PRELIMINARY DETERMINATION

PERMIT RENEWAL
City of Bessemer
1700 3rd Avenue North
Bessemer, Alabama 35020

Raimund-Muscoda Inert Landfill
Permit No. 37-42

October 16, 2025

The City of Bessemer has submitted to the Alabama Department of Environmental Management (ADEM) an application for renewal of the Solid Waste Disposal Facility Permit for a construction and demolition landfill known as the Raimund-Muscoda Inert Landfill (Permit 37-42). The waste stream for the Raimund-Muscoda Inert Landfill would remain nonputrescible and nonhazardous construction and demolition waste, rubbish as defined by ADEM Admin. Code 335-13-1-.03, tires, ashes from clearing and grubbing activities only, and highway cleanings. The service area for the Raimund-Muscoda Inert Landfill would remain Bessemer, Pleasant Grove, and Hueytown in the State of Alabama. The maximum average daily volume of waste disposed of at the Raimund-Muscoda Inert Landfill would remain 300 cubic yards per day. All other permit conditions would remain the same.

The Raimund-Muscoda Inert Landfill is described as being located in the Northwest ¼ of Northeast ¼ of Section 21, Township 19 South, Range 4 West in Jefferson County, Alabama. The Raimund-Muscoda Inert Landfill consists of approximately 35.1 acres with 18.3 acres approved for disposal.

The Land Division has determined that the permit renewal application meets the applicable requirements of ADEM's Administrative Code Division 13 regulations.

Technical Contact:

Hunter Baker
Solid Waste Engineering Section
Land Division

SOLID WASTE DISPOSAL FACILITY PERMIT

PERMITTEE:	**City of Bessemer**
FACILITY NAME:	**Raimund-Muscoda Inert Landfill**
FACILITY LOCATION:	**Northwest ¼ of Northeast ¼ of Section 21, Township 19 South, Range 4 West in Jefferson County. The permitted facility consists of approximately 35.1 acres with a disposal area of 18.3 acres.**
PERMIT NUMBER:	**37-42**
PERMIT TYPE:	**Construction and Demolition**
WASTE APPROVED FOR DISPOSAL:	**Nonputrescible and nonhazardous construction and demolition waste, rubbish as defined by Rule 335-13-1-.03, tires, ashes from clearing and grubbing activities only, and highway cleanings.**
APPROVED WASTE VOLUME:	**Maximum Average Daily Volume of 300 cubic yards per day**
APPROVED SERVICE AREA:	**Bessemer, Pleasant Groove and Hueytown in the State of Alabama.**

In accordance with and subject to the provisions of the Solid Wastes & Recyclable Materials Management Act, as amended, Code of Alabama 1975, S 22-27-1 to 22-27-27 ("SWRMMA"), the Alabama Environmental Management Act, as amended, Code of Alabama 1975, S 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:	**?????**
EFFECTIVE DATE:	**?????**
EXPIRATION DATE:	**?????**

Alabama Department of Environmental Management

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
SOLID WASTE PERMIT

Permittee:	City of Bessemer 1700 3RD Avenue North Bessemer, Alabama 35020
Landfill Name:	Raimund-Muscoda Inert Landfill
Landfill Location:	Northwest ¼ of Northeast ¼ of Section 21, Township 19 South, Range 4 West in Jefferson County
Permit Number:	37-42
Landfill Type:	Construction and Demolition

Pursuant to the Solid Wastes & Recyclable Materials Management Act, Code of Alabama 1975, §§ 22-27-1, *et seq*., as amended, and attendant regulations promulgated thereunder by the Alabama Department of Environmental Management (ADEM or Department), this permit is issued to the City of Bessemer (hereinafter called the Permittee), to operate a solid waste disposal facility, known as the Raimund-Muscoda 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 335-13-16 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 Administrative 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 August 4, 2020, and as amended for permit renewal and known as the Permit Application (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 ADEM 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 **?????** and shall remain in effect until **?????** unless suspended or revoked.

_____ _____

Alabama Department of Environmental Management 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 335-13. 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, §§ 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 335-13, 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 constitutes a violation of Code of Alabama 1975, §§ 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 ADEM, within a reasonable time, any information that ADEM 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, §§ 22-27-1 *et seq*.

9. Monitoring, Corrective Actions, and Records

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   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 ADEM Admin. Code 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 120 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. Before the Permittee may commence disposal of waste in any new cell or phase:

a. The Permittee must submit a letter to the Department signed by both the Permittee and a professional engineer stating that the facility has been constructed in compliance with this permit.

b. The Department must inspect the new cells or phases unless the Permittee is notified that the Department will waive the inspection.

c. The Permittee may not commence disposal activities in any new cells or phases until approval of the new cells or phases is granted by the Department.

13. Noncompliance. The Permittee shall report all instances of noncompliance with the permit at the time noncompliance is discovered.

14. 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 335-13-4-.21(1)(b).

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 inspections and maintenance activities.

b. Daily Volume reports.

c. Personnel training documents and records.

d. Groundwater monitoring records if required.

e. Explosive gas monitoring records if required.

f. Copies of this Permit and the Application.

g. 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. Groundwater monitoring is not required at this time, but if it is determined that monitoring is necessary, the Permittee shall conduct monitoring and submit reports as directed by the Department. Likewise, if necessary, explosive gas monitoring must be conducted and reports submitted as directed by the Department. 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 ADEM Admin. Code 335-13 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 ADEM Admin. Code 335-13 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 Bessemer City Hall, the following documents and amendments, revisions and modifications to these documents until an engineer certifies closure.

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:

Mailing Address.
Chief, Solid Waste Branch, Land Division
Alabama Department of Environmental Management

P.O. Box 301463
Montgomery, AL 36130-1463

Physical Address.
Chief, Solid Waste Branch, Land Division
Alabama Department of Environmental Management
1400 Coliseum Blvd.
Montgomery, Alabama 36110-2400

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 pursuant to ADEM Admin. Code 335-1-1-.06.

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 335-13.

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, as provided in the application, for detecting and preventing the disposal of free liquids, regulated hazardous waste, PCB's, regulated medical waste, and other unauthorized waste streams 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 not dispose of industrial process waste at this landfill. Only those wastes shown in Section III.B. are allowed for disposal in this landfill.

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 C/D LANDFILLS

A. Waste Identification and Management.

1. Subject to the terms of this permit, the Permittee may accept for disposal 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 Raimund-Muscoda Inert Landfill is approximately 35.1 acres with 18.3 acres approved for disposal.

3. The maximum average daily volume of waste disposed at the facility shall not exceed 300 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 ADEM Admin. Code 335-13-5-.06(2)(b)2. The average daily volume shall be computed as specified by ADEM Admin. Code 335-13-4-.23(2)(f).

B. Waste Streams. The Permittee may accept for disposal nonputrescible and nonhazardous construction and demolition waste, rubbish as defined by ADEM Admin. Code 335-13-1-.03, tires, ashes from clearing and grubbing activities only, and highway cleanings.

C. Service Area. The Permittee is allowed to accept waste from Bessemer, Pleasant Grove, and Hueytown in the State of Alabama.

D. Waste Placement, Compaction, and Cover. All waste shall be confined to an area as small as possible within a single working face and placed onto an appropriate slope not to exceed 4 to 1 (25%) or as approved by the Department. 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 and listed in Section VIII. shall be added at the conclusion of each week's operation.

E. Liner Requirements. At this time, the Permittee shall not be required to install a liner system. The base of the landfill shall be a minimum of five (5) feet above the highest measured groundwater level as determined by ADEM Admin. Code 335-13-4-.11(2)(a).

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

G. 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.

H. Adverse Weather Disposal. The Permittee shall provide for disposal activities in adverse weather conditions.

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

J. Environmental Monitoring and Treatment Structures. The Permittee shall provide protection and proper maintenance of environmental monitoring and treatment structures.

K. Vector Control. The Permittee shall provide for vector control as required by ADEM Admin. Code 335-13.

L. 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 ADEM Admin. Code 335-13-4-.23(1)(j) are met.

M. 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.

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

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

P. 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.

Q. 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 ADEM Admin. Code 335-13-4-.23(1)(f).

R. Litter Control. The Permittee shall control litter.

S. Fire Control. The Permittee shall provide fire control measures.

SECTION IV. GROUNDWATER MONITORING REQUIREMENTS:

Groundwater monitoring is not required at this landfill provided that the waste stream is in accordance with Section III.B. Should any waste be disposed other than the waste streams indicated in Section III.B., the Department may require that groundwater-monitoring wells be installed.

SECTION V. GAS MONITORING REQUIREMENTS

The permittee must install and maintain an explosive gas monitoring system in accordance with ADEM Admin. Code 335-13.

SECTION VI. SURFACE WATER MANAGEMENT

The Permittee shall construct and maintain run-on and run-off control structures to control the discharge of pollutants in stormwater. Any discharges from drainage control structures shall be permitted through a discharge permit issued by the ADEM Water Division.

SECTION VII. CLOSURE AND POST-CLOSURE REQUIREMENTS

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

B. Vegetative Cover. The Permittee shall establish a vegetative or other appropriate cover, as approved by the Department, 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 a registered professional 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 a minimum 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.

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 ADEM. 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 a registered professional engineer, verifying the post-closure has been completed according to the Post-Closure Plan.

J. Recording Instrument. The Permittee must provide documentation of compliance with the requirements of the Uniform Environmental Covenants Program in ADEM Admin. Code 335-5 and shall execute the following:

1. Record a notation onto the land deed within 90 days from the certification of closure. 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.

2. File the covenant at the courthouse where the land deed is held within thirty (30) days of receipt of the covenant signed by ADEM's Land Division Chief.

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

K. 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

There are no approved variances for the Raimund-Muscoda Inert Landfill

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.

Permit Application

EEFS
E.E.F.S. COMPANY, P.C.
CIVIL & STRUCTURAL ENGINEERS

July 30, 2020

RECEIVED
AUG – 4 2020
LAND DIVISION

Mr. Jared D. Kelly, Chief
Solid Waste Engineering Section
Land Division
ADEM
P.O. Box 301463
Montgomery, AL 36130-1463

Attn: Mr. Hunter Baker

Re: Permit Renewal for Raimund-Muscoda Inert Landfill
Permit No. 37-42
City of Bessemer, Jefferson County

Dear Sir:

We are submitting three copies of ADEM Form No. 305 and supporting documents as part of the application for renewal of the referenced permit which will expire on January 9, 2021.

Also, enclosed is a check in the amount of $5,400.00 for the permit renewal fee.

If you need additional information, please contact me at (205) 424-3737.

Sincerely,

Ronald R. Gilbert, P.E.
City Engineer

Attachments

cc: Mayor Kenneth E. Gulley, City of Bessemer
Lawrence Hatter, Bessemer Public Works
Shan Paden, Bessemer City Attorney

EEFS Company, P.C.
P.O. Box 982 • Bessemer, Alabama 35021
Office: (205) 424-3737 • Fax: (205) 424-3730

SOLID WASTE DISPOSAL FACILITY

CONSTRUCTION/DEMOLITION LANDFILL
PERMIT APPLICATION PACKAGE

SOLID WASTE APPLICATION

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

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

2. **Facility Name** RAIMUND - MUSCODA INERT LANDFILL

3. **Applicant/Permittee:**

   Name: CITY OF BESSEMER

   Address: 1700 THIRD AVENUE NORTH
   BESSEMER, AL 35020

   Telephone: (205) 424-4060

   If applicant/permittee is a Corporation, please list officers:
   N/A

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

   Township 19S **Range** 4W
   Section 21 **County** JEFFERSON

5. **Land Owner:** SAME AS APPLICANT/PERMITTEE

   Name: CITY OF BESSEMER

   Address: 1700 THIRD AVENUE NORTH
   BESSEMER, AL 35020

   Telephone: (205) 424-4060

   (Attach copy of agreement from landowner if applicable.) N/A

6. **Contact Person:**

Name MICHAEL REESE

Position or Affiliation DIRECTOR OF PUBLIC IMPROVEMENTS

Address: 1230 15TH AVENUE NORTH
BESSEMER, AL 35020

Telephone: (205) 424-4084

7. **Size of Facility:** ±35 **Acres**

Size of Disposal Area(s): ±18.3 **Acres**

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

BESSEMER, HUEYTOWN, PLEASANT GROVE

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

_____ **Tons/Day** 300 **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.):**

INERT MATERIALS, TIRES, TREES, LIMBS, STUMPS, CONSTRUCTION MATERIALS INCLUDING WOOD, CONCRETE, STEEL, ASHES FROM CLEARING & GRUBBING ONLY, STREET CLEANING DEBRIS, DEMOLITION MATERIAL FROM RESIDENTIAL DEMOLITION

SIGNATURE (Responsible official of permit applicant):

Michael Reese II **TITLE:** Director of Public Works

MICHAEL REESE **DATE:** 8/27/2025
(please print or type name)

FEE SCHEDULE E
SOLID WASTE PERMITS/REGISTRATION

Type of Activity	Initial Issuance	Modification	Reissuance
Medical Waste Transfer Facility	$2,035	$725	$1,330
New Technology Review	$10,205	------	------
Commercial Treatment Facility	$16,460	$7,280	$9,180
Commercial Transportation of Medical Waste	$3,490	$1,460	$2,035
Storage of Untreated Medical Waste	$2,630	$665	$1,960
Municipal Solid Waste Landfill/ CCR Unit	$83,880	------	$37,270
Minor Mod. (1)*	------	$3,275	------
Major Mod. (2)*	------	$32,615	------
Construction/Demolition Waste Landfill	$7,145	------	$5,400
Minor Mod. (1)*	------	$1,460	------
Major Mod. (2)*	------	$2,915	------
Industrial Waste Landfill	$12,670	------	$8,150
Minor Mod. (1)*	------	$1,460	------
Major Mod. (2)*	------	$4,375	------
Compost Facility	$4,860		$3,670
Minor Mod.	------	$1,225	------
Major Mod	------	$1,945	------
Additive Fees			
Geological Review	$4,865	$3,275	$3,275
Solid Waste Disposal Notification	$215	$215	$215
Variance Request	$1,460	$1,460	$1,460
Beneficial Use Facility Registration	$1,015		$510

(1)*. These are modifications as included in ADEM Admin. Code rule 335-13-5-.06(2).

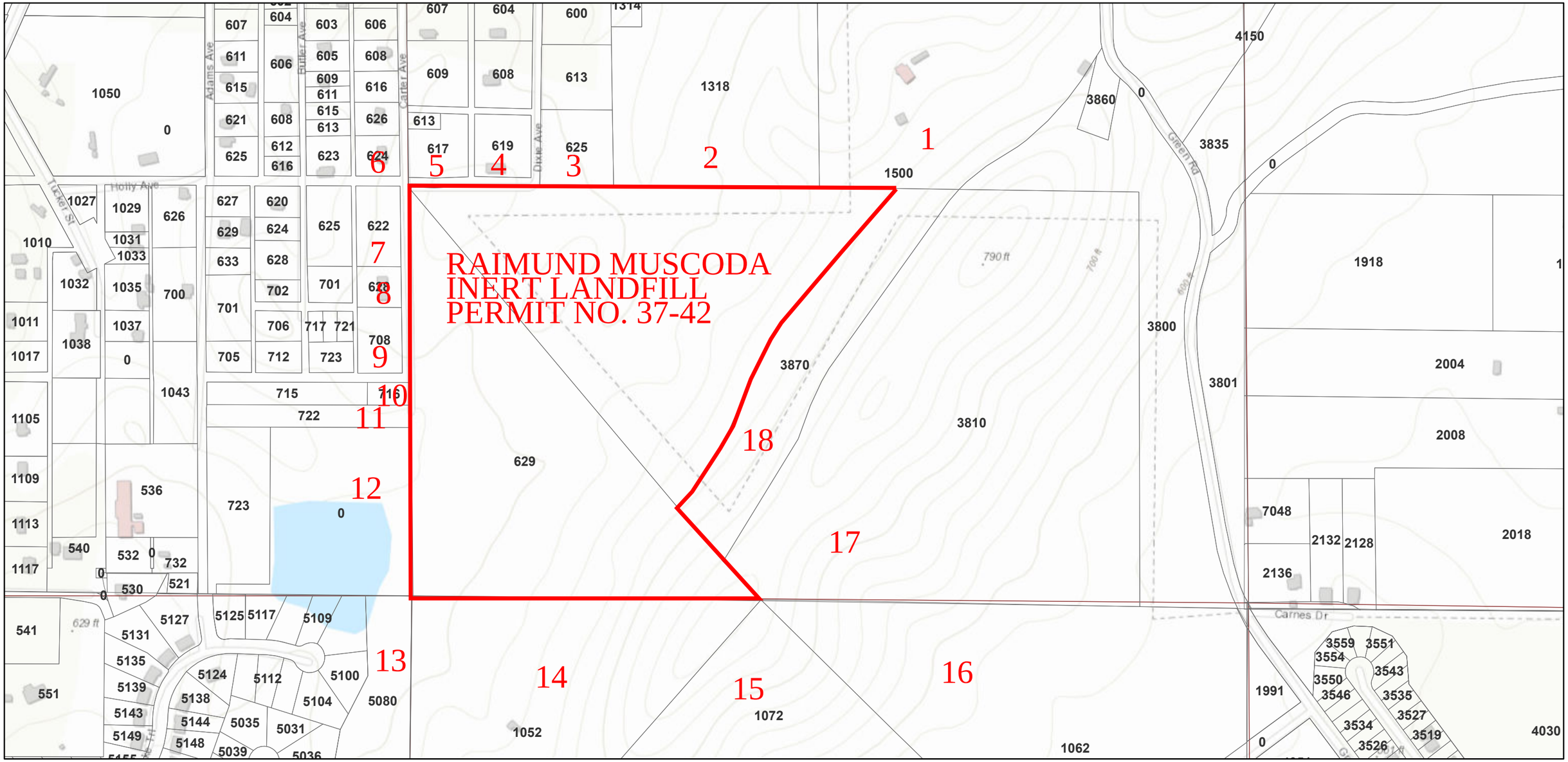
(2)*. These are modifications as included in ADEM Admin. Code rule 335-13-5-.06(1).

City of Bessemer - Maimund-Muscoda Inert Landfill Permit No. 37-42
Exhibit #1 - Adjacent Property Owner List

Parcel	Owner Name	Owner Mailing Address	Owner Site Address
1	City of Bessemer	1700 3rd Avenue North Bessemer, AL 35020	1500 Mountain Road Bessemer, AL 35020
2	Sherrina V. Rice	4939 Owens Loop Bessemer, AL 35022	1318 Martin Street Bessemer, AL 35020
3	Cedric Moreland, Jr	320 Elm Street SW Bessemer, AL 35022	625 Dixie Avenue Bessemer, AL 35020
4	Tammy Stewart	492 Cherokee Circle Fairfield, AL 35064	619 Carter Avenue Bessemer, AL 35020
5	Gwendolyn Louise Curry	87 Northampton Drive Willingboro, NJ 08046	617 Carter Avenue Bessemer, AL 35020
6	Earnest Watford	624 Carter Avenue Bessemer, AL 35020	624 Carter Avenue Bessemer, AL 35020
7	Alexis Augustus	13104 Winters Cove Del Valle, TX 78617	622 Carter Avenue Bessemer, AL 35020
8	Carey Blackmon	628 Carter Avenue Bessemer, AL 35020	628 Carter Avenue Bessemer, AL 35020
9	Arleen Dixon Whitted	50 Pepper Tree Apartments 23 Division Street South Bessemer, AL 35020	708 Carter Avenue Bessemer, AL 35020
10	Jeraldine Johnson	1517 E 86th Street Chicago, IL 60619	716 Carter Avenue Bessemer, AL 35020
11	Heirs of Roy Leonard Jr.	708 Carter Avenue Bessemer, AL 35020	722 Carter Avenue Bessemer, AL 35020
12	Robert L. Snider	P.O. Box 361405 Hoover, AL 35236	723 Adams Avenue Bessemer, AL 35020
13	Robert L. Snider	P.O. Box 361405 Hoover, AL 35236	5080 Meadow Lake Crest Bessemer, AL 35020
14	City of Bessemer	1700 3rd Avenue North Bessemer, AL 35020	1052 Nixon Road Bessemer, AL 35020
15	City of Bessemer	1700 3rd Avenue North Bessemer, AL 35020	1072 Nixon Road Bessemer, AL 35020
16	Brenda Rumley	P.O. Box 361483 Hoover, AL 35226	1062 Nixon Road Bessemer, AL 35020
17	Brenda Rumley	P.O. Box 361483 Hoover, AL 35226	3810 Green Road Bessemer, AL 35020
18	City of Bessemer	1700 3rd Avenue North Bessemer, AL 35020	3870 Green Road Bessemer, AL 35020

NOTES:
(1) Source of information was taken from Jefferson County Tax Assessor GIS Website on 7/10/2025
(2) See the attached Exhibit 2 - Adjacent Property Map for additional information

