill Equipment, Personnel, Working Face Size, and Weekly Cover Soil Needs By Daily Intake Rate

Range of Daily Intake Rate (tons/day)	Equipment		Personnel per Shift	Surface Area of Working Face (sf)	Three Days Cover Soil Needs (cubic yard)
	Equipment Type and Use	Operating Units			
0-1,000	Dozer (spread refuse and cover, compact waste, berm construction) (backup equipment) Compactor (spread, compact waste and cover material) Scraper pan (haul cover material) Loaders (optional)	1 1	Site Supervisor: 1 Operators: 1 Gate Attendant: 1	Lift Height= 10' SAWF = 1,350 sf	175 cy
1,000-2,000	Dozer (spread refuse and cover, compact waste, berm construction) (backup equipment) Compactor (spread, compact waste and cover material) Scraper pan (haul cover material) Loaders (optional)	2 1	Site Supervisor: 1 Operators: 2 Gate Attendant: 1	Lift Height= 10' SAWF = 2,700 sf	315 cy
2,000-3,000	Dozer (spread refuse and cover, compact waste, berm construction) (backup equipment) Compactor (spread, compact waste and cover material) Scraper pan (haul cover material) Loaders (optional)	3 1	Site Supervisor: 1 Operators: 3 Gate Attendant: 1	Lift Height= 10' SAWF = 4,050 sf	450 cy
3,000-5,000	Dozer (spread refuse and cover, compact waste, berm construction) (backup equipment) Compactor (spread, compact waste and cover material) Scraper pan (haul cover material) Loaders (optional)	3 1	Site Supervisor: 1 Operators: 3 Gate Attendant: 1	Lift Height= 10' SAWF = 5,400 sf	575 cy

Notes:

1. Compactor(s) will be CAT 826 or equivalent. Dozer(s) will be CAT D5, CAT D8 or equivalent. Track Loader(s) will be CAT 963 or equivalent. Rubber Tire Scrapers will be Terex TS14B or equivalent.
2. Equipment and manpower needs are based on operating Monday through Saturday during daylight hours.
3. Intake Rate reflects in-place compacted volume.
4. Cover soil needs were derived using a waste density of 1,200 lbs/cy, with a lift height of 10', and 9" (loose) daily cover thickness (resulting in a 6" compacted daily cover thickness.

APPENDIX III

WASTE CONTROL PLAN

Attachment E

Groundwater Monitoring Plan

GROUNDWATER MONITORING PLAN

AXIS INDUSTRIAL LANDFILL
12950-A HIGHWAY 43 NORTH
AXIS, MOBILE COUNTY, ALABAMA 36505
PERMIT NO.: 49-21
PROJECT NO.: 16-050315.16

PREPARED FOR:

ECOSOUTH SERVICES OF MOBILE, LLC
P.O. BOX 220
AXIS, ALABAMA 36505

OCTOBER 27, 2016
REVISED JANUARY 26, 2018

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Lori K. Norton, P.G.
Project Geologist

William W. Cooch, P.G.
Principal Geologist

GEOLOGIST CERTIFICATION

I certify under penalty of law that I am a Registered Professional Geologist, licensed to practice in the State of Alabama and experienced in conducting hydro-geological investigations. The information submitted herein, to the best of my knowledge and belief is true, accurate and complete.

1/26/2018

William W. Cooch, P.G.
Principal Geologist
Highland Technical Services, Inc.

Date

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FIGURES

APPENDICES

1.0 PURPOSE AND SCOPE

EcoSouth Services of Mobile, LLC (EcoSouth) has prepared this Groundwater Monitoring Plan (Plan) as part of a planned permit modification for Solid Waste Facility Disposal Permit Number 49-21 for the Axis Industrial Landfill located in Axis, Mobile County, Alabama. This Plan has been prepared in accordance with the Alabama Department of Environmental Management (ADEM) Administrative Code 335-13 and the US Environmental Protection Agency (EPA) Coal Combustion Residue (CCR) Rule 40 CFR Part 257. The following is a discussion of the site history, environmental setting, description of the monitoring requirements, and activities to be conducted over the life of the permitted facility.

2.0 SITE HISTORY AND STATUS

The Axis Industrial Landfill (Permit No.: 49-21) is located at 12950-A Highway 43 North in Axis, Alabama. The landfill is located in Sections 1 and 18, Township 1 South, Range 1 East in Mobile County, Alabama. The site location is displayed on Figure 1.

EcoSouth was issued Permit Number 49-21 for the Axis Industrial Landfill by the ADEM on April 5, 2016 (most current). The permitted facility consists of approximately 70.3 acres with 46.8 acres approved for disposal. The landfill is used for the disposal of construction, demolition and rubbish waste, as defined by ADEM, and industrial waste streams approved by ADEM; including waste building materials, packing, and rubbish resulting from construction, repair or demolition operations including masonry, sheet rock, insulation, scrap metal, wood, wood products, concrete, soil, brick, asphalt, ash from untreated materials, brush, land clearing debris, disaster debris, approved wastewater sludges, total petroleum hydrocarbons and automobile fluff (solid waste from automobile shredding) from Alter Metal Recycling located in Mobile County. Cells 1 through 8 consists of 23.85 acres of unlined landfill used for the disposal of construction debris and inert industrial waste. Cell 9 is an existing lined cell used for the disposal of special industrial wastes and Cells 10 and 11 are permitted as future lined disposal cells.

This Plan has been prepared in anticipation of the ADEM approving the facility for the disposal of CCR, as such, the groundwater monitoring requirements presented herein include the analytical parameters required by 40 CFR Part 257 Appendix III. The CCR parameters include boron, calcium, chloride, fluoride, pH, sulfate and total dissolved solids (TDS).

3.0 ENVIRONMENTAL SETTING

3.1 SITE GEOLOGY AND HYDROGEOLOGY

According to geologic information published by the Geological Survey of Alabama, the site is underlain by Alluvial, coastal, and low terrace deposits of Holocene Age. These deposits are very recent and typically consist of very pale-orange to grayish-orange; varicolored fine to coarse quartz sand containing clay lenses and gravel. The gravel present in this formation is composed of quartz and chert pebbles.

According to the *Hydrogeology and Vulnerability to Contamination of Major Aquifers in Alabama: Area 13*, 2000, prepared by the Geological Survey of Alabama (GSA), the site is located in the East Gulf Coastal Plain section of the Coastal Plain physiographic province and within the recharge area for the Watercourse Aquifer which has also been referred to as the Beach Sand Aquifer and the Alluvial-coastal aquifer. The Watercourse Aquifer is hydraulically connected to the underlying Miocene-Pliocene Aquifer and is considered unconfined. The aquifer is recharged throughout its outcrop by water that infiltrates the overlying residual soils. Groundwater in the aquifer typically occurs in beds of sand and gravel that originate from coastal deposits, and buried river sediments which are surrounded by silty and clayey sediments.

3.2 SURFACE WATER

Surface water from the Axis Industrial Landfill generally flows west and north from higher topographic elevations on the landfill towards an unnamed tributary of Cold Creek located approximately 0.20 miles northwest of the landfill's property boundary. The unnamed tributary flows north toward Cold Creek which then meanders east towards the Mobile River, located approximately 0.80 miles east of the site.

4.0 MONITORING WELL NETWORK AND GROUNDWATER FLOW

4.1 MONITORING WELL NETWORK

Currently, the Axis Industrial Landfill maintains five (5) monitoring wells (MW-1, MW-2, MW-4, MW-6, and MW-7) for monitoring shallow groundwater beneath the site. Monitoring wells MW-1 and MW-4 are designated as the upgradient (background) wells for groundwater quality comparisons. Monitoring well MW-1 is located along the western boundary of the landfill and MW-4 is located along the northeast boundary of the property. Wells MW-2, MW-6, and MW-7 are designated as the compliance wells for the facility. Compliance well MW-2 is located along the northwestern boundary of the property; MW-6 is located along the eastern boundary of the property; and MW-7 is located along the southern property boundary. The monitoring well locations are shown in Figure 2.

Based upon interpretation of groundwater flow direction to the northeast during recent groundwater monitoring events, Highland Technical Services, Inc. (HTSI) is of the opinion that monitoring well MW-7 would better serve as the background monitoring well for statistical evaluations.

It should be noted that the current Permit indicates that MW-4, which is located at the northeast property boundary, is one of the facility's designated background monitoring wells. Based on the groundwater elevation data collected during recent monitoring events, MW-4 is the most downgradient well in the existing monitoring well network. While the Permit indicates that MW-4 should be used for background comparisons for statistical analysis, HTSI is of the opinion that the resulting statistical evaluation using well MW-4 as background would yield inaccurate results. As such, HTSI recommends MW-7 be used for background comparisons for all future monitoring events for statistical analysis of groundwater data.

The available well construction details for monitoring wells at the site are included in Table 4.1 on the following page.

TABLE 4.1 – MONITORING WELL CONSTRUCTION DETAILS

WELL ID	TOP OF CASING ELEVATION (FT-AMSL)	MEASURED TOTAL DEPTH (FT-BTOC)	CASING DIAMETER	SCREENED INTERVAL
MW-1	38.28*	71.80	4-inch	NA
MW-2	46.17	72.39	4-inch	NA
MW-4	47.30	81.48	4-inch	NA
MW-6	47.60	86.77	4-inch	NA
MW-7	49.26**	85.09	4-inch	NA

ft-amsl – feet above mean sea level
ft-btoc – feet below top of casing
*MW-1 - resurveyed on December 19, 2007 following well repair activities
**MW-7 - correct top of well casing (incorrectly listed as 47.26 ft-amsl in current Permit)
NA – Not Available

4.2 GROUNDWATER FLOW

During each semi-annual monitoring event, static water level depth will be measured in each of the monitoring wells prior to purging. For reference, groundwater elevations measured during the September 2017 sampling event ranged from 13.15 to 15.69 feet above mean sea level (ft-amsl). Groundwater elevation data is included in Table 4.2 below. A map depicting the potentiometric surface and flow direction for shallow groundwater beneath the site at the time of the September 2017 event is provided as Figure 2.

TABLE 4.2 - GROUNDWATER MEASUREMENTS AND ELEVATIONS – SEPTEMBER 18, 2017

WELL ID	TOP OF CASING ELEVATION (FT-AMSL)	MEASURED TOTAL DEPTH (FT-BTOC)	MEASURED DEPTH TO GW (FT-BTOC)	GROUNDWATER ELEVATION (FT-AMSL)
MW-1	38.28	72.15	25.08	13.20
MW-2	46.17	72.97	33.02	13.15
MW-4	47.30	81.50	33.91	13.39
MW-6	47.60	85.20	33.83	13.77
MW-7	49.26	85.10	33.57	15.69

ft-btoc = feet below top of casing
ft-amsl = feet above mean sea level
GW = Groundwater

The direction of groundwater flow beneath the Landfill at the time of the September 2017 groundwater monitoring event was generally to the northeast and northwest with a calculated hydraulic gradient (dh/dl) of approximately 0.00109 feet per foot (ft/ft). Groundwater flow velocity in the subsurface materials underlying the Landfill was calculated using the formula V = (K) (dh/dl)/ne, where K is hydraulic conductivity and ne is effective porosity. Based on the

characteristics of the underlying formation, representative hydraulic conductivity and effective porosity for fine to very coarse quartz sand and clay and clayey gravel are estimated to be 1.0 x 10^{-3} centimeter per second (cm/sec) and 25%, respectively (Freeze, p. 29 and 37). Using an estimated hydraulic conductivity of 1.0 x 10^{-3} cm/sec, an effective porosity of 25%, and the calculated hydraulic gradient of 0.00109 ft/ft, the groundwater flow rate was estimated to be approximately 4.51 feet per year (ft/year). An example of the flow rate calculations is included as Appendix A.

The groundwater surface elevation will be measured at each of the monitoring wells at the landfill each time the wells are sampled and at least semi-annually throughout the active life of the facility, and during the post-closure care period. The groundwater surface elevation will be used to determine the flow rate and direction of groundwater flow beneath the site during each monitoring event. Based on historic groundwater data collected over the life of the subject facility, the groundwater flow direction beneath the facility is generally to the north-northeast and northwest.

Since the calculated gradient and flow rate are derived under the assumption that groundwater flow occurs through a homogeneous, isotropic, porous medium, these calculations should only be considered a rough estimate of actual groundwater flow. This seepage velocity does not take into account the effects of vertical flow gradients, flow along secondary fracture pathways, or other conditions caused by lateral heterogeneity.

It should be noted that the potentiometric surface elevation map (Figure 2) is a model of the groundwater potentiometric surface based upon available measured groundwater levels and should be considered only a general depiction of groundwater flow direction for the local area of the landfill. While the potentiometric surface typically parallels surface topography, the accuracy of the potentiometric surface map is limited to available data from the control points and may conflict with surface topography and/or the actual groundwater potentiometric surface at certain locations

5.0 ESTABLISHING BACKGROUND CONCENTRATIONS

In accordance with Part 257.94(b), new CCR landfills require that a minimum of eight independent samples be collected from each background well and analyzed for the constituents listed in Part 257 Appendices III and IV during the first six months of sampling. The parameters to be analyzed in establishing background concentrations are included in Table 5.0 below.

5.0 – PARAMETERS REQUIRED BY CCR FOR ESTABLISHING BACKGROUND CONCENTRATIONS

APPENDIX III PARAMETERS	APPENDIX IV PARAMETERS
Boron	Antimony
Calcium	Arsenic
Chloride	Barium
Fluoride	Beryllium
pH	Cadmium
Sulfate	Chromium
TDS	Cobalt
	Fluoride
	Lead
	Lithium
	Mercury
	Molybdenum
	Selenium
	Thallium
	Radium 226 and 228 combined

TDS - Total Dissolved Solids

Past groundwater monitoring events have included the majority of the constituents listed in the Appendix IV list of 40 CFR Part 257. Therefore a sufficient dataset for those parameters is available for use in the statistical analysis required by 40 CFR Part 257. Parameters for which the facility currently had no background information included the following:

- All Appendix III Parameters
- Lithium
- Molybdenum
- Radium 226 and 228 combined

As such, eight replicate samples were collected from on the following dates:

- November 3, 2016 (all constituents except lithium and molybdenum)
- December 1, 2016
- December 22, 2016
- January 12, 2017
- February 2, 2017
- February 22, 2017
- March 10, 2017
- April 7, 2017
- April 21, 2017 (lithium and molybdenum only)

It should be noted that during the first event completed on November 3, 2016, analysis was not completed for lithium and molybdenum; therefore, HTSI mobilized to the site on April 21, 2017 to collect the eighth required sample for these two constituents.

The results of the CCR replicate sampling events were submitted to the ADEM in a *CCR Groundwater Monitoring Report* dated July 21, 2017.

6.0 GROUNDWATER SAMPLING AND ANALYSIS

Groundwater samples will be collected at the Axis Industrial Landfill on a semi-annual basis throughout the active life of the facility and the post-closure care period in accordance with ADEM Administrative Rule 335-13-4-.27. Unless otherwise specified by the ADEM, groundwater sampling will be conducted during March and September of each year.

During the semi-annual groundwater monitoring events, and prior to sample collection, static water level measurements will be taken in each monitoring well using an electronic water-level indicator to determine the depth of water and the measured water level as it relates to the screened interval of the well.

All samples will be collected using either a peristaltic or bladder pump following low-flow sampling protocols. In order to collect water in the screened interval, low-flow purging will be

conducted by situating the pump-intake in the middle or slightly above the middle of the screened interval of the well. Since the screened interval is unknown, the pump intake will be set at five feet above the bottom of the well anticipating that each well is constructed with a 10-foot screen.

The intake velocity of the pump will then be set to a flow rate that minimizes draw-down inside the well casing, thereby reducing turbidity and agitation of the water column in the well in order to prevent volatilization of volatile organic compounds (VOCs), if present, and the introduction of suspended sediment into the water column. The pumping rate will be maintained between 200 to 500 milliliters per minute and the water level will be monitored every three to five minutes to determine steady-state flow. An attempt will be made to maintain a draw-down of one foot or less during purging.

Prior to sample collection, groundwater will be purged from each well at a rate approximately equal to the well recharge rate. The turbidity, temperature, specific conductance, dissolved oxygen (DO), oxidation-reduction (redox) potential, and pH of groundwater will be monitored and recorded every three to five minutes as the wells are purged. Samples will be collected when stabilization of these indicator parameters is recorded in three consecutive readings. The three successive readings should be within ± 0.1 for pH, ± 3% for conductivity, ± 10 mv for redox potential, and ± 10% for turbidity and DO. DO and turbidity usually require the longest time for stabilization. Conductivity, DO, and turbidity are the most sensitive parameters. The above stabilization guidelines are provided as estimates and may not always be achieved. Samples will be collected after field indicator parameters have stabilized and will be placed directly into the laboratory containers with minimal agitation to minimize volatilization of chemicals of concern (COCs). The field indicator parameters will be recorded for each well on a field sampling log. An example field sampling log is included as Appendix B. Data collected in the field during sampling activities will be documented on a Monitoring Well Sampling Record (MWSR). An example MWSR is included as Appendix C.

Groundwater samples will be obtained by filling appropriate laboratory-prepared sample containers directly from the discharge tubing connected to the pump or from disposable polyethylene bailers. New tubing will be used for each sample, and the pump will be decontaminated prior to use at each sample location. Subsequent to sample collection, the containers will be labeled and placed in a cooler with ice in an effort to achieve and maintain a

sample temperature of 4°C. In the event one or more wells is purged dry, those wells will be allowed to recharge sufficiently prior to sampling. Once recharged, samples from those wells will be collected using a disposal bailer.

The samples will be delivered to a NELAP certified laboratory, along with proper chain of custody documentation including project name and number; sampler's name and signature; sample identification numbers; sample date, time, and location; requested analyses; and sample container type and quantity. The samples collected from monitoring wells MW-1, MW-2, MW-4, MW-6, and MW-7 will be analyzed for using the EPA Methods shown in Table 6.0.

TABLE 6.0 – LABORATORY ANALYTICAL METHODS

PARAMETER	SAMPLE MATRIX	EPA METHOD
Appendix I Metals plus Boron and Calcium	Water	6010B or 6020
Mercury	Water	7470
Appendix I VOCs	Water	8260B
CCR PARAMETERS		
Chloride	Water	325.2 / 9251
Fluoride	Water	340.2
Sulfate	Water	375.4 / 9038
TDS	Water	2540C

The laboratory analysis will follow the protocols provided in the *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods SW-846* (SW-846), *Standard Methods for the Examination of Water and Wastewater (latest edition),* or other appropriate methods approved by the ADEM.

Both preserved and unpreserved groundwater samples will be collected for metals analysis during each monitoring event. The unpreserved samples will be retained in the event elevated metals concentrations are identified in one or more the groundwater samples. Specific unpreserved samples to those that returned elevated metals will be submitted and filtered for analysis by the laboratory, on an as needed basis, to determine if any metals detected in the unfiltered samples are also present in dissolved concentrations. *Please note that field filtration is not allowed by ADEM guidelines.*

6.1 GROUNDWATER SAMPLE MANAGEMENT

As part of this Plan, each groundwater sample will be tracked from the time of collection by completing sample custody documentation. The sample custody documentation will include the field documentation and the chain of custody report. All samples will be placed in laboratory provided containers and preserved in a manner appropriate to the analytical method requested. Sample containers will be stored in a clean, secure area prior to use. Containerized samples will be labeled as they are collected and placed in a cooler with ice to maintain a sample temperature of 4°C until delivered to the analytical laboratory. Sample criteria are summarized in the Table 6.1 below.

TABLE 6.1 – GROUNDWATER SAMPLING CRITERIA

ANALYSIS	SAMPLE MATRIX	BOTTLE TYPE	PRESERVATIVE	HOLDING TIMES
Appendix I Metals plus Boron and Calcium	Water	(1) 500 ml Plastic	4°C / HNO_3	180 Days Mercury 28 Days
Filtered Sample Appendix I Metals	Water	(1) 500 ml Plastic	4°C	180 Days Mercury 28 Days
Appendix I VOCs	Water	(2) 40 ml vials	4°C / HCL	14 Days
CCR PARAMETERS				
Chloride	Water	(1) 125 ml Plastic	4°C	28 days
Fluoride and Sulfate	Water	(1) 500 ml Plastic	4°C	28 days
TDS	Water	(1) 500 ml Plastic	4°C	7 Days

VOCs – Volatile Organic Carbons
ml – Milliliter
C – Celsius
HNO_3 – Nitric Acid
HCL – Hydrochloric Acid
TDS – Total Dissolved Solids

Sample labels will be filled out and affixed to appropriate containers immediately prior to or following sample collection, as appropriate. The label will be filled out in indelible ink and will include the following information on the portion affixed to the sample container: sample ID number; analyses requested; project name; the person's name collecting the sample; and, sample location number.

The field data recorded at the time of sample collection provides an unambiguous identification of each sample. These field data will be recorded on groundwater monitoring well field logs. Field notes will include the following:

- date and time of sampling;
- name(s) of field personnel conducting sampling;
- name(s) of any observers at the sampling site;
- purpose of sampling;
- description of sample point;
- number and size(s) of sample(s) taken;
- field sample identification number(s);
- deviation from sampling plan, if any;
- field observations;
- references (such as maps) of sampling site; and
- sample handling and shipping information.

Sample handling and shipping procedures will assure that samples are properly preserved, protected, and secured until delivered to the analytical laboratory. After sample containers are labeled, they will be sealed in plastic air cushion bags and wrapped in clear plastic bags to protect sample bottles and labels from potential moisture damage. Ice packs will be sealed in plastic bags and placed on top of samples in order to maintain an optimum temperature of 4°C until the samples are delivered to the laboratory. Any remaining void space in the ice chest will be filled with appropriate bubble-wrap packing material.

Samples will be hand delivered or shipped via overnight delivery service to the laboratory. Shipped samples will be accompanied by an appropriate freight (shipment) bill of lading form with the completed freight bill number recorded on the Chain of Custody accompanying each cooler shipment. The Chain of Custody will be sealed in a plastic bag and taped to the underside of the cooler lid. Coolers will be sealed with tape and a custody seal that will be

initialed and dated to prevent any tampering during shipping and handling. The laboratory will be notified prior to shipment of samples that would arrive at the laboratory on a weekend or holiday to assure that the samples are properly received.

Sample custody documentation procedures will be maintained throughout the following activities:

- initial sample collection;
- transportation from sample collection site to analytical laboratory;
- receipt and preparation of laboratory sample extracts and digestives;
- storage at laboratory until an evaluation of analytical results determines that re-analysis is not required; and,
- final sample disposition.

At the time of sample collection, samples will be labeled and a record of the sampling activity will be recorded in the daily field log. Sample labeling procedures were discussed previously. Information required to identify sample custody and to request sample analyses are then entered on the Chain of Custody. The information recorded on the Chain of Custody will include:

- project name and number;
- sampler's name and signature;
- sample identification numbers;
- sample date, time, and location;
- requested analyses;
- sample container type and quantity;
- requested analytical turnaround time; and
- person to receive results and a contact telephone number to call in case problems arise.

A Sample Chain of Custody is included as Appendix D.

7.0 DECONTAMINATION OF EQUIPMENT

All non-disposable equipment and tools will be decontaminated or disposed of in accordance with the most recent edition of the *Alabama Environmental Investigation and Remediation Guidance* (AEIRG). Personnel decontamination will be performed on an as-needed basis only. Sampling equipment will be either disposable or decontaminated prior to use and between sampling locations. New disposable nitrile gloves will be used during the collection each groundwater sample. Disposable polyethylene tubing will be used with the purge-pump during well purging. The water level indicator and bladder pump will be decontaminated by washing with distilled water and laboratory grade detergent wash, followed by rinsing with distilled water.

8.0 SEMI-ANNUAL REPORTING

Upon receipt of the laboratory analytical results, and within sixty (60) days of the date of sampling, a semi-annual report will be submitted to the ADEM discussing groundwater quality beneath the subject facility. The report will include a statistical analysis of groundwater in accordance with ADEM Administrative Code R. 335-13-4-.27(2)(l) and the Environmental Protection Agency (EPA) standards referenced in the *Statistical Analysis of Groundwater Monitoring Data at Resource Conservation Recovery Act (RCRA) Facilities Unified Guidance*, U.S. EPA, 2009 (Unified Guidance).

8.1 STATISTICAL PROCEDURES

In the application of statistics to groundwater monitoring data from this site, all data will be treated as independent and representative of the quality of groundwater at the site. Statistical methods used, and their application to data from this site, will be in general accordance with the EPA standards referenced in the Unified Guidance. The groundwater monitoring data will analyzed statistically using the ChemStat Version 6.4 or comparable statistical software.

Historical groundwater data for cobalt, iron, nickel, zinc and VOCs dating back to March 2005 is available for each of the wells in the monitoring well network. Historical data dating back to March 2008 is available for the remaining Appendix I metals for each well.

Upon receipt of the laboratory analytical results, the results will be reviewed to assesses the potential for statistically significant increases (SSIs) of detected Appendix I VOCs and metals in groundwater samples collected from the facility monitoring well network. Statistical analysis will

only be conducted for parameters that were reported in groundwater samples collected during each groundwater monitoring event.

Monitoring well MW-7 will be used as the background groundwater quality monitoring location used for statistical evaluations. Monitoring wells MW-1, MW-2, MW-4, and MW-6 will be used as compliance wells. The historically detected constituents, data sets, and time versus concentrations graphs will be provided in each semi-annual report.

8.2 TEST FOR NORMALITY

In accordance with the EPA Unified Guidance, a test for normality should be conducted on the appropriate constituents to determine the appropriate statistical method to be used to evaluate groundwater analytical data as it relates to the distribution of these constituents. A test for normality will be completed for the appropriate constituents, as discussed in the following paragraphs, and will satisfy the performance standards required for the selection of the statistical procedures to be used at a facility in accordance with ADEM Administrative Code R. 335-13-4-.27(2)(m)1.

Typically, groundwater analytical data is subjected to a distribution analysis to determine if the data is normally distributed or can be transformed to a normal distribution using either log-normal or ladder of powers data transformations. If data is normally distributed, or can be transformed to create a normal distribution, a parametric statistical analysis is recommended. However, when the data contains a large percentage of non-detects (greater than 50%), the validity of distribution tests are questionable, suggesting that a non-parametric statistical analysis be used.

In order to determine if a parametric or non-parametric statistical analysis should be conducted, a test for normality will be completed for the detected constituent(s) with less than 50% non-detects in an effort to determine if the data set for the detected constituent(s) is normally distributed or can be transformed to a normal distribution. The Shapiro-Wilks Test for Normality will be used for constituents with less than 50 measurements and the Shapiro-Francia Test for Normality will be used for constituents with greater than 50 measurements, as discussed in Chapter 10 of the Unified Guidance.

If data is normally distributed, or can be transformed to create a normal distribution, a parametric statistical method will be used. When the data is not normally distributed, or cannot be transformed to create a normal distribution, a non-parametric statistical method will be used. Additionally, when the data contains a large percentage of non-detects (greater than 50%), the validity of distribution tests are questionable and it is suggested that a non-parametric method be used.

During historical monitoring events, detected concentrations of Appendix I metals have had non-detect rates of greater than 50%, with the exception of barium. Therefore, it is anticipated that tests for normality may be completed for barium during future groundwater monitoring events. Since there are more than 50 measurements for this constituent, the Shapiro-Francia Test for Normality will most likely be used, as discussed in Chapter 10 of the Unified Guidance.

Based on the high rate of non-detects for the remaining constituents historically detected in samples collected from the site, non-parametric statistical analysis will most likely be used in assessing groundwater quality during all future monitoring events. In the event a detected concentration does show non-detect rates of less than 50%, then a test for normality will be conducted for that constituent, and a determination for using either parametric or non-parametric statistical analysis will be made based on the outcome of the test.

8.3 TESTS FOR OUTLIERS

A test for outliers will be conducted when multiple values in a dataset appear anomalously low or high when compared to other values (Unified Guidance). These tests will only be conducted for constituents detected in the compliance wells during each groundwater sampling event to determine if there are outliers in the historical dataset as per the Unified Guidance. In order to screen for outliers, either a Dixon's Test or a Rosner's Test will be conducted. A Dixon's Test is used when there are 25 or fewer data points and a Rosner's Test is for datasets containing 20 or more data points. Based on the historical data collected to date, it is more likely that a Rosner's Test will be conducted since it may be used to identify multiple outliers within larger datasets. In the event a outlier is identified, an attempt will be made to determine the cause of the outlier, i.e. lab error, field error, etc., if possible. If outliers are identified within a constituent's dataset, a determination will be made as to whether the outlier(s) should remain or be removed from the dataset prior to completing the statistical analysis.

8.4 INTER-WELL STATISTICAL ANALYSIS

Based on a review of the historical laboratory analytical results from groundwater samples collected from the monitoring well network, an inter-well statistical analysis will be completed for the determination of SSIs in constituent concentrations in groundwater samples collected during each semi-annual event with the exception of mercury in the samples collected from MW-2 as discussed in Section 8.5 of this Plan. The type of statistical method that will be used for evaluating groundwater data for this site will be the Inter-Well Non-Parametric Prediction Limit analysis in accordance with ADEM Administrative Code R. 335-13-4-.27(2)(l)3. In the event a future detected concentration of a constituent has a non-detect rate of less than 50%, and a test for normality is warranted, an Inter-Well Parametric Prediction Limit analysis may be conducted for that constituent if the data is normally distributed, or can be transformed to create a normal distribution.

Should the statistical analysis confirm the presence of a SSI for one or more target constituents over background groundwater quality, Axis Industrial Landfill will comply with the requirements of ADEM Admin. Code 335-13-4-.27(n)3 and notify the Department within 14 days of the finding.

8.5 INTRA-WELL STATISTICAL ANALYSIS – MERCURY IN MW-2

8.5.1 Naturally Occurring Metals – Mobile County, Alabama

According to the USGS Mineral Resources Online Spatial Data for Mobile County, Alabama, many of the Appendix I Metals are found to occur naturally in subsurface soils. Using the detected concentrations of each Appendix I Metal detected in samples included in the spatial data collected in Mobile County, HTSI calculated a mean concertation for each. Where a reported concentration was at a concentration below the method detection limit, a value of ½ the detection limit was used to calculate the mean value for that metal. Table 8.5.1 on the following page shows the mean concentrations of metals in soil in Mobile County.

TABLE 8.5.1 - MEAN CONCENTRATIONS OF METALS IN SOILS MOBILE COUNTY, ALABAMA

METAL	MEAN CONCENTRATION (MG/KG)
Antimony	0.36
Arsenic	2.55
Barium	52.00
Beryllium	0.26
Cadmium	0.05
Chromium	15.75
Copper	8.25
Lead	8.20
Mercury	0.03
Nickel	8.52
Selenium	0.2
Silver	0.5
Thallium	0.83
Tin	1.11
Vanadium	37.00
Zinc	12.50

Notes:
Reference - Mineral Resources Online Spatial Data Geochemistry and Mineralogy of US Soils
Mean Value for each metal calculated using USGS soil sample numbers 6688, 3616, 7712, 10784

While the reported concentrations of mercury in the samples collected from MW-2 have returned SSIs, the detected concentrations of mercury have been well below the naturally occurring calculated mean concentration for mercury in soil of 0.03 mg/kg. As such, it is the opinion of HTSI, that an alternate source for mercury in groundwater is the presence of naturally occurring mercury in subsurface soils in Mobile County.

A Box Plot was generated for mercury to aid in determining if spatial variability exists across the site, specifically in the relationship of mercury between the background well and the compliance wells. The Box Plot for mercury is provided as Appendix E. A review of the Box Plot indicates that spatial variation exists across the site, specifically as it relates to compliance well MW-2 and the remaining wells at the facility.

8.5.2 Mercury in Compliance Well MW-2

Since spatial variability for mercury is apparent between the background well and MW-2, and mercury occurs naturally in subsurface soils in Mobile County, HTSI is of the opinion that Intra-Well Non-Parametric Prediction Limit analysis is appropriate for determining if SSIs exist for mercury detected in the samples collected from MW-2 during the semi-annual groundwater monitoring events.

Mercury has only been detected once at two other monitoring locations (MW-1 and MW-4) since mercury was added as a target constituent in 2008. This detection at MW-1 is considered an outlier and, when removed from the site wide dataset, results in mercury being detected only in samples collected from well MW-2 (detected during 73% of the events since 2008) and MW-4 (detected during 10% of the events since 2008). Of the nineteen (19) sampling events that have occurred since March 2008, mercury has been detected in the samples collected from MW-2 fourteen (14) times with an average concentration of 0.00217 milligrams per liter (mg/l). Where mercury was reported at a concentration below the method detection limit in the dataset, ½ the detection limit was used in calculating the average concentration. The detected concentration of mercury in the sample collected from MW-2 (0.00202 mg/l) during the September 2017 monitoring event (most recent) is consistent with the average historical concentration of mercury in this well.

It should be noted that at the time of the site's original development as a landfill, monitoring well MW-2 was positioned upgradient of the facility as groundwater flow direction was influenced by extraction of groundwater from on-site process wells (PW) which locally influenced groundwater flow direction. At that time, groundwater flow direction was generally to the south (opposite direction), as opposed to the present day general groundwater flow direction to the north caused by the cessation of groundwater withdrawal. During the period of time that groundwater flow was reversed, wells MW-2 and MW-4 were directly downgradient of a known potential source of contamination (current Akzo-Nobel facility).

8.5.3 Sen's Slope Trend Analysis - Mercury in Compliance Well MW-2

A trend analysis completed during the most recent groundwater monitoring event (September 2017) indicated that there was "no identifiable trend" in the dataset of mercury at this well. As such, the detected concentrations of mercury in samples collected from MW-2 have not exhibited an increasing trend since mercury was added as a target constituent to the facility Permit in 2008. Due to the historical detections of mercury in the samples collected from MW-2, a Sen's Slope Trend Analysis will be completed for the detected concentrations of mercury in samples collected from MW-2 during future semi-annual groundwater monitoring events in order to determine if there is an upward trend in mercury at this location.

8.6 SEN'S SLOPE TREND ANALYSIS – APPENDIX I VOCS

8.6.1 VOC Analytical Results

Historically, Appendix I VOCs have been detected in samples collected from compliance well MW-6. During the most recent groundwater sampling event (September 2017), Appendix I VOC chloroform was detected in the samples collected from compliance well MW-6 at a concentration below its EPA Regional Screening Level (RSL). No other VOCs were detected in the samples collected from the monitoring well network. The presence of the above-referenced VOC in the groundwater samples collected from compliance well MW-6 provided evidence of a statistically significant concentration of this constituent in MW-6.

8.6.2 Sen's Slope Trend Analysis

According to the Unified Guidance, the Sen's Non-Parametric Estimator of Slope is a method of estimating the true slope (change over time) of analytical data. If the data shows an upward slope, there is evidence of an upward trend or increase in a constituent concentration. "No identifiable trend" would indicate no significant increase or decrease in a particular constituent concentration over time. A decreasing trend would indicate decreasing constituent concentrations over time. Since this method is non-parametric, it is considered suitable for a high percentage of non-detects and is not significantly affected by outliers.

In an effort to further address SSIs indicated for Appendix I VOCs in samples collected from compliance wells during semi-annual groundwater monitoring events, a Sen's Slope Trend analysis will be performed to determine if there is an identifiable trend in the target constituent concentration over time.

8.7 IDENTIFICATION OF A SSI

Should the statistical analysis confirm the presence of a SSI for one or more target constituents over background groundwater quality, Axis Industrial Landfill will comply with the requirements of ADEM Admin. Code 335-13-4-.27(2)(n)3 and notify the Department within 14 days of the finding. Within 90 days of the determination of a SSI, an assessment monitoring program will be established and comply with ADEM Admin. Code 335-13-4-.27(4) unless a determination can be made that a source other than the landfill unit caused the contamination, or there was an error in sampling, analytical testing, or statistical analysis. In the event there is determination of an alternate source, a report will be submitted to the ADEM for approval and placed in the operating record.

If an outlier is used as part of the data set and does not indicate a SSI through inter-well analysis, then the outlier will be reevaluated following the next semi-annual groundwater monitoring event to determine if it should remain in the data set. If an outlier indicates a SSI, then the results will be verified by conducting a resampling event within 45 days of the original event. The results of the resampling event will be used to determine if the original outlier is valid. If analytical results from the resampling event indicate that the original outlier is not valid, then the analytical results from the resampling event will be added to the dataset and a determination for SSIs for that constituent will be reevaluated. The results will then be submitted to the ADEM.

8.8 REPORTING

In addition to statistical analysis discussed above, the semi-annual report will also include, at a minimum, the following information:

- A discussion of the environmental setting of the facility.
- Summary tables of the laboratory analysis.
- Monitoring well sampling records.
- A table of historic groundwater elevations.
- Copies of the laboratory reports.
- Potentiometric surface map(s) illustrating groundwater elevation and flow direction.
- Time versus Concentration Graphs for each detected constituent.
- Other supporting figures, such as site and well location maps.

9.0 REFERENCES

Alabama Department of Environmental Management, Administrative Code R. 335-13-x-xx.

Alabama Department of Environmental Management, *Axis Industrial Landfill, Solid Waste Disposal Permit No. 49-21*, Effective April 05, 2016, Expiration Date April 04, 2021, Issuance Date April 5, 2016.

Gillet, B., Raymond, D.E., Moore, J.D., and B. H. Tew. 2000. *Hydrogeology and Vulnerability to Contamination of Major Aquifers in Alabama: Area 13*: Geological Survey Of Alabama, Hydrogeology Division, Groundwater Assessment Program Number Circular 199A.

Geological Survey of Alabama, *Special Map 220*, Geologic Map of Alabama, 1988.

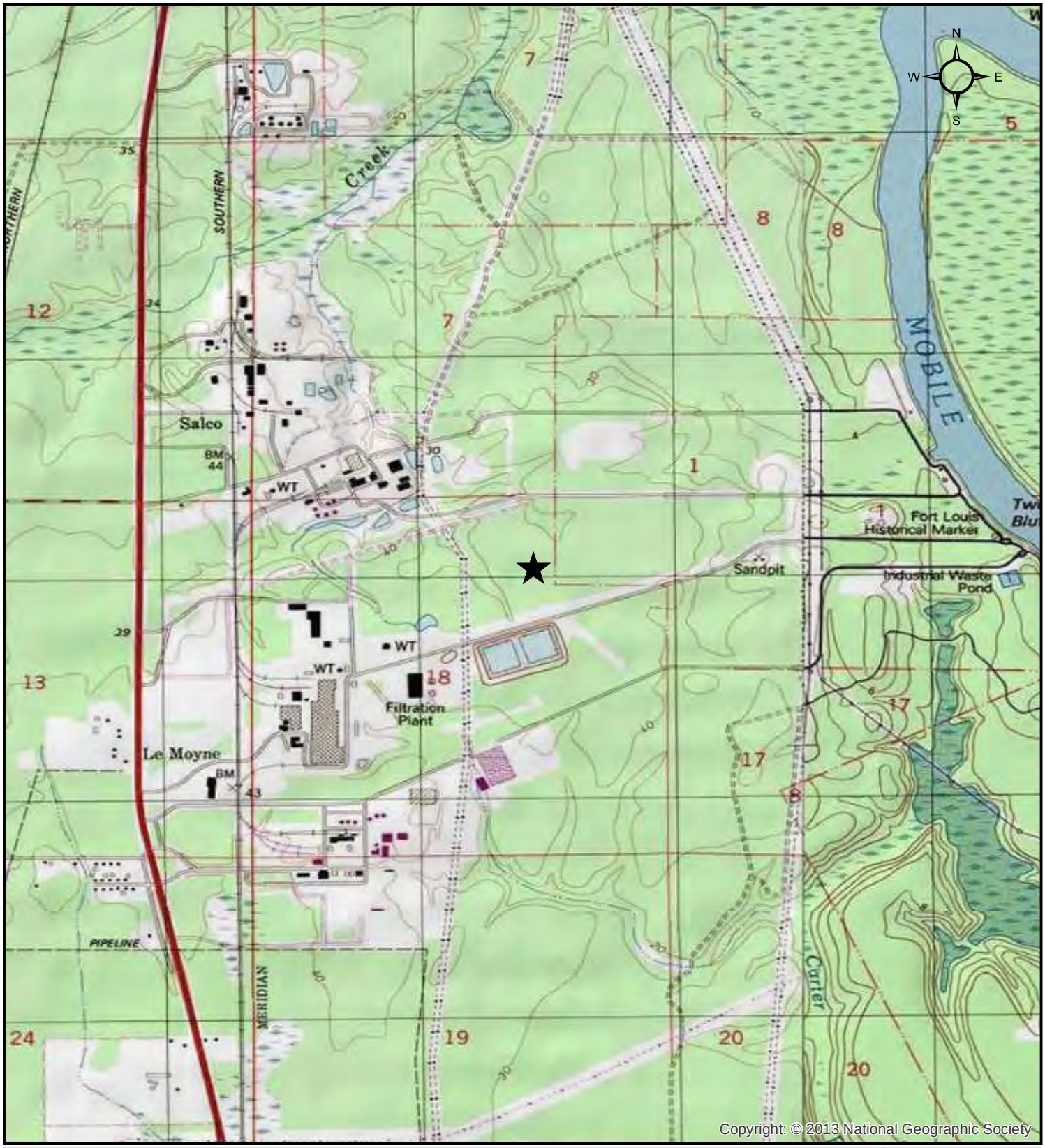
Highland Technical Services, Inc., *Semi-Annual Groundwater Monitoring Report - March 2016*, April 18, 2016.

US EPA Region II, *Ground Water Sampling Procedure Low Stress (Low Flow) Purging and Sampling*, September 2001.

US EPA, Office of Solid Waste, *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities*, Unified Guidance, March 2009.

U.S EPA, *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities*, 40 CFR 257.

FIGURES



Legend

★ Site Location

USGS Quad ID: 30088-H1
QSGS Quad Name: Creola, Alabama

Highland Technical Services, Inc.

528 MINERAL TRACE
HOOVER, AL 35244
(205) 985-4874

TITLE:
Site Location Map

Axis Landfill

Axis, Alabama

SCALE:
0 1,000 2,000
1 inch = 2,000 feet

FIGURE NO.
1

PROJECT NO.
16-050315.16

DRAWN BY
RFS

DATE DRAWN
9/14/2016

Legend

- Monitoring Wells
- Potentiometric Contour Line
- Groundwater Flow Direction
- (13.20) Measured Groundwater Elevation

Highland Technical Services, Inc.