CITY OF BESSEMER

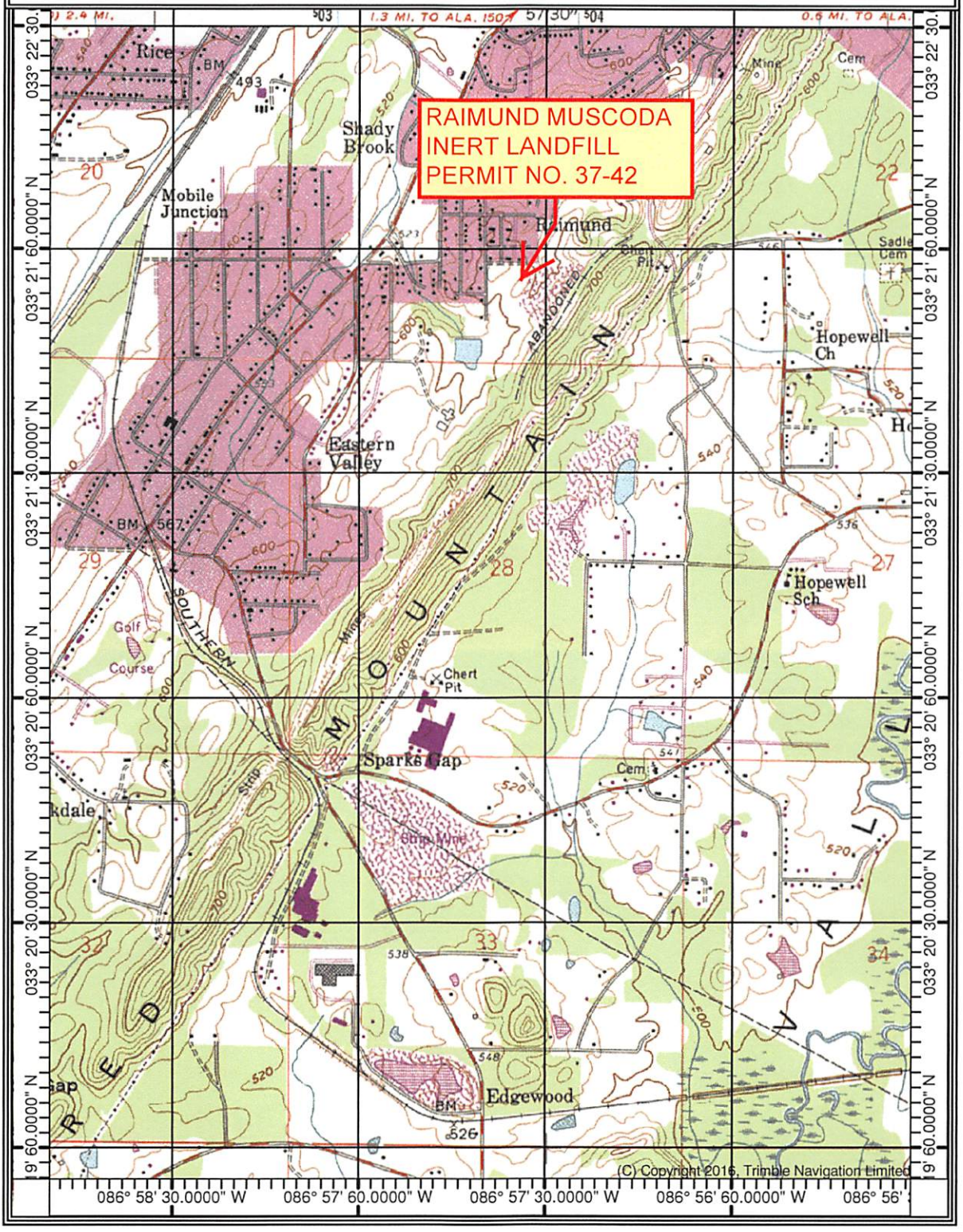


Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

EXHIBIT 2 - ADJACENT PROPERTY MAP

CITY OF BESSEMER

Map Name: GREENWOOD | Scale: 1 inch = 2,000 ft. | Horizontal Datum: NAD27
Print Date: 07/22/20 | Map Center: 033° 21' 15.8200" N,



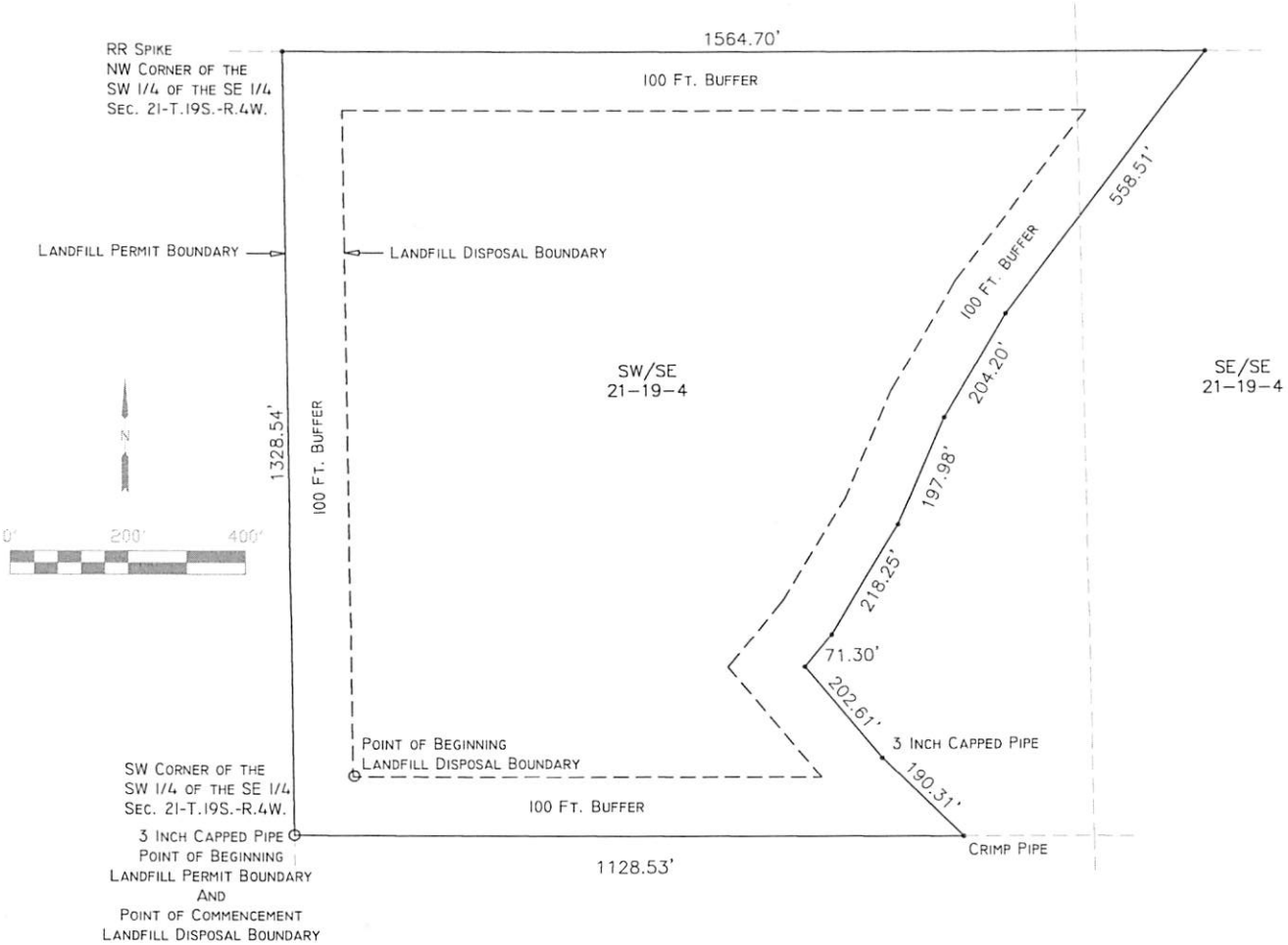
SCALE 1:24000

0 1000 2000 3000 4000 5000 6000
Feet

EXHIBIT 3 - USGS LOCATION MAP

CITY OF BESSEMER

EXHIBIT 4 - VICINITY MAP



Sketch for Legal Description

Landfill Permit Boundary

Located in the South ½ of the Southeast ¼ of Section 21 South, Township 19 South, Range 4 West, Jefferson County, Alabama. More particularly described as follows:

Begin at a 3 inch capped pipe located at the Southwest corner of the Southwest ¼ of the Southeast ¼ of Section 21 South, Township 19 South, Range 4 West, Jefferson County, Alabama; thence run N 00 degrees 46 minutes 53 seconds W along the West line of the Southwest ¼ of the Southeast ¼ of said Section 21 a distance of 1328.54 feet to a railroad spike located at the Northwest corner of said ¼ – ¼ section; thence run S 89 degrees 47 minutes 14 seconds E along the North line of the South ½ of the Southeast ¼ of said Section 21 a distance of 1564.70 feet; thence run S 37 degrees 37 minutes 01 seconds W a distance of 558.51 feet; thence run S 30 degrees 35 minutes 52 seconds W a distance of 204.20 feet; thence run S 23 degrees 32 minutes 16 seconds W a distance of 197.98 feet; thence run S 31 degrees 43 minutes 36 seconds W a distance of 218.25 feet; thence run S 39 degrees 57 minutes 08 seconds W a distance of 71.30 feet; thence run S 40 degrees 07 minutes 26 seconds E a distance of 202.61 feet to a 3 inch capped pipe; thence run S 45 degrees 32 minutes 36 seconds E a distance of 190.31 feet to a crimped pipe on the South line of the Southwest ¼ of the Southeast ¼ of said Section 21; thence run N 89 degrees 43 minutes 01 seconds W along the South line of said ¼ – ¼ section a distance of 1128.53 feet to the point of beginning.

Containing 35 Acres more or less.

Landfill Disposal Area Boundary

Located in the South ½ of the Southeast ¼ of Section 21 South, Township 19 South, Range 4 West, Jefferson County, Alabama. More particularly described as follows:

Commence at a 3 inch capped pipe located at the Southwest corner of the Southwest ¼ of the Southeast ¼ of Section 21 South, Township 19 South, Range 4 West, Jefferson County, Alabama; thence run N 00 degrees 46 minutes 53 seconds W along the West line of the Southwest ¼ of the Southeast ¼ of said Section 21 a distance of 98.16 feet; thence run N 89 degrees 13 minutes 07 seconds E a distance of 100 feet to the Point of Beginning, said point being 100 feet North of the South line of the Southwest ¼ of the Southeast ¼ of said Section 21; thence run N 00 degrees 46 minutes 53 seconds W, parallel with and 100 feet East of the West line of the Southwest ¼ of the Southeast ¼ of said Section 21 a distance of 1128.63 feet to a point 100 feet South of the North line of said ¼ – ¼ section; thence run S 89 degrees 47 minutes 14 seconds E, parallel with and 100 feet South of the North line of the South ½ of the Southeast ¼ of said Section 21 a distance of 1260.59 feet; thence run S 37 degrees 37 minutes 01 seconds W a distance of 362.29 feet; thence run S 30 degrees 35 minutes 52 seconds W a distance of 216.50 feet; thence run S 23 degrees 32 minutes 16 seconds W a distance of 196.99 feet; thence run S 31 degrees 43 minutes 36 seconds W a distance of 203.91 feet; thence run S 39 degrees 57 minutes 08 seconds W a distance of 148.14 feet; thence run S 40 degrees 07 minutes 26 seconds E a distance of 244.34 feet to a point being 100 feet North of the South line of the Southwest ¼ of the Southeast ¼ of said Section 21; thence run N 89 degrees 43 minutes 01 seconds W, parallel with and 100 feet North of the South line of said ¼ – ¼ section a distance of 790.32 feet to the point of beginning.

EEFS
Engineering, Environmental & Forestry Services, Co.
Civil & Structural Engineering/Land Surveying
1930 Second Avenue North, Suite 150, (PO Box 982)
Bessemer, Alabama 35020
Phone: 205-424-3737

NO	DATE	REVISION

PROJECT NAME
Raimund Muscoda Inert Landfill
City of Bessemer
ADEM Permit No. 37-42
Jefferson County, Alabama

DRAWING NUMBER	SHEET TITLE	PROJECT NUMBER
	2020-11-04-RM-Landfill.dwg	B-1476 Phase 2
SHEET NUMBER 1 OF 1	SCALE 1 Inch = 200 Feet	DRAWN BY GVS / CHECKED BY DRM / DATE 11-05-2020

DISCLAIMER: E.E.F.S. COMPANY P.C. CLAIMS PROPRIETARY RIGHTS IN THE INFORMATION DISCLOSED ON THIS DRAWING OR DOCUMENT. IT IS NOT TO BE REPRODUCED OR USED TO MANUFACTURE ANYTHING SHOWN HEREON WITHOUT THE WRITTEN PERMISSION OF E.E.F.S. COMPANY P.C. IT IS LOANED CONFIDENTIALLY AND MUST NOT BE USED IN ANYWAY DETRIMENTAL TO OUR INTEREST.

Landfill Permit Boundary

Located in the South ½ of the Southeast ¼ of Section 21 South, Township 19 South, Range 4 West, Jefferson County, Alabama.

More particularly described as follows:

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Containing 35 Acres more or less.

Landfill Disposal Area Boundary

Located in the South ½ of the Southeast ¼ of Section 21 South, Township 19 South, Range 4 West, Jefferson County, Alabama.

More particularly described as follows:

Commence at a 3 inch capped pipe located at the Southwest corner of the Southwest ¼ of the Southeast ¼ of Section 21 South, Township 19 South, Range 4 West, Jefferson County, Alabama; thence run N 00 degrees 46 minutes 53 seconds W along the West line of the Southwest ¼ of the Southeast ¼ of said Section 21 a distance of 98.16 feet; thence run N 89 degrees 13 minutes 07 seconds E a distance of 100 feet to the Point of Beginning, said point being 100 feet North of the South line of the Southwest ¼ of the Southeast ¼ of said Section 21; thence run N 00 degrees 46 minutes 53 seconds W, parallel with and 100 feet East of the West line of the Southwest ¼ of the Southeast ¼ of said Section 21 a distance of 1128.63 feet to a point 100 feet South of the North line of said ¼ - ¼ section; thence run S 89 degrees 47 minutes 14 seconds E, parallel with and 100 feet South of the North line of the South ½ of the Southeast ¼ of said Section 21 a distance of 1260.59 feet; thence run S 37 degrees 37 minutes 01 seconds W a distance of 362.29 feet; thence run S 30 degrees 35 minutes 52 seconds W a distance of 216.50 feet; thence run S 23 degrees 32 minutes 16 seconds W a distance of 196.99 feet; thence run S 31 degrees 43 minutes 36 seconds W a distance of 203.91 feet; thence run S 39 degrees 57 minutes 08 seconds W a distance of 148.14 feet; thence run S 40 degrees 07 minutes 26 seconds E a distance of 244.34 feet to a point being 100 feet North of the South line of the Southwest ¼ of the Southeast ¼ of said Section 21; thence run N 89 degrees 43 minutes 01 seconds W, parallel with and 100 feet North of the South line of said ¼ - ¼ section a distance of 790.32 feet to the point of beginning.

EEFS
E.E.F.S. COMPANY, P.C.
CIVIL & STRUCTURAL ENGINEERS

January 24, 2023

Mr. Jared Kelly
Solid Waste Engineering Section
ADEM - Land Division
1400 Coliseum Blvd
Montgomery, AL 36130-1463

ATTN: Mr. Hunter Baker

Re: Application Review
City of Bessemer Raimund-Muscoda Landfill Permit 37-42

Dear Mr. Baker:

In response to the attached application review of the permit application for the above referenced facility, we submit the following documentation on behalf of the City of Bessemer.

The following documentation was requested in the attached application review letter dated April 27, 2022. The responses to each item on the letter are below and are based on our meeting held at ADEM Montgomery office on August 24, 2022.

1. *"A demonstration that the bottom elevation of the proposed disposal area shall be a minimum of five feet above the highest measured groundwater elevation as described by ADEM Rule 335-13-4-(2)(a)."*
    - **RESPONSE: See attached Drill Holes Location Map and the most recent cell map that was previously approved by ADEM which contains 3 total pages under file name #1 – Drill Holes & New Cell Maps. Drill hole #1 groundwater elevation was determined to be 526.4, bedrock was hit with no groundwater detected at drill hole #2 (elevation 557.0), and no groundwater or bedrock was encountered at drill hole #3 to elevation 540.0. The lowest proposed bottom elevation of the disposal area is 592.0.**

2. *"Documentation of sufficient on-site control points to provide accurate horizontal and vertical control in accordance with ADEM Rule 335-13-4-.12(2)(a)."*
    - **RESPONSE: See attached control points map which contains 1 page under file name #2 – Control Points. There are three site horizontal control points based on NAD 83 (Alabama West Zone) and one site vertical control point based on NAVD 88.**

3. *"Presentation of geological and hydrological units, sections, plan, and profile sheets in accordance with ADEM Rule 335-13-4-.12(2)(b)."*
    - **RESPONSE: See attached original drainage calculations and maps submitted by PERC Engineering in Appendix A of the original Permit Application Report which contains 32 total pages under file name #3 – Drainage.**

4. *"Boundary plat and legal property description prepared, signed, and sealed by a land surveyor of the facility and disposal area boundaries in accordance with ADEM Rule 335-13-4-.12(2)(c)."*
    - **RESPONSE: See attached boundary survey map with legal description of the facility and disposal area signed and stamped by a professional land surveyor as requested which contains 1 page under file name #4 – Boundary Survey & Legal Description.**

5. *"Initial and final topographic maps at contour intervals of five feet or as otherwise specified in accordance with ADEM Rule 335-13-4-.12(2)(d)."*
    - **RESPONSE: See attached initial and final topographic maps on five-foot contour intervals as requested which contains 2 total pages under file name #5 – Initial & Final Topo Maps.**

6. *"Existing and proposed surface drainage plans to include control structures designed to handle run-on and run-off in accordance with ADEM Rule 335-13-4-.12(2)(e)."*
    - **RESPONSE: See attached initial and final topographic maps on five-foot contour intervals as requested which contains 2 total pages under file name #5 – Initial & Final Topo Maps.**

7. *"Details of plans for permanent all weather access roads in accordance with ADEM Rule 335-13-4-.12(2)(g)."*
    - **RESPONSE: See attached access drive plan set which contains 7 total pages under file name #7 – Access Road Plan Set.**

8. *"Presentation of special engineering features or considerations to be implemented or maintained by the Permittee in accordance with ADEM Rule 335-13-4-.12(2)(j)."*
    - **RESPONSE: No special engineering features other than what has previously been described and presented are required at this time for the subject inert C&D landfill.**

9. *"Quality assurance/quality control (QA/QC) plan for all components of the liner, leachate collection, and cap systems in accordance with ADEM Rule 335-13-4-.12(2)(k)."*
    - **RESPONSE: See attached initial QA/QC plan submitted by PERC Engineering under Section 6 of the original Permit Application Report which contains 5 total pages under file name #9 – QA-QC Plan.**

10. *"An updated application for designated by the Department, if applicable, in accordance with ADEM Rule 335-13-5-.02(2)(a)1."*
    - **RESPONSE: See attached most recent permit renewal application package previously submitted for 2021 through 2026 permit period which contains 15 total pages under file name #10 – Renewal Application 2021-2026.**

11. *"An updated list of names and mailing addresses of all property owners whose property is adjacent to the site in accordance with ADEM Rule 335-13-5-.02(2)(a)3."*
    - **RESPONSE: See attached previously submitted list of adjacent property owners and map excerpted from the 2021-2026 permit renewal application mentioned in #10 above which contains 2 total pages under file name #11 – Adjacent Property Owners 2021 Renewal Application. A more current 2023 list can be submitted upon request.**

The City of Bessemer has most of the original permit application report previously submitted by PERC Engineering and can be provided to ADEM in its entirety upon request.

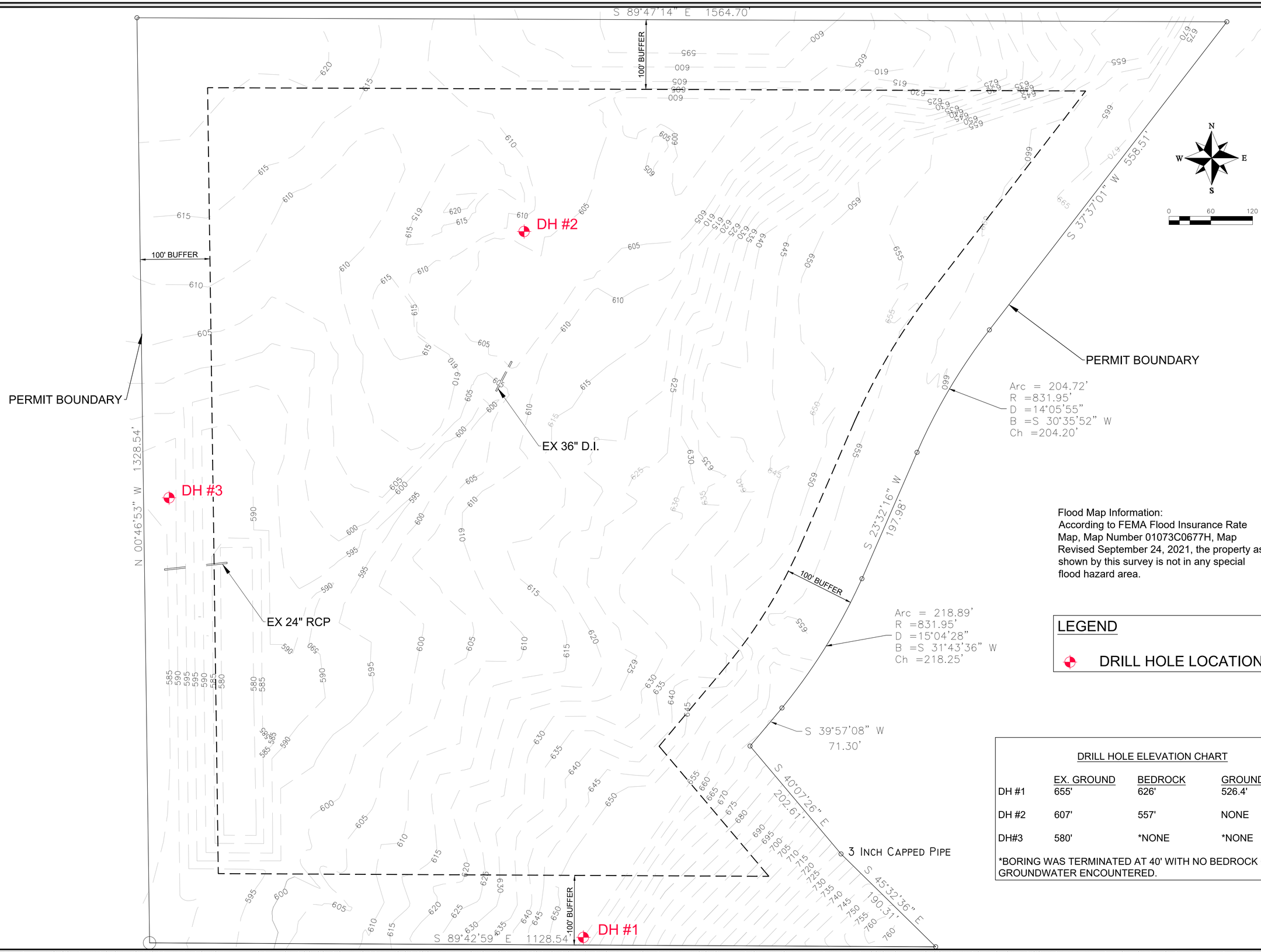
If you have any questions or comments, please contact me at 205-424-3737 extension 206.

Sincerely,

Daniel R. Mayfield, P.E.

Attachments

EEFS Company, P.C.
P.O. Box 982 • Bessemer, Alabama 35021
Office: (205) 424-3737 • Fax: (205) 424-3730



Flood Map Information:
According to FEMA Flood Insurance Rate Map, Map Number 01073C0677H, Map Revised September 24, 2021, the property as shown by this survey is not in any special flood hazard area.

LEGEND

DRILL HOLE LOCATION

DRILL HOLE ELEVATION CHART

	EX. GROUND	BEDROCK	GROUNDWATER
DH #1	655'	626'	526.4'
DH #2	607'	557'	NONE
DH#3	580'	*NONE	*NONE

*BORING WAS TERMINATED AT 40' WITH NO BEDROCK OR GROUNDWATER ENCOUNTERED.

EEFS
Engineering, Environmental & Forestry Services Company
Civil & Structure Engineering / Land Surveying
1930 2nd Avenue North, Suite 150 (P.O. Box 982)
Bessemer, Alabama - 35020
p: 205.424.3737 / f: 205.424.3730 / www.eefs-eng.com

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DESIGN REVIEW APPROVE

REVISION | DATE | NO.

PROJECT NAME
RAIMUND MUSCODA LANDFILL
CITY OF BESSEMER
BESSEMER, AL

SHEET TITLE
DRILL HOLES LOCATION MAP

PROJECT NUMBER
B-1681

DRAWN BY: MPR | CHECKED BY: GVS

DATE
11/21/2022

DRAWING NUMBER
SHT 1

SHEET NUMBER
1 OF 1

SCALE
1" = 60'

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EEFS
Engineering, Environmental & Forestry Services Company

Civil & Structural Engineering / Land Surveying
1930 2nd Avenue North, Suite 150 (P.O. Box 982)
Bessemer, Alabama - 35020
p: 205.424.3737 / www.eefs-eng.com
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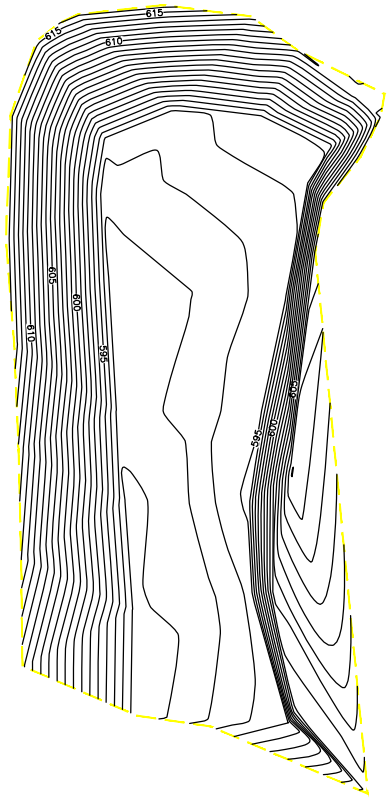
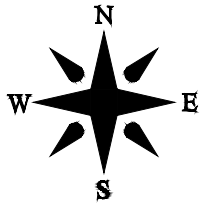
RAIMUND MUSCODA LANDFILL 2021

TOPOGRAPHIC SURVEY 9/10/21
REVISED TO ADD DRILL HOLE INFORMATION
11/21/22





0 100 200

LEGEND

PERMIT BOUNDARY

NEW CELL

DRILL HOLE

DH #2

DH #3

NOTE: THE LOWEST GRADING ELEVATION IN THIS CELL IS 592' WHICH IS WELL ABOVE THE HIGHEST MEASURED GROUNDWATER ELEVATION FOR DRILL HOLES #2 & #3.

DRILL HOLE ELEVATION CHART

	EX. GROUND	BEDROCK	GROUNDWATER
DH #1	655'	626'	526.4'
DH #2	607'	557'	NONE
DH#3	580'	*NONE	*NONE

*BORING WAS TERMINATED AT 40' WITH NO BEDROCK OR GROUNDWATER ENCOUNTERED.

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Bessemer, Alabama - 35020
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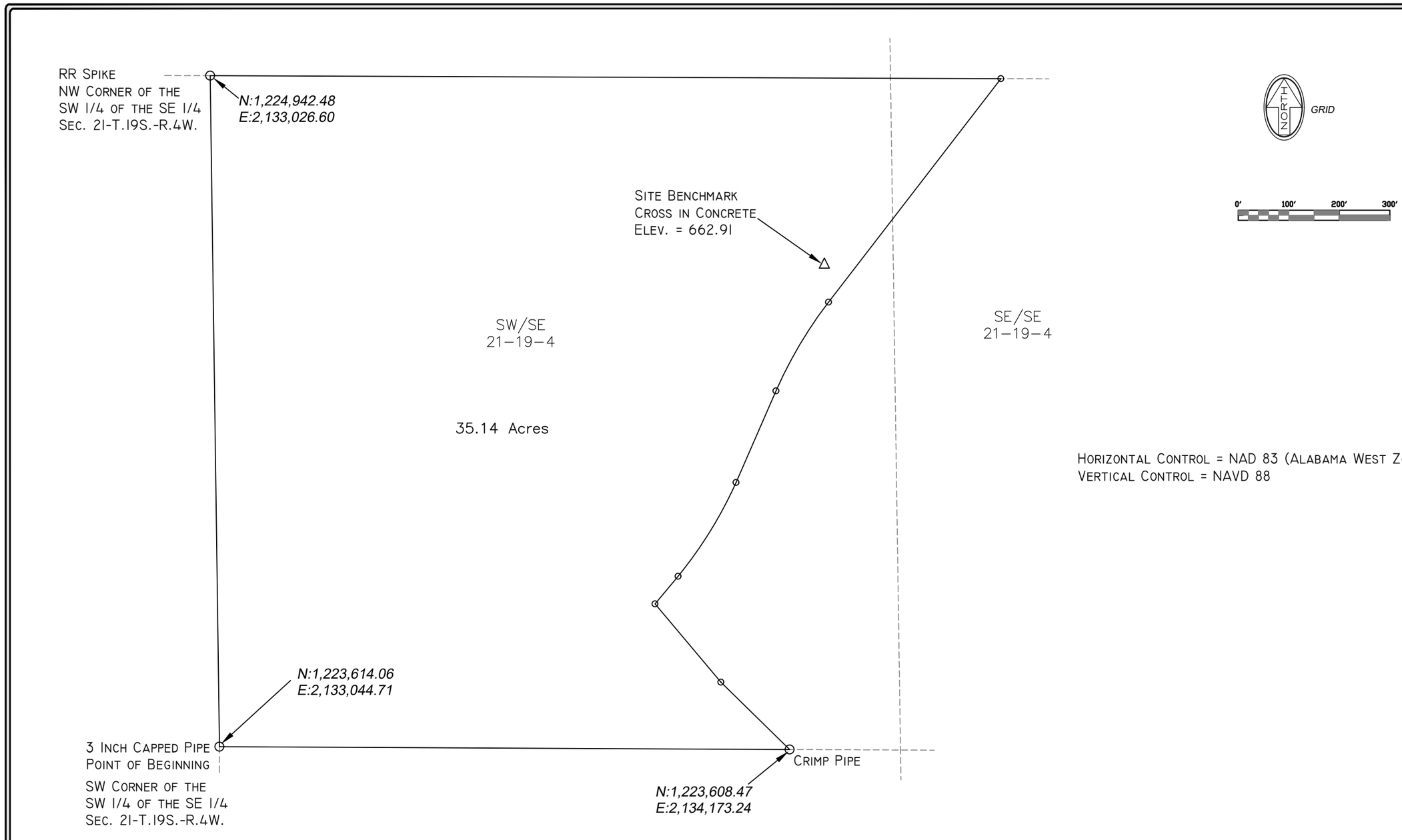
RAIMUND MUSCODA
LANDFILL 2021
TOPOGRAPHIC SURVEY 9/10/21
REVISED TO ADD DRILL HOLE INFORMATION
11/21/22



EEFS
Engineering, Environmental & Forestry Services, Co.
Civil & Structural Engineering/Land Surveying
1930 Second Avenue North, Suite 150, (PO Box 982)
Bessemer, Alabama 35020
Phone: 205-424-3737

SITE CONTROL POINTS
Raimund Muscoda Inert Landfill
City of Bessemer
ADEM Permit No. 37-42
Jefferson County, Alabama

SHEET NUMBER
1 OF 1

SHEET TITLE
2023-01-24
RM-Control Points

PROJECT NUMBER
B-1681

DRAWN BY
GVS

CHECKED BY
DRM

SCALE
1 Inch = 200 Feet

DATE
01/24/2023

Summary of Appendix A

Drainage Calculations

PERC Engineering Co., Inc.
Jasper, Alabama

Design Calculations

Project: Raimund-Muscoda Inert LF	Designed By: Ron Gilbert	Date: 8-4-92
Location: Bessemer, Al	Reviewed By:	Date:
Subject/Title: Drainage Calc	Remarks:	Sheet No.: 1 of

PDA #1 = $3.75\ in^2 * \frac{(300)^2}{43560} = 7.75\ AC$

PDA #2 = $9.60\ in^2 * \frac{300^2}{43560} = 19.83\ AC$

PDA #3 = $13.35\ in^2 * \frac{300^2}{43560} = 27.58\ AC$

Divert Water

Area 1 None

Area 2 $4.53\ in^2 * 2.07 = 9.36\ ac$

Area 3 $6.22\ in^2 * 2.07 = 12.88\ ac$

t_c from Nomograph

Area 3 Height = 760 - 590 = 170 Ft

Length = 1700 Ft

$t_{c_3} = 5.9$ min

Area 2 Height = 760 - 590 = 170 Ft

Length = 1400 Ft

$t_{c_2} = 4.3$ min

Area 1 Height = 625 - 590 = 35 Ft

Length = 750 Ft

$t_{c_1} = 4.3$ min

PERC Engineering Co., Inc.
Jasper, Alabama

Design Calculations

Project: Raimund-Muscoda Inert LF	Designed By: Jon Gilbert	Date: 8-4-92
Location: Bessemer, Al	Reviewed By:	Date:
Subject/Title: Drainage Calc.	Remarks:	Sheet No.: 2 of

Area 2

t_c From Nomograph - Diverted Areas

Height = 780 - 650 = 130 Ft

Length = 470 + 650 = 1,120 Ft

t_{c_2} = 4.0 min

Area 3

Height = 760 - 650 = 110 Ft

Length = 470 + 850 = 1320 Ft

t_{c_3} = 5.1 min

Peak Flows (Diverted Areas)

Area 2

$Q = CIA$

$C = .5$

$I = 12.25$ IN/hr

$A = 9.36$ AC

$Q_p = 57.3$ Ft^3/s

Area 3

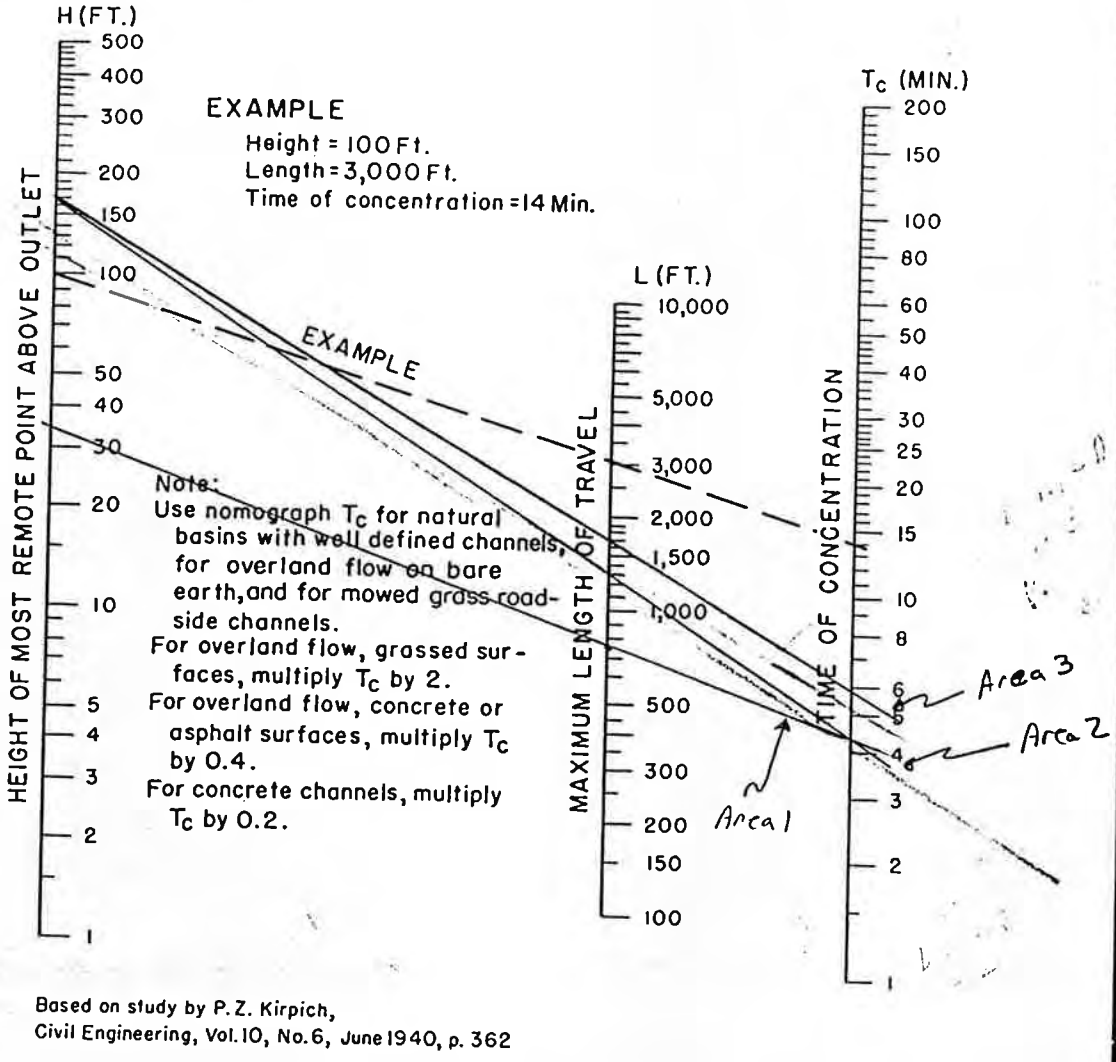
$Q = CIA$

$C = .5$

$I = 9.02$

$A = 12.88$ AC

$Q_p = 58.1$ Ft^3/s



Based on study by P. Z. Kirpich,
Civil Engineering, Vol. 10, No. 6, June 1940, p. 362

Fig. 14-2. Time of concentration of small drainage basins. (Source: *Design of Roadside Drainage Channels*, 1965.)

The designer should contact the nearest office of the National Weather Service for rainfall intensity data. In the event that suitable local rainfall intensity data are not available, approximate data may be obtained from Fig. 14-3, a chart published by the Federal Highway Administration. This map shows rainfall intensity values in inches per hour for various areas of the contiguous United States for a two-year, 30-minute rainfall. The two-year rainfall intensity for other durations may be obtained by multiplying by the following factors:

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 4, 1992

HYDROLOGIC REPORT FOR

RAIMUND-MUSCODA INERT LANDFILL

UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A
25 YEAR STORM FREQUENCY

BASIN IDENTIFIER		AREA 1	
DISCHARGES INTO		DRAIN 1	
BASIN AREA	=	7.75	ACRES
RUNOFF COEFF.	=	0.50	
RAINFALL INT.	=	11.29	IN/HR
TIME OF CONC.	=	4.30	MINUTES
VOLUME	=	32780.60	CUBIC FEET

TIME (MIN)	RUNOFF (C.F.S.)
0.0	0.0
2.2	4.6
4.3	9.2
6.5	10.7
8.6	12.2
10.8	28.0
12.9	43.8
15.0	30.4
17.2	17.0
19.3	15.8
21.5	14.6
23.6	12.8
25.8	11.1
27.9	9.4
30.1	7.7
32.2	6.8
34.4	5.9
36.5	5.8
38.7	5.6
40.9	2.8
43.0	0.0
45.2	0.0
47.3	0.0
49.5	0.0
51.6	0.0
53.8	0.0
55.9	0.0
58.1	0.0
60.2	0.0
62.4	0.0

CLEC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 4, 1992

HYDROLOGIC REPORT FOR

RAIMUND-MUSCODA INERT LANDFILL

UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A
25 YEAR STORM FREQUENCY

BASIN IDENTIFIER		AREA2	
DISCHARGES INTO		DRAIN 2	
BASIN AREA	=	19.83	ACRES
RUNOFF COEFF.	=	0.50	
RAINFALL INT.	=	11.29	IN/HR
TIME OF CONC.	=	4.30	MINUTES
VOLUME	=	83876.05	CUBIC FEET

TIME (MIN)	RUNOFF (C.F.S.)
0.0	0.0
2.2	11.7
4.3	23.5
6.5	27.3
8.6	31.1
10.8	71.6
12.9	112.0
15.0	77.8
17.2	43.6
19.3	40.4
21.5	37.3
23.6	32.8
25.8	28.4
27.9	24.1
30.1	19.8
32.2	17.5
34.4	15.2
36.5	14.8
38.7	14.3
40.9	7.1
43.0	0.0
45.2	0.0
47.3	0.0
49.5	0.0
51.6	0.0
53.8	0.0
55.9	0.0
58.1	0.0
60.2	0.0
62.4	0.0

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 4, 1992

HYDROLOGIC REPORT FOR

RAIMUND-MUSCODA INERT LANDFILL

UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A
25 YEAR STORM FREQUENCY

BASIN IDENTIFIER AREA 3
DISCHARGES INTO DRAIN

BASIN AREA	=	27.58	ACRES
RUNOFF COEFF.	=	0.50	
RAINFALL INT.	=	8.65	IN/HR
TIME OF CONC.	=	5.90	MINUTES
VOLUME	=	132006.91	CUBIC FEET

TIME (MIN)	RUNOFF (C.F.S.)
0.0	0.0
3.0	12.3
5.9	24.6
8.9	31.2
11.8	37.8
14.8	78.6
17.7	119.4
20.7	94.9
23.6	70.5
26.6	55.7
29.5	40.9
32.5	33.3
35.4	25.7
38.4	22.4
41.3	19.1
44.3	19.0
47.2	19.0
50.2	17.5
53.1	15.9
56.1	8.0
59.0	0.0
62.0	0.0
64.9	0.0
67.9	0.0
70.8	0.0
73.8	0.0
76.7	0.0
79.6	0.0
82.6	0.0
85.5	0.0

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 4, 1992

HYDROLOGIC REPORT FOR

RAIMUND--MUSCODA INERT LANDFILL

UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A
25 YEAR STORM FREQUENCY

BASIN IDENTIFIER DIVERTED AREA 2
DISCHARGES INTO OFF-SITE

BASIN AREA	=	9.36	ACRES
RUNOFF COEFF.	=	0.50	
RAINFALL INT.	=	12.25	IN/HR
TIME OF CONC.	=	4.00	MINUTES
VOLUME	=	38575.18	CUBIC FEET

TIME (MIN)	RUNOFF (C.F.S.)
0.0	0.0
2.0	6.2
4.0	12.5
6.0	13.2
8.0	13.9
10.0	35.6
12.0	57.3
14.0	40.6
16.0	23.8
18.0	19.6
20.0	15.3
22.0	14.0
24.0	12.7
26.0	10.8
28.0	8.9
30.0	8.6
32.0	8.3
34.0	8.2
36.0	8.0
38.0	4.0
40.0	0.0
42.0	0.0
44.0	0.0
46.0	0.0
48.0	0.0
50.0	0.0
52.0	0.0
54.0	0.0
56.0	0.0
58.0	0.0

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 4, 1992

HYDROLOGIC REPORT FOR

RAIMUND-MUSCODA INERT LANDFILL

UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A
25 YEAR STORM FREQUENCY

BASIN IDENTIFIER DIVERTED AREA 3
DISCHARGES INTO OFF-SITE

BASIN AREA	=	12.88	ACRES
RUNOFF COEFF.	=	0.50	
RAINFALL INT.	=	9.02	IN/HR
TIME OF CONC.	=	5.10	MINUTES
VOLUME	=	58430.46	CUBIC FEET

TIME (MIN)	RUNOFF (C.F.S.)
0.0	0.0
2.6	6.0
5.1	12.1
7.6	16.0
10.2	19.8
12.8	38.9
15.3	58.1
17.9	45.9
20.4	33.7
22.9	28.1
25.5	22.6
28.0	19.4
30.6	16.2
33.1	13.3
35.7	10.5
38.2	9.9
40.8	9.4
43.3	9.0
45.9	8.7
48.4	4.3
51.0	0.0
53.5	0.0
56.1	0.0
58.6	0.0
61.2	0.0
63.7	0.0
66.3	0.0
68.8	0.0
71.4	0.0
73.9	0.0