528 MINERAL TRACE
HOOVER, AL 35244
(205) 985-4874

TITLE: Site Plan & Monitoring Well Location Map

September 18, 2017

Axis Industrial Landfill
Axis, Alabama

SCALE: 0 175 350
1 inch = 350 feet

FIGURE NO. 2

PROJECT NO. 17-050315.17

DRAWN BY SWA

DATE DRAWN 10/31/2017

APPENDIX A

Appendix B
Calculated Groundwater Flow Velocities
September 18, 2017

Monitoring Well	Groundwater Elevation (ft-amsl)	Distance Detween Wells (feet)	Gradient (i)	Hydraulic Conductivity (cm/sec)	effective porosity (ne)	Estimated Flow Velocity (feet/year)
MW-7	15.69					
MW-2	13.15	1505.00	0.00169	0.001000	0.25	6.98
MW-6	13.77					
MW-4	13.39	770.00	0.00049	0.001000	0.25	2.04
		average gradient	0.00109		average velocity	4.51

Notes:
1. Effective porosity values from Freeze & Cherry (1979) Table 2.4.
2. Hydraulic conductivity values were obtained from Freeze and Cherry (1979) Table 2.2

ft-amsl - feet above mean sea level
cm/sec - centimeters per second

APPENDIX B

GROUNDWATER SAMPLING LOG

SITE NAME:	PROJECT:	HTSI PROJECT NO:
FIELD PERSONNEL/SAMPLER:	WEATHER CONDITIONS:	DATE:
WELL NO:	WELL DIAMETER (in):	PURGE PUMP TYPE OR BAILER:
TOTAL WELL DEPTH (feet):		
STATIC WATER LEVEL (feet):	TIME:	
DEPTH TO FREE PRODUCT (feet):		
LENGTH OF WATER COLUMN:		
WELL VOLUME (gallons):		

PURGING DATA

INITAIL PUMP OR TUBING DEPTH IN WELL (feet):	FINAL PUMP OR TUBING DEPTH IN WELL (feet):	
PURGING INITIATED AT:	PURGING ENDED AT:	TOTAL VOLUME PURGED (gallons):

TIME	DEPTH TO WATER (feet)	pH (standard units)	COND. (mS/cm)	TURBIDITY (NTUs)	DISSOLVED OXYGEN (mg/L)	TEMP. (°C)	REDOX (ORP) (mV)	COLOR	ODOR

REMARKS:

SAMPLING DATA

SAMPLE DATE:	SAMPLE TIME:	SAMPLE METHOD:

ANALYSIS AND/OR METHOD	VOLUME	#CONTAINERS	PRESERVATIVE USED:	COMMENTS:

REMARKS:

Verify Well Cap Secured and Locked*	**Yes:**		

CALIBRATION INFORMATION:

SAMPLED BY (PRINT):	SAMPLER(S) SIGNATURES:

HIGHLAND TECHNICAL SERVICES, INC.
528 Mineral Trace
Hoover, Alabama 35244
Phone (205) 985-4874 Fax (205) 987-6080

APPENDIX C

MONITORING WELL SAMPLING RECORD

PROJECT NO:
PROJECT NAME: Axis Industrial Landfill
SITE LOCATION: Axis, Alabama
RECORDED BY:

WELL NUMBER	MW-1	MW-2	MW-4	MW-6	MW-7
GENERAL WELL DATA					
Top of Casing (TOC) Elevation (ft)	38.28	46.17	47.30	47.60	49.26
Original Total Depth (ft below TOC)	71.80	73.00	81.50	85.10	85.20
TOC Height (ft above/below grade)	6.44	NA	NA	NA	NA
Screened Interval (ft)	NA	NA	NA	NA	NA
Well Diameter (in)/Material	4" PVC	4" PVC	4" PVC	4" PVC	4" PVC
Current Well Condition	Good	Good	Good	Good	Good
WATER LEVEL DATA					
Date (mm/dd/yyyy)					
Time (military)					
Measured Total Depth (ft below TOC)					
Static Water Level (ft below TOC)					
Static Elevation (ft - AMSL)					
WELL PURGE DATA					
Purge Date (mm/dd/yyyy)					
Purge Time (military)					
Minimum Purge Volume (gal)					
Actual Purge Volume (gal)					
Equipment Used					
WELL SAMPLING DATA					
Sampling Date (mm/dd/yyyy)					
Sampling Time (military)					
Weather Conditions					
Equipment Used					
Groundwater pH (std units)					
Specific Conductance (mS/cm)					
Turbidity (NTU)					
Dissolved Oxygen (mg/L)					
Groundwater Temperature (degrees C)					
Oxidation-Reduction Potential (mV)					
Number of Containers Filled					
Water Clarity					
Parameters to be Analyzed*					

I certify that all water level measurement devices, purging equipment, and sampling equipment were properly cleaned prior to use in each well. Signature

REMARKS

NA = Not Applicable/Not Available

HIGHLAND TECHNICAL SERVICES, INC.
528 Mineral Trace
Hoover, Alabama 35244
Phone (205) 985-4874 Fax (205) 987-6080

APPENDIX D

Highland Technical Services, Inc.
528 Mineral Trace
Hoover, AL 35244

G

Billing Information:

Report to:

Email to:

Analysis/Container/Preservative

Chain of Custody
Page ___ of ___

ESC
L·A·B S·C·I·E·N·C·E·S

12065 Lebanon Road
Mt. Juliet, TN 37122

Phone: (800) 767-5859
Phone: (615) 758-5858
Fax: (615) 758-5859

Project Description:

City/Sate Collected

Phone:
FAX:

Client Project #:

ESC Key:

Collected by:

Site/Facility ID#:

P.O.#:

Collected by (signature):

Immediately Packed on Ice N ____ Y ___

Rush? (Lab MUST Be Notified)
_____ Same Day. 200%
_____ Next Day.. . . . . 100%
_____ Two Day 50%
Three Day 25%

Date Results Needed:

Email? __No__Yes

FAX? __No__Yes

CoCode (lab use only)

Template/Prelogin

Shipped Via:

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	Remarks/Contaminant	Sample # (lab only)

*Matrix: **SS** - Soil/Solid **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other_____

pH _____ Temp _____

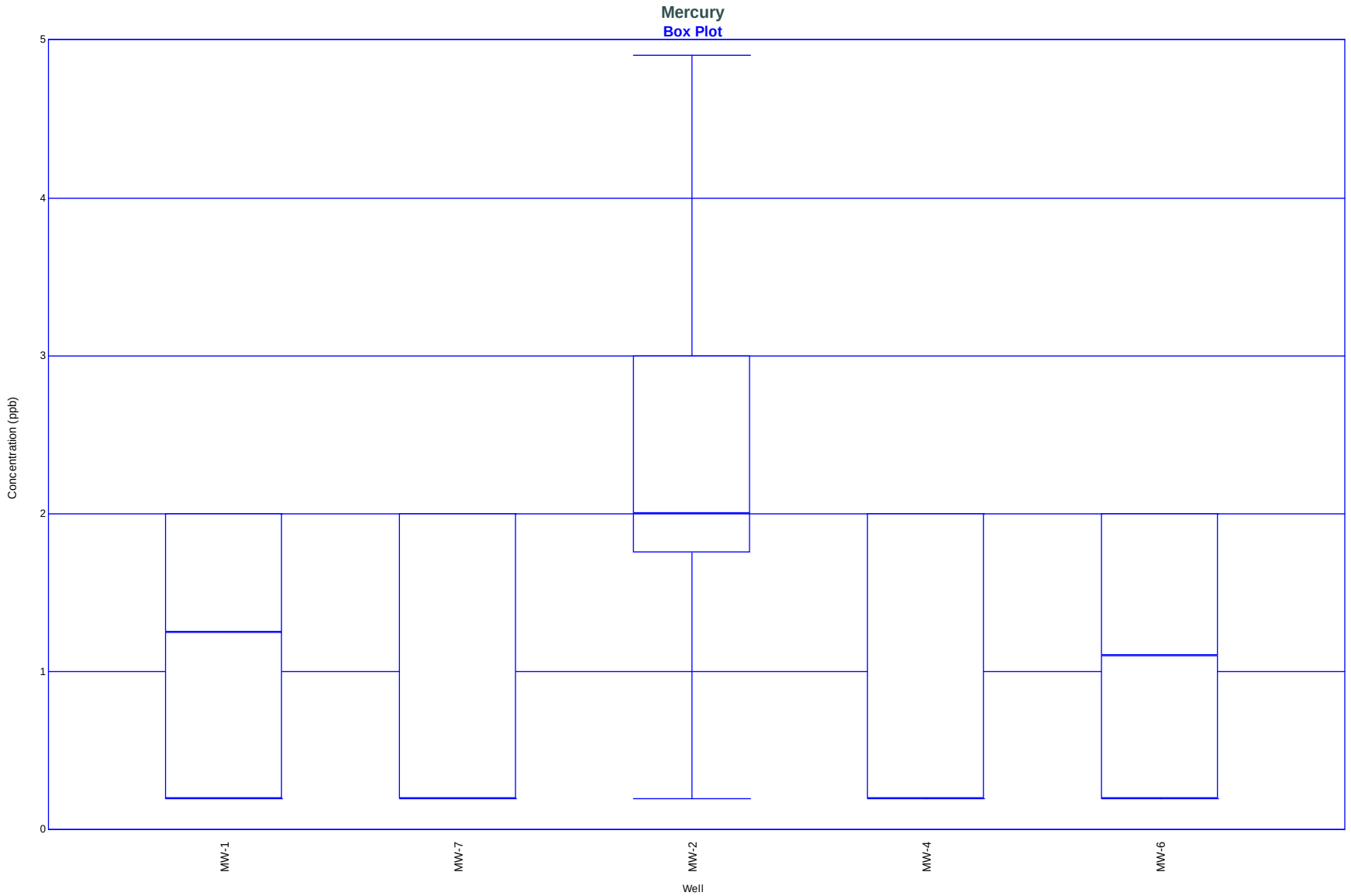
Remarks:

Flow _____ Other _____

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ _____	Condition: (lab use only)	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp:	Bottles Received:	
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date:	Time:	pH Checked: / NCF:

APPENDIX E

Axis Industrial Landfill



Mercury

Attachment F

Control Program for Unauthorized Waste

Control Program for Unauthorized Waste
EcoSouth Services, LLC
Axis Industrial Landfill
ADEM Solid Waste Disposal Facility Permit No. 49-21

I. GENERAL INFORMATION

EcoSouth Services, LLC has developed this Control Program for Unauthorized Waste in accordance with Division 13 of the Alabama Department of Environmental Management (ADEM) Administrative Code.

The Control Program for Unauthorized Waste consists of this written plan, documentation of control measures with responses on site, and documentation of the training program for site personnel. This Control Program also includes preventative measures such as signage and inspections of incoming waste loads. The response actions including segregation, alternative disposal, recordkeeping, and reporting requirements.

EcoSouth has been issued the Solid Waste Disposal Permit No. 49-21 (Appendix I) by the Alabama Department of Environmental Management (ADEM). The service area and waste streams approved for disposal at the facility are listed in the facility permit.

II. PREVENTATIVE MEASURES

A. OBJECTIVE

The objective of preventative measures is to preclude the delivery of unauthorized wastes (Appendix II) to the site. Preventative measures will include, but are not limited to, effective signage, the monitoring of incoming waste loads, the implementation of alternative collection programs, and the enforcement of applicable local laws.

B. SIGNAGE AND SECURITY

Signage at the facility entrance will inform users of the name of the landfill, days and hours of operation, name of the permittee, owner and/or operator, waste types accepted, and disposal fees for the use of the landfill.

Access after operating hours will be limited by perimeter fencing and a lockable gate at the facility entrance.

C. IDENTIFICATION OF INDUSTRIAL USERS

The majority of the incoming waste received is industrial waste hauled by EcoSouth contracted trucks. The remaining waste is comprised of municipal solid waste and construction and demolition waste, which is hauled by both EcoSouth contracted and independent drivers.

EcoSouth will identity all industrial users of the facility, producers of special wastes, and transporters of these wastes. Prior to the disposal of industrial waste or regulated medical waste from industrial users, the facility shall follow certification procedures detailed in ADEM Admin. Code r. 335-13-4-.21(1)(c).

D. MONITORING AND IDENTIFICATION OF INCOMING WASTE

Drivers who are employed by EcoSouth have been trained to identify wastes not authorized by the facilities permit. The waste acceptance process begins when the EcoSouth employee collects the waste at the waste source. Prior to loading the waste onto the truck, the driver is to examine the waste to ensure unapproved waste is not present. If unapproved waste is detected, the driver will not accept the load.

The acceptance process for independent haulers begins at the scale house. Prior to entry to the landfill, the attendant will visually screen each incoming load. Any truck containing unauthorized waste will be turned back at the gate. For industrial wastes, the scale house attendant will also review waste approval forms, if applicable, to verify that only certified acceptable wastes are allowed for disposal.

To the extent practicable, EcoSouth personnel will examine the contents of all hauling vehicles prior to, and after, allowing them to tip. Facility personnel should monitor

for liquids or wet loads, chemicals, medical or hazardous wastes, slurry, barrels, drums, air conditioners, or other unapproved wastes. Facility personnel should also watch for items such as: 1 gallon and 5 gallon containers with liquids, compressed gas cylinders, 20 gallon, 35 gallon, and 55 gallon drums, or any powder or liquid which emits a vapor or is smoking. Types of unauthorized waste are discussed in the following subsections of this document, in order to provide information relevant to identification and handling of unauthorized wastes. Should the operator or facility personnel notice any unauthorized waste, the procedure for response described in Section IV will be followed.

1. Hazardous Waste

Hazardous wastes include wastes defined as hazardous by the Resource Conservation and Recovery Act (RCRA) and the ADEM Administrative Code. Wastes are classified as hazardous based on their ignitability, corrosivity, reactivity, and toxicity. Any material that is contaminated by a hazardous waste is also defined as a hazardous waste.

Typical processes that generate hazardous waste include, but are not limited to, auto repair and maintenance; printing and allied industries; dry cleaning; photograph processing; laboratory procedures; pest control; metal, textile, plastic, and leather manufacturing; and wood preservation. Facility personnel will watch for potential indicator items such as drums, cans with liquids, compressed gas cylinders, powders or liquids with odors or vapors, and containers with labels indicating hazardous contents.

Empty drums and containers that are “drip dry,” have been triple-rinsed, or otherwise properly emptied, and are open on both ends, may be accepted. The Environmental Protection Agency (EPA), under Resource Conservation and Recovery Act (RCRA), has developed regulations for properly emptying drums prior to disposal (see 40 CFR §261.7). Drums must be "RCRA empty" (also referred to as “drip dry”), or otherwise managed in full compliance with Uniform Hazardous Waste Manifest requirements. Depending upon the type of hazardous waste that the container held, EPA has issued different requirements for determining when a container is empty. These requirements are summarized below:

- Non-Acute Hazardous Wastes: Containers of less than 110 gallon capacity that have held these materials are "empty" when no more than 3% (or 2.5 cm or 1 inch) residue remains in the container AND all possible residues have been removed by commonly employed methods. This means that more viscous materials should show clear evidence of effort to remove the remaining material by scraping or other "commonly employed methods."

- Acute Hazardous Wastes: More stringent requirements are necessary to empty a container that has held acute hazardous waste. While these wastes are found predominantly on the "P-list" in 40 CFR §261.33, certain "F- and K-list" wastes in 40 CFR §261.31 and §261.32 are also deemed acutely hazardous. These containers must either be triple-rinsed with an appropriate solvent, or cleaned using another documented, proven method. If the liner has prevented all contact between the waste and the container, the container is considered empty when the liner is removed.

2. Medical Waste

Medical Waste is defined as a solid waste or combination of solid wastes, which because of its infectious characteristics may either cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness, or pose a substantial present hazard or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Medical waste includes, but is not limited to, cultures and stock of microorganisms and biological materials, blood and blood products, tissues and other anatomical wastes, sharps used in patient care or veterinary practice, residue resulting from the cleanup of a spill of medical waste, and any solid waste that is mixed with medical waste.

Medical waste is typically treated and stored at the generator and delivered to disposal facilities in labeled, red, liner bags to render the waste easily visible and recognizable. However, medical waste may also be delivered in various other unmarked containers or mixed with other types of waste.

Medical waste will only be authorized for disposal if it has been certified as treated medical waste in accordance with ADEM Admin Code r.335-17-7-.02 and does not contain free liquids. Untreated medical waste must be treated on-site at the point of generation or off-site at an approved treatment facility prior to delivery to the facility. Prior to disposal of medical waste, the facility must obtain certification from the generator that the waste has been treated and does not contain regulated, untreated medical waste.

3. Asbestos

There are two main types of asbestos waste: friable and non-friable asbestos. The facility is permitted to accept both friable and non-friable asbestos containing materials. Each type of asbestos waste is discussed in the following paragraphs.

Non-friable asbestos-containing material (ACM) is any material containing more than 1% asbestos and cannot be crumbled, pulverized, or reduced to powder by hand pressure. Category I non-friable ACM includes materials such as packings, gaskets, resilient floor coverings, and asphalt roofing products. Category II non-friable ACM includes all other ACM that cannot be crumbled, pulverized, or reduced to powder by hand pressure and are not included in Category I.

Friable ACM is defined as any waste material containing more than 1% asbestos that, when dry, is capable of being crumbled, pulverized or reduced to powder by hand pressure.

Should any ACM identified in incoming waste loads, it must be handled and disposed in accordance with ADEM Admin Code Div. 13.

4. Other Prohibited Wastes

Polychlorinated biphenyl (PCB) waste includes, but is not limited to, materials containing more than 50 parts per million (ppm) PCB. If such waste is delivered to the site, it will not be stored on the site nor disposed of without specific approval of the EPA and ADEM. PCBs are no longer being made in the United States, but are still present in many electrical transformers, capacitors, and insulating fluids. They have a heavy, oil-like consistency, and are clear to yellow in color. PCB waste, or waste containing PCB, is not acceptable at this facility.

Other unauthorized waste types include, but are not limited to, radioactive wastes, pesticides, lead-acid batteries, bulk or uncharacterized liquid waste, and used oil. Drums, as discussed previously, may only be accepted if they are empty, crushed, have both ends knocked out, and can be classified as "drip dry" or triple-rinsed as explained in Section II.A.1.ii of this plan.

E. Random Inspection

Random waste inspections will be performed at the EcoSouth facility and will be documented on the Random Waste Inspection Checklist provided in Appendix III. The initial sample size will be 1% of the waste hauling vehicles entering the facility, with at least one per day. The procedures for the Random Waste Working Face Inspection are also included in Appendix III.

F. Applicable Local Laws

In addition to satisfying the requirements of Division 13 of the ADEM Administrative Code, any applicable local laws pertaining to waste screening will be followed at the facility. There are currently no applicable local laws in Mobile County pertaining to waste screening; if any laws are implemented in the future, operations will be updated to comply with those requirements.

III. RESPONSE ACTIONS

A. UNAUTHORIZED WASTE REFUSAL

If unauthorized waste is recognized during the incoming load inspections or during random inspections, and prior to tipping, the site manager will refuse to accept the waste. In this case, the hauler will be informed that the waste is unacceptable at the facility, and the hauler will not be allowed to tip. If unauthorized waste is identified after tipping, if possible, the operator will inform the hauler that the waste is unacceptable at the facility, and have the hauler reload the unauthorized waste into the transport vehicle for removal from the site. The name of the generator and hauler will be recorded on the form provided in Appendix VI to prevent any future deliveries without prior inspection. The generator, if known, will also be contacted and informed that this type waste is unacceptable at this facility.

B. UNAUTHORIZED WASTE ACCEPTANCE

1. Removal and Segregation

Unauthorized waste will be segregated from acceptable waste, secured, and contained to prevent leakage or contamination to the environment. If unauthorized waste is delivered to the facility, it will be, if possible, isolated from other incoming waste using mobile equipment, and properly contained until it can be transported off-site for disposal or treatment at an approved facility. The acceptable waste will then be processed on site in accordance with the facility's permit. If the unauthorized waste cannot be segregated by facility personnel and equipment, the area should be isolated and processing operations moved to another location, or halted, until the unauthorized waste is properly removed. During the period the waste is on site, no one should attempt to handle the material by hand. Protective clothing, equipment, and sufficient training is generally required to handle any such material. After removal, the facility's record will be updated identifying the unauthorized waste removed from the site, and its final disposition as described in Section III.C.

If hazardous waste is discovered, it should be contained to prevent spills, leaks, or any contact with other materials. If the hazardous waste is already in a container, the container will be inspected for leakage, contained by another means if necessary, and segregated from acceptable waste in an area where any spills or leaks can be contained. The site manager will then arrange for a permitted hazardous transport contractor to remove the waste from the facility for disposal or treatment at an approved facility. Any hazardous waste materials must be handled and disposed in accordance with the ADEM Administrative Code.

If untreated, medical waste is discovered in the landfill, processing activities shall be moved to another area or halted, and an approved contractor will be mobilized to the site to segregate the medical waste, containerize and label it properly, and transport it to a facility

approved to treat medical waste. If the area cannot be isolated and the site manager has the mechanical means to segregate the medical waste, the operator shall use equipment to segregate the waste and place it in a containment area, or in plastic containers with lids. The site manager will then arrange for a permitted medical waste transport contractor to remove the waste from the facility.

If PCB waste is discovered in the landfill, it will be segregated from the acceptable waste and handled by properly trained personnel. PCB waste will not be disposed of without the specific approval of ADEM.

If lead-acid batteries are discovered in the landfill, the batteries will be removed from the acceptable waste, stored under cover and delivered to a battery retailer, or a collection or reclamation facility permitted or otherwise authorized by ADEM.

If explosives or unexploded munitions are discovered in the landfill, they will be treated as a hazardous waste. The site manager will notify ADEM and arrange for qualified personnel to remove and transport the material from the facility.

All employees that are handling unauthorized waste shall use protective clothing and equipment (PPE) as required by Occupational Safety and Health Administration (OSHA) standards.

2. Transport and Disposal

If the generator of the unauthorized waste is known, the site manager will contact the generator with instructions to have the unauthorized waste removed from the site immediately, and transported to an approved facility for disposal or treatment. The waste will be temporarily stored on site prior to removal by a contractor, but will be removed as soon as is practical. If the generator is unknown, the facility is responsible for contacting a qualified transport and disposal contractor based on the type of unauthorized waste.

C. RECORDKEEPING

Incidents of unauthorized waste refusal will be recorded on the form provided in Appendix VI. The records will include information such as the date and time of the incident, waste type(s), generator, hauler, facility personnel involved, response actions (including records of transportation and ultimate disposition), regulatory interaction and correspondence, and other relevant documentation (e.g., waste manifests, photographs, contracts for transport and disposal, certificates of waste destruction, analytical data, permits). Load inspections will be recorded on the form provided in Appendix III. All reports and resulting correspondence will be maintained at the facility or other designated location, and will be available to ADEM for review.

IV. TRAINING PROGRAM

A. OBJECTIVE

The objective of the training program is to teach facility personnel to recognize, remove, and report waste not authorized by the ADEM Administrative Code to be disposed of at this facility. The following sections discuss each component of the program and the schedule by which applicable personnel will be trained.

B. APPLICABILITY

All on-site personnel involved with waste acceptance activities including, but not limited to, the site manager, gate attendant, waste spotter, and equipment operators will be subject to the training program described in this section.

C. PROGRAM ELEMENTS

Applicable facility personnel will be trained to comply with all of the elements of this plan and proper waste acceptance operations in accordance with the ADEM Administrative Code and the facility permit. These operations include, but are not limited to:

- Training to recognize free liquids, regulated hazardous wastes, regulated medical wastes, regulated PCB wastes, and other unauthorized waste types as described in Section II.C.1
- Monitoring of incoming waste as described in Section II.C
- Safe removal and/or segregation of unauthorized waste as described in Section III.
- Response, reporting, and recordkeeping requirements as described in Section III.

D. TRAINING SCHEDULE AND RECORDKEEPING

All applicable on-site personnel will be trained to identify unauthorized waste and to take the correct response procedures within three months of implementing this Control Program, or within three months of the date of hire. A refresher, training course will be performed annually, and will include any changes to this Program. A sample outline for employee training is provided in Appendix VII. The training will be documented on the training form provided in Appendix IV, which will be maintained in the facility Operating Record, available for review by the ADEM

APPENDIX I

SOLID WASTE DISPOSAL FACILITY PERMIT
45-01

APPENDIX II

LIST OF AUTHORIZED/UNAUTHORIZED WASTES

AUTHORIZED AND UNAUTHORIZED WASTES

AUTHORIZED WASTE

Acceptable materials allowed at this facility are the approved waste as listed in Solid Waste Disposal Permit 49-21. Acceptable waste materials shall include only those materials permitted by state or federal law. Acceptable refuse expected to be commonly processed by the facility are listed below:

- Municipal Solid Waste
- Industrial Waste
- Construction and Demolition Debris
- Rubbish
- Approved Wastewater Sludges
- Total Petroleum hydrocarbons
- Automobile Fluff
- Remediation Waste

UNAUTHORIZED WASTE

Unacceptable or Prohibited Materials - Materials considered to be unacceptable or prohibited include, but are not limited to, the following:

- Free Liquids
- Regulated Hazardous Wastes
- Solid wastes, residues, or soils containing more than 1.0 parts per billion (ppb) of Dioxins
- Solid wastes, residues, or soils containing more than 50.0 parts per million (ppm) of PCB's
- Pesticide containers that have not been triple rinsed and crushed
- Drums that are not empty, not properly cleaned, and/or not opened on both ends
- Waste Oil
- Untreated Medical Waste

APPENDIX III

RANDOM WASTE INSPECTION FORM AND WORKING FACE INSPECTION PROCEDURES

RANDOM LOAD INSPECTION TEMPLATE

ADEM Admin. Code r. 335-13-4-.21(1)(b)

Axis Industrial Landfill 49-21

Facility Name & Permit Number Inspection Time & Date

WASTE HAULER INFORMATION

Company Name:

Driver Name:

Vehicle Description/Container Type:

GENERATOR & WASTE INFORMATION

Waste Generator Name & Address

Method of Shipment: O Bulk O Drum O Bagged O Other:

Quantity Generated: Amount:_____ O Tons O

Cubic Yards O Other Per: O Weekly O Monthly O Yearly O Other

Special Waste Approval Number, if applicable:

WASTE CHARACTERISTICS

Waste Description

(C/D, MSW, Ind.):

Typical Color(s):

Strong Odor: O Yes O No Describe:

Physical State: O Solid O Liquid O Powder O Semi-Solid or

Sludge O Other: pH Range: O 2 O 2.1-12.4

O 12.5 O N/A (Solid) O Actual:

Approval Decision: O Approved O Rejected

Does the load contain unauthorized waste? O Yes O No

If yes, identify which waste: □ Free Liquids □ Hazardous Waste □ Medical Waste □ PCB Waste

If the load contains any of the waste listed above, the load is unacceptable for disposal and should be rejected. Indicate reasons for rejection below and attach any additional documentation:

**If load is rejected by the facility), please see the facility's plan for procedures for notifying the proper authorities per ADEM Admin. Code r. 335-13-4-. 21(1)(b)5.*

By signing this Inspection Form, I hereby certify that all information in this form and all attached documents contain true and accurate descriptions of the waste material.

Inspector Signature Date

RANDOM WORKING FACE WASTE INSPECTION PROCEDURES

The following action plan details the procedure to follow when conducting the random refuse inspection.

A. Dump single load in prepared area
    1. Hold truck and driver until inspection is completed

B. Examine waste for unauthorized wastes and/or safety hazards
    1. Containers labeled as hazardous
    2. Excessive or unusual moisture
    3. Biomedical (red bag) waste
    4. Powders, dust, smoke, vapors, or chemical odors
    5. Pastes, slurries, or bright colors (such as dyes)

C. Take action: one or more as appropriate
    1. Incorporate acceptable waste into working face
    2. Hold suspect waste for identification by on-site personnel and confirmation by others if necessary.
        a. Contract Laboratory
        b. Contact ADEM inspector
        c. Contact Federal regulator
        d. Contact Waste Generator
    3. Remove unauthorized waste (in priority order)
        a. Hold rejected waste for generator
        b. Hold rejected waste for collector management
        c. Prepare for waste collection by licensed collector

D. Document actions
    1. Record inspection
    2. Retain reports

APPENDIX IV

TRAINING FORM

EMPLOYEE TRAINING SCHEDULE	Employee: _____ Title: _____ _____

Instructions: Describe the employee training program for your facility below. The program should, at a minimum, cover unauthorized waste recognition, removal, and required reporting. Provide a schedule for the training program and the list of the employees who attend training sessions.

Training Date	Training Provider	Training Topics		Brief Description of Training Program/Materials (e.g., film, newsletter, course)

APPENDIX V

CONTACT NUMBERS

CONTACT NUMBERS

NAMES	NUMBERS
Fire Department	911
Police Department	911
Rescue Squad	911
Hospital	911
Alabama Power	(888) 990-2726
Alabama Department of Environmental Management	(334) 271-7700
National Response Center	(800) 424-8802

Transportation and Disposal Contractors

Safety-Kleen Corp.	(251) 456-3042

APPENDIX VI

REJECTED WASTE FORM

REJECTED WASTE FORM

WASTE DESCRIPTION/TYPE: _____
_____
_____
_____

WASTE: REJECTED ☐ ACCEPTED ☐

NOTIFIED: WASTE SOURCE ☐ HAULING MANAGEMENT ☐

LOCAL AUTHORITY ☐ ADEM ☐ EPA ☐

OTHER: _____

Refused Waste Generator: _____

Refused Waste Transporter: _____

Address: _____

Destination: _____

Address: _____

Accepted Waste: _____

Contained Area: _____

Secured By: _____

Additional Comments: _____
_____
_____
_____
_____
_____
_____

Signature: Date & Time:

APPENDIX VII

SAMPLE TRAINING OUTLINE

Notes for Unauthorized Waste Training

I. Unauthorized Waste/Waste Screening

A. ADEM Administrative Code Division 13-4-.21

B. Review Control Program for Unauthorized Waste in Operations Manual

C. Preventative Measures

1. Signs and Fences

2. Applicable Local Laws
   - Unauthorized Waste Plan states there are no applicable local laws that are more stringent than current state laws

.

D. Monitoring (by all landfill personnel)
   - Unauthorized Waste Plan states 1% of your loads or 1 per day minimum
   - Random Working Face Inspection
     - Spread and visually inspect
     - Flag suspicious items
     - Coordinate field testing (if appropriate)
     - Record inspection event

1. Training Program - The 3 R's
   - **Recognize**
     - How do we recognize types of waste?
       - Medical – Red Bags; Biohazard
       - Hazardous – Marked; Drums; Containers
       - Asbestos – Shingles; Floor Tiles (less and less)
       - PCBs – Ballast; TV; Computers

   - **Remove –** if detected
     - Segregate
     - Secure
     - Prevent leakage/contamination
     - Approved contractor to cleanup/remove

    - Dispose at regulated facility

- **Report** - to operator ASAP

2. Recordkeeping
    - Time and date of incident, waste type, generator, hauler, driver, facility personnel involved, and response actions
    - Document regulatory interaction and correspondence
    - Waste manifests, photographs, contracts with transport and disposal providers, certificates of waste destruction, analytical data, permits
    - Records kept for three (3) years

Attachment G

Closure/Post-Closure Plan

9.0 CLOSURE AND POST-CLOSURE PLAN

9.1 POST-CLOSURE CARE PERIOD

The Landfill Permittee must maintain the landfill and continue monitoring requirements throughout the post-closure care period. The post-closure maintenance and monitoring period shall continue for 30 years or for a period of time that has otherwise been determined by ADEM.

9.2 CHANGE IN LENGTH OF POST CLOSURE CARE PERIOD

The length of the post-closure care period may be decreased by the ADEM, if the landfill supervisor demonstrates that a reduced period is sufficient to protect human health and the environment and the demonstration is approved by the Department.

The length of the post-closure care period may also be increased, if ADEM determines that the lengthened period is necessary to protect human health and the environment.

9.3 FACILITY INVENTORY

The facility is design to have a maximum inventory of approximately 3.0 million cubic yard. The largest area needing final closure is anticipated to be approximately 46.8 acres.

9.4 FACILITY MAINTENANCE

The Landfill Permittee shall maintain the landfill property for the post-closure care period as determined by ADEM. The Permittee shall inspect the facility on a monthly basis and after major storm events to identify problems with vector control, erosion, cracks, ponding, settlement, and other such deficiencies.

Eroded areas shall be filled with suitable soil cover, compacted, graded, and revegetated. Areas that allow surface water ponding due to settlement shall also be filled, graded, and vegetated. Extensive surface cracks must be identified and corrected to prevent the infiltration of surface water.

The Permittee shall also ensure inspection and maintenance of all access control structures. Signs will continue to be posted at the facility throughout post-closure, which state that the facility is closed and provide the location of the nearest

permitted landfill. Any waste dumped at the facility following final closure shall be moved to an approved landfill by the permittee, the operating agency, or the owner.

9.5 FINAL COVER SYSTEM

It is anticipated that, at the time of closure, the Axis Landfill will be closed in place utilizing an equivalent final cover system design consisting of a composite soil-geosynthetic final cover system which consists of (from bottom-up):

- 12" Clay Infiltration Layer with a permeability less than or equal to $1x10^{-5}$ cm/sec;
- 40-mil low density polyethylene (LLDPE) flexible membrane liner;
- Double-sided geocomposite drainage layer;
- 18" Drainage Layer consisting of naturally present soils; and,
- 6" Erosion Layer consisting of topsoil to promote vegetative growth.

9.6 FINAL COVER MAINTENANCE

Throughout the post-closure care period, the final cover system will require attention and maintenance. After the landfill is closed, the Landfill Permittee shall make monthly inspections of the entire cover system to detect problems, such as erosion and settlement that could reduce the effectiveness of the cap.

The Landfill Permittee should mow the entire landfill at least once a year to reduce the growth of woody plants. The volunteer growth of any trees should be prevented on the final cover. Inspection immediately following mowing could detect the beginning of erosion or the settlement of the cover.

The erosion layer or topsoil is constructed to protect the LLDPE liner. It is imperative that erosion problems be identified and corrected to prevent damage to the cap, which may result to washout of waste materials and increased infiltration. Any eroded areas must be filled, compacted, and regrassed. Periodically lime and fertilizer will have to be added to the cover in order to maintain an adequate vegetative cover.

Due to decomposition of waste, and compaction of the waste by overburden, the landfill surface will be subject to settlement and the potential for rainwater ponding. Inspections should detect settled areas. These areas must be filled, compacted, and regrassed to prevent ponding and encourage runoff, while maintaining a minimum grade of 5 percent.

The Permittee shall inspect all surface water control structures including concrete inlets, storm sewers, culverts, sediment pond outlets, berms, ditches, and terraces to insure the integrity of the surface water control system remains intact. Any damage due to settlement, erosion, or caused by maintenance equipment shall be promptly repaired.

9.7 LEACHATE COLLECTION SYSTEM MAINTENANCE

The Landfill Permittee shall continue collecting and treating leachate throughout the post- closure care period. Monthly inspections must be made to detect any leaks in the dual containment piping leading to the leachate transfer system. All joints and fittings must also be inspected for leaks. Should any leaks be identified, then the Landfill Permittee must immediately have the leak repaired and the system opened to flow as soon as possible thereafter.

9.8 GROUNDWATER MONITORING

The Landfill Permittee must continue detection monitoring at all groundwater monitoring wells on a semi-annual basis. Samples from each well must be collected and analyzed for the constituents outlined in the permit. The requirements for groundwater monitoring and record- keeping apply throughout the post-closure care period. The Landfill Permittee should refer to Chapter 10 of this Manual for specific groundwater requirements. All groundwater monitoring wells must be maintained and any wells that are damaged or destroyed by equipment, etc. should be immediately replaced in accordance with the details and the Groundwater Monitoring Plan.

9.9 LANDFILL GAS MONITORING

All explosive gas monitoring wells and gas collection and conveyance system infrastructure must be maintained throughout post-closure. Any structures damaged or destroyed by equipment, etc. must be immediately replaced in accordance with the details shown on the Permit Plans. Landfill gasses that could potentially migrate off-site must continue to be monitored on a quarterly basis, throughout the post-closure care period, and results placed in the Operating Record. Specific monitoring requirements are outlined throughout the Operations Manual.

9.10 STORMWATER MONITORING DURING POST-CLOSURE

Stormwater monitoring shall occur in accordance with a current NPDES Permit for a period of time specified by the Department.

9.11 POST- CLOSURE CERTIFICATION

Following the completion of the post-closure care period of this facility, the Permittee will submit to the Department a certification, signed by an independent registered professional engineer verifying that the post-closure care has been completed in accordance with the post-closure plan. A copy of the certification will also be placed in the Operating Record.

9.12 DEED RECORD AND ENVIRONMENTAL COVENANT

Within 90 days after closure requirements are achieved, the Owner shall record a notation onto the land deed or onto some other legal instrument that is normally examined during a title search, that will in perpetuity, notify any potential purchaser of the property that:

1. The land has been used as a solid waste disposal facility;
2. Post-closure use of the property must never be allowed to disturb the integrity of the final cover or the function of the monitoring systems, unless ADEM determines that the activities will not increase the potential threat to human health or the environment; or the activities are necessary to reduce the threat to human health or the environment.
3. The locations and dimensions of the disposal facility with respect to permanently surveyed benchmarks and section corners have been placed on a plat prepared and sealed by a land surveyor.
4. The Permittee of the Axis Landfill is EcoSouth Services of Mobile, LLC, and the facility was utilized for the disposal of MSW Waste.
5. Certification by an Engineer or Land Surveyor that all closure requirements have been completed as determined by the Department.

Upon completion of the deed recording requirements, the Owner shall submit a certified copy of the recording instrument to the Department and place a copy in the Operating Record. Additionally, ADEM must be notified within 120 days after permit expiration that the notation has been recorded and a copy placed in the Operating Record.

In addition to the deed notation, ADEM now requires an environmental covenant be filed for the property. Below are the steps required for filing the covenant:

- The covenant will be prepared and then signed by the property owner and mailed to ADEM.
- ADEM will review and sign the covenant and return to the property owner.
- The covenant is then to be recorded at the County Courthouse and signed by the County Clerk.
- A final copy of the covenant is to be submitted to ADEM.

9.13 POST-CLOSURE LAND USE

Post-closure use of the property must never be allowed to disturb the integrity of the final cover or any component of the monitoring systems. Maintenance or post-closure use with equipment shall only be performed during dry periods to prevent damage to the final cover system.

Post-closure land uses of the Axis Landfill should be limited to agricultural purposes that rely on the use of short rooted grasses. Due to the potential for settlement, the construction of buildings should be limited. If the Landfill Owner or Permittee, upon final closure of the facility, has future post-closure plans to utilize any portion of the landfill property, ADEM will be notified.

The Permittee or Owner, or any subsequent owner of the land upon which a landfill facility is located must request approval from the Department if they wish to remove waste, waste residues, the liner, or any contaminated soils. The owner may also ask permission to remove the notation from the recording instrument, if all the waste and contaminated soils are removed from the property and no unpermitted discharges to waters have occurred.

9.14 POST-CLOSURE CARE CONTACTS

EcoSouth Services of Mobile, LLC
Jeff Claunch
12945 Highway 43 N
Axis, Alabama 36505
Phone: (251) 675-9800
Jeff.claunch@ecosouthservices.com

Alabama Department of Environmental Management
Solid Waste Branch
P.O. Box 301463
Montgomery, Alabama 36130-1463
(334) 271-7700

LaBella Associates, D.P.C.
Darrell Thornock, P.E.
2101 Executive Park Drive, Suite 102
Opelika, Alabama 36801
(804) 355-4520
dthornock@labellapc.com

Attachment H

Financial Assurance Estimates

ESTIMATION OF CLOSURE COSTS

FILL IN THE BOXES. THE REST WILL BE CALCULATED FOR YOU

Soil Cap Components

				Calculation or Conversion	
I.	**Slope & Fill**				
a.	Area to be capped	12.4	acres	x 4,840yd2/ac	60,016 yd2
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	10,003 yd3
d.	Percentage of soil from off-site	0%			
e.	Purchace unit cost for off-site material	$8.05	/yd3		
f.	Percentage of soil from on-site			(1 - d)	100%
g.	Excavation unit cost (on-site material)	$4.39	/yd3		
h.	Total soil unit cost			(d x e) + (f x g)	$4.39 /yd3
i.	Hauling, Placement and Spredding unit cost	$1.50	/yd3		
j.	Compaction unit cost	$0.37	/yd3		
k.	Total soil unit cost			h + i + j	$6.26 /yd3
l.	Soil subtotal			k x b	$62,617
m.	Percent compaction	25%			
	Total Slope & Fill Cost			l x (1 + m)	***$78,271***
II.	**Infiltration Layer Soil**				
Infiltration Soil Cost					
a.	Area to be capped		acres	x 4,840yd2/ac	0 yd2
b.	Depth of infiltration soil needed	18	inches	x 1yd/36in	0.50 yd
c.	Quantity of infiltration soil needed			a x b	0 yd3
d.	Percentage of soil from off-site	0%			
e.	Purchace unit cost for off-site material	$11.13	/yd3		
f.	Percentage of soil from on-site			(1 - d)	100%
g.	Excavation unit cost (on-site material)	$6.39	/yd3		
h.	Total infiltration soil unit cost			(d x e) + (f x g)	$6.39 /yd3
i.	Hauling, Placement and Spredding unit cost	$1.50	/yd3		
j.	Compaction unit cost	$1.83	/yd3		
k.	Total infiltration soil unit cost			h + i + j	$9.72 /yd3
l.	Infiltration soil subtotal			k x b	$0
m.	Percent compaction	25%			
n.	*Subtotal Infiltration Soil Cost*			l x (1 + m)	***$0***
Soil Admixture Cost					
o.	Area to be capped		acres	x 4,840yd2/ac	0 yd2
p.	Soil admixture unit cost		/yd2		
q.	*Subtotal admixture cost*			a x b	*$0*
Soil Testing					
r.	Area to be capped	0	acres		
s.	Testing unit cost	$1,700.00	/acre		
t.	*Subtotal soil testing cost*			a x b	*$0*
	Total Infiltration Soil Cost (soil, admixtures, and testing)			n + q + t	***$0***

III. Erosion Control / Protective Cover Soil

a.	Area to be capped	12.4	acres	x 4,840yd2/ac	60,016	yd2
b.	Depth of soil needed	18	inches	x 1yd/36in	0.50	yd
c.	Quantity of soil needed			a x b	30,008	yd3
d.	Percentage of soil from off-site	0%				
e.	Purchace unit cost for off-site material	$8.05	/yd3			
f.	Percentage of soil from on-site			(1 - d)	100%	
g.	Excavation unit cost (on-site material)	$4.39	/yd3			
h.	Total erosion/protective soil unit cost			(d x e) + (f x g)	$4.39	/yd3
i.	Hauling, Placement and Spredding unit cost	$1.50	/yd3			
j.	Compaction unit cost	$0.37	/yd3			
k.	Total soil unit cost			h + i + j	$6.26	/yd3
l.	Erosion/Protective soil subtotal			k x b	$187,850	
m.	Percent compaction	25%				
	Total Erosion Control/Protective Cover Soil Cost			l x (1 + m)	***$234,813***	

IV. Vegetative support soil (Topsoil)

a.	Area to be capped	12.4	acres	x 4,840yd2/ac	60,016	yd2
b.	Depth of topsoil needed	6	inches	x 1yd/36in	0.17	yd
c.	Quantity of topsoil needed			a x b	10,003	yd3
d.	Percentage of topsoil from off-site	0%				
e.	Purchace unit cost for off-site material	$13.10	/yd3			
f.	Percentage of topsoil from on-site			(1 - d)	100%	
g.	Excavation unit cost (on-site material)	$6.00	/yd3			
h.	Total topsoil unit cost			(d x e) + (f x g)	$6.00	/yd3
i.	Hauling, Placement and Spredding unit cost	$1.50	/yd3			
j.	Total soil unit cost			h + i	$7.50	/yd3
	Total Topsoil Cost			c x j	***$75,020***	

V. Vegetative Cover

a.	Area to be vegetated	12.4	acres			
b.	Vegetative cover (seeding) unit cost	$4,000	/acre			
c.	Erosion control matting unit cost		/acre			
	Total Vegetative Cover Cost			a x (b + c)	***$49,600***	

Soil Cap Component Subtotal (I + II + III + IV + V): $437,703

Geosynthetic Barrier & Infiltration Layers

VI. Flexible Membrane Liner

				Calculation or Conversion		
a.	Quantity of FML needed	12.4	acres	x 43,560ft2/ac	540,144	ft2
b.	Purchase unit cost	$0.43	/ft2			
c.	Installation unit cost	$0.11	/ft2			
d.	Total FML unit cost			b + c	$0.54	
	Total FML cost			a x d	***$291,678***	

VII. Geosynthetic Clay Liner

a.	Quantity of GCL needed		acres	x 43,560ft2/ac	0	ft2
b.	Purchase unit cost	$0.40	/ft2			
c.	Installation unit cost	$0.08	/ft2			
d.	Total GCL unit cost			b + c	$0.48	/ft2
	Total GCL Cost			a x d	***$0***	

Geosynthetic Layers Subtotal (VI + VII): $291,678

Drainage Components

				Calculation or Conversion	
VIII.	**Sand or Gravel Drainage**				
a.	Area to be capped		acres	x 4,840yd2/ac	0 yd2
b.	Depth of sand or gravel needed		inches	x 1yd/36in	0.00 yd
c.	Quantity of drainage material needed			a x b	0 yd3
d.	Percentage of media from off-site				
e.	Purchace unit cost for off-site material		/yd3		
f.	Percentage of material from on-site			(1 - d)	100%
g.	Excavation unit cost (on-site material)		/yd3		
h.	Total drainage material unit cost			(d x e) + (f x g)	$0.00 /yd3
i.	Hauling, Placement and Spredding unit cost		/yd3		
j.	Compaction unit cost		/yd3		
k.	Total drainage material unit cost			h + i + j	$0.00 /yd3
l.	Drainage material subtotal			k x b	$0.00
m.	Percent compaction				
	Total drainage material cost			l x (1 + m)	***$0***
IX.	**Geotextile**				
a.	Quantity of geotextile needed		acres	x 43,560ft2/ac	0 ft2
b.	Purchase unit cost		/ft2		
c.	Installation unit cost		/ft2		
d.	Total geotextile unit cost			b + c	$0.00 /ft2
	Total Geotextile Cost			a x d	***$0***
X.	**Geonet Composite**				
a.	Quantity of geonet composite needed	12.4	acres	x 43,560ft2/ac	540,144 ft2
b.	Purchase unit cost	$0.61	/ft2		
c.	Installation unit cost	$0.08	/ft2		
d.	Total geonet composite unit cost			b + c	$0.69 /ft2
	Total Geonet Composite Cost			a x d	***$372,699***
XI.	**Drainage Tile**				
a.	Length of drainage tile needed	0	LF		
b.	Purchase unit cost	$26.00	/LF		
c.	Trenching and backfilling cost	$6.00	/LF		
d.	Total drainage tile unit cost			b + c	$32.00 /ft2
	Total Drainage Tile Cost			a x d	***$0***

XII. Drainage Channels (Stormwater Control)

Drainage benches and berms

a.	Size of drainage bench needed	***1,772***	LF		
b.	Drainage bench unit cost	***$7.00***	/LF		
c.	*Subtotal drainage bench cost*			a x b	*$12,404*
d.	Size of drainage swale/berm needed	260	LF		
e.	Drainage swale/berm unit cost	$33	/LF		
f.	*Subtotal drainage swale/berm cost*			d x e	*$8,450*

Rip Rap

g.	Quantity of Rip Rap needed	290	yd2		
h.	Rip rap unit cost	$42.50	/yd2		
i.	*Total rip rap cost*			g x h	*$12,325*

Gabian Baskets

j.	Quantity of gabian baskets needed		yd3		
k.	Gabian basket unit cost		/yd3		
l.	Subtotal gabian basket cost			j x k	*$0*
	Total Stormwater Control			c + f + i + l	***$33,179***

Drainage Component Subtotal (VIII + IX + X + XI+ XII): $405,878

Landfill Gas and Groundwater Features

XIII. Landfill Gas Monitoring & Control Components

Landfill Perimeter System

				Calculation	
a.	Number of probes to be installed	0	probes		
b.	LFG probe unit cost		/probe		
c.	*Subtotal LFG probe cost*			a x b	*$0*

Landfill Control Systems

d.	Area to be closed	12.4	acres		
e.	Average number of wells per acre	1	wells / acre		
f.	LFG well unit cost	$4,000	/well		
g.	*Subtotal LFG well cost*			d x e x f	*$49,600*
h.	Length of header pipe needed		LF		
i.	Header pipe unit cost	$20.00	/LF		
j.	Header pipe installation cost	$2.10	/LF		
k.	*Subtotal LFG active well hook-up*			h x (i + j)	*$0*
	Total Landfill Gas Management Cost			c + g + k	***$49,600***

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 x c) + (d x e x f)	***$0***

Landfill Gas & Groundwater Features Subtotal (XIII + XIV): $49,600

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 x (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 x b	***$0***
XVII.	**Landfill Access Road**				
a.	Size of LF access road		yd2		
b.	Depth of gravel needed	12	inches	x 1yd/36in	0.3 yd
c.	Depth of asphalt needed		inches	x 1yd/36in	0.0 yd
d.	Total material needed			a x (b + c)	0 yd3
e.	Road material unit cost	$11.46	/yd3		
f.	Placement/Spreading unit cost	$1.50	/yd3		
	Total access road cost			c x (d + e)	***$0***
XVIII.	**Site Security**				
Fencing					
a.	Length of fencing needed		ft		
b.	Fence unit cost		/ft		
c.	*Subtotal fencing cost*			a x b	*$0*
Gate or Barrier					
d.	Number of gates required				
e.	Gate unit cost		/gate		
f.	*Subtotal gate cost*			d x e	*$0*
Closed Sign					
g.	Number of signs required	2			
h.	Sign unit cost	$65.00	/gate		
i.	*Subtotal sign cost*			g x h	*$130*
	Total site security cost			c + f + i	***$130***
XIX.	**Mobilization / Demobilization**				
a.	Cost for mobilization/demobilization	$30,000			
	Total mobilization/demobilization cost				***$30,000***

Miscellaneous Subtotal (XV + … + XIX): $30,130

Closure Cost Subtotal (CCS):	(I + … + XIX)	$1,214,990
Contingency (10%):	CCS x 0.10	$121,499
Engineering & Documentation:		
Construction QA/QC (5%)	CCS x 0.05	$60,749
Closure Certification and CQA Report (5%)	CCS x 0.05	$60,749
Survey and as-builts (2%)	CCS x 0.02	$24,300
Cost for survey and deed notation		$2,000
Total Engineering & Documentation Costs		***$147,799***

Total Closure Cost: CCS + Contingency + Engineering **$ 1,484,287**

ESTIMATION OF POST-CLOSURE COSTS

FILL IN THE BOXES. THE REST WILL BE CALCULATED FOR YOU

I. Groundwater Monitoring

				Calculation or Conversion	
a.	Total number of monitoring wells	5	wells		
b.	Total number of sampling events/year	2	events/yr	a x b	10 samples/yr
c.	Quantity of additional samples (e.g. QA/QC)		samples/even	a x c	0 samples/yr
d.	Total samples per year			b + c	10 samples/yr
e.	Analysis unit cost (Table 3.1 constituents)	$265.00	/sample		
f.	*Total Analysis cost*			d x e	*$2,650.00* /yr
g.	GW Monitoring unit cost	$3,000.00	/event		
i.	*Total sampling cost*			f + (g x b)	*$8,650.00* /yr
j.	Engineering fees & reports	$2,000	/yr		
	Yearly Groundwater Monitoring Cost			f + i + j	***$13,300 /yr***

II. Landfill Gas Monitoring, Maintenance, and Control

a.	Frequency of LFG compliance monitoring	4	events/yr		
b.	LFG Monitoring unit cost	$750.00	/event		
c.	*Total perimeter LFG monitoring cost*			a x b	*$3,000* /yr
d.	Frequency of suface monitoring (air permit)		events/yr		
e.	Surface monitoring unit cost		/event		
f.	*Total surface monitoring cost*			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.	*Total constrol system cost*			g + (h x i)	*$0* /yr
	Yearly Landfill Gas Monitoring, Maintenance, & Control Cost			c + f + j	***$3,000 /yr***

III. Leachate Management

a.	Quantity of leachate generated	20,500	gal/yr		
	On-site Leachate Management or Pre-Treatment				
b.	On-site treatment operating unit cost		/gal		
c.	*Total on-site management cost*			a x b	*$0* /yr
	Leachate Disposal				
d.	Private disposal unit cost		/gal		
e.	POTW disposal unit cost	$0.10	/gal		
f.	Direct discharge to POTW unit cost		/month		
g.	Pump & Haul unit cost	$0.15	/gal		
h.	Subtotal leachate disposal unit cost			d + e + f + g	$0.25
i.	*Total leachate disposal cost*			a x h	*$5,125* /yr
j.	Leachate sampling & analysis unit cost	$265.00	/sample		
k.	Frequency of leachate sampling & analysis	1	sample/yr		
l.	*Total leachate sampling & analysis cost*			j x k	*$265.00* /yr
	Yearly Leachate Management Cost			c + i + l	***$5,390 /yr***

IV. Cap Maintenance & Repair

a.	Closed Landfill Area	12.4	acres		
	Mowing & Fertilization				
b.	Mowing frequency	2	visits/yr		
c.	Mowing unit cost	$79.00	/acre/visit		
d.	*Total mowing cost*			a x b x c	*$1,959* /yr
e.	Fertilizer frequency	1	visits/yr		
f.	Fertilizer unit cost	$289.00	/acre/visit		
g.	*Total fertilizer cost*			a x e x f	*$3,584* /yr

Cap Erosion & Repair

h.	Area to reseed/year			33% x a	4.1	acres
i.	Reseeding unit cost	$1,895.00	/acre			
j.	maximum years for reseeding				3	year
k.	Total reseeding cost			h x i x j	$23,498.00	
l.	*Total annual reseeding cost*			k ÷ post closure length	*$783.27*	/yr
m.	Area of cap erosion/year			10% x a	1.2	acres
n.	Cap erosion repair unit cost	$150.00	/acre			
o.	Mobilization/Demobilization	$105.00	/yr			
p.	*Total cap erosion repair cost*			(k x l) + m	*$291*	/yr
	Yearly Cap Maintenance & Repair cost			d + g + l + p	***$6,617***	***/yr***

V. Sediment Basin Maintenance & Repair

a.	Sediment basin cleanout frequency, 1 per	5	years	1 / a	0.20	event/yr
b.	Sediment basin cleanout unit cost	$2,700	/event			
c.	Mobilization/Demobilization	$1,000	/event			
d.	*Total sediment basin maintenance cost*			a x (b + c)	*$740*	/yr
e.	Total number of stormwater sampling locations	2	locations			
f.	Stormwater sampling frequency	1	events/yr			
g.	Total number of stormwater samples			e x f	2	samples/yr
h.	Analysis unit cost (VPDES permit parameters)	$3,500	/sample			
i.	*Total Analysis cost*			g x h	*$7,000*	/yr
j.	Mobilization unit cost		/event			
k.	Technician field unit cost	$700.00	/event			
l.	*Total sampling cost*			f x (j + k)	*$700.00*	/yr
m.	Engineering fees & reports	$1,000	/yr			
n.	*Total Stormwater Sampling & Analysis cost*			f + i + j	*$1,700*	*/yr*
	Yearly Sediment Basin Maintenance & Repair			d + n	***$2,440***	***/yr***

VI. Vector & Rodent Control

a.	Vector and rodent control unit cost	$500	/yr			
	Yearly Vector and Rodent Control Cost			a	***$500***	***/yr***

VII. Post-Closure Care General Inspections

a.	General Inspection unit cost		/inspection			
b.	Number of inspections per year	1				
	Yearly Post-Closure Care General Inspection Cost			a x b	***$0***	***/yr***

Annual Post-Closure Care Cost (APCC)			I + … + VII	$31,247 /yr
Length of post-closure care (LPCC)	30	years		
Post-Closure Care Cost			APCC x LPCC	$937,412
Engineering & Documentation			Engineering Sum	$11,750
Post-Closure Care Evaluation	$11,000			
Post-Closure Care Certification	$750			
Cost for survey and deed notation (if not completed at time of landfill closure)				
FA Mechanism Maintenance Cost	$200	/yr	FA maintenance x LPCC	$6,000
Total Post-Closure Care Cost			Post-Closure Cost + Engineering + FA Maintenance	**$ 949,162**

Attachment I

Slope Stability Calculations

Project:	EcoSouth Axis Landfill		
Project Number:	2192290 Phase 01		
Calculated By:	DWT	Date:	11/6/20
Revised By:		Date:	
Checked By:		Date:	
Subject:	Global Stability		
Sheet:	1 of 6		

GLOBAL STATIC AND SEISMIC SLOPE STABILITY

OBJECTIVE

The objective of this calculation is to analyze the stability of the EcoSouth Axis Industrial Landfill (Landfill) Phase 2 at 3:1 final grade conditions. This analysis will determine an acceptable soil to waste friction envelope that will yield deep-seated translational and rotational factors of safety exceeding 1.5 for static conditions and 1.0 for seismic conditions. Final grades represent worst case for stability because interim grades have lower waste depths.

This analysis includes:

Attachment A – Cross Section Location
Attachment B – SLIDE v. 8.018 Slope Stability Software Analysis Output Data

METHODOLOGY

Cross Section – Final Grade Slopes

A cross-section through the proposed final grades configuration that included the maximum crest height and sloping landfill base grade was considered. The slope profile in Phase 2 has a maximum elevation of approximately 106 feet with a waste thickness of approximately 84 feet at the point of the section. Since global stability is being analyzed, the cover system was modeled as one soil unit. The baseliner is generally sloping to the north at a slope greater than 2 percent.

LANDFILL DESIGN

The landfill system design consists of the following (from top to bottom):

- Cover System (3 ft)
- Waste (84 ft thickness)
- Base Liner System (2 ft)
- Subgrade

STATIC STABILITY ANALYSIS

The software program used to calculate slope stability FS within this analysis is entitled, "SLIDE" version 8.018, compiled by Rocscience, Inc. of Toronto, ON, Canada. The program uses limit equilibrium techniques to determine a minimum FS for each given input cross-section slope. SLIDE will calculate a minimum FS for both rotational and non-circular, translational failure surfaces within the cross-section under both static and seismic conditions based upon slope geometry, a phreatic surface, and the shear strength parameters of waste and soils.

Block Search with Janbu's Method

The Block Search method is a technique used within SLIDE to locate the most critical non-circular failure surface within each cross-section. This method was used for both static and seismic conditions. The Block search method was used in conjunction with the Simplified Janbu Method as it does not incorporate moment equilibrium and is therefore appropriate for ***translational*** soil movement.

Characteristics of Block Search/Janbu's Method include:

- The ability to single out a confined zone that may represent a potentially weak layer;
- Generating passive and active portions or "blocks" of the failure surface at angles that are randomly generated within a specified range;
- Applicable to any shape of failure surface;
- Satisfies both vertical force and moment equilibrium for each slice and overall horizontal force equilibrium for the entire wedge;
- Considers all interslice shear forces to be horizontal (no interslice shear force);

Bishop's Simplified Method

Bishop's simplified method is a limit equilibrium technique used within this analysis by SLIDE to locate the most critical ***rotational*** failure surface within the cross-section.

Characteristics of Bishop's Method include:

- Dividing failure mass into a number of slices;
- Satisfies vertical force equilibrium for each slice and overall moment equilibrium about the center of the rotational failure surface;
- Specifically applicable to rotational failure surfaces;
- Considers all interslice shear forces to be horizontal (no interslice shear forces).

Janbu's Method

The Simplified Janbu Method was also used for analyzing the most critical ***rotational*** failure surface for each cross section, considering static and seismic conditions. This approach uses the method of slices to determine the stability of the slide mass. The simplified procedure assumes that there are no inter-slice shear forces. Janbu's method satisfies vertical force equilibrium for each slice, as well as overall horizontal force equilibrium for the entire slide mass.

Geosynthetic Shear Strength Parameters

The shear strength of the baseliner within this stability analysis is represented by the most critical contact interface along the landfill floor and sideslopes defining the weakest material and plane within the landfill baseliner. The most critical peak strength interface contact of the proposed baseliner was represented in the analysis as a layer with a thickness 0.5 foot along the bottom soil layer.

The shear strength parameters utilized in both analyses were varied for the 1.0 foot and 0.5 foot thick layers respectively to determine the minimum shear strength of the interfaces that will result in a factor of safety of at least 1.5 for static conditions and 1.0 for seismic conditions.

LANDFILL DESIGN

SOIL & WASTE PARAMETERS

Cover and Fill Soil Parameters

γ: Moist Unit weight of constructed soil layers = 110 pcf
γ_S: Saturated Unit weight of constructed soil layers = 115 pcf
c': Cohesion = 0 psf
Φ': Friction angle = 32 degrees

Waste Parameters

The shear strength values for Industrial waste were estimated to be:

γ: Moist Unit weight of waste = 80 pcf
γ_S: Saturated Unit weight waste = 85 pcf
c': Cohesion = 0 psf
Φ': Friction angle = 26 degrees

The shear strength values for MSW waste were taken from the Ohio State EPA publication Geotechnical and Stability Analysis for Ohio Waste Containment Facilities, 2004.

Drainage Layer Parameters

γ: Moist Unit weight of drainage layer = 130 pcf
γ_S: Saturated Unit weight of drainage layer = 135 pcf
c': Cohesion = 0 psf
Φ': Friction angle = 35 degrees

Geosynthetic Materials Parameters

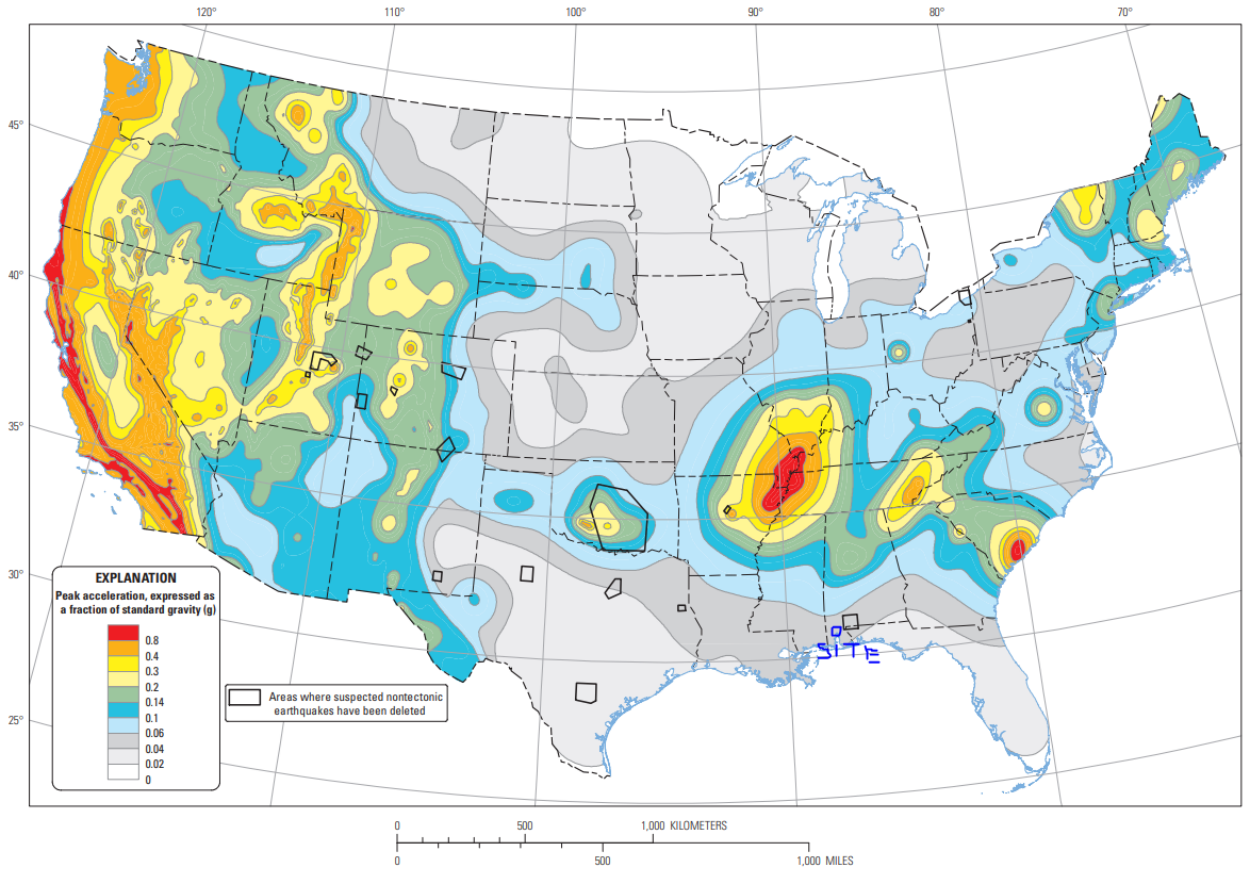
γ: Moist Unit weight of geosynthetic layers = 90 pcf
γ_S: Saturated Unit weight of geosynthetic layers = 95 pcf
c': Cohesion =0 psf
Φ': Friction angle = 17 degrees

Soil Liner Parameters

γ: Moist Unit weight of compacted soil liner = 110 pcf
γ_S: Saturated Unit weight of compacted soil liner = 115 pcf
c': Cohesion = 0 psf
Φ': Friction angle = 33 degrees

SEISMIC STABILITY ANALYSIS

The shear wave acceleration is modeled within the stability analysis by inputting a coefficient, (Cs) that is some fraction of gravity. The peak acceleration for the site is estimated to be 0.05 g which is taken from the map below USGS Map, October 2002 which gives the acceleration that has a 10% probability of occurring in 50 years



Two-percent probability of exceedance in 50 years map of peak ground acceleration

The peak acceleration at the base (approximately 0.05 g, from USGS Map) was adjusted to reflect the peak acceleration at the crest of the landfill using Figure 8-11 adopted from Singh and Sun (1995). Accordingly, the peak acceleration at the crest is estimated to be 0.07g.

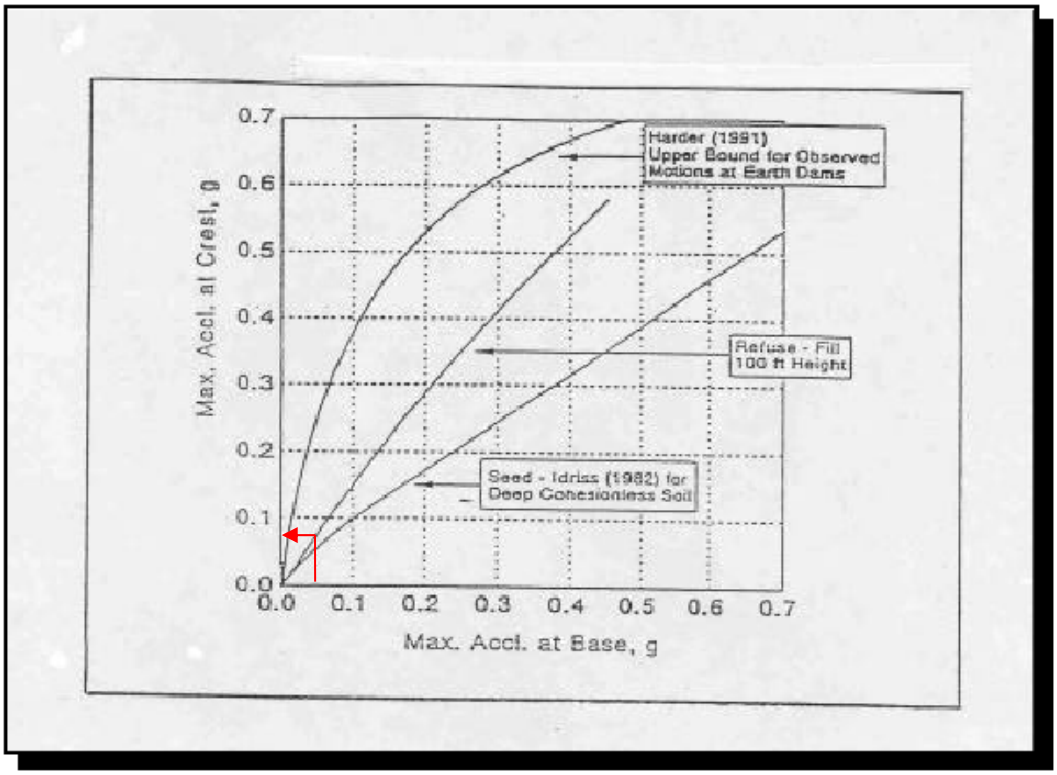


Figure 8-11 Approximate relationship between maximum accelerations at the base and crest for various ground conditions. Singh and Sun,1995, Figure 3.

The modified peak horizontal ground acceleration was used directly as the seismic coefficient in the SLIDE slope stability program.

SLOPE STABILITY RESULTS

Factors of safety (FS) were calculated for the final slope condition for the new landfill expansion. The SLIDE software package calculated FS, expressing the ratio of resisting to driving forces, for each failure surface considering static conditions. Attachment B contains the SLIDE slope stability software output data.

The most critical failure surface for the cross section was then evaluated under seismic conditions.

RESULTS & OUTPUT

Factors of safety (FS) were calculated for the final slope condition for the MSW Landfill. The SLIDE software package calculated FS, expressing the ratio of resisting to driving forces, for each failure surface considering static and seismic conditions. The SLIDE slope stability software output data are

attached. The geometry of the critical failure planes are shown in attachment B. Below is a summary of the analysis files and results.

	Failure Type	Static/Seismic	FS
Cross Section	Translational	Static	2.54
	Rotational	Static	1.58
	Translational	Seismic	2.12
	Rotational	Seismic	1.46

CONCLUSIONS

Considering rotational and translational failure surfaces, it was the rotational surfaces that produced the lowest FS for the each case. Factors of Safety calculated within this stability analysis comply with industry excepted standards. All ***deep-seated*** translational and rotational analyses provided a static and seismic factor of safety greater than 1.5 and 1.0, respectfully. **In conclusion, the proposed EcoSouth Axis Industrial Landfill 3:1 slopes will be structurally stable under static and seismic conditions.**

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AXIS LANDFILL

AXIS, ALABAMA

NO:	DATE:	DESCRIPTION:
Revisions		

PROJECT NUMBER: 2201419

DRAWN BY: IWW

REVIEWED BY: LBB

ISSUED FOR: BIDDING

DATE:

DRAWING NAME:

3 : 1 FINAL GRADING PLAN

DRAWING NUMBER:

01

6/3/2010 8:47:56 AM L:\EcoSouth\dwg\2020\cell 10 and 11 stability.dwg Layout=Layout1

Slide Analysis Information

EcoSouth Phase 2 Landfill 3-1

Project Summary

File Name:	EcoSouth Phase 2 Landfill 3-1.slmd
Slide Modeler Version:	8.018
Project Title:	EcoSouth Major Permit Modification 3:1 Slopes
Author:	Darrell Thornock,P.E.
Company:	LaBella Associates, D.P.C.
Date Created:	11/6/2020

Currently Open Scenarios

Group Name	Scenario Name	Global Minimum	Compute Time
Block	Master Scenario	Bishop Simplified: 2.536270 Janbu Simplified: 2.255640	00h:00m:00.477s
	Block Seismic	Bishop Simplified: 2.122350 Janbu Simplified: 1.889090	00h:00m:00.473s
	Circular	Bishop Simplified: 1.578460 Janbu Simplified: 1.530640	00h:00m:00.811s
	Circular Seismic	Bishop Simplified: 1.460030 Janbu Simplified: 1.365580	00h:00m:00.675s

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Left to Right

Analysis Options

All Open Scenarios	
Slices Type:	Vertical
Analysis Methods Used	
	Bishop simplified
	Janbu simplified
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

All Open Scenarios	
Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

All Open Scenarios	
Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Block - Circular		All other Scenarios	
Surface Type:	Circular	Surface Type:	Non-Circular Block Search
Search Method:	Auto Refine Search	Number of Surfaces:	5000
Divisions along slope:	20	Multiple Groups:	Enabled
Circles per division:	10	Pseudo-Random Surfaces:	Enabled
Number of iterations:	10	Convex Surfaces Only:	Disabled
Divisions to use in next iteration:	50%	Left Projection Angle (Start Angle) [°]:	135
Composite Surfaces:	Disabled	Left Projection Angle (End Angle) [°]:	135
Minimum Elevation:	Not Defined	Right Projection Angle (Start Angle) [°]:	45
Minimum Depth [ft]:	20	Right Projection Angle (End Angle) [°]:	45
Minimum Area:	Not Defined	Minimum Elevation:	Not Defined
Minimum Weight:	Not Defined	Minimum Depth:	Not Defined
		Minimum Area:	Not Defined
		Minimum Weight:	Not Defined

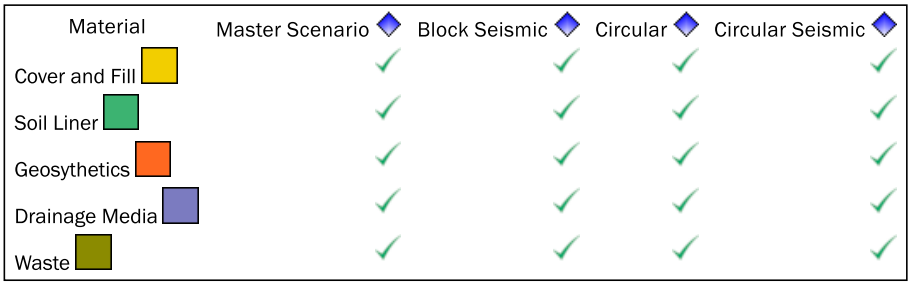
Seismic Loading

Block - Master Scenario		Block - Block Seismic		Block - Circular		Block - Circular Seismic	
Advanced seismic analysis:	No	Advanced seismic analysis:	No	Advanced seismic analysis:	No	Advanced seismic analysis:	No
Staged pseudostatic analysis:	No	Staged pseudostatic analysis:	No	Staged pseudostatic analysis:	No	Staged pseudostatic analysis:	No
		Seismic Load Coefficient (Horizontal):	0.07			Seismic Load Coefficient (Horizontal):	0.07

Materials

Property	Cover and Fill	Soil Liner	Geosythetics	Drainage Media	Waste
Color					
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unsaturated Unit Weight [lbs/ft3]	110	110	90	130	80
Saturated Unit Weight [lbs/ft3]	115	115	95	135	85
Cohesion [psf]	0	0	0	0	0
Friction Angle [°]	32	33	17	35	26
Water Surface	Assigned per scenario	Assigned per scenario	Assigned per scenario	Assigned per scenario	Assigned per scenario
Hu Value	1	1	1	1	1

Materials In Use



Global Minimums

Block - Master Scenario

Method: bishop simplified

FS	2.536270
Axis Location:	-9.749, 140.893
Left Slip Surface Endpoint:	-77.065, 76.012
Right Slip Surface Endpoint:	1.766, 48.111
Resisting Moment:	6.5501e+06 lb-ft
Driving Moment:	2.58257e+06 lb-ft
Total Slice Area:	1111.41 ft2
Surface Horizontal Width:	78.8315 ft
Surface Average Height:	14.0986 ft

Method: janbu simplified

FS	2.255640
Axis Location:	-9.749, 140.893
Left Slip Surface Endpoint:	-77.065, 76.012
Right Slip Surface Endpoint:	1.766, 48.111
Resisting Horizontal Force:	58858.3 lb
Driving Horizontal Force:	26093.9 lb
Total Slice Area:	1111.41 ft2
Surface Horizontal Width:	78.8315 ft
Surface Average Height:	14.0986 ft

Block - Block Seismic

Method: bishop simplified

FS	2.122350
Axis Location:	-9.749, 140.893
Left Slip Surface Endpoint:	-77.065, 76.012
Right Slip Surface Endpoint:	1.766, 48.111
Resisting Moment:	6.52884e+06 lb-ft
Driving Moment:	3.07624e+06 lb-ft
Total Slice Area:	1111.41 ft2
Surface Horizontal Width:	78.8315 ft
Surface Average Height:	14.0986 ft

Method: janbu simplified

FS	1.889090
Axis Location:	-9.749, 140.893
Left Slip Surface Endpoint:	-77.065, 76.012
Right Slip Surface Endpoint:	1.766, 48.111
Resisting Horizontal Force:	58951.1 lb
Driving Horizontal Force:	31206.2 lb
Total Slice Area:	1111.41 ft2
Surface Horizontal Width:	78.8315 ft
Surface Average Height:	14.0986 ft

Block - Circular

Method: bishop simplified

FS	1.578460
Center:	-5.726, 256.517
Radius:	209.957
Left Slip Surface Endpoint:	-140.362, 95.412
Right Slip Surface Endpoint:	5.516, 46.861
Resisting Moment:	1.42205e+07 lb-ft
Driving Moment:	9.00908e+06 lb-ft
Total Slice Area:	1593.56 ft2
Surface Horizontal Width:	145.878 ft
Surface Average Height:	10.9239 ft

Method: janbu simplified

FS	1.530640
Center:	-5.726, 256.517
Radius:	209.957
Left Slip Surface Endpoint:	-140.362, 95.412
Right Slip Surface Endpoint:	5.516, 46.861
Resisting Horizontal Force:	63421.2 lb
Driving Horizontal Force:	41434.5 lb
Total Slice Area:	1593.56 ft2
Surface Horizontal Width:	145.878 ft
Surface Average Height:	10.9239 ft

Block - Circular Seismic

Method: bishop simplified

FS	1.460030
Center:	-68.213, 199.683
Radius:	140.837
Left Slip Surface Endpoint:	-170.146, 102.498
Right Slip Surface Endpoint:	-39.383, 61.828
Resisting Moment:	1.11804e+07 lb-ft
Driving Moment:	7.65767e+06 lb-ft
Total Slice Area:	1900.4 ft2
Surface Horizontal Width:	130.763 ft
Surface Average Height:	14.5331 ft

Method: janbu simplified

FS	1.365580
Center:	-68.213, 199.683
Radius:	140.837
Left Slip Surface Endpoint:	-170.146, 102.498
Right Slip Surface Endpoint:	-39.383, 61.828
Resisting Horizontal Force:	73806.9 lb
Driving Horizontal Force:	54047.9 lb
Total Slice Area:	1900.4 ft2
Surface Horizontal Width:	130.763 ft
Surface Average Height:	14.5331 ft

Global Minimum Coordinates

Block - Master Scenario

Method: bishop simplified

X	Y
-77.0652	76.0116
-35.3137	34.2602
-0.316562	45.8053
0.144097	46.489
1.76629	48.1112

Method: janbu simplified

X	Y
-77.0652	76.0116
-35.3137	34.2602
-0.316562	45.8053
0.144097	46.489
1.76629	48.1112

Block - Block Seismic

Method: bishop simplified

X	Y
-77.0652	76.0116
-35.3137	34.2602
-0.316562	45.8053
0.144097	46.489
1.76629	48.1112

Method: janbu simplified

X	Y
-77.0652	76.0116
-35.3137	34.2602
-0.316562	45.8053
0.144097	46.489
1.76629	48.1112

Block - Circular

Block - Circular Seismic

Entity Information

Group: Block

Shared Entities

Type	Coordinates

	X	Y
External Boundary	75	42.1
	34.1	44
	28.1	42
	22.9	42
	16.9	44
	12.6	44.5
	0	48.7
	-43.5	63.2
	-71.5	77.2
	-73.5	77.2
	-79.5	75.2
	-160.2	102
	-250	106.5
	-250	103.5
	-250	103.495
	-250	26
	-250	24.5
	-250	24
	-250	23
	-250	10
	75	10

	X	Y
Material Boundary	-250	103.495
	-160.2	99
	-2.67141	46.5888
	-0.316562	45.8053
	0	45.7

	X	Y
Material Boundary	0	45.7
	2.31203	45.4798
	12.6	44.5

	X	Y
Material Boundary	-250	24.5
	-204.7	24.5
	-101.6	22.5
	-64.9	24.5
	-0.316562	45.8053

	X	Y
Material Boundary	-0.1	45.7
	0	45.7

	X	Y
Material Boundary	-250	26
	-204.7	26
	-101.6	24
	-64.9	26
	-2.67141	46.5888

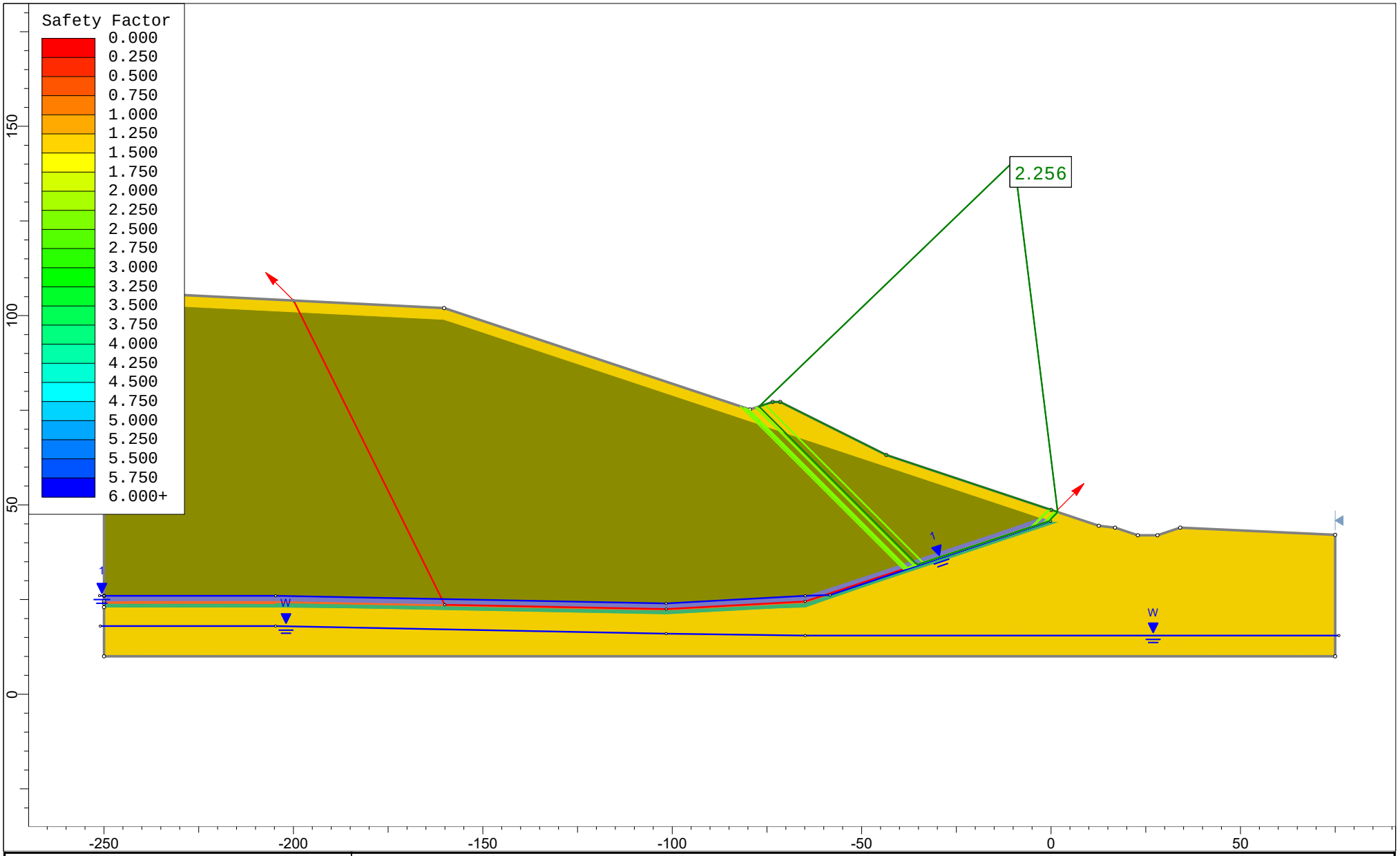
	X	Y
Material Boundary	-250	24
	-204.7	24
	-101.6	22
	-64.9	24
	-0.1	45.7

	X	Y
Material Boundary		

-250	23
-204.7	23
-101.6	21
-64.9	23
2.31203	45.4798

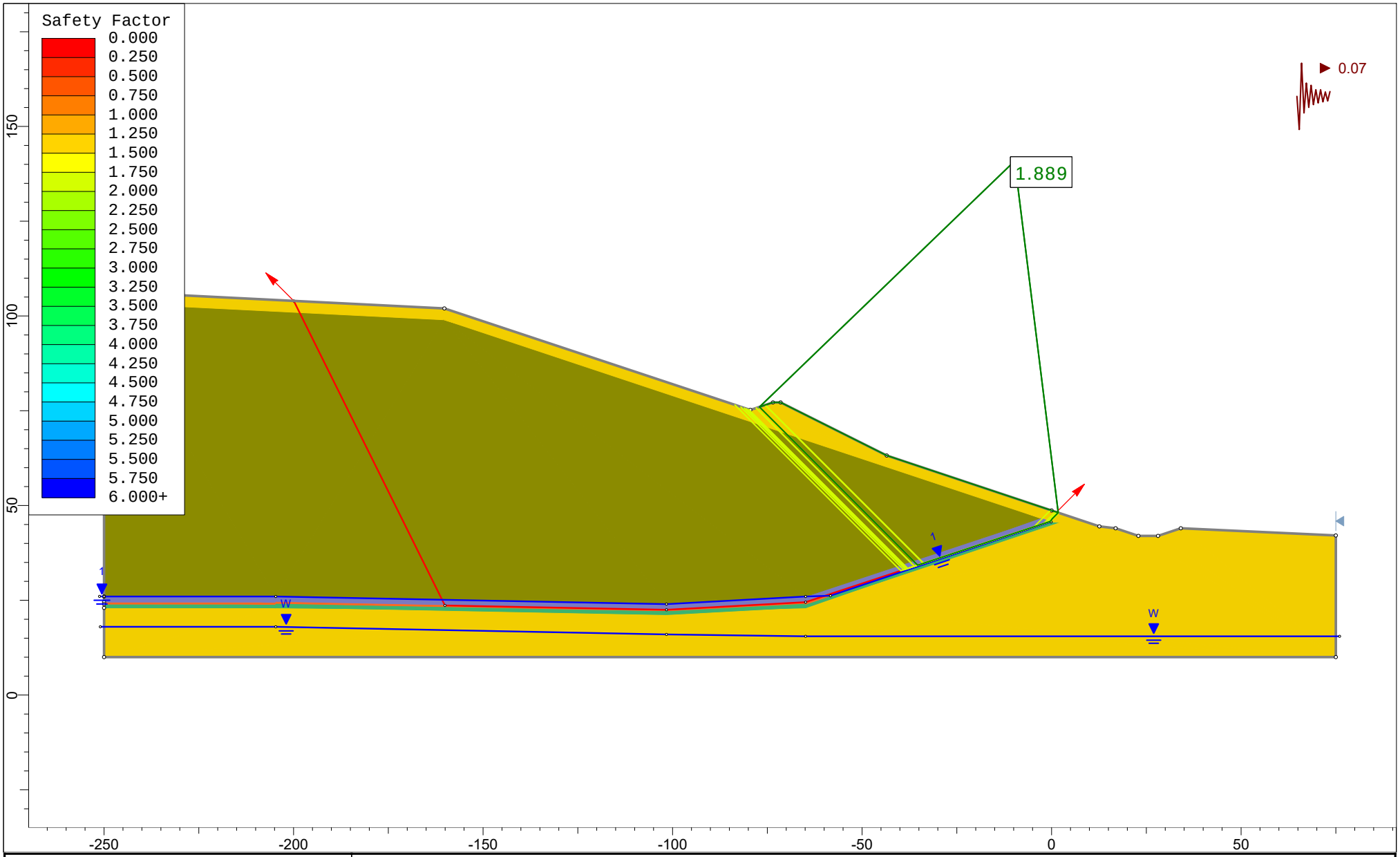
Scenario-based Entities

Type	Coordinates	Master Scenario	Block Seismic	Circular	Circular Seismic
Water Table	X: -251, 18; -204.7, 18; -101.6, 16; -64.9, 15.5; 76, 15.5	Assigned to materials: Cover and Fill, Soil Liner	Assigned to materials: Cover and Fill, Soil Liner	Assigned to materials: Cover and Fill, Soil Liner	✗
Piezoline	X: -251.179, 26.025; -250, 26; -204.7, 26; -101.6, 24; -64.9, 26; -58.3426, 26.1959; -0.1, 45.7	Assigned to materials: Geosythetics, Drainage Media, Waste	Assigned to materials: Geosythetics, Drainage Media, Waste	Assigned to materials: Geosythetics, Drainage Media, Waste	Assigned to materials: Geosythetics, Drainage Media, Waste
Block Search Polyline	X: -199.927, 103.991; -160.051, 23.6339; -101.6, 22.5; -64.9, 24.5; -0.316562, 45.8053; 1.3341, 48.2553	✓	✓	✗	✗
Water Table	X: -250, 26; -204.7, 26; -101.6, 24; -64.9, 26; -33.9632, 34.7057	✗	✗	✗	Assigned to materials: Cover and Fill, Soil Liner