Design Calculations

PERC Engineering Co., Inc.
Jasper, Alabama

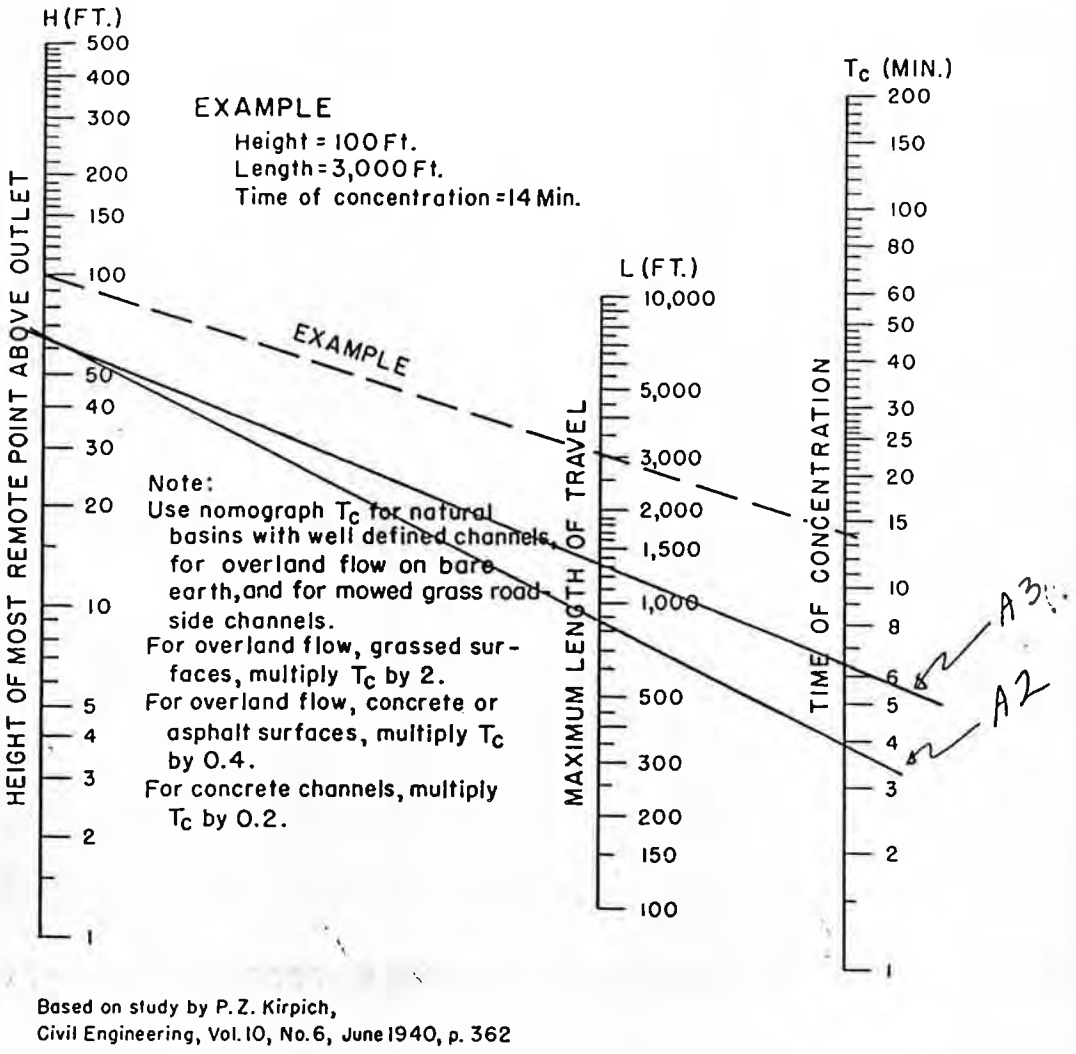
Project: Raimund-Muscoda Inert LF	Designed By: Ron Gilbert	Date: 8-4-92
Location: Bessemer, Al	Reviewed By:	Date:
Subject/Title: Drainage Calc.	Remarks:	Sheet No.: A-9 of

Drainage Area Info.
Top of Red Mountain surface water diveted
Pre-LandFill Condition

Area 1 7.75 Acres
$H = 35 ft$
$L = 750 ft$
$t_c = 4.3 min$

Area 2 19.83 AC - 9.36 Ac (diverted) = 10.47 AC
$H = 655 - 590 = 65 ft$
$L = 500 + 350 = 850 Ft$
$t_c = 4.0 min$

Area 3 27.58 AC - 12.88 Ac (diverted) = 14.70 AC
$H = 655 - 590 = 65 ft$
$L = 500 + 800 = 1300 Ft$
$t_c = 6.2 min$



Based on study by P. Z. Kirpich,
Civil Engineering, Vol. 10, No. 6, June 1940, p. 362

Fig. 14-2. Time of concentration of small drainage basins. (Source: *Design of Roadside Drainage Channels*, 1965.)

The designer should contact the nearest office of the National Weather Service for rainfall intensity data. In the event that suitable local rainfall intensity data are not available, approximate data may be obtained from Fig. 14-3, a chart published by the Federal Highway Administration. This map shows rainfall intensity values in inches per hour for various areas of the contiguous United States for a two-year, 30-minute rainfall. The two-year rainfall intensity for other durations may be obtained by multiplying by the following factors:

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 4, 1992

HYDROLOGIC REPORT FOR

RAIMUND-MUSCODA INERT LANDFILL

UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A
25 YEAR STORM FREQUENCY

BASIN IDENTIFIER PRE-LF DIVERTED
DISCHARGES INTO DRAIN 1

BASIN AREA	=	7.75	ACRES
RUNOFF COEFF.	=	0.50	
RAINFALL INT.	=	11.29	IN/HR
TIME OF CONC.	=	4.30	MINUTES
VOLUME	=	32780.60	CUBIC FEET

TIME (MIN)	RUNOFF (C.F.S.)
0.0	0.0
2.2	4.6
4.3	9.2
6.5	10.7
8.6	12.2
10.8	28.0
12.9	43.8
15.0	30.4
17.2	17.0
19.3	15.8
21.5	14.6
23.6	12.8
25.8	11.1
27.9	9.4
30.1	7.7
32.2	6.8
34.4	5.9
36.5	5.8
38.7	5.6
40.9	2.8
43.0	0.0
45.2	0.0
47.3	0.0
49.5	0.0
51.6	0.0
53.8	0.0
55.9	0.0
58.1	0.0
60.2	0.0
62.4	0.0

HYDROLOGIC REPORT FOR

RAIMUND-MUSCODA INERT LANDFILL

UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A
25 YEAR STORM FREQUENCY

BASIN IDENTIFIER = PRE-LF DIVERTED A2
DISCHARGES INTO = DRAIN 2

BASIN AREA	=	10.47	ACRES
RUNOFF COEFF.	=	0.50	
RAINFALL INT.	=	12.25	IN/HR
TIME OF CONC.	=	4.00	MINUTES
VOLUME	=	43149.81	CUBIC FEET

TIME (MIN)	RUNOFF (C.F.S.)
0.0	0.0
2.0	7.0
4.0	13.9
6.0	14.8
8.0	15.6
10.0	39.9
12.0	64.1
14.0	45.4
16.0	26.6
18.0	21.9
20.0	17.1
22.0	15.6
24.0	14.2
26.0	12.1
28.0	9.9
30.0	9.6
32.0	9.3
34.0	9.1
36.0	9.0
38.0	4.5
40.0	0.0
42.0	0.0
44.0	0.0
46.0	0.0
48.0	0.0
50.0	0.0
52.0	0.0
54.0	0.0
56.0	0.0
58.0	0.0

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 4, 1992

HYDROLOGIC REPORT FOR

RAIMUND-MUSCODA INERT LANDFILL

UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A
25 YEAR STORM FREQUENCY

BASIN IDENTIFIER PRE-LF DIVERTED A3
DISCHARGES INTO DRAIN 3

BASIN AREA	=	14.70	ACRES
RUNOFF COEFF.	=	0.50	
RAINFALL INT.	=	8.52	IN/HR
TIME OF CONC.	=	6.20	MINUTES
VOLUME	=	71677.60	CUBIC FEET

TIME (MIN)	RUNOFF (C.F.S.)
0.0	0.0
3.1	6.3
6.2	12.6
9.3	15.9
12.4	19.2
15.5	40.9
18.6	62.6
21.7	49.2
24.8	35.8
27.9	28.8
31.0	21.7
34.1	17.3
37.2	12.9
40.3	11.6
43.4	10.4
46.5	9.6
49.6	8.8
52.7	8.7
55.8	8.6
58.9	4.3
62.0	0.0
65.1	0.0
68.2	0.0
71.3	0.0
74.4	0.0
77.5	0.0
80.6	0.0
83.7	0.0
86.8	0.0
89.9	0.0

PERC Engineering Co., Inc.
Jasper, Alabama

Design Calculations

Project: Raimund-Muscoda Inert LF	Designed By: Ron Gilbert	Date: 8-4-92
Location: Bessemer, Al	Reviewed By:	Date:
Subject/Title: Drainage Calc.	Remarks:	Sheet No.: A-14 of

Drainage Area Info.

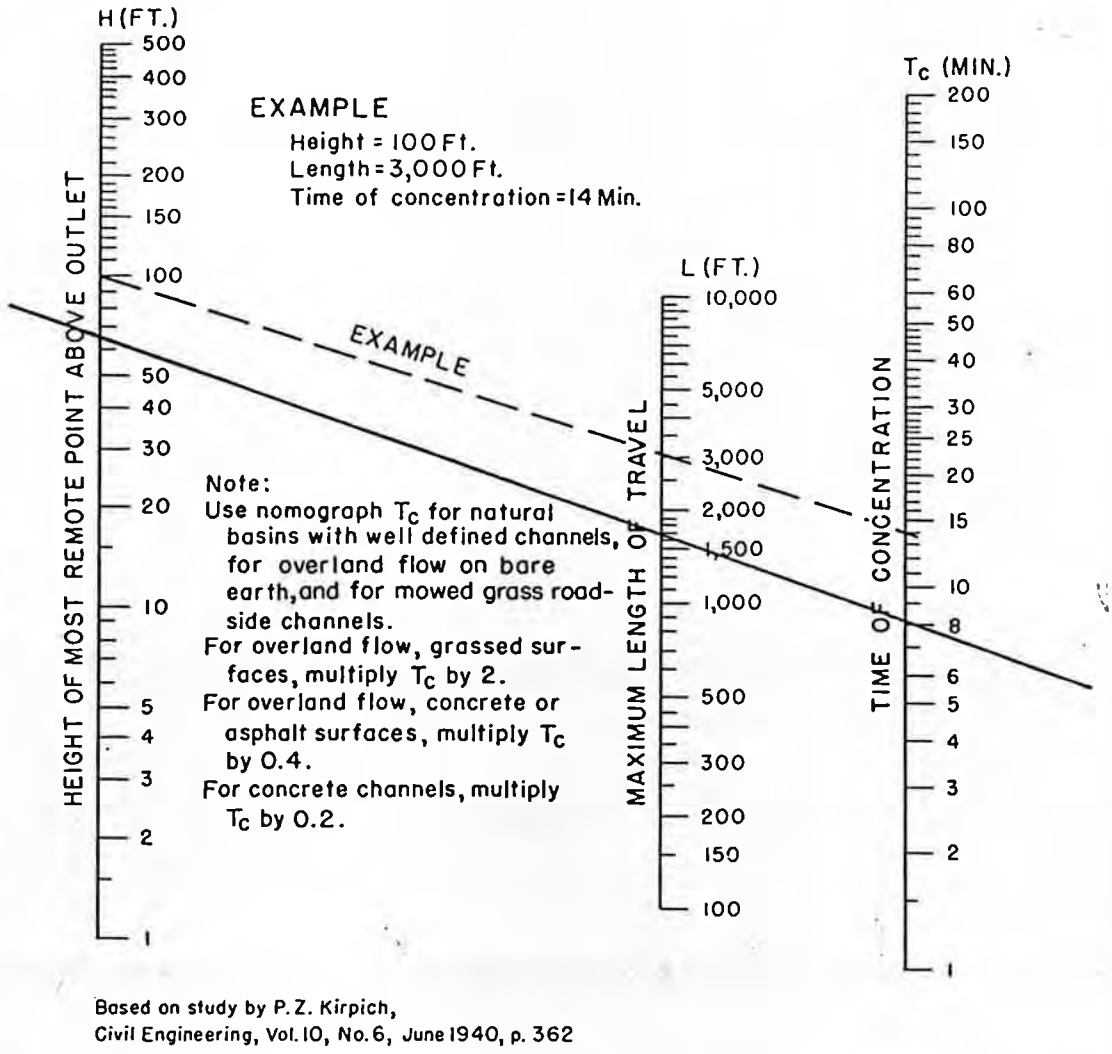
Berm and Pond Constructed - Pre Disposal

Area 1 7.75 AC
Area 2 10.47 AC
Area 3 14.70 AC
TOA 32.92 AC

Height = 655 - 590 = 65

Length = 580 + 1050 = 1,630

T_c = 8.1 min



Based on study by P. Z. Kirpich,
Civil Engineering, Vol. 10, No. 6, June 1940, p. 362

Fig. 14-2. Time of concentration of small drainage basins. (Source: *Design of Roadside Drainage Channels*, 1965.)

The designer should contact the nearest office of the National Weather Service for rainfall intensity data. In the event that suitable local rainfall intensity data are not available, approximate data may be obtained from Fig. 14-3, a chart published by the Federal Highway Administration. This map shows rainfall intensity values in inches per hour for various areas of the contiguous United States for a two-year, 30-minute rainfall. The two-year rainfall intensity for other durations may be obtained by multiplying by the following factors:

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 25, 1992

HYDROLOGIC REPORT FOR

RAIMUND-MUSCODA INERT LANDFILL

UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A
25 YEAR STORM FREQUENCY

BASIN IDENTIFIER PRE-DISPOSAL
DISCHARGES INTO POND NO. 1

BASIN AREA	=	33.00	ACRES
RUNOFF COEFF.	=	0.50	
RAINFALL INT.	=	7.72	IN/HR
TIME OF CONC.	=	8.10	MINUTES
VOLUME	=	183776.25	CUBIC FEET

TIME (MIN)	RUNOFF (C.F.S.)
0.0	0.0
4.1	11.7
8.1	23.5
12.2	26.6
16.2	29.7
20.3	78.6
24.3	127.4
28.3	95.5
32.4	63.7
36.4	55.0
40.5	46.3
44.5	35.5
48.6	24.8
52.6	23.5
56.7	22.3
60.7	22.0
64.8	21.8
68.8	20.3
72.9	18.8
77.0	9.4
81.0	0.0
85.1	0.0
89.1	0.0
93.2	0.0
97.2	0.0
101.3	0.0
105.3	0.0
109.4	0.0
113.4	0.0
117.5	0.0

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 25, 1992

HYDROLOGIC REPORT FOR

RAIMUND-MUSCODA INERT LANDFILL

POND DEPTH VS STORAGE PROVIDED

POND IDENTIFIER POND NO. 1

ELEV feet	DEPTH feet	AREA sq.ft.	VOLUME cu.ft.	SUM VOL cu.ft.
575.0		9200.0		0.0
	1.0		10462.5	
576.0		11725.0		10462.5
	1.0		12987.5	
577.0		14250.0		23450.0
	1.0		15512.5	
578.0		16775.0		38962.5
	1.0		18037.5	
579.0		19300.0		57000.0
	1.0		20562.5	
580.0		21825.0		77562.5
	1.0		23212.5	
581.0		24600.0		100775.0
	1.0		25987.5	
582.0		27375.0		126762.5
	1.0		28762.5	
583.0		30150.0		155525.0
	1.0		31537.5	
584.0		32925.0		187062.5
	1.0		34312.5	
585.0		35700.0		221375.0
	1.0		37260.0	
586.0		38820.0		258635.0
	1.0		40380.0	
587.0		41940.0		299015.0
	1.0		43500.0	
588.0		45060.0		342515.0
	1.0		46620.0	
589.0		48180.0		389135.0
	1.0		49740.0	
590.0		51300.0		438875.0

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 25, 1992

HYDROLOGIC REPORT FOR RAIMUND-MUSCODA INERT LANDFILL STAGE, STORAGE & DISCHARGE

POND IDENTIFIER POND NO. 1

1 = 24 INCH CIRCULAR STANDPIPE - INVERT 585

2 = 10 FOOT TRAPEZOIDAL CHANNEL - INVERT 588

ELEV	STORAGE (CU.FT.)	OUTFLOW (CFS)	2S/T+O (CFS)
575.0	0.0	0.0	0.0
576.0	10462.5	0.0	86.1
577.0	23450.0	0.0	193.0
578.0	38962.5	0.0	320.7
579.0	57000.0	0.0	469.1
580.0	77562.5	0.0	638.4
581.0	100775.0	0.0	829.4
582.0	126762.5	0.0	1043.3
583.0	155525.0	0.0	1280.0
584.0	187062.5	0.0	1539.6
585.0	221375.0	0.0	1822.0
586.0	258635.0	12.8	2141.4
587.0	299015.0	18.1	2479.2
588.0	342515.0	21.8	2840.9
589.0	389135.0	114.2	3317.0
590.0	438875.0	333.6	3945.7

PERC ENGINEERING CO.
JASPER, ALABAMA
AUGUST 25, 1992

HYDROLOGIC REPORT FOR

RAIMUND-MUSCODA INERT LANDFILL

HYDROGRAPH RESERVOIR ROUTING

BASIN IDENTIFIER PRE-DISPOSAL
POND IDENTIFIER POND NO. 1
25 YEAR STORM FREQUENCY

T	I1	I2	2S1/T	O1	2S2/T +O2	O2	2S2/T
4.1	0.0	11.7	0.0	0.0	11.7	0.0	11.7
8.1	11.7	23.5	11.7	0.0	47.0	0.0	47.0
12.2	23.5	26.6	47.0	0.0	97.1	0.0	97.1
16.2	26.6	29.7	97.1	0.0	153.4	0.0	153.4
20.3	29.7	78.6	153.4	0.0	261.8	0.0	261.8
24.3	78.6	127.4	261.8	0.0	467.7	0.0	467.7
28.3	127.4	95.5	467.7	0.0	690.6	0.0	690.6
32.4	95.5	63.7	690.6	0.0	849.8	0.0	849.8
36.4	63.7	55.0	849.8	0.0	968.5	0.0	968.5
40.5	55.0	46.3	968.5	0.0	1069.7	0.0	1069.7
44.5	46.3	35.5	1069.7	0.0	1151.4	0.0	1151.4
48.6	35.5	24.8	1151.4	0.0	1211.7	0.0	1211.7
52.6	24.8	23.5	1211.7	0.0	1260.1	0.0	1260.1
56.7	23.5	22.3	1260.1	0.0	1305.9	0.0	1305.9
60.7	22.3	22.0	1305.9	0.0	1350.2	0.0	1350.2
64.8	22.0	21.8	1350.2	0.0	1394.0	0.0	1394.0
68.8	21.8	20.3	1394.0	0.0	1436.0	0.0	1436.0
72.9	20.3	18.8	1436.0	0.0	1475.0	0.0	1475.0
77.0	18.8	9.4	1475.0	0.0	1503.2	0.0	1503.2
81.0	9.4	0.0	1503.2	0.0	1512.6	0.0	1512.6
85.1	0.0	0.0	1512.6	0.0	1512.6	0.0	1512.6
89.1	0.0	0.0	1512.6	0.0	1512.6	0.0	1512.6
93.2	0.0	0.0	1512.6	0.0	1512.6	0.0	1512.6
97.2	0.0	0.0	1512.6	0.0	1512.6	0.0	1512.6
101.3	0.0	0.0	1512.6	0.0	1512.6	0.0	1512.6
105.3	0.0	0.0	1512.6	0.0	1512.6	0.0	1512.6
109.4	0.0	0.0	1512.6	0.0	1512.6	0.0	1512.6
113.4	0.0	0.0	1512.6	0.0	1512.6	0.0	1512.6
117.5	0.0	0.0	1512.6	0.0	1512.6	0.0	1512.6

MAXIMUM ELEVATION = 585.0 FT
MAXIMUM STORAGE = 221375.0 CU FT
MAXIMUM DISCHARGE = 0.0 CFS

HYDROLOGIC REPORT FOR
RAIMUND-MUSCODA INERT LANDFILL

PHYSICAL DATA

OFFSITE AREA = 0.00
ONSITE AREA = 33.00

TOTAL DRAINAGE BASIN = 33.00 ACRES

PREDEVELOPMENT COEFFICIENT

	AREA	COEFF
OFFSITE IMPERVIOUS =	0.00	0.95
OFFSITE LANDSCAPED =	0.00	0.55
OFFSITE NATURAL =	0.00	0.30
ONSITE IMPERVIOUS =	1.00	0.95
ONSITE LANDSCAPED =	24.00	0.55
ONSITE NATURAL =	8.00	0.30

PRE-DEVELOPMENT COEFF. Cu = 0.50

DEVELOPED COEFFICIENT

	AREA	COEFF
OFFSITE IMPERVIOUS =	0.00	0.95
OFFSITE LANDSCAPED =	0.00	0.55
OFFSITE NATURAL =	0.00	0.30
ONSITE IMPERVIOUS =	7.00	0.95
ONSITE LANDSCAPED =	26.00	0.55
ONSITE NATURAL =	0.00	0.30

DEVELOPED COEFF. Cd = 0.63

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 25, 1992

HYDROLOGIC REPORT FOR

RAIMUND-MUSCODA INERT LANDFILL

UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A
25 YEAR STORM FREQUENCY

BASIN IDENTIFIER		POND NO. 1	
DISCHARGES INTO		OFF-SITE	
BASIN AREA	=	33.00	ACRES
RUNOFF COEFF.	=	0.63	
RAINFALL INT.	=	7.72	IN/HR
TIME OF CONC.	=	8.10	MINUTES
VOLUME	=	231558.06	CUBIC FEET