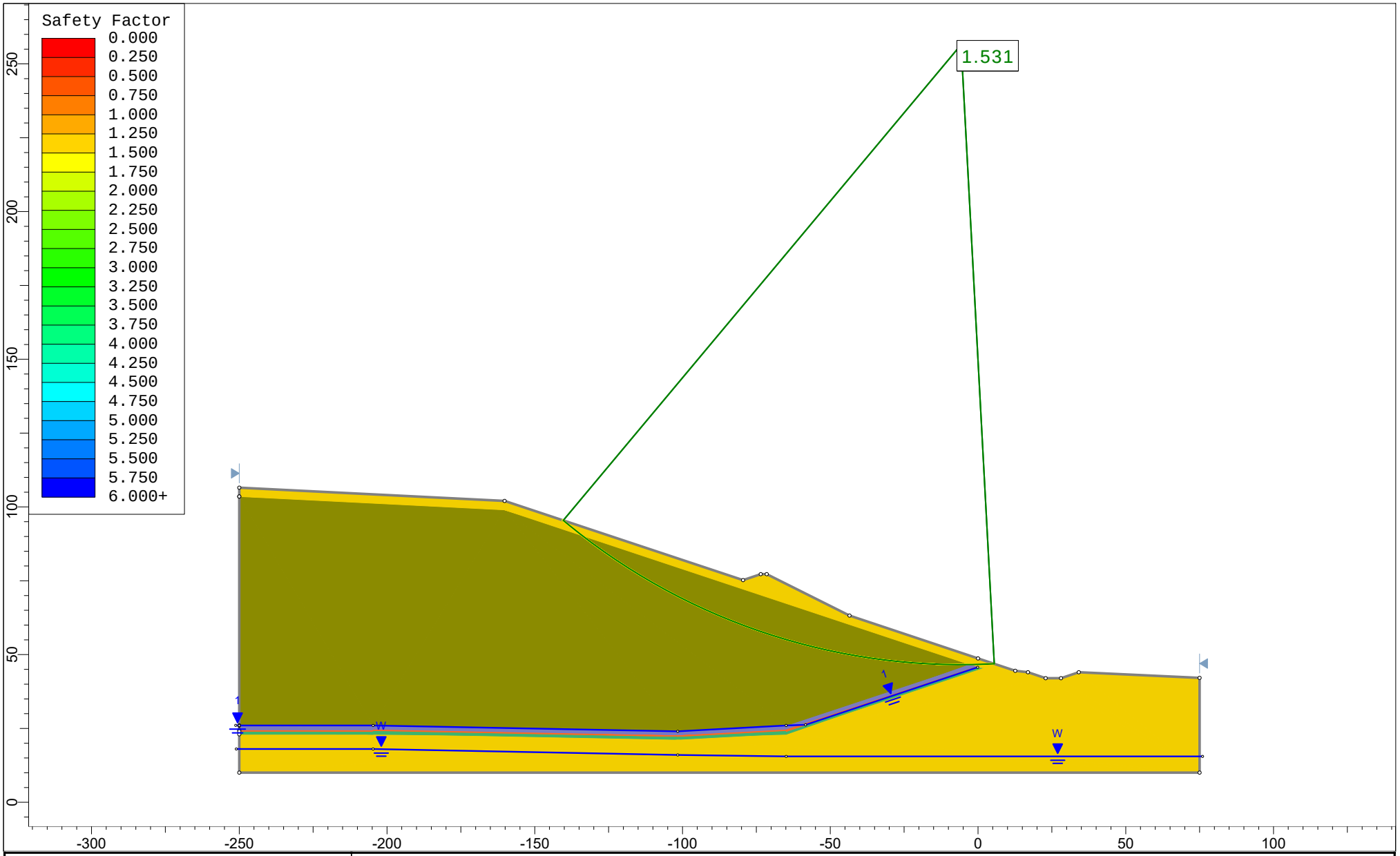
rocscience	*Project*	EcoSouth Major Permit Modification 3:1 Slopes		
	Analysis Description			
	Drawn By	Darrell Thornock,P.E.	*Scale* 1:420	*Company* LaBella Associates, D.P.C.
	Date	11/6/2020		*File Name* EcoSouth Phase 2 Landfill 3-1.slmd

SLIDEINTERPRET 8.018



rocscience	Project	EcoSouth Major Permit Modification 3:1 Slopes		
	Analysis Description			
	Drawn By	Darrell Thornock,P.E.	Scale 1:420	Company LaBella Associates, D.P.C.
	Date	11/6/2020		File Name EcoSouth Phase 2 Landfill 3-1.slmd

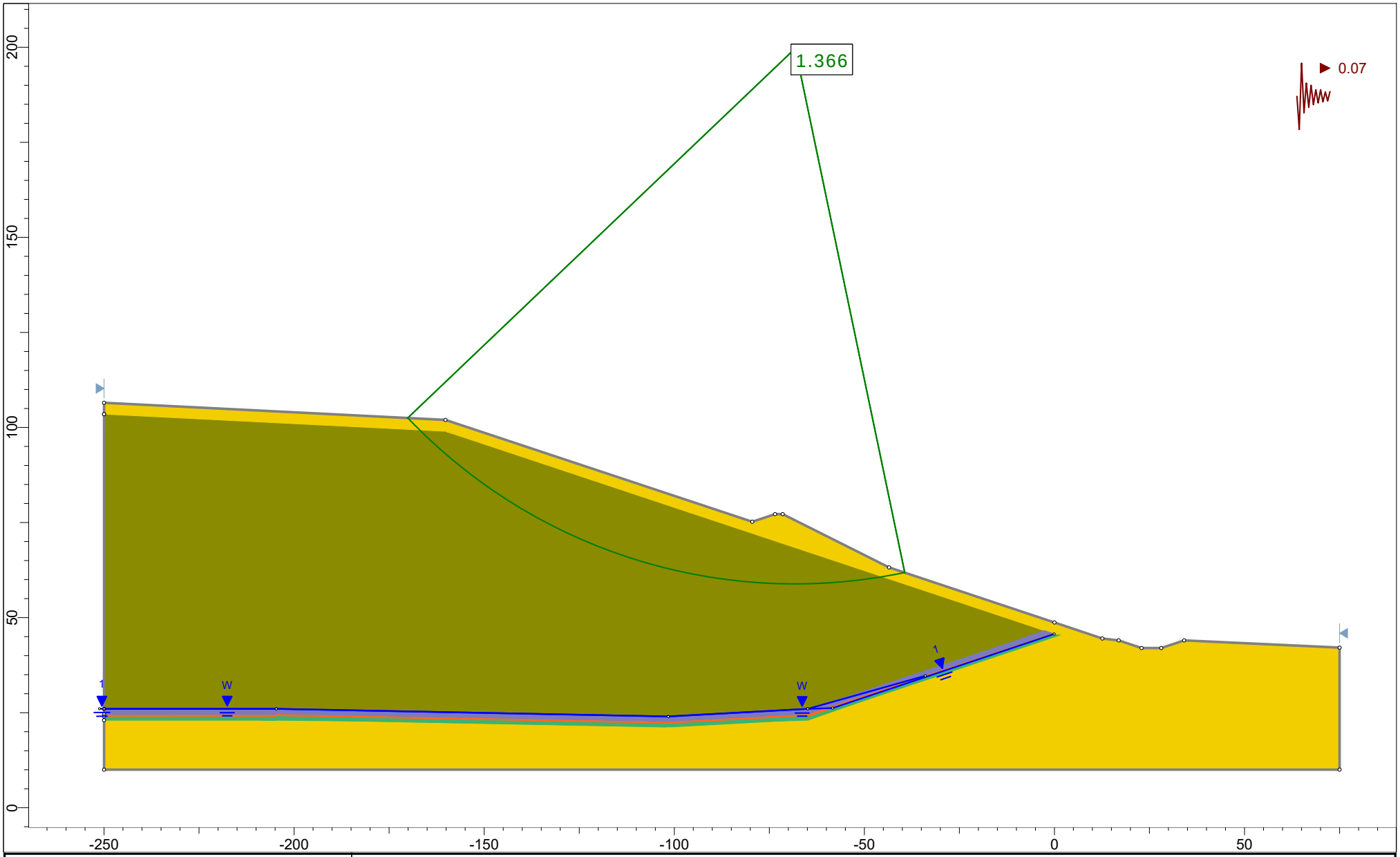
SLIDEINTERPRET 8.018



rocscience

SLIDEINTERPRET 8.018

Project	EcoSouth Major Permit Modification 3:1 Slopes		
Analysis Description			
Drawn By	Darrell Thornock,P.E.	*Scale* 1:539	*Company* LaBella Associates, D.P.C.
Date	11/6/2020		*File Name* EcoSouth Phase 2 Landfill 3-1.slmd



rocscience	Project	EcoSouth Major Permit Modification 3:1 Slopes		
	Analysis Description			
	Drawn By	Darrell Thornock,P.E.	Scale 1:419	Company LaBella Associates, D.P.C.
	Date	11/6/2020		File Name EcoSouth Phase 2 Landfill 3-1.slmd

SLIDEINTERPRET 8.018

Project:	EcoSouth Axis Landfill		
Project Number:	2192290 Phase 01		
Calculated By:	DWT	Date:	11/6/2020
Revised By:		Date:	
Checked By:		Date:	
Subject:	Landfill Cover Veneer Stability		
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FINAL COVER VENEER STATIC AND SEISMIC SLOPE STABILITY

OBJECTIVE

The objective of this calculation is to perform a slope stability analysis for the final cover system of the EcoSouth Axis Landfill.

METHODOLOGY

A spreadsheet taken from a report prepared by the Geosynthetic Research Institute (GRI), Drexel University, entitled "Cover Soil Stability Involving Geosynthetic Interfaces", by Te-Yang Soong and Robert M. Koerner is utilized to perform the calculation. This method analyzes the situation where a uniform layer of cover soil lies along a finite length of landfill side slope.

The seismic coefficient used within the stability analysis was obtained from the "Peak Acceleration (%g) with 2% Probability of Exceedance in 50 Years (site: NEHRP B-C boundary)" published by the U.S.G.S in 2014 and Figure 9-9 of the "Geotechnical and Stability Analyses for Ohio Waste Containment Facilities" September 14, 2002, which are included here. As suggested, the factor of safety for the worst-case slope and most critical interface must be greater than or equal to 1.0. The factor of safety for the static conditions must be greater than or equal to 1.5.

VARIABLES DEFINED

The shear strength envelope of the most critical interface in the final cover system was defined in the "Final Cover Veneer Slope Stability" calculation included with this Amendment.

The seismic coefficient, Cs, is defined as follows:

Cs = Seismic Coefficient, or the yield acceleration, Ky, which is expressed as a percentage of g, (acceleration due to gravity)

The seismic coefficient is multiplied by the weight of the active and passive blocks to produce a horizontal force resulting from the seismic acceleration. (F = ma)

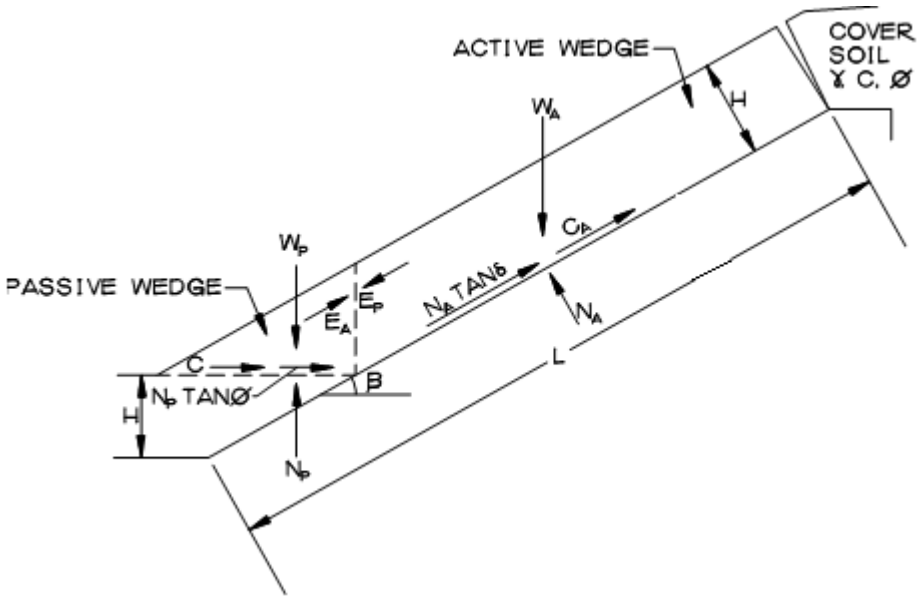


Figure 1, Side Slope Geometry & Free Body Diagram

Slope Dimensions	
Maximum Slope Length	280 feet
Slope Orientation	3H:1V or 18.43 degrees

The proposed final cover system along the landfill sideslope is outlined below, from top to bottom:

- 6-inch thick vegetative support (Topsoil) layer;
- 18-inch drainage layer;
- Geocomposite;
- FML;
- 12-inch clay infiltration layer;
- Waste.

W_A = Total weight of the active wedge;
W_P = Total weight of the passive wedge;
N_A = Effective force normal to the failure plane of the active wedge;
N_P = Effective force normal to the failure plane of the passive wedge;
γ = Unit weight of the cover soil;

h = Thickness of the cover soil;
L = Length of slope measured along the soil cover;
β = Soil slope angle beneath the soil cover;
ϕ = Internal angle of friction within the cover soil;
δ = Interface friction angle between the most critical interface;
C_a = Adhesive force between the components lying along the most critical interface of the active wedge;
c_a = The adhesion developed between the components lying along the most critical interface of the active wedge;
C = Cohesive force along the failure plane of the passive wedge;
c = cohesion of the cover soil;
E_A = Interwedge force acting on the active wedge from the passive wedge;
E_P = Interwedge force acting on the passive wedge from the active wedge;
FS = Factor of safety against cover soil sliding down the slope; and
C_s = Seismic coefficient in percent of gravity. The resulting acceleration at the crest of the landfill is based on the design bedrock acceleration.

Additional Material Properties

Assumed unit weight of the cap protection layer material: γ_S = 115 pcf

The final cover soils were modeled as one layer with a thickness of 2.0 feet and assigned the average values for cohesion and friction angle.

Internal angle of friction = 32°

Equations Used

The forces illustrated in Figure 1 are resolved below to produce a FS:

$$W_a = \gamma\, h^2 \left[\frac{L}{h} - \frac{1}{\sin\beta} - \frac{\tan\beta}{2}\right]$$

$$N_a = W_a \cos\beta$$

$$C_a = c_a \left[L - \frac{h}{\sin\beta}\right]$$

Balancing the forces in the horizontal direction, the following formulation results:

$$E_A \cos\beta + \frac{N_A \tan\delta + C_a}{FS} \cos\beta = C_S W_A + N_A \sin\beta$$

The interwedge force acting on the active wedge is:

$$E_A = \frac{FS \cdot \left(C_S W_A + N_A \sin\beta\right) - \left(N_A \tan\delta + C_a\right)\cos\beta}{FS \cos\beta}$$

The passive wedge can be considered in a similar manner:

$$W_p = \frac{\gamma\, h^2}{\sin 2\beta}$$

$$N_p = W_p + E_p \sin\beta$$

$$C = \frac{c\, h}{\sin\beta}$$

Balancing the forces in the horizontal direction produces:

$$E_p \cos\beta + C_S W_P = \frac{C + N_p \tan\phi}{FS}$$

The interwedge force acting on the passive wedge is:

$$E_p = \frac{C + W_p \tan\phi - C_S W_P (FS)}{\cos\beta\,(FS) - \sin\beta \tan\phi}$$

Setting $E_A = E_p$, the equation can be arranged in the form of the following quadratic equation:

$$a(FS)^2 + b(FS) + c = 0$$

Where the coefficients a, b and c are equal to the following expressions:

$$a = (C_S W_A + N_A \sin\beta)\cos\beta + C_S W_p \cos\beta$$

$$b = -\left[(C_S W_A + N_A \sin\beta)\sin\beta \tan\phi + (N_A \tan\delta + C_a)\cos^2\beta + \cos\beta(C + W_p \tan\phi)\right]$$

$$c = (N_A \tan\delta + C_a)\sin\beta\cos\beta\tan\phi$$

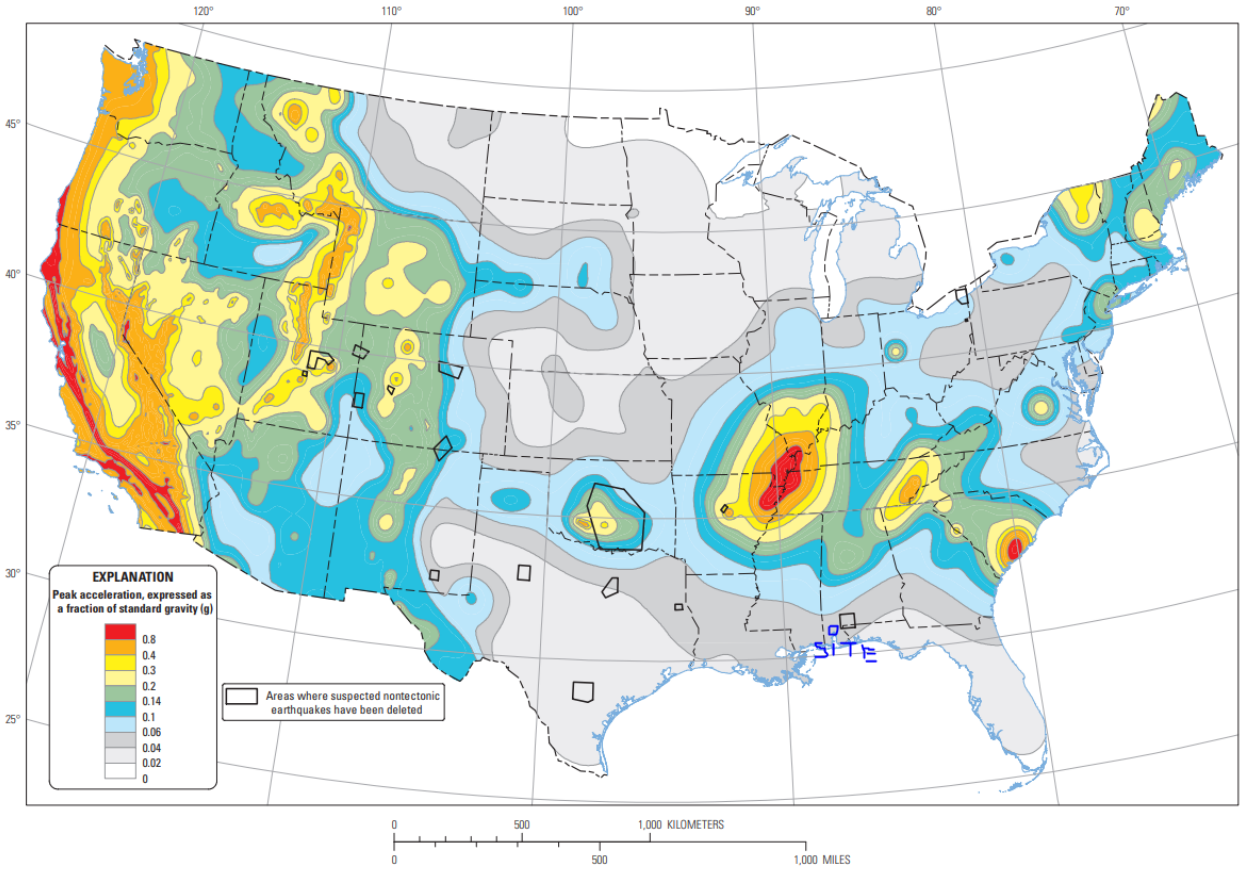
The quadratic equation is then used to calculate the FS:

$$FS = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

For the ease of calculation the above quadratic equation was input into a spreadsheet format to produce a FS corresponding to a given set of input parameters. A copy of the spreadsheet calculations displaying the results is included in Attachment A.

Seismic Analysis

The shear wave acceleration is modeled within the stability analysis by inputting a coefficient, (Cs) that is some fraction of gravity. The peak acceleration for the site is estimated to be 0.05g which is taken from the "Peak Acceleration (%g) with 2% Probability of Exceedance in 50 Years" published by the U.S.G.S in 2014. Since this analysis is for the final cover system, the acceleration at the crest of the landfill will be considered.



Two-percent probability of exceedance in 50 years map of peak ground acceleration

When plotting this value onto Singh and Sun's 1995 figure below for the relationship between maximum horizontal seismic acceleration at the base and crest of 84 feet of refuse, the maximum horizontal seismic acceleration at the crest of the landfill can be expected to be 0.07 g.

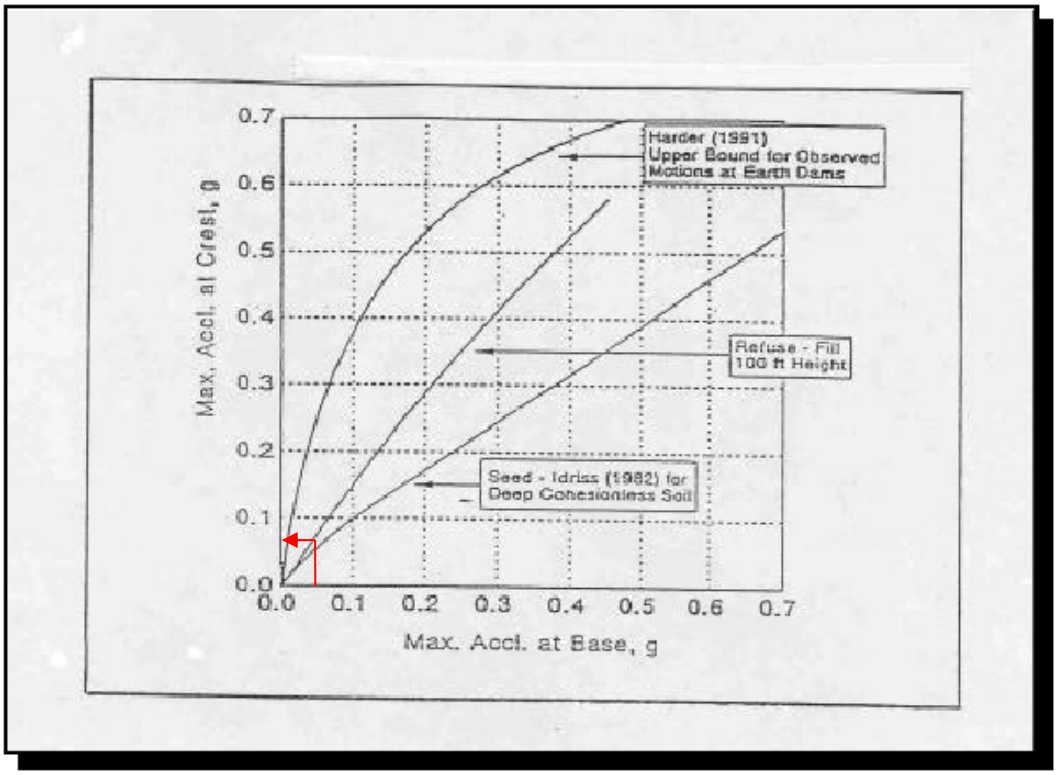


Figure 8-11 Approximate relationship between maximum accelerations at the base and crest for various ground conditions. Singh and Sun,1995, Figure 3.

The parameters used in the seismic analysis are stated below:

h = Thickness of cover soil = 2.0 ft
L = Length of slope measured along the geomembrane = 280 ft
γ = Unit weight of the cover soil = 115.0 lb/ft^3
δ = Critical interface friction angle = 26.6 degrees (conservative)
c_a = Adhesion of cover soil = 0.0 lb/ft^2
D = Thickness of cover soil along the bottom of the slope = 2.0 ft
ϕ = Friction angle of the cover soil layer = 32 degrees
c = Cohesion of cover soil = 0.0 lb/ft^2

CALCULATIONS

The spreadsheet printout of the seismic stability analysis considering yield acceleration is included in Attachment A.

RESULTS

The results of the static stability analyses to determine the yield acceleration is presented below:

FS = 1.53

The results of the seismic stability analyses to determine the yield acceleration is presented below:

C_s = 0.07 g, FS = 1.24

Therefore, the final cover system should be stable during static conditions and seismic activity with a factors of safety of 1.53 and 1.24 respectively.

REFERENCES

1. Soong, Te-Yang and Koerner, R.M., (1996) "Cover Soil Slope Stability Involving Geosynthetic Interfaces", Geosynthetic Research Institute, Drexel University, GRI Report #18

2. Ohio EPA, (September 14, 2002), "Geotechnical and Stability Analyses for Ohio Waste Containment Facilities".

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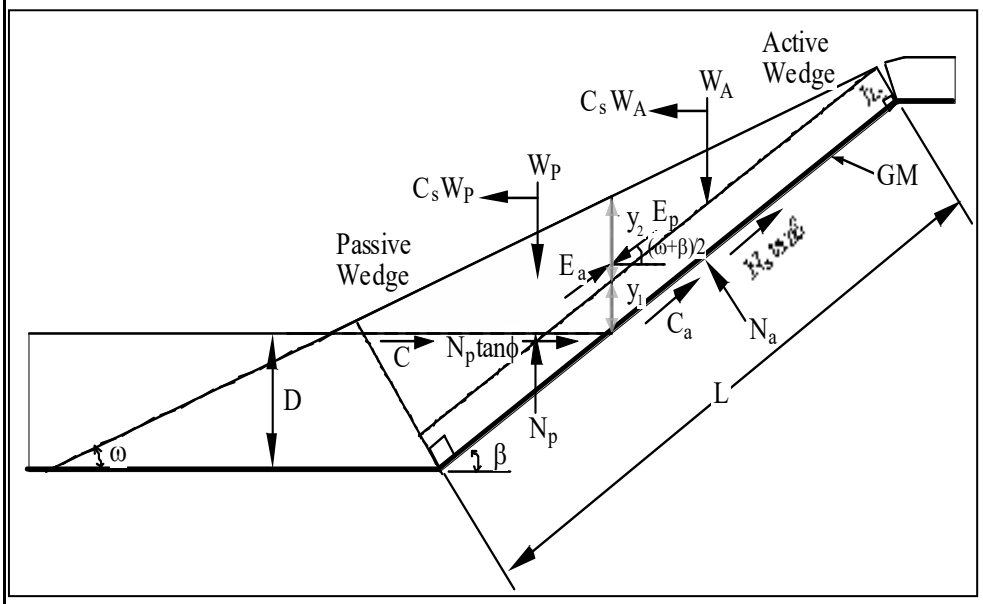
ATTACHMENT A

LANDFILL COVER SYSTEM
STABILITY ANALYSIS
COMPUTER SPREADSHEET RESULT

ECOSOUTH AXIS LANDFILL

Uniform and/or Tapered Cover Soil with Consideration of Static Forces



Calculation of FS

Active Wedge:

Wa=	*62868.3*	*lb*
Na=	*59643.9*	*lb*
Ca=	*0.0*	*lb*

Passive Wedge:

Wp=	*766.8*	*lb*
C=	*0.0*	*lb*

$$FS = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

a=	*17889.0*
b=	*-31061.8235*
c=	*5597.7*

FS= 1.53

(Note: for uniform cover soil thickness the input value of ω = β)

thickness of cover soil at top (crest) of the slope = hc =	2.00	ft		
thickness of cover soil along the bottom of the site = D =	2.00	ft		
soil slope angle beneath the cover = β =	18.43	°	*= 0.32*	*(rad.)*
finished cover soil slope angle = ω =	18.43	°	*= 0.32*	*(rad.)*
length of slope measured along the geomembrane = L =	280.0	ft		

y2=	*0.00*	*(ft)*
y1=	*2.11*	*(ft)*
(ω+β)/2=	*0.322*	*(rad.)*
(=	*18.4*	*°)*

unit weight of the cover soil = γ =	115.0	lb/ft^3		
friction angle of the cover soil = ϕ =	32.0	°	*= 0.56*	*(rad.)*
cohesion of the cover soil = c =	0.0	lb/ft^2		
critical interface friction angle = δ =	26.6	°	*= 0.46*	*(rad.)*
adhesion between cover soil and geocomposite = ca =	0.0	lb/ft^2		

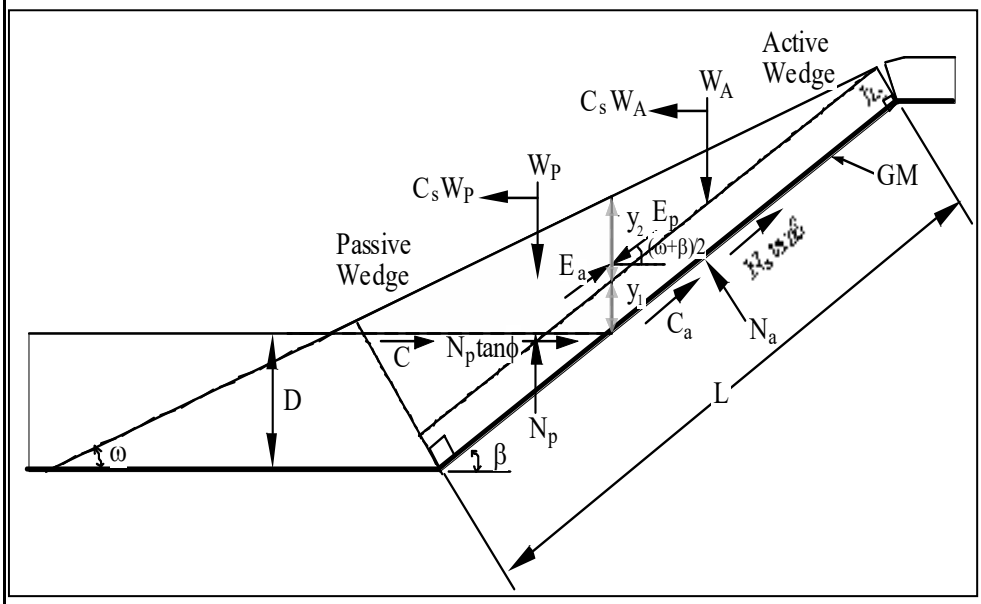
seismic coefficient = Cs =	0.000	g

Note: numbers in boxes are input values

numbers in Italics are calculated values

ECOSOUTH AXIS LANDFILL

Uniform and/or Tapered Cover Soil with Consideration of Seismic Forces



Calculation of FS

Active Wedge:

Wa=	*62868.3*	*lb*
Na=	*59643.9*	*lb*
Ca=	*0.0*	*lb*

Passive Wedge:

Wp=	*766.8*	*lb*
C=	*0.0*	*lb*

$$FS = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

a=	*22115.0*
b=	*-31931.1959*
c=	*5597.7*

FS= 1.24

(Note: for uniform cover soil thickness the input value of ω = β)

thickness of cover soil at top (crest) of the slope = hc =	2.00	ft		
thickness of cover soil along the bottom of the site = D =	2.00	ft		
soil slope angle beneath the cover = β =	18.43	°	*= 0.32*	*(rad.)*
finished cover soil slope angle = ω =	18.43	°	*= 0.32*	*(rad.)*
length of slope measured along the geomembrane = L =	280.0	ft		

y2=	*0.00*	*(ft)*
y1=	*2.11*	*(ft)*
(ω+β)/2=	*0.322*	*(rad.)*
(=	*18.4*	*°)*

unit weight of the cover soil = γ =	115.0	lb/ft^3		
friction angle of the cover soil = ϕ =	32.0	°	*= 0.56*	*(rad.)*
cohesion of the cover soil = c =	0.0	lb/ft^2		
critical interface friction angle = δ =	26.6	°	*= 0.46*	*(rad.)*
adhesion between cover soil and geocomposite = ca =	0.0	lb/ft^2		

seismic coefficient = Cs =	0.070	g

Note: numbers in boxes are input values

numbers in Italics are calculated values

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DETERMINATION OF LOW NORMAL LOAD INTERFACE STRENGTH FOR THE FINAL COVER SYSTEM

OBJECTIVE

Calculate the shear strength that will provide an unsaturated veneer slope stability FS ≥ 1.5 with respect to the landfill cover soils failing along the final cover sideslopes. The calculation will also consider the presence of moving equipment placing and spreading protective cover material across the sideslope.

METHODOLOGY

The analytical method used to calculate the veneer slope stability FS is taken from a report prepared by the Geosynthetic Research Institute (GRI), Drexel University:

1) "*Cover Soil Slope Stability Involving Geosynthetic Interfaces*", (GRI REPORT #18), by Te-Yang Soong and Robert M. Koerner, December 9, 1996 and

GRI Report #18 is used to consider the presence of equipment on top of the soil cover layer and provides a FS based on the most critical interface shear strength of final cover components. The spreadsheet calculates a FS by dividing the protective cover material along the sideslope into two blocks:

1) an active wedge of protective cover material along the length of the sideslope; and
2) a passive wedge of protective cover material at the toe of the sideslope.

A freebody diagram is then drawn identifying the forces on each wedge and static equilibrium equations are resolved in terms of vertical and horizontal components. Expressions are derived that quantify the magnitude of both the passive and active interwedge forces. Subsequently, the interwedge force equations are set equal to each other and are arranged in the form of a quadratic equation that can be solved to calculate a FS.

This calculation analyzes the longest length of the final cover sideslope. Figure 1 illustrates the proposed geometry of the final cover sideslope and the freebody of the forces acting along the sideslope.

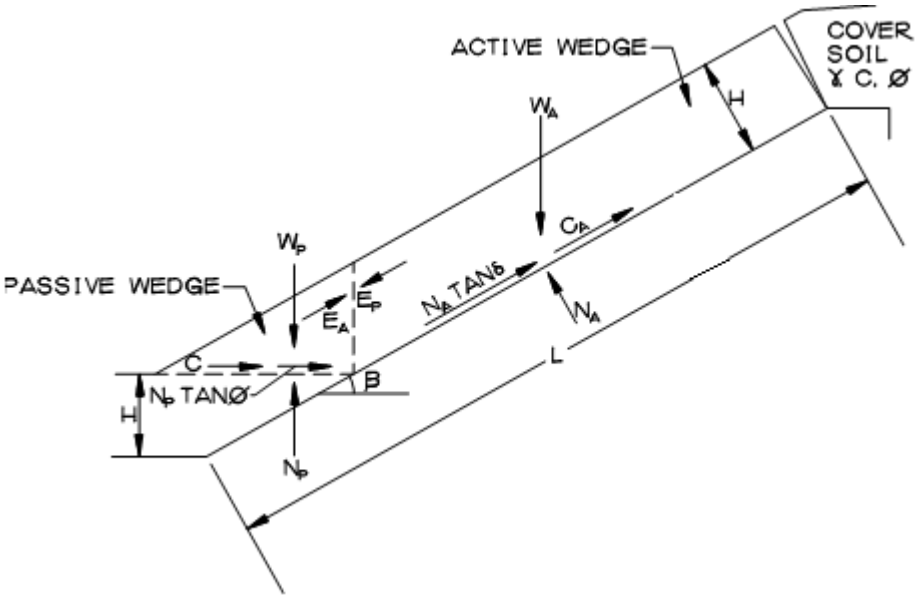

Figure 1, Slope Geometry & Free Body Diagram

Slope Dimensions	
Maximum Length of Cover Sideslope	280 feet
Cover Sideslope Orientation	3H:1V or 18.43 degrees

This veneer slope stability FS calculation is prepared proposing the following assumptions:

- The presence of moving equipment (dynamic loading) along the protective cover sideslope is analyzed within GRI Report #18.
- The shear strength component of adhesion developed between material layers is ignored.
- Tensile strength of the geosynthetic materials contributing to the veneer slope stability FS is ignored.
- The protective cover material provides a buttress at the toe of the slope, i.e. the passive soil wedge.
- For conservatism, the cohesive strength of the proposed protective cover material was ignored.
- All calculations will utilize a 1-foot unit width of sideslope.

LANDFILL COVER

The Landfill Cover System is outlined below, from top to bottom:

- 6-inch thick Vegetative Support Layer (Topsoil);
- 18-inch thick drainage Layer;
- Geocomposite;
- FML;
- 12-inch clay infiltration layer;
- Waste.

PROTECTIVE COVER MATERIAL PARAMETERS

Unit weight: γ_{Total} = 115 pcf;

Cohesion: c = 0.0 psf; and
Internal angle of friction: ϕ_i = 32 degrees

REQUIRED SHEAR STRENGTH PARAMETERS

The calculation spreadsheet presented within GRI Report #18 will be used to determine the shear strength parameter (contact interface friction angle, $\delta_{interface\ friction}$) that corresponds to a FS ≥ 1.5 under drained conditions for all interfaces. The input variables of final cover sideslope length, protective cover, and LGP equipment will be held constant within the spreadsheet while the contact interface friction angle, $\delta_{interface\ friction,}$ is varied until a FS of ≥ 1.5 is achieved. Cohesion values of 0 psf will be entered for conservatism.

The calculated $\delta_{interface\ friction}$ that corresponds to the FS ≥ 1.5 represents laboratory data where a straight line is drawn from the origin through the first data point (i.e. c = 0 psf) that corresponds to the lowest normal load within the given data set. The lowest normal load models the shear strength of protective cover material under relatively light normal loads that are anticipated to be initially encountered in the field during placement of the material. With respect to the landfill cover, normal loads representative of 2.0 foot of landfill cover are appropriate. The proposed critical contact interface will undergo ASTM D-5321-92 Direct Shear Testing and will be required to meet the minimum calculated contact interface friction angle corresponding to the first normal load.

The resulting contact interface friction angles will be included with other minimum shear strength parameters specified within the Construction Quality Assurance (CQA) Plan and/or specifications.

VARIABLES DEFINED

W_A = Total weight of the active wedge;
W_P = Total weight of the passive wedge;
N_A = Effective force normal to the failure plane of the active wedge;
N_P = Effective force normal to the failure plane of the passive wedge;
γ = Unit weight of the leachate collection/protective cover material;
h = Thickness of the leachate collection/protective cover material;
L = Length of slope measured along the geomembrane;
β = Soil slope angle beneath the geomembrane;
ϕ = Internal angle of friction within the protective cover soil;
δ = Interface friction angle between the most critical geosynthetic to soil interface;
C_a = Adhesive force between the components lying along the most critical geosynthetic interface of the active wedge;
c_a = The adhesion developed between the components lying along the most critical geosynthetic interface of the active wedge;
C = Cohesive force along the failure plane of the passive wedge;
c = cohesion of the protective cover soil;
E_A = Interwedge force acting on the active wedge from the passive wedge;
E_P = Interwedge force acting on the passive wedge from the active wedge; and
FS = Factor of safety against protective cover soil sliding down the slope.

CALCULATIONS

It is proposed that a Low Ground Pressure (LGP) bulldozer will be used to place protective cover material across the sideslope. The pressure exerted upon the top of the landfill cover layer by a bulldozer is modeled as illustrated in Figure 2.

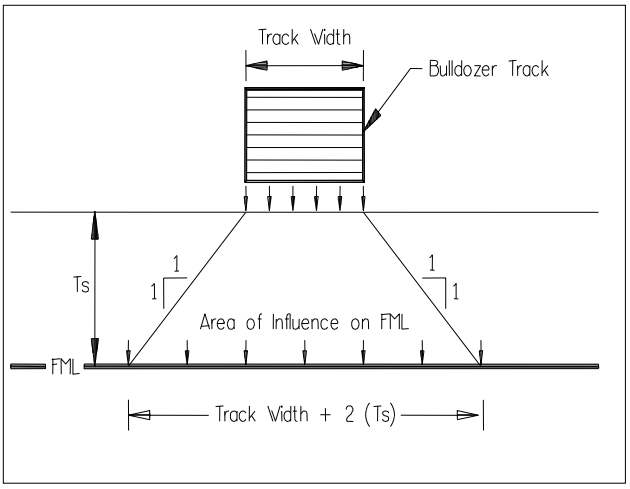

Figure 2, Stress Distribution of the LGP Bulldozer

The following typical LGP Bulldozer equipment specifications are used within the GRI Report #18.

- 2 tracks
- Track length = 9.4 feet
- Track width = 3.0 feet
- Operating weight = 38,300 lbs
- One Track Contact area = 28.2 ft^2
- One Track Contact pressure = 19,150 lbs / 28.2 ft^2 = 679.1 psf

Subsequently, the forces illustrated in Figure 1 are resolved below to produce a veneer slope stability FS. The equations presented are taken from pages 13 and 14 of GRI Report #18.

$$W_a = \gamma\, h^2 \left[\frac{L}{h} - \frac{1}{\sin\beta} - \frac{\tan\beta}{2} \right]$$

$$N_a = W_a \cos\beta$$

$$C_a = c_a \left[L - \frac{h}{\sin\beta} \right]$$

Balancing the forces in the vertical direction, the following formulation results:

$$E_A \sin\beta = W_A - N_A \cos\beta - \frac{N_A \tan\delta + C_a}{FS} \sin\beta$$

The interwedge force acting on the active wedge is:

$$E_A = \frac{FS \cdot (W_A - N_A \cos\beta) - (N_A \tan\delta + C_a)\sin\beta}{\sin\beta\, FS}$$

The passive wedge can be considered in a similar manner:

$$W_p = \frac{\gamma\, h^2}{\sin 2\beta}$$

$$N_p = W_p + E_p \sin\beta$$

$$C = \frac{c\, h}{\sin\beta}$$

Balancing the forces in the horizontal direction produces:

$$E_p \cos\beta = \frac{C + N_p \tan\phi}{FS}$$

The interwedge force acting on the passive wedge is:

$$E_p = \frac{C + W_p \tan\phi}{\cos\beta\,(FS) - \sin\beta \tan\phi}$$

Setting $E_A = E_p$ the equation can be arranged in the form of the quadratic equation:

$$a(FS)^2 + b(FS) + c = 0$$

Where the coefficients a, b and c are equal to the following expressions:

$$a = (W_A - N_A \cos\beta)\cos\beta$$

$$b = -\left[(W_A - N_A \cos\beta)\sin\beta \tan\phi + (N_A \tan\delta + C_a)\sin\beta \cos\beta + \sin\beta(C + W_p \tan\phi)\right]$$

$$c = (N_A \tan\delta + C_a)\sin^2\beta \tan\phi$$

The quadratic equation is then used to calculate the FS:

$$FS = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

For the ease of calculations the above quadratic equation was input into a spreadsheet format to produce a FS corresponding to a given set of input parameters. A copy of the spreadsheet calculations displaying the results is included in Attachment A.