TIME (MIN)	RUNOFF (C.F.S.)
0.0	0.0
4.1	14.8
8.1	29.6
12.2	33.5
16.2	37.5
20.3	99.0
24.3	160.5
28.3	120.4
32.4	80.2
36.4	69.2
40.5	58.3
44.5	44.8
48.6	31.2
52.6	29.7
56.7	28.1
60.7	27.7
64.8	27.4
68.8	25.5
72.9	23.6
77.0	11.8
81.0	0.0
85.1	0.0
89.1	0.0
93.2	0.0
97.2	0.0
101.3	0.0
105.3	0.0
109.4	0.0
113.4	0.0
117.5	0.0

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 25, 1992

HYDROLOGIC REPORT FOR RAIMUND-MUSCODA INERT LANDFILL

STAGE, STORAGE & DISCHARGE

POND IDENTIFIER POND NO. 1

1 = 24 INCH CIRCULAR STANDPIPE - INVERT 585

2 = 10 FOOT TRAPEZOIDAL CHANNEL - INVERT 588

ELEV	STORAGE (CU.FT.)	OUTFLOW (CFS)	2S/T+O (CFS)
575.0	0.0	0.0	0.0
576.0	10462.5	0.0	86.1
577.0	23450.0	0.0	193.0
578.0	38962.5	0.0	320.7
579.0	57000.0	0.0	469.1
580.0	77562.5	0.0	638.4
581.0	100775.0	0.0	829.4
582.0	126762.5	0.0	1043.3
583.0	155525.0	0.0	1280.0
584.0	187062.5	0.0	1539.6
585.0	221375.0	0.0	1822.0
586.0	258635.0	12.8	2141.4
587.0	299015.0	18.1	2479.2
588.0	342515.0	21.8	2840.9
589.0	389135.0	114.2	3317.0
590.0	438875.0	333.6	3945.7

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 25, 1992

HYDROLOGIC REPORT FOR

RAIMUND-MUSCODA INERT LANDFILL

HYDROGRAPH RESERVOIR ROUTING

BASIN IDENTIFIER POND NO. 1
POND IDENTIFIER POND NO. 1
25 YEAR STORM FREQUENCY

T	I1	I2	2S1/T	O1	2S2/T +O2	O2	2S2/T
4.1	0.0	14.8	0.0	0.0	14.8	0.0	14.8
8.1	14.8	29.6	14.8	0.0	59.2	0.0	59.2
12.2	29.6	33.5	59.2	0.0	122.3	0.0	122.3
16.2	33.5	37.5	122.3	0.0	193.3	0.0	193.3
20.3	37.5	99.0	193.3	0.0	329.8	0.0	329.8
24.3	99.0	160.5	329.8	0.0	589.3	0.0	589.3
28.3	160.5	120.4	589.3	0.0	870.2	0.0	870.2
32.4	120.4	80.2	870.2	0.0	1070.8	0.0	1070.8
36.4	80.2	69.2	1070.8	0.0	1220.3	0.0	1220.3
40.5	69.2	58.3	1220.3	0.0	1347.8	0.0	1347.8
44.5	58.3	44.8	1347.8	0.0	1450.8	0.0	1450.8
48.6	44.8	31.2	1450.8	0.0	1526.8	0.0	1526.8
52.6	31.2	29.7	1526.8	0.0	1587.7	0.0	1587.7
56.7	29.7	28.1	1587.7	0.0	1645.4	0.0	1645.4
60.7	28.1	27.7	1645.4	0.0	1701.2	0.0	1701.2
64.8	27.7	27.4	1701.2	0.0	1756.4	0.0	1756.4
68.8	27.4	25.5	1756.4	0.0	1809.4	0.0	1809.4
72.9	25.5	23.6	1809.4	0.0	1858.5	1.5	1857.1
77.0	23.6	11.8	1857.1	1.5	1891.1	2.8	1888.3
81.0	11.8	0.0	1888.3	2.8	1897.4	3.0	1894.4
85.1	0.0	0.0	1894.4	3.0	1891.4	2.8	1888.6
89.1	0.0	0.0	1888.6	2.8	1885.8	2.5	1883.3
93.2	0.0	0.0	1883.3	2.5	1880.7	2.3	1878.4
97.2	0.0	0.0	1878.4	2.3	1876.0	2.2	1873.9
101.3	0.0	0.0	1873.9	2.2	1871.7	2.0	1869.7
105.3	0.0	0.0	1869.7	2.0	1867.8	1.8	1865.9
109.4	0.0	0.0	1865.9	1.8	1864.1	1.7	1862.4
113.4	0.0	0.0	1862.4	1.7	1860.7	1.5	1859.2
117.5	0.0	0.0	1859.2	1.5	1857.7	1.4	1856.2

MAXIMUM ELEVATION = 585.2 FT
MAXIMUM STORAGE = 230167.8 CU FT
MAXIMUM DISCHARGE = 3.0 CFS

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 25, 1992

HYDROLOGIC REPORT FOR

RAIMUND-MUSCODA INERT LANDFILL

UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A
100 YEAR STORM FREQUENCY

BASIN IDENTIFIER = POND NO. 1
DISCHARGES INTO = OFF-SITE

BASIN AREA	=	33.00	ACRES
RUNOFF COEFF.	=	0.63	
RAINFALL INT.	=	9.32	IN/HR
TIME OF CONC.	=	8.10	MINUTES
VOLUME	=	279285.53	CUBIC FEET

TIME (MIN)	RUNOFF (C.F.S.)
0.0	0.0
4.1	17.9
8.1	35.8
12.2	41.2
16.2	46.7
20.3	120.2
24.3	193.8
28.3	146.1
32.4	98.5
36.4	84.1
40.5	69.8
44.5	54.1
48.6	38.4
52.6	35.5
56.7	32.6
60.7	32.2
64.8	31.8
68.8	29.5
72.9	27.3
77.0	13.6
81.0	0.0
85.1	0.0
89.1	0.0
93.2	0.0
97.2	0.0
101.3	0.0
105.3	0.0
109.4	0.0
113.4	0.0
117.5	0.0

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 25, 1992

HYDROLOGIC REPORT FOR RAIMUND-MUSCODA INERT LANDFILL

STAGE, STORAGE & DISCHARGE

POND IDENTIFIER POND NO. 1

1 = 24 INCH CIRCULAR STANDPIPE - INVERT 585

2 = 10 FOOT TRAPEZOIDAL CHANNEL - INVERT 588

ELEV	STORAGE (CU.FT.)	OUTFLOW (CFS)	2S/T+O (CFS)
575.0	0.0	0.0	0.0
576.0	10462.5	0.0	86.1
577.0	23450.0	0.0	193.0
578.0	38962.5	0.0	320.7
579.0	57000.0	0.0	469.1
580.0	77562.5	0.0	638.4
581.0	100775.0	0.0	829.4
582.0	126762.5	0.0	1043.3
583.0	155525.0	0.0	1280.0
584.0	187062.5	0.0	1539.6
585.0	221375.0	0.0	1822.0
586.0	258635.0	12.8	2141.4
587.0	299015.0	18.1	2479.2
588.0	342515.0	21.8	2840.9
589.0	389135.0	114.2	3317.0
590.0	438875.0	333.6	3945.7

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 25, 1992

HYDROLOGIC REPORT FOR RAIMUND-MUSCODA INERT LANDFILL

STAGE, STORAGE & DISCHARGE

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1 = 24 INCH CIRCULAR STANDPIPE - INVERT 585

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ELEV	STORAGE (CU.FT.)	OUTFLOW (CFS)	2S/T+O (CFS)
575.0	0.0	0.0	0.0
576.0	10462.5	0.0	86.1
577.0	23450.0	0.0	193.0
578.0	38962.5	0.0	320.7
579.0	57000.0	0.0	469.1
580.0	77562.5	0.0	638.4
581.0	100775.0	0.0	829.4
582.0	126762.5	0.0	1043.3
583.0	155525.0	0.0	1280.0
584.0	187062.5	0.0	1539.6
585.0	221375.0	0.0	1822.0
586.0	258635.0	12.8	2141.4
587.0	299015.0	18.1	2479.2
588.0	342515.0	21.8	2840.9
589.0	389135.0	114.2	3317.0
590.0	438875.0	333.6	3945.7

PERC ENGINEERING CO., INC.
JASPER, ALABAMA
AUGUST 25, 1992

HYDROLOGIC REPORT FOR

RAIMUND-MUSCODA INERT LANDFILL

HYDROGRAPH RESERVOIR ROUTING

BASIN IDENTIFIER POND NO. 1
POND IDENTIFIER POND NO. 1
100 YEAR STORM FREQUENCY

T	I1	I2	2S1/T	O1	2S2/T +O2	O2	2S2/T
4.1	0.0	17.9	0.0	0.0	17.9	0.0	17.9
8.1	17.9	35.8	17.9	0.0	71.6	0.0	71.6
12.2	35.8	41.2	71.6	0.0	148.6	0.0	148.6
16.2	41.2	46.7	148.6	0.0	236.5	0.0	236.5
20.3	46.7	120.2	236.5	0.0	403.4	0.0	403.4
24.3	120.2	193.8	403.4	0.0	717.4	0.0	717.4
28.3	193.8	146.1	717.4	0.0	1057.4	0.0	1057.4
32.4	146.1	98.5	1057.4	0.0	1302.0	0.0	1302.0
36.4	98.5	84.1	1302.0	0.0	1484.6	0.0	1484.6
40.5	84.1	69.8	1484.6	0.0	1638.5	0.0	1638.5
44.5	69.8	54.1	1638.5	0.0	1762.4	0.0	1762.4
48.6	54.1	38.4	1762.4	0.0	1854.9	1.3	1853.6
52.6	38.4	35.5	1853.6	1.3	1926.2	4.2	1922.0
56.7	35.5	32.6	1922.0	4.2	1986.0	6.5	1979.5
60.7	32.6	32.2	1979.5	6.5	2037.8	8.6	2029.2
64.8	32.2	31.8	2029.2	8.6	2084.6	10.5	2074.2
68.8	31.8	29.5	2074.2	10.5	2125.1	12.1	2113.0
72.9	29.5	27.3	2113.0	12.1	2157.7	13.0	2144.7
77.0	27.3	13.6	2144.7	13.0	2172.5	13.2	2159.3
81.0	13.6	0.0	2159.3	13.2	2159.7	13.0	2146.6
85.1	0.0	0.0	2146.6	13.0	2133.6	12.4	2121.1
89.1	0.0	0.0	2121.1	12.4	2108.7	11.4	2097.2
93.2	0.0	0.0	2097.2	11.4	2085.8	10.5	2075.3
97.2	0.0	0.0	2075.3	10.5	2064.7	9.7	2055.0
101.3	0.0	0.0	2055.0	9.7	2045.4	8.9	2036.4
105.3	0.0	0.0	2036.4	8.9	2027.5	8.2	2019.3
109.4	0.0	0.0	2019.3	8.2	2011.1	7.6	2003.6
113.4	0.0	0.0	2003.6	7.6	1996.0	6.9	1989.1
117.5	0.0	0.0	1989.1	6.9	1982.1	6.4	1975.7

MAXIMUM ELEVATION = 586.1 FT
MAXIMUM STORAGE = 262353.2 CU FT
MAXIMUM DISCHARGE = 13.2 CFS

Triangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: RAIMUND-MUCODA LF

Comment: DIVERSION DITCH SIZE (25 YEAR STORM)

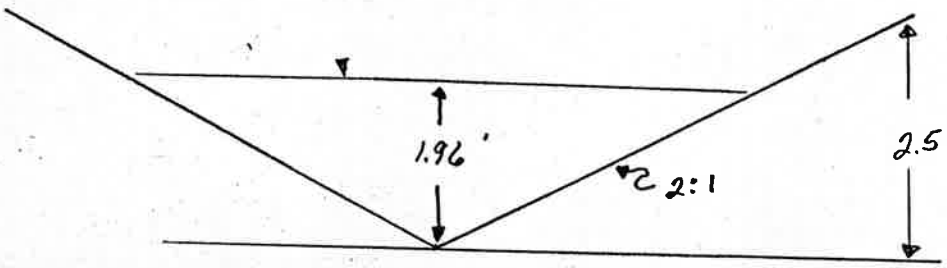
Solve For Depth

Given Input Data:

Left Side Slope..	2.00:1 (H:V)
Right Side Slope.	2.00:1 (H:V)
Manning's n.....	0.025
Channel Slope....	0.0200 ft/ft
Discharge.....	58.10 cfs

Computed Results:

Depth.....	1.95 ft
Velocity.....	7.66 fps
Flow Area.....	7.58 sf
Flow Top Width...	7.79 ft
Wetted Perimeter.	8.71 ft
Critical Depth...	2.21 ft
Critical Slope...	0.0102 ft/ft
Froude Number....	1.37 (flow is Supercritical)



1.96' * 1.25 = 2.45'

Open Channel Flow Module, Version 3.41 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: RAIMUND-MUSCODA LF

Comment: DIVERSION DITCH SIZE (25 YEAR STORM)

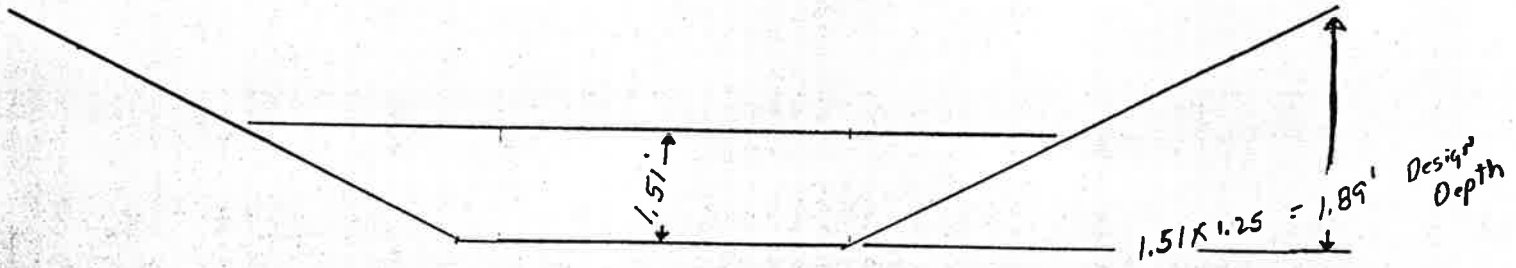
Solve For Depth

Given Input Data:

Bottom Width.....	2.00 ft
Left Side Slope..	2.00:1 (H:V)
Right Side Slope.	2.00:1 (H:V)
Manning's n.....	0.025
Channel Slope....	0.0200 ft/ft
Discharge.....	58.10 cfs

Computed Results:

Depth.....	1.51 ft
Velocity.....	7.64 fps
Flow Area.....	7.60 sf
Flow Top Width...	8.05 ft
Wetted Perimeter.	8.76 ft
Critical Depth...	1.77 ft
Critical Slope...	0.0100 ft/ft
Froude Number....	1.39 (flow is Supercritical)



Open Channel Flow Module, Version 3.41 (c) 1991
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Pre-Drainage Area

Area 1	Area 2	Area 3
7.75	19.83	27.58

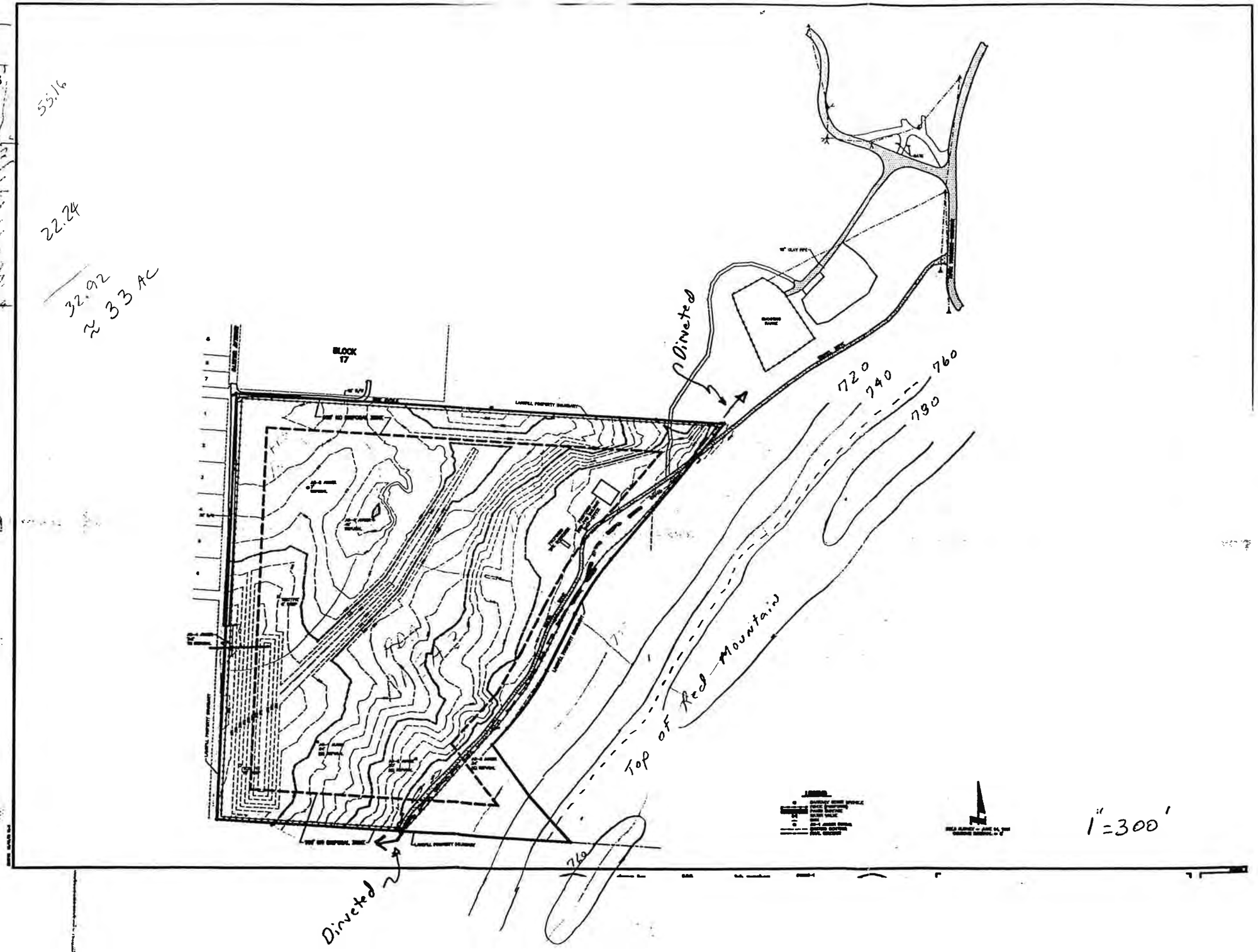
Area to Divert from Inert Landfill

Area 1	Area 2	Area 3
0	9.36	12.88

55.16

22.24

32.92 ≈ 33 AC



LEGEND

Symbol	Meaning
○	SET REBAR W/CAP
●	FOUND PROPERTY CORNER
■	CONCRETE MONUMENT
⊚	SANITARY SEWER MANHOLE
—×—×—	FENCE
═══	EDGE OF WATER
▒	PAVED SURFACE
⋈	WATER VALVE
⊥	SIGN
P.O.B.	POINT OF BEGINNING
— — —	APPROXIMATE LIMITS OF PRIOR FILL ACTIVITY
⊙	AB-1 AUGER
Ⓖ	METHANE GAS MONITORING WELL

NOTES:

1.) BENCHMARK ELEVATIONS ARE BASED ON USGS DATUM.

2.) BOUNDARY LINES SHOWN HEREON ARE BASED ON A SURVEY DONE BY PERC ENGINEERING CO., INC.. DATED 6-25-91

ABBREVIATIONS

P.O.C.	POINT OF COMMENCEMENT	R.R.	RAILROAD
P.O.B.	POINT OF BEGINNING	R/W	RIGHT-OF-WAY
BLDG.	BUILDING	SEC.	SECTION
M.	MEASURED	NE 1/4	NORTHEAST 1/4
PLAT	SECTION CLOSURE, DATED OCT. 1905	NW 1/4	NORTHWEST 1/4
		SW 1/4	SOUTHWEST 1/4
AC.	ACRES	SE 1/4	SOUTHEAST 1/4
B.M.	BENCH MARK	T11S	TOWNSHIP 11 SOUTH
ELEV.	ELEVATION	R8W	RANGE 8 WEST
(TYP.)	TYPICAL	S. CLOSURE	SECTION CLOSURE
VOL.	VOLUME	R	RADIUS
℄	CENTERLINE	A	ARC
VOL.	VOLUME	C	CHORD
		T	TANGENT

I certify that the survey represented hereon meets the minimum technical standard requirements for land surveying in the State of Alabama as adopted by the Alabama Society of Professional Land Surveyors.

LYNELL EARLY, P.L.S.
AL. REG. NO. 16689

AS - BUILT

PERC ENGINEERING CO., INC.
CIVIL ENGINEERS & LAND SURVEYORS
1606 Hwy 78 West/P. O. BOX 1712/Jasper, Alabama 35502-1712/(205)384-5553

drawn by: G.B.C.
checked by:
scale: 1"= 100'
contour interval: 5'
initial field survey date: 10-04-91

last field survey date: 4-27-95
dwg name: RLF
f.b./page:
closure: 1:10133 1:6072
1:16666 1:8779

6-1-95
ALABAMA REGISTERED No. 16689 PROFESSIONAL LAND SURVEYOR LYNELL EARLY

City of Bessemer
Raimund-Muscoda Inert Landfill
AS-BUILT Survey and Topographic Survey
Part of
SW 1/4 - SE 1/4 and SE 1/4 - SE 1/4
Sec. 21, T19S, R4W
Jefferson County, Alabama

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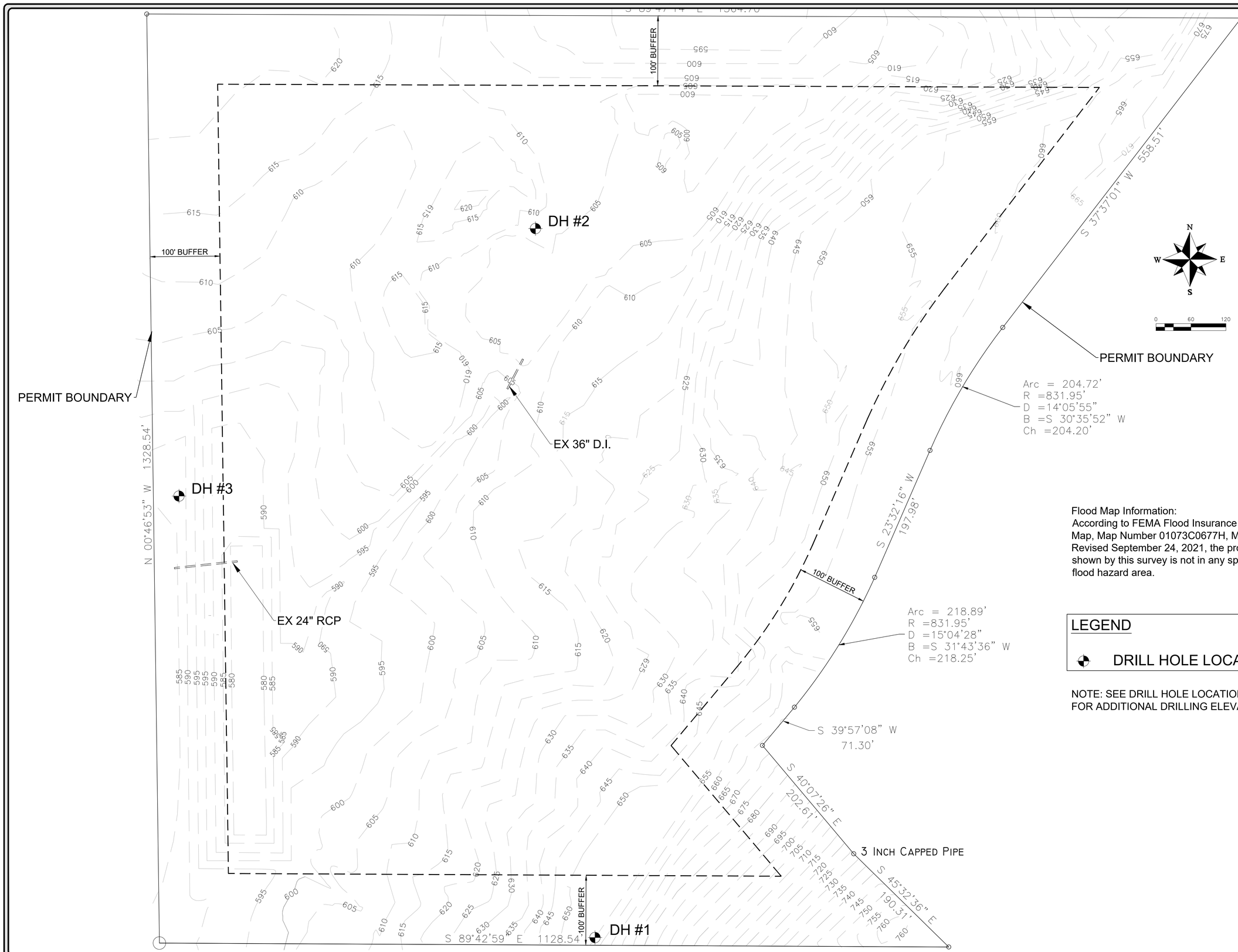

Flood Map Information:
According to FEMA Flood Insurance Rate Map, Map Number 01073C0677H, Map Revised September 24, 2021, the property as shown by this survey is not in any special flood hazard area.

LEGEND

DRILL HOLE LOCATION

NOTE: SEE DRILL HOLE LOCATION MAP FOR ADDITIONAL DRILLING ELEVATIONS

EEFS
Engineering, Environmental & Forestry Services Company
Civil & Structure Engineering / Land Surveying
1930 2nd Avenue North, Suite 150 (P.O. Box 982)
Bessemer, Alabama - 35020
p: 205.424.3737 / f: 205.424.3730 / www.eefs-eng.com

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DESIGN REVIEW APPROVE

NO.	DATE	REVISION

PROJECT NAME
RAIMUND MUSCODA LANDFILL
CITY OF BESSEMER
BESSEMER, AL

SHEET TITLE
TOPOGRAPHIC MAP - INITIAL

PROJECT NUMBER
B-1681

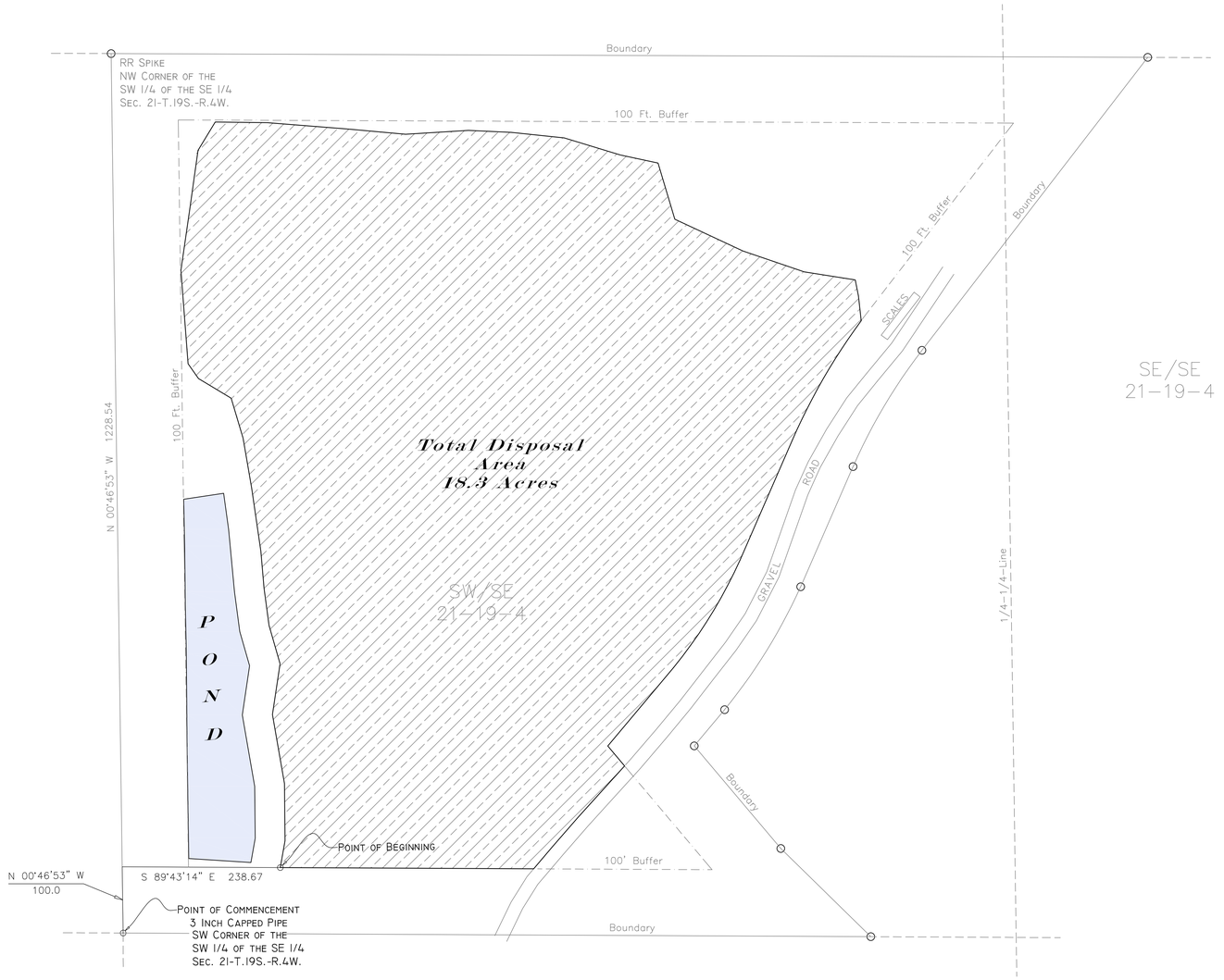
DRAWN BY	CHECKED BY
MPR	GVS

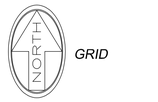
DATE
11/21/2022

DRAWING NUMBER
SHT 1
SHEET NUMBER
1 OF 2

SCALE
1" = 60'

DISCLAIMER: E.E.F.S. COMPANY P.C. CLAIMS PROPRIETARY RIGHTS IN THE INFORMATION DISCLOSED ON THIS DRAWING OR DOCUMENT. IT IS NOT TO BE REPRODUCED OR USED TO MANUFACTURE ANYTHING SHOWN HEREON WITHOUT THE WRITTEN PERMISSION OF E.E.F.S. COMPANY P.C. IT IS LOANED CONFIDENTIALLY AND MUST NOT BE USED IN ANYWAY DETRIMENTAL TO OUR INTEREST.





Raimund Muscoda Landfill
Disposal Area

Located in the South ½ of the Southeast ¼ of Section 21 South, Township 19 South, Range 4 West, Jefferson County, Alabama.
More particularly described as follows:
Commence at a 3 inch capped pipe located at the Southwest corner of the Southwest ¼ of the Southeast ¼ of Section 21 South, Township 19 South, Range 4 West, Jefferson County, Alabama; thence run N 00 degrees 46 minutes 53 seconds W along the West line of the Southwest ¼ of the Southeast ¼ of said Section 21 a distance of 100.00; thence run S 89 degrees 43 minutes 14 seconds E a distance of 238.67 feet to the Point of Beginning. From the point of beginning thus obtained, run along the perimeter with the following calls; thence run N 09°55'21" E for a distance of 41.35'; thence run N 00°35'00" W for a distance of 86.07'; thence run N 09°50'26" W for a distance of 105.87'; thence run N 08°26'26" E for a distance of 77.56'; thence run N 16°01'01" W for a distance of 60.30'; thence run N 07°31'27" W for a distance of 56.56'; thence run N 05°05'00" W for a distance of 56.19'; thence run N 08°14'59" W for a distance of 96.09'; thence run N 09°44'44" W for a distance of 76.84'; thence run N 16°35'37" W for a distance of 62.92'; thence run N 59°00'53" W for a distance of 57.57'; thence run N 34°55'34" W for a distance of 27.25'; thence run N 04°22'40" W for a distance of 141.57'; thence run N 08°11'05" E for a distance of 93.08'; thence run N 08°01'09" E for a distance of 89.93'; thence run N 31°13'49" E for a distance of 50.15'; thence run S 89°16'47" E for a distance of 78.42'; thence run S 85°30'02" E for a distance of 120.61'; thence run S 84°48'41" E for a distance of 89.02'; thence run N 86°28'14" E for a distance of 94.95'; thence run S 87°19'53" E for a distance of 64.84'; thence run S 84°00'52" E for a distance of 80.31'; thence run S 73°02'22" E for a distance of 88.58'; thence run S 78°01'06" E for a distance of 58.21'; thence run S 16°38'10" E for a distance of 88.51'; thence run S 64°55'12" E for a distance of 113.51'; thence run S 71°12'41" E for a distance of 97.54'; thence run S 81°00'31" E for a distance of 78.12'; thence run S 11°15'55" E for a distance of 24.69'; thence run S 06°14'41" E for a distance of 37.69'; to a curve turning to the left with a radius of 932.03, with a delta angle of 12°49'42", with a chord length of 208.24, with a chord bearing of S 29°57'43" W, ; thence run along the arc a distance of 208.68; thence run S 23°32'16" W for a distance of 197.39'; to a curve turning to the right with a radius of 731.95, with a delta angle of 14°59'09", with a chord length of 190.90, with a chord bearing of S 31°43'31" W, ; thence run along the arc a distance of 191.44; thence run S 39°57'08" W for a distance of 154.71'; thence run S 40°07'26" E for a distance of 39.43'; thence run S 42°13'43" W for a distance of 45.63'; thence run S 42°08'30" W for a distance of 58.61'; thence run S 41°02'08" W for a distance of 58.13'; thence run S 40°17'38" W for a distance of 44.92'; thence run N 89°42'59" W for a distance of 382.40' to the Point of Beginning.

Containing 18.3 Acres more or less.

I, George V. Shell, Jr., a Registered Land Surveyor in the State of Alabama hereby state that this is a true and correct survey around the perimeter of the disposal area and further state that this drawing and survey has been completed in accordance with the current Standards of Practice for surveying in the State of Alabama to the best of my knowledge, information and belief.

George V. Shell, Jr.
Al. Reg. # 20894

ALABAMA LICENSED No. 20894 PROFESSIONAL LAND SURVEYOR GEORGE V. SHELL, JR.

07/14/2025
Date

EEFS
Engineering, Environmental & Forestry Services, Co.
Civil & Structural Engineering/Land Surveying
1930 Second Avenue North, Suite 150, (PO Box 982)
Bessemer, Alabama 35020
Phone: 205-424-3737

RENEW DESIGN PROTECT

DISPOSAL AREA SURVEY
Raimund Muscoda Inert Landfill
City of Bessemer
ADEM Permit No. 37-42
Jefferson County, Alabama

SHEET NUMBER
1 OF *1*

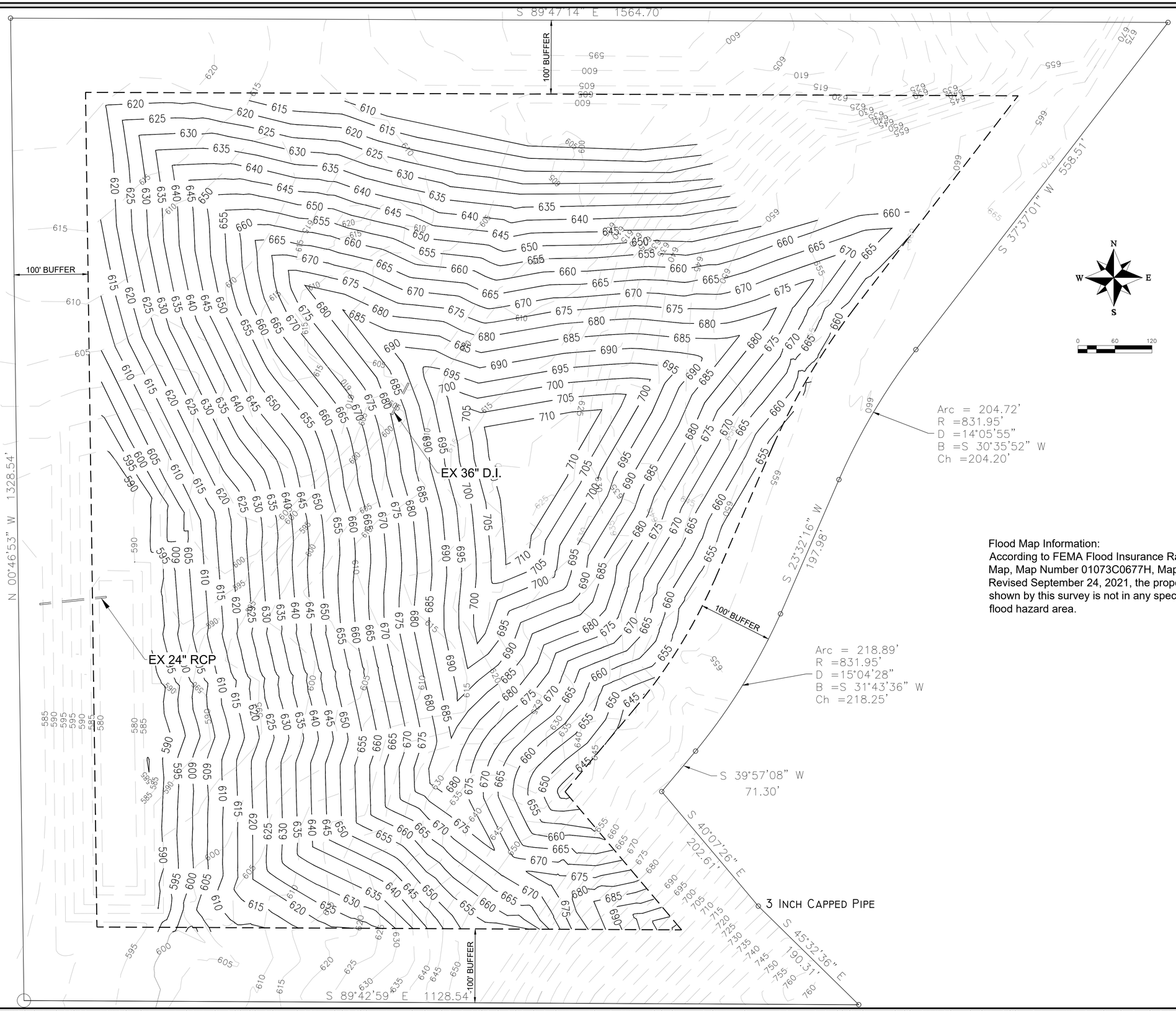
SHEET TITLE
2025-07-11 RM-Disposal Area

PROJECT NUMBER
B-1957

DRAWN BY *GVS*
CHECKED BY *DRM*

SCALE
1 Inch = 100 Feet

DATE
07/14/2025



Flood Map Information:
According to FEMA Flood Insurance Rate Map, Map Number 01073C0677H, Map Revised September 24, 2021, the property as shown by this survey is not in any special flood hazard area.

EEFS
Engineering, Environmental & Forestry Services Company
Civil & Structure Engineering / Land Surveying
1930 2nd Avenue North, Suite 150 (P.O. Box 862)
Bessemer, Alabama - 35020
p: 205.424.3737 / f: 205.424.3730 / www.eefs-eng.com

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DESIGN REVIEW APPROVED

NO.	DATE	REVISION

PROJECT NAME
RAIMUND MUSCODA LANDFILL
CITY OF BESSEMER
BESSEMER, AL

SHEET TITLE
TOPOGRAPHIC MAP - FINAL

PROJECT NUMBER
B-1681

DRAWN BY	CHECKED BY
MPR	GVS

DATE
11/21/2022

DRAWING NUMBER
SHT 2
SHEET NUMBER
2 OF 2

SCALE
1" = 60'

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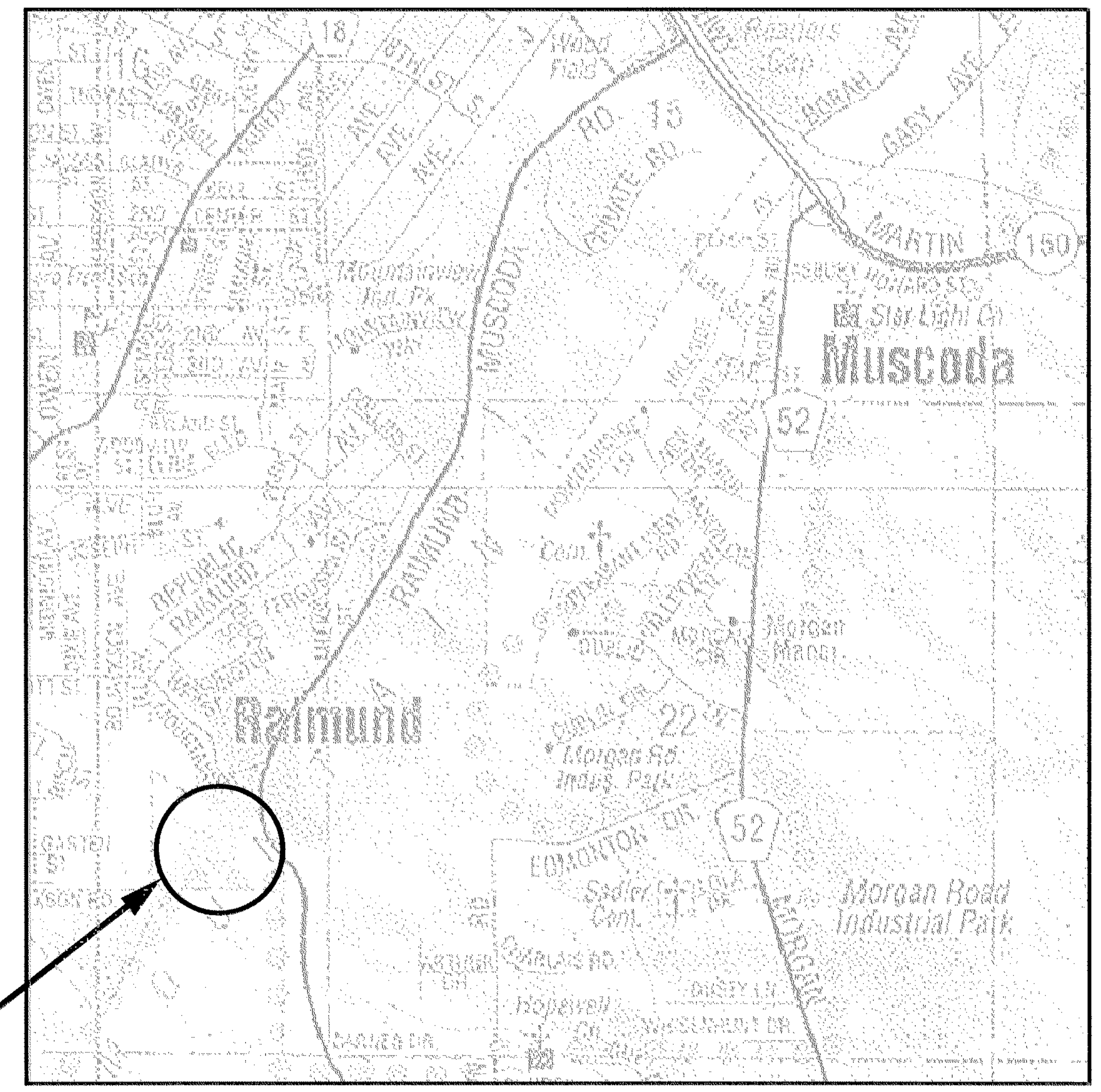
CITY OF BESSEMER
RAIMUND-MUSCODA LANDFILL ACCESS DRIVE
BESSEMER, ALABAMA



PROJECT LOCATION

INDEX

SITUATED IN THE SE 1/4 OF SECTION 21, TOWNSHIP 19 SOUTH, RANGE 4 WEST
JEFFERSON COUNTY, ALABAMA

Vicinity Map
(n.t.s.)