CONCLUSIONS

Utilizing a contact interface shear strength friction angle of 26.6 degrees (conservative) within GRI Report #18 resulted in a veneer slope stability FS equal to 1.53 while the equipment is static. This is the critical interface friction angle for the final cover interface. While the equipment is placing the materials systems, a veneer slope stability FS equal to 1.45 was calculated. Additional assumptions include:

- The presence of an equipment load along the landfill cover sideslope, equipment pushes material from toe towards the crest;
- The shear strength component of adhesion/cohesion between the landfill cover material and the in-place waste does not exist; and,
- Calculations consider that the 24-inch thick soil protective cover layer is entirely in-place along the length of landfill cover sideslope approximately 380 feet.

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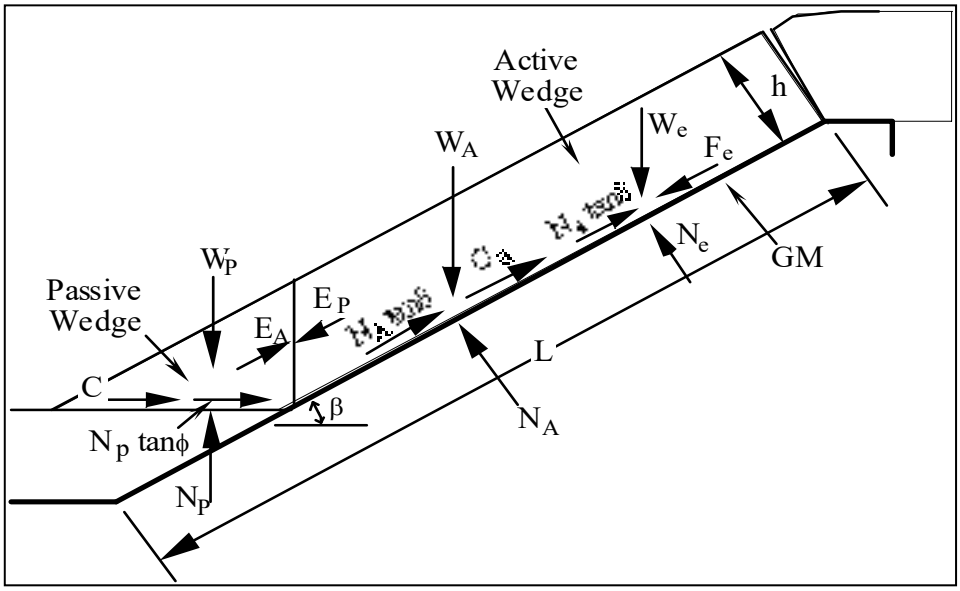
Attachment A

Spreadsheet Calculation

ECOSOUTH AXIS LANDFILL

Placement of the 24-inch thick Landfill Cover
across the 3:1 (H:V) Sideslopes



Calculation of FS

Active Wedge:

Wa= 62868.3 lb
Na= 59643.9 lb

Passive Wedge:

Wp= 766.8 lb

$$FS = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

a= 20694.2
b= -35886
c= 6475.4

FS= 1.53

thickness of protective cover soil = h =	2.00	ft			
pro. cov. mat. slope angle beneath the geocomposite = β =	18.43	°	*= 0.32*	*(rad.)*	
finished protective cover material slope angle = ω =	18.43	°	*= 0.32*	*(rad.)*	
length of slope measured along the geocomposite = L =	280.0	ft			
unit weight of the protective cover soil = γ =	115.0	lb/ft^3			
friction angle of the protective cover soil = ϕ =	32.0	°	*0.56*	*(rad.)*	
cohesion of the protective cover soil = c =	0.0	lb/ft^2	=	*C= 0*	*lb*
critical interface friction angle = δ =	26.60	°	*0.46*	*(rad.)*	
adhesion = ca =	0.0	lb/ft^2		*Ca= 0*	*lb*

thickness of the protective cover soil = h =	2.00	ft	*b/h= 1.5*
equipment ground pressure (= wt. of equipment/(2wb)) = q =	679.1	lb/ft^2	*We=qwl= 6128.2*
length of each equipment track = w =	9.4	ft	*Ne=Wecos β= 5813.9*
width of each equipment track = b =	3.0	ft	*Fe=We(a/g)= 0.0*
influence factor* at geocomposite interface = I =	0.96		
acceleration/deceleration of the bulldozer = a =	0.00	g	

*Influence Factor Default Values

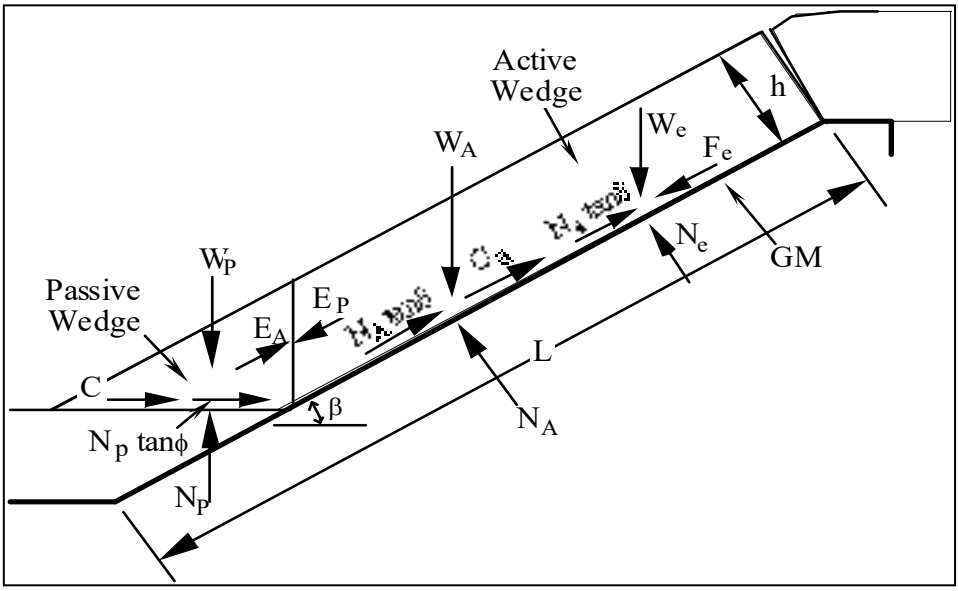
Cover Soil Thickness	Equipment Track Width		
	Very Wide	Wide	Standard
[2] 300 mm	1.00	0.97	0.94
300-1000 mm	0.97	0.92	0.70
[3] 1000 mm	0.95	0.75	0.30

Note: numbers in boxes are input values

numbers in Italics are calculated values

ECOSOUTH AXIS LANDFILL

Placement of the 24-inch thick Landfill Cover
across the 3:1 (H:V) Sideslopes with the incorporation of Equipment Loads



Calculation of FS

Active Wedge:

Wa= 62868.3 lb
Na= 59643.9 lb

Passive Wedge:

Wp= 766.8 lb

$$FS = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

a= 21798.8
b= -36116
c= 6475.4

FS= 1.452

thickness of protective cover soil = h =	2.00	ft			
pro. cov. mat. slope angle beneath the geocomposite = β =	18.43	°	*= 0.32*	*(rad.)*	
finished protective cover material slope angle = ω =	18.43	°	*= 0.32*	*(rad.)*	
length of slope measured along the geocomposite = L =	280.0	ft			
unit weight of the protective cover soil = γ =	115.0	lb/ft^3			
friction angle of the protective cover soil = ϕ =	32.0	°	*= 0.56*	*(rad.)*	
cohesion of the protective cover soil = c =	0.0	lb/ft^2		*C= 0*	*lb*
critical interface friction angle = δ =	26.60	°	*= 0.46*	*(rad.)*	
adhesion = ca =	0.0	lb/ft^2		*Ca= 0*	*lb*

thickness of the protective cover soil = h =	2.00	ft		*b/h= 1.5*
equipment ground pressure (= wt. of equipment/(2wb)) = q =	679.1	lb/ft^2		*We=qwI= 6128.2*
length of each equipment track = w =	9.4	ft		*Ne=Wecos β= 5813.9*
width of each equipment track = b =	3.0	ft		*Fe=We(a/g)= 1164.4*
influence factor* at geocomposite interface = I =	0.96			
acceleration/deceleration of the bulldozer = a =	0.19	g		

*Influence Factor Default Values

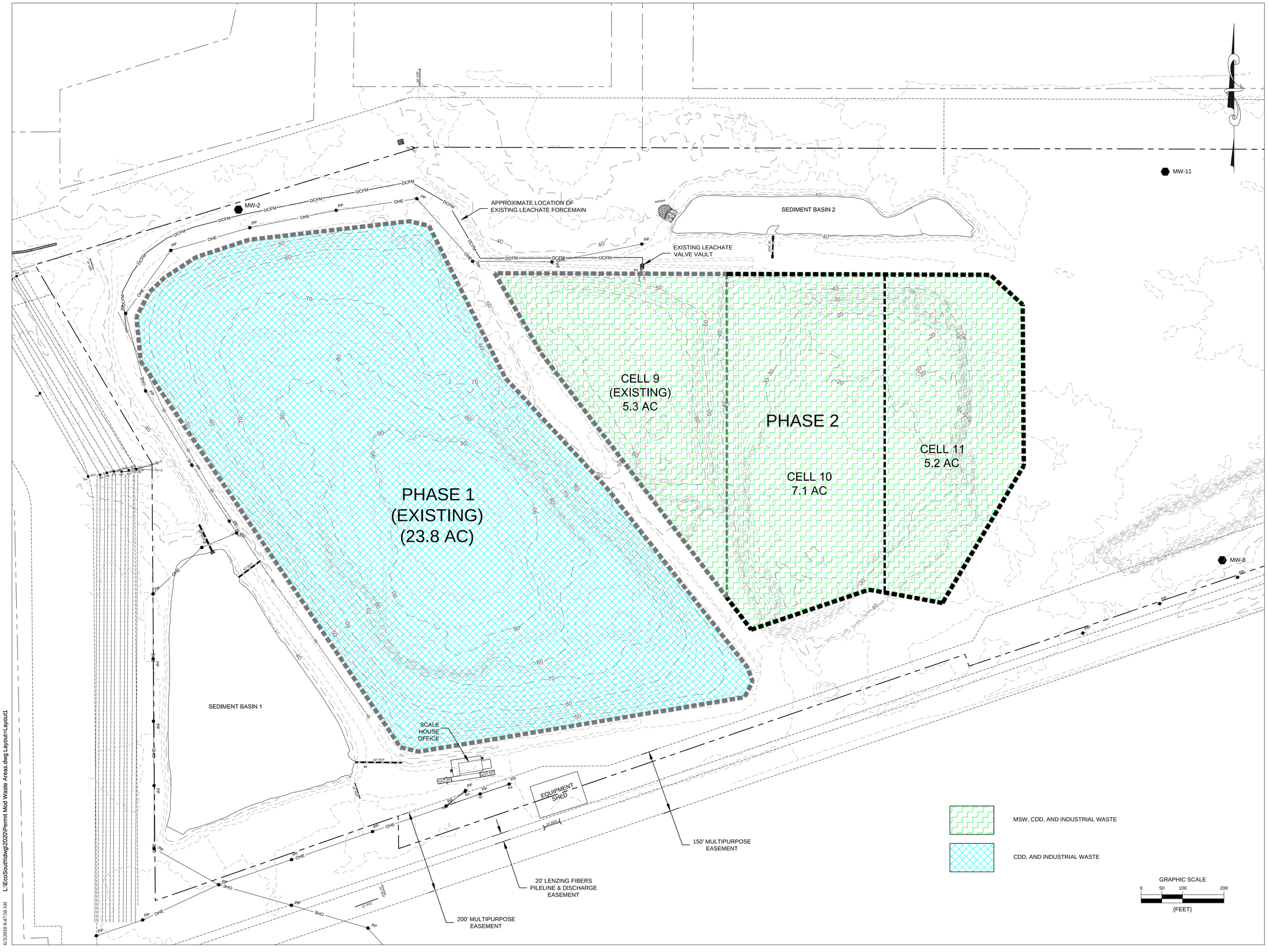
Cover Soil Thickness	Equipment Track Width		
	Very Wide	Wide	Standard
[2] 300 mm	1.00	0.97	0.94
300-1000 mm	0.97	0.92	0.70
[3] 1000 mm	0.95	0.75	0.30

Note: numbers in boxes are input values

numbers in Italics are calculated values

Attachment J

Site Drawings



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LaBella
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1604 Ownby Lane
Richmond, VA 23220
804-355-4520

labellapc.com

ECOSOUTH SERVICES OF MOBILE, LLC.

AXIS, ALABAMA

AXIS LANDFILL

AXIS, ALABAMA

NO:	DATE:	DESCRIPTION:
Revisions		

PROJECT NUMBER: 2201419

DRAWN BY: IWW

REVIEWED BY: LBB

ISSUED FOR:

DATE: 11/6/2020

DRAWING NAME:

PERMIT MODIFICATION WASTE AREAS

DRAWING NUMBER:

01

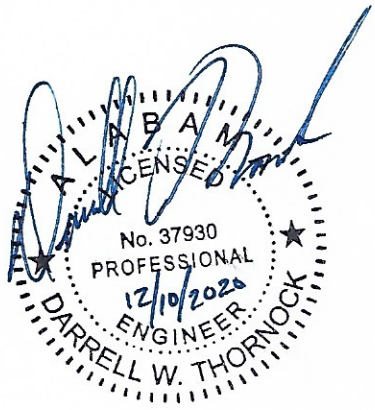
Engineer's Certification

I certify under penalty of law that I am a Professional Engineer, licensed to practice in the State of Alabama and experienced in the design and permitting of waste management facilities. The information submitted herein, to the best of my knowledge and belief is true, accurate, and complete.

12/10/2020

Darrell Thornock, P.E.
Technical Consultant
LaBella Associates, D.P.C.

Date



APPROXIMATE LOCATION OF EXISTING LEACHATE FORCEMAIN

EXISTING LEACHATE VALVE VAULT

SEDIMENT BASIN 2

100' BUFFER

MW-11

MW-9

MW-8

CELL 9
(EXISTING)
5.3 AC

PHASE 2

CELL 11
5.2 AC

CELL 10
7.1 AC

PHASE 1
(EXISTING)
(23.8 AC)

SEDIMENT BASIN 1

SCALE HOUSE OFFICE

EQUIPMENT SHED

150' MULTIPURPOSE EASEMENT

20' LENZING FIBERS PILELINE & DISCHARGE EASEMENT

200' MULTIPURPOSE EASEMENT

MSW, CDD, AND INDUSTRIAL WASTE

CDD, AND INDUSTRIAL WASTE

100 FOOT BUFFER

GRAPHIC SCALE
0 50 100 200
(FEET)

6/3/2010 8:47:56 AM L:\EcoSouth\dwg\2020\Permit Mod Waste Areas.dwg Layout=Layout1

LaBella
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1604 Ownby Lane
Richmond, VA 23220
804-355-4520

labellapc.com

ALABAMA LICENSED No. 37939 PROFESSIONAL ENGINEER DARRELL W. THORNOCK 11-6-2020

ECOSOUTH SERVICES OF MOBILE, LLC.

AXIS, ALABAMA

AXIS LANDFILL

AXIS, ALABAMA

NO:	DATE:	DESCRIPTION:

Revisions

PROJECT NUMBER: 2201419

DRAWN BY: IWW

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ISSUED FOR:

DATE: 11/6/2020

DRAWING NAME:

PERMIT MODIFICATION WASTE AREAS

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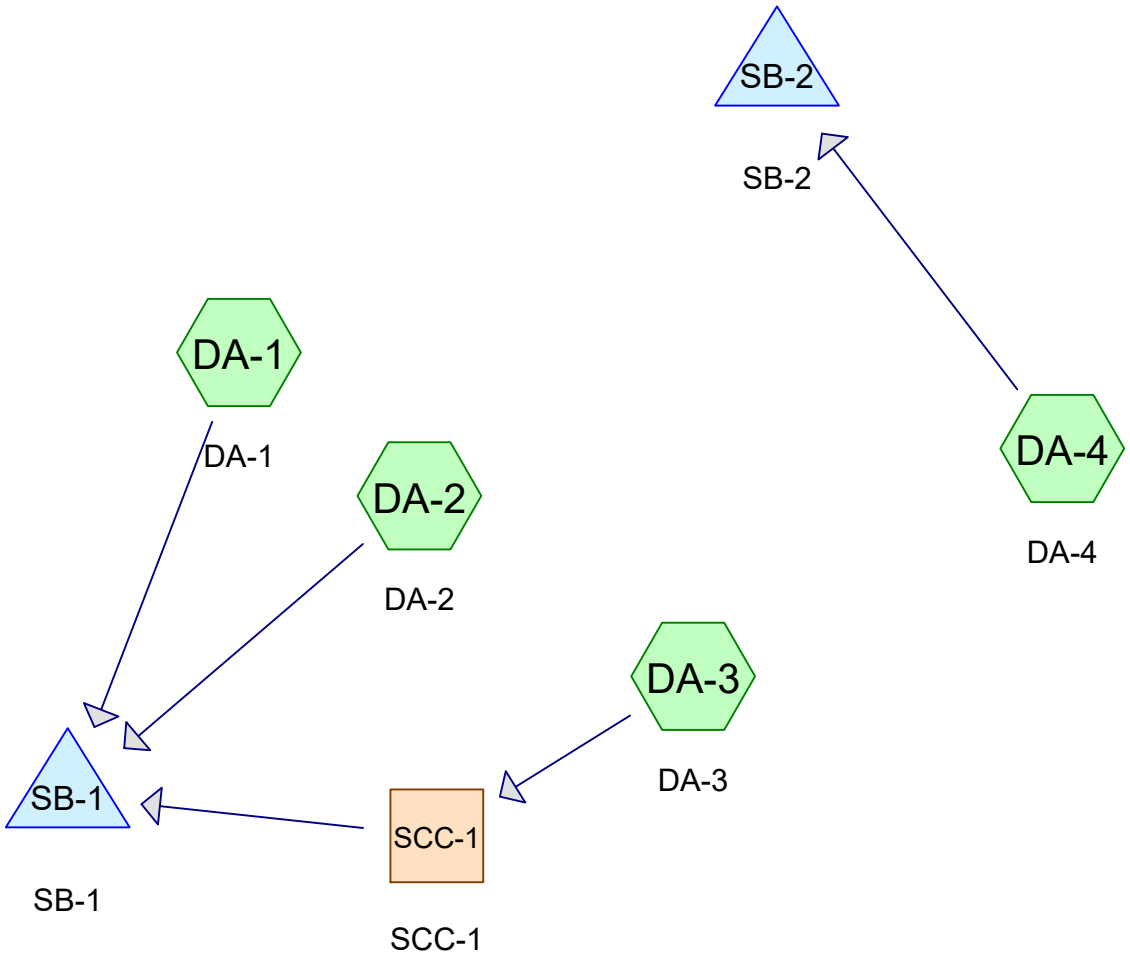
01



Subcat Reach Pond Link

Routing Diagram for Phase 1 & 2 Stormwater

Prepared by {enter your company name here}, Printed 12/10/2020

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
50.360	79	50-75% Grass cover, Fair, HSG C (DA-1, DA-2, DA-3, DA-4)
1.290	100	POnd (DA-4)
51.650	**80**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
50.360	HSG C	DA-1, DA-2, DA-3, DA-4
0.000	HSG D	
1.290	Other	DA-4
51.650		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	50.360	0.000	0.000	50.360	50-75% Grass cover, Fair	DA-1, DA-2, DA-3, DA-4
0.000	0.000	0.000	0.000	1.290	1.290	POnd	DA-4
0.000	**0.000**	**50.360**	**0.000**	**1.290**	**51.650**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	DA-1	0.00	0.00	40.0	0.0200	0.025	48.0	0.0	0.0
2	DA-2	0.00	0.00	40.0	0.0200	0.025	48.0	0.0	0.0
3	DA-3	0.00	0.00	50.0	0.0200	0.025	36.0	0.0	0.0
4	DA-4	0.00	0.00	54.0	0.0100	0.013	36.0	0.0	0.0
5	SB-1	35.00	34.00	72.0	0.0139	0.013	48.0	0.0	0.0

Time span=5.00-32.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-1: DA-1 Runoff Area=10.300 ac 0.00% Impervious Runoff Depth=5.79"
Flow Length=2,483' Tc=20.9 min CN=79 Runoff=63.55 cfs 4.968 af

Subcatchment DA-2: DA-2 Runoff Area=17.100 ac 0.00% Impervious Runoff Depth=5.79"
Flow Length=1,224' Tc=12.7 min CN=79 Runoff=134.20 cfs 8.248 af

Subcatchment DA-3: DA-3 Runoff Area=6.400 ac 0.00% Impervious Runoff Depth=5.79"
Flow Length=685' Tc=8.7 min CN=79 Runoff=57.21 cfs 3.087 af

Subcatchment DA-4: DA-4 Runoff Area=17.850 ac 7.23% Impervious Runoff Depth>6.03"
Flow Length=1,047' Tc=13.3 min CN=81 Runoff=142.11 cfs 8.963 af

Reach SCC-1: SCC-1 Avg. Flow Depth=2.05' Max Vel=2.50 fps Inflow=57.21 cfs 3.087 af
n=0.030 L=975.0' S=0.0021 '/' Capacity=222.16 cfs Outflow=46.12 cfs 3.087 af

Pond SB-1: SB-1 Peak Elev=35.81' Storage=710,125 cf Inflow=221.35 cfs 16.302 af
Outflow=0.00 cfs 0.000 af

Pond SB-2: SB-2 Peak Elev=41.62' Storage=314,574 cf Inflow=142.11 cfs 8.963 af
Outflow=65.37 cfs 7.587 af

Total Runoff Area = 51.650 ac Runoff Volume = 25.265 af Average Runoff Depth = 5.87"
97.50% Pervious = 50.360 ac 2.50% Impervious = 1.290 ac

Summary for Subcatchment DA-1: DA-1

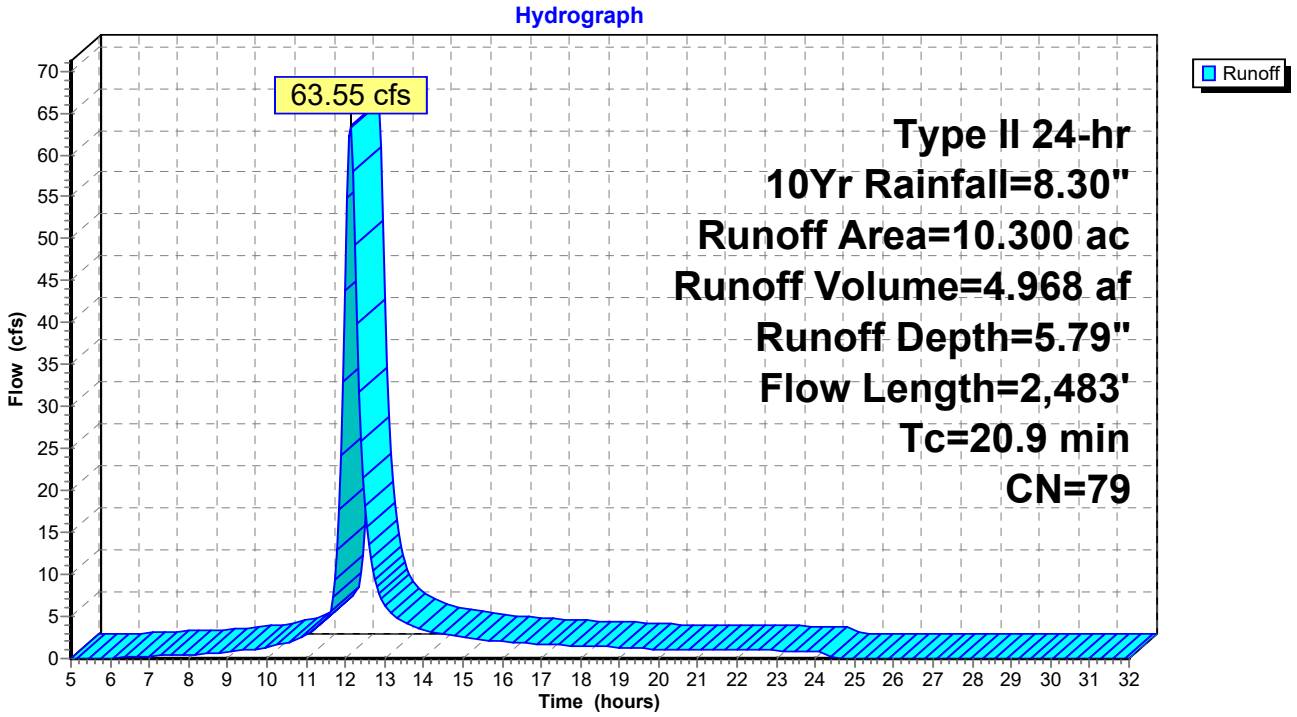
Runoff = 63.55 cfs @ 12.13 hrs, Volume= 4.968 af, Depth= 5.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type II 24-hr 10Yr Rainfall=8.30"

Area (ac)	CN	Description
10.300	79	50-75% Grass cover, Fair, HSG C
10.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	129	0.0780	0.28		**Sheet Flow,** Grass: Dense n= 0.240 P2= 5.55"
2.4	240	0.0125	1.68		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.9	315	0.0200	2.76	4.83	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 4.0 & 10.0 '/' Top.W=7.00' n= 0.030
0.4	250	0.2500	11.50	25.88	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=0.50' Z= 3.0 '/' Top.W=6.00' n= 0.033
8.4	1,509	0.0030	2.98	53.61	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 3.0 '/' Top.W=15.00' n= 0.030
0.1	40	0.0200	8.41	105.63	**Pipe Channel, CMP_Round 48"** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.025
20.9	2,483	Total			

Subcatchment DA-1: DA-1



Summary for Subcatchment DA-2: DA-2

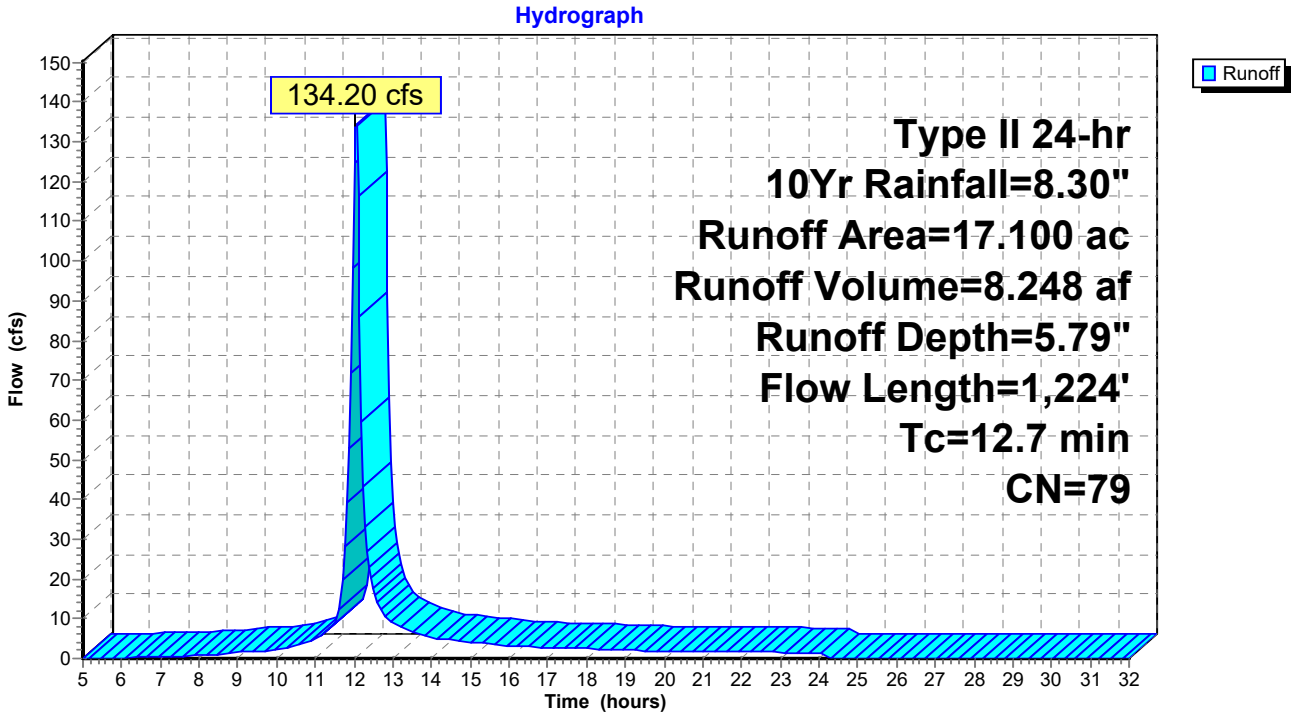
Runoff = 134.20 cfs @ 12.04 hrs, Volume= 8.248 af, Depth= 5.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type II 24-hr 10Yr Rainfall=8.30"

Area (ac)	CN	Description
17.100	79	50-75% Grass cover, Fair, HSG C
17.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	124	0.1050	0.31		**Sheet Flow,** Grass: Dense n= 0.240 P2= 5.55"
2.2	240	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
3.4	560	0.0200	2.76	4.83	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 4.0 & 10.0 '/' Top.W=7.00' n= 0.030
0.4	260	0.2500	11.50	25.88	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=0.50' Z= 3.0 '/' Top.W=6.00' n= 0.033
0.1	40	0.0200	8.41	105.63	**Pipe Channel, CMP_Round 48"** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.025
12.7	1,224	Total			

Subcatchment DA-2: DA-2



Summary for Subcatchment DA-3: DA-3

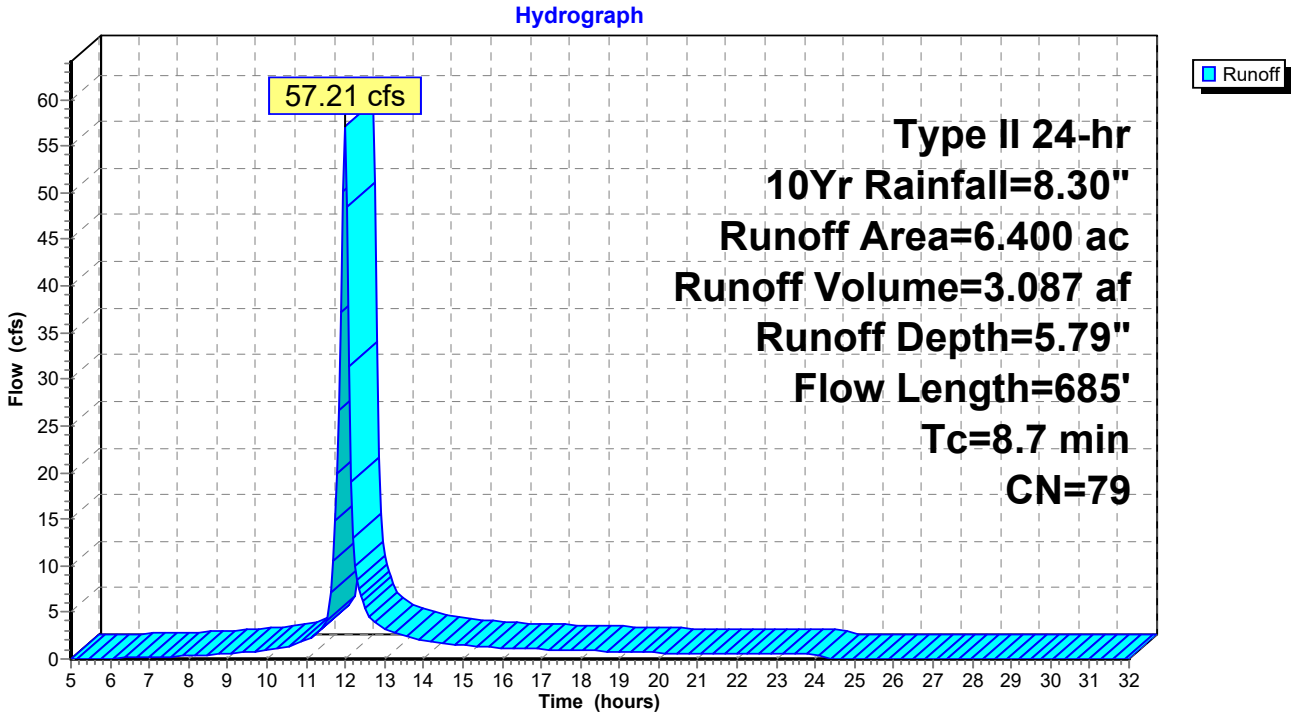
Runoff = 57.21 cfs @ 12.00 hrs, Volume= 3.087 af, Depth= 5.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type II 24-hr 10Yr Rainfall=8.30"

Area (ac)	CN	Description
6.400	79	50-75% Grass cover, Fair, HSG C
6.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	122	0.0900	0.29		**Sheet Flow,** Grass: Dense n= 0.240 P2= 5.55"
1.1	175	0.0200	2.76	4.83	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 4.0 & 10.0 '/' Top.W=7.00' n= 0.030
0.5	338	0.2500	11.50	25.88	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=0.50' Z= 3.0 '/' Top.W=6.00' n= 0.033
0.1	50	0.0200	6.94	49.05	**Pipe Channel, CMP_Round 36"** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.025
8.7	685	Total			

Subcatchment DA-3: DA-3



Summary for Subcatchment DA-4: DA-4

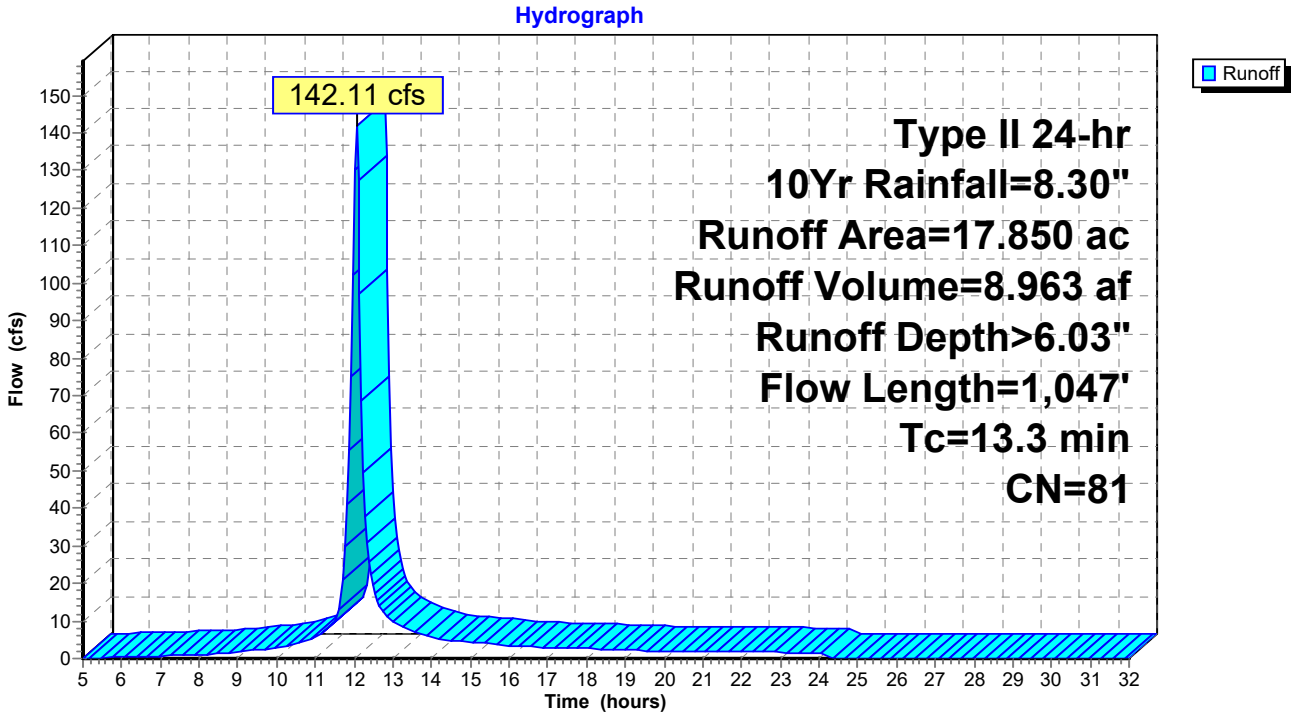
Runoff = 142.11 cfs @ 12.05 hrs, Volume= 8.963 af, Depth> 6.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type II 24-hr 10Yr Rainfall=8.30"

	Area (ac)	CN	Description
	16.560	79	50-75% Grass cover, Fair, HSG C
*	1.290	100	POnd
	17.850	81	Weighted Average
	16.560		92.77% Pervious Area
	1.290		7.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	149	0.0810	0.29		**Sheet Flow,** Grass: Dense n= 0.240 P2= 5.55"
2.0	200	0.0125	1.68		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.3	384	0.0200	2.76	4.83	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 4.0 & 10.0 '/' Top.W=7.00' n= 0.030
0.4	260	0.2500	11.50	25.88	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=0.50' Z= 3.0 '/' Top.W=6.00' n= 0.033
0.1	54	0.0100	9.44	66.70	**Pipe Channel, RCP_Round 36"** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
13.3	1,047	Total			

Subcatchment DA-4: DA-4



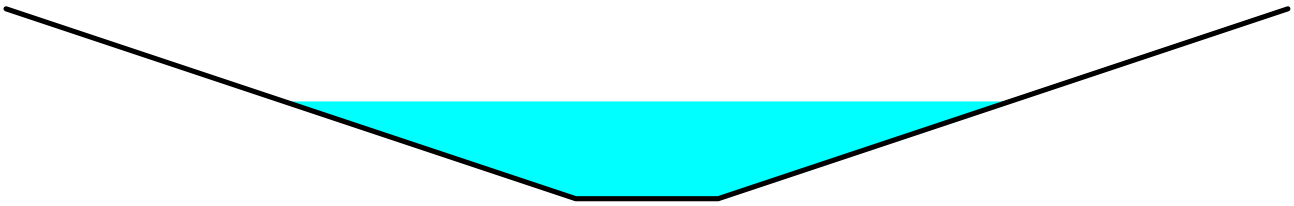
Summary for Reach SCC-1: SCC-1

Inflow Area = 6.400 ac, 0.00% Impervious, Inflow Depth = 5.79" for 10Yr event
Inflow = 57.21 cfs @ 12.00 hrs, Volume= 3.087 af
Outflow = 46.12 cfs @ 12.16 hrs, Volume= 3.087 af, Atten= 19%, Lag= 10.0 min

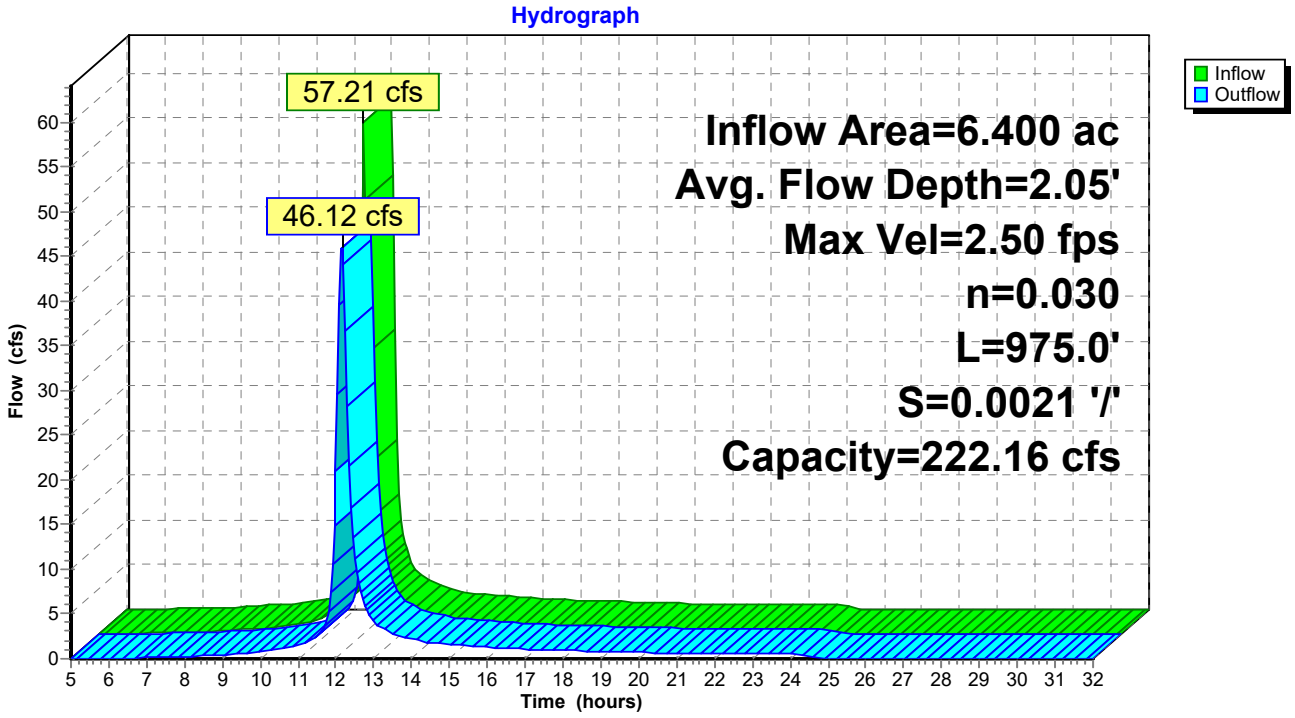
Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.50 fps, Min. Travel Time= 6.5 min
Avg. Velocity = 0.68 fps, Avg. Travel Time= 24.0 min

Peak Storage= 18,269 cf @ 12.06 hrs
Average Depth at Peak Storage= 2.05'
Bank-Full Depth= 4.00' Flow Area= 60.0 sf, Capacity= 222.16 cfs

3.00' x 4.00' deep channel, n= 0.030
Side Slope Z-value= 3.0 '/' Top Width= 27.00'
Length= 975.0' Slope= 0.0021 '/'
Inlet Invert= 42.00', Outlet Invert= 40.00'



Reach SCC-1: SCC-1



Summary for Pond SB-1: SB-1

Inflow Area = 33.800 ac, 0.00% Impervious, Inflow Depth = 5.79" for 10Yr event
Inflow = 221.35 cfs @ 12.08 hrs, Volume= 16.302 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Peak Elev= 35.81' @ 32.00 hrs Surf.Area= 160,395 sf Storage= 710,125 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

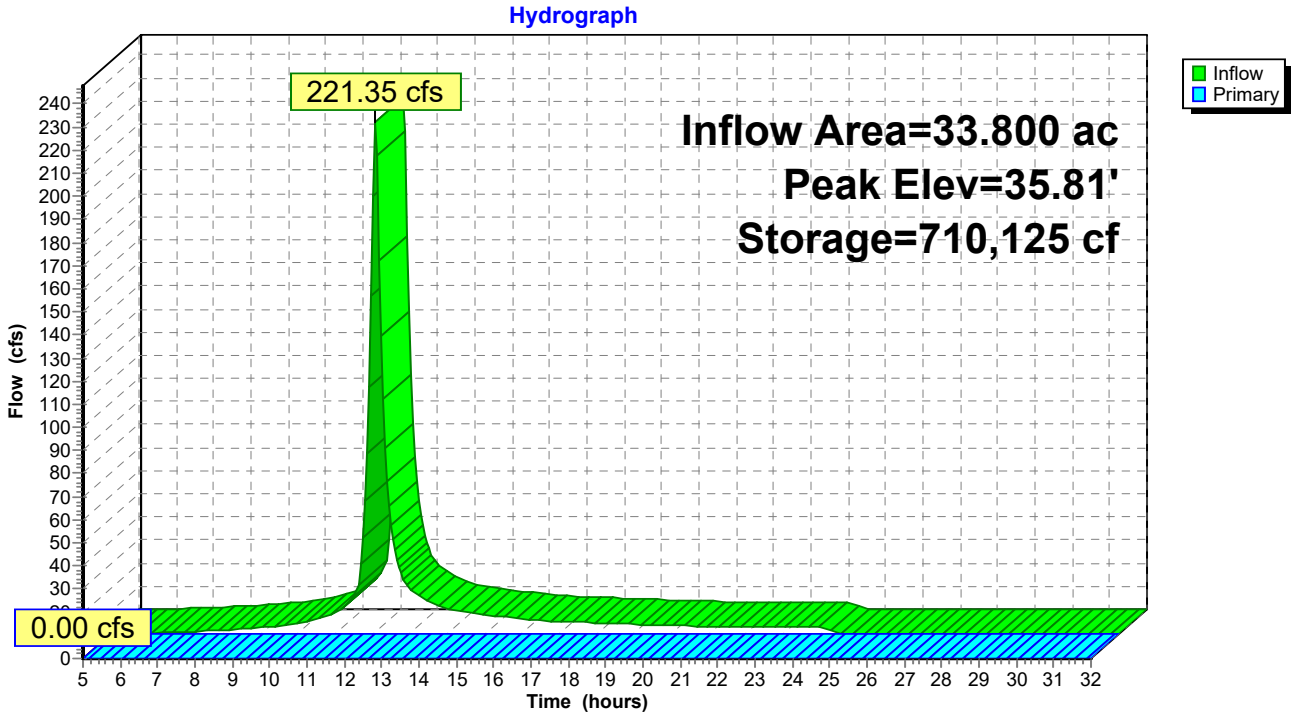
Volume	Invert	Avail.Storage	Storage Description
#1	29.00'	1,681,695 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
29.00	3,200	0	0
30.00	39,401	21,301	21,301
31.00	69,732	54,567	75,867
32.00	111,869	90,801	166,668
33.00	133,636	122,753	289,420
34.00	147,709	140,673	430,093
35.00	155,387	151,548	581,641
36.00	161,541	158,464	740,105
37.00	176,219	168,880	908,985
38.00	186,176	181,198	1,090,182
39.00	193,578	189,877	1,280,059
40.00	200,693	197,136	1,477,195
41.00	208,308	204,501	1,681,695

Device	Routing	Invert	Outlet Devices
#1	Primary	35.00'	**48.0" Round Culvert** L= 72.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 35.00' / 34.00' S= 0.0139 '/' Cc= 0.900 n= 0.013, Flow Area= 12.57 sf
#2	Device 1	37.70'	**8.5' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 1	39.10'	**24.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=29.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SB-1: SB-1


Hydrograph
221.35 cfs
0.00 cfs
Inflow Area=33.800 ac
Peak Elev=35.81'
Storage=710,125 cf
Inflow
Primary
Flow (cfs)
Time (hours)

Summary for Pond SB-2: SB-2

Inflow Area = 17.850 ac, 7.23% Impervious, Inflow Depth > 6.03" for 10Yr event
Inflow = 142.11 cfs @ 12.05 hrs, Volume= 8.963 af
Outflow = 65.37 cfs @ 12.21 hrs, Volume= 7.587 af, Atten= 54%, Lag= 9.9 min
Primary = 65.37 cfs @ 12.21 hrs, Volume= 7.587 af

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Starting Elev= 39.00' Surf.Area= 57,415 sf Storage= 150,923 cf
Peak Elev= 41.62' @ 12.21 hrs Surf.Area= 65,855 sf Storage= 314,574 cf (163,652 cf above start)

Plug-Flow detention time= 313.3 min calculated for 4.115 af (46% of inflow)
Center-of-Mass det. time= 79.6 min (882.4 - 802.8)

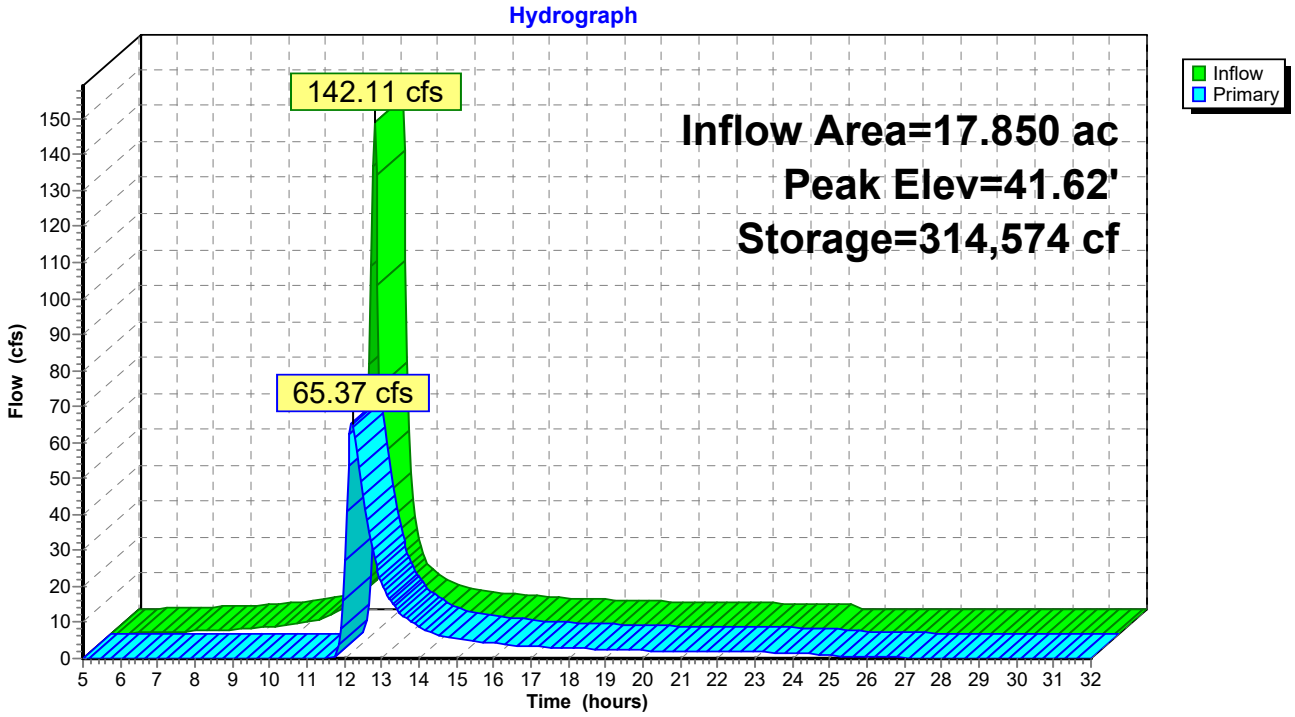
Volume	Invert	Avail.Storage	Storage Description
#1	36.00'	477,984 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
36.00	43,258	0	0
38.00	52,638	95,896	95,896
40.00	62,192	114,830	210,726
42.00	66,709	128,901	339,627
44.00	71,648	138,357	477,984

Device	Routing	Invert	Outlet Devices
#1	Primary	40.00'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=64.97 cfs @ 12.21 hrs HW=41.62' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Weir Controls 64.97 cfs @ 4.16 fps)

Pond SB-2: SB-2


Hydrograph
142.11 cfs
65.37 cfs
Inflow Area=17.850 ac
Peak Elev=41.62'
Storage=314,574 cf
Inflow
Primary
Flow (cfs)
Time (hours)

Time span=5.00-32.00 hrs, dt=0.05 hrs, 541 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-1: DA-1 Runoff Area=10.300 ac 0.00% Impervious Runoff Depth>7.77"
Flow Length=2,483' Tc=20.9 min CN=79 Runoff=84.41 cfs 6.671 af

Subcatchment DA-2: DA-2 Runoff Area=17.100 ac 0.00% Impervious Runoff Depth>7.77"
Flow Length=1,224' Tc=12.7 min CN=79 Runoff=177.72 cfs 11.074 af

Subcatchment DA-3: DA-3 Runoff Area=6.400 ac 0.00% Impervious Runoff Depth>7.77"
Flow Length=685' Tc=8.7 min CN=79 Runoff=75.62 cfs 4.144 af

Subcatchment DA-4: DA-4 Runoff Area=17.850 ac 7.23% Impervious Runoff Depth>8.02"
Flow Length=1,047' Tc=13.3 min CN=81 Runoff=186.69 cfs 11.936 af

Reach SCC-1: SCC-1 Avg. Flow Depth=2.34' Max Vel=2.70 fps Inflow=75.62 cfs 4.144 af
n=0.030 L=975.0' S=0.0021 '/' Capacity=222.16 cfs Outflow=63.11 cfs 4.144 af

Pond SB-1: SB-1 Peak Elev=37.25' Storage=953,502 cf Inflow=298.33 cfs 21.890 af
Outflow=0.00 cfs 0.000 af

Pond SB-2: SB-2 Peak Elev=42.15' Storage=349,978 cf Inflow=186.69 cfs 11.936 af
Outflow=98.97 cfs 10.560 af

Total Runoff Area = 51.650 ac Runoff Volume = 33.826 af Average Runoff Depth = 7.86"
97.50% Pervious = 50.360 ac 2.50% Impervious = 1.290 ac

Summary for Subcatchment DA-1: DA-1

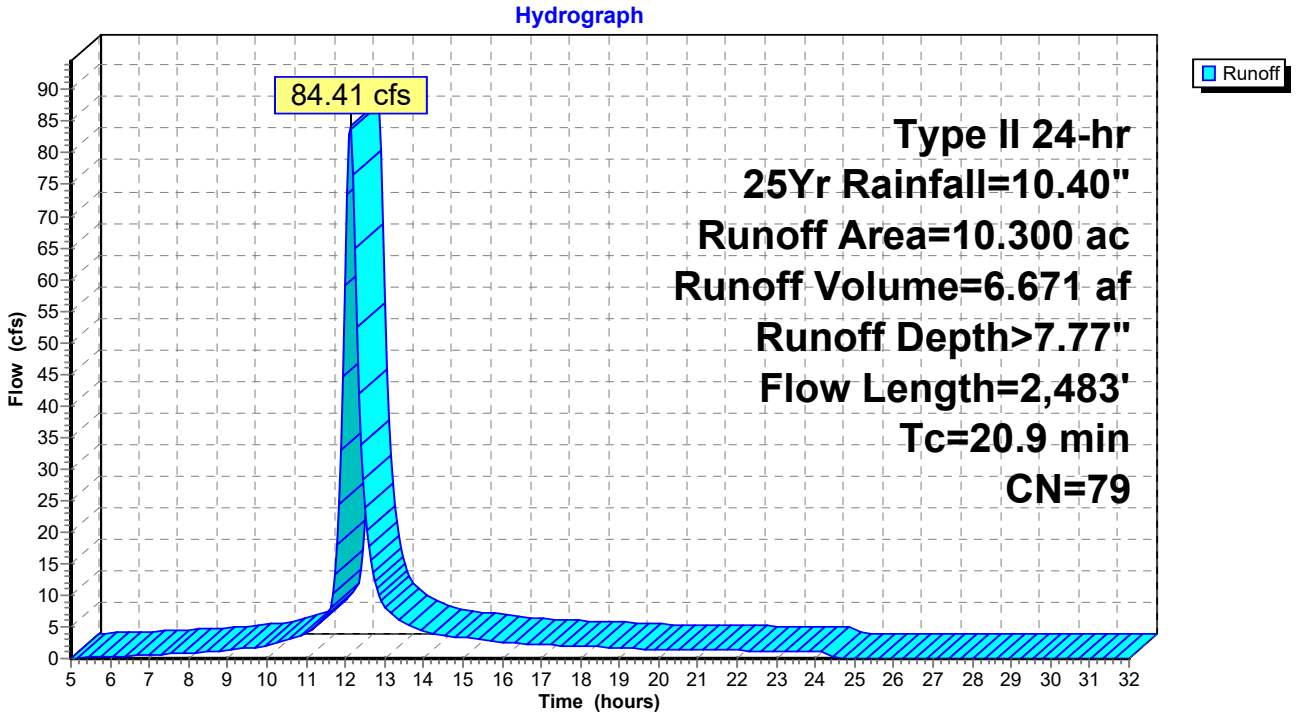
Runoff = 84.41 cfs @ 12.13 hrs, Volume= 6.671 af, Depth> 7.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type II 24-hr 25Yr Rainfall=10.40"

Area (ac)	CN	Description
10.300	79	50-75% Grass cover, Fair, HSG C
10.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	129	0.0780	0.28		**Sheet Flow,** Grass: Dense n= 0.240 P2= 5.55"
2.4	240	0.0125	1.68		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.9	315	0.0200	2.76	4.83	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 4.0 & 10.0 '/' Top.W=7.00' n= 0.030
0.4	250	0.2500	11.50	25.88	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=0.50' Z= 3.0 '/' Top.W=6.00' n= 0.033
8.4	1,509	0.0030	2.98	53.61	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=2.00' Z= 3.0 '/' Top.W=15.00' n= 0.030
0.1	40	0.0200	8.41	105.63	**Pipe Channel, CMP_Round 48"** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.025
20.9	2,483	Total			

Subcatchment DA-1: DA-1



Summary for Subcatchment DA-2: DA-2

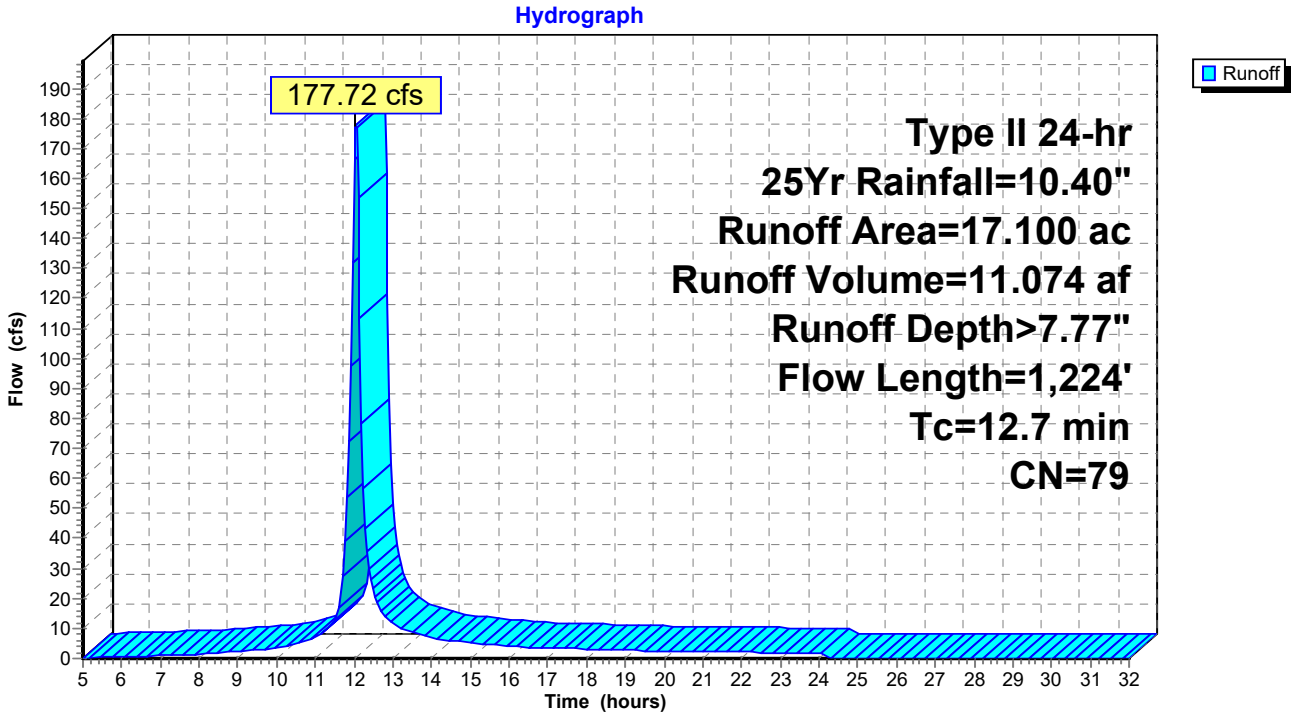
Runoff = 177.72 cfs @ 12.04 hrs, Volume= 11.074 af, Depth> 7.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type II 24-hr 25Yr Rainfall=10.40"

Area (ac)	CN	Description
17.100	79	50-75% Grass cover, Fair, HSG C
17.100		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	124	0.1050	0.31		**Sheet Flow,** Grass: Dense n= 0.240 P2= 5.55"
2.2	240	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
3.4	560	0.0200	2.76	4.83	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 4.0 & 10.0 '/' Top.W=7.00' n= 0.030
0.4	260	0.2500	11.50	25.88	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=0.50' Z= 3.0 '/' Top.W=6.00' n= 0.033
0.1	40	0.0200	8.41	105.63	**Pipe Channel, CMP_Round 48"** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.025
12.7	1,224	Total			

Subcatchment DA-2: DA-2



Summary for Subcatchment DA-3: DA-3

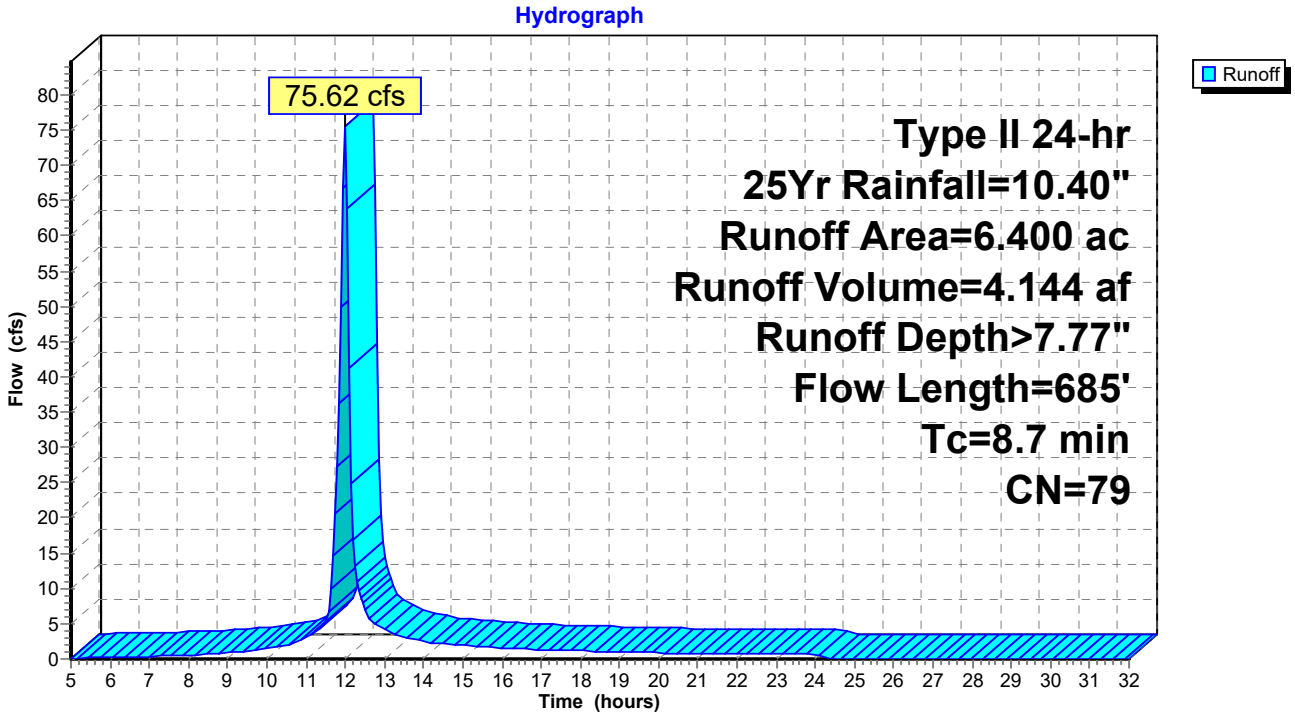
Runoff = 75.62 cfs @ 12.00 hrs, Volume= 4.144 af, Depth> 7.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type II 24-hr 25Yr Rainfall=10.40"

Area (ac)	CN	Description
6.400	79	50-75% Grass cover, Fair, HSG C
6.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	122	0.0900	0.29		**Sheet Flow,** Grass: Dense n= 0.240 P2= 5.55"
1.1	175	0.0200	2.76	4.83	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 4.0 & 10.0 '/' Top.W=7.00' n= 0.030
0.5	338	0.2500	11.50	25.88	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=0.50' Z= 3.0 '/' Top.W=6.00' n= 0.033
0.1	50	0.0200	6.94	49.05	**Pipe Channel, CMP_Round 36"** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.025
8.7	685	Total			

Subcatchment DA-3: DA-3



Summary for Subcatchment DA-4: DA-4

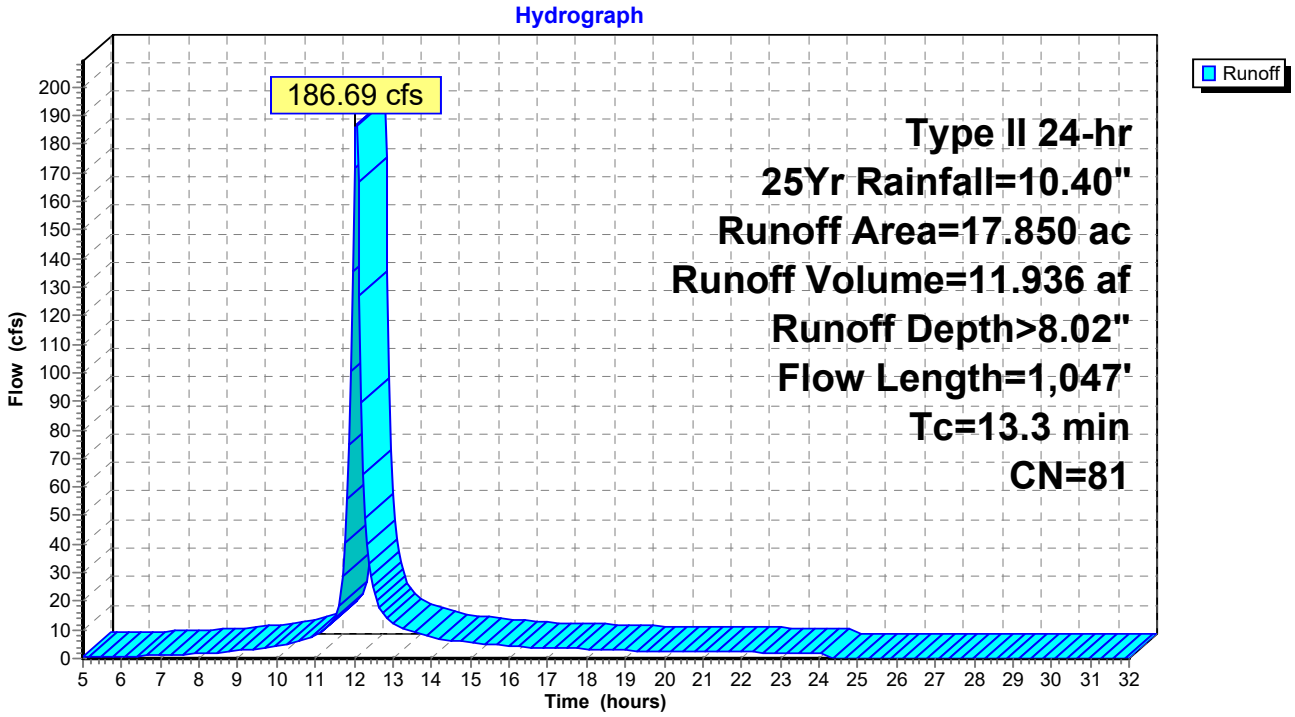
Runoff = 186.69 cfs @ 12.05 hrs, Volume= 11.936 af, Depth> 8.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Type II 24-hr 25Yr Rainfall=10.40"

	Area (ac)	CN	Description
	16.560	79	50-75% Grass cover, Fair, HSG C
*	1.290	100	POnd
	17.850	81	Weighted Average
	16.560		92.77% Pervious Area
	1.290		7.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	149	0.0810	0.29		**Sheet Flow,** Grass: Dense n= 0.240 P2= 5.55"
2.0	200	0.0125	1.68		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.3	384	0.0200	2.76	4.83	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 4.0 & 10.0 '/' Top.W=7.00' n= 0.030
0.4	260	0.2500	11.50	25.88	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=0.50' Z= 3.0 '/' Top.W=6.00' n= 0.033
0.1	54	0.0100	9.44	66.70	**Pipe Channel, RCP_Round 36"** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
13.3	1,047	Total			

Subcatchment DA-4: DA-4



Summary for Reach SCC-1: SCC-1

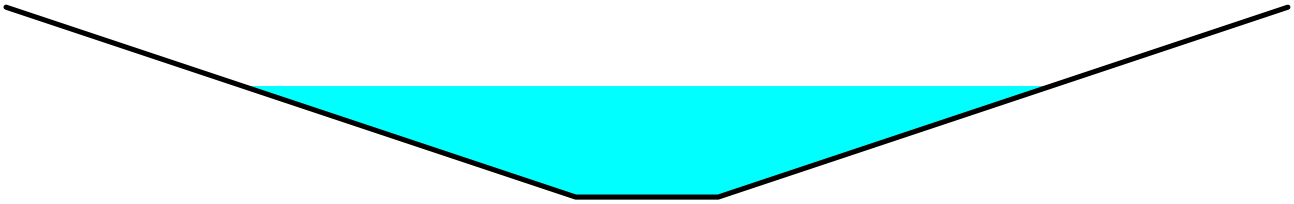
[82] Warning: Early inflow requires earlier time span

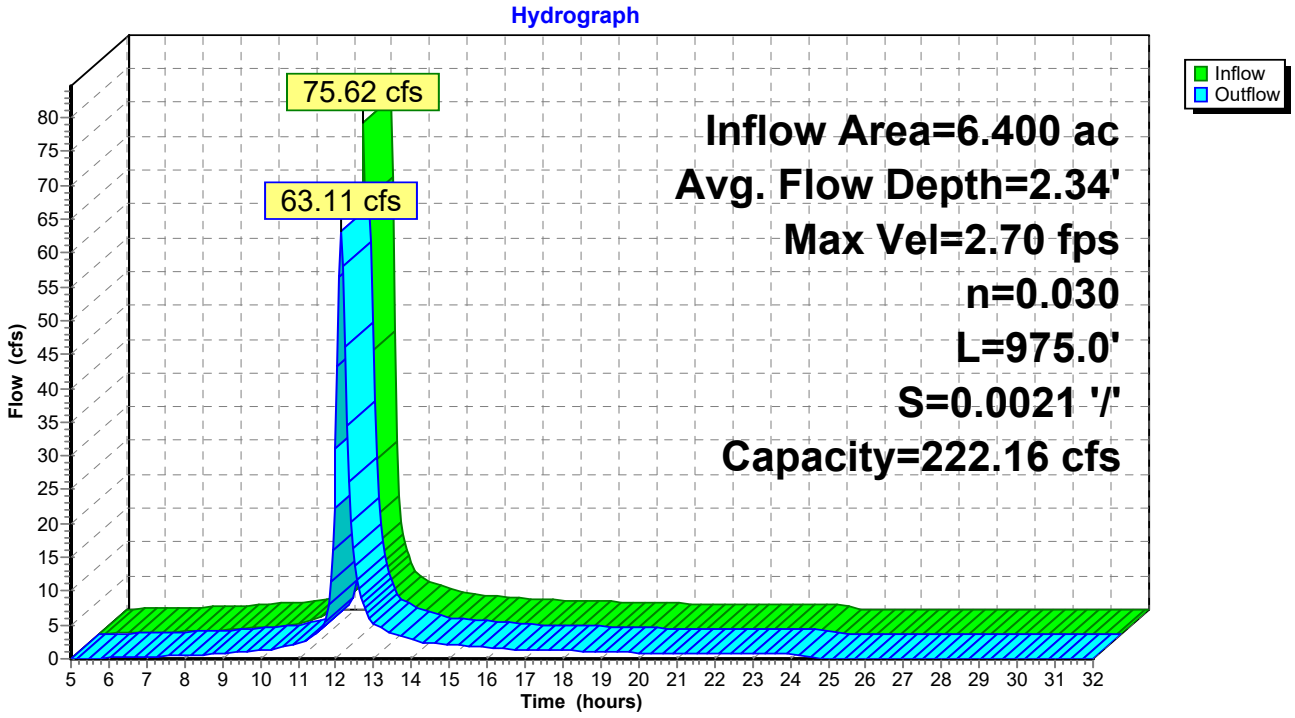
Inflow Area = 6.400 ac, 0.00% Impervious, Inflow Depth > 7.77" for 25Yr event
Inflow = 75.62 cfs @ 12.00 hrs, Volume= 4.144 af
Outflow = 63.11 cfs @ 12.15 hrs, Volume= 4.144 af, Atten= 17%, Lag= 9.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.70 fps, Min. Travel Time= 6.0 min
Avg. Velocity = 0.74 fps, Avg. Travel Time= 21.9 min

Peak Storage= 22,848 cf @ 12.05 hrs
Average Depth at Peak Storage= 2.34'
Bank-Full Depth= 4.00' Flow Area= 60.0 sf, Capacity= 222.16 cfs

3.00' x 4.00' deep channel, n= 0.030
Side Slope Z-value= 3.0 '/' Top Width= 27.00'
Length= 975.0' Slope= 0.0021 '/'
Inlet Invert= 42.00', Outlet Invert= 40.00'





Summary for Pond SB-1: SB-1

Inflow Area = 33.800 ac, 0.00% Impervious, Inflow Depth > 7.77" for 25Yr event
Inflow = 298.33 cfs @ 12.07 hrs, Volume= 21.890 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Peak Elev= 37.25' @ 32.00 hrs Surf.Area= 178,717 sf Storage= 953,502 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

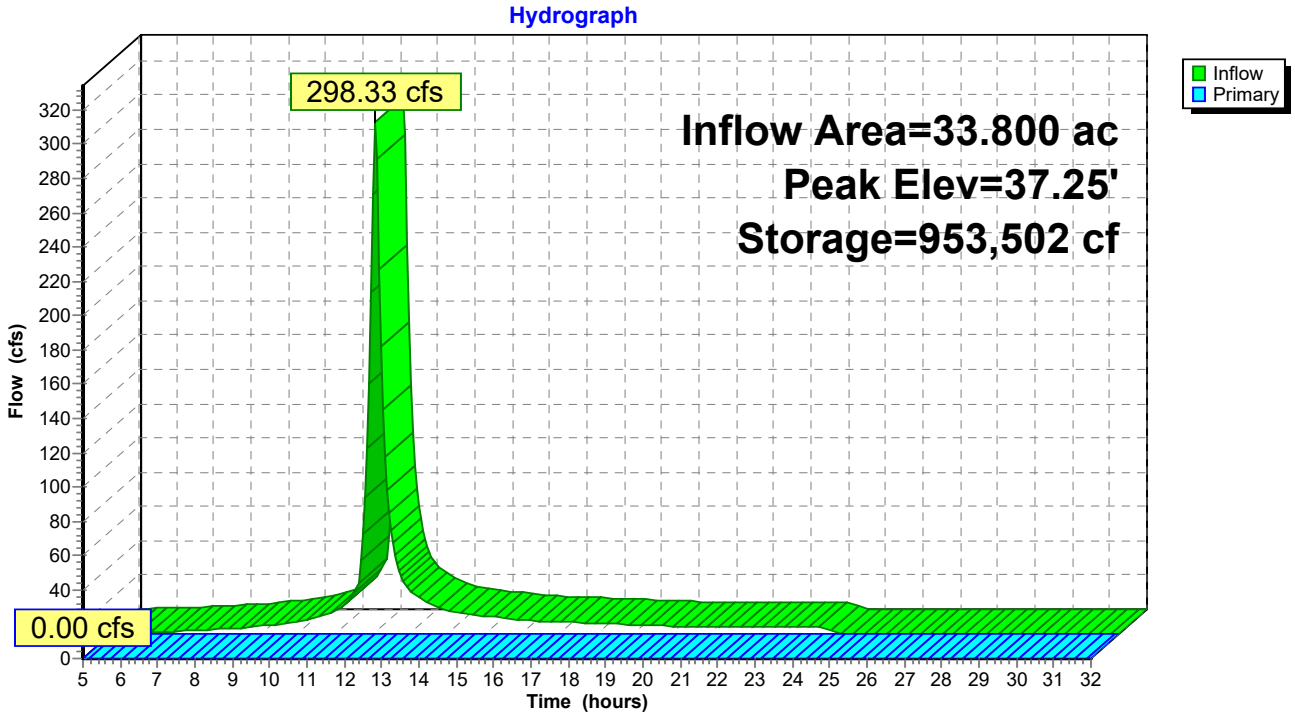
Volume	Invert	Avail.Storage	Storage Description
#1	29.00'	1,681,695 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
29.00	3,200	0	0
30.00	39,401	21,301	21,301
31.00	69,732	54,567	75,867
32.00	111,869	90,801	166,668
33.00	133,636	122,753	289,420
34.00	147,709	140,673	430,093
35.00	155,387	151,548	581,641
36.00	161,541	158,464	740,105
37.00	176,219	168,880	908,985
38.00	186,176	181,198	1,090,182
39.00	193,578	189,877	1,280,059
40.00	200,693	197,136	1,477,195
41.00	208,308	204,501	1,681,695

Device	Routing	Invert	Outlet Devices
#1	Primary	35.00'	**48.0" Round Culvert** L= 72.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 35.00' / 34.00' S= 0.0139 '/' Cc= 0.900 n= 0.013, Flow Area= 12.57 sf
#2	Device 1	37.70'	**8.5' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Device 1	39.10'	**24.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=29.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond SB-1: SB-1


Hydrograph
298.33 cfs
0.00 cfs
Inflow Area=33.800 ac
Peak Elev=37.25'
Storage=953,502 cf
Inflow
Primary
Flow (cfs)
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
Time (hours)
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32

Summary for Pond SB-2: SB-2

[82] Warning: Early inflow requires earlier time span

Inflow Area = 17.850 ac, 7.23% Impervious, Inflow Depth > 8.02" for 25Yr event
Inflow = 186.69 cfs @ 12.05 hrs, Volume= 11.936 af
Outflow = 98.97 cfs @ 12.19 hrs, Volume= 10.560 af, Atten= 47%, Lag= 8.7 min
Primary = 98.97 cfs @ 12.19 hrs, Volume= 10.560 af

Routing by Stor-Ind method, Time Span= 5.00-32.00 hrs, dt= 0.05 hrs
Starting Elev= 39.00' Surf.Area= 57,415 sf Storage= 150,923 cf
Peak Elev= 42.15' @ 12.19 hrs Surf.Area= 67,091 sf Storage= 349,978 cf (199,055 cf above start)

Plug-Flow detention time= 243.9 min calculated for 7.095 af (59% of inflow)
Center-of-Mass det. time= 71.0 min (866.4 - 795.3)

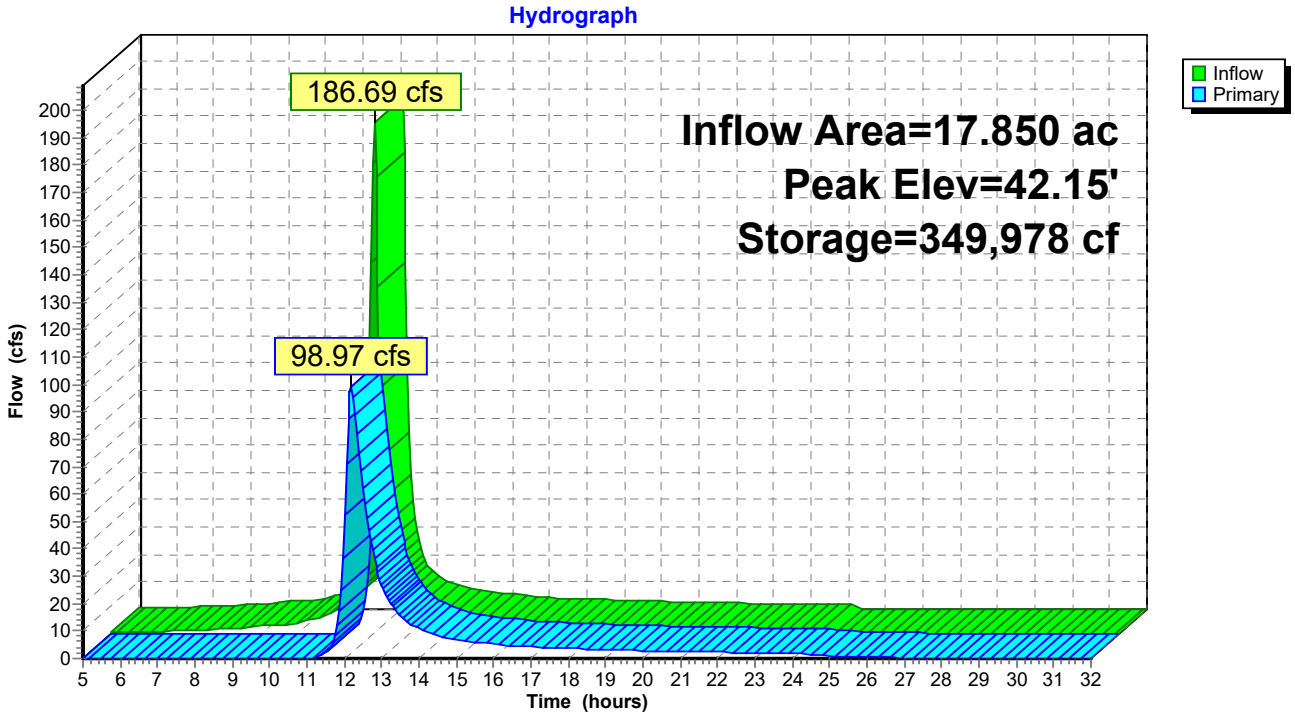
Volume	Invert	Avail.Storage	Storage Description
#1	36.00'	477,984 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
36.00	43,258	0	0
38.00	52,638	95,896	95,896
40.00	62,192	114,830	210,726
42.00	66,709	128,901	339,627
44.00	71,648	138,357	477,984

Device	Routing	Invert	Outlet Devices
#1	Primary	40.00'	**10.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=98.59 cfs @ 12.19 hrs HW=42.15' (Free Discharge)
1=Sharp-Crested Rectangular Weir (Weir Controls 98.59 cfs @ 4.79 fps)

Pond SB-2: SB-2


Hydrograph
186.69 cfs
98.97 cfs
Inflow Area=17.850 ac
Peak Elev=42.15'
Storage=349,978 cf
Inflow
Primary
Flow (cfs)
Time (hours)

Job:	Axis Industrial Landfill		
Job Number:	2192290 Ph 01		
Calculated By:	DWT	Date:	7/15/2020
Checked By:		Date:	
Subject:	SB Summary		
Sheet:	1 of 2		

Basin # SB-1 Location: West of Phase 1
Total Area Draining to basin: 33.8 acres

Basin Volume Design

1. Peak Flow 24-hr event Q_{10} for the Drainage area **221.4 cfs**

Peak Flow 24-hr event Q_{25} for the Drainage area **298.3 cfs**
(see attached calculations using TR-55 method)

2. Basin Volumes

Minimum required volume = 3600 [cf/acre] * Drainage Area [acre]
3600 [cf/acre] * 33.8 [acre]
121,680 [cf]

Provided total volume = **953,502** [cf] (from AutoCAD)

Sediment cleanout depth = 2 [ft]
Volume above sediment cleanout level = **877,635** [cf]

3. Area of basin

Minimum required surface area = 325 [sf/cfs] * Q_{10} peak inflow [cfs]
325 [sf/cfs] * 221.4 [cfs]
71,955 [sf]

Basin surface area at elevation 39.1 (top of outlet structure) = 193,578 sf (from AutoCAD)

Length of flow in basin = 500 [ft]
Average Width (@ riser el.) 350 [ft]
Length to Width ratio of basin = L / (Wa) = 1.43

4. Pond discharge capacity

Barrel Diameter = 48 [in]
Barrel Length = 72 [ft]

Job:	Axis Industrial Landfill		
Job Number:	2192290 Ph 01		
Calculated By:	DWT	Date:	7/15/2020
Checked By:		Date:	
Subject:	SB Summary		
Sheet:	2 of 2		

Flow Routing Calculations Attached to Show Suitable Sizing of Pond and Outlet Devices

Predevelopment 10yr storm peak flow	=	Unknown	[cfs]
Postdevelopment 10yr storm peak flow	=	0.00	[cfs]
Predevelopment 25yr storm peak flow	=	Unknown	[cfs]
Postdevelopment 25yr storm peak flow	=	0.00	[cfs]

(Post- development flows obtained from outlet pipe of SB-1 flows. See attached output reports)

Job:	Axis Industrial Landfill		
Job Number:	2192290 Ph 01		
Calculated By:	DWT	Date:	9/28/2020
Checked By:		Date:	
Subject:	SB Summary		
Sheet:	1 of 2		

Basin # SB-2 Location: North of Phase 2

Total Area Draining to basin: 17.9 acres

Basin Volume Design

1. Peak Flow 24-hr event Q_{10} for the Drainage area **142.1 cfs**

Peak Flow 24-hr event Q_{25} for the Drainage area **186.69 cfs**

(see attached calculations using TR-55 method)

2. Basin Volumes

Minimum required volume = 3600 [cf/acre] * Drainage Area [acre]

3600 [cf/acre] * 17.9 [acre]

64,440 [cf]

Provided total volume = **210,726** [cf] (from AutoCAD)

Sediment cleanout depth = 2 [ft]

Volume above sediment cleanout level = **114,830** [cf]

3. Area of basin

Minimum required surface area = 325 [sf/cfs] * Q_{10} peak inflow [cfs]

325 [sf/cfs] * 142.1 [cfs]

46,186 [sf]

Basin surface area at elevation 40 (top of outlet structure) = 62,192 sf (from AutoCAD)

Length of flow in basin = 242 [ft]

Average Width (@ outlet el.) = 89 [ft]

Length to Width ratio of basin = L / (Wa) = 2.72

4. Pond discharge capacity

Weir Width = 10 [ft]

Weir Length = 20 [ft]

Job:	Axis Industrial Landfill		
Job Number:	2192290 Ph 01		
Calculated By:	DWT	Date:	9/28/2020
Checked By:		Date:	
Subject:	SB Summary		
Sheet:	2 of 2		

Flow Routing Calculations Attached to Show Suitable Sizing of Pond and Outlet Devices

Predevelopment 10yr storm peak flow	=	Unknown	[cfs]
Postdevelopment 10yr storm peak flow	=	65.4	[cfs]
Predevelopment 25yr storm peak flow	=	Unknown	[cfs]
Postdevelopment 25yr storm peak flow	=	99.1	[cfs]

(Post- development flows obtained from outlet weir of SB-2 flows. See attached output reports)

Project:	EcoSouth Axis Landfill		
Project Number:	2192290 Phase 01		
Calculated By:	DWT	Date:	12/16/20
Revised By:		Date:	
Checked By:		Date:	
Subject:	Global Stability		
Sheet:	1 of 6		

GLOBAL STATIC AND SEISMIC SLOPE STABILITY

OBJECTIVE

The objective of this calculation is to analyze the stability of the EcoSouth Axis Industrial Landfill (Landfill) Phase 1 at 3:1 final grade conditions. This analysis will determine an acceptable soil to waste friction envelope that will yield deep-seated translational and rotational factors of safety exceeding 1.5 for static conditions and 1.0 for seismic conditions. Final grades represent worst case for stability because interim grades have lower waste depths.