CLIENT
CITY OF BESSEMER
1800 3RD. AVENUE NORTH
BESSEMER, ALABAMA 35020
PHONE NO. (205)-424-4060

CONTACT
RONALD R. GILBERT, P.E.
PHONE NO. (205)-424-3737

UTILITY OWNERS

ALABAMA GAS CORPORATION
605 R. ARRINGTON JR. BLVD. N.
BIRMINGHAM, ALABAMA 35203-2707
(800)-292-4005
205-326-8100

BRIGHTHOUSE NETWORKS
151 LONDON PARKWAY
BIRMINGHAM, ALABAMA 35211
(205) 591-6880

BESSEMER WATER SERVICE
1600 1ST. AVENUE NORTH
BESSEMER, ALABAMA 35020
(205) 481-4333

BESSEMER ELECTRICAL SERVICES TVA
1600 1ST. AVENUE NORTH
BESSEMER, ALABAMA 35020
(205) 481-4333

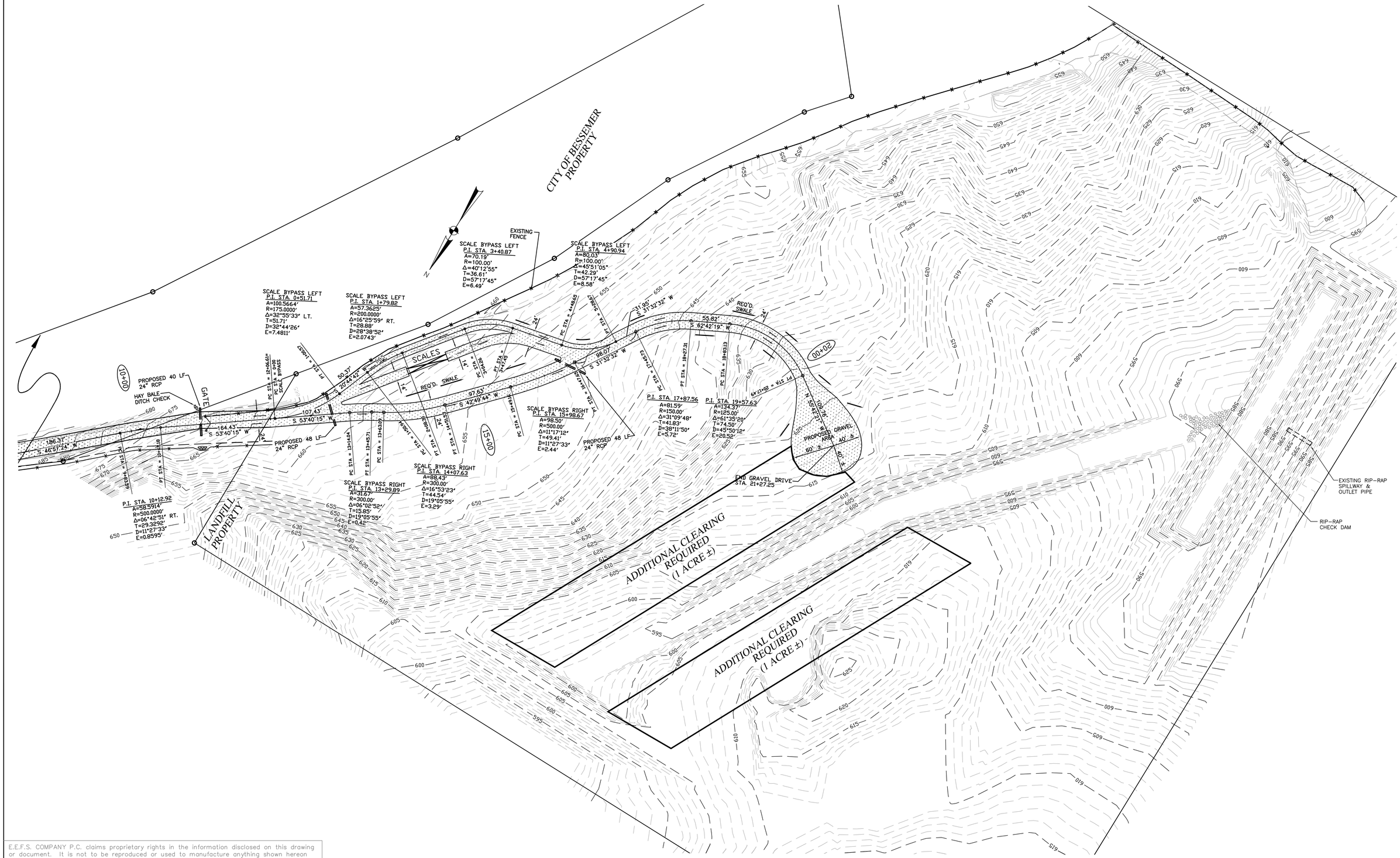
BELLSOUTH TELEPHONE COMPANY
3196 HIGHWAY 280 SOUTH
BIRMINGHAM, ALABAMA 35243
(205) 972-3598

PLANS PREPARED BY

Samuel J. Martin
SAMUEL J. MARTIN, P.L.S.
DATE: 7-9-09

PLANS APPROVED BY

Ronald Gilbert
RONALD R. GILBERT, P.E.
DATE: 8-14-09



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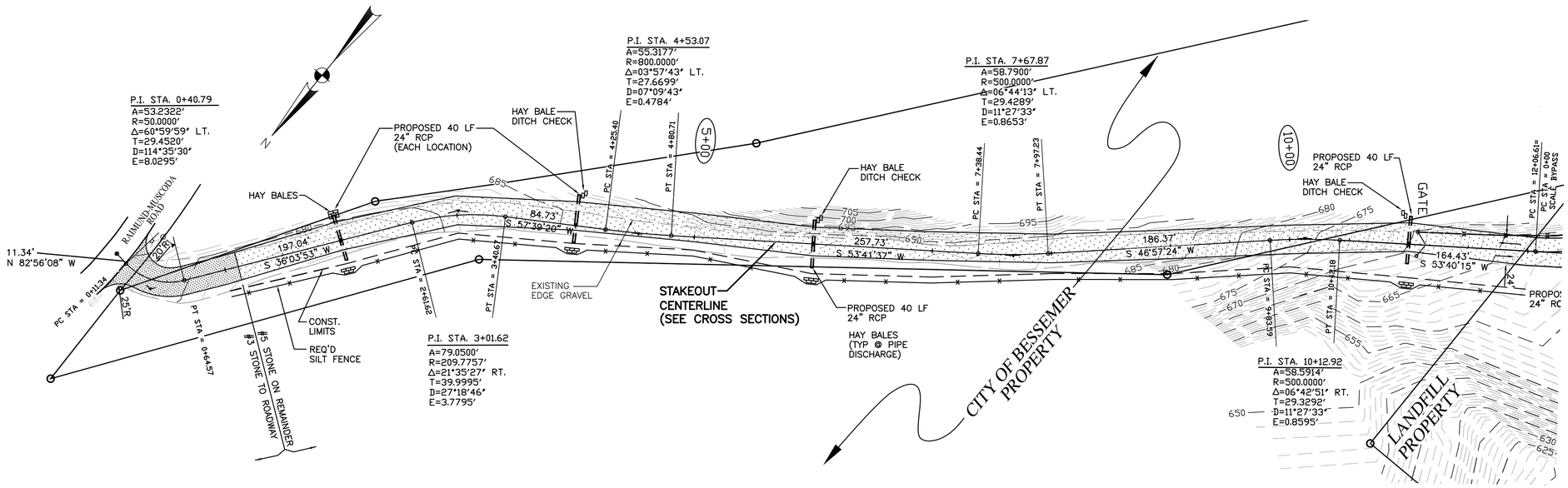
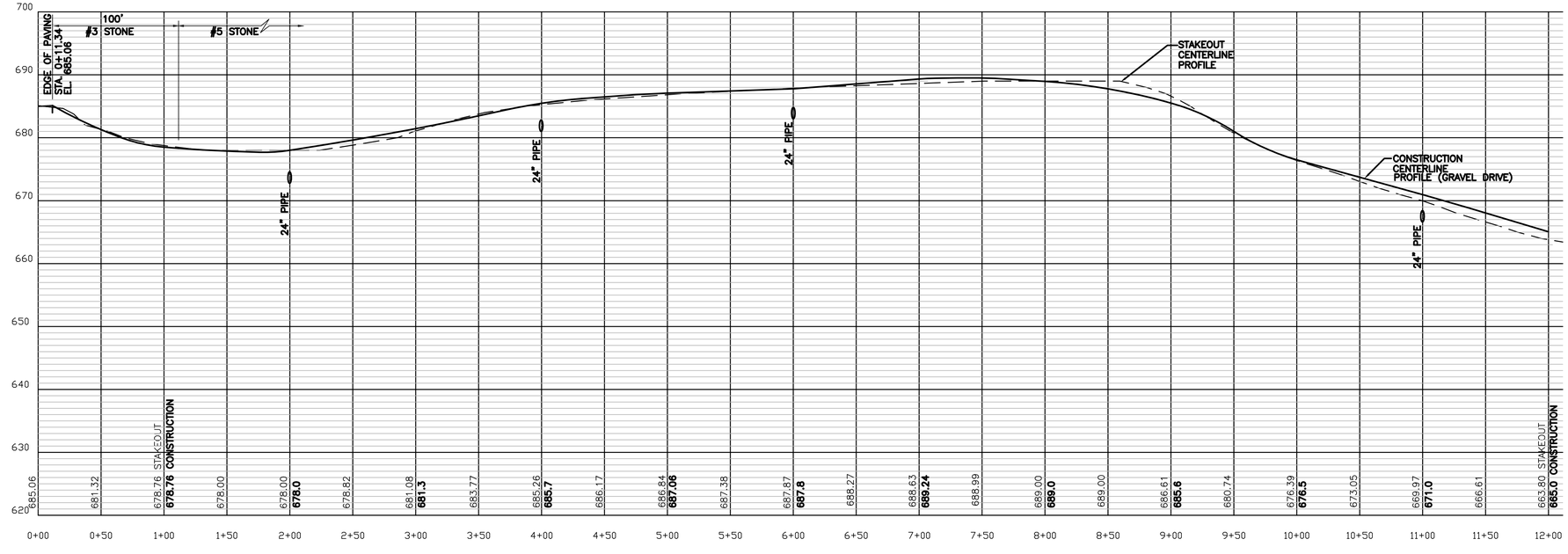
P.O. BOX 982 (1930 2nd AVE. N, SUITE 150)
BESSEMER, ALABAMA-35021 424-3737

NO.	DATE	REVISION	APP'D

CITY OF BESSEMER
RAIMUND-MUSCODA LANDFILL-PLAN VIEW
BESSEMER, ALABAMA

DATE SUBMITTED: XXX	
DRAWN BY: WRS	
APPROVED BY : SJM	
DWG. NAME: PLAN PROFILE	E.E.F.S. JOB No.: B-699
SCALE: 1"=60'	SHEET No.: 2 of 7





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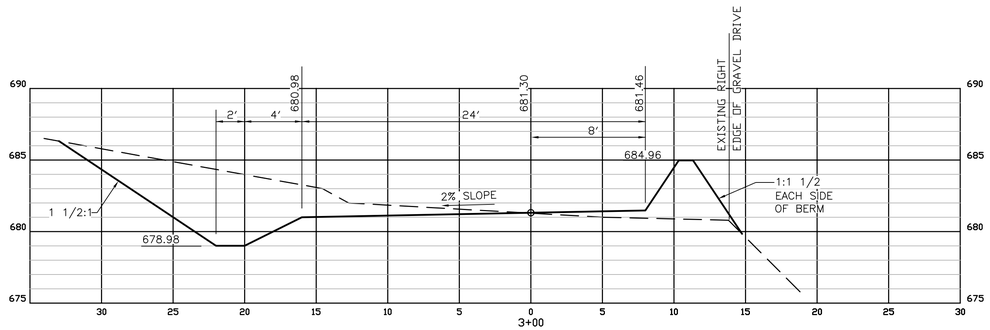
NO.	DATE	REVISION	APP'D

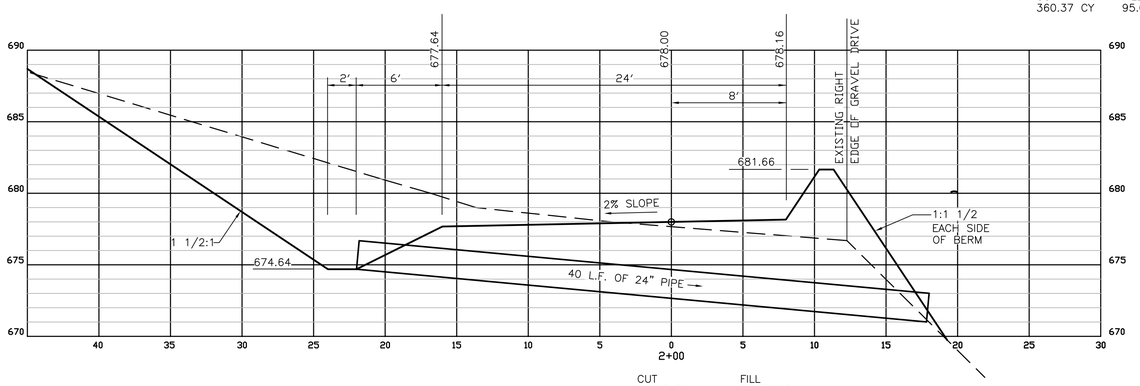
CITY OF BESSEMER
RAIMUND-MUSCODA LANDFILL-PLAN & PROFILE
BESSEMER, ALABAMA

DATE SUBMITTED: XXX	
DRAWN BY: WRS	
APPROVED BY : SJM	
DWG. NAME: SAM ROAD	E.E.F.S. JOB No.: B–699
SCALE: 1"=50'	SHEET No.: 3 of 7



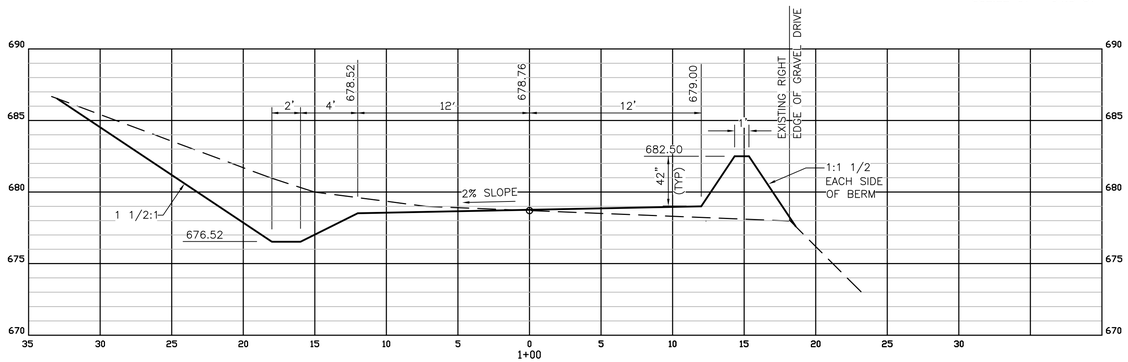
CUT 65.9 SF FILL 17.56 SF

CUT 360.37 CY FILL 95.06 CY



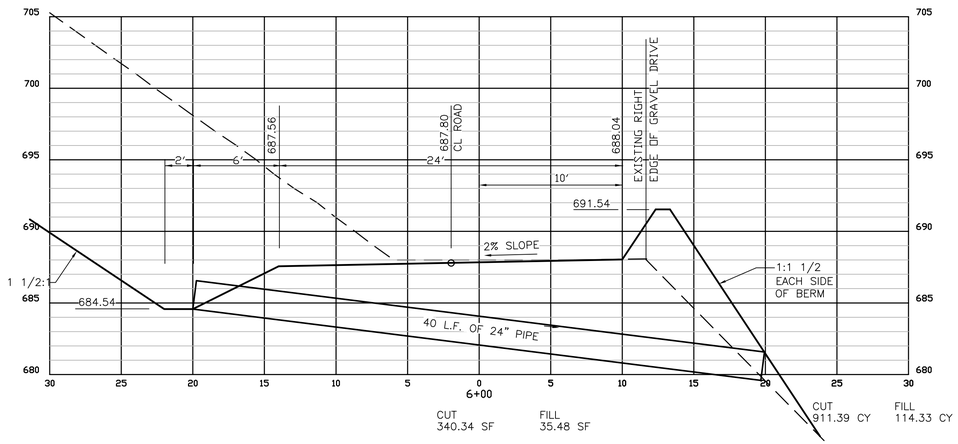
CUT 128.7 SF FILL 33.77 SF

CUT 382.22 CY FILL 94.8 CY



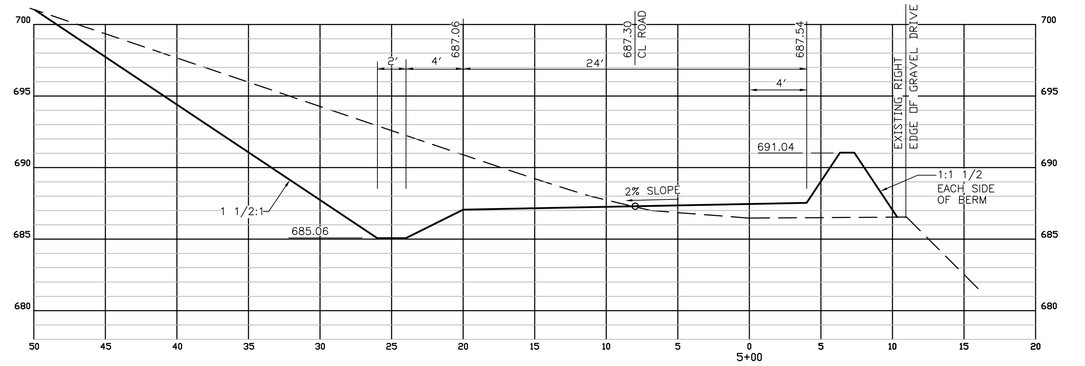
CUT 77.7 SF FILL 17.42 SF (CUT/FILL 0 @ STA. 0+11)

CUT 128.06 CY FILL 28.71 CY



CUT 340.34 SF FILL 35.48 SF

CUT 911.39 CY FILL 114.33 CY



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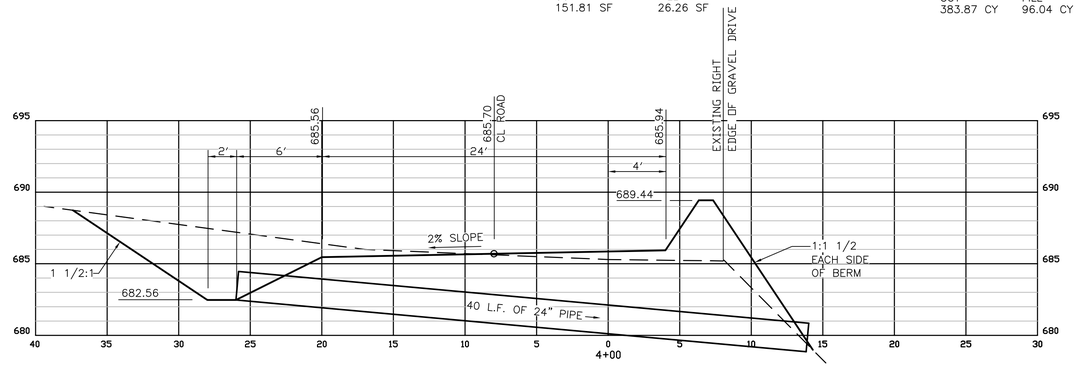
CUT 383.87 CY FILL 96.04 CY



CUT 55.48 SF FILL 25.6 SF

CUT 224.78 CY FILL 79.92 CY

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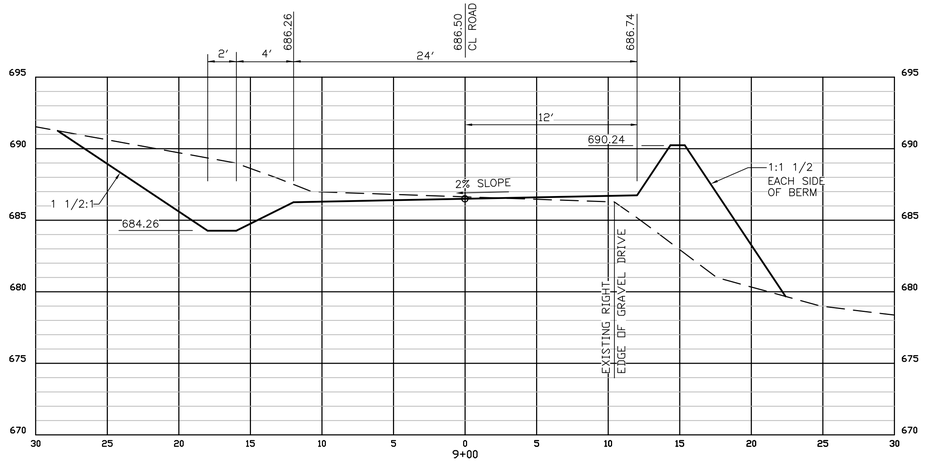
BESSEMER, ALABAMA–35021 424–3737