This analysis includes:

Attachment A – Cross Section Location
Attachment B – SLIDE v. 8.018 Slope Stability Software Analysis Output Data

METHODOLOGY

Cross Section – Final Grade Slopes

A cross-section through the proposed final grades configuration that included the maximum crest height and sloping landfill base grade was considered. The slope profile in Phase 1 has a maximum elevation of approximately 112 feet with a waste thickness of approximately 67 feet at the point of the section. Since global stability is being analyzed, the cover system was modeled as one soil unit. The baseliner is generally sloped from east to west.

LANDFILL DESIGN

The landfill system design consists of the following (from top to bottom):

- Cover System (3 ft)
- Waste (67 ft thickness)
- Subgrade

STATIC STABILITY ANALYSIS

The software program used to calculate slope stability FS within this analysis is entitled, "SLIDE" version 8.018, compiled by Rocscience, Inc. of Toronto, ON, Canada. The program uses limit equilibrium techniques to determine a minimum FS for each given input cross-section slope. SLIDE will calculate a minimum FS for both rotational and non-circular, translational failure surfaces within the cross-section under both static and seismic conditions based upon slope geometry, a phreatic surface, and the shear strength parameters of waste and soils.

Block Search with Janbu's Method

The Block Search method is a technique used within SLIDE to locate the most critical non-circular failure surface within each cross-section. This method was used for both static and seismic conditions. The Block search method was used in conjunction with the Simplified Janbu Method as it does not incorporate moment equilibrium and is therefore appropriate for ***translational*** soil movement.

Characteristics of Block Search/Janbu's Method include:

- The ability to single out a confined zone that may represent a potentially weak layer;
- Generating passive and active portions or "blocks" of the failure surface at angles that are randomly generated within a specified range;
- Applicable to any shape of failure surface;
- Satisfies both vertical force and moment equilibrium for each slice and overall horizontal force equilibrium for the entire wedge;
- Considers all interslice shear forces to be horizontal (no interslice shear force);

Bishop's Simplified Method

Bishop's simplified method is a limit equilibrium technique used within this analysis by SLIDE to locate the most critical ***rotational*** failure surface within the cross-section.

Characteristics of Bishop's Method include:

- Dividing failure mass into a number of slices;
- Satisfies vertical force equilibrium for each slice and overall moment equilibrium about the center of the rotational failure surface;
- Specifically applicable to rotational failure surfaces;
- Considers all interslice shear forces to be horizontal (no interslice shear forces).

Janbu's Method

The Simplified Janbu Method was also used for analyzing the most critical ***rotational*** failure surface for each cross section, considering static and seismic conditions. This approach uses the method of slices to determine the stability of the slide mass. The simplified procedure assumes that there are no inter-slice shear forces. Janbu's method satisfies vertical force equilibrium for each slice, as well as overall horizontal force equilibrium for the entire slide mass.

Geosynthetic Shear Strength Parameters

The shear strength of the baseliner within this stability analysis is represented by the most critical contact interface along the landfill floor and sideslopes defining the weakest material and plane within the landfill baseliner. The most critical peak strength interface contact of the subgrade along the bottom of the waste layer.

The shear strength parameters utilized in both analyses were varied for the 1.0 foot and 0.5 foot thick layers respectively to determine the minimum shear strength of the interfaces that will result in a factor of safety of at least 1.5 for static conditions and 1.0 for seismic conditions.

LANDFILL DESIGN

SOIL & WASTE PARAMETERS

Cover and Fill Soil Parameters

γ: Moist Unit weight of constructed soil layers = 110 pcf
γ_S: Saturated Unit weight of constructed soil layers = 115 pcf
c': Cohesion = 0 psf
Φ': Friction angle = 32 degrees

Waste Parameters

The shear strength values for Industrial waste were estimated to be:

γ: Moist Unit weight of waste = 80 pcf
γ_S: Saturated Unit weight waste = 85 pcf
c': Cohesion = 0 psf
Φ': Friction angle = 26 degrees

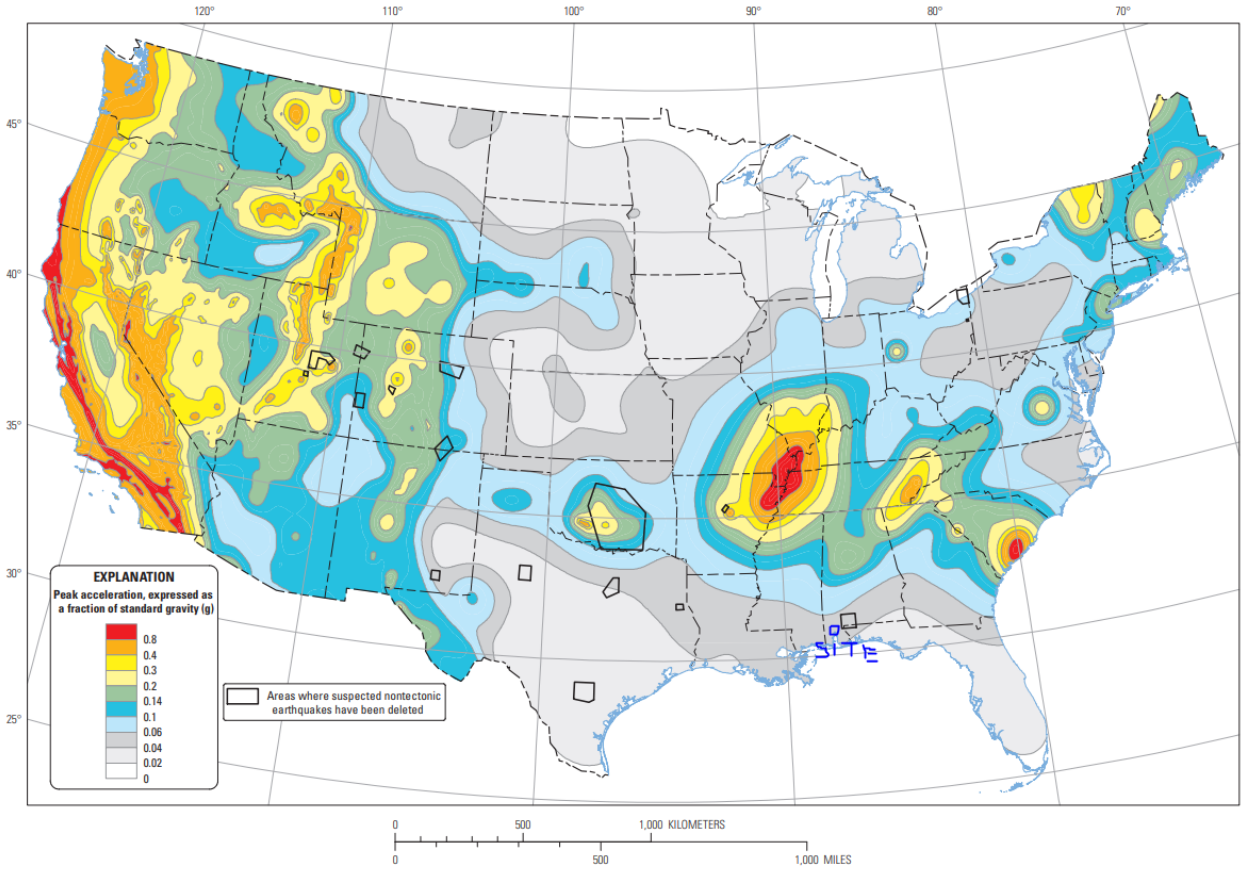
The shear strength values for MSW waste were taken from the Ohio State EPA publication Geotechnical and Stability Analysis for Ohio Waste Containment Facilities, 2004.

Soil Liner Parameters

γ: Moist Unit weight of compacted soil liner = 110 pcf
γ_S: Saturated Unit weight of compacted soil liner = 115 pcf
c': Cohesion = 0 psf
Φ': Friction angle = 33 degrees

SEISMIC STABILITY ANALYSIS

The shear wave acceleration is modeled within the stability analysis by inputting a coefficient, (Cs) that is some fraction of gravity. The peak acceleration for the site is estimated to be 0.05 g which is taken from the map below USGS Map, October 2002 which gives the acceleration that has a 10% probability of occurring in 50 years



Two-percent probability of exceedance in 50 years map of peak ground acceleration

The peak acceleration at the base (approximately 0.05 g, from USGS Map) was adjusted to reflect the peak acceleration at the crest of the landfill using Figure 8-11 adopted from Singh and Sun (1995). Accordingly, the peak acceleration at the crest is estimated to be 0.07g.

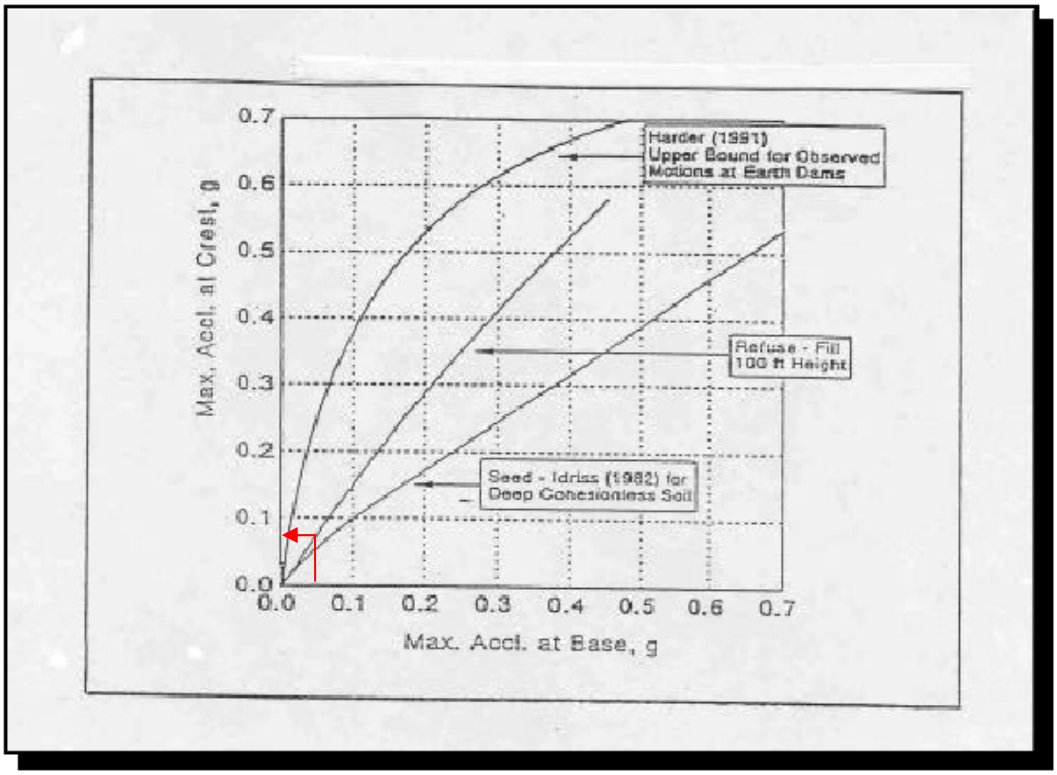


Figure 8-11 Approximate relationship between maximum accelerations at the base and crest for various ground conditions. Singh and Sun,1995, Figure 3.

The modified peak horizontal ground acceleration was used directly as the seismic coefficient in the SLIDE slope stability program.

SLOPE STABILITY RESULTS

Factors of safety (FS) were calculated for the final slope condition for the new landfill expansion. The SLIDE software package calculated FS, expressing the ratio of resisting to driving forces, for each failure surface considering static conditions. Attachment B contains the SLIDE slope stability software output data.

The most critical failure surface for the cross section was then evaluated under seismic conditions.

RESULTS & OUTPUT

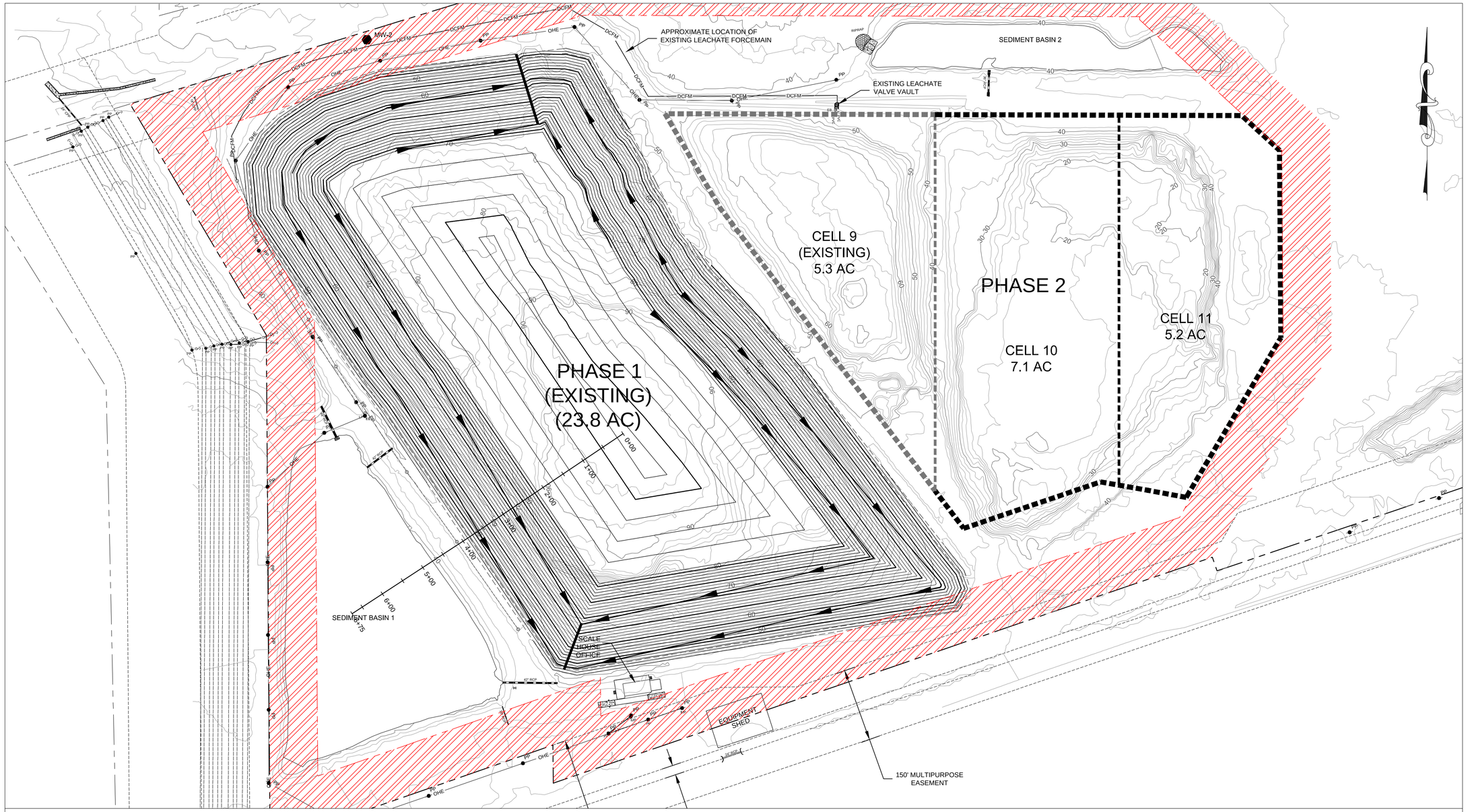
Factors of safety (FS) were calculated for the final slope condition for the MSW Landfill. The SLIDE software package calculated FS, expressing the ratio of resisting to driving forces, for each failure surface considering static and seismic conditions. The SLIDE slope stability software output data are

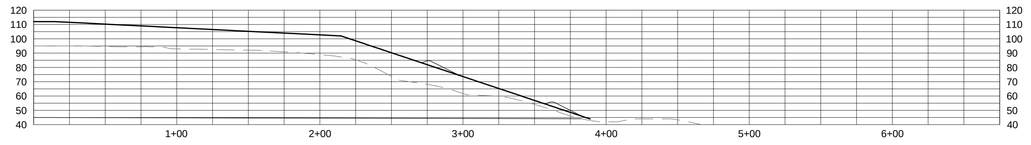
attached. The geometry of the critical failure planes are shown in attachment B. Below is a summary of the analysis files and results.

	Failure Type	Static/Seismic	FS
Cross Section	Translational	Static	2.34
	Rotational	Static	1.36
	Translational	Seismic	1.73
	Rotational	Seismic	1.14

CONCLUSIONS

Considering rotational and translational failure surfaces, it was the rotational surfaces that produced the lowest FS for the each case. Factors of Safety calculated within this stability analysis comply with industry excepted standards. All ***deep-seated*** translational and rotational analyses provided a static and seismic factor of safety greater than 1.5 and 1.0, respectfully. **In conclusion, the proposed EcoSouth Axis Industrial Landfill 3:1 slopes will be structurally stable under static and seismic conditions.**





GRAPHIC SCALE
0 50 100 200
(FEET)

LaBella
Powered by partnership.
1604 Ownby Lane
Richmond, VA 23220
804-355-4520
labellapc.com

ECOSOUTH SERVICES OF MOBILE, LLC.
AXIS, ALABAMA

AXIS LANDFILL
AXIS, ALABAMA

NO:	DATE:	DESCRIPTION:

Revisions

PROJECT NUMBER: 2201419
DRAWN BY: IWW
REVIEWED BY: LBB
ISSUED FOR: BIDDING
DATE:
DRAWING NAME:

PHASE 1 3:1 SLOPES

DRAWING NUMBER:

CP-01

Slide Analysis Information

EcoSouth Phase 1 Landfill 3-1

Project Summary

File Name:	EcoSouth Phase 1 Landfill 3-1.slmd
Slide Modeler Version:	8.018
Project Title:	EcoSouth Phase 1 Stability
Author:	Darrell Thornock, P.E.
Company:	LaBella Associates, D.P.C.
Date Created:	12/16/2020

Currently Open Scenarios

Group Name	Scenario Name	Global Minimum	Compute Time
Block	Master Scenario	Bishop Simplified: 2.336880 Janbu Simplified: 2.335370	00h:00m:00.378s
	Block Seismic	Bishop Simplified: 1.741000 Janbu Simplified: 1.728630	00h:00m:00.344s
	Circular	Bishop Simplified: 1.483460 Janbu Simplified: 1.358840	00h:00m:00.789s
	Circular Seismic	Bishop Simplified: 1.216180 Janbu Simplified: 1.139080	00h:00m:00.860s

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Data Output:	Standard
Failure Direction:	Left to Right

Analysis Options

All Open Scenarios

Slices Type:	Vertical

Analysis Methods Used

	Bishop simplified
	Janbu simplified
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

All Open Scenarios	
Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

All Open Scenarios	
Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Block - Circular		All other Scenarios	
Surface Type:	Circular	Surface Type:	Non-Circular Block Search
Search Method:	Auto Refine Search	Number of Surfaces:	5000
Divisions along slope:	20	Multiple Groups:	Enabled
Circles per division:	10	Pseudo-Random Surfaces:	Enabled
Number of iterations:	10	Convex Surfaces Only:	Disabled
Divisions to use in next iteration:	50%	Left Projection Angle (Start Angle) [°]:	135
Composite Surfaces:	Disabled	Left Projection Angle (End Angle) [°]:	135
Minimum Elevation:	Not Defined	Right Projection Angle (Start Angle) [°]:	45
Minimum Depth [ft]:	10	Right Projection Angle (End Angle) [°]:	45
Minimum Area:	Not Defined	Minimum Elevation:	Not Defined
Minimum Weight:	Not Defined	Minimum Depth:	Not Defined
		Minimum Area:	Not Defined
		Minimum Weight:	Not Defined

Seismic Loading

Block - Master Scenario		Block - Block Seismic		Block - Circular		Block - Circular Seismic	
Advanced seismic analysis:	No	Advanced seismic analysis:	No	Advanced seismic analysis:	No	Advanced seismic analysis:	No
Staged pseudostatic analysis:	No	Staged pseudostatic analysis:	No	Staged pseudostatic analysis:	No	Staged pseudostatic analysis:	No
		Seismic Load Coefficient (Horizontal):	0.07			Seismic Load Coefficient (Horizontal):	0.07

Materials

Property	Cover and Fill	Soil Liner	Waste
Color			
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unsaturated Unit Weight [lbs/ft3]	110	110	80
Saturated Unit Weight [lbs/ft3]	115	115	85
Cohesion [psf]	0	0	0
Friction Angle [°]	32	33	26
Water Surface	Assigned per scenario	Assigned per scenario	Assigned per scenario
Hu Value	1	1	
Ru Value			0

Materials In Use

Material	Master Scenario	Block Seismic	Circular	Circular Seismic
Cover and Fill	✓	✓	✓	✓
Soil Liner	✓	✓	✓	✓
Waste	✓	✓	✓	✓

Global Minimums

Block - Master Scenario

Method: bishop simplified

FS	2.336880
Axis Location:	298.065, 371.561
Left Slip Surface Endpoint:	88.577, 108.277
Right Slip Surface Endpoint:	383.000, 46.000
Resisting Moment:	4.00957e+07 lb-ft
Driving Moment:	1.71578e+07 lb-ft
Total Slice Area:	3102.03 ft2
Surface Horizontal Width:	294.423 ft
Surface Average Height:	10.536 ft

Method: janbu simplified

FS	2.335370
Axis Location:	298.065, 371.561
Left Slip Surface Endpoint:	88.577, 108.277
Right Slip Surface Endpoint:	383.000, 46.000
Resisting Horizontal Force:	130347 lb
Driving Horizontal Force:	55814.1 lb
Total Slice Area:	3102.03 ft2
Surface Horizontal Width:	294.423 ft
Surface Average Height:	10.536 ft

Block - Block Seismic

Method: bishop simplified

FS	1.741000
Axis Location:	298.065, 371.561
Left Slip Surface Endpoint:	88.577, 108.277
Right Slip Surface Endpoint:	383.000, 46.000
Resisting Moment:	3.95188e+07 lb-ft
Driving Moment:	2.26989e+07 lb-ft
Total Slice Area:	3102.03 ft2
Surface Horizontal Width:	294.423 ft
Surface Average Height:	10.536 ft

Method: janbu simplified

FS	1.728630
Axis Location:	298.065, 371.561
Left Slip Surface Endpoint:	88.577, 108.277
Right Slip Surface Endpoint:	383.000, 46.000
Resisting Horizontal Force:	128413 lb
Driving Horizontal Force:	74285.9 lb
Total Slice Area:	3102.03 ft2
Surface Horizontal Width:	294.423 ft
Surface Average Height:	10.536 ft

Block - Circular

Method: bishop simplified

FS	1.483460
Center:	332.671, 139.256
Radius:	82.116
Left Slip Surface Endpoint:	272.208, 83.693
Right Slip Surface Endpoint:	346.023, 58.232
Resisting Moment:	2.01662e+06 lb-ft
Driving Moment:	1.3594e+06 lb-ft
Total Slice Area:	539.32 ft2
Surface Horizontal Width:	73.815 ft
Surface Average Height:	7.30637 ft

Method: janbu simplified

FS	1.358840
Center:	309.205, 102.722
Radius:	39.485
Left Slip Surface Endpoint:	274.251, 84.357
Right Slip Surface Endpoint:	323.274, 65.828
Resisting Horizontal Force:	14572.8 lb
Driving Horizontal Force:	10724.4 lb
Total Slice Area:	350.224 ft2
Surface Horizontal Width:	49.0225 ft
Surface Average Height:	7.14413 ft

Block - Circular Seismic

Method: bishop simplified

FS	1.216180
Center:	373.435, 296.141
Radius:	241.853
Left Slip Surface Endpoint:	242.542, 92.769
Right Slip Surface Endpoint:	355.938, 54.922
Resisting Moment:	7.02329e+06 lb-ft
Driving Moment:	5.77487e+06 lb-ft
Total Slice Area:	650.009 ft2
Surface Horizontal Width:	113.396 ft
Surface Average Height:	5.73223 ft

Method: janbu simplified

FS	1.139080
Center:	319.066, 116.022
Radius:	55.535
Left Slip Surface Endpoint:	273.592, 84.142
Right Slip Surface Endpoint:	333.531, 62.404
Resisting Horizontal Force:	17490.7 lb
Driving Horizontal Force:	15355.1 lb
Total Slice Area:	431.415 ft2
Surface Horizontal Width:	59.9385 ft
Surface Average Height:	7.19763 ft

Global Minimum Coordinates

Block - Master Scenario

Method: bishop simplified

X	Y
88.5771	108.277
383	46

Method: janbu simplified

X	Y
88.5771	108.277
383	46

Block - Block Seismic

Method: bishop simplified

X	Y
88.5771	108.277
383	46

Method: janbu simplified

X	Y
88.5771	108.277
383	46

Block - Circular

Block - Circular Seismic

Entity Information

Group: Block

Shared Entities

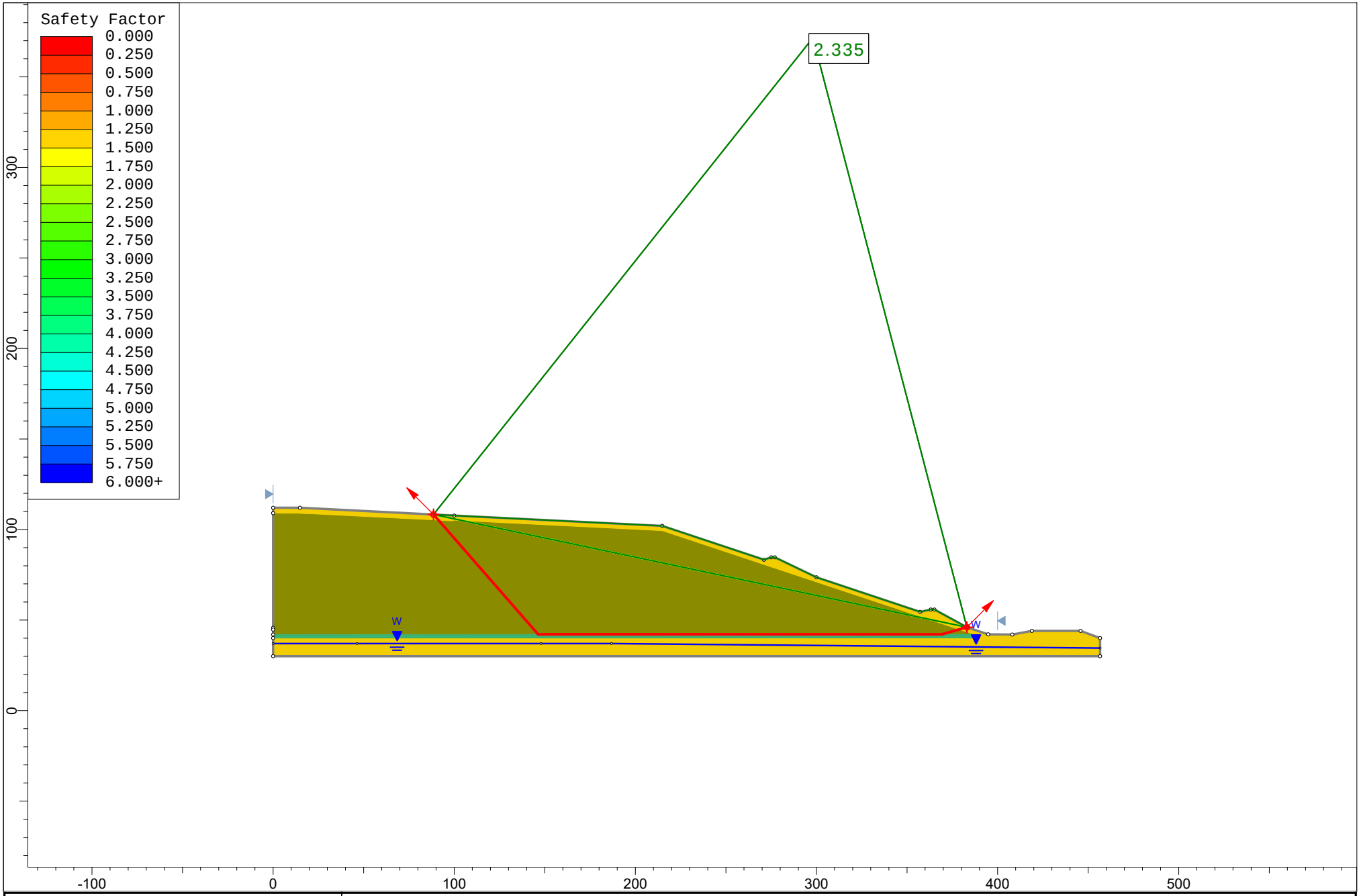
Type	Coordinates	
	X	Y
External Boundary	456.6	40
	445.8	44
	418.9	44
	408.1	42
	394.8	42.1
	383	46
	365.1	55.8
	363.1	55.8
	357.2	54.5
	300	73.6
	277	84.6
	275	84.6
	271	83.3
	214.8	102
	100	107.7
	14.8	112
	0	112
	2.22045e-16	109
	0	45.7
	0	44.7065
	0	42
	0	40
	0	30
	456.6	30

Type	X	Y
Material Boundary	0	40
	385.8	40.1
	385.8	42.1
	383	43
	300	70.6
	214.8	99
	100	104.7
	14.8	109
	2.22045e-16	109

Type	X	Y
Material Boundary	0	42
	385.8	42.1

Scenario-based Entities

Type	Coordinates	Master Scenario	Block Seismic	Circular	Circular Seismic
Water Table	X: 0, 46.3, 147.928, 186.814, 456.6 Y: 37, 37, 37, 37, 34.5	Assigned to materials: Cover and Fill Soil Liner	Assigned to materials: Cover and Fill Soil Liner	Assigned to materials: Cover and Fill Soil Liner	Assigned to materials: Cover and Fill Soil Liner
Non-Circular Failure Surface	X: 88.5771, 146.339, 369.194, 383 Y: 108.277, 42.0957, 42.0957, 46	✓	✓	✗	✗



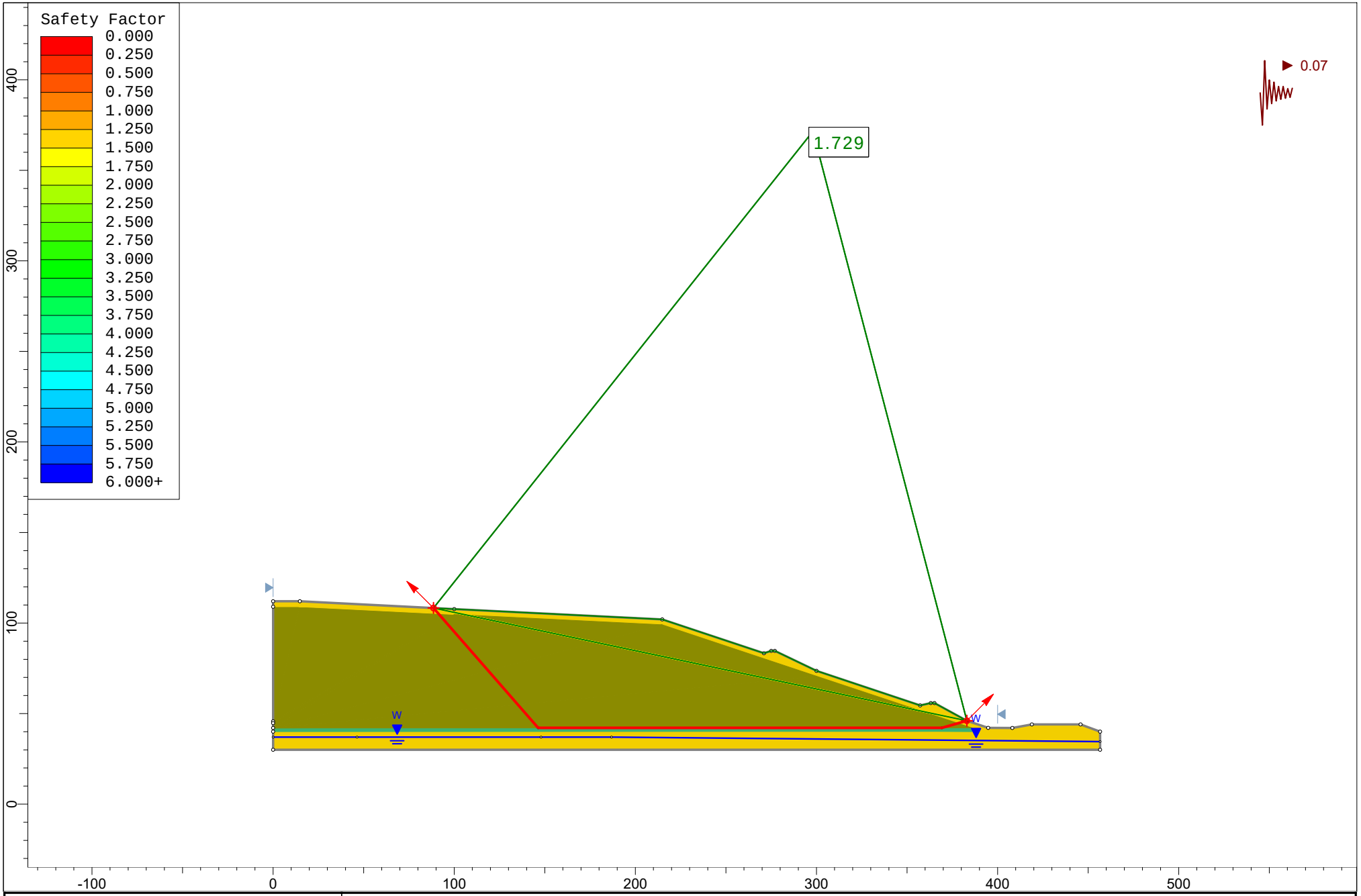
rocscience	*Project*	EcoSouth Phase 1 Stability		
	Analysis Description			
	Drawn By Darrell Thornock, P.E.	*Scale* 1:854	*Company*	LaBella Associates, D.P.C.
	Date 12/16/2020		*File Name*	EcoSouth Phase 1 Landfill 3-1.slmd

SLIDEINTERPRET 8.018

rocscience

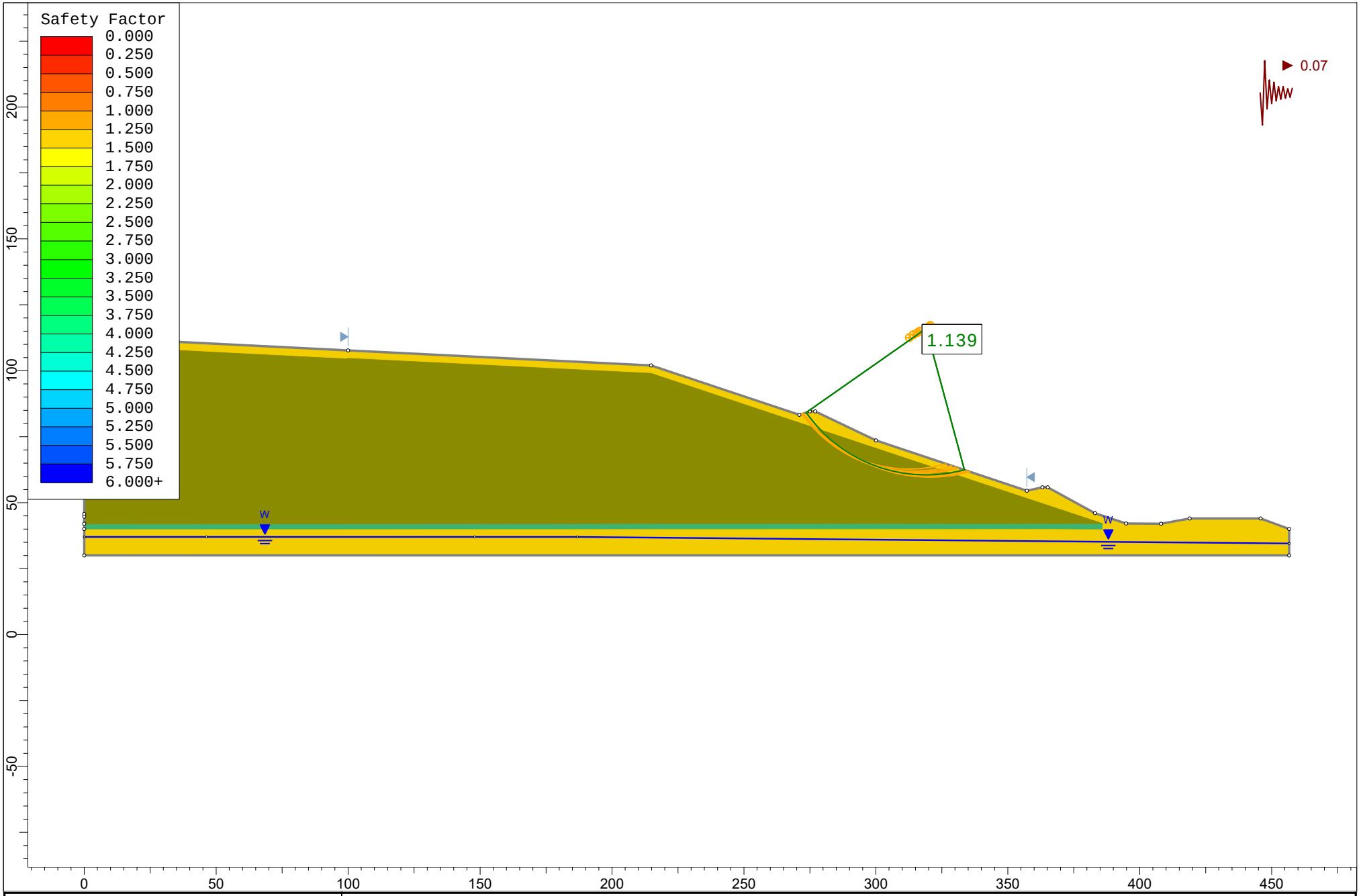
SLIDEINTERPRET 8.018

Project	EcoSouth Phase 1 Stability				
Analysis Description					
Drawn By	Darrell Thornock, P.E.	*Scale*	1:586	*Company*	LaBella Associates, D.P.C.
Date	12/16/2020			*File Name*	EcoSouth Phase 1 Landfill 3-1.slmd



rocscience	Project	EcoSouth Phase 1 Stability		
	Analysis Description			
	Drawn By	Darrell Thornock, P.E.	Scale 1:854	Company LaBella Associates, D.P.C.
	Date	12/16/2020		File Name EcoSouth Phase 1 Landfill 3-1.slmd

SLIDEINTERPRET 8.018



rocscience	Project	EcoSouth Phase 1 Stability		
	Analysis Description			
	Drawn By	Darrell Thornock, P.E.	Scale 1:586	Company LaBella Associates, D.P.C.
	Date	12/16/2020		File Name EcoSouth Phase 1 Landfill 3-1.slmd

SLIDEINTERPRET 8.018

January 12, 2020

Mr. Scott Story, Chief
Solid Waste Branch
Land Division
Alabama Department of Environmental Management
PO Box 301463
Montgomery, Alabama 36130-1463

RE: Request for Major Permit Modification
Axis Industrial Landfill
Permit No. 49-21

Dear Mr. Story,

LaBella Associates, on behalf of EcoSouth Services LLC, is requesting a modification of Solid Waste Permit No. 49-21 to allow for the disposal of municipal solid waste, to increase the maximum allowable daily waste volume from 1,500 cubic yards per day, to 5,000 tons per day, and to increase the final slopes cover system slopes to a maximum of 3 to 1. To account for these operational changes, EcoSouth has prepared the attached package of documents to meet the permitting requirements of the ADEM Division 13 regulations. This package includes the ADEM Form 439 Application, documentation of local approval, updates to the facility Operations Plan, Groundwater Monitoring Plan, Control Program for Unauthorized Waste, and Closure/Post-Closure Plan, a list of adjacent landowners, cost estimates for financial assurance, and calculations to support the variance from ADEM Admin. Code 335-13-4-.20(2)(c)2 to allow the final slopes of the Axis Landfill to increase from 4 to 1 (25%) to 3 to 1 (33.3%).

In addition, LaBella requests to continue the existing variances that have been previously approved by ADEM for Permit No. 49-21. These variances include the following:

1. A variance from Rule 335-13-4-.22(1)(b) allowing the operation of an additional working face at the Axis Industrial Landfill. One working face will be allowed in Phase I and a second working face will be allowed in Phase II due to the differentiation in liner systems in each phase. (See Section 111.E.)

2. A variance from Rule 335-13-4-.12(2)(f) requiring a 100 foot buffer zone.

3. A variance from Rule 335-13-4-.23(1)(c) defining working slopes not to exceed 4 to 1 (25%). The permittee is approved to operate working slopes of 3 to 1 (33%). (See Section III.E)

For areas of industrial landfilling, LaBella requests to continue the existing modifications that have been previously approved by ADEM for Permit No. 49-21. These modifications include the following:

1. A modification allowing the use of autofluff as an alternative cover material. The alternate cover material should be mixed with sand or other soils in the ratio of 50% soil: 50%

autofluff. Additionally, the Permittee is required to cover with six inches of earthen material at conclusion of each month's operation. (See Section III.E.)

2. A modifiation allowing the use of Residual Short Fiber (RSF) as an alternative cover material. The alternate cover material should be mixed with sand or other soils in the ratio of 50% soil: 50% RSF. Additionally, the Permittee is required to cover with six inches of earthen material at conclusion of each month's operation. (See Section III.E.)

In addition to the approved variances and modifications listed above, LaBella requests to modify the permit to allow for the following for areas of municipal solid waste:

1. A modification allowing the use of autofluff as an alternative cover material. The alternate cover material should be mixed with sand or other soils in the ratio of 50% soil: 50% autofluff. Additionally, the Permittee is required to cover with six inches of earthen material at conclusion of each week's operation. (See Section III.E.)

2. A modification allowing the use of Residual Short Fiber (RSF) as an alternative cover material. The alternate cover material should be mixed with sand or other soils in the ratio of 50% soil: 50% RSF. Additionally, the Permittee is required to cover with six inches of earthen material at conclusion of each week's operation. (See Section III.E.)

The required fees for this permit modification have been sent to ADEM. Please let me know if you have any questions or need additional information regarding this matter. I can be reached by email at DThornock@labellapc.com or by phone at (804) 980-7458.

Respectfully submitted,
LaBella Associates

Darrell Thornock, PE
Technical Consultant

Attachments

LaBella
Powered by partnership.

January 12, 2021

Alabama Department of Environmental Management
Post Office Box 301463
Montgomery, Alabama 36130-1463

Attention: Mr. Blake Holden
Solid Waste Branch

RE: Groundwater Monitoring Plan
Dated October 27, 2016, Revised January 26, 2018 & January 11, 2021
Axis Industrial Landfill
Mobile County, Alabama
Permit No.: 49-21

Dear Mr. Holden:

On behalf of EcoSouth Services of Mobile, LLC, LaBella Associates (LaBella) is submitting this revision of the *Groundwater Monitoring Plan*, originally dated October 27, 2016, (with a revision dated January 26, 2018) in response to the Alabama Department of Environmental Management (ADEM) letter dated January 8, 2021. This revised *Groundwater Monitoring Plan* was prepared as part of a planned permit modification for Solid Waste Facility Disposal Permit Number 49-21 (Permit) for the Axis Industrial Landfill located in Axis, Mobile County, Alabama. Below are the ADEM comments followed by their response.

ADEM Comment: Mercury was not analyzed at the facility prior to 2008, therefore it may not be appropriate to rely on intrawell or trend analysis to determine whether a release has occurred for this constituent. It is recommended that the source of mercury detected in MW-2 be definitively ascertained as required under ADEM Admin. Code r. 335-14-4-.27(3)(c)3.

Response: The Plan has been revised to provide more clarification for the statistical analysis to be completed for the site following each semi-annual groundwater monitoring event.

Section 8.4 has been revised to show that inter-well analysis will be used for all constituents at the site. The exception for mercury for compliance well MW-2 has been removed. Additionally, Sections 8.5.1, 8.5.2, and 8.5.3 have been removed. Determining the source of mercury detected in MW-2 will be completed, if warranted.