NO.	DATE	REVISION	APP'D

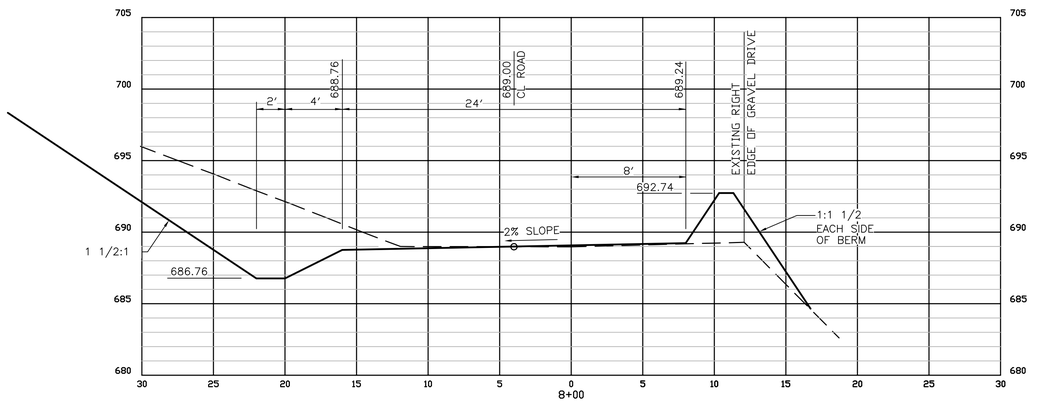
CITY OF BESSEMER
RAIMUND-MUSCODA LANDFILL-ROAD CROSS SECTIONS
BESSEMER, ALABAMA

DATE SUBMITTED: XXX	
DRAWN BY: WRS	
APPROVED BY : SJM	
DWG. NAME: SAM ROAD	E.E.F.S. JOB No.: B–699
SCALE: 1"=5'	SHEET No.: 4 of 7



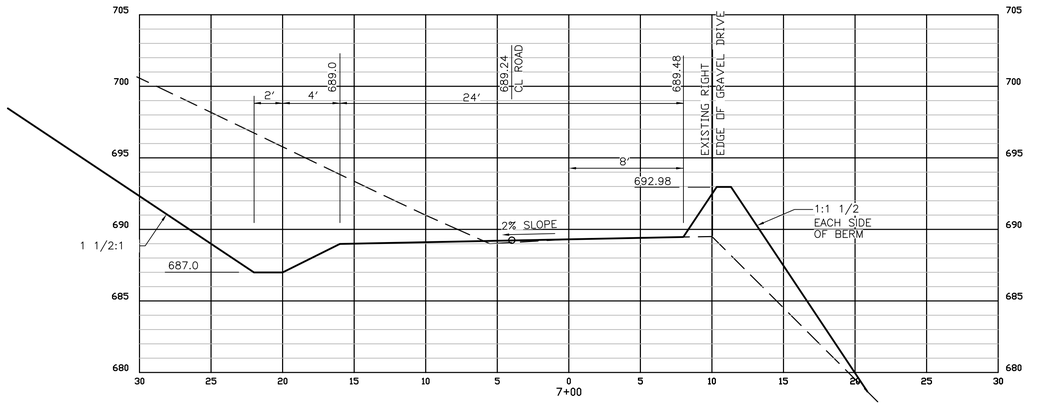
CUT 54.47 SF FILL 49.73 SF

CUT 286.43 CY FILL 121.93 CY



CUT 100.2 SF FILL 16.11 SF

CUT 742.15 CY FILL 87.41 CY



CUT 300.56 SF FILL 31.09 SF

CUT 1186.85 CY FILL 123.28 CY

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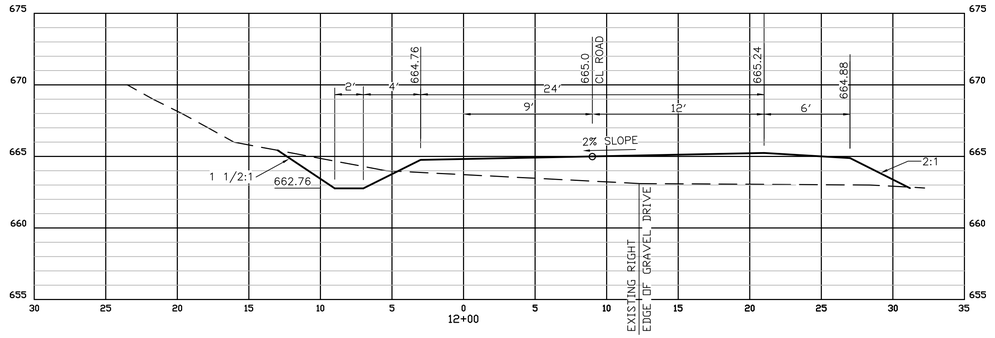
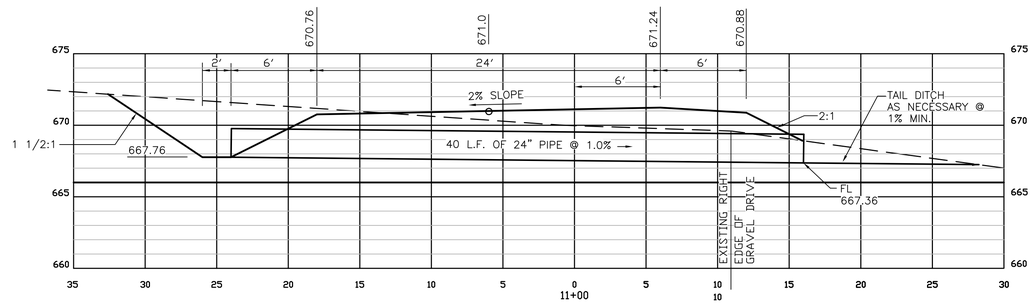
TOTALS CUT 5440.44 CY FILL 1296.12 CY

CUT 16.70 FILL 101.85



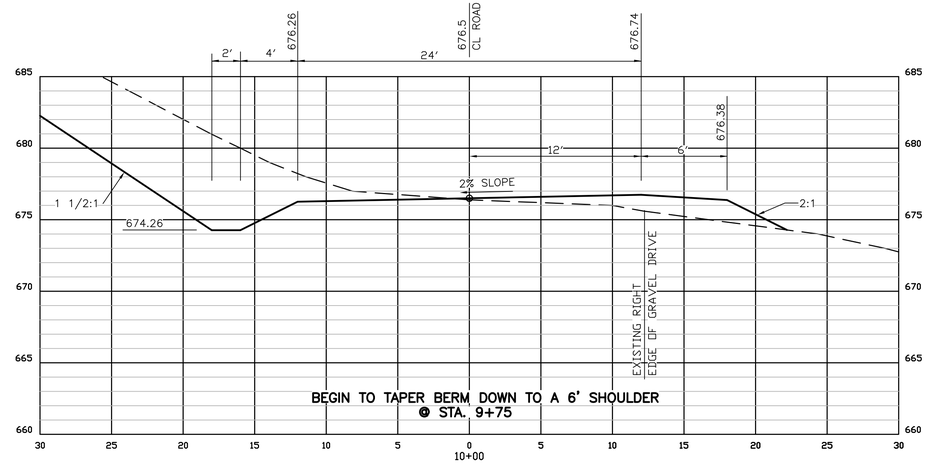
CUT 9.02 SF FILL 55.0 SF

CUT 80.41 CY FILL 150.46 CY



CUT 34.4 SF FILL 26.25 SF

CUT 350.02 CY FILL 79.42 CY



CUT 154.61 SF FILL 16.64 SF

CUT 387.19 CY FILL 122.91 CY

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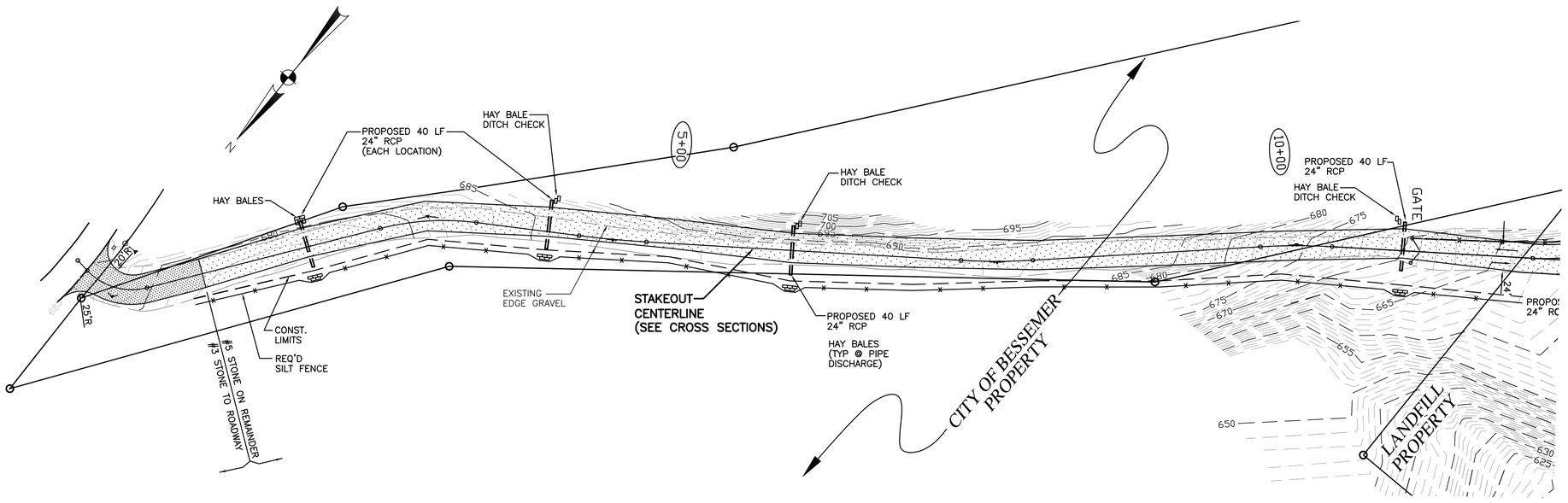
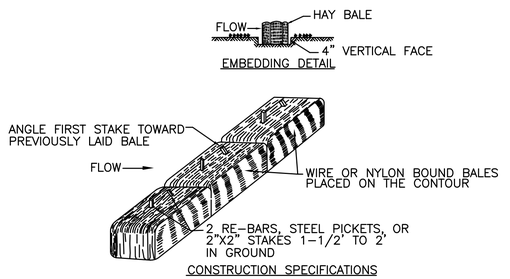
BESSEMER, ALABAMA–35021 424–3737

NO.	DATE	REVISION	APP'D

CITY OF BESSEMER
RAIMUND-MUSCODA LANDFILL-ROAD CROSS SECTIONS
BESSEMER, ALABAMA

DATE SUBMITTED: XXX	
DRAWN BY: WRS	
APPROVED BY : SJM	
DWG. NAME: SAM ROAD	E.E.F.S. JOB No.: B–699
SCALE: 1"=50'	SHEET No.: 5 of 7



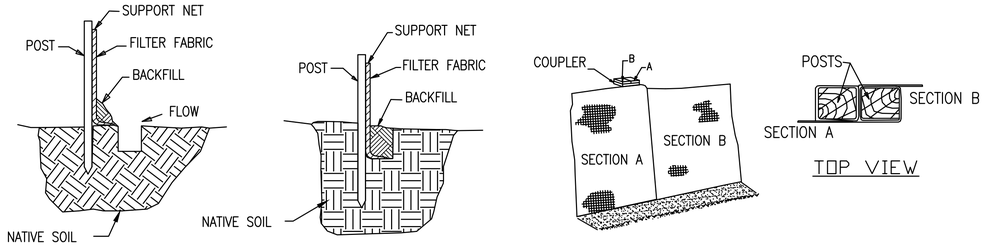


1.) BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2.) EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 4".
3.) BALES SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
4.) INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.

HAY BALE DETAIL

(N.T.S.)

SEE ALDOT STD. EC-665-E



CONSTRUCTION SPECIFICATIONS

1.) SILT FENCING SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY FITTING THE ADJACENT FENCE SECTION.
2.) EACH SECTION OF FENCING SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 6".
3.) FENCING SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR REBARS AT A SPACING NOT TO EXCEED 6'.
4.) INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.

— x — x — x — x — x —

DENOTES THE PROPOSED SILT FENCE LOCATION

SILT SCREEN TYPICAL

SEE ALDOT STD. EC-665-F

NOTE:

CONTRACTOR SHALL CONSIDER THE EROSION & SEDIMENTATION CONTROL DEVICES SHOWN AS MINIMUM-IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INSTALL AND MAINTAIN ANY DEVICES NECESSARY TO PROPERLY CONTAIN THE CONSTRUCTION SITE AND PROTECT ADJACENT PROPERTIES, ROADWAYS AND DRAINAGE COURSES.

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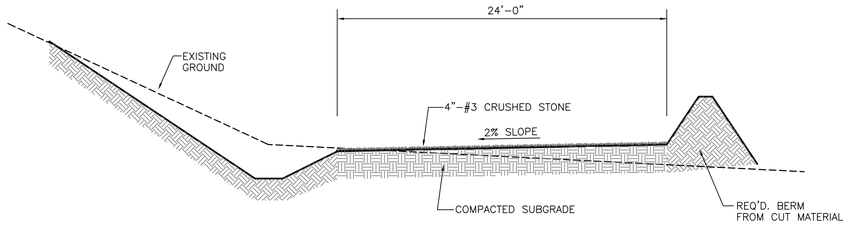
BESSEMER, ALABAMA-35021 424-3737

NO.	DATE	REVISION	APP'D

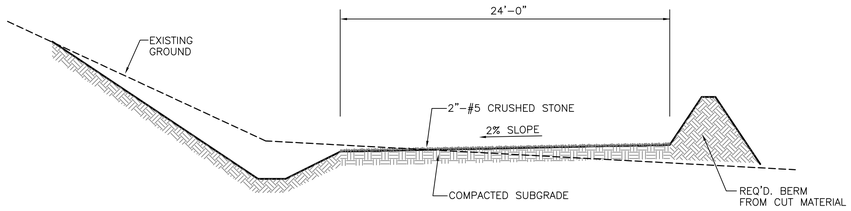
CITY OF BESSEMER
RAIMUND-MUSCODA LANDFILL-EROSION CONTROL PLAN
BESSEMER, ALABAMA

DATE SUBMITTED: XXX	
DRAWN BY: WRS	
APPROVED BY : SJM	
DWG. NAME: PLAN PROFILE	E.E.F.S. JOB No.: B-699
SCALE: 1"=50'	SHEET No.: 6 of 7



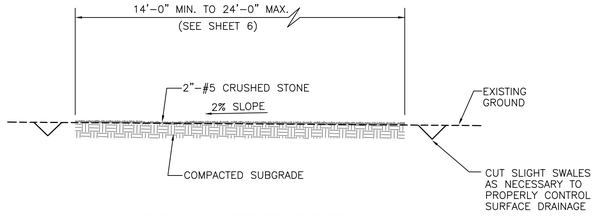
TYPICAL ASPHALT PAVING SECTION

STA. 0+11.34 THRU STA. 1+11.34



TYPICAL CRUSHED STONE SECTION

STA. 1+11.34 THRU STA. 12+00



TYPICAL CRUSHED STONE SECTION

STA. 12+00.00 THRU STA. 20+17
(SEE SHEET #2-STA 21+27 FOR GRAVEL "CUL-DE-SAC" INFORMATION)

STANDARD NOTES

1. ALL WORK TO BE DONE IN ACCORDANCE WITH THE CITY OF BESSEMER, AND ANY APPLICABLE ADEM REGULATIONS.
2. THE CONTRACTOR AND/OR DEVELOPER SHALL BE RESPONSIBLE FOR CONSTRUCTION AND MAINTENANCE OF EROSION AND SEDIMENTATION CONTROLS DURING CONSTRUCTION FOR THE PROTECTION OF ADJACENT PROPERTIES, ROADWAYS AND WATERWAYS.
3. THE CONTRACTOR AND/OR DEVELOPER SHALL BE RESPONSIBLE FOR PROVIDING A CONSTRUCTION SITE FREE OF DRAINAGE PROBLEMS.
4. THE CONTRACTOR AND/OR DEVELOPER SHALL BE RESPONSIBLE FOR MAINTAINING A PROPER TRAFFIC CONTROL PLAN FOR PUBLIC SAFETY ADJACENT TO THE CONSTRUCTION SITE. THE TRAFFIC CONTROL PLAN SHALL BE IN CONFORMANCE WITH THE "NATIONAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) – PART VI, LATEST EDITION, AS WELL AS THE "ALABAMA MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES" (AMUTCD), LATEST EDITION. THE TRAFFIC CONTROL DEVICES INDICATED REPRESENT CONDITIONS KNOWN DURING PLAN DEVELOPMENT. IN THE EVENT ACTUAL PHYSICAL CONDITIONS WARRANT ADDITIONAL TRAFFIC CONTROL DEVICES, THEY SHALL BE INSTALLED IN CONFORMANCE WITH THE "MUTCD", PART VI, AS DIRECTED BY THE ENGINEER.
5. ANY UTILITIES ENCOUNTERED WITHIN THE ROADWAY SHALL BE BACKFILLED WITH STONE.

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BESSEMER, ALABAMA-35021 424-3737

NO.	DATE	REVISION	APP'D

CITY OF BESSEMER
RAIMUND-MUSCODA LANDFILL-DETAILS AND NOTES
BESSEMER, ALABAMA

DATE SUBMITTED: XXX	
DRAWN BY: WRS	
APPROVED BY : SJM	
DWG. NAME: PLAN PROFILE	E.E.F.S. JOB No.: B-699
SCALE: 1"=5'	SHEET No.: 7 of 7

6.0 Quality Assurance and Quality Control Plan (QA/QC Plan)

The QA/QC Plan was developed for the construction of the City of Bessemer Raimund-Muscoda Inert Landfill which will address the site work, earthwork, and final cover materials. The plans major objective is to test construction requirements so design and performance standards are achieved.

The final cover for the facility will have to meet the requirements of Rule 335-13-4-.23(1)(c)(1) and 335-13-4-.23(1)(d). The final cover will have to be a minimum of two feet thick after compaction and shall be of a quality to be easily managed and with a sufficient clay content to provide an adequate seal on the landfill waste. This quality control and assurance should be used as a guide line for achieving these goals.

The City of Bessemer (or assigned representative) will be in control of the site construction work. The City would like to leave the option for construction by a contractor open as a possibility, but plans to do site construction with the Street and Sanitation Department equipment and employees.

Quality Control work shall be performed by a QA/QC engineering firm.

6.1 Objectives

Quality assurance (QA) for landfill construction is planned and the systematic actions necessary to provide adequate confidence that the permit requirements have been achieved.

The inert landfill QA/QC Plan will focus on mainly soil work. Some important terms to discuss which will be an important part of the plan are:

1) Unified Soil Classification System ASTM
2) Standard Proctor ASTM
3) Permeability
4) Density
5) Moisture Content
6) Atterberg Limits
7) Plasticity
8) Grain Size Distribution

6.2 QA/QC Engineer

The inspection and test requirements of the project will be directed by the engineer.

The following records will be maintained by the engineer and will be supplied to the owner upon request or at project completion.

These records are:

1) Technical Specifications
2) Certified plans and construction drawings
3) Field and laboratory test results
4) Inspection reports (daily)
5) As-built drawings
6) Notification to contractor/owner of test failures and date of rework/retest.

6.3 Landfill Soil Test (Subgrade, Berms, Closure Cap, Other Fill)

The following test shall be performed on soil subgrade, berms, and other fill areas at the inert landfill site.

1) Unified Soil Classification

   a) ASTM 0422 Particle Site Analysis of Soils

      i) Minimum number of test is one test per material change or one per 3,000 cubic yards of material fill.

   b) ASTM D4318 Atterberg Limits

      i) Minimum number of test is one per material change or one per 3,000 cubic yards of material fill.

2) Visual Soil Identification
   ASTM D2488

   a) One test per day or material change to be recorded on the inspection report.

3) Standard Proctor Test
   ASTM 0698

   a) Minimum of one test per 5,000 yards of material fill or at a soil material change.

4) Moisture Content
   ASTM D2216

a) Minimum of 2 test per 800 cubic yards or more often in areas of material changes.

5) Density of Soil Tests
ASTM D2922 - Nuclear Method
ASTM D1566 - Sand Cone
ASTM D2937 - Drive Cylinder

a) Minimum of 1 test per 800 cubic yards of fill material or more often in areas of material changes.

6) Permeability test

a) Minimum of 1 test per 2 acres or more often in areas of material change.

7) Fill areas for landfill construction and berms shall be free from stumps, trees, roots, sod, muck, debris, or frost. Only approved materials shall be used.

8) Compacted fill shall be constructed by depositing fill materials in successive uniform layers of not more than eight (8) inches in depth, loose measurements over the entire area, and the surface of each layer shall be kept parallel to the elevation of the finished compacted fill.

9) Each layer shall be compacted by use of a sheeps foot roller, or other suitable roller depending upon character of material.

10) The density of each layer shall not be less than ninety-five (95) percent of the maximum density as determined by SPT(ASTM D698) (For site construction of berms, pond, and roads).

11) Rocks greater than two (2) inches shall not be placed in compacted fills. Rocks may be used in berms provided that all voids are filled with fine materials and the hole is compacted to a dense mass. Rocks greater than 1 cubic foot in volume or larger then one foot in any dimension shall not be placed in fill areas. Rock shall not be placed in fill less than 2 feet.

12) Bare areas shall be proof-rolled with a large roller tired vehicle of sufficient weight to reveal unstable areas as determined by the engineer. Unstable areas shall be undercut and stabilized as approved by the engineer.