ADEM Comment: It is recommended that Section 8.8 of the GWMP indicate that a table of all historical monitoring results will be included in semi-annual monitoring reports.

Response: Section 8.8 (now Section 8.7) has been revised to include the language “Historically detected constituents, data sets, and time versus concentrations graphs.”

Additional Revisions:

Section 8.1 has been revised to show that the statistical software used for the site will be the Sanitas Statistical Software.

Section 8.3 has been revised to include using Tukey's Outlier Screening, or either a Dixon's Test or a Rosner's Test, when testing for outliers.

Section 8.6 through 8.8 are now Section 8.5 through 8.7.

Section 8.5 (former Section 8.6) has been revised to include a discussion on the Double Quantification Rule (DQR).

If you have any questions concerning this submittal or require any additional information, please contact our office at (205) 985.4874.

Sincerely,
LABELLA ASSOCIATES

Lori K. Norton, P.G.
Senior Project Geologist

cc: EcoSouth Services of Mobile, LLC

GROUNDWATER MONITORING PLAN

AXIS INDUSTRIAL LANDFILL
12950-A HIGHWAY 43 NORTH
AXIS, MOBILE COUNTY, ALABAMA 36505
PERMIT NO.: 49-21
PROJECT NO.: 16-050315.16

PREPARED FOR:

ECOSOUTH SERVICES OF MOBILE, LLC
P.O. BOX 220
AXIS, ALABAMA 36505

OCTOBER 27, 2016
REVISED JANUARY 26, 2018
REVISED JANUARY 12, 2021

PREPARED BY:

HIGHLAND TECHNICAL SERVICES, INC.
528 MINERAL TRACE
BIRMINGHAM, ALABAMA 35244
PHONE: (205) 985-4874 FAX: (205) 987-6080

Lori K. Norton, P.G.
Project Geologist

William W. Cooch, P.G.
Principal Geologist

GEOLOGIST CERTIFICATION

I certify under penalty of law that I am a Registered Professional Geologist, licensed to practice in the State of Alabama and experienced in conducting hydro-geological investigations. The information submitted herein, to the best of my knowledge and belief is true, accurate and complete.

1/12/2021

William W. Cooch, P.G.
Principal Geologist
Highland Technical Services, Inc.

Date

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 PURPOSE AND SCOPE

EcoSouth Services of Mobile, LLC (EcoSouth) has prepared this Groundwater Monitoring Plan (Plan) as part of a planned permit modification for Solid Waste Facility Disposal Permit Number 49-21 for the Axis Industrial Landfill located in Axis, Mobile County, Alabama. This Plan has been prepared in accordance with the Alabama Department of Environmental Management (ADEM) Administrative Code 335-13 and the US Environmental Protection Agency (EPA) Coal Combustion Residue (CCR) Rule 40 CFR Part 257. The following is a discussion of the site history, environmental setting, description of the monitoring requirements, and activities to be conducted over the life of the permitted facility.

2.0 SITE HISTORY AND STATUS

The Axis Industrial Landfill (Permit No.: 49-21) is located at 12950-A Highway 43 North in Axis, Alabama. The landfill is located in Sections 1 and 18, Township 1 South, Range 1 East in Mobile County, Alabama. The site location is displayed on Figure 1.

EcoSouth was issued Permit Number 49-21 for the Axis Industrial Landfill by the ADEM on April 5, 2016 (most current). The permitted facility consists of approximately 70.3 acres with 46.8 acres approved for disposal. The landfill is used for the disposal of construction, demolition and rubbish waste, as defined by ADEM, and industrial waste streams approved by ADEM; including waste building materials, packing, and rubbish resulting from construction, repair or demolition operations including masonry, sheet rock, insulation, scrap metal, wood, wood products, concrete, soil, brick, asphalt, ash from untreated materials, brush, land clearing debris, disaster debris, approved wastewater sludges, total petroleum hydrocarbons and automobile fluff (solid waste from automobile shredding) from Alter Metal Recycling located in Mobile County. Cells 1 through 8 consists of 23.85 acres of unlined landfill used for the disposal of construction debris and inert industrial waste. Cell 9 is an existing lined cell used for the disposal of special industrial wastes and Cells 10 and 11 are permitted as future lined disposal cells.

This Plan has been prepared in anticipation of the ADEM approving the facility for the disposal of CCR, as such, the groundwater monitoring requirements presented herein include the analytical parameters required by 40 CFR Part 257 Appendix III. The CCR parameters include boron, calcium, chloride, fluoride, pH, sulfate and total dissolved solids (TDS).

3.0 ENVIRONMENTAL SETTING

3.1 SITE GEOLOGY AND HYDROGEOLOGY

According to geologic information published by the Geological Survey of Alabama, the site is underlain by Alluvial, coastal, and low terrace deposits of Holocene Age. These deposits are very recent and typically consist of very pale-orange to grayish-orange; varicolored fine to coarse quartz sand containing clay lenses and gravel. The gravel present in this formation is composed of quartz and chert pebbles.

According to the *Hydrogeology and Vulnerability to Contamination of Major Aquifers in Alabama: Area 13*, 2000, prepared by the Geological Survey of Alabama (GSA), the site is located in the East Gulf Coastal Plain section of the Coastal Plain physiographic province and within the recharge area for the Watercourse Aquifer which has also been referred to as the Beach Sand Aquifer and the Alluvial-coastal aquifer. The Watercourse Aquifer is hydraulically connected to the underlying Miocene-Pliocene Aquifer and is considered unconfined. The aquifer is recharged throughout its outcrop by water that infiltrates the overlying residual soils. Groundwater in the aquifer typically occurs in beds of sand and gravel that originate from coastal deposits, and buried river sediments which are surrounded by silty and clayey sediments.

3.2 SURFACE WATER

Surface water from the Axis Industrial Landfill generally flows west and north from higher topographic elevations on the landfill towards an unnamed tributary of Cold Creek located approximately 0.20 miles northwest of the landfill's property boundary. The unnamed tributary flows north toward Cold Creek which then meanders east towards the Mobile River, located approximately 0.80 miles east of the site.

4.0 MONITORING WELL NETWORK AND GROUNDWATER FLOW

4.1 MONITORING WELL NETWORK

Currently, the Axis Industrial Landfill maintains five (5) monitoring wells (MW-1, MW-2, MW-4, MW-6, and MW-7) for monitoring shallow groundwater beneath the site. Monitoring wells MW-1 and MW-4 are designated as the upgradient (background) wells for groundwater quality comparisons. Monitoring well MW-1 is located along the western boundary of the landfill and MW-4 is located along the northeast boundary of the property. Wells MW-2, MW-6, and MW-7 are designated as the compliance wells for the facility. Compliance well MW-2 is located along the northwestern boundary of the property; MW-6 is located along the eastern boundary of the property; and MW-7 is located along the southern property boundary. The monitoring well locations are shown in Figure 2.

Based upon interpretation of groundwater flow direction to the northeast during recent groundwater monitoring events, Highland Technical Services, Inc. (HTSI) is of the opinion that monitoring well MW-7 would better serve as the background monitoring well for statistical evaluations.

It should be noted that the current Permit indicates that MW-4, which is located at the northeast property boundary, is one of the facility's designated background monitoring wells. Based on the groundwater elevation data collected during recent monitoring events, MW-4 is the most downgradient well in the existing monitoring well network. While the Permit indicates that MW-4 should be used for background comparisons for statistical analysis, HTSI is of the opinion that the resulting statistical evaluation using well MW-4 as background would yield inaccurate results. As such, HTSI recommends MW-7 be used for background comparisons for all future monitoring events for statistical analysis of groundwater data.

The available well construction details for monitoring wells at the site are included in Table 4.1 on the following page.

TABLE 4.1 – MONITORING WELL CONSTRUCTION DETAILS

WELL ID	TOP OF CASING ELEVATION (FT-AMSL)	MEASURED TOTAL DEPTH (FT-BTOC)	CASING DIAMETER	SCREENED INTERVAL
MW-1	38.28*	71.80	4-inch	NA
MW-2	46.17	72.39	4-inch	NA
MW-4	47.30	81.48	4-inch	NA
MW-6	47.60	86.77	4-inch	NA
MW-7	49.26**	85.09	4-inch	NA

ft-amsl – feet above mean sea level
ft-btoc – feet below top of casing
*MW-1 - resurveyed on December 19, 2007 following well repair activities
**MW-7 - correct top of well casing (incorrectly listed as 47.26 ft-amsl in current Permit)
NA – Not Available

4.2 GROUNDWATER FLOW

During each semi-annual monitoring event, static water level depth will be measured in each of the monitoring wells prior to purging. For reference, groundwater elevations measured during the September 2017 sampling event ranged from 13.15 to 15.69 feet above mean sea level (ft-amsl). Groundwater elevation data is included in Table 4.2 below. A map depicting the potentiometric surface and flow direction for shallow groundwater beneath the site at the time of the September 2017 event is provided as Figure 2.

TABLE 4.2 - GROUNDWATER MEASUREMENTS AND ELEVATIONS – SEPTEMBER 18, 2017

WELL ID	TOP OF CASING ELEVATION (FT-AMSL)	MEASURED TOTAL DEPTH (FT-BTOC)	MEASURED DEPTH TO GW (FT-BTOC)	GROUNDWATER ELEVATION (FT-AMSL)
MW-1	38.28	72.15	25.08	13.20
MW-2	46.17	72.97	33.02	13.15
MW-4	47.30	81.50	33.91	13.39
MW-6	47.60	85.20	33.83	13.77
MW-7	49.26	85.10	33.57	15.69

ft-btoc = feet below top of casing
ft-amsl = feet above mean sea level
GW = Groundwater

The direction of groundwater flow beneath the Landfill at the time of the September 2017 groundwater monitoring event was generally to the northeast and northwest with a calculated hydraulic gradient (dh/dl) of approximately 0.00109 feet per foot (ft/ft). Groundwater flow velocity in the subsurface materials underlying the Landfill was calculated using the formula V = (K) (dh/dl)/ne, where K is hydraulic conductivity and ne is effective porosity. Based on the

characteristics of the underlying formation, representative hydraulic conductivity and effective porosity for fine to very coarse quartz sand and clay and clayey gravel are estimated to be 1.0 x 10^{-3} centimeter per second (cm/sec) and 25%, respectively (Freeze, p. 29 and 37). Using an estimated hydraulic conductivity of 1.0 x 10^{-3} cm/sec, an effective porosity of 25%, and the calculated hydraulic gradient of 0.00109 ft/ft, the groundwater flow rate was estimated to be approximately 4.51 feet per year (ft/year). An example of the flow rate calculations is included as Appendix A.

The groundwater surface elevation will be measured at each of the monitoring wells at the landfill each time the wells are sampled and at least semi-annually throughout the active life of the facility, and during the post-closure care period. The groundwater surface elevation will be used to determine the flow rate and direction of groundwater flow beneath the site during each monitoring event. Based on historic groundwater data collected over the life of the subject facility, the groundwater flow direction beneath the facility is generally to the north-northeast and northwest.

Since the calculated gradient and flow rate are derived under the assumption that groundwater flow occurs through a homogeneous, isotropic, porous medium, these calculations should only be considered a rough estimate of actual groundwater flow. This seepage velocity does not take into account the effects of vertical flow gradients, flow along secondary fracture pathways, or other conditions caused by lateral heterogeneity.

It should be noted that the potentiometric surface elevation map (Figure 2) is a model of the groundwater potentiometric surface based upon available measured groundwater levels and should be considered only a general depiction of groundwater flow direction for the local area of the landfill. While the potentiometric surface typically parallels surface topography, the accuracy of the potentiometric surface map is limited to available data from the control points and may conflict with surface topography and/or the actual groundwater potentiometric surface at certain locations

5.0 ESTABLISHING BACKGROUND CONCENTRATIONS

In accordance with Part 257.94(b), new CCR landfills require that a minimum of eight independent samples be collected from each background well and analyzed for the constituents listed in Part 257 Appendices III and IV during the first six months of sampling. The parameters to be analyzed in establishing background concentrations are included in Table 5.0 below.

5.0 – PARAMETERS REQUIRED BY CCR FOR ESTABLISHING BACKGROUND CONCENTRATIONS

APPENDIX III PARAMETERS	APPENDIX IV PARAMETERS
Boron	Antimony
Calcium	Arsenic
Chloride	Barium
Fluoride	Beryllium
pH	Cadmium
Sulfate	Chromium
TDS	Cobalt
	Fluoride
	Lead
	Lithium
	Mercury
	Molybdenum
	Selenium
	Thallium
	Radium 226 and 228 combined

TDS - Total Dissolved Solids

Past groundwater monitoring events have included the majority of the constituents listed in the Appendix IV list of 40 CFR Part 257. Therefore a sufficient dataset for those parameters is available for use in the statistical analysis required by 40 CFR Part 257. Parameters for which the facility currently had no background information included the following:

- All Appendix III Parameters
- Lithium
- Molybdenum
- Radium 226 and 228 combined

As such, eight replicate samples were collected from on the following dates:

- November 3, 2016 (all constituents except lithium and molybdenum)
- December 1, 2016
- December 22, 2016
- January 12, 2017
- February 2, 2017
- February 22, 2017
- March 10, 2017
- April 7, 2017
- April 21, 2017 (lithium and molybdenum only)

It should be noted that during the first event completed on November 3, 2016, analysis was not completed for lithium and molybdenum; therefore, HTSI mobilized to the site on April 21, 2017 to collect the eighth required sample for these two constituents.

The results of the CCR replicate sampling events were submitted to the ADEM in a *CCR Groundwater Monitoring Report* dated July 21, 2017.

6.0 GROUNDWATER SAMPLING AND ANALYSIS

Groundwater samples will be collected at the Axis Industrial Landfill on a semi-annual basis throughout the active life of the facility and the post-closure care period in accordance with ADEM Administrative Rule 335-13-4-.27. Unless otherwise specified by the ADEM, groundwater sampling will be conducted during March and September of each year.

During the semi-annual groundwater monitoring events, and prior to sample collection, static water level measurements will be taken in each monitoring well using an electronic water-level indicator to determine the depth of water and the measured water level as it relates to the screened interval of the well.

All samples will be collected using either a peristaltic or bladder pump following low-flow sampling protocols. In order to collect water in the screened interval, low-flow purging will be

conducted by situating the pump-intake in the middle or slightly above the middle of the screened interval of the well. Since the screened interval is unknown, the pump intake will be set at five feet above the bottom of the well anticipating that each well is constructed with a 10-foot screen.

The intake velocity of the pump will then be set to a flow rate that minimizes draw-down inside the well casing, thereby reducing turbidity and agitation of the water column in the well in order to prevent volatilization of volatile organic compounds (VOCs), if present, and the introduction of suspended sediment into the water column. The pumping rate will be maintained between 200 to 500 milliliters per minute and the water level will be monitored every three to five minutes to determine steady-state flow. An attempt will be made to maintain a draw-down of one foot or less during purging.

Prior to sample collection, groundwater will be purged from each well at a rate approximately equal to the well recharge rate. The turbidity, temperature, specific conductance, dissolved oxygen (DO), oxidation-reduction (redox) potential, and pH of groundwater will be monitored and recorded every three to five minutes as the wells are purged. Samples will be collected when stabilization of these indicator parameters is recorded in three consecutive readings. The three successive readings should be within ± 0.1 for pH, ± 3% for conductivity, ± 10 mv for redox potential, and ± 10% for turbidity and DO. DO and turbidity usually require the longest time for stabilization. Conductivity, DO, and turbidity are the most sensitive parameters. The above stabilization guidelines are provided as estimates and may not always be achieved. Samples will be collected after field indicator parameters have stabilized and will be placed directly into the laboratory containers with minimal agitation to minimize volatilization of chemicals of concern (COCs). The field indicator parameters will be recorded for each well on a field sampling log. An example field sampling log is included as Appendix B. Data collected in the field during sampling activities will be documented on a Monitoring Well Sampling Record (MWSR). An example MWSR is included as Appendix C.

Groundwater samples will be obtained by filling appropriate laboratory-prepared sample containers directly from the discharge tubing connected to the pump or from disposable polyethylene bailers. New tubing will be used for each sample, and the pump will be decontaminated prior to use at each sample location. Subsequent to sample collection, the containers will be labeled and placed in a cooler with ice in an effort to achieve and maintain a

sample temperature of 4°C. In the event one or more wells is purged dry, those wells will be allowed to recharge sufficiently prior to sampling. Once recharged, samples from those wells will be collected using a disposal bailer.

The samples will be delivered to a NELAP certified laboratory, along with proper chain of custody documentation including project name and number; sampler's name and signature; sample identification numbers; sample date, time, and location; requested analyses; and sample container type and quantity. The samples collected from monitoring wells MW-1, MW-2, MW-4, MW-6, and MW-7 will be analyzed for using the EPA Methods shown in Table 6.0. Parameters listed in Table 6.0 include Appendix III parameters which will be sampled for once the facility accepts CCR waste.

TABLE 6.0 – LABORATORY ANALYTICAL METHODS

PARAMETER	SAMPLE MATRIX	EPA METHOD
Appendix I Metals plus Boron and Calcium	Water	6010B or 6020
Mercury	Water	7470
Appendix I VOCs	Water	8260B
CCR PARAMETERS		
Chloride	Water	325.2 / 9251
Fluoride	Water	340.2
Sulfate	Water	375.4 / 9038
TDS	Water	2540C

The laboratory analysis will follow the protocols provided in the *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods SW-846* (SW-846), *Standard Methods for the Examination of Water and Wastewater (latest edition),* or other appropriate methods approved by the ADEM.

Both preserved and unpreserved groundwater samples will be collected for metals analysis during each monitoring event. The unpreserved samples will be retained in the event elevated metals concentrations are identified in one or more the groundwater samples. Specific unpreserved samples to those that returned elevated metals will be submitted and filtered for analysis by the laboratory, on an as needed basis, to determine if any metals detected in the

unfiltered samples are also present in dissolved concentrations. *Please note that field filtration is not allowed by ADEM guidelines.*

6.1 GROUNDWATER SAMPLE MANAGEMENT

As part of this Plan, each groundwater sample will be tracked from the time of collection by completing sample custody documentation. The sample custody documentation will include the field documentation and the chain of custody report. All samples will be placed in laboratory provided containers and preserved in a manner appropriate to the analytical method requested. Sample containers will be stored in a clean, secure area prior to use. Containerized samples will be labeled as they are collected and placed in a cooler with ice to maintain a sample temperature of 4°C until delivered to the analytical laboratory. Sample criteria are summarized in the Table 6.1 below.

TABLE 6.1 – GROUNDWATER SAMPLING CRITERIA

ANALYSIS	SAMPLE MATRIX	BOTTLE TYPE	PRESERVATIVE	HOLDING TIMES
Appendix I Metals plus Boron and Calcium	Water	(1) 500 ml Plastic	4°C / HNO_3	180 Days Mercury 28 Days
Filtered Sample Appendix I Metals	Water	(1) 500 ml Plastic	4°C	180 Days Mercury 28 Days
Appendix I VOCs	Water	(2) 40 ml vials	4°C / HCL	14 Days
CCR PARAMETERS				
Chloride	Water	(1) 125 ml Plastic	4°C	28 days
Fluoride and Sulfate	Water	(1) 500 ml Plastic	4°C	28 days
TDS	Water	(1) 500 ml Plastic	4°C	7 Days

VOCs – Volatile Organic Carbons
ml – Milliliter
C – Celsius
HNO_3 – Nitric Acid
HCL – Hydrochloric Acid
TDS – Total Dissolved Solids

Sample labels will be filled out and affixed to appropriate containers immediately prior to or following sample collection, as appropriate. The label will be filled out in indelible ink and will include the following information on the portion affixed to the sample container: sample ID number; analyses requested; project name; the person's name collecting the sample; and, sample location number.

The field data recorded at the time of sample collection provides an unambiguous identification of each sample. These field data will be recorded on groundwater monitoring well field logs. Field notes will include the following:

- date and time of sampling;
- name(s) of field personnel conducting sampling;
- name(s) of any observers at the sampling site;
- purpose of sampling;
- description of sample point;
- number and size(s) of sample(s) taken;
- field sample identification number(s);
- deviation from sampling plan, if any;
- field observations;
- references (such as maps) of sampling site; and
- sample handling and shipping information.

Sample handling and shipping procedures will assure that samples are properly preserved, protected, and secured until delivered to the analytical laboratory. After sample containers are labeled, they will be sealed in plastic air cushion bags and wrapped in clear plastic bags to protect sample bottles and labels from potential moisture damage. Ice packs will be sealed in plastic bags and placed on top of samples in order to maintain an optimum temperature of 4°C until the samples are delivered to the laboratory. Any remaining void space in the ice chest will be filled with appropriate bubble-wrap packing material.

Samples will be hand delivered or shipped via overnight delivery service to the laboratory. Shipped samples will be accompanied by an appropriate freight (shipment) bill of lading form with the completed freight bill number recorded on the Chain of Custody accompanying each cooler shipment. The Chain of Custody will be sealed in a plastic bag and taped to the underside of the cooler lid. Coolers will be sealed with tape and a custody seal that will be

initialed and dated to prevent any tampering during shipping and handling. The laboratory will be notified prior to shipment of samples that would arrive at the laboratory on a weekend or holiday to assure that the samples are properly received.

Sample custody documentation procedures will be maintained throughout the following activities:

- initial sample collection;
- transportation from sample collection site to analytical laboratory;
- receipt and preparation of laboratory sample extracts and digestives;
- storage at laboratory until an evaluation of analytical results determines that re-analysis is not required; and,
- final sample disposition.

At the time of sample collection, samples will be labeled and a record of the sampling activity will be recorded in the daily field log. Sample labeling procedures were discussed previously. Information required to identify sample custody and to request sample analyses are then entered on the Chain of Custody. The information recorded on the Chain of Custody will include:

- project name and number;
- sampler's name and signature;
- sample identification numbers;
- sample date, time, and location;
- requested analyses;
- sample container type and quantity;
- requested analytical turnaround time; and
- person to receive results and a contact telephone number to call in case problems arise.

A Sample Chain of Custody is included as Appendix D.

7.0 DECONTAMINATION OF EQUIPMENT

All non-disposable equipment and tools will be decontaminated or disposed of in accordance with the most recent edition of the *Alabama Environmental Investigation and Remediation Guidance* (AEIRG). Personnel decontamination will be performed on an as-needed basis only. Sampling equipment will be either disposable or decontaminated prior to use and between sampling locations. New disposable nitrile gloves will be used during the collection each groundwater sample. Disposable polyethylene tubing will be used with the purge-pump during well purging. The water level indicator and bladder pump will be decontaminated by washing with distilled water and laboratory grade detergent wash, followed by rinsing with distilled water.

8.0 SEMI-ANNUAL REPORTING

Upon receipt of the laboratory analytical results, and within sixty (60) days of the date of sampling, a semi-annual report will be submitted to the ADEM discussing groundwater quality beneath the subject facility. The report will include a statistical analysis of groundwater in accordance with ADEM Administrative Code R. 335-13-4-.27(2)(l) and the Environmental Protection Agency (EPA) standards referenced in the *Statistical Analysis of Groundwater Monitoring Data at Resource Conservation Recovery Act (RCRA) Facilities Unified Guidance*, U.S. EPA, 2009 (Unified Guidance).

8.1 STATISTICAL PROCEDURES

In the application of statistics to groundwater monitoring data from this site, all data will be treated as independent and representative of the quality of groundwater at the site. Statistical methods used, and their application to data from this site, will be in general accordance with the EPA standards referenced in the Unified Guidance. The groundwater monitoring data will analyzed statistically using the Sanitas statistical software.

Historical groundwater data for cobalt, iron, nickel, zinc and VOCs dating back to March 2005 is available for each of the wells in the monitoring well network. Historical data dating back to March 2008 is available for the remaining Appendix I metals for each well.

Upon receipt of the laboratory analytical results, the results will be reviewed to assesses the potential for statistically significant increases (SSIs) of detected Appendix I VOCs and metals in groundwater samples collected from the facility monitoring well network. Statistical analysis will

only be conducted for parameters that were reported in groundwater samples collected during each groundwater monitoring event.

Monitoring well MW-7 will be used as the background groundwater quality monitoring location used for statistical evaluations. Monitoring wells MW-1, MW-2, MW-4, and MW-6 will be used as compliance wells. The historically detected constituents, data sets, and time versus concentrations graphs will be provided in each semi-annual report.

8.2 TEST FOR NORMALITY

In accordance with the EPA Unified Guidance, a test for normality should be conducted on the appropriate constituents to determine the appropriate statistical method to be used to evaluate groundwater analytical data as it relates to the distribution of these constituents. A test for normality will be completed for the appropriate constituents, as discussed in the following paragraphs, and will satisfy the performance standards required for the selection of the statistical procedures to be used at a facility in accordance with ADEM Administrative Code R. 335-13-4-.27(2)(m)1.

Typically, groundwater analytical data is subjected to a distribution analysis to determine if the data is normally distributed or can be transformed to a normal distribution using either log-normal or ladder of powers data transformations. If data is normally distributed, or can be transformed to create a normal distribution, a parametric statistical analysis is recommended. However, when the data contains a large percentage of non-detects (greater than 50%), the validity of distribution tests are questionable, suggesting that a non-parametric statistical analysis be used.

In order to determine if a parametric or non-parametric statistical analysis should be conducted, a test for normality will be completed for the detected constituent(s) with less than 50% non-detects in an effort to determine if the data set for the detected constituent(s) is normally distributed or can be transformed to a normal distribution. The Shapiro-Wilks Test for Normality will be used for constituents with less than 50 measurements and the Shapiro-Francia Test for Normality will be used for constituents with greater than 50 measurements, as discussed in Chapter 10 of the Unified Guidance.

If data is normally distributed, or can be transformed to create a normal distribution, a parametric statistical method will be used. When the data is not normally distributed, or cannot be transformed to create a normal distribution, a non-parametric statistical method will be used. Additionally, when the data contains a large percentage of non-detects (greater than 50%), the validity of distribution tests are questionable and it is suggested that a non-parametric method be used.

During historical monitoring events, detected concentrations of Appendix I metals have had non-detect rates of greater than 50%, with the exception of barium. Therefore, it is anticipated that tests for normality may be completed for barium during future groundwater monitoring events. Since there are more than 50 measurements for this constituent, the Shapiro-Francia Test for Normality will most likely be used, as discussed in Chapter 10 of the Unified Guidance.

Based on the high rate of non-detects for the remaining constituents historically detected in samples collected from the site, non-parametric statistical analysis will most likely be used in assessing groundwater quality during all future monitoring events. In the event a detected concentration does show non-detect rates of less than 50%, then a test for normality will be conducted for that constituent, and a determination for using either parametric or non-parametric statistical analysis will be made based on the outcome of the test.

8.3 TESTS FOR OUTLIERS

A test for outliers will be conducted when multiple values in a dataset appear anomalously low or high when compared to other values (Unified Guidance). These tests will only be conducted for constituents detected in the compliance wells during each groundwater sampling event to determine if there are outliers in the historical dataset as per the Unified Guidance. In order to screen for outliers a Tukey's Outlier Screening, or either a Dixon's Test or a Rosner's Test will be conducted. In the event a outlier is identified, an attempt will be made to determine the cause of the outlier, i.e. lab error, field error, etc., if possible. If outliers are identified within a constituent's dataset, a determination will be made as to whether the outlier(s) should remain or be removed from the dataset prior to completing the statistical analysis.

8.4 INTER-WELL STATISTICAL ANALYSIS

Based on a review of the historical laboratory analytical results from groundwater samples collected from the monitoring well network, an inter-well statistical analysis will be completed for

the determination of SSIs in constituent concentrations in groundwater samples collected during each semi-annual event. The type of statistical method that will be used for evaluating groundwater data for this site will be the Inter-Well Non-Parametric Prediction Limit analysis in accordance with ADEM Administrative Code R. 335-13-4-.27(2)(l)3. In the event a future detected concentration of a constituent has a non-detect rate of less than 50%, and a test for normality is warranted, an Inter-Well Parametric Prediction Limit analysis may be conducted for that constituent if the data is normally distributed, or can be transformed to create a normal distribution.

Should the statistical analysis confirm the presence of a SSI for one or more target constituents over background groundwater quality, Axis Industrial Landfill will comply with the requirements of ADEM Admin. Code 335-13-4-.27(n)3 and notify the Department within 14 days of the finding.

8.5 SEN'S SLOPE TREND ANALYSIS – APPENDIX I VOCS

8.5.1 VOC Analytical Results & Double Quantification Rule

Historically, two (2) of the forty-seven (47) Appendix I VOCs have been detected in one or more of the wells in the closed landfill monitoring well network. These include chloroform in samples historically collected from MW-6, and toluene which was detected in samples collected from background well MW-7 and compliance wells MW-2 and MW-4 in March 2020. No other VOCs were detected in the samples collected from the monitoring well network. Pursuant to the Unified Guidance, when background sample data consists entirely of non-detects for a specific constituent, but there are detections above the laboratory detection limit in samples collected from compliance wells, then the Double Quantification Rule (DQR) can be applied. The DQR states that an SSI is declared when a constituent/compliance well pair displays consecutive quantified detections above the detection limit and the constituent/background well pair(s) contains only non-detects. Therefore, when the DQR is applied, further analysis to determine a SSI is not warranted. If there are no consecutive detects (either from scheduled events and/or sampling following a detection), then the constituent/compliance well pair is not subjected to statistical analysis.

Forty-five (45) of the forty-seven (47) Appendix I VOCs have not been detected historically (100% non-detects) in the samples collected from background well MW-7 or the compliance wells. In the event one of these constituents is detected during future monitoring events, the DQR will be applied with Department approval and retesting to determine whether the value

detected was an error. If the constituent is detected during the resampling event, then that constituent will be subjected to statistical analysis.

8.5.2 Sen's Slope Trend Analysis

According to the Unified Guidance, the Sen's Non-Parametric Estimator of Slope is a method of estimating the true slope (change over time) of analytical data. If the data shows an upward slope, there is evidence of an upward trend or increase in a constituent concentration. "No identifiable trend" would indicate no significant increase or decrease in a particular constituent concentration over time. A decreasing trend would indicate decreasing constituent concentrations over time. Since this method is non-parametric, it is considered suitable for a high percentage of non-detects and is not significantly affected by outliers.

In an effort to further address SSIs indicated for Appendix I VOCs in samples collected from compliance wells during semi-annual groundwater monitoring events, a Sen's Slope Trend analysis will be performed to determine if there is an identifiable trend in the target constituent concentration over time.

8.6 IDENTIFICATION OF A SSI

Should the statistical analysis confirm the presence of a SSI for one or more target constituents over background groundwater quality, Axis Industrial Landfill will comply with the requirements of ADEM Admin. Code 335-13-4-.27(2)(n)3 and notify the Department within 14 days of the finding. Within 90 days of the determination of a SSI, an assessment monitoring program will be established and comply with ADEM Admin. Code 335-13-4-.27(4) unless a determination can be made that a source other than the landfill unit caused the contamination, or there was an error in sampling, analytical testing, or statistical analysis. In the event there is determination of an alternate source, a report will be submitted to the ADEM for approval and placed in the operating record.

If an outlier is used as part of the data set and does not indicate a SSI through inter-well analysis, then the outlier will be reevaluated following the next semi-annual groundwater monitoring event to determine if it should remain in the data set. If an outlier indicates a SSI, then the results will be verified by conducting a resampling event within 45 days of the original event. The results of the resampling event will be used to determine if the original outlier is valid. If analytical results from the resampling event indicate that the original outlier is not valid,

then the analytical results from the resampling event will be added to the dataset and a determination for SSIs for that constituent will be reevaluated. The results will then be submitted to the ADEM.

8.7 REPORTING

In addition to statistical analysis discussed above, the semi-annual report will also include, at a minimum, the following information:

- A discussion of the environmental setting of the facility.
- Summary tables of the laboratory analysis.
- Monitoring well sampling records.
- A table of historic groundwater elevations.
- Historically detected constituents, data sets, and time versus concentrations graphs.
- Copies of the laboratory reports.
- Potentiometric surface map(s) illustrating groundwater elevation and flow direction.
- Time versus Concentration Graphs for each detected constituent.
- Other supporting figures, such as site and well location maps.

9.0 REFERENCES

Alabama Department of Environmental Management, Administrative Code R. 335-13-x-xx.

Alabama Department of Environmental Management, *Axis Industrial Landfill, Solid Waste Disposal Permit No. 49-21*, Effective April 05, 2016, Expiration Date April 04, 2021, Issuance Date April 5, 2016.

Gillet, B., Raymond, D.E., Moore, J.D., and B. H. Tew. 2000. *Hydrogeology and Vulnerability to Contamination of Major Aquifers in Alabama: Area 13*: Geological Survey Of Alabama, Hydrogeology Division, Groundwater Assessment Program Number Circular 199A.

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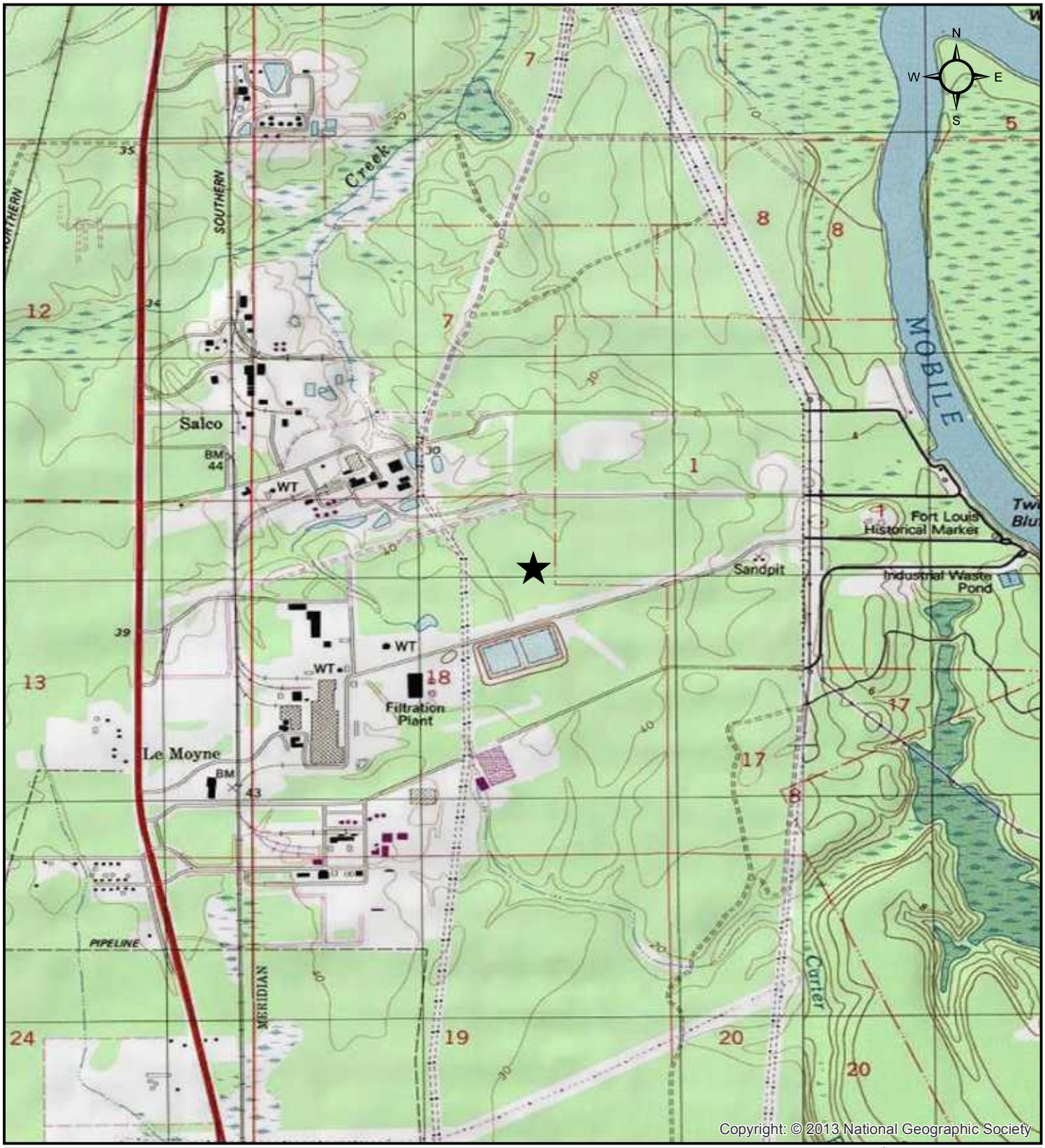
Highland Technical Services, Inc., *Semi-Annual Groundwater Monitoring Report - March 2016*, April 18, 2016.

US EPA Region II, *Ground Water Sampling Procedure Low Stress (Low Flow) Purging and Sampling*, September 2001.

US EPA, Office of Solid Waste, *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities*, Unified Guidance, March 2009.

U.S EPA, *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities*, 40 CFR 257.

FIGURES



Legend

★ Site Location

USGS Quad ID: 30088-H1
QSGS Quad Name: Creola, Alabama

Highland Technical Services, Inc.

528 MINERAL TRACE
HOOVER, AL 35244
(205) 985-4874

TITLE:
Site Location Map

Axis Landfill

Axis, Alabama

SCALE:
0 1,000 2,000
1 inch = 2,000 feet

FIGURE NO.
1

PROJECT NO.
16-050315.16

DRAWN BY
RFS

DATE DRAWN
9/14/2016

Legend

- Monitoring Wells
- Potentiometric Contour Line
- Groundwater Flow Direction
- (13.20) Measured Groundwater Elevation

Highland Technical Services, Inc.

528 MINERAL TRACE
HOOVER, AL 35244
(205) 985-4874

TITLE: Site Plan & Monitoring Well Location Map

September 18, 2017

Axis Industrial Landfill
Axis, Alabama

SCALE: 0 175 350
1 inch = 350 feet

FIGURE NO. 2

PROJECT NO. 17-050315.17

DRAWN BY SWA

DATE DRAWN 10/31/2017

APPENDIX A

Appendix B
Calculated Groundwater Flow Velocities
September 18, 2017

Monitoring Well	Groundwater Elevation (ft-amsl)	Distance Detween Wells (feet)	Gradient (i)	Hydraulic Conductivity (cm/sec)	effective porosity (ne)	Estimated Flow Velocity (feet/year)
MW-7	15.69					
MW-2	13.15	1505.00	0.00169	0.001000	0.25	6.98
MW-6	13.77					
MW-4	13.39	770.00	0.00049	0.001000	0.25	2.04
		average gradient	0.00109		average velocity	4.51

Notes:
1. Effective porosity values from Freeze & Cherry (1979) Table 2.4.
2. Hydraulic conductivity values were obtained from Freeze and Cherry (1979) Table 2.2

ft-amsl - feet above mean sea level
cm/sec - centimeters per second

APPENDIX B

Highland Technical Services, Inc.

GROUNDWATER SAMPLING LOG

SITE NAME:	PROJECT:	HTSI PROJECT NO:
FIELD PERSONNEL/SAMPLER:	WEATHER CONDITIONS:	DATE:
WELL NO:	WELL DIAMETER (in):	PURGE PUMP TYPE OR BAILER:
TOTAL WELL DEPTH (feet):		
STATIC WATER LEVEL (feet):	TIME:	
DEPTH TO FREE PRODUCT (feet):		
LENGTH OF WATER COLUMN:		
WELL VOLUME (gallons):		

PURGING DATA

INITAIL PUMP OR TUBING DEPTH IN WELL (feet):	FINAL PUMP OR TUBING DEPTH IN WELL (feet):	
PURGING INITIATED AT:	PURGING ENDED AT:	TOTAL VOLUME PURGED (gallons):

TIME	DEPTH TO WATER (feet)	pH (standard units)	COND. (mS/cm)	TURBIDITY (NTUs)	DISSOLVED OXYGEN (mg/L)	TEMP. (°C)	REDOX (ORP) (mV)	COLOR	ODOR

REMARKS:

SAMPLING DATA

SAMPLE DATE:	SAMPLE TIME:	SAMPLE METHOD:

ANALYSIS AND/OR METHOD	VOLUME	#CONTAINERS	PRESERVATIVE USED:	COMMENTS:

REMARKS:

Verify Well Cap Secured and Locked*	**Yes:**	

CALIBRATION INFORMATION:

SAMPLED BY (PRINT):	SAMPLER(S) SIGNATURES:

HIGHLAND TECHNICAL SERVICES, INC.
528 Mineral Trace
Hoover, Alabama 35244
Phone (205) 985-4874 Fax (205) 987-6080

APPENDIX C

MONITORING WELL SAMPLING RECORD

PROJECT NO:
PROJECT NAME: Axis Industrial Landfill
SITE LOCATION: Axis, Alabama
RECORDED BY:

WELL NUMBER	MW-1	MW-2	MW-4	MW-6	MW-7
GENERAL WELL DATA					
Top of Casing (TOC) Elevation (ft)	38.28	46.17	47.30	47.60	49.26
Original Total Depth (ft below TOC)	71.80	73.00	81.50	85.10	85.20
TOC Height (ft above/below grade)	6.44	NA	NA	NA	NA
Screened Interval (ft)	NA	NA	NA	NA	NA
Well Diameter (in)/Material	4" PVC	4" PVC	4" PVC	4" PVC	4" PVC
Current Well Condition	Good	Good	Good	Good	Good
WATER LEVEL DATA					
Date (mm/dd/yyyy)					
Time (military)					
Measured Total Depth (ft below TOC)					
Static Water Level (ft below TOC)					
Static Elevation (ft - AMSL)					
WELL PURGE DATA					
Purge Date (mm/dd/yyyy)					
Purge Time (military)					
Minimum Purge Volume (gal)					
Actual Purge Volume (gal)					
Equipment Used					
WELL SAMPLING DATA					
Sampling Date (mm/dd/yyyy)					
Sampling Time (military)					
Weather Conditions					
Equipment Used					
Groundwater pH (std units)					
Specific Conductance (mS/cm)					
Turbidity (NTU)					
Dissolved Oxygen (mg/L)					
Groundwater Temperature (degrees C)					
Oxidation-Reduction Potential (mV)					
Number of Containers Filled					
Water Clarity					
Parameters to be Analyzed*					

I certify that all water level measurement devices, purging equipment, and sampling equipment were properly cleaned prior to use in each well. Signature

REMARKS

NA = Not Applicable/Not Available

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Hoover, Alabama 35244
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APPENDIX D

Highland Technical Services, Inc.
528 Mineral Trace
Hoover, AL 35244

G

Billing Information:

Report to:

Email to:

Analysis/Container/Preservative

Chain of Custody
Page ___ of ___

ESC LAB SCIENCES
12065 Lebanon Road
Mt. Juliet, TN 37122

Phone: (800) 767-5859
Phone: (615) 758-5858
Fax: (615) 758-5859

Project Description:

City/Sate Collected

Phone:
FAX:

Client Project #:

ESC Key:

Collected by:

Site/Facility ID#:

P.O.#:

Collected by (signature):

Immediately Packed on Ice N ____ Y ___

Rush? (Lab MUST Be Notified)
_____ Same Day. 200%
_____ Next Day.. . . . . 100%
_____ Two Day 50%
Three Day 25%

Date Results Needed:

Email? __No__Yes

FAX? __No__Yes

No. of Cntrs

CoCode (lab use only)

Template/Prelogin

Shipped Via:

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time		Remarks/Contaminant	Sample # (lab only)

*Matrix: **SS** - Soil/Solid **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other_____

pH _____ Temp _____

Remarks:

Flow _____ Other _____

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ _____	Condition: (lab use only)	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp:	Bottles Received:	
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date:	Time:	pH Checked: NCF: