



ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

SOLID WASTE DISPOSAL FACILITY PERMIT

PERMITTEE: Georgia-Pacific Brewton LLC

FACILITY NAME: Georgia-Pacific Brewton LLC Main Landfill

FACILITY LOCATION: Southwest ¼ of Section 1 and Northwest ¼ of Section 12, Township 1 North, Range 9 East in Escambia County, Alabama. The facility area consists of approximately 5,000 acres with a disposal area of 65 acres.

PERMIT NUMBER: 27-05

PERMIT TYPE: Industrial

WASTE APPROVED FOR DISPOSAL: Non-hazardous industrial waste including but not limited to ash generated from the combustion of wood waste, wood yard debris, de-watered primary and secondary wastewater sludge, lime and causticizing by-products, off spec paperboard and pulp stock, broken or scrap pallets, old machines felts, construction debris, unusable scrap metal, materials dredged from the water treatment plant river intake structure, grounds maintenance debris, and aquatic vegetation harvested from the wastewater treatment plant.

APPROVED WASTE VOLUME: Maximum Average Daily Volume of waste is 2,300 cubic yards per day

APPROVED SERVICE AREA: Georgia-Pacific Brewton LLC in Brewton, AL

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

ISSUANCE DATE: ??????????????????

EFFECTIVE DATE: ??????????????????

EXPIRATION DATE: ??????????????????

**ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
SOLID WASTE PERMIT**

Permittee: Georgia-Pacific Brewton LLC
P.O. Box 709
Brewton, Alabama 36427

Landfill Name: Georgia-Pacific Brewton LLC Main Landfill

Landfill Location: A part of the Southwest ¼ of Section 1 and the Northwest ¼ of Section 12, Township 1 North, Range 9 East, and located in Escambia County, Alabama.

Permit Number: 27-05

Landfill Type: Industrial Landfill

Pursuant to the Alabama 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), this permit is issued to Georgia-Pacific Brewton LLC, (hereinafter called the Permittee), to operate a solid waste disposal facility known as Georgia-Pacific Brewton LLC Main 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 335-13-15 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 March 19, 2019, for permit renewal and as amended, 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 the Department of any deviation from or changes in the information in the Application that would affect the Permittee's ability to comply with the applicable ADEM Admin. Code or permit conditions.

This permit is effective as of ??????????????????, 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 Div. 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 Division 13, unless this permit specifically provides otherwise; where terms are not otherwise defined, the meaning associated with such terms shall be as defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

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

E. Duties and Requirements

1. Duty to Comply

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

2. Duty to Reapply

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

3. Permit Expiration

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

4. Need to Halt or Reduce Activity Not A Defense

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

5. Duty to Mitigate

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

6. Proper Operation and Maintenance

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

7. Duty to Provide Information

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

8. Inspection and Entry

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

- a. Enter at reasonable times the Permittee's premises where the regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit.
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit.
- c. Inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit.
- d. Sample or monitor, at reasonable times, any substances or parameters at any location for the purposes of assuring permit compliance or as otherwise authorized by Code of Alabama 1975, Section 22-27-1 *et seq.*

9. Monitoring, Corrective Actions, and Records

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

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

- b. The Permittee shall retain records, at the location specified in Section I.,I., of all monitoring, or corrective action information, including all calibration and maintenance records, copies of all reports and records required by this permit, and records of all data used to complete the application for this permit for a period of at least three years from the date of the sample, measurement, report or record or for periods elsewhere specified in this permit. These periods may be extended by the request of the Department at any time and are automatically extended during the course of any unresolved enforcement action regarding this facility.
- c. Records of monitoring and corrective action information shall include.
 - i. The exact place, date, and time of sampling or measurement.
 - ii. The individual(s) and company who performed the sampling or measurements.
 - iii. The date(s) analyses were performed.
 - iv. The individual(s) and company who performed the analyses.
 - v. The analytical techniques or methods used.
 - vi. The results of such analyses.
- d. The Permittee shall submit all monitoring and corrective action results at the interval specified elsewhere in this permit.

10. Reporting Planned Changes

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

11. Transfer of Permit

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

12. Certification of Construction

The Permittee may not commence disposal of waste in any new cell or phase until the Permittee has submitted to the Department, by certified mail or hand delivery, a letter signed by both the Permittee and a professional engineer stating that the facility has been constructed in compliance with the permit. The Department must inspect the constructed cells or phases before the owner or operator can commence waste disposal unless the Permittee is notified that the Department will waive the inspection.

13. Compliance Schedules

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

14. Other Noncompliance

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

15. Other Information

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

F. Design and Operation of Facility

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

G. Inspection Requirements

1. The Permittee shall comply with all requirements of ADEM Admin. Code Division 13.
2. The Permittee shall insure that all waste disposed in the landfill is in accordance with the approved waste stream as indicated in this permit and an annotation placed 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 the items listed below if applicable and not exempt by variance:
 - a. Documentation of inspection and maintenance activities.
 - b. Daily Volume reports.
 - c. Personnel training documents and records.
 - d. Solid/Hazardous Waste Determination Forms for Industrial Wastes, and the associated Department disposal approval correspondence for industrial waste and special waste.
 - e. Groundwater monitoring records.
 - f. Explosive gas monitoring records.
 - g. Surface water and leachate monitoring records.
 - h. Copies of this Permit and the Application.
 - i. Copies of all variances granted by the Department, including copies of all approvals of special operating conditions.

2. Quarterly Volume Report

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

3. Monitoring and Corrective Action Reports

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

4. Availability, Retention, and Disposition of Records

- a. All records, including plans, required under this permit or Division 13 must be furnished upon request, and made available at reasonable times for inspection by any officer, employee, or representative of the Department.
- b. All records, including plans, required under this permit or Division 13 shall be retained by the Permittee for a period of at least three years. The retention period for all records is extended automatically during the course of any unresolved enforcement action regarding the facility, or as requested by the Department.
- c. A copy of records of waste disposal locations and quantities must be submitted to the Department and local land authority upon closure of the facility.

I. Documents to be Maintained by the Permittee

The Permittee shall maintain, at the Georgia-Pacific Brewton LLC, office, the following documents and amendments, revisions and modifications to these documents until an engineer certifies closure of the permitted landfill.

1. Operating record.
2. Closure Plan.

J. Mailing Location

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

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 if the information is protected under Code of Alabama 1975 §§ 22-39-18, as amended.

M. State Laws and Regulations

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

SECTION II. GENERAL OPERATING CONDITIONS

A. Operation of Facility

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

B. Open Burning

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

C. Prevention of Unauthorized Disposal

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

D. Unauthorized Discharge

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

E. Industrial Waste Disposal

The Permittee shall dispose of industrial waste as required by ADEM Admin. Code 335-13-4-.21(1)(c), and as specified in the Application.

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.

SECTION III. SPECIFIC REQUIREMENTS FOR INDUSTRIAL WASTE LANDFILLS

A. Waste Identification and Management

1. Subject to the terms of this permit, the Permittee may dispose of the nonhazardous solid wastes listed in III.B. Disposal of any other wastes is prohibited, except waste granted a temporary or one time waiver by the Director.
2. The total permitted area for the GP Brewton LLC., facility is approximately 5000 acres with 65 acres approved for disposal.
3. The maximum average daily volume of waste disposed at the facility shall not exceed 2,300 cubic yards per day, except as provided under Rule 335-13-5-.06(2)(a)5. The average daily volume shall be computed as specified by Rule 335-13-5-.06(2)(a)5.(i).

B. Waste Streams

The Permittee may accept for disposal on-site generated industrial non-hazardous waste, including but not limited to; ash generated from the combustion of wood waste, wood yard debris, de-watered primary and secondary wastewater sludge, lime and causticizing by-products, off spec paperboard and pulp stock, broken or scrap pallets, old machines felts, construction debris, unusable scrap metal, materials dredged from the water treatment plant river intake structure, grounds maintenance debris, and aquatic vegetation harvested from the wastewater treatment plant.

C. Service Area:

The Permittee is allowed to receive for disposal waste from Georgia-Pacific Brewton LLC in Brewton, AL.

D. Waste Placement, Compaction, and Cover

All waste shall be confined to an area as small as possible and placed onto an appropriate slope. A variance has been granted allowing the operating slopes of a maximum slope of 3 to 1 (33%) (See Section VIII, 4.) The closure face shall not exceed a slope of 4 to 1 (25%). All waste shall be spread in layers two feet or less in thickness and thoroughly compacted weekly with adequate landfill equipment. No cover is required until final elevations have been reached (See Section VIII.1.).

E. Liner Requirements

The Permittee is not required to install additional liner materials at this time. The bottom elevation of any future disposal cell shall be a minimum of five (5) feet above the temporal fluctuation of the groundwater table, unless otherwise approved by the Department.

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 Division 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 Rule 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 Rule 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

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

1. The permittee shall maintain the groundwater monitoring wells and piezometers identified in Table IV.1. at the locations specified in the Application, and any other groundwater monitoring wells which are added (Section IV.,A.,3.) during the active life and the post closure care period.
2. The Permittee shall maintain groundwater monitoring wells MW-6 and MW-7 as the background groundwater monitoring wells for the entire solid waste disposal facility.
3. The Permittee shall install and maintain additional groundwater monitoring wells as necessary to assess changes in the rate and extent of any plume of contamination or as otherwise deemed necessary to maintain compliance with the ADEM Admin. Code.
4. Prior to installing any additional groundwater monitoring wells, the Permittee shall submit a report to the Department with a permit modification request specifying the design, location and installation of any additional monitoring wells. This report shall be submitted within ninety (90) days prior to the installation which, at a minimum, shall include.
 - a. Well construction techniques including proposed casing depths, proposed total depth, and proposed screened interval of well(s);
 - b. Well development method(s);
 - c. A complete analysis of well construction materials;
 - d. A schedule of implementation for construction; and
 - e. Provisions for determining the lithologic characteristics, hydraulic conductivity and grain-size distribution for the applicable aquifer unit(s) at the location of the new well(s).

5. The Permittee is approved to use an interwell approach for statistical analysis.

B. Groundwater Monitoring Requirements

1. The Permittee shall determine the groundwater surface elevation at each monitoring well and piezometer identified in Table IV.1. each time the well or piezometer is sampled and at least semi-annually throughout the active life and post-closure care period.
2. The Permittee shall determine the groundwater flow rate and direction in the first zone of saturation at least annually or each time groundwater is sampled and submit as required by ADEM Admin. Code Division 13.
3. The Permittee shall sample, and analyze all monitoring wells identified in Table IV.1 for the parameters listed in Appendix I of Rule 335-13-4-.27(3), and/or any other parameters specified by the

Department in Table IV.2, on a semi-annual basis throughout the active life of the facility and the post-closure care period in accordance with Rule 335-13-4-.27(3). Sampling shall be conducted during March and September of each year, beginning with the effective date of this permit. **The records and results of this sampling and analysis activity shall be submitted to the Department, within ninety (90) days of the date of sampling. Groundwater monitoring shall be conducted according to the groundwater monitoring plan submitted March 19, 2019.**

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

C. Sampling and Analysis Procedures

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

1. Samples shall be collected, preserved, and shipped (when shipped off-site for analysis) in accordance with the procedures specified in the Groundwater Monitoring Plan. Monitoring wells shall be bailed or pumped to remove at least four times the well volume of water. Slow recharge wells shall be bailed until dry. Wells shall be allowed to recharge prior to sampling.
2. Samples shall be analyzed according to the procedures specified of the Application, Standard Methods for the Examination of Water and Wastewater (American Public Health Association, latest edition), Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020), Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA Publication SW-846, latest edition), or other appropriate methods approved by this Department. All field tests must be conducted using approved EPA test kits and procedures.
3. Samples shall be tracked and controlled using the chain-of-custody and QA/QC procedures specified of the Application.

D. Recordkeeping and Reporting Requirements

1. Recording of Results

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

2. Recordkeeping

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

E. Permit Modification

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

TABLE IV.1.
GROUNDWATER MONITORING WELLS.

Monitoring Well Number	Top of Casing (feet msl)	Depth of Water (ft-bls)
UPGRADIENT		
MW-6	105.34	2.41
MW-7	101.30	4.21
DOWNGRADIENT		
MW-2	75.45	2.29
MW-3	78.58	3.74
MW-4R	82.15	7.15
MW-8	81.83	2.84
PIEZOMETERS		
TW-04	83.06	5.37
*ft-bls = Depth in feet below land surface		

TABLE IV.2.
SEMI-ANNUAL GROUNDWATER MONITORING PARAMETERS

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

SECTION V. GAS MONITORING REQUIREMENTS

The Permittee is not required to conduct gas monitoring. If it is determined that gas monitoring is necessary, the Permittee must conduct gas monitoring in accordance with 335-13 (See Section VIII,2).

SECTION VI. LEACHATE AND SURFACE WATER MANAGEMENT REQUIREMENTS

At this time, the Permittee is not required to install a leachate collection system. If the Department determines that a leachate collection system is necessary, the Permittee shall submit a proposed plan that would meet the Division 13 regulations.

The permittee shall construct and maintain run-on and run-off control structures. Any discharges from drainage control structures shall be permitted through a discharge permit issued by the Department.

SECTION VII. CLOSURE AND POST-CLOSURE REQUIREMENTS

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

- A. Final Cover

The Permittee shall grade final soil cover such that surface water does not pond over the permitted area as specified in the Application. The final cover system shall comply with ADEM Admin. Code Division 13, as described in the facility closure/post-closure plan.

B. Vegetative Cover

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

C. Notice of Intent

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

D. Completion of Closure Activities

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

E. Certification of Closure

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

F. Post-Closure Care Period

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

G. Post-Closure Maintenance

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

H. Post-Closure Use of Property

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

I. Certification of Post-Closure

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

J. Notice in Deed to Property

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

disposal facility, the name of the Permittee, type of disposal activity, location of the disposal facility and beginning and closure dates of the disposal activity.

K. Recording Instrument

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

L. Removal of Waste

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

SECTION VIII. VARIANCES

The following variances have been granted for the Georgia-Pacific Brewton LLC Main Landfill:

1. The Permittee is granted a variance from Rule 335-13-4-.23(1)(a)1 requiring weekly cover. Final cover shall be required after reaching final fill elevations. (See Section III.D.)
2. The Permittee is granted a variance exempting gas monitoring at the site. (See Section V)
3. The Permittee is granted a variance allowing clarifier sludge and boiler ash from the plant's dewatering ponds and unprocessed pulp stock to be disposed in the landfill while on occasion containing free liquids (water). (See Section II.C.)
4. The Permittee is granted a variance from Rule 335-13-4-.23(1)(c) requiring 4:1 operating slopes. The Permittee shall maintain operating slopes that will not exceed a slope of 3 to 1 (33%). (See Section III.D.)

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.

APPLICATION



Georgia-Pacific Brewton LLC tel:
251 867 3621
PO Box 709 fax:
251 867 8353
Brewton, AL 36427

March 18, 2019

Mr. Blake Holden
Solid Waste Engineering Section, Land Division
Alabama Department of Environmental Management
1400 Coliseum Boulevard
Montgomery, AL 36110



RE: Permit Renewal Application
Landfill Permit No. 27-05
Georgia-Pacific Brewton LLC

Dear Mr. Holden:

Please find enclosed three (3) copies of Alabama Department of Environmental Management (ADEM) Form 439, Application for Renewal for the Georgia-Pacific Brewton LLC Main Landfill, Permit No. 27-05, along with the associated permit renewal application fee of \$4,075.

The permit modification and vertical expansion proposal for Landfill No. 27-05 were originally prepared and submitted to ADEM in August 1996 (for Jefferson Smurfit Corporation). The proposal was approved by ADEM and a new permit for the landfill was issued in June 1997. This permit was renewed in November 2003. In March 2008, the permit was reissued to reflect the ownership change from Jefferson Smurfit Corporation to Georgia-Pacific Brewton LLC. This permit was renewed in August 2009 and September 2014. The current permit expires in September 2019.

Elements required by ADEM's Administrative Code, Division 13 that are applicable to industrial landfills were addressed in the original application.

There have been no operational changes to the landfill, or differences in the type or characteristics of the on-site generated Mill residuals disposed of in the landfill, since approval of the minor permit modification request to increase the maximum average daily volume (from 1,200 cubic yards per day [CY/day] to 2,300 CY/day). This request was approved by ADEM on February 24, 2017.

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)
 CCR Landfill (CCRLF)
 CCR Surface Impoundment (CCRSI)
 Other (explain) _____

2. Facility Name Georgia-Pacific Brewton LLC Main Landfill (Permit No. 27-05)

3. Applicant:
Name: Georgia-Pacific Brewton LLC
Address: P.O. Box 709 / 32224 Hwy 31
Brewton, Alabama 36427

Telephone: (251) 867-8380

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

Township 1 North Range 9 East
Section 1 and 12 County Escambia

5. Land Owner:
Name: Georgia-Pacific Brewton LLC
Address: P.O. Box 709 / 32224 Hwy 31
Brewton, Alabama 36427

Telephone: (251) 867-8380

(Attach copy of agreement from landowner if applicable.)

Solid Waste Permit Application

Page 2

6. Contact Person:

Name Mr. Corey Singleton

Position or
Affiliation Environmental Engineer

Address: P.O. Box 709 / 32224 Hwy 31

Brewton, Alabama 36427

Telephone: (251) 867-8380

7. Size of Facility: Size of Disposal Area(s):

5,000 Acres 65 Acres

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

The industrial landfill will receive waste only from the Georgia-Pacific Brewton LLC Mill and its grounds. The facility is a pulp and paper mill that manufactures solid bleach sulfate (SBS), coated board, and unbleached linerboard.

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

 Tons/Day 2,300 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.):

Non-hazardous solid waste consisting of ash generated from the combustion of coal and wood waste, wood yard debris, de-watered primary and secondary wastewater sludge, lime and causticizing by-products, off-spec paperboard and pulp stock, broken or scrap pallets, old machine felts, construction debris, unusable scrap metal, materials dredged from the wastewater treatment plant, aquatic vegetation harvested from the wastewater treatment plant, grounds maintenance debris, and other non-hazardous industrial waste generated at the mill.

SIGNATURE

DATE



GROUNDWATER MONITORING AND STATISTICAL ANALYSIS PLAN

**GEORGIA-PACIFIC BREWTON LLC
BREWTON MILL MAIN LANDFILL, PERMIT No. 27-05
BREWTON, ALABAMA**

FEBRUARY 2015

PREPARED FOR:



**32224 HIGHWAY 31
BREWTON, ALABAMA 36426**

PREPARED BY:

**SYNTERRA
148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601**



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1.0 INTRODUCTION

This Groundwater Monitoring and Statistical Analysis Plan has been prepared specifically for the Georgia-Pacific (GP) Brewton Mill Main Landfill site in Brewton, Alabama. This plan has been prepared to meet the requirements of the Alabama Department of Environmental Management (ADEM) Land Division – Solid Waste Program Permit Regulations, ADEM Admin. Code R.335-13-4 for solid waste disposal sites. The Brewton Mill Main Landfill is regulated under ADEM solid waste permit No. 27-05.

The Brewton Mill Main Landfill site will be monitored in a manner that protects human health and the environment by monitoring the quality of background and downgradient groundwater. The relevant point of compliance has been established based on site conditions. This monitoring plan also provides the mechanism for assessment and corrective action should a groundwater protection standard be exceeded at the point of compliance.

1.1 Certification

The analytical parameters, sampling and analysis procedures, and statistical analysis methods described in this Plan meet ADEM requirements. The number, spacing, and depth of the wells in the Brewton Mill Main Landfill groundwater monitoring system meets the requirements stated in R.335-13-4-.27 and is consistent with professional standards and practices in Alabama at the time this plan was prepared.



Howard Frank, P.G.
Alabama License No. 1210



2.0 RELEVANT POINT OF COMPLIANCE

The Brewton Mill Main Landfill is located on the southwest side of the Brewton Mill, west of the town of Brewton, Alabama (Figure 1). The location of the groundwater-monitoring network at the Brewton Mill Main Landfill was determined based upon limited space between the landfill boundaries, the locations of mill's former and current wastewater treatment system, and ancillary manufacturing operations (Figure 2).

The Main Landfill occupies approximately 65 acres. Space around the Main Landfill is limited by the former sludge lagoon to the west/northwest, a railroad line, the mill's wastewater treatment system to the south/southeast, and manufacturing operations to the north. The groundwater-monitoring network serves as the relevant point of compliance.

To demonstrate the suitability of the monitoring wells to monitor groundwater quality in the uppermost aquifer around the unit, water level measurements are taken semiannually in the wells. A water level map from the most recent semiannual monitoring event (September 2014) is included as Figure 3.

Based on the water level measurements, the direction of groundwater flow across the site is southwest (Figure 3). The horizontal gradient across the landfill averages approximately 0.003 feet per foot (September 2014 monitoring event). The approximate rate of groundwater flow near the Main Landfill is approximately 330 feet per year.

3.0 GROUNDWATER MONITORING SYSTEM

The Brewton Mill Main Landfill was established in 1986. The landfill occupies approximately 65 acres within the 5,000-acre mill site (Figure 1). The Main Landfill is used for disposal of nonputrescible and nonhazardous waste, including ash generated from the combustion of wood waste, wood yard debris, dewatered primary and secondary wastewater sludge, lime and causticizing by-products, and off-specification paperboard and pulp stock.

A total of six wells (MW-2, MW-3, MW-4R, MW-6, MW-7, and MW-8) have been installed around the Main Landfill to monitor groundwater quality (Figure 2). Permanent piezometer TW-04 is also included in the groundwater monitoring network, but is utilized for water level measurement only. Monitoring wells MW-6 and MW-7 are located upgradient of the landfill. Monitoring wells MW-2, MW-3, MW-4R, and MW-8 are located downgradient of the landfill. Monitoring wells MW-2 and MW-3 were installed in 1994. MW-4R was installed as a replacement well for MW-4 in July 2010. Monitoring wells MW-6, MW-7, and MW-8 and permanent piezometer TW-04 were installed in August 2014 as part of the minor permit modification request approved by ADEM through issuance of modified solid waste Permit 27-05, effective July 10, 2014.

Monitoring well MW-5 was originally installed as an upgradient monitoring well for the Main Landfill in 1994. Effective with the issuance date of the modified solid waste permit (July 10, 2014), MW-5 is no longer part of the groundwater monitoring well network for the Main Landfill. It will be properly abandoned after background conditions have been established for new upgradient monitoring wells MW-6 and MW-7.

The Brewton Mill is located in the Coastal Plain physiographic province of south Alabama. Surficial sediments of recent to Pleistocene age comprise the shallower aquifers of the area. The site is located at the edge of the floodplain of the Conecuh River. The landfill is bordered by low-lying land to the west and northwest. Groundwater recharge occurs because of direct infiltration of precipitation. Groundwater discharge occurs at the low-lying areas west and northwest of the site and along the Conecuh River to the south (RMT, Inc., 1994). A water level map showing the direction of groundwater flow is included as Figure 3.

Soils in the area generally consist of unconsolidated sands, gravels, silts, and clays. Silty sands and clays were the dominant soil types in the subsurface logged during

hydrogeologic investigations. A sand unit approximately 23 to 35 feet thick underlies the landfill throughout the site. Water present in the sand unit and the overlying clay, where present, forms the surficial aquifer at the site. The sand unit is overlain by fine-grained clay soils that exhibit low hydraulic conductivity, approximately 10 to 15 feet thick on the west side of the landfill. This layer of clay soils appears to pinch out to the east and is not present on the south side of the landfill. A deeper clay unit occurs at depths ranging from 23 to 52 feet below ground surface. The deeper clay unit appears to be contiguous throughout the site (RMT, Inc., 1994).

According to well construction records, the Main Landfill monitoring wells are constructed of 2-inch diameter PVC pipe. Well screens consist of a 0.010-millimeter slotted PVC screen set at the base of the well. Monitoring wells MW-2, MW-3, MW-6, MW-7, and MW-8 have a 10-foot screen. Monitoring well MW-4R has a 15-foot screen and MW-5 has a 5-foot screen. Sand was used to fill the annular space around the well screen. Bentonite powder was placed at the top of the sand pack to seal the well from surface water. The wells were completed by grouting to the surface. The wells are enclosed in 4-inch square steel protective casings. Well construction details are provided in Table 1. Construction diagrams and lithologic data are included as Appendix A.

The Main Landfill monitoring wells are primarily screened in sand, silty sand, or silty gravel. The total depth of the wells ranges from 13 feet below ground surface (MW-8) to 26 feet below ground surface (MW-7).

The average hydraulic conductivity for the GP Brewton Main Landfill is 7.74×10^{-4} feet per sec (66.9 feet per year). This is based on hydraulic conductivity testing performed at the Main Landfill in May 2009 and August 2014. Hydraulic conductivity values calculated for the Main Landfill wells ranged from 2.90×10^{-4} feet per second (MW-3) to 1.41×10^{-3} feet per second (MW-2). The lower hydraulic conductivity values in MW-5 are typical of clay soil. A summary of the hydraulic conductivity determination is included as Appendix B.

In accordance with the modified solid waste Permit 27-05, quarterly groundwater sampling will be conducted for the new wells to establish baseline groundwater quality data for statistical evaluation. The new wells (MW-6, MW-7, and MW-8) will be sampled for eight consecutive, quarterly events, beginning with the September 2014 monitoring event. Based on this schedule, the eighth event will be completed in June 2016 and the first semiannual detection monitoring event utilizing an interwell statistical comparison will be performed in September 2016.

The landfill analytical data will continue to be evaluated using intrawell statistical methods for inorganic compounds and interwell statistical methods for volatile organic compounds (VOCs) until after the eight sampling events for the new wells have been completed. After March 2016, interwell statistical methods will be used for both VOCs and inorganic compounds.




4.0 GROUNDWATER SAMPLING AND ANALYSIS

The procedures and protocols that will be used to perform groundwater monitoring of the Brewton Mill Main Landfill site are described in the following sections. This includes procedures and techniques for sample collection, sample preservation and shipment, analytical procedures, chain of custody, and quality assurance/quality control.

4.1 Field Sampling

Experienced technicians will conduct sampling activities. A copy of the sampling procedures and protocols will be provided to the sampling team and will be reviewed by that team prior to each sampling event. Personnel will wear new, disposable nitrile gloves during all groundwater sampling activities. At a minimum, the gloves will be replaced at each sample location. The wells will be purged using new disposable sampling equipment.

Groundwater sampling involves three tasks:

-  Measuring the static water level and well depth to calculate the volume of water in the well.
-  Properly purging the appropriate well volumes to generate a sample representative of the aquifer.
-  Collecting, preserving, and handling the groundwater samples prior to receipt by the laboratory in a way that maintains sample integrity.

To limit the potential for cross-contamination during the sampling event, the wells will be sampled in the order of the lowest level of constituent concentrations to the highest level of constituent concentrations, based on historical data. If the constituent levels are not known, the wells will be sampled from upgradient to downgradient.

4.2 Well Sampling Procedures

The initial step is to measure the water level and the depth of each well before purging. This will be accomplished by lowering an electrical water level indicator into the well until it touches the water and measures a response. The water level measurements will be taken to the nearest 0.01 foot. The water level indicator will be thoroughly decontaminated before use at each well. Each well will have a reference point from which the water level measurement is taken. The reference point will be established in relation to a permanent benchmark, as mean sea level (msl), and the survey shall note

the well location. An Alabama Registered Land Surveyor has surveyed the benchmark for each well (Table 1). Water level elevations will be measured within a 24-hour period of the day that the samples are collected.

The monitoring wells will be purged before taking samples to clear the well of stagnant water, which is not representative of aquifer conditions. To determine the purge volume, the following method will be used:

$$V = 0.041 d^2 h, \text{ where: } V = \text{one well volume of water in gallons}$$

$d = \text{diameter of the well casing in inches}$

$h = \text{height of the water column in feet}$

A minimum of four well volumes of water will be purged from the Main Landfill monitoring wells, unless the well goes dry prior to the removal of four well volumes. Indicator parameters (pH, specific conductance, turbidity, and temperature) will be measured periodically and recorded to document stabilization of these parameters prior to sample collection. The meters used for field measurements will be calibrated in the field to the equipment manufacturer's specifications. At least one set of indicator parameter readings will be collected per well volume. The well will be considered properly purged if the indicator parameters of specific conductance and temperature have stabilized to within 10 percent of the previous reading and the pH has stabilized to within 0.1 units of the previous reading.

The monitoring wells will be purged using new, disposable high-density polyethylene bailers.

4.3 Sample Collection and Parameters

The wells will be sampled using quiescent sampling methods. Samples for VOCs will be collected from each well immediately after purging if sufficient water for sampling is present. If the well goes dry during purging, the sample will be collected after the volume of groundwater necessary for the VOC sample has accumulated in the well. Samples for metals analysis will be collected the day following purging using a disposable bailer. The bailer will be lowered in the well to the top of the water column and the sample will be collected with minimal disturbance to the water column. No purging will be performed on the day that the samples for metals analysis are collected.

The samples from the Brewton Mill Main Landfill will be analyzed for parameters listed in Appendix I of R.335-13-4. The Appendix I constituents are summarized in Table 2.

Samples will be collected on a semiannual basis in March and September. Groundwater monitoring will be conducted during the life of the facility, including the closure and postclosure periods.

4.4 Chain-of-Custody Procedures

By the use of chain-of-custody procedures, the handling of samples will be traceable from the time of collection to the time of final sample disposition. Field sampling personnel will be responsible for collecting the samples and for logging the samples into assigned field notebooks or a sample collection log. The field sampling personnel will complete and verify the chain-of-custody forms. The laboratory sample custodian and analysts will be responsible for custody of samples at the laboratory.

Prior to collecting samples in the field, the sampling personnel will obtain the sample bottles necessary for sampling. A self-adhesive sample label will be affixed to each sample bottle before sample collection. The field sampler will complete the label with the appropriate information using waterproof ink. At a minimum, the sample label will contain the following:

- 🌀 Client - Job Name/Project Number
- 🌀 Sample Identification
- 🌀 Date and Time Collected (except for duplicate samples)
- 🌀 Sampler's Signature (or initials)
- 🌀 Required Preservatives

Chain-of-custody forms will accompany sample containers to document the transfer of the containers and samples from the originating laboratory through the field and to the laboratory receiving the samples for analyses. A sample container is under custody in the field if the following conditions exist:

- 🌀 It is in the field investigator's actual possession.
- 🌀 It is in the field investigator's view, after being in his/her physical possession.
- 🌀 It was in the field investigator's physical possession and then she/he secured it to prevent tampering.
- 🌀 It is in a secure area restricted to authorized personnel only.

The field sampling personnel will complete and verify the chain-of-custody forms. A copy of the chain-of-custody will be placed in the landfill operating record and the original will accompany the shipped samples. If the samples are shipped by a commercial carrier, a copy of the shipping label will be placed into the landfill operating record. Shipping label numbers will be included on the chain-of-custody form, along with the company name of the carrier.

For shipment to the laboratory, shipping containers will be sealed and accompanied by the chain-of-custody record, with appropriate signatures. The transfer of custody is the responsibility of the field sampling personnel and the laboratory. Upon receipt by the laboratory, a sample custodian will inspect the condition of the samples, reconcile the sample(s) received against the chain-of-custody record, log in the sample(s) in the laboratory sample tracking system, and store the sample(s) in a secured sample storage area maintained at a temperature between 0° and 4° Celsius (C) until assigned to an analyst for analysis.

The pH of samples that contain preservatives will be checked on arrival at the laboratory. In addition, the temperature of the samples will also be measured and documented on the chain-of-custody form upon receipt at the laboratory.

4.5 Sample Handling and Analysis

Sample containers, preservation methods, and holding times that meet US EPA standards will be used. Samples will be collected in new, preserved containers provided by the contract laboratory. Sample vials for VOC analyses will be preserved with hydrochloric acid. Sample bottles for metal analyses will be preserved with nitric acid.

For delivery of samples to the laboratory, the following procedure will be implemented:

<u>Step</u>	<u>Procedure</u>
1.	Collect and seal the samples as outlined in this plan.
2.	Place sample containers in laboratory shipping container(s). Samples will be packed securely with packing material to protect the sample containers from accidental breakage during shipment and to prevent a leak or spill.
3.	Fill shipping container with enough ice to last the trip. Place ice in sealed plastic bags around sample containers.
4.	Complete the chain-of-custody form(s).

5. Place the chain-of-custody form in a sealed plastic bag and place inside the shipping container.
6. Seal shipping container using packing tape or duct tape.
7. Deliver or ship to the laboratory. Fastest available shipping methods will be used whenever required by short holding times or project schedules.

4.6 Analytical Methods

The laboratory performing the analyses will use the methods specified in Appendix I of R. 335-13-4. The record of groundwater analyses shall include the methods used (by number), the sample preparation date (if applicable), and the date of actual analysis. Data from samples that are not analyzed within the recommended holding times will be considered suspect. Any deviation from an US EPA-approved method shall be adequately tested to ensure that the quality of the results meets the performance specifications (*e.g.*, detection limit, sensitivity, precision, accuracy) of the reference method. A planned deviation shall be justified and submitted for approval by ADEM.

4.7 Field Analytical Techniques

Equipment used for field analytical measurements will be suitable for the analytical method and will be properly calibrated each day it is in use. Field analysis will be conducted on samples that are considered representative of the source from which they were collected. The field analyses described below will be performed on all water samples collected.

Measurement of pH and Temperature

Measurements of pH will be made using a combination electrode and portable pH meter. A meter with provisions for automatic temperature compensation will be used. The pH probe will contain a temperature sensor and will be used for measuring sample temperature. The meter will be calibrated daily according to the manufacturer's instructions.

The meter will be checked for any mechanical or electrical failures, weak batteries, and cracked or fouled electrodes before mobilizing for field activities. For an apparent discrepancy in a pH measurement, the electrode will be checked with pH 7.0 buffer and recalibrated to the closest reference buffer. The sample will then be reanalyzed. The buffer solution containers will be refilled each day from fresh stock solutions.

Measurement of Conductivity

The meter will be calibrated according to the manufacturer's instructions. Batteries will be checked, and conductivity cells will be cleaned and checked against known standards. Sample results will be expressed in micromhos/centimeter (umhos/cm), automatically temperature compensated to 25° C.

Measurement of Turbidity

The meter will be calibrated according to the manufacturer's instructions. Batteries will be checked, and the meter calibration will be checked against known standards. Sample results will be expressed in nephelometric turbidity units (NTUs).

5.0 QUALITY ASSURANCE/QUALITY CONTROL

To assess and verify the performance of the field sampling and laboratory techniques, the following quality control procedures will be followed.

5.1 Equipment Blanks

If contaminants are routinely detected in landfill monitoring well samples, equipment blanks will be collected as a quality control check on the field sampling equipment, sample collection methods, decontamination procedures, and external contamination. Equipment blanks consist of distilled water poured over clean, unused field sampling equipment, *e.g.*, bailer or pump, and contained in each sample container or bottle with any preservatives required for that analysis.

5.2 Trip Blank

A trip blank of deionized water sealed in 40-milliliter VOC vials at the laboratory will be shipped with the sample bottles to the field and back to the laboratory. Other appropriate sample containers may be used at the discretion of the laboratory. Analytical results from trip blanks will be used to evaluate contamination introduced by laboratory equipment and sample handling and transportation procedures.

5.3 Laboratory Quality Assurance/Quality Control

Samples from the Brewton Mill Main Landfill monitoring wells will be analyzed by a qualified commercial environmental laboratory accredited by the National Environmental Laboratory Accreditation Program (NELAP). At a minimum, laboratory quality control will include analysis of method blank samples, laboratory control samples, and matrix spike samples.

5.4 Data Validation

Laboratory analytical data will be reviewed for precision, accuracy, and completeness in accordance with the permit requirements, the US EPA *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (USEPA-540-R-08-01, June 2008), *Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (EPA540/R-10/011, January 2010), and the most recently promulgated versions of the analytical methods.

After receipt of the laboratory analytical results, the data package will be reviewed for completeness to verify the appropriate samples were collected and the requested analyses performed. The sample collection logs will be reviewed and compared to the chain-of-custody documentation to verify collection information is properly

transcribed. The chain-of-custody forms will be verified against the laboratory sample check-in documentation.

Laboratory batch quality control data will be evaluated for precision, accuracy, and completeness. Trip blank and equipment blank data will be reviewed to verify no contamination was present.

6.0 STATISTICAL ANALYSIS PROCEDURES

To comply with R.335-13-4-.27(2)(a)3.(l), groundwater analytical data from the GP Brewton Mill Main Landfill will be evaluated to determine whether a statistically significant increase (SSI) has occurred. Appropriate statistical methods for the landfill groundwater monitoring program will be determined utilizing the US EPA's *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance* (EPA 530/R-09-007, March 2009) and the ASTM *Standard Guide for Developing Appropriate Statistical Approaches for Groundwater Detection Monitoring Programs* (D6312-98, 2012). The data set for each constituent detected during each semiannual monitoring event will be evaluated for SSIs using the statistical method considered appropriate based on the detection frequency of each constituent in each well and the statistical characteristics of the data set (*i.e.*, distribution type, number of background samples, variations in reporting limits, *etc.*).

The groundwater monitoring well network for the Brewton Mill Main Landfill was modified in August 2014 to include three new wells (MW-6, MW-7, and MW-8) and one permanent piezometer (TW-04). The changes to the groundwater monitoring well network were made as indicated in the minor permit modification request approved by ADEM through issuance of modified solid waste Permit 27-05, effective July 10, 2014.

In accordance with modified solid waste Permit 27-05 (effective July 10, 2014), an interwell statistical comparison will be utilized after baseline groundwater quality data for statistical evaluation has been established for new wells MW-6, MW-7, and MW-8. A minimum of eight data sets are required for evaluating distribution. The new wells will be sampled for eight consecutive, quarterly events, beginning with the September 2014 monitoring event. Based on this schedule, the eighth event will be completed in June 2016 and the first semiannual detection monitoring event utilizing an interwell statistical comparison will be performed in September 2016.

The landfill analytical data will continue to be evaluated using intrawell statistical methods for inorganic compounds and interwell statistical methods for VOCs until after the eight sampling events for the new wells have been completed. After March 2016, interwell statistical methods will be used for both VOCs and inorganic compounds. Interwell statistical methods are described in this Groundwater Monitoring and Statistical Analysis Plan.



Current upgradient monitoring well MW-5 will be properly abandoned after background has been established for new upgradient monitoring wells MW-6 and MW-7.

Once background conditions have been established for the new wells, an appropriate interwell prediction limit statistical procedure will be utilized to statistically evaluate groundwater monitoring data from the Brewton Main Landfill. Data sets from the upgradient wells (MW-6 and MW-7) will be combined to form a pooled background data set. Data from each downgradient monitoring well will be compared to the pooled background data set to determine if a SSI has occurred.

6.1 Statistical Evaluation

The first step in statistically evaluating the data is to determine the type of distribution exhibited for each parameter at each well and for the pooled background data set. The appropriate prediction interval statistic used to calculate the prediction limit is dependent upon whether the data for a given constituent exhibits a normal or non-normal distribution and the number of nondetected results in a data set. The Shapiro-Wilks normality test, or comparable procedure, will be used to evaluate the statistical distribution of the data sets.

The data will then be screened for outliers and trends prior to conducting the statistical analysis. If an outlier is detected in the current data set, it will be screened for statistical significance for informational purposes. Based on the results of the statistical screening, the verification resampling strategy will be as follows:

-  If the outlier result is not statistically significant, the result will be verified by resampling during the next semiannual monitoring event. If results of the resampling do not confirm the outlier result as being valid, the outlier result will not be included in the historical dataset for computing background mean and standard deviation for the compliance statistic.
-  If the outlier result appears to be statistically significant, the result will be verified by resampling within 45 days of the date of the original sampling event. If results from the resampling do not confirm the suspected outlier as being valid, then results from the resampling will replace the outlier result in the database. Statistical analysis will then be performed on results from the resampling.

The trend analysis procedure will be used with the prediction interval procedure to support conclusions about potential SSIs.

6.2 Prediction Limit Procedure

The interwell Prediction Limit statistic will be used to compare the results for the most recent sample to the historical (background) data for each constituent in each well. The data will be evaluated using either a Parametric or Nonparametric Prediction Limit procedure, based on data distribution, and other statistical characteristics, as prescribed in the US EPA and ASTM guidance documents. A determination that the current result lies in the historical population indicates that a statistically significant increase has not occurred and that the given parameter complies with established standards.

The Prediction Limit procedure estimates numerical bounds on a series of m independent future values. The prediction limit can be used to test whether the mean of one or more data points are equal to the mean of a background population. Assuming there is insignificant natural spatial variability, a prediction limit can be constructed using historical background data. The number of futures samples (m) should be chosen to reflect a single new observation collected from each compliance well prior to the next statistical evaluation, plus a fixed number ($m-1$) of possible resamples. The initial future observation at each compliance point is then compared to the prediction limit. If it exceeds the prediction limit, one or more verification samples are collected and retested (US EPA *Unified Guidance*, Part I, Chapter 8, Section 8.3) prior to declaring an SSI.




6.3 Alternate Statistical Methods

The Prediction Limit procedure is only one of the statistical methods that might be utilized to evaluate groundwater quality data. This conventional statistical method is recognized in the US EPA and ASTM guidance. However, more robust techniques for handling nondetected values are available and might be appropriate for the site. Comparisons between the conventional statistical methods and alternate statistical procedures might be performed and submitted to ADEM for approval in the event that GP utilizes a statistical method other than the interwell prediction interval to determine whether an SSI has occurred at the Brewton Mill Main Landfill.

7.0 DETECTION MONITORING PROGRAM

Detection monitoring will continue on a semiannual basis during the life of the facility, continuing into the closure and postclosure care period, in accordance with R.335-13-4-.27(3). The results of the groundwater monitoring will be provided to ADEM within 90 days of sample collection and added to the landfill operating record.

GP will submit to ADEM a report containing all of the analytical and statistical analysis performed at the Brewton Mill Main Landfill for the sampling. The report will contain:

-  A determination of the technical sufficiency of the monitoring well network in detecting a release from the Main Landfill,
-  The determination of groundwater elevations, groundwater flow directions, and groundwater flow rates, and
-  The results of the statistical analysis performed on the analytical data.

A Statistically Significant Increase (SSI) will be declared when a detected sample concentration exceeds the upper prediction limit for a data value that has been confirmed by verification sampling.

If it is determined that a preliminary SSI for one or more of the constituents required for routine monitoring at any one of the point of compliance wells, GP shall within 14 days notify ADEM of the finding and which constituents have shown statistically significant increases and place a copy of the notice in the Landfill Operating Record. GP will resample the monitoring well in question within 45 days of the finding to determine the validity of the results. ADEM will be notified of the results of the resampling within 45 days of collection of the samples.

If the SSI is verified, GP will, within 90 days determine whether the exceedance can be related to a source other than the landfill or is a result from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality prior to establishing an assessment monitoring program. If a successful demonstration is made and documented, GP will continue detection monitoring as specified. If a successful demonstration is not made, GP will initiate the assessment monitoring program.

8.0 ASSESSMENT MONITORING AND CORRECTIVE ACTION PROGRAM

Assessment monitoring will be initiated if a statistically significant increase over background has been detected and validated for one or more of the groundwater monitoring constituents listed in Table 2 and an alternate source has not been identified. The assessment monitoring program will be implemented in accordance with specifications outlined in R.335-13-4-.27(4). Within 90 days of initiating an assessment monitoring program, GP will prepare and submit to ADEM for review and approval, a groundwater quality assessment plan for identifying the source, nature, and extent of the constituents in groundwater. The groundwater quality assessment plan will contain a detailed schedule for the implementation and completion of the provisions of the plan. Upon approval of the plan, GP will implement the plan according to the plan schedule. The groundwater quality assessment will be completed in a timely manner as outlined in the plan. If contamination is determined to have migrated off-site, GP will notify all persons who own land or who reside on land that directly overlies any part of the plume of contamination.

If the concentration of the constituent(s) which triggered assessment monitoring program is below the groundwater protection standard, the facility will remain in assessment monitoring until the constituent(s) is not detected above the laboratory reporting limit for at least two consecutive monitoring events, in accordance with ADEM Admin. Code R.335-13-4-27(4)(e).

Within 90 days of finding that any of the assessment monitoring constituent has been detected at a statistically significant level exceeding the groundwater protection standards, GP shall initiate an assessment of corrective action measures. The assessment of corrective measures shall be conducted in accordance with specifications stipulated in R.335-13-4-.27(5).

Upon the completion of the corrective action assessment, GP shall submit to ADEM a corrective action remedy detailing the actions to be taken to address groundwater quality and a schedule for the initiation and completion of remedial activities. Corrective action will be initiated and completed within a reasonable time period as determined by the technical factors. The corrective action remedy will be protective of human health and the environment; attain appropriate groundwater protection standards; control the source of the release; and comply with all applicable standards for the management of wastes.

GP will implement the corrective action plan within 90 days of approval by ADEM or as stipulated in R.335-13-4-.27(5). The corrective action plan will also contain provisions for the implementation of a groundwater monitoring program and network to demonstrate the effectiveness of the corrective action program. GP will continue the corrective action measures to the extent necessary to ensure that the groundwater protection standards are not exceeded for a period of three consecutive years. GP will submit to ADEM semiannual reports, which discuss the effectiveness of the corrective action program.

If GP or ADEM determines that the corrective action program no longer performs to design specifications or is ineffective in achieving the required results, GP will submit to ADEM within 90 days of the determination, a proposal to make appropriate changes or revisions to the corrective action program.

If groundwater protection standards are exceeded at the end of the postclosure care period, GP will be responsible for maintaining the corrective action program to the extent necessary. When ADEM has issued approval to discontinue the corrective action program, GP will return to detection monitoring of the landfill for the remainder of the active life and post-closure care period, unless additional groundwater quality assessment or corrective actions are required.

9.0 REFERENCES

US EPA Region IV, 2012 – 2014, Science and Ecosystem Support Division, Field Branches Quality System and Technical Procedures.

US EPA, March 2009, *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities – Unified Guidance*, EPA 530/R-09-007.

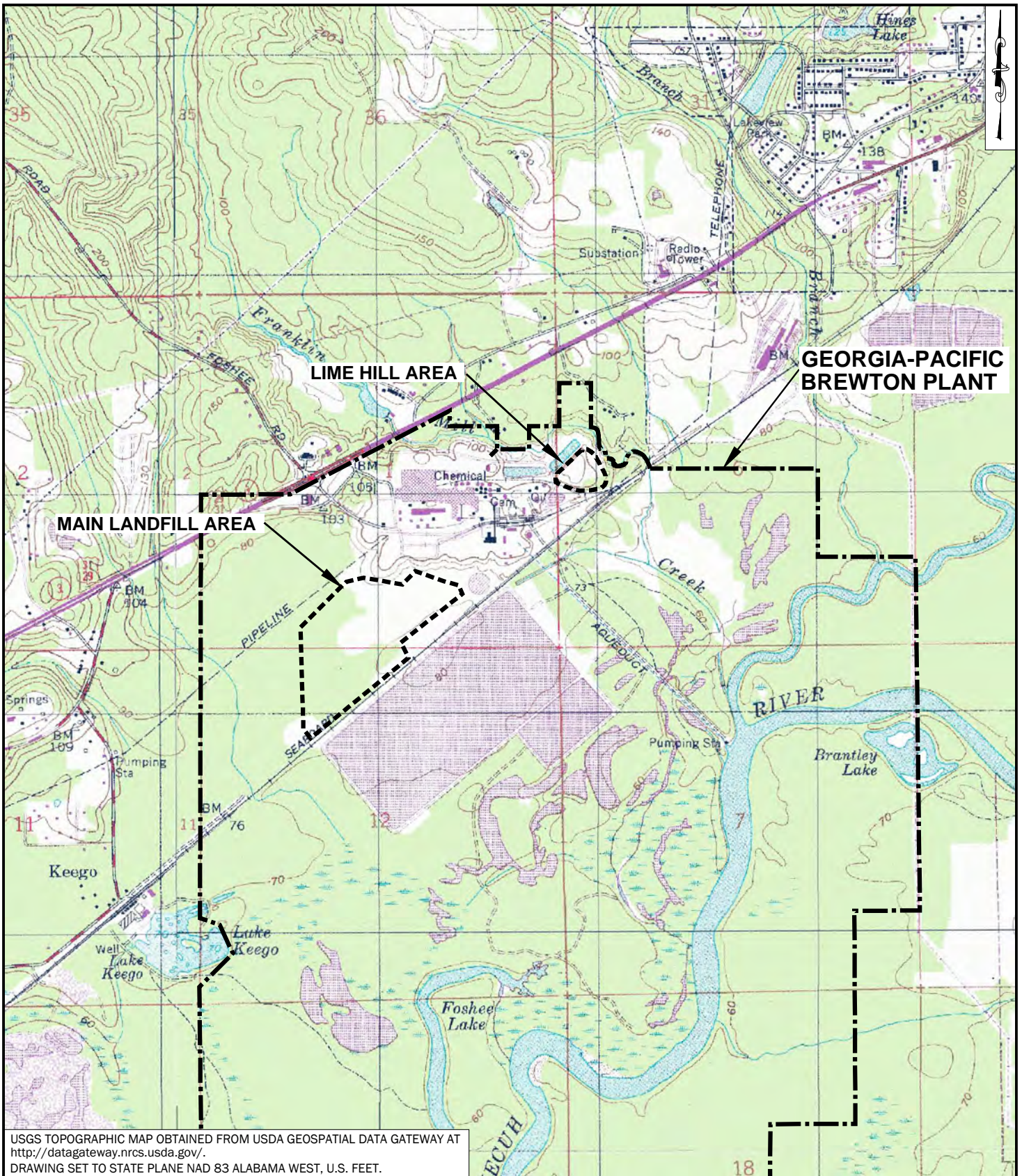
ASTM D6312-98, 2012, *Standard Guide for Developing Appropriate Statistical Approaches for Groundwater Detection Monitoring Programs*.

Gibbons, R.D. (1994) *Statistical Methods for Groundwater Monitoring*. John Wiley & Sons, Inc., New York.

Gibbons, R.D. (1999) Use of Combined Shewhart-CUSUM Control Charts for Ground Water Monitoring Applications. *Ground Water*, v.37 no.5, p.682-691.

RMT, Inc., Solid Waste Landfill Vertical Expansion Feasibility Study Project Report, Container Corporation of America, Brewton, Alabama, June 1994.

FIGURES



USGS TOPOGRAPHIC MAP OBTAINED FROM USDA GEOSPATIAL DATA GATEWAY AT <http://datagateway.nrcs.usda.gov/>.
DRAWING SET TO STATE PLANE NAD 83 ALABAMA WEST, U.S. FEET.



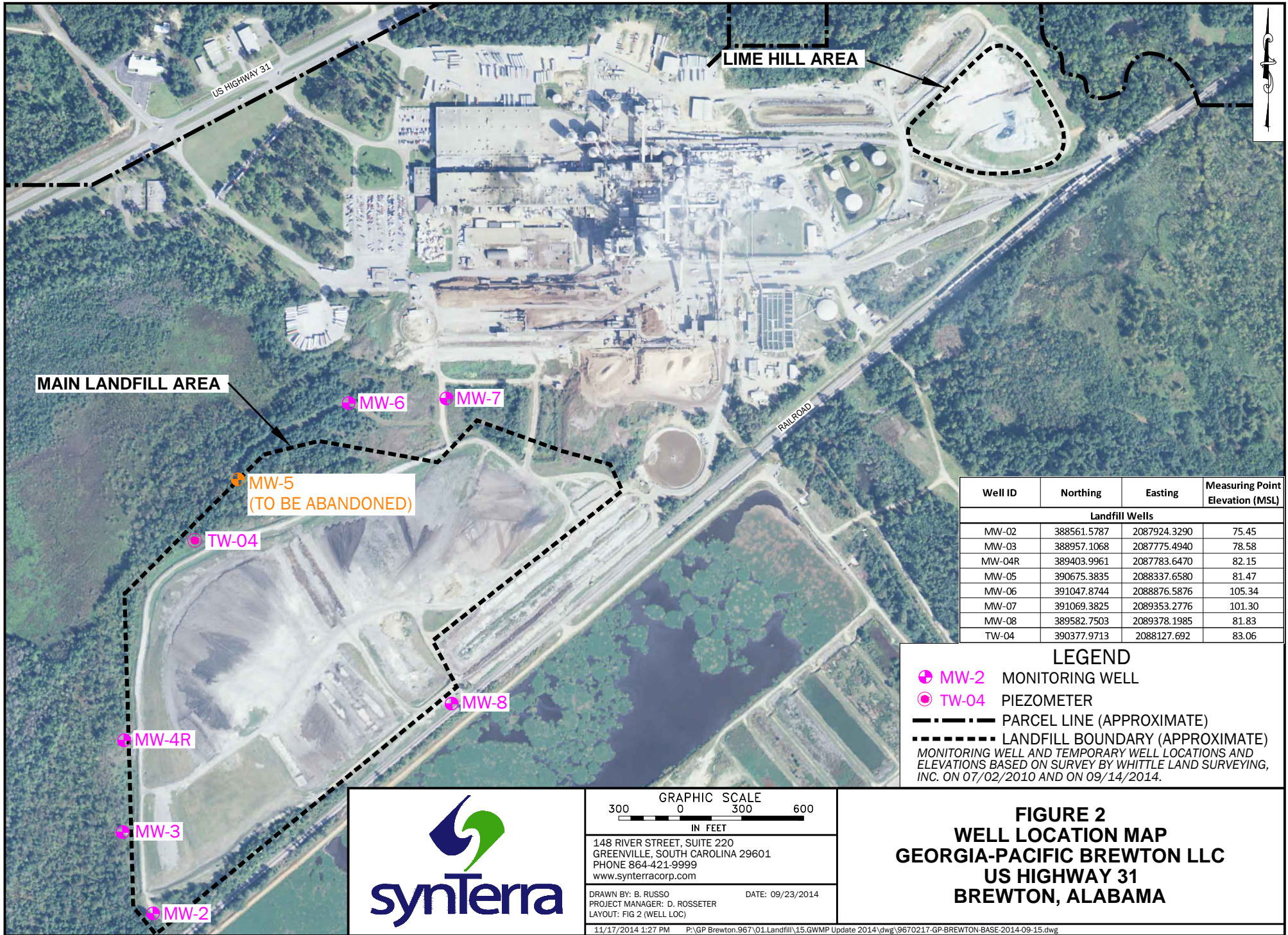
148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA
PHONE 864-421-9999
www.synterracorp.com



FIGURE 1
USGS TOPOGRAPHIC MAP
GEORGIA-PACIFIC BREWTON LLC
US HIGHWAY 31
BREWTON, ALABAMA
BREWTON, AL QUADRANGLE

DRAWN BY: B. RUSSO
PROJECT MANAGER: D. ROSSETER
LAYOUT: FIG 1 (USGS)
DATE: 07/24/2012
CONTOUR INTERVAL: 10 FT
MAP DATE: 1986





Well ID	Northing	Easting	Measuring Point Elevation (MSL)
Landfill Wells			
MW-02	388561.5787	2087924.3290	75.45
MW-03	388957.1068	2087775.4940	78.58
MW-04R	389403.9961	2087783.6470	82.15
MW-05	390675.3835	2088337.6580	81.47
MW-06	391047.8744	2088876.5876	105.34
MW-07	391069.3825	2089353.2776	101.30
MW-08	389582.7503	2089378.1985	81.83
TW-04	390377.9713	2088127.692	83.06

LEGEND

- MW-2 MONITORING WELL
- TW-04 PIEZOMETER
- · - · - PARCEL LINE (APPROXIMATE)
- - - - LANDFILL BOUNDARY (APPROXIMATE)

MONITORING WELL AND TEMPORARY WELL LOCATIONS AND ELEVATIONS BASED ON SURVEY BY WHITTLE LAND SURVEYING, INC. ON 07/02/2010 AND ON 09/14/2014.

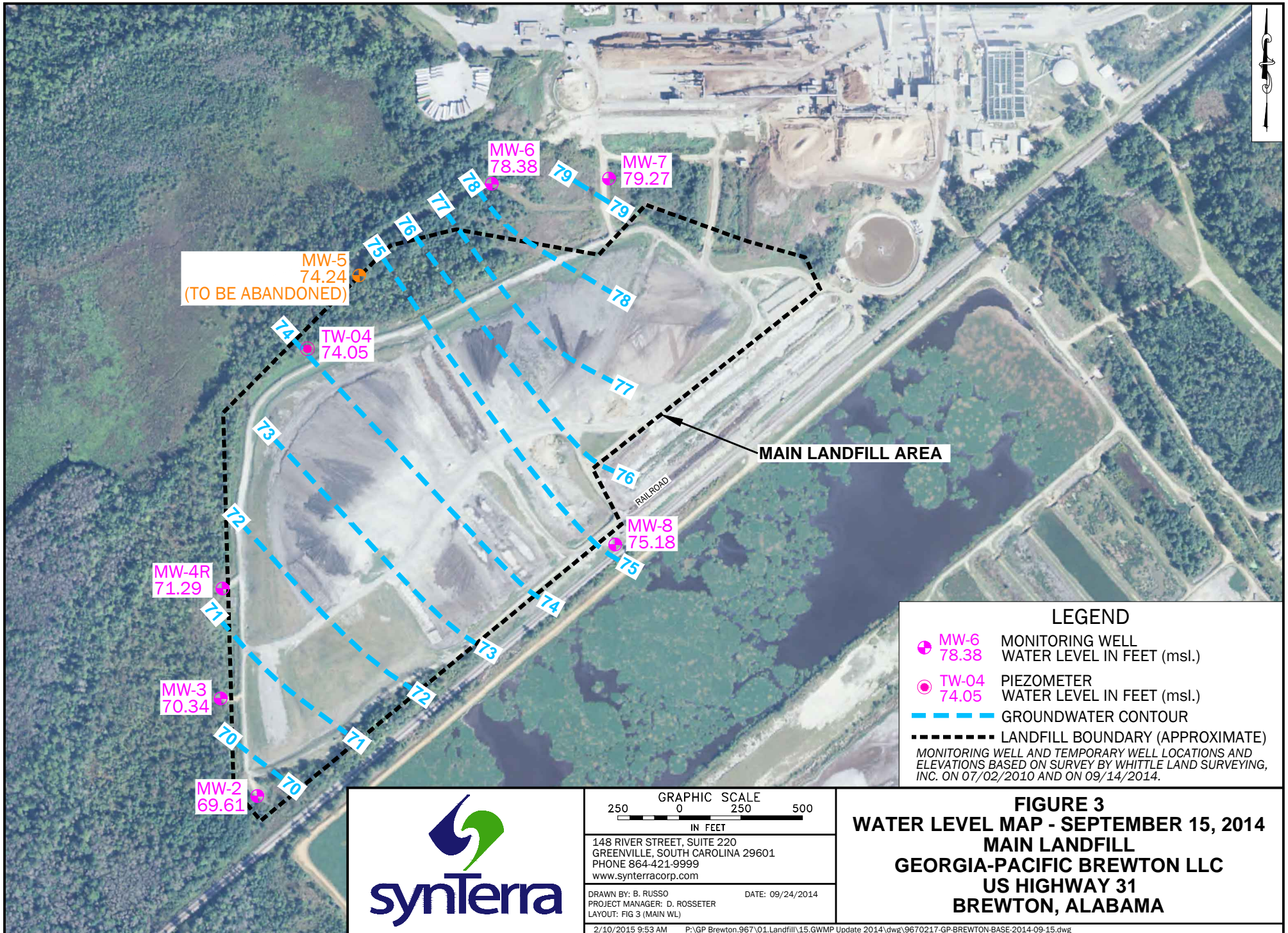


GRAPHIC SCALE
300 0 300 600
IN FEET

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: B. RUSSO DATE: 09/23/2014
PROJECT MANAGER: D. ROSSETER
LAYOUT: FIG 2 (WELL LOC)

FIGURE 2
WELL LOCATION MAP
GEORGIA-PACIFIC BREWTON LLC
US HIGHWAY 31
BREWTON, ALABAMA



LEGEND

- MW-6 78.38 MONITORING WELL WATER LEVEL IN FEET (msl.)
- TW-04 74.05 PIEZOMETER WATER LEVEL IN FEET (msl.)
- GROUNDWATER CONTOUR
- LANDFILL BOUNDARY (APPROXIMATE)

MONITORING WELL AND TEMPORARY WELL LOCATIONS AND ELEVATIONS BASED ON SURVEY BY WHITTLE LAND SURVEYING, INC. ON 07/02/2010 AND ON 09/14/2014.

GRAPHIC SCALE

250 0 250 500

IN FEET

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synTerracorp.com

DRAWN BY: B. RUSSO DATE: 09/24/2014
PROJECT MANAGER: D. ROSSETER
LAYOUT: FIG 3 (MAIN WL)

2/10/2015 9:53 AM P:\GP Brewton.967\01.Landfill\15.GWMP Update 2014.dwg\9670217-GP-BREWTON-BASE-2014-09-15.dwg

FIGURE 3
WATER LEVEL MAP - SEPTEMBER 15, 2014
MAIN LANDFILL
GEORGIA-PACIFIC BREWTON LLC
US HIGHWAY 31
BREWTON, ALABAMA

TABLES

**TABLE 1. SUMMARY OF WELL CONSTRUCTION DETAILS
 GEORGIA-PACIFIC BREWTON, LLC
 MAIN LANDFILL PERMIT NO. 27-05
 BREWTON, ALABAMA**

Well ID	Date Installed	Northing	Easting	Top of Casing Elevation (feet MSL)	PVC Stickup (feet)	Ground Surface Elevation (feet)	Total Well Depth (feet bgs)	Well Screen Interval (feet bgs)
TW-04	11/5/2013	390377.9713	2088127.6920	83.06	2.58	80.48	15	5 to 15
MW-2	1/20/1994	388561.5787	2087924.3290	75.45	2.32	73.13	15.4	5 to 15
MW-3	1/24/1994	388957.1068	2087775.4940	78.58	3.18	75.40	20	9.6 to 19.6
MW-4R	7/7/2010	389403.9961	2087783.6470	82.15	2.34	79.81	24.5	9.5 to 24.5
MW-5 (to be abandoned)	1/27/1994	390675.3835	2088337.6580	81.47	3.03	78.44	10.3	4.9 to 9.9
MW-6	8/13/2014	391047.8744	2088876.5876	105.34	2.68	102.66	29	19 to 29
MW-7	8/13/2014	391069.3825	2089353.2776	101.30	2.49	98.81	26	16 to 26
MW-8	8/13/2014	389582.7503	2089378.1985	81.83	2.55	79.28	13	3 to 13

Prepared By: HJF Checked By: DMR

Notes

MSL - Mean Sea Level

bgs - below ground surface

TW-04, MW-6, MW-7, and MW-8 Locations and Elevations Based on Survey by Whittle Land Surveying, Inc. on 9/14/2014.

MW-2, MW-3, MW-4R, and MW-5 Locations and Elevations Based on Survey by Whittle Land Surveying, Inc. on 7/2/2010.

All survey measurements are in Alabama State Plan Coordinates and according to United States Standard Foot.

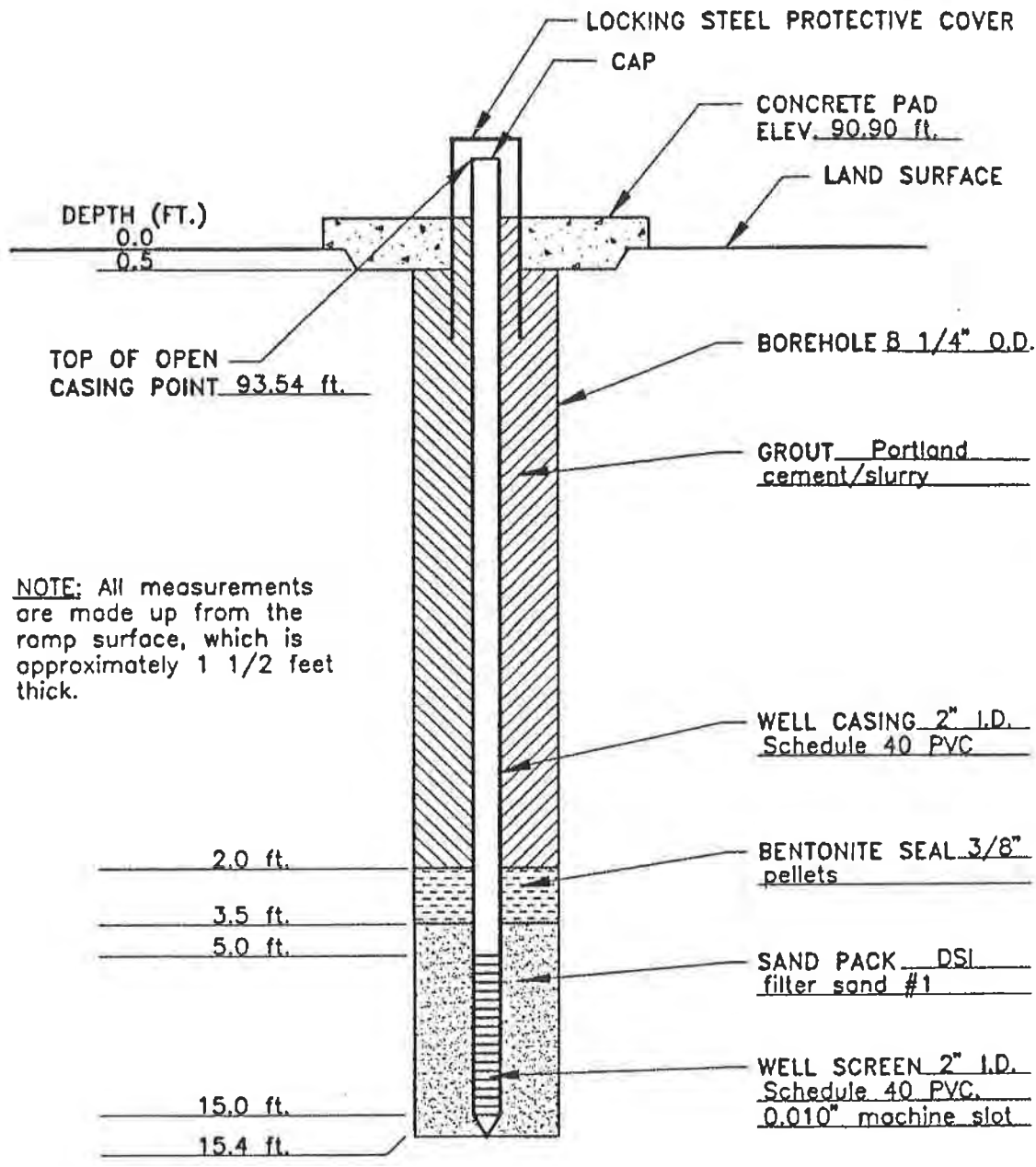
**TABLE 2. DETECTION MONITORING PARAMETERS
 BREWTON MILL MAIN LANDFILL
 Georgia-Pacific Brewton LLC
 Brewton, Alabama**

ANALYTE		
Appendix I Metals	Appendix I Volatile Organic Compounds	
Antimony, total	Acetone	trans-1,3-Dichloropropene
Arsenic, total	Acrylonitrile	Ethylbenzene
Barium, total	Benzene	2-Hexanone
Beryllium, total	Bromochloromethane	Methyl bromide
Cadmium, total	Bromodichloromethane	Methyl chloride
Chromium, total	Bromoform	Methylene bromide
Cobalt, total	Carbon disulfide	Methylene chloride
Copper, total	Carbon tetrachloride	Methyl ethyl ketone
Lead, total	Chlorobenzene	Methyl iodide
Mercury, total	Chloroethane	4-Methyl-2-pentanone
Nickel, total	Chloroform	Styrene
Selenium, total	Dibromochloromethane	1,1,1,2-Tetrachloroethane
Silver, total	1,2-Dibromo-3-chloropropane	1,1,2,2-Tetrachloroethane
Thallium, total	1,2-Dibromoethane	Tetrachloroethylene
Vanadium, total	1,2-Dichlorobenzene	Toluene
Zinc, total	1,4-Dichlorobenzene	1,1,1-Trichloroethane
	trans-1,4-Dichloro-2-butene	1,1,2-Trichloroethane
	1,1-Dichloroethane	Trichloroethylene
	1,2-Dichloroethane	Trichlorofluoromethane
	1,1-Dichloroethylene	1,2,3-Trichloropropane
	cis-1,2-Dichloroethylene	Vinyl acetate
	trans-1,2-Dichloroethylene	Vinyl chloride
	1,2-Dichloropropane	Xylenes
	cis-1,3-Dichloropropene	

APPENDIX A

Monitoring Well Construction Diagrams and Lithologic Data

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NOTE: All measurements are made up from the ramp surface, which is approximately 1 1/2 feet thick.

PIEZOMETER CONSTRUCTION DIAGRAM
Not To Scale

PROJECT CONTAINER CORP. OF AMERICA - BREWTON, AL

PROJECT NO. 70100.04

WELL NO. MW/PZ-2

DATE INSTALLED JANUARY 20, 1994

DRILLING CONTRACTOR A. T. & E.

RMT GEOLOGIST R. S. WIXON





BORING NO. ED-2

SHEET NO. 1 OF 2

PROJECT NAME CONTAINER CORP OF AMERICA PROJECT NO. 70100.04

LOCATION BREWTON, AL INSTALLATION _____

CONTRACTOR A.T. & E. SURFACE ELEV. _____

DRILLING METHOD MUD ROTARY BOREHOLE DIA. 4 IN.

SAMPLING NOTES					VISUAL CLASSIFICATION AND GENERAL OBSERVATIONS	
INTERVAL		RECOVERY		MOISTURE		
NO.	TYPE	BLOWS	%	%		DEPTH
1	SS	2-3 5-8	100		5	NOTE: All measurements are made from the ramp surface, which is approximately 1.0 ft. thick. SILTY SAND (SM) - fine to coarse grained; silty; soft; dark brown; roots abundant.
2	SS	9-10 13-15	65		10	SILT SAND (SM) - fine to coarse grained; silty; firm.
3	ST		20			SILTY GRAVEL (GM) - medium to very coarse; very silty; light grayish brown.
4	SS	4-6 6-7	65		15	SILTY SAND (SM) - medium to coarse grained; silty; light gray.
5	ST		55			
6	SS	5-5 4-8	70		20	SILTY SAND (SM) - fine to coarse grained; silty; grayish white.
7	ST		75			
8	SS	4-4 6-6	70		25	SILTY SAND (SM) - fine to medium grained; silty; very soft; light grayish white.
9	SS	6-9 13-12	70		30	- as above.
10	ST		50			
11	SS	6-6 7-7	70		35	- as above.

GENERAL NOTES	
DATE STARTED	<u>19 JAN 94</u>
DATE COMPLETED	<u>20 JAN 94</u>
RIG	<u>CME-550 ATV</u>
CREW CHIEF	<u>P. BERGMAN</u>
LOGGED	<u>RSW</u> CHECKED _____

WATER LEVEL OBSERVATIONS	
WHILE DRILLING	<input checked="" type="checkbox"/>
AT COMPLETION	<input checked="" type="checkbox"/>
AFTER DRILLING	_____
CAVE-IN: DATE/TIME	_____ DEPTH _____
WATER: DATE/TIME	<u>2/2 9:45</u> DEPTH <u>4.27 FT.</u>



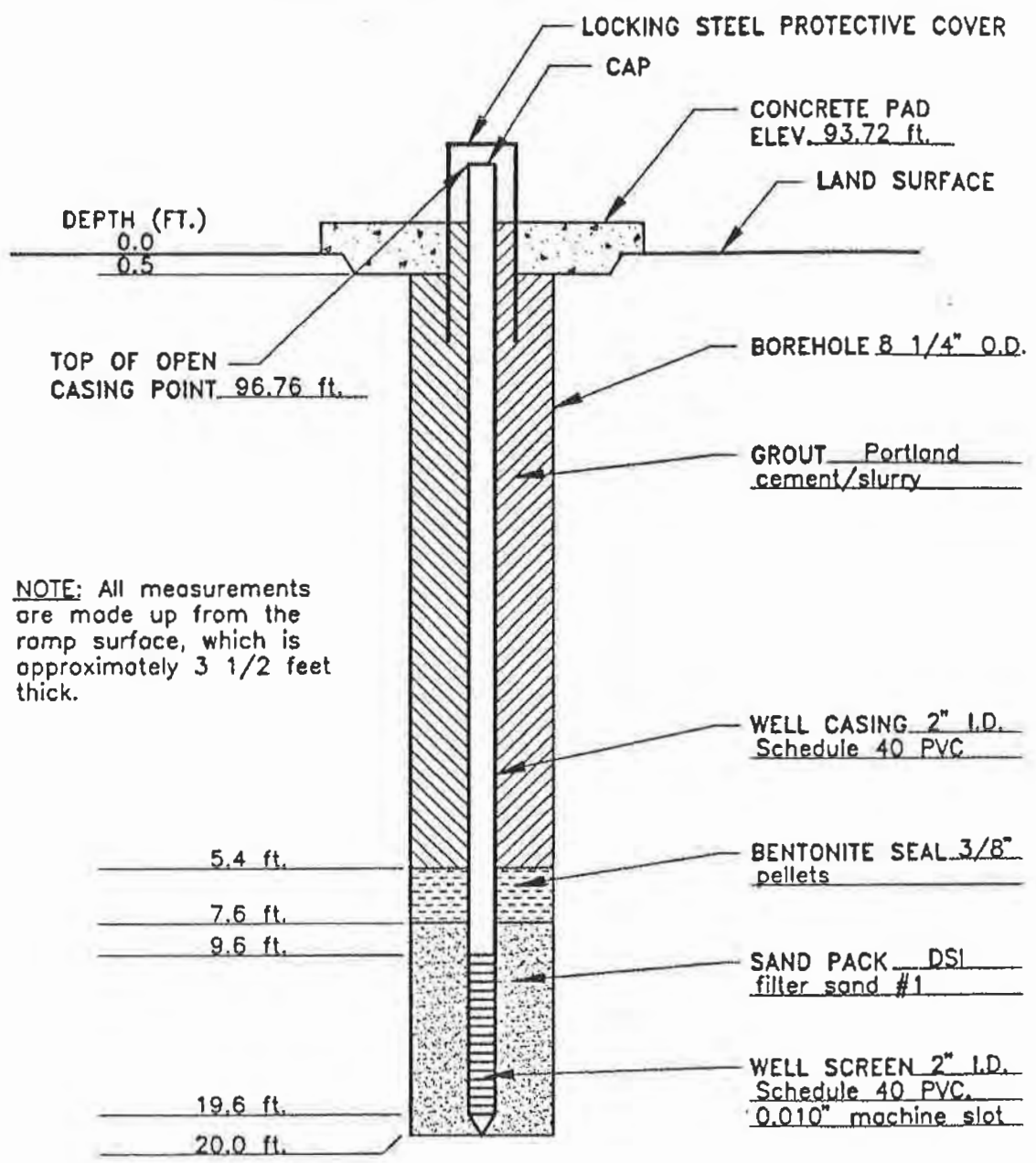
LOG OF TEST BORING

BORING NO. EB-2
 SHEET NO. 2 OF 2
 PROJECT NO. 70100.04
 INSTALLATION _____
 SURFACE ELEV. _____
 BOREHOLE DIA. 4 IN.

PROJECT NAME CONTAINER CORP OF AMERICA
 LOCATION BREWTON, AL
 CONTRACTOR A.T. & E.
 DRILLING METHOD MUD ROTARY

SAMPLING NOTES						VISUAL CLASSIFICATION AND GENERAL OBSERVATIONS
INTERVAL		RECOVERY		MOISTURE		
NO.	TYPE	BLOWS	%	%	DEPTH	
12	SS	2-1 1-4	60			SILTY SAND (SM) - fine to medium grained; silty; soft; light grayish white with a few streaks of light reddish brown. - as above; reddish orange color change observed in mud.
13	SS	3-5 7-7	80		45	
14	ST		0			CLAY (CL) - some very fine grained sand; very silty; highly plastic; yellowish orange mottled with greenish gray.
15	ST		70		50	
BORING TERMINATED AT 51.0 FEET						
					55	
					60	
					65	
					70	
					75	
					80	
					85	

J:\CAD\GRAPHIC\70100\70100MW3.DWG



PIEZOMETER CONSTRUCTION DIAGRAM
Not To Scale

PROJECT CONTAINER CORP. OF AMERICA - BREWTON, AL
PROJECT NO. 70100.04
WELL NO. MW PZ-3
DATE INSTALLED JANUARY 24, 1994
DRILLING CONTRACTOR A. T. & E.
RMT GEOLOGIST R. S. WIXON





LOG OF TEST BORING

BORING NO. EB-3SHEET NO. 1 OF 2PROJECT NAME CONTAINER CORP OF AMERICA PROJECT NO. 70100.04LOCATION BREWTON, AL INSTALLATION _____CONTRACTOR A.T. & E. SURFACE ELEV. _____DRILLING METHOD MUD ROTARY BOREHOLE DIA. 4 IN.

SAMPLING NOTES						VISUAL CLASSIFICATION AND GENERAL OBSERVATIONS
INTERVAL		RECOVERY		MOISTURE		
NO.	TYPE	BLOWS	%	%	DEPTH	
1	SS	WOH	0		5	NOTE: All measurements are made from the ramp surface, which is approximately 3.5 ft. thick. - no recovery.
2	SS	WOH	60		10	CLAY (CL) - silty; plastic; dark gray; abundant wood fragments.
3	SS	10-11 12-12	50		15	SAND (SP) - fine to coarse grained; some gravel; trace of silt; soft; white.
4	ST		0			
5	SS	5-5 6-5	60		20	SILTY SAND (SM) - fine to medium grained; some gravel; silty; soft; grayish white.
6	SS	3-2 3-4	50		25	SILTY SAND (SM) - fine to coarse grained; silty; very soft; grayish white.
7	SS	4-4 6-7	60		30	SAND (SW) - fine to medium grained, well-graded w/silt; silty; very soft; light gray to grayish white.
8	ST		0			
9	SS	4-6 7-6	70		35	- as above.
10	ST		75	23.4		- as above with clay and gravel; some wood fibers. (total unit weight = 117.0 pcf)

GENERAL NOTES	
DATE STARTED	<u>21 JAN 94</u>
DATE COMPLETED	<u>24 JAN 94</u>
RIG	<u>CME-550 ATV</u>
CREW CHIEF	<u>P. BERGMAN</u>
LOGGED	<u>RSW</u> CHECKED _____

WATER LEVEL OBSERVATIONS	
WHILE DRILLING	<u>∇</u> _____
AT COMPLETION	<u>∇</u> _____
AFTER DRILLING	
CAVE-IN: DATE/TIME	DEPTH _____
WATER: DATE/TIME	<u>2/2 10:10</u> DEPTH <u>6.56 FT.</u>



LOG OF TEST BORING

BORING NO. EB-3

SHEET NO. 2 OF 2

PROJECT NAME CONTAINER CORP OF AMERICA PROJECT NO. 70100.04

LOCATION BREWTON, AL INSTALLATION _____

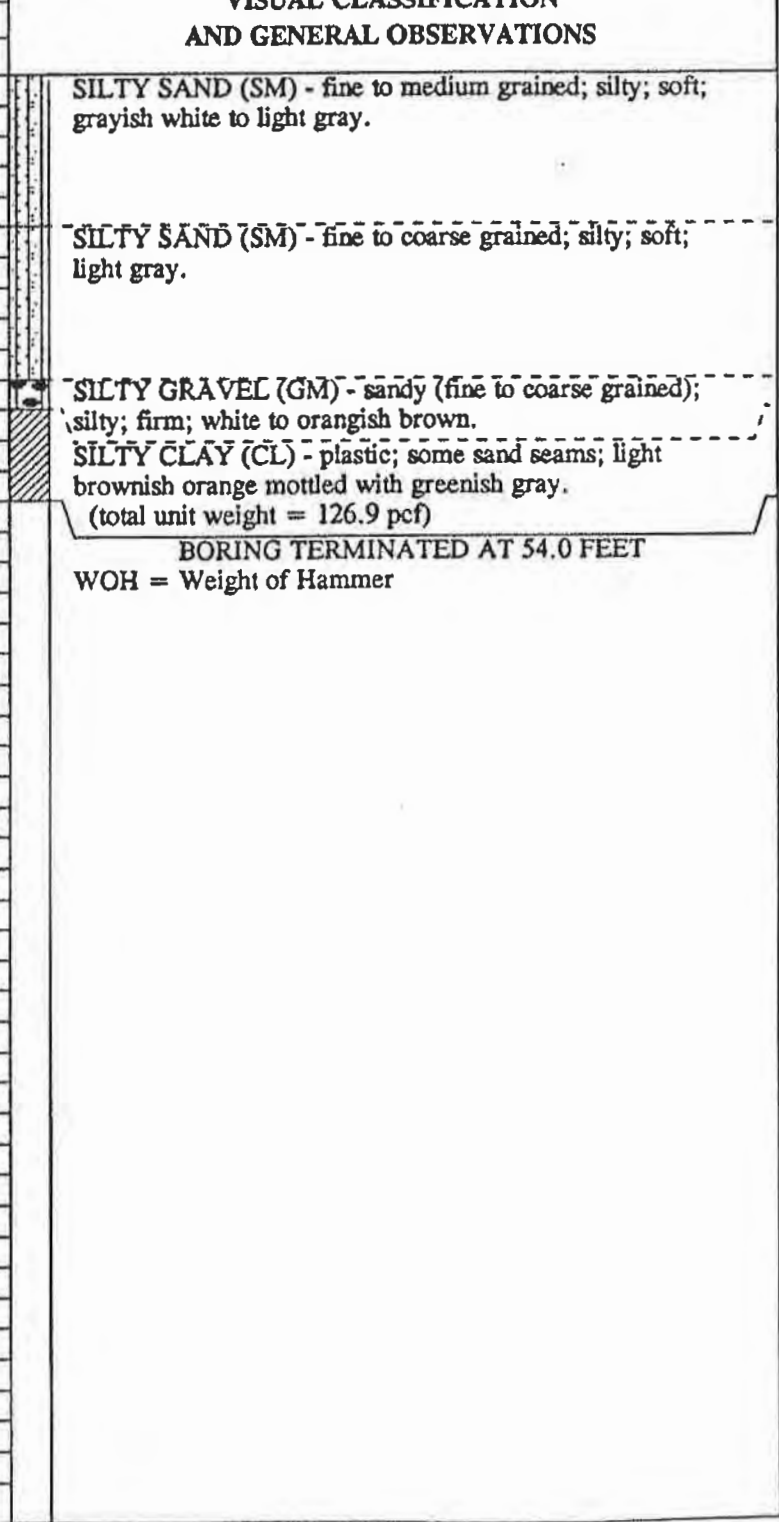
CONTRACTOR A.T. & E. SURFACE ELEV. _____

DRILLING METHOD MUD ROTARY BOREHOLE DIA. 4 IN.

SAMPLING NOTES

VISUAL CLASSIFICATION AND GENERAL OBSERVATIONS

INTERVAL		RECOVERY		MOISTURE	
NO.	TYPE	BLOWS	%	%	DEPTH
11	SS	5-5 8-12	70		
12	SS	6-8 9-14	70		45
13	SS	5-4 5-5	50		50
14	ST		100	19.9	54



PROJECT: MW-4 Well Replacement	WELL / BORING NO: MW-4R
PROJECT NO: 967.01	STARTED: 7/7/10 COMPLETED: 7/7/10
DRILLING COMPANY: Technical Drilling Services	NORTHING: 8139.4686 EASTING: 21787.7609
DRILLING METHOD: Hollow Stem Augers	ELEVATION 79.81 ft M.P. ELEV: 82.15 ft
BOREHOLE DIAMETER: 6.25 IN	WATER: ft TOC TOTAL DEPTH: 24.5 ft BGS
NOTES:	LOGGED BY: H. Frank CHECKED BY: J. Wylie

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)	WELL CONSTRUCTION
5			ASH, gray	X	100	1010		2" Schedule 40 PVC
10			ASH, gray, wood pulp, wet below 9 feet	X	100	0000		
15		SW	No Recovery (some wet sand in spoon). Material washed out of sampler.	X	0	0000		
20		SW	SAND, gray, fine to coarse sand grading to coarse gravel (1"+ diameter), well graded, loose, wet	X	90	3232		
25		SW	SAND, gray, fine to coarse sand grading to coarse gravel (1"+ diameter), well graded, loose, wet	X	50	3433		2" Schedule 40, 0.010 slot, PVC screen
25.5			Bottom of boring 25.5'					

LOG A E1WNN04 G-P BREWTON.GPJ GINT US LAB.GDT 8/13/10



SynTerra
 148 River Street, Suite 220
 Greenville, South Carolina 29601
 Telephone: (864) 421-9999
 Fax: (864) 421-9909

CLIENT: G-P Brewton
 PROJECT LOCATION: Brewton, Alabama

PROJECT: Well Installation-Main Landfill	WELL / BORING NO: MW-6 (LF)
PROJECT NO: 967.01.09	STARTED: 8/13/14 COMPLETED: 8/14/14
DRILLING COMPANY: Technical Drilling Services	NORTHING: 9783.3481 EASTING: 22880.6991
DRILLING METHOD: Hollow Stem Augers	ELEVATION 102.66 ft M.P. ELEV: 105.34 ft
BOREHOLE DIAMETER: 8.25 IN	WATER: 26.60 ft TOC TOTAL DEPTH: 29.0 ft BGS
NOTES: Lithology based on TW-02 and soil cuttings.	LOGGED BY: H. Frank CHECKED BY: J. Wylie

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)	WELL CONSTRUCTION
5								
10			Wood waste/organics, brown, 6" sandy silt lense at 4' bgs. Some fine gray sand and fine gravel, dry.					2" Schedule 40 PVC
15								Bentonite seal
20		SM	SAND, silty, poorly graded, very fine to fine grain, alternating layers (approximately 6" thick) of brown and gray sand. Black sand grains at 23.75'.					Gravel pack
25		SM	SAND, silty, poorly graded, very fine to fine grain, brown. (Description based on auger cuttings).					2" Schedule 40, 0.010 slot, PVC screen
			Bottom of Boring 29'					

LOG A EWIN04 G-P BREWTON.GPJ_GINT US LAB.GDT 9/23/14

PROJECT: Well Installation-Main Landfill	WELL / BORING NO: MW-7 (LF)
PROJECT NO: 967.01.09	STARTED: 8/13/14 COMPLETED: 8/14/14
DRILLING COMPANY: Technical Drilling Services	NORTHING: 9804.8562 EASTING: 23357.3891
DRILLING METHOD: Hollow Stem Augers	ELEVATION 98.81 ft M.P. ELEV: 101.30 ft
BOREHOLE DIAMETER: 8.25 IN	WATER: 21.84 ft TOC TOTAL DEPTH: 26.0 ft BGS
NOTES:	LOGGED BY: H. Frank CHECKED BY: J. Wylie

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)	WELL CONSTRUCTION
5			Wood waste/organics, dark brown, dry.		21	0		2" Schedule 40 PVC
10			Wood waste/organics, dark brown, dry.		21	0		Bentonite seal
15		SP	SAND, beige to orange/brown (variable), poorly graded, very fine grained, loose, dry.		100	32		Native material (borehole collapse).
20		SP	SAND, tan, poorly graded, very fine grained, loose, moist.		50	35		Gravel pack
25		SW	SAND, brown, fine to coarse grained, rounded gravel, well graded, loose, wet.		100	47		2" Schedule 40, 0.010 slot, PVC screen
		SW	SAND, gray, very fine to fine grained with fine to coarse gravel, rounded to subangular, loose, wet.					
			Bottom of boring 26'					

LOG A EWIN04 G-P BREWTON.GPJ_GINT US LAB.GDT 9/23/14

PROJECT: Well Installation-Main Landfill	WELL / BORING NO: MW-8 (LF)
PROJECT NO: 967.01.09	STARTED: 8/13/14 COMPLETED: 8/14/14
DRILLING COMPANY: Technical Drilling Services	NORTHING: 8318.224 EASTING: 23382.31
DRILLING METHOD: Hollow Stem Augers	ELEVATION 79.28 ft M.P. ELEV: 81.83 ft
BOREHOLE DIAMETER: 8.25 IN	WATER: 6.00 ft TOC TOTAL DEPTH: 13.0 ft BGS
NOTES: Lithology based on TW-7	LOGGED BY: H. Frank CHECKED BY: J. Wylie

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)	WELL CONSTRUCTION
			ASH, gravel, gray brown (Fill).					
5		SP	SAND, brown grading to gray, poorly graded very fine to fine grain, loose, wet.					
		SP	SAND, brown grading to gray, poorly graded fine to medium grain, loose to medium dense, wet.					
10		SP	SAND, gray, poorly graded fine grain with some medium to coarse and trace of fine gravel, medium dense, wet.					
15			Bottom of boring 13'.					
20								
25								

LOG A EWIN04 G-P BREWTON.GPJ_GINT US.LAB.GDT 9/23/14

PROJECT: Well Installation-Main Landfill	WELL / BORING NO: TW-04
PROJECT NO: 967.01.09	STARTED: 11/4/13 COMPLETED: 8/14/14
DRILLING COMPANY: Technical Drilling Services	NORTHING: 9113.445 EASTING: 22131.8037
DRILLING METHOD: GeoProbe 6610DT	ELEVATION 80.48 ft M.P. ELEV: 83.06 ft
BOREHOLE DIAMETER: 2.25 IN	WATER: 7.95 ft TOC TOTAL DEPTH: 15.0 ft BGS
NOTES: Converted to permanent piezometer.	LOGGED BY: H. Frank CHECKED BY: J. Wylie

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)	WELL CONSTRUCTION
0 - 5	[Cross-hatched pattern]		Ash, fill material Soil sample collected from 8.5'.	[Dotted pattern]	60			<p>Bentonite seal. 1" PVC riser. Additional gravel pack Pre-packed 1" diameter well screen</p>
5 - 10	[Diagonal line pattern]	SC	SAND, clayey, gray, poorly graded fine grain sand, wet.	[Dotted pattern]	60			
10 - 15	[Dotted pattern]	SP	SAND, black grading to gray, poorly graded very fine to fine grain sand, saturated.	[Dotted pattern]	80			
15 - 15.0			Bottom of boring 15'.					

LOG A EWIN04 G-P BREWTON.GPJ_GINT US.LAB.GDT 9/23/14

APPENDIX B

**Hydraulic Conductivity Determination
Summary**

**SUMMARY OF AQTESOLV INPUT VALUES
 GEORGIA-PACIFIC BREWTON, LLC
 MAIN LANDFILL PERMIT NO. 27-05
 BREWTON, ALABAMA**

	Aqtesolv Value	MW-6 Test 1	MW-6 Test 2	MW-7 Test 1	MW-7 Test 2	MW-8 Test 1	MW-8 Test 2
Type of Evaluation (Hvorslev or Bouwer-Rice)	-	Bouwer-Rice	Bouwer-Rice	Bouwer-Rice	Bouwer-Rice	Bouwer-Rice	Bouwer-Rice
Initial Displacement (ft)	H(0)	1.209	0.135	1.263	1.072	0.736	0.743
Depth to Water Table from TOC (ft)	-	26.60	26.60	21.84	21.84	6.00	6.00
Depth to Bottom of Aquifer (ft) ¹	-	50	50	50	50	30	30
Saturated Thickness (ft)	b	23.40	23.40	28.16	28.16	24.00	24.00
Depth to Bottom of Well from TOC (ft)	-	31.68	31.68	28.60	28.60	16.10	16.10
Static Water Column Length (ft)	H	5.08	5.08	6.76	6.76	10.1	10.10
Depth from Water Table to Top of Screen (ft)	d	0	0	0.00	0.00	0.1	0.10
Actual Screen Length (ft)	-	10	10	10	10	10	10
Aqtesolv Screen Length (ft)	L	5.08	5.08	6.76	6.76	10	10
Transducer Depth (ft)	T	4.6	4.6	6.3	6.3	9.6	9.6
Kv/Kh Ratio ³	Kv/Kh	0.01	0.01	0.01	0.01	0.01	0.01
Well Diameter (inches)	-	2.0	2.0	2.0	2.0	2.0	2.0
Radius of Well Casing (ft)	r(c)	0.083	0.083	0.083	0.083	0.083	0.083
Slug/Bailer Diameter (inches)	-	1.50	1.50	1.50	1.50	1.50	1.50
Slug/Bailer Length (inches)	-	48.0	48.0	48.0	48.0	48.0	48.0
Radius of Equipment (ft)	r(eq)	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625
Packer Radius (ft)	r(p)	NA	NA	NA	NA	NA	NA
Diameter of Borehole (in)	-	8.25	8.25	8.25	8.25	8.25	8.25
Radius of Borehole (in)	r(b)	4.13	4.13	4.13	4.13	4.13	4.13
Radius of Well Screen (ft)	r(w)	0.34	0.34	0.34	0.34	0.34	0.34
Radius of Well Skin (ft)	r(sk)	0.34	0.34	0.34	0.34	0.34	0.34
Effective Porosity of Filter Pack ²	n(e)	0.32	0.32	0.32	0.32	0.32	0.32

¹ Assumed using bottom elevation of aquifer at 50 feet above Mean Sea Level and estimated ground surface elevation at well.

² Assume 33% for #1 sand (fine), 32% for #2 sand (medium), 30% for #3 sand (coarse). Source of data is Aqtesolv Help File.

³ Typical default value for ratio of vertical hydraulic conductivity to horizontal hydraulic conductivity.

Prepared by: HJF Checked by: DMR

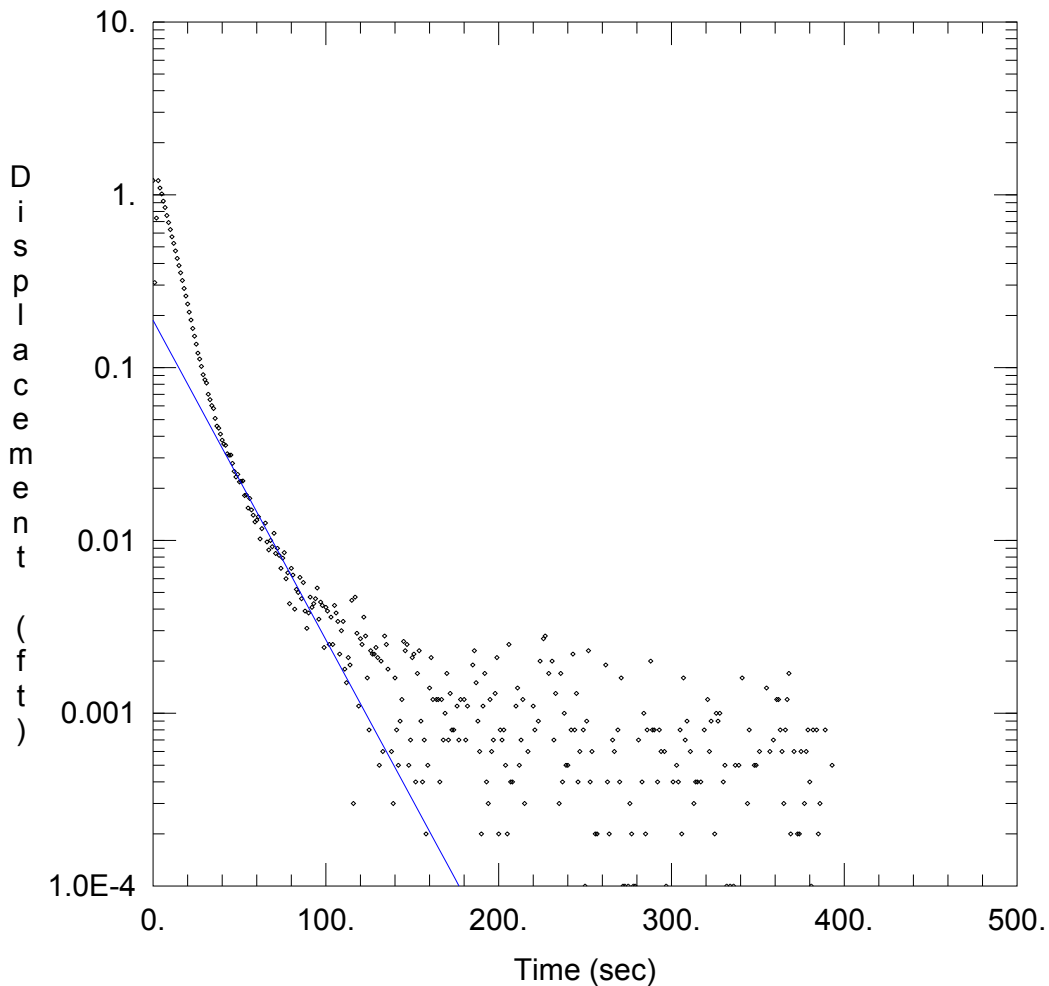
**SUMMARY OF AQTESOLV RESULTS
 GEORGIA-PACIFIC BREWTON, LLC
 MAIN LANDFILL PERMIT NO. 27-05
 BREWTON, ALABAMA**

Landfill Well ID	Slug Test Number	Hydraulic Conductivity (cm/sec)	
		Measured	Average
MW-2	Test 1	4.30E-02	3.17E-02
	Test 2	2.82E-02	
	Test 3	4.08E-02	
	Test 4	1.79E-02	
	Test 5	2.86E-02	
MW-3	Test 1	2.34E-02	1.61E-02
	Test 2	8.83E-03	
MW-6	Test 1	1.64E-02	1.51E-02
	Test 2	1.37E-02	
MW-7	Test 1	3.08E-02	2.98E-02
	Test 2	2.89E-02	
MW-8	Test 1	1.46E-02	1.31E-02
	Test 2	1.16E-02	
AVERAGE (ALL VALUES)		2.36E-02	
HIGHEST CONDUCTIVITY		4.30E-02	
LOWEST CONDUCTIVITY		8.83E-03	

Prepared By: HJF Checked By: DMR

Notes

Slug tests for wells MW-2 and MW-3 conducted May 13, 2009.



MW-6, TEST 1

Data Set: P:\GP Brewton.967\01.Landfill\13.New Well Installation\Slug Tests\MW-6 Test1.aqt
 Date: 09/23/14 Time: 21:48:47

PROJECT INFORMATION

Company: SynTerra
 Client: Georgia-Pacific Brewton, LLC
 Project: 967.01.13
 Location: Brewton, AL
 Test Date: August 15, 2014

AQUIFER DATA

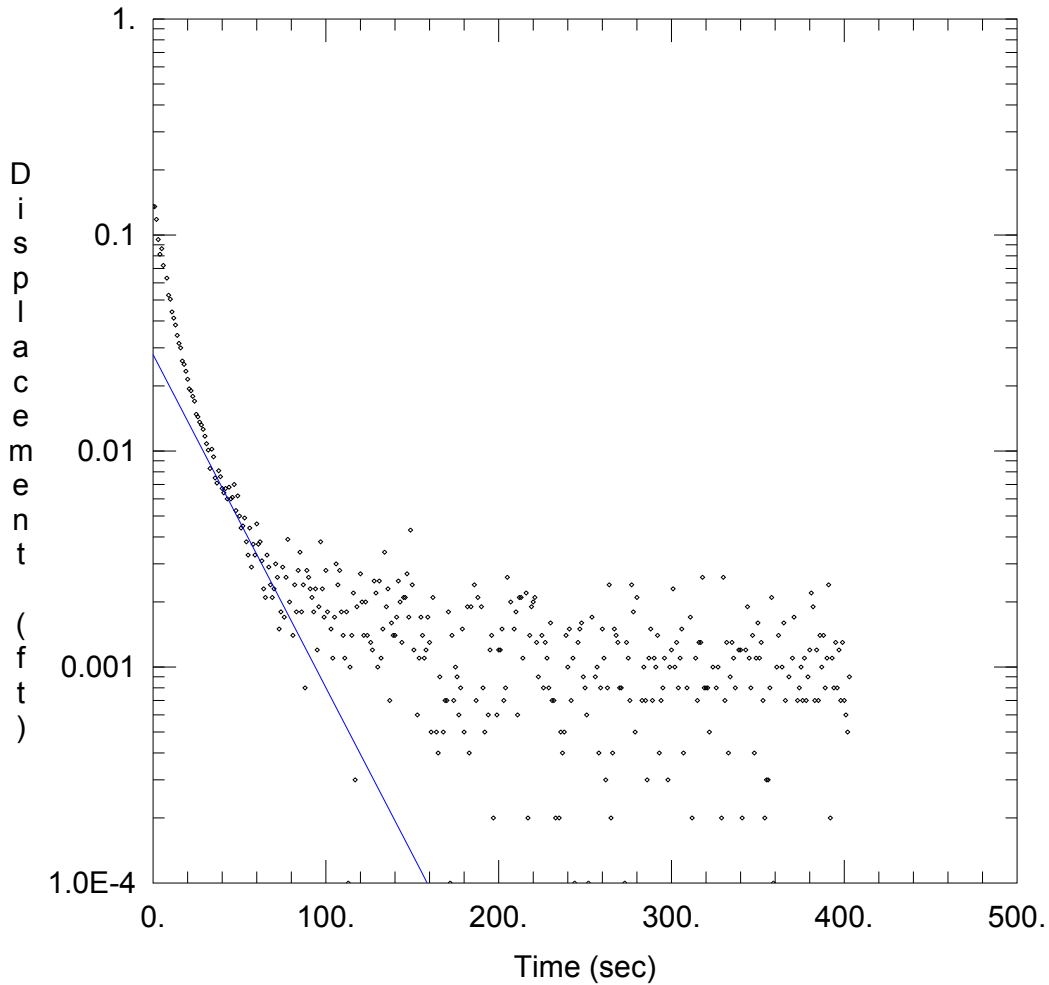
Saturated Thickness: 23.4 ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-6)

Initial Displacement: 1.209 ft Static Water Column Height: 5.08 ft
 Total Well Penetration Depth: 5.08 ft Screen Length: 5.08 ft
 Casing Radius: 0.083 ft Well Radius: 0.34 ft
 Gravel Pack Porosity: 0.32

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.01644 cm/sec y0 = 0.1878 ft



MW-6, TEST 2

Data Set: P:\GP Brewton.967\01.Landfill\13.New Well Installation\Slug Tests\MW-6 Test2.aqt
 Date: 09/23/14 Time: 21:54:17

PROJECT INFORMATION

Company: SynTerra
 Client: Georgia-Pacific Brewton, LLC
 Project: 967.01.13
 Location: Brewton, AL
 Test Date: August 15, 2014

AQUIFER DATA

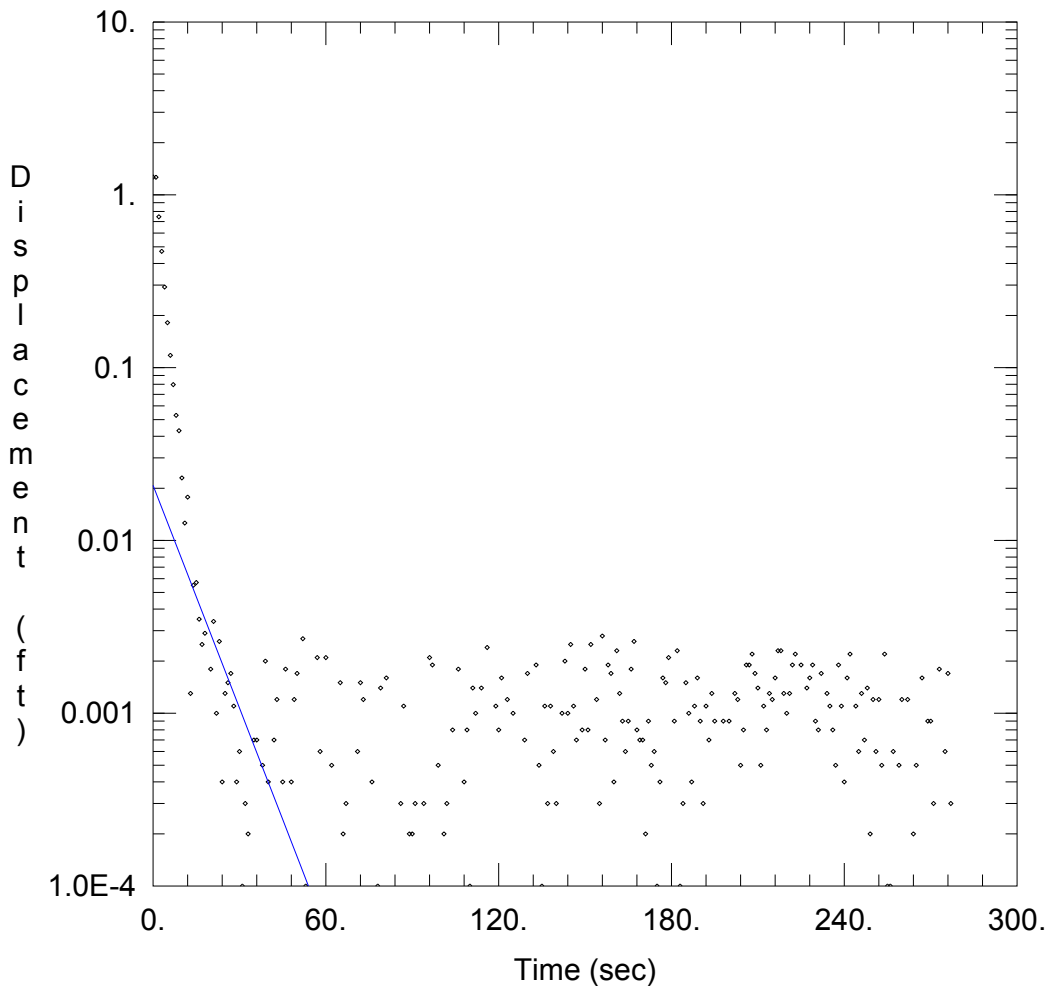
Saturated Thickness: 23.4 ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-6)

Initial Displacement: 0.1354 ft Static Water Column Height: 5.08 ft
 Total Well Penetration Depth: 5.08 ft Screen Length: 5.08 ft
 Casing Radius: 0.083 ft Well Radius: 0.34 ft
 Gravel Pack Porosity: 0.32

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.01371 cm/sec y0 = 0.02795 ft



MW-7, TEST 1

Data Set: P:\GP Brewton.967\01.Landfill\13.New Well Installation\Slug Tests\MW-7 Test1.aqt
 Date: 09/23/14 Time: 21:54:04

PROJECT INFORMATION

Company: SynTerra
 Client: Georgia-Pacific Brewton, LLC
 Project: 967.01.13
 Location: Brewton, AL
 Test Date: August 15, 2014

AQUIFER DATA

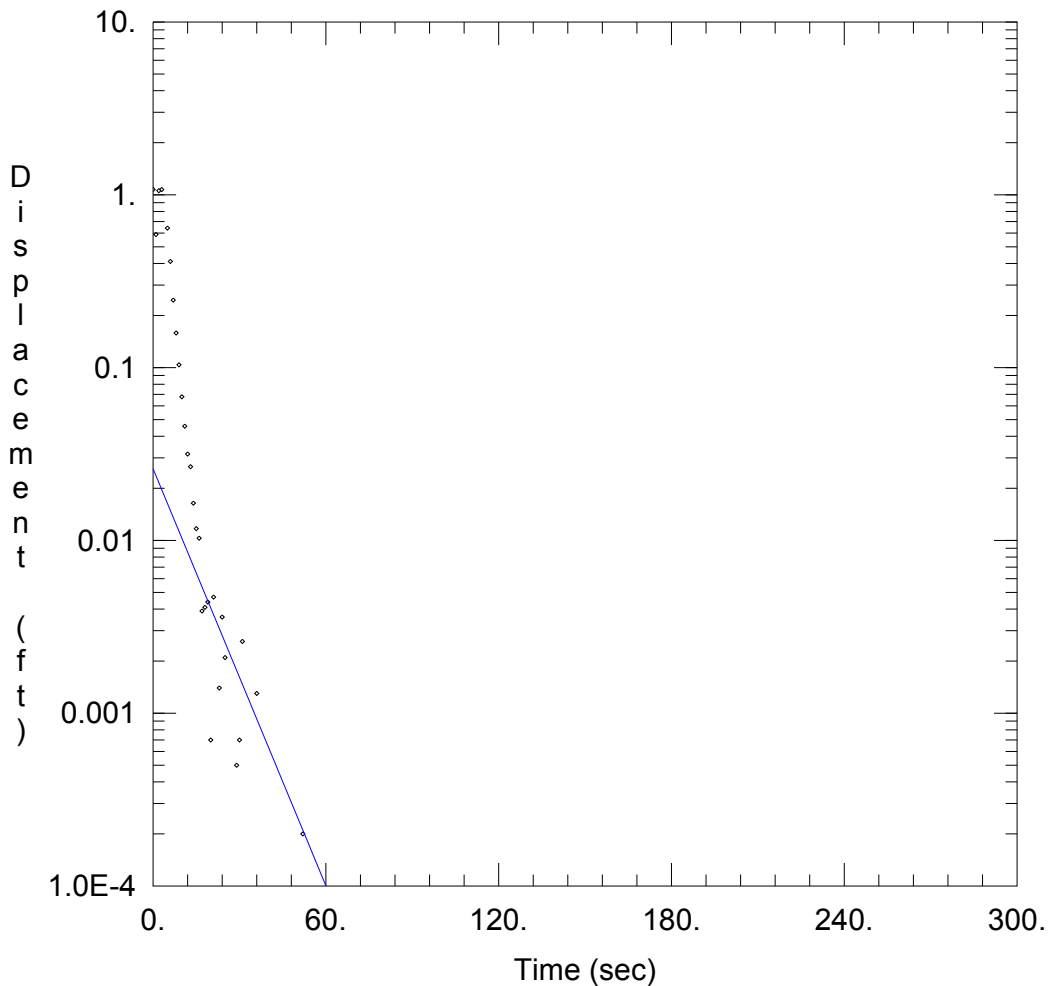
Saturated Thickness: 28.16 ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-7)

Initial Displacement: 1.263 ft Static Water Column Height: 6.76 ft
 Total Well Penetration Depth: 6.76 ft Screen Length: 6.76 ft
 Casing Radius: 0.083 ft Well Radius: 0.34 ft
 Gravel Pack Porosity: 0.32

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.03083 cm/sec y0 = 0.02081 ft



MW-7, TEST 2

Data Set: P:\GP Brewton.967\01.Landfill\13.New Well Installation\Slug Tests\MW-7 Test2.aqt
 Date: 09/23/14 Time: 21:53:50

PROJECT INFORMATION

Company: SynTerra
 Client: Georgia-Pacific Brewton, LLC
 Project: 967.01.13
 Location: Brewton, AL
 Test Date: August 15, 2014

AQUIFER DATA

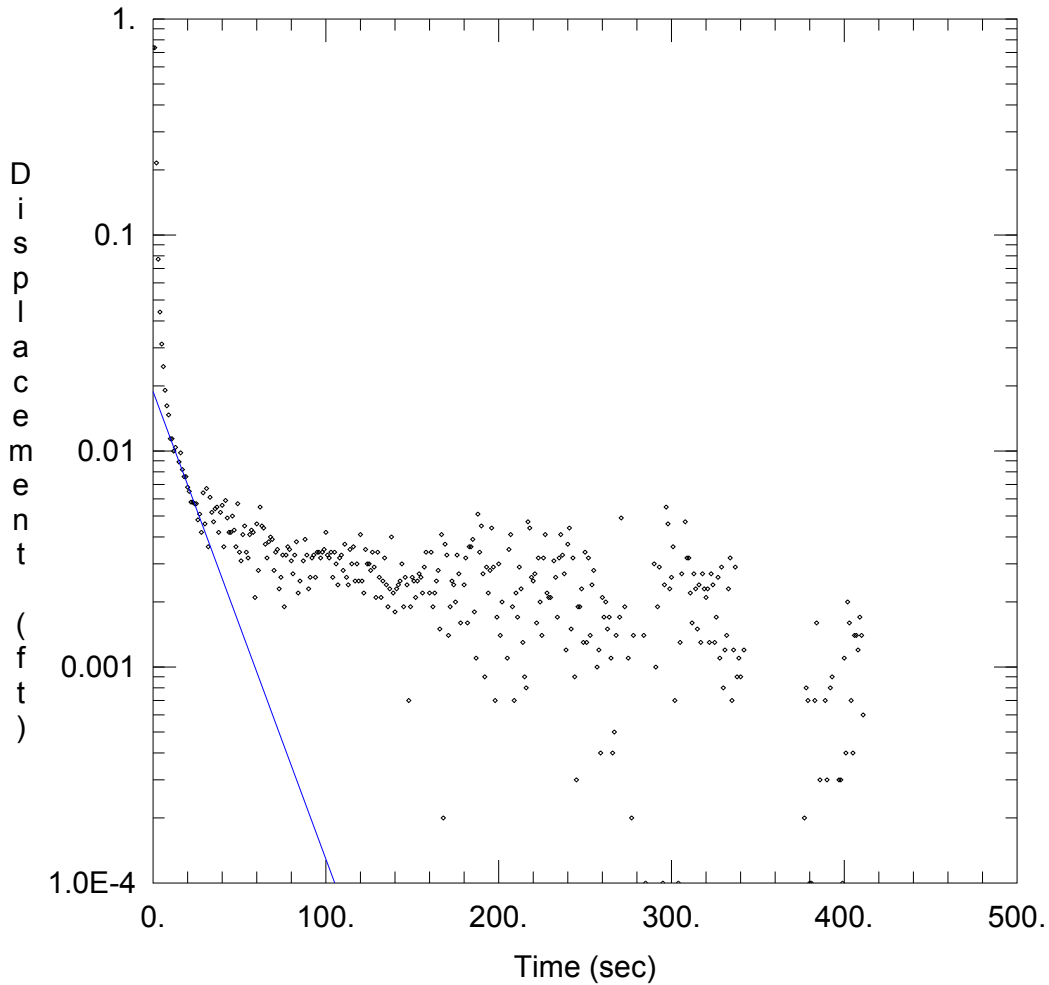
Saturated Thickness: 28.16 ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-7)

Initial Displacement: 1.071 ft Static Water Column Height: 6.76 ft
 Total Well Penetration Depth: 6.76 ft Screen Length: 6.76 ft
 Casing Radius: 0.083 ft Well Radius: 0.34 ft
 Gravel Pack Porosity: 0.32

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.02886 cm/sec y0 = 0.02596 ft



MW-8, TEST 1

Data Set: P:\GP Brewton.967\01.Landfill\13.New Well Installation\Slug Tests\MW-8 Test1.aqt
 Date: 09/23/14 Time: 21:53:38

PROJECT INFORMATION

Company: SynTerra
 Client: Georgia-Pacific Brewton, LLC
 Project: 967.01.13
 Location: Brewton, AL
 Test Date: August 15, 2014

AQUIFER DATA

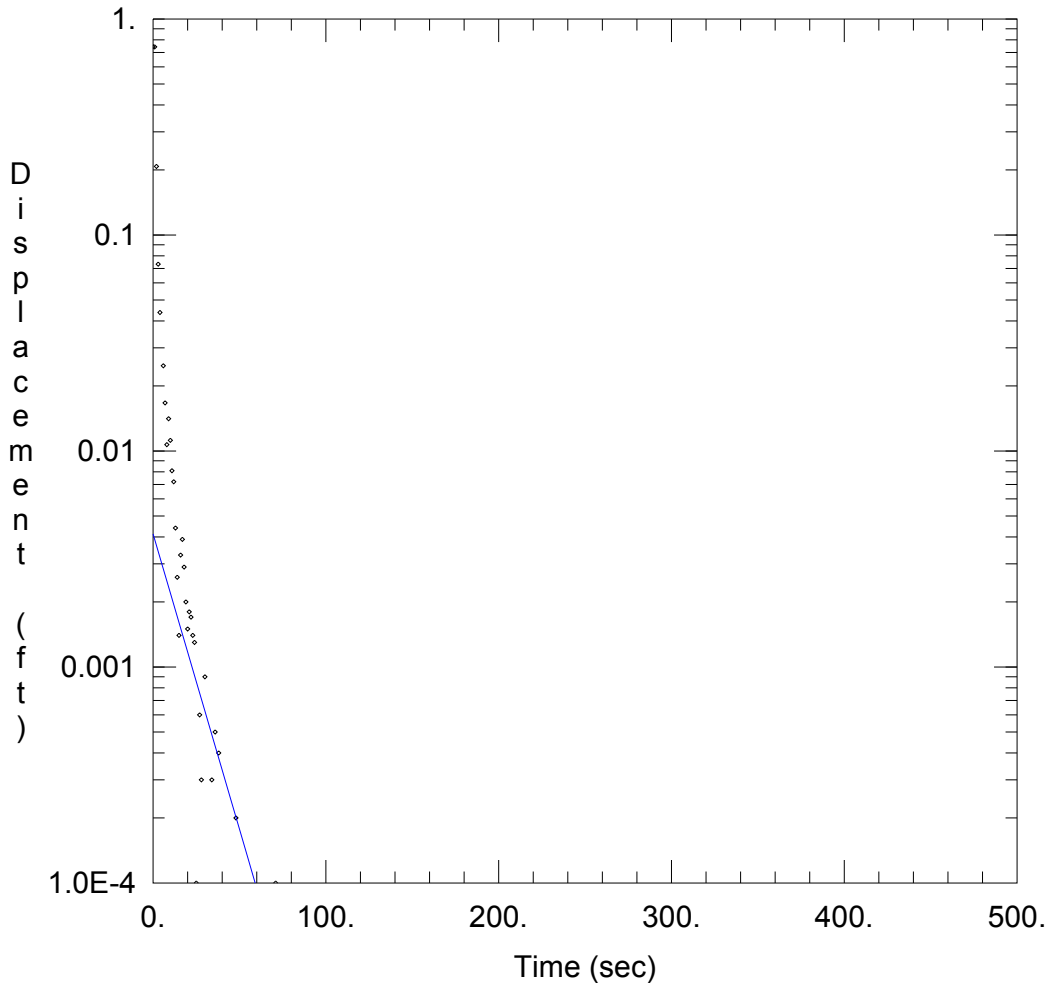
Saturated Thickness: 24. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-8)

Initial Displacement: 0.7362 ft Static Water Column Height: 10.1 ft
 Total Well Penetration Depth: 10. ft Screen Length: 10. ft
 Casing Radius: 0.083 ft Well Radius: 0.34 ft
 Gravel Pack Porosity: 0.32

SOLUTION

Aquifer Model: Unconfined Solution Method: Bowser-Rice
 K = 0.01155 cm/sec y0 = 0.01885 ft



MW-8, TEST 2

Data Set: P:\GP Brewton.967\01.Landfill\13.New Well Installation\Slug Tests\MW-8 Test2.aqt
 Date: 09/23/14 Time: 21:53:22

PROJECT INFORMATION

Company: SynTerra
 Client: Georgia-Pacific Brewton, LLC
 Project: 967.01.13
 Location: Brewton, AL
 Test Date: August 15, 2014

AQUIFER DATA

Saturated Thickness: 24. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-8)

Initial Displacement: 0.743 ft Static Water Column Height: 10.1 ft
 Total Well Penetration Depth: 10. ft Screen Length: 10. ft
 Casing Radius: 0.083 ft Well Radius: 0.34 ft
 Gravel Pack Porosity: 0.32

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.01459 cm/sec y0 = 0.004129 ft

Storm Water Conveyance

Landfill Permit No. 27-05

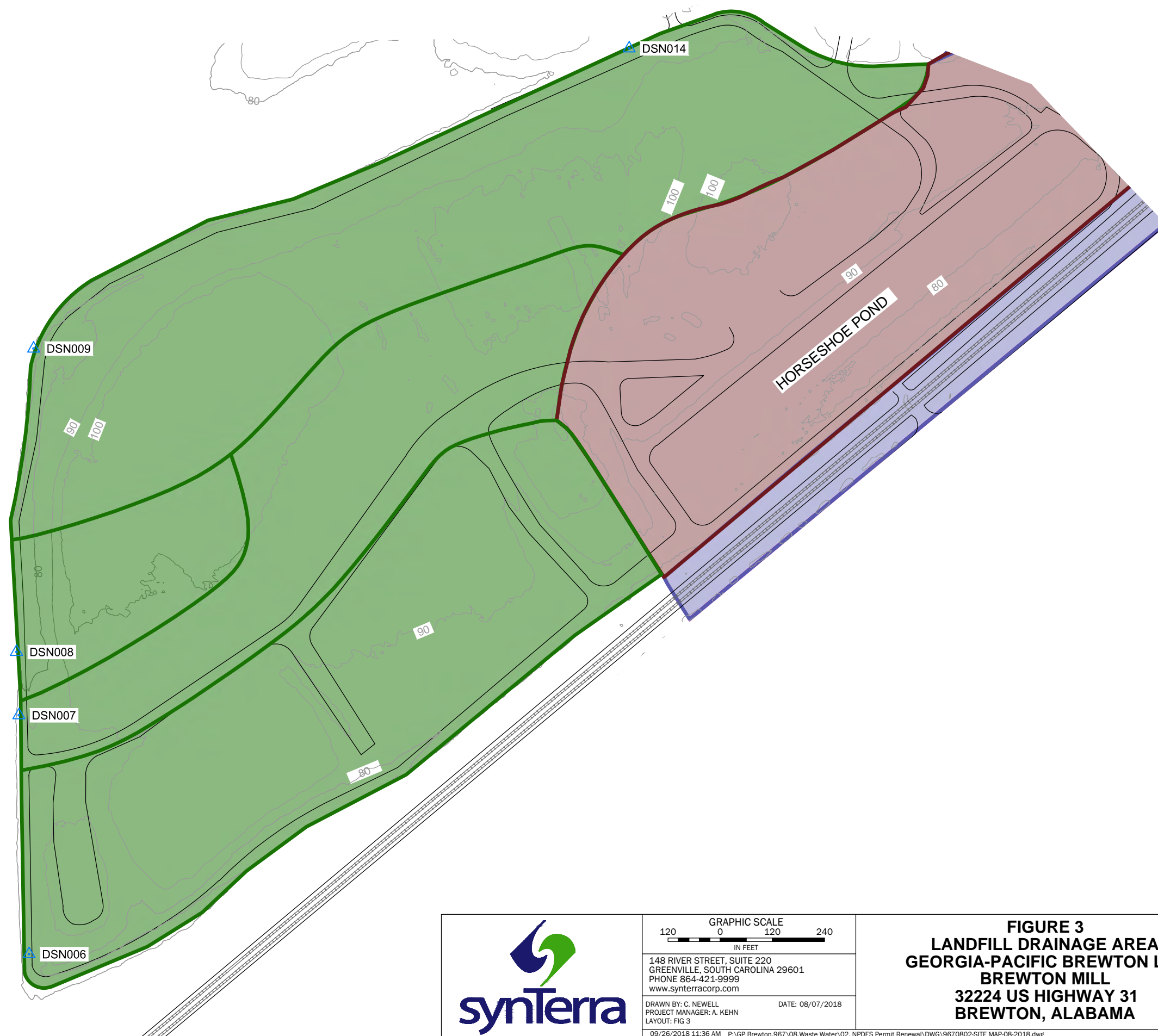
Georgia-Pacific Brewton LLC

To aid in the collection of storm water and minimize standing water, the landfill has been graded and is sloped outward to promote drainage toward the perimeter haul road. Storm water runoff flows by gravity to the base of the landfill and is conveyed by a perimeter ditch, located interior to the perimeter haul road. **Figure 3** (attached) shows the landfill drainage areas and permitted National Pollutant Discharge Elimination System (NPDES) outfalls.

Storm water that collects in the north, west, and southwest portion of the landfill sheet flows into this perimeter ditch and is conveyed to culverts located under the perimeter haul road and discharged into the adjacent surface water body west of the landfill (through outfalls DSN006, DSN007, DSN008, and DSN009). This surface water body then enters the Mill tertiary wastewater treatment system before being ultimately discharged at outfall DSN001, located approximately three and a half miles south at the Conecuh River.

Storm water that collects in the southeast portion of the landfill sheet flows into the perimeter ditch and is conveyed through a culvert into the "Horseshoe Pond". Water that collects in the Horseshoe Pond is routed to the on-site wastewater treatment system via a pumping station.

Temporary vegetation is planted on the lower slopes of the landfill, and in inactive areas of the landfill, to reduce storm water velocity and minimize erosion. The perimeter ditches are also vegetated. Hay bales and GeoHay are used in the perimeter drainage ditches (as needed) to further reduce storm water flow and collect sediment.



LEGEND

- OUTFALL ▲ DSN007
- DSN006, DSN007, DSN008, DSN009
DRAINAGE AREAS —
- DSN003 DRAINAGE AREA —
- WASTEWATER TREATMENT
DRAINAGE AREAS —



148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: C. NEWELL
PROJECT MANAGER: A. KEHN
LAYOUT: FIG 3

DATE: 08/07/2018

09/26/2018 11:36 AM P:\GP Brewton.967\08.Waste Water\02. NPDES Permit Renewal\DWG\9670802-SITE MAP-08-2018.dwg

FIGURE 3
LANDFILL DRAINAGE AREA
GEORGIA-PACIFIC BREWTON LLC
BREWTON MILL
32224 US HIGHWAY 31
BREWTON, ALABAMA

ADEM

**ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT**



George C. Wallace
Governor

gh Pegues, Director December 2, 1986

51 Federal Drive
Montgomery, AL
330
3/271-7700

Mr. Jack H. Kirkland
Container Corporation of America
P. O. Box 709
Brewton, AL 36427

ld Offices:

h 806, Building B
3 O'Neer Circle
Birmingham, AL
35203
3/962-8182

Dear Mr. Kirkland:

RE: Solid Waste Permit

1, Park 852
Tusculum, AL
35202
3/353-1713

Please find enclosed Permit No. 27-05 authorizing Container Corporation to operate a second solid waste landfill at your facility in Escambia County.

36 Perimeter Road
Birmingham, AL
35202
3/678-2336

You should review the Permit carefully along with Sections 4-170 and 4-172 of the Solid Waste Management Regulations for operational requirements. A variance is granted to 4-172.01(a) which requires weekly cover. If a problem develops from the uncovered waste however, this variance will be voided.

Specific wastes approved for disposal are boiler fly ash, lime mud, waste bark and fibrous material, primary sludge, and secondary sludge. The perimeter of the north and west sides of the landfill should be marked immediately with treated posts, as you indicated, to establish the landfill boundary.

When closure procedures are complete on your existing landfill, you should contact this office to arrange for a final inspection.

If you have any questions, please do not hesitate to call.

Sincerely,

Donald G. Parrish, Jr.
Engineer
Solid Waste Section
Land Division

DGP:sl

Enclosure

cc: Mr. Tom Phillips, Public Health Area 6 w/enclosure

ADEM

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT



Guy Hunt
Governor

Leigh Pegues, Director

October 25, 1990

1751 Cong. W. L.
Dickinson Drive
Montgomery, AL
36130
205/271-7700

Mr. Jack H. Kirkland
Container Corporation of America
P.O. Box 709
Brewton, Al 36427

Field Offices:

Unit 806, Building B
225 Oxmoor Circle
Birmingham, AL
35209
205/942-6168

P.O. Box 953
Decatur, AL
35602
205/353-1713

2204 Perimeter Road
Mobile, AL
36615
205/479-2336

Dear Mr. Kirkland:

After reviewing your request to dispose of off spec board in Container Corporation's Landfill (Permit No. 27-05), the Department has determined that there will be no adverse affects to the facility if this is allowed.

Sincerely,

A handwritten signature in cursive script, appearing to read "Teresa E. Green".

Teresa E. Green
Solid Waste Branch
Land Division

TEG/bdc#370

c: Mr. B.G. Bardwell

Mr. John M. Lister

Public Health Area #6 South

File: Escambia 27-05

called Teresa Green on April 15, 1991 to
confirm this approval was continuous.

ADEM

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT



Guy Hunt
Governor

Leigh Pegues, Director

December 13, 1991

1751 Cong. W. L.
Dickinson Drive
Montgomery, AL
36130
(205) 271-7700
FAX 271-7950
270-5612

Mr. B. G. Bardwell
Container Corporation of America
P. O. Box 709 Highway 31 South
Brewton, AL 36427

Field Offices:

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

P.O. Box 953
Decatur, AL
35602
(205) 353-1713
FAX 340-9359

2204 Perimeter Road
Mobile, AL
36688
(205) 479-2336
FAX 479-2593

Dear Mr. Bardwell:

RE: Container Corporation Landfill
Permit No. 27-05
Request for Variance to Gas Monitoring

This Department has reviewed Container Corporation's request for variance to the requirements of the Alabama Department of Environmental Management Administrative Code, Rule 395-13-4-.16(6) governing explosive gas monitoring and reporting for the above referenced facility submitted by BCM Engineers Inc.

Container Corporation has satisfactorily addressed these requirements and variance from explosive gas monitoring and reporting at this facility is approved.

Be advised that the variance may be terminated at any time should the Department find that operation under the variance does not meet minimum state laws and regulations or is a potential threat to public health.

Further questions should be directed to Ms. Lynn Roper at (205) 271-7726.

Sincerely,

Leigh Pegues
Director

LP/LTR/bbg#5065

c: Mr. Jack Kirkland
Mr. John Lister
Ms. Donna Herndon

4-13

4-13

7. November

ADEM



Mes W. Warr
Acting Director

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Fob James, Jr.
Governor

November 13, 1995

XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX

(334) 271-7700

1751 Cong. W. L.
Dickinson Drive
Montgomery, AL
36109-2608

Mr. Gary Trimble
Jefferson Smurfit Corporation
Paper Mill Division
P.O. Box 709
Brewton, AL 36427

RECEIVED

NOV 20 1995

JSC (US)
BY RAD

Mailing Address:
PO Box 301463
Montgomery, AL
36130-1463

Dear Mr. Trimble:

RE: Variance Request
Jefferson Smurfit Landfill
Permit Number 27-05

FAX: (334)
Admin: 271-7950
Air: 279-3044
Land: 279-3050
Water: 279-3051
Sp Proj: 213-4399
Field Ops: 272-8131
Backup: 270-5612

The Department received two letters dated August 25, 1995 and October 23, 1995 seeking temporary relief from ADEM rule 335-13-4-.23(18). Specifically, it was requested that boiler ash from the plant's dewatering ponds and unprocessed pulp stock (wood pulp) be allowed to be disposed of in landfill #27-05 while, on occasion, containing some free liquids (water). As it has been demonstrated through the annual ADEM certification of industrial waste streams that these wastes are nonhazardous, and that no immediate harm will come to the environment or human health, your request is approved.

Field Offices:

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

The following conditions to this approval apply, however:

The liquified ash and pulp stock shall not be continuous waste streams; when requiring disposal, the quantities shall be kept to a minimum as outlined in the above referenced letters;

400 Well St, NE
P.O. Box 953
Decatur, AL
35602-0953
(205) 353-1713
FAX: 340-9359

The wastes shall be mixed with dry lime and wood waste when being landfilled;

You shall conduct a waste minimization engineering study to find a long term solution for the dewatering of the boiler ash and pulp wastes;

2204 Perimeter Rd
Mobile, AL
36615-1131
(334) 450-3400
FAX: 479-2593

In accordance with ADEM rule 335-13-8-.05, this variance may be terminated by the Department if it is found that the above conditions are not met and/or that the operation under this variance does not meet the minimum federal and state laws or is unreasonably threatening to the public health.

Should you have any further questions concerning this matter, please contact Mr. Giles Steele-Perkins at (334) 271-7819.

Sincerely,

John A. Poole, Jr., Chief
Land Division

JAP/GS-P/bdc(SWBRANCH#27)

Waste Screening Procedures – 335-13-4-.21(1)(b)

Landfill Permit No. 27-05

Georgia-Pacific Brewton LLC

Waste streams designated for disposal in the landfill will be pre-approved by the GP Brewton Environmental Department. Waste profiles will be completed, submitted, and reviewed by the Environmental Department and include evaluating waste for free liquids, regulated hazardous wastes, regulated medical wastes, and regulated PCB wastes.

The landfill operator will inspect loads brought to the landfill to ensure that incoming loads do not contain free liquids, hazardous wastes, or other unallowable wastes (*e.g.*, tires, materials containing PCBs, or any other foreign material not identified in the permit).

The landfill operator will maintain records of waste inspection a minimum of once per week and provide such records to the Environmental Department.

If unacceptable wastes are brought to the landfill, the landfill operator is to refuse acceptance of such waste. Unacceptable wastes brought to the landfill and not discovered until after a load is dumped, should be segregated for proper disposal. If unacceptable wastes are identified in the landfill, the Environmental Department should be notified immediately. The Landfill Operator will be responsible for providing due diligence in inspecting the waste for unacceptable materials. "Due diligence" is defined as watching for materials that would be readily visible in the course of spreading as well as leaving the cab of the bulldozer to hand-inspect suspicious items.



Alabama Department of Environmental Management
adem.alabama.gov

1400 Coliseum Blvd. 36110-2400 ■ Post Office Box 301463
Montgomery, Alabama 36130-1463
(334) 271-7700 ■ FAX (334) 271-7950

June 26, 2019

MEMORANDUM

To: Blake Holden
Engineering Section
Solid Waste Branch

From: Wesley S. Edwards
Hydrogeology Section
Groundwater Branch

RE: Groundwater Monitoring Plan
Georgia-Pacific Brewton LLC Main LF #27-05
Brewton, Escambia County, Alabama

Summary

The Department has received the Groundwater Monitoring and Statistical Analysis Plan dated February 2015 for the above referenced facility. The ADEM Solid Waste Branch requested that the Hydrogeology Unit review the groundwater modification and provide pertinent comments and recommendations. This report is a result of that request.

Comments and Recommendations

The submitted groundwater monitoring plan appears to be adequate to verify compliance with groundwater monitoring requirements listed in ADEM Admin Code r. 335-13-4-.27 at this time.





Georgia-Pacific Brewton LLC tel
251 867 3621
PO Box 709 fax
251 867 8353
Brewton, AL 36427

October 9, 2019

Mr. Blake Holden
Solid Waste Engineering Section, Land Division
Alabama Department of Environmental Management
1400 Coliseum Boulevard
Montgomery, AL 36110

RE: Permit Renewal Application
Landfill Permit No. 27-05
Georgia-Pacific Brewton LLC

Dear Mr. Holden:

Please find enclosed three (3) copies of the revised groundwater monitoring and statistical analysis plan for landfill 27-05. Also enclosed is the additional associated permit renewal application fee of \$4,075 for a 10-year permit.

If you have any questions or require additional information, please call (251) 809-7380.

Sincerely,

A handwritten signature in black ink, appearing to read 'Corey Singleton', written over a horizontal line.

Corey Singleton
Environmental Engineer
Georgia-Pacific Brewton LLC

Enclosures:

Check No. 3000077725

cc: Roberto Flores, Georgia-Pacific Brewton LLC
Saul J. Furstein, Georgia-Pacific LLC
Matthew S. Mudge, SynTerra

GROUNDWATER MONITORING AND STATISTICAL ANALYSIS PLAN

**GEORGIA-PACIFIC BREWTON LLC
BREWTON MILL MAIN LANDFILL, PERMIT No. 27-05
BREWTON, ALABAMA**

**FEBRUARY 2015
(REVISED AUGUST 2019)**



PREPARED FOR:



**32224 HIGHWAY 31
BREWTON, ALABAMA 36426**

PREPARED BY:

**SYNTERRA
148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601**

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Figure 2. Well Location Map (Revised August 2019)
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Appendix B Hydraulic Conductivity Determination Summary


1.0 INTRODUCTION


This Groundwater Monitoring and Statistical Analysis Plan has been prepared specifically for the Georgia-Pacific (GP) Brewton Mill Main Landfill site in Brewton, Alabama. This plan has been prepared to meet the requirements of the Alabama Department of Environmental Management (ADEM) Land Division – Solid Waste Program Permit Regulations, ADEM Admin. Code R.335-13-4 for solid waste disposal sites. The Brewton Mill Main Landfill is regulated under ADEM solid waste permit No. 27-05.

The Brewton Mill Main Landfill site will be monitored in a manner that protects human health and the environment by monitoring the quality of background and downgradient groundwater. The relevant point of compliance has been established based on site conditions. This monitoring plan also provides the mechanism for assessment and corrective action should a groundwater protection standard be exceeded at the point of compliance.

1.1 Certification

The analytical parameters, sampling and analysis procedures, and statistical analysis methods described in this Plan meet ADEM requirements. The number, spacing, and depth of the wells in the Brewton Mill Main Landfill groundwater monitoring system meets the requirements stated in R.335-13-4-.27 and is consistent with professional standards and practices in Alabama at the time this plan was prepared.


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2.0 RELEVANT POINT OF COMPLIANCE

The Brewton Mill Main Landfill is located on the southwest side of the Brewton Mill, west of the town of Brewton, Alabama (**Figure 1**). The location of the groundwater-monitoring network at the Brewton Mill Main Landfill was determined based upon limited space between the landfill boundaries, the locations of mill's former and current wastewater treatment system, and ancillary manufacturing operations (**Figure 2**).

The Main Landfill occupies approximately 65 acres. Space around the Main Landfill is limited by the former sludge lagoon to the west/northwest, a railroad line, the mill's wastewater treatment system to the south/southeast, and manufacturing operations to the north. The groundwater-monitoring network serves as the relevant point of compliance.

To demonstrate the suitability of the monitoring wells to monitor groundwater quality in the uppermost aquifer around the unit, water level measurements are taken semiannually in the wells. A water level map from the most recent semiannual monitoring event (~~September 2014~~ **March 2019**) is included as **Figure 3**.

Based on the water level measurements, the direction of groundwater flow across the site is southwest (**Figure 3**). The horizontal gradient across the landfill averages approximately ~~0.003~~ **0.0027** feet per foot (~~September 2014~~ **March 2019** monitoring event). The approximate rate of groundwater flow near the Main Landfill is approximately ~~330~~ **275** feet per year.

3.0 GROUNDWATER MONITORING SYSTEM

The Brewton Mill Main Landfill was established in 1986. The landfill occupies approximately 65 acres within the 5,000-acre mill site (**Figure 1**). The Main Landfill is used for disposal of nonputrescible and nonhazardous waste, including ash generated from the combustion of wood waste, wood yard debris, dewatered primary and secondary wastewater sludge, lime and causticizing by-products, and off-specification paperboard and pulp stock.

A total of six wells (MW-2, MW-3, MW-4R, MW-6, MW-7, and MW-8) have been installed around the Main Landfill to monitor groundwater quality (**Figure 2**). Permanent piezometer TW-04 is also included in the groundwater monitoring network, but is utilized for water level measurement only. Monitoring wells MW-6 and MW-7 are located upgradient of the landfill. Monitoring wells MW-2, MW-3, MW-4R, and MW-8 are located downgradient of the landfill. Monitoring wells MW-2 and MW-3 were installed in 1994. MW-4R was installed as a replacement well for MW-4 in July 2010. Monitoring wells MW-6, MW-7, and MW-8 and permanent piezometer TW-04 were installed in August 2014 as part of the minor permit modification request approved by ADEM through issuance of modified solid waste Permit 27-05, effective July 10, 2014.

Monitoring well MW-5 was originally installed as an upgradient monitoring well for the Main Landfill in 1994. Effective with the issuance date of the modified solid waste permit (July 10, 2014), MW-5 is no longer part of the groundwater monitoring well network for the Main Landfill. It ~~will be~~ **was** properly abandoned **in September 2018** after background conditions ~~have been~~ **were** established for new upgradient monitoring wells MW-6 and MW-7.

The Brewton Mill is located in the Coastal Plain physiographic province of south Alabama. Surficial sediments of recent to Pleistocene age comprise the shallower aquifers of the area. The site is located at the edge of the floodplain of the Conecuh River. The landfill is bordered by low-lying land to the west and northwest. Groundwater recharge occurs because of direct infiltration of precipitation. Groundwater discharge occurs at the low-lying areas west and northwest of the site and along the Conecuh River to the south (RMT, Inc., 1994). A water level map showing the direction of groundwater flow is included as **Figure 3**.

Soils in the area generally consist of unconsolidated sands, gravels, silts, and clays. Silty sands and clays were the dominant soil types in the subsurface logged during

hydrogeologic investigations. A sand unit approximately 23 to 35 feet thick underlies the landfill throughout the site. Water present in the sand unit and the overlying clay, where present, forms the surficial aquifer at the site. The sand unit is overlain by fine-grained clay soils that exhibit low hydraulic conductivity, approximately 10 to 15 feet thick on the west side of the landfill. This layer of clay soils appears to pinch out to the east and is not present on the south side of the landfill. A deeper clay unit occurs at depths ranging from 23 to 52 feet below ground surface. The deeper clay unit appears to be contiguous throughout the site (RMT, Inc., 1994).

According to well construction records, the Main Landfill monitoring wells are constructed of 2-inch diameter PVC pipe. Well screens consist of a 0.010-millimeter slotted PVC screen set at the base of the well. Monitoring wells MW-2, MW-3, MW-6, MW-7, and MW-8 have a 10-foot screen. Monitoring well MW-4R has a 15-foot screen and MW-5 has a 5-foot screen. Sand was used to fill the annular space around the well screen. Bentonite powder was placed at the top of the sand pack to seal the well from surface water. The wells were completed by grouting to the surface. The wells are enclosed in 4-inch square steel protective casings. Well construction details are provided in **Table 1**. Construction diagrams and lithologic data are included as **Appendix A**.

The Main Landfill monitoring wells are primarily screened in sand, silty sand, or silty gravel. The total depth of the wells ranges from 13 feet below ground surface (MW-8) to 26 feet below ground surface (MW-7).

The average hydraulic conductivity for the GP Brewton Main Landfill is 7.74×10^{-4} feet per sec (66.9 feet per year). This is based on hydraulic conductivity testing performed at the Main Landfill in May 2009 and August 2014. Hydraulic conductivity values calculated for the Main Landfill wells ranged from 2.90×10^{-4} feet per second (MW-3) to 1.41×10^{-3} feet per second (MW-2). The lower hydraulic conductivity values in MW-5 are typical of clay soil. A summary of the hydraulic conductivity determination is included as **Appendix B**.

In accordance with the modified solid waste Permit 27-05, quarterly groundwater sampling ~~will be~~ **was** conducted for the new wells to establish baseline groundwater quality data for statistical evaluation. The new wells (MW-6, MW-7, and MW-8) ~~will be~~ **were** sampled for eight consecutive, quarterly events, beginning with the September 2014 monitoring event. ~~Based on this schedule, the~~ **The** eighth event ~~will be~~ **was** completed in June 2016 and the first semiannual detection monitoring event utilizing an interwell statistical comparison ~~will be~~ **was** performed in September 2016.

The landfill analytical data ~~will continue to be~~ **was** evaluated using intrawell statistical methods for inorganic compounds and interwell statistical methods for volatile organic compounds (VOCs) until after the eight sampling events for the new wells ~~have been~~ **were** completed. After March 2016, interwell statistical methods ~~will be~~ **have been** used for both VOCs and inorganic compounds.

4.0 GROUNDWATER SAMPLING AND ANALYSIS

The procedures and protocols that will be used to perform groundwater monitoring of the Brewton Mill Main Landfill site are described in the following sections. This includes procedures and techniques for sample collection, sample preservation and shipment, analytical procedures, chain of custody, and quality assurance/quality control.

4.1 Field Sampling

Experienced technicians will conduct sampling activities. A copy of the sampling procedures and protocols will be provided to the sampling team and will be reviewed by that team prior to each sampling event. Personnel will wear new, disposable nitrile gloves during all groundwater sampling activities. At a minimum, the gloves will be replaced at each sample location. The wells will be purged using new disposable sampling equipment.

Groundwater sampling involves three tasks:

- ☞ Measuring the static water level and well depth to calculate the volume of water in the well.
- ☞ Properly purging the appropriate well volumes to generate a sample representative of the aquifer.
- ☞ Collecting, preserving, and handling the groundwater samples prior to receipt by the laboratory in a way that maintains sample integrity.

To limit the potential for cross-contamination during the sampling event, the wells will be sampled in the order of the lowest level of constituent concentrations to the highest level of constituent concentrations, based on historical data. If the constituent levels are not known, the wells will be sampled from upgradient to downgradient.

4.2 Well Sampling Procedures

The initial step is to measure the water level and the depth of each well before purging. This will be accomplished by lowering an electrical water level indicator into the well until it touches the water and measures a response. The water level measurements will be taken to the nearest 0.01 foot. The water level indicator will be thoroughly decontaminated before use at each well. Each well will have a reference point from which the water level measurement is taken. The reference point will be established in relation to a permanent benchmark, as mean sea level (msl), and the survey shall note

the well location. An Alabama Registered Land Surveyor has surveyed the benchmark for each well (**Table 1**). Water level elevations will be measured within a 24-hour period of the day that the samples are collected.

The monitoring wells will be purged before taking samples to clear the well of stagnant water, which is not representative of aquifer conditions. To determine the purge volume, the following method will be used:

$$V = 0.041 d^2 h, \text{ where: } V = \text{one well volume of water in gallons}$$

$d = \text{diameter of the well casing in inches}$

$h = \text{height of the water column in feet}$

A minimum of four well volumes of water will be purged from the Main Landfill monitoring wells, unless the well goes dry prior to the removal of four well volumes. Indicator parameters (pH, specific conductance, turbidity, and temperature) will be measured periodically and recorded to document stabilization of these parameters prior to sample collection. The meters used for field measurements will be calibrated in the field to the equipment manufacturer's specifications. At least one set of indicator parameter readings will be collected per well volume. The well will be considered properly purged if the indicator parameters of specific conductance and temperature have stabilized to within 10 percent of the previous reading and the pH has stabilized to within 0.1 units of the previous reading.

The monitoring wells will be purged using new, disposable high-density polyethylene bailers.

4.3 Sample Collection and Parameters

The wells will be sampled using quiescent sampling methods. Samples for VOCs will be collected from each well immediately after purging if sufficient water for sampling is present. If the well goes dry during purging, the sample will be collected after the volume of groundwater necessary for the VOC sample has accumulated in the well. Samples for metals analysis will be collected the day following purging using a disposable bailer. The bailer will be lowered in the well to the top of the water column and the sample will be collected with minimal disturbance to the water column. No purging will be performed on the day that the samples for metals analysis are collected.

The samples from the Brewton Mill Main Landfill will be analyzed for parameters listed in Appendix I of R.335-13-4. The Appendix I constituents are summarized in **Table 2**.

Samples will be collected on a semiannual basis in March and September. Groundwater monitoring will be conducted during the life of the facility, including the closure and post-closure periods.

4.4 Chain-of-Custody Procedures

By the use of chain-of-custody procedures, the handling of samples will be traceable from the time of collection to the time of final sample disposition. Field sampling personnel will be responsible for collecting the samples and for logging the samples into assigned field notebooks or a sample collection log. The field sampling personnel will complete and verify the chain-of-custody forms. The laboratory sample custodian and analysts will be responsible for custody of samples at the laboratory.

Prior to collecting samples in the field, the sampling personnel will obtain the sample bottles necessary for sampling. A self-adhesive sample label will be affixed to each sample bottle before sample collection. The field sampler will complete the label with the appropriate information using waterproof ink. At a minimum, the sample label will contain the following:

- ↪ Client - Job Name/Project Number
- ↪ Sample Identification
- ↪ Date and Time Collected (except for duplicate samples)
- ↪ Sampler's Signature (or initials)
- ↪ Required Preservatives

Chain-of-custody forms will accompany sample containers to document the transfer of the containers and samples from the originating laboratory through the field and to the laboratory receiving the samples for analyses. A sample container is under custody in the field if the following conditions exist:

- ↪ It is in the field investigator's actual possession.
- ↪ It is in the field investigator's view, after being in his/her physical possession.
- ↪ It was in the field investigator's physical possession and then she/he secured it to prevent tampering.
- ↪ It is in a secure area restricted to authorized personnel only.

The field sampling personnel will complete and verify the chain-of-custody forms. A copy of the chain-of-custody will be placed in the landfill operating record and the original will accompany the shipped samples. If the samples are shipped by a commercial carrier, a copy of the shipping label will be placed into the landfill operating record. Shipping label numbers will be included on the chain-of-custody form, along with the company name of the carrier.

For shipment to the laboratory, shipping containers will be sealed and accompanied by the chain-of-custody record, with appropriate signatures. The transfer of custody is the responsibility of the field sampling personnel and the laboratory. Upon receipt by the laboratory, a sample custodian will inspect the condition of the samples, reconcile the sample(s) received against the chain-of-custody record, log in the sample(s) in the laboratory sample tracking system, and store the sample(s) in a secured sample storage area maintained at a temperature between 0° and 4° Celsius (C) until assigned to an analyst for analysis.

The pH of samples that contain preservatives will be checked on arrival at the laboratory. In addition, the temperature of the samples will also be measured and documented on the chain-of-custody form upon receipt at the laboratory.

4.5 Sample Handling and Analysis

Sample containers, preservation methods, and holding times that meet US EPA standards will be used. Samples will be collected in new, preserved containers provided by the contract laboratory. Sample vials for VOC analyses will be preserved with hydrochloric acid. Sample bottles for metal analyses will be preserved with nitric acid.

For delivery of samples to the laboratory, the following procedure will be implemented:

<u>Step</u>	<u>Procedure</u>
1.	Collect and seal the samples as outlined in this plan.
2.	Place sample containers in laboratory shipping container(s). Samples will be packed securely with packing material to protect the sample containers from accidental breakage during shipment and to prevent a leak or spill.
3.	Fill shipping container with enough ice to last the trip. Place ice in sealed plastic bags around sample containers.
4.	Complete the chain-of-custody form(s).

5. Place the chain-of-custody form in a sealed plastic bag and place inside the shipping container.
6. Seal shipping container using packing tape or duct tape.
7. Deliver or ship to the laboratory. Fastest available shipping methods will be used whenever required by short holding times or project schedules.

4.6 Analytical Methods

The laboratory performing the analyses will use the methods specified in Appendix I of R. 335-13-4. The record of groundwater analyses shall include the methods used (by number), the sample preparation date (if applicable), and the date of actual analysis. Data from samples that are not analyzed within the recommended holding times will be considered suspect. Any deviation from an US EPA-approved method shall be adequately tested to ensure that the quality of the results meets the performance specifications (*e.g.*, detection limit, sensitivity, precision, accuracy) of the reference method. A planned deviation shall be justified and submitted for approval by ADEM.

4.7 Field Analytical Techniques

Equipment used for field analytical measurements will be suitable for the analytical method and will be properly calibrated each day it is in use. Field analysis will be conducted on samples that are considered representative of the source from which they were collected. The field analyses described below will be performed on all water samples collected.

Measurement of pH and Temperature

Measurements of pH will be made using a combination electrode and portable pH meter. A meter with provisions for automatic temperature compensation will be used. The pH probe will contain a temperature sensor and will be used for measuring sample temperature. The meter will be calibrated daily according to the manufacturer's instructions.

The meter will be checked for any mechanical or electrical failures, weak batteries, and cracked or fouled electrodes before mobilizing for field activities. For an apparent discrepancy in a pH measurement, the electrode will be checked with pH 7.0 buffer and recalibrated to the closest reference buffer. The sample will then be reanalyzed. The buffer solution containers will be refilled each day from fresh stock solutions.

Measurement of Conductivity

The meter will be calibrated according to the manufacturer's instructions. Batteries will be checked, and conductivity cells will be cleaned and checked against known standards. Sample results will be expressed in micromhos/centimeter (umhos/cm), automatically temperature compensated to 25° C.

Measurement of Turbidity

The meter will be calibrated according to the manufacturer's instructions. Batteries will be checked, and the meter calibration will be checked against known standards. Sample results will be expressed in nephelometric turbidity units (NTUs).

5.0 QUALITY ASSURANCE/QUALITY CONTROL

To assess and verify the performance of the field sampling and laboratory techniques, the following quality control procedures will be followed.

5.1 Equipment Blanks

If contaminants are routinely detected in landfill monitoring well samples, equipment blanks will be collected as a quality control check on the field sampling equipment, sample collection methods, decontamination procedures, and external contamination. Equipment blanks consist of distilled water poured over clean, unused field sampling equipment, *e.g.*, bailer or pump, and contained in each sample container or bottle with any preservatives required for that analysis.

5.2 Trip Blank

A trip blank of deionized water sealed in 40-milliliter VOC vials at the laboratory will be shipped with the sample bottles to the field and back to the laboratory. Other appropriate sample containers may be used at the discretion of the laboratory. Analytical results from trip blanks will be used to evaluate contamination introduced by laboratory equipment and sample handling and transportation procedures.

5.3 Laboratory Quality Assurance/Quality Control

Samples from the Brewton Mill Main Landfill monitoring wells will be analyzed by a qualified commercial environmental laboratory accredited by the National Environmental Laboratory Accreditation Program (NELAP). At a minimum, laboratory quality control will include analysis of method blank samples, laboratory control samples, and matrix spike samples.

5.4 Data Validation

Laboratory analytical data will be reviewed for precision, accuracy, and completeness in accordance with the permit requirements, the US EPA Contract Laboratory Program *National Functional Guidelines for Organic Superfund Methods Data Review* (USEPA-540-R-08-01, June 2008 USEPA-540-R-2017-002, January 2017), the US EPA Contract Laboratory Program *National Functional Guidelines for Inorganic Superfund Data Review* (EPA540/R-10/011, January 2010 USEPA-540-R-2017-001, January 2017), and the most recently promulgated versions of the analytical methods.

After receipt of the laboratory analytical results, the data package will be reviewed for completeness to verify the appropriate samples were collected and the requested analyses performed. The sample collection logs will be reviewed and compared to the chain-of-custody documentation to verify collection information is properly

transcribed. The chain-of-custody forms will be verified against the laboratory sample check-in documentation.

Laboratory batch quality control data will be evaluated for precision, accuracy, and completeness. Trip blank and equipment blank data will be reviewed to verify no contamination was present.

6.0 STATISTICAL ANALYSIS PROCEDURES

To comply with R.335-13-4-.27(2)(a)3.(l), groundwater analytical data from the GP Brewton Mill Main Landfill will be evaluated to determine whether a statistically significant increase (SSI) has occurred. Appropriate statistical methods for the landfill groundwater monitoring program will be determined utilizing the US EPA's *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance* (EPA 530/R-09-007, March 2009) and the ASTM *Standard Guide for Developing Appropriate Statistical Approaches for Groundwater Detection Monitoring Programs* (D6312-98, 2012). The data set for each constituent detected during each semiannual monitoring event will be evaluated for SSIs using the statistical method considered appropriate based on the detection frequency of each constituent in each well and the statistical characteristics of the data set (*i.e.*, distribution type, number of background samples, variations in reporting limits, *etc.*).

The groundwater monitoring well network for the Brewton Mill Main Landfill was modified in August 2014 to include three new wells (MW-6, MW-7, and MW-8) and one permanent piezometer (TW-04). The changes to the groundwater monitoring well network were made as indicated in the minor permit modification request approved by ADEM through issuance of modified solid waste Permit 27-05, effective July 10, 2014.

In accordance with modified solid waste Permit 27-05 (effective July 10, 2014), an interwell statistical comparison will be utilized after baseline groundwater quality data for statistical evaluation has been established for new wells MW-6, MW-7, and MW-8. A minimum of eight data sets are required for evaluating distribution. The new wells ~~will be~~ were sampled for eight consecutive, quarterly events, beginning with the September 2014 monitoring event. ~~Based on this schedule, the~~ The eighth event ~~will be~~ was completed in June 2016 and the first semiannual detection monitoring event utilizing an interwell statistical comparison ~~will be~~ was performed in September 2016.

The landfill analytical data ~~will continue to be~~ was evaluated using intrawell statistical methods for inorganic compounds and interwell statistical methods for VOCs until after the eight sampling events for the new wells ~~have been~~ were completed. After March 2016, interwell statistical methods ~~will be~~ have been used for both VOCs and inorganic compounds. Interwell statistical methods are described in this Groundwater Monitoring and Statistical Analysis Plan.

Current upgradient monitoring well MW-5 ~~will be~~ **was** properly abandoned after background ~~has been~~ **was** established for new upgradient monitoring wells MW-6 and MW-7.

Once background conditions have been established for the new wells, an appropriate interwell prediction limit statistical procedure will be utilized to statistically evaluate groundwater monitoring data from the Brewton Main Landfill. Data sets from the upgradient wells (MW-6 and MW-7) will be combined to form a pooled background data set, **as approved by ADEM**. Data from each downgradient monitoring well will be compared to the pooled background data set to determine if a SSI has occurred.

6.1 Statistical Evaluation

The first step in statistically evaluating the data is to determine the type of distribution exhibited for each parameter at each well and for the pooled background data set. The appropriate prediction interval statistic used to calculate the prediction limit is dependent upon whether the data for a given constituent exhibits a normal or non-normal distribution and the number of nondetected results in a data set. The Shapiro-Wilks normality test, or comparable procedure, will be used to evaluate the statistical distribution of the data sets.

The data will then be screened for outliers and trends prior to conducting the statistical analysis. If an outlier is detected in the current data set, it will be screened for statistical significance for informational purposes. Based on the results of the statistical screening, the verification resampling strategy will be as follows:

- ☞ If the outlier result is not statistically significant, the result will be verified by resampling during the next semiannual monitoring event. If results of the resampling do not confirm the outlier result as being valid, the outlier result will not be included in the historical dataset for computing background mean and standard deviation for the compliance statistic.
- ☞ If the outlier result appears to be statistically significant, the result will be verified by resampling within 45 days of the date of the original sampling event. If results from the resampling do not confirm the suspected outlier as being valid, then results from the resampling will replace the outlier result in the database. Statistical analysis will then be performed on results from the resampling.

The trend analysis procedure will be used with the prediction interval procedure to support conclusions about potential SSIs.

6.2 Prediction Limit Procedure

The interwell Prediction Limit statistic will be used to compare the results for the most recent sample to the historical (background) data for each constituent in each well. The data will be evaluated using either a Parametric or Nonparametric Prediction Limit procedure, based on data distribution, and other statistical characteristics, as prescribed in the US EPA and ASTM guidance documents. A determination that the current result lies in the historical population indicates that a statistically significant increase has not occurred and that the given parameter complies with established standards.

The Prediction Limit procedure estimates numerical bounds on a series of m independent future values. The prediction limit can be used to test whether the mean of one or more data points are equal to the mean of a background population. Assuming there is insignificant natural spatial variability, a prediction limit can be constructed using historical background data. The number of futures samples (m) should be chosen to reflect a single new observation collected from each compliance well prior to the next statistical evaluation, plus a fixed number ($m-1$) of possible resamples. The initial future observation at each compliance point is then compared to the prediction limit. If it exceeds the prediction limit, one or more verification samples are collected and retested (US EPA *Unified Guidance*, Part I, Chapter 8, Section 8.3) prior to declaring an SSI.

6.3 Alternate Statistical Methods

The Prediction Limit procedure is only one of the statistical methods that might be utilized to evaluate groundwater quality data. This conventional statistical method is recognized in the US EPA and ASTM guidance. However, more robust techniques for handling nondetected values are available and might be appropriate for the site. Comparisons between the conventional statistical methods and alternate statistical procedures might be performed and submitted to ADEM for approval in the event that GP utilizes a statistical method other than the interwell prediction interval to determine whether an SSI has occurred at the Brewton Mill Main Landfill.

7.0 DETECTION MONITORING PROGRAM

Detection monitoring will continue on a semiannual basis during the life of the facility, continuing into the closure and post-closure care period, in accordance with R.335-13-4-.27(3). The results of the groundwater monitoring will be provided to ADEM within 90 days of sample collection and added to the landfill operating record.

GP will submit to ADEM a report containing all of the analytical and statistical analysis performed at the Brewton Mill Main Landfill for the sampling. The report will contain:

- A determination of the technical sufficiency of the monitoring well network in detecting a release from the Main Landfill,
- The determination of groundwater elevations, groundwater flow directions, and groundwater flow rates, and
- The results of the statistical analysis performed on the analytical data.

A Statistically Significant Increase (SSI) will be declared when a detected sample concentration exceeds the upper prediction limit for a data value that has been confirmed by verification sampling.

If it is determined that a preliminary SSI for one or more of the constituents required for routine monitoring at any one of the point of compliance wells, GP shall within 14 days notify ADEM of the finding and which constituents have shown statistically significant increases and place a copy of the notice in the Landfill Operating Record. GP will resample the monitoring well in question within 45 days of the finding to determine the validity of the results. ADEM will be notified of the results of the resampling within 45 days of collection of the samples.

If the SSI is verified, GP will, within 90 days determine whether the exceedance can be related to a source other than the landfill or is a result from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality prior to establishing an assessment monitoring program. If a successful demonstration is made and documented, GP will continue detection monitoring as specified. If a successful demonstration is not made, GP will initiate the assessment monitoring program.

8.0 ASSESSMENT MONITORING AND CORRECTIVE ACTION PROGRAM

Assessment monitoring will be initiated if a statistically significant increase over background has been detected and validated for one or more of the groundwater monitoring constituents listed in **Table 2** and an alternate source has not been identified. The assessment monitoring program will be implemented in accordance with specifications outlined in R.335-13-4-.27(4). Within 90 days of initiating an assessment monitoring program, GP will prepare and submit to ADEM for review and approval, a groundwater quality assessment plan for identifying the source, nature, and extent of the constituents in groundwater. The groundwater quality assessment plan will contain a detailed schedule for the implementation and completion of the provisions of the plan. Upon approval of the plan, GP will implement the plan according to the plan schedule. The groundwater quality assessment will be completed in a timely manner as outlined in the plan. If contamination is determined to have migrated off-site, GP will notify all persons who own land or who reside on land that directly overlies any part of the plume of contamination.

If the concentration of the constituent(s) which triggered assessment monitoring program is below the groundwater protection standard, the facility will remain in assessment monitoring until the constituent(s) is not detected above the laboratory reporting limit for at least two consecutive monitoring events, in accordance with ADEM Admin. Code R.335-13-4-27(4)(e).

Within 90 days of finding that any of the assessment monitoring constituent has been detected at a statistically significant level exceeding the groundwater protection standards, GP shall initiate an assessment of corrective action measures. The assessment of corrective measures shall be conducted in accordance with specifications stipulated in R.335-13-4-.27(5).

Upon the completion of the corrective action assessment, GP shall submit to ADEM a corrective action remedy detailing the actions to be taken to address groundwater quality and a schedule for the initiation and completion of remedial activities. Corrective action will be initiated and completed within a reasonable time period as determined by the technical factors. The corrective action remedy will be protective of human health and the environment; attain appropriate groundwater protection standards; control the source of the release; and comply with all applicable standards for the management of wastes.

GP will implement the corrective action plan within 90 days of approval by ADEM or as stipulated in R.335-13-4-.27(5). The corrective action plan will also contain provisions for the implementation of a groundwater monitoring program and network to demonstrate the effectiveness of the corrective action program. GP will continue the corrective action measures to the extent necessary to ensure that the groundwater protection standards are not exceeded for a period of three consecutive years. GP will submit to ADEM semiannual reports, which discuss the effectiveness of the corrective action program.

If GP or ADEM determines that the corrective action program no longer performs to design specifications or is ineffective in achieving the required results, GP will submit to ADEM within 90 days of the determination, a proposal to make appropriate changes or revisions to the corrective action program.

If groundwater protection standards are exceeded at the end of the post-closure care period, GP will be responsible for maintaining the corrective action program to the extent necessary. When ADEM has issued approval to discontinue the corrective action program, GP will return to detection monitoring of the landfill for the remainder of the active life and post-closure care period, unless additional groundwater quality assessment or corrective actions are required.

9.0 REFERENCES

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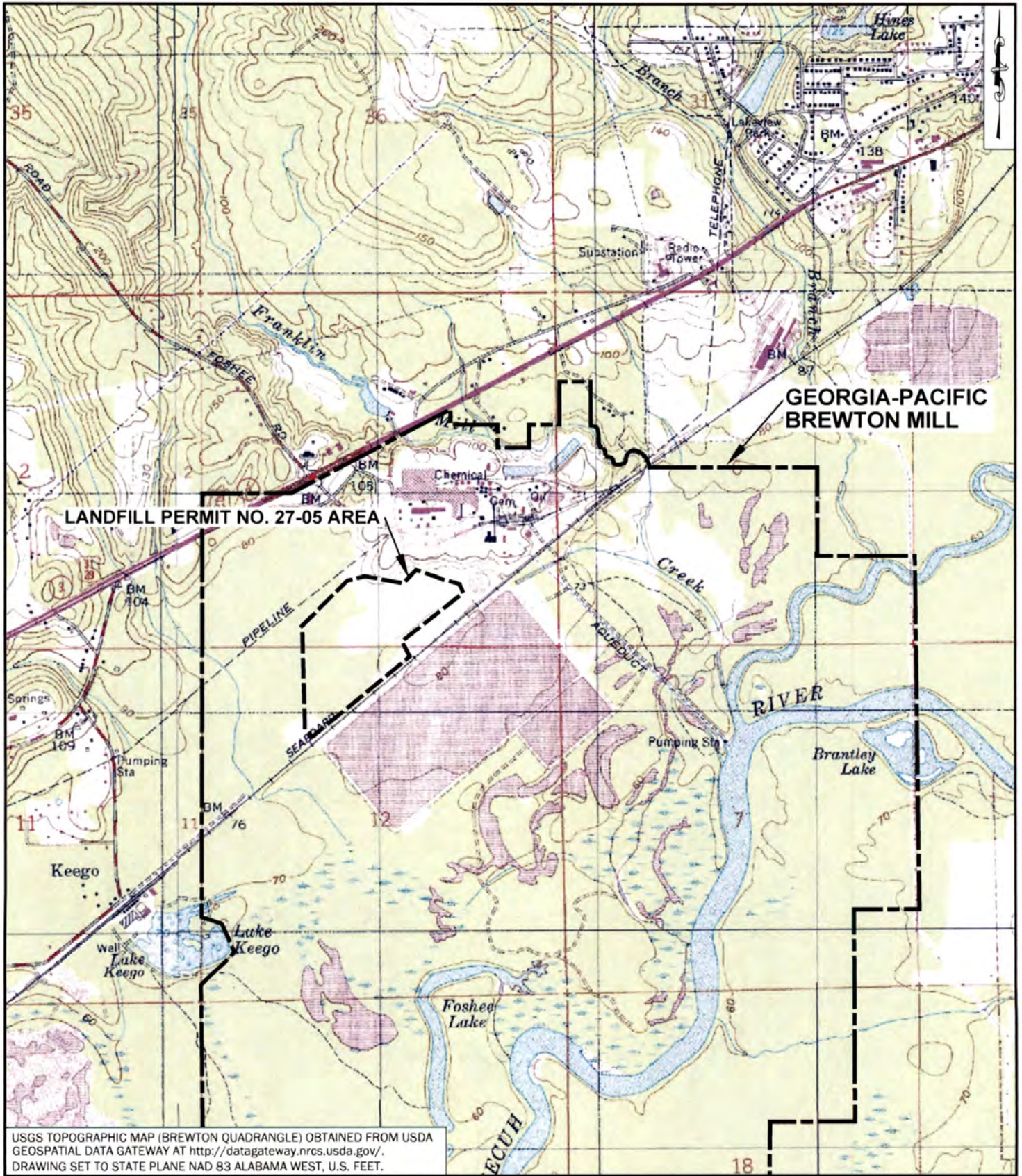
US EPA Region IV, 2012 – 2014, Science and Ecosystem Support Division, Field Branches Quality System and Technical Procedures.

US EPA, March 2009, *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities – Unified Guidance*, EPA 530/R-09-007.

US EPA, 2017, *National Functional Guidelines for Inorganic Superfund Data Review*, Contract Laboratory Program, EPA-540-R-2017-001, January.

US EPA, 2017, *National Functional Guidelines for Organic Superfund Data Review*, Contract Laboratory Program, EPA-540-R-2017-002, January.

FIGURES



USGS TOPOGRAPHIC MAP (BREWTON QUADRANGLE) OBTAINED FROM USDA GEOSPATIAL DATA GATEWAY AT <http://datagateway.nrcs.usda.gov/>. DRAWING SET TO STATE PLANE NAD 83 ALABAMA WEST, U.S. FEET.

FIGURE 1
USGS TOPOGRAPHIC MAP
GEORGIA-PACIFIC BREWTON LLC
US HIGHWAY 31
BREWTON, ALABAMA



148 RIVER STREET, SUITE 220
 GREENVILLE, SOUTH CAROLINA
 PHONE 864-421-9999
 www.synterracorp.com



DRAWN BY: C. NEWELL
 PROJECT MANAGER: M. MUDGE
 LAYOUT: FIG 1 (USGS)

DATE: 4/19/19
 CONTOUR INTERVAL: 10 FT
 MAP DATE: 2014





LANDFILL PERMIT NO. 27-05 AREA

Well ID	Northing	Easting	Ground Surface Elevation
MW-2	388567.06	2087946.80	72.62
MW-3	388961.55	2087793.93	74.39
MW-4R	389408.28	2087798.08	78.86
MW-5	390684.16	2088340.14	77.51
MW-6	391062.20	2088875.58	102.10
MW-7	391088.11	2089351.96	98.18
MW-8	389601.56	2089391.25	78.77
TW-04	390385.31	2088133.17	79.45

LEGEND

- ⊕ MW-2 MONITORING WELL
- ⊙ PZ-1 PIEZOMETER
- ⊕ MW-5 ABANDONED MONITORING WELL
- LANDFILL BOUNDARY (APPROXIMATE)

SOURCES:
 1. MONITORING WELL AND TEMPORARY WELL LOCATIONS AND ELEVATIONS BASED ON SURVEY BY HERRING SURVEYING & MAPPING, LLC ON 07/26/2018.
 2. FEBRUARY 11, 2015 AERIAL PHOTOGRAPH WAS TAKEN FROM GOOGLE EARTH AT <https://www.google.com/maps>.

GRAPHIC SCALE

250 0 250 500

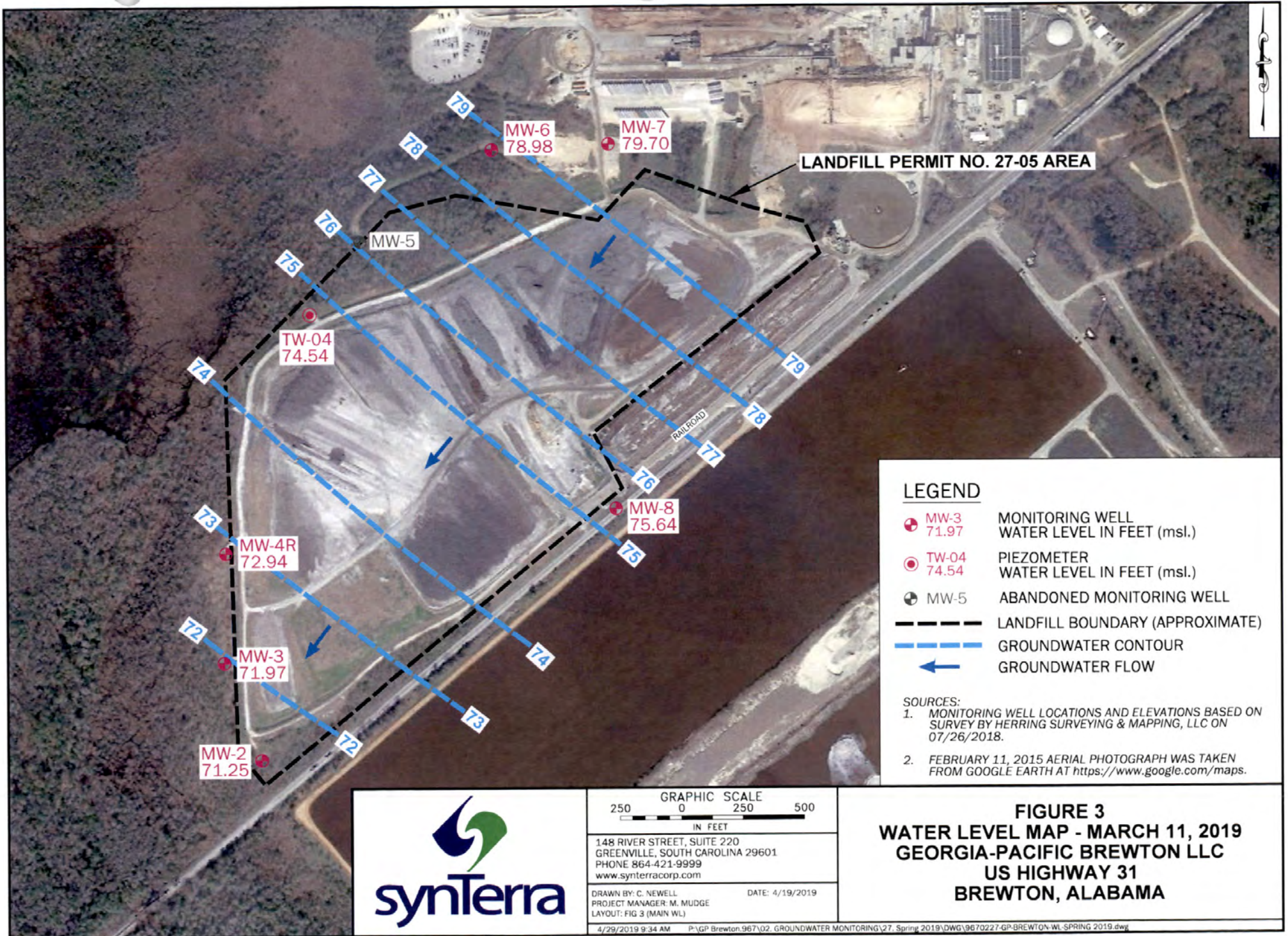
IN FEET

148 RIVER STREET, SUITE 220
 GREENVILLE, SOUTH CAROLINA 29601
 PHONE 864-421-9999
 www.synTerracorp.com

DRAWN BY: C. NEWELL DATE: 4/19/2019
 PROJECT MANAGER: M. MUDGE
 LAYOUT: FIG 2 (WELL LOC)

4/29/2019 9:33 AM P:\GP Brewton.967\02_GROUNDWATER MONITORING\27_Spring 2019\DWG\9670227-GP-BREWTON-WL-SPRING 2019.dwg

**FIGURE 2
 WELL LOCATION MAP
 GEORGIA-PACIFIC BREWTON LLC
 US HIGHWAY 31
 BREWTON, ALABAMA**



LEGEND

- MW-3 71.97 MONITORING WELL WATER LEVEL IN FEET (msl.)
- ⊙ TW-04 74.54 PIEZOMETER WATER LEVEL IN FEET (msl.)
- MW-5 ABANDONED MONITORING WELL
- LANDFILL BOUNDARY (APPROXIMATE)
- - - - - GROUNDWATER CONTOUR
- ← GROUNDWATER FLOW

- SOURCES:**
1. MONITORING WELL LOCATIONS AND ELEVATIONS BASED ON SURVEY BY HERRING SURVEYING & MAPPING, LLC ON 07/26/2018.
 2. FEBRUARY 11, 2015 AERIAL PHOTOGRAPH WAS TAKEN FROM GOOGLE EARTH AT <https://www.google.com/maps>.

GRAPHIC SCALE

250 0 250 500

IN FEET

148 RIVER STREET, SUITE 220
GREENVILLE, SOUTH CAROLINA 29601
PHONE 864-421-9999
www.synterracorp.com

DRAWN BY: C. NEWELL DATE: 4/19/2019
PROJECT MANAGER: M. MUDGE
LAYOUT: FIG 3 (MAIN WL)

4/29/2019 9:34 AM P:\GP Brewton\967\02.GROUNDWATER MONITORING\27.Spring 2019\DWG\9670227-GP-BREWTON-WL.SPRING 2019.dwg

FIGURE 3
WATER LEVEL MAP - MARCH 11, 2019
GEORGIA-PACIFIC BREWTON LLC
US HIGHWAY 31
BREWTON, ALABAMA

TABLES

**TABLE 1. SUMMARY OF WELL CONSTRUCTION DETAILS
 GEORGIA-PACIFIC BREWTON LLC
 MAIN LANDFILL PERMIT NO. 27-05
 BREWTON, ALABAMA**

Well ID	Date Installed	Construction Materials	Diameter (inches)	Northing ¹ (Feet)	Easting ¹ (Feet)	Ground Surface Elevation ¹ (Feet MSL)	Total Boring Depth ² (Feet BGS)	Measuring Point TOC ¹ (Feet MSL)	Screen Interval ² (Feet BGS)	Measured Well Depth ³ (Feet below TOC)
MW-2	1/20/1994	PVC	2	388567.06	2087946.80	72.62	15.4	75.35	5 to 15	18.27
MW-3	1/24/1994	PVC	2	388961.55	2087793.93	74.39	20	78.44	9.6 to 19.6	22.87
MW-4R	7/7/2010	PVC	2	389408.28	2087798.08	78.86	24.5	81.86	9.5 to 24.5	27.11
<i>MW-5 (abandoned)</i>	<i>1/27/1994</i>	<i>PVC</i>	<i>2</i>	<i>390684.16</i>	<i>2088340.14</i>	<i>77.51</i>	<i>10.3</i>	<i>81.19</i>	<i>4.9 to 9.9</i>	<i>13.96</i>
MW-6	8/13/2014	PVC	2	391062.20	2088875.58	102.10	29	105.12	19 to 29	31.87
MW-7	8/13/2014	PVC	2	391088.11	2089351.96	98.18	26	100.99	16 to 26	28.46
MW-8	8/13/2014	PVC	2	389601.56	2089391.25	78.77	13	81.57	3 to 13	16.16
TW-04	11/5/2013	PVC	1	390385.31	2088133.17	79.45	15	82.73	5 to 15	17.6

Prepared By: MSM

Checked By: MCM

Notes:

¹ - Coordinate and elevation data based on site survey completed 7/26/2018 by Herring Surveying & Mapping, LLC.

² - As reported on soil boring and monitoring well construction logs.

³ - Well depths measured by SynTerra in March 2018 and July 2018.

BGS - Below Ground Surface

Coordinate and elevation data referenced to Alabama West Zone State Plane Coordinates, North American Datum 1983 (NAD83).

MSL - Mean sea level (NAVD88)

TOC - Top of Casing

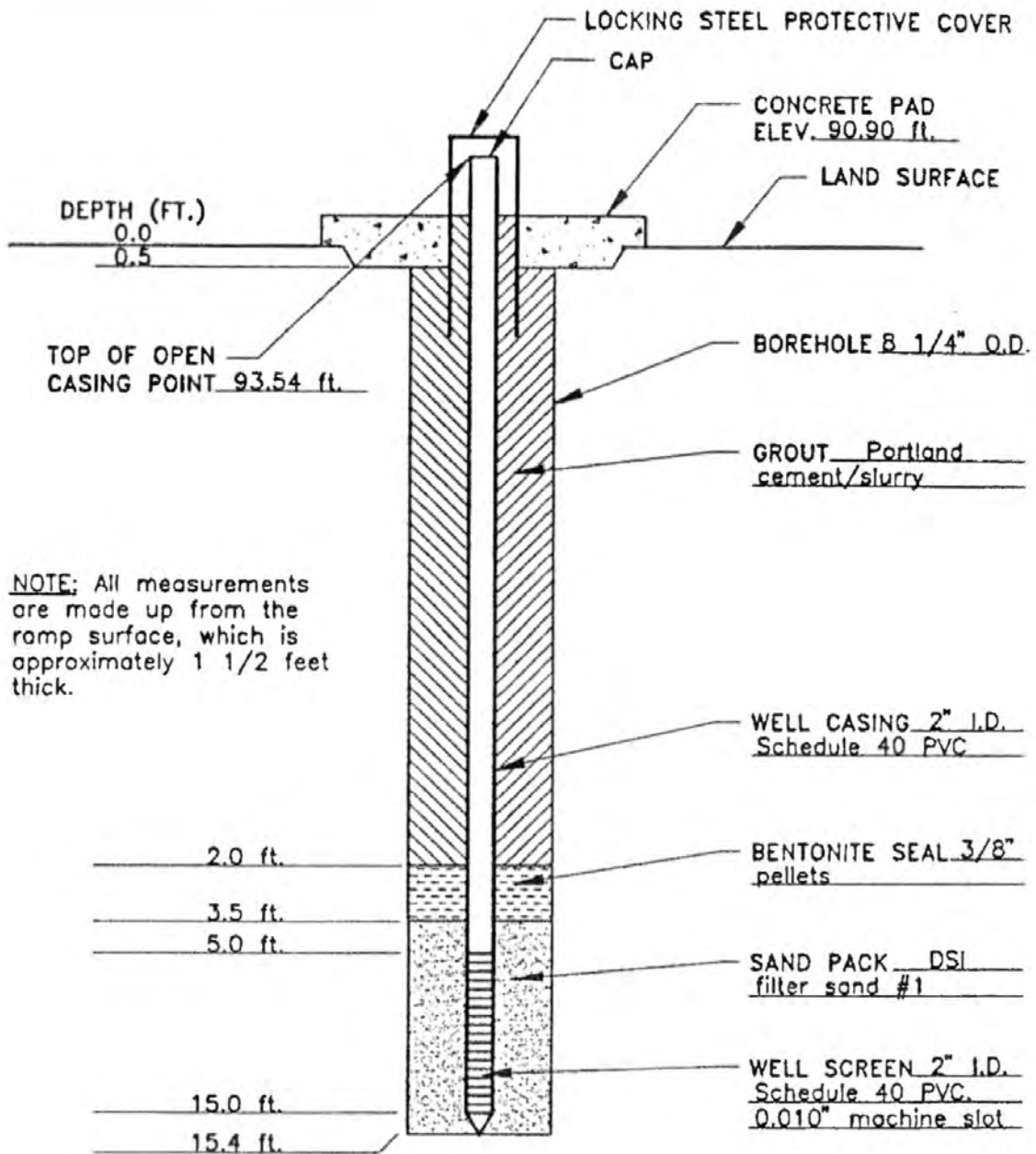
**TABLE 2. DETECTION MONITORING PARAMETERS
 BREWTON MILL MAIN LANDFILL
 Georgia-Pacific Brewton LLC
 Brewton, Alabama**

ANALYTE		
Appendix I Metals	Appendix I Volatile Organic Compounds	
Antimony, total	Acetone	trans-1,3-Dichloropropene
Arsenic, total	Acrylonitrile	Ethylbenzene
Barium, total	Benzene	2-Hexanone
Beryllium, total	Bromochloromethane	Methyl bromide
Cadmium, total	Bromodichloromethane	Methyl chloride
Chromium, total	Bromoform	Methylene bromide
Cobalt, total	Carbon disulfide	Methylene chloride
Copper, total	Carbon tetrachloride	Methyl ethyl ketone
Lead, total	Chlorobenzene	Methyl iodide
Mercury, total	Chloroethane	4-Methyl-2-pentanone
Nickel, total	Chloroform	Styrene
Selenium, total	Dibromochloromethane	1,1,1,2-Tetrachloroethane
Silver, total	1,2-Dibromo-3-chloropropane	1,1,2,2-Tetrachloroethane
Thallium, total	1,2-Dibromoethane	Tetrachloroethylene
Vanadium, total	1,2-Dichlorobenzene	Toluene
Zinc, total	1,4-Dichlorobenzene	1,1,1-Trichloroethane
	trans-1,4-Dichloro-2-butene	1,1,2-Trichloroethane
	1,1-Dichloroethane	Trichloroethylene
	1,2-Dichloroethane	Trichlorofluoromethane
	1,1-Dichloroethylene	1,2,3-Trichloropropane
	cis-1,2-Dichloroethylene	Vinyl acetate
	trans-1,2-Dichloroethylene	Vinyl chloride
	1,2-Dichloropropane	Xylenes
	cis-1,3-Dichloropropene	

APPENDIX A

**Monitoring Well Construction Diagrams
and Lithologic Data**

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NOTE: All measurements are made up from the ramp surface, which is approximately 1 1/2 feet thick.

PIEZOMETER CONSTRUCTION DIAGRAM

Not To Scale

PROJECT CONTAINER CORP. OF AMERICA - BREWTON, AL
PROJECT NO. 70100.04
WELL NO. MW PZ-2
DATE INSTALLED JANUARY 20, 1994
DRILLING CONTRACTOR A. T. & E.
RMT GEOLOGIST R. S. WIXON



BORING NO. ED-2SHEET NO. 1 OF 2PROJECT NAME CONTAINER CORP OF AMERICA PROJECT NO. 70100.04LOCATION BREWTON, AL INSTALLATION _____CONTRACTOR A.T. & E. SURFACE ELEV. _____DRILLING METHOD MUD ROTARY BOREHOLE DIA. 4 IN.

SAMPLING NOTES					VISUAL CLASSIFICATION AND GENERAL OBSERVATIONS
INTERVAL		RECOVERY		MOISTURE	
NO.	TYPE	BLOWS	%	% DEPTH	
1	SS	2-3 5-8	100		NOTE: All measurements are made from the ramp surface, which is approximately 1.0 ft. thick.
2	SS	9-10 13-15	65		SILTY SAND (SM) - fine to coarse grained; silty; soft; dark brown; roots abundant.
3	ST		20		SILT SAND (SM) - fine to coarse grained; silty; firm.
4	SS	4-6 6-7	65		SILTY GRAVEL (GM) - medium to very coarse; very silty; light grayish brown.
5	ST		55		SILTY SAND (SM) - medium to coarse grained; silty; light gray.
6	SS	5-5 4-8	70		SILTY SAND (SM) - fine to coarse grained; silty; grayish white.
7	ST		75		
8	SS	4-4 6-6	70		SILTY SAND (SM) - fine to medium grained; silty; very soft; light grayish white.
9	SS	6-9 13-12	70		- as above.
10	ST		50		
11	SS	6-6 7-7	70		- as above.

GENERAL NOTES
 DATE STARTED 19 JAN 94
 DATE COMPLETED 20 JAN 94
 RIG CME-550 ATV
 CREW CHIEF P. BERGMAN
 LOGGED RSW CHECKED _____

WATER LEVEL OBSERVATIONS
 WHILE DRILLING
 AT COMPLETION
 AFTER DRILLING _____
 CAVE-IN: DATE/TIME _____ DEPTH _____
 WATER: DATE/TIME 2/2 9:45 DEPTH 4.27 FT.



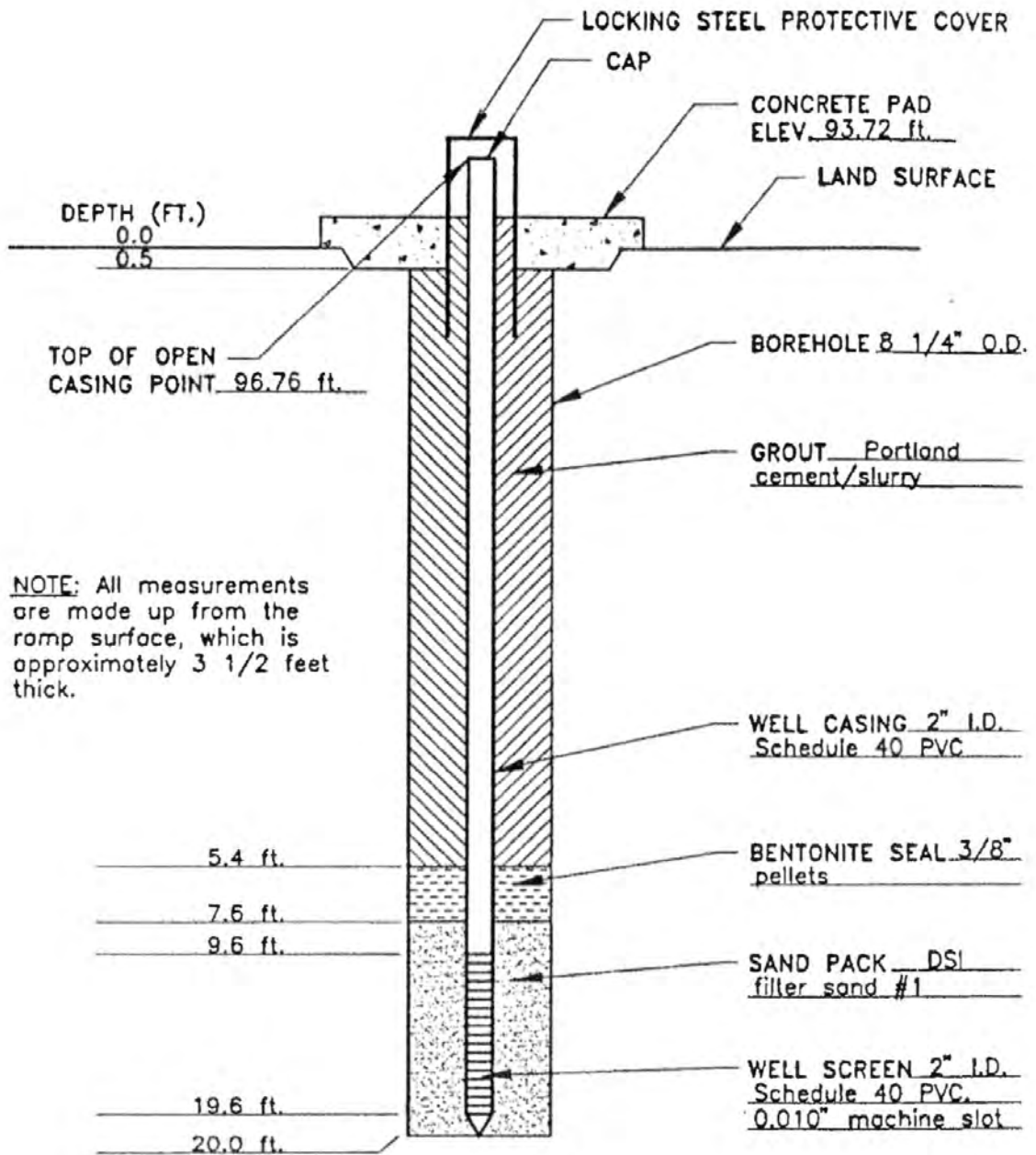
LOG OF TEST BORING

BORING NO. EB-2
 SHEET NO. 2 OF 2
 PROJECT NO. 70100.04
 LOCATION BREWTON, AL INSTALLATION _____
 CONTRACTOR A.T. & E. SURFACE ELEV. _____
 DRILLING METHOD MUD ROTARY BOREHOLE DIA. 4 IN.

PROJECT NAME CONTAINER CORP OF AMERICA

SAMPLING NOTES					VISUAL CLASSIFICATION AND GENERAL OBSERVATIONS	
INTERVAL		RECOVERY		MOISTURE		
NO.	TYPE	BLOWS	%	%	DEPTH	
12	SS	2-1 1-4	60			SILTY SAND (SM) - fine to medium grained; silty; soft; light grayish white with a few streaks of light reddish brown. - as above; reddish orange color change observed in mud.
13	SS	3-5 7-7	80		45	CLAY (CL) - some very fine grained sand; very silty; highly plastic; yellowish orange mottled with greenish gray.
14	ST		0			
15	ST		70		50	
BORING TERMINATED AT 51.0 FEET						
					55	
					60	
					65	
					70	
					75	
					80	
					85	

J:\CAD\GRAPHIC\70100\70100MW3.DWG



NOTE: All measurements are made up from the ramp surface, which is approximately 3 1/2 feet thick.

PIEZOMETER CONSTRUCTION DIAGRAM

Not To Scale

PROJECT CONTAINER CORP. OF AMERICA - BREWTON, AL

PROJECT NO. 70100.04

WELL NO. MW PZ-3

DATE INSTALLED JANUARY 24, 1994

DRILLING CONTRACTOR A. T. & E.

RMT GEOLOGIST R. S. WIXON





LOG OF TEST BORING

BORING NO. EB-3SHEET NO. 1 OF 2PROJECT NAME CONTAINER CORP OF AMERICA PROJECT NO. 70100.04LOCATION BREWTON, AL INSTALLATION _____CONTRACTOR A.T. & E. SURFACE ELEV. _____DRILLING METHOD MUD ROTARY BOREHOLE DIA. 4 IN.

SAMPLING NOTES						VISUAL CLASSIFICATION AND GENERAL OBSERVATIONS
INTERVAL		RECOVERY		MOISTURE		
NO.	TYPE	BLOWS	%	%	DEPTH	
1	SS	WOH	0		5	NOTE: All measurements are made from the ramp surface, which is approximately 3.5 ft. thick. - no recovery.
2	SS	WOH	60		10	CLAY (CL) - silty; plastic; dark gray; abundant wood fragments.
3	SS	10-11 12-12	50		15	SAND (SP) - fine to coarse grained; some gravel; trace of silt; soft; white.
4	ST		0			
5	SS	5-5 6-5	60		20	SILTY SAND (SM) - fine to medium grained; some gravel; silty; soft; grayish white.
6	SS	3-2 3-4	50		25	SILTY SAND (SM) - fine to coarse grained; silty; very soft; grayish white.
7	SS	4-4 6-7	60		30	SAND (SW) - fine to medium grained, well-graded w/silt; silty; very soft; light gray to grayish white.
8	ST		0			
9	SS	4-6 7-6	70		35	- as above.
10	ST		75	23.4		- as above with clay and gravel; some wood fibers. (total unit weight = 117.0 pcf)

GENERAL NOTES
 DATE STARTED 21 JAN 94
 DATE COMPLETED 24 JAN 94
 RIG CME-550 ATV
 CREW CHIEF P. BERGMAN
 LOGGED RSW CHECKED _____

WATER LEVEL OBSERVATIONS
 WHILE DRILLING ∇
 AT COMPLETION ∇
 AFTER DRILLING _____
 CAVE-IN: DATE/TIME _____ DEPTH _____
 WATER: DATE/TIME 2/2 10:10 DEPTH 6.56 FT.



LOG OF TEST BORING

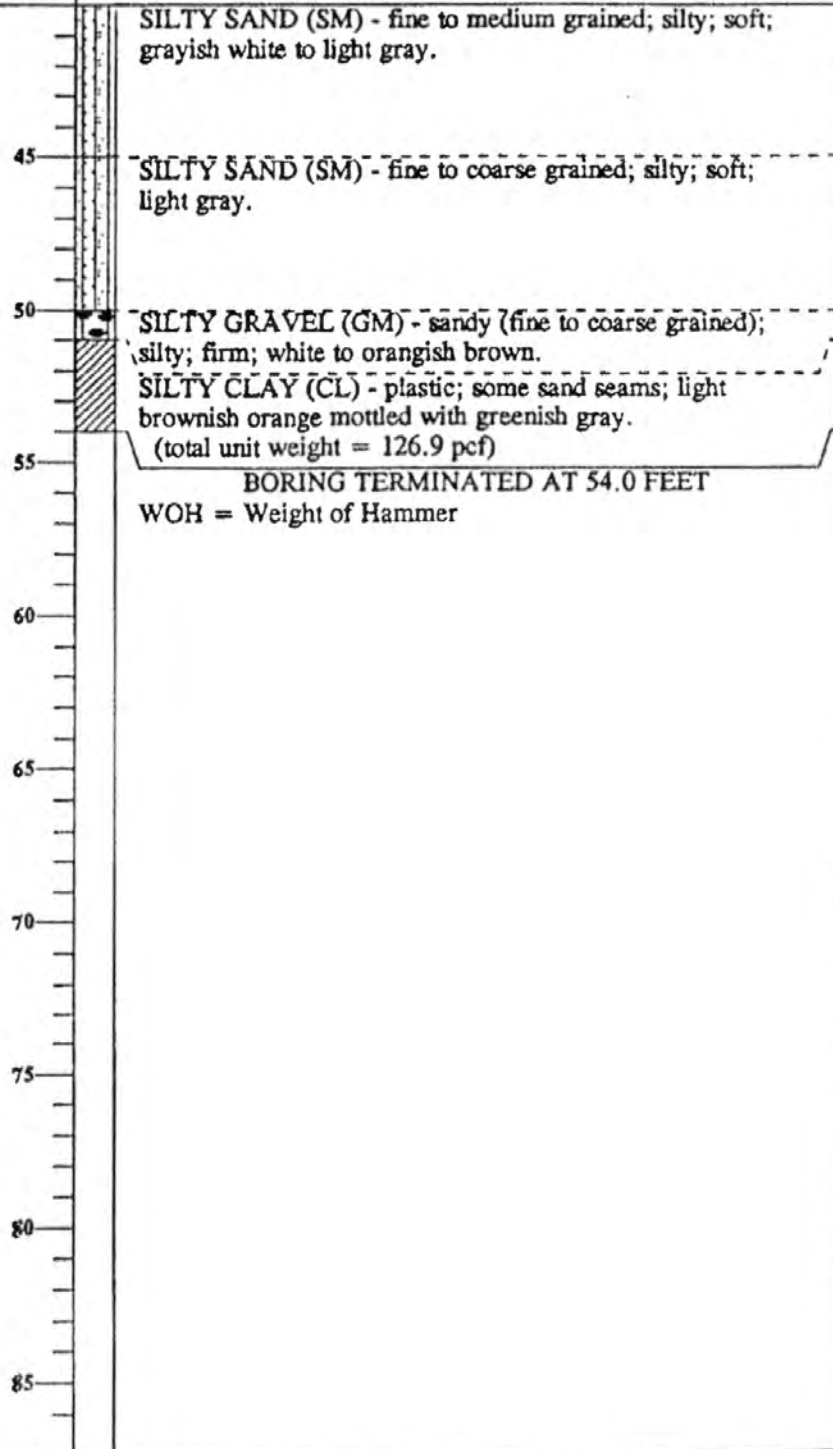
BORING NO. EB-3SHEET NO. 2 OF 2PROJECT NAME CONTAINER CORP OF AMERICA PROJECT NO. 70100.04LOCATION BREWTON, AL INSTALLATION _____CONTRACTOR A.T. & E. SURFACE ELEV. _____DRILLING METHOD MUD ROTARY BOREHOLE DIA. 4 IN.

SAMPLING NOTES

INTERVAL		RECOVERY		MOISTURE	
NO.	TYPE	BLOWS	%	%	DEPTH

11	SS	5-5 8-12	70		
12	SS	6-8 9-14	70		
13	SS	5-4 5-5	50		
14	ST		100	19.9	

VISUAL CLASSIFICATION AND GENERAL OBSERVATIONS



PROJECT: MW-4 Well Replacement	WELL / BORING NO: MW-4R
PROJECT NO: 967.01	STARTED: 7/7/10 COMPLETED: 7/7/10
DRILLING COMPANY: Technical Drilling Services	NORTHING: 8139.4686 EASTING: 21787.7609
DRILLING METHOD: Hollow Stem Augers	ELEVATION: 79.81 ft M.P. ELEV: 82.15 ft
BOREHOLE DIAMETER: 6.25 IN	WATER: ft TOC TOTAL DEPTH: 24.5 ft BGS
NOTES:	LOGGED BY: H. Frank CHECKED BY: J. Wylie

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)	WELL CONSTRUCTION
5			ASH, gray		100	1 0 1 0		2" Schedule 40 PVC
10			ASH, gray, wood pulp, wet below 9 feet		100	0 0 0 0		
15		SW	No Recovery (some wet sand in spoon). Material washed out of sampler.		0	0 0 0 0		
20		SW	SAND, gray, fine to coarse sand grading to coarse gravel (1"+ diameter), well graded, loose, wet		90	3 2 3 2		2" Schedule 40, 0.010 slot, PVC screen
25		SW	SAND, gray, fine to coarse sand grading to coarse gravel (1"+ diameter), well graded, loose, wet		50	3 4 3 3		
			Bottom of boring 25.5'					

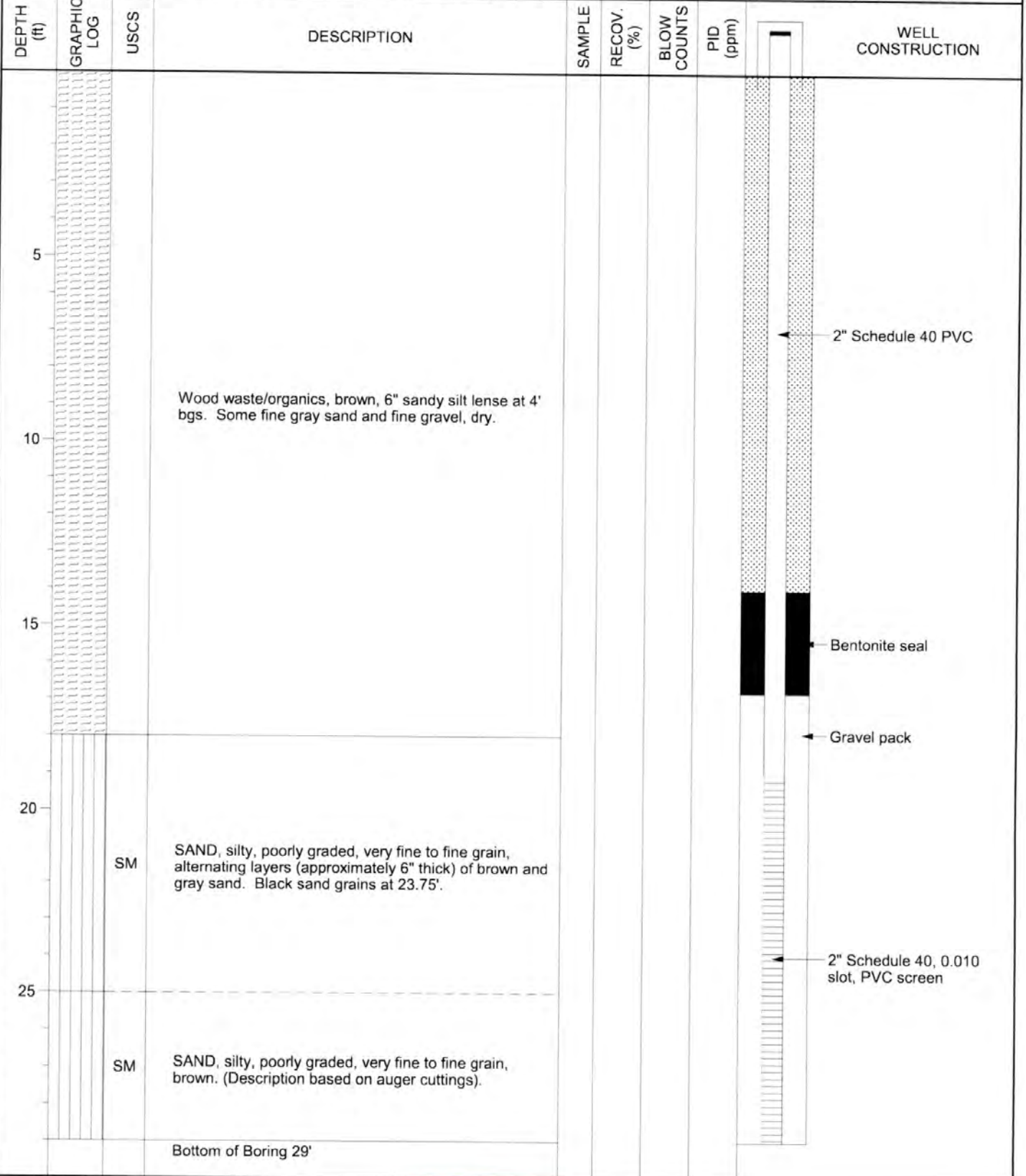
LOG A.EWNN04 G-P BREWTON.GPJ GINT US LAB.GDT 8/13/10



SynTerra
 148 River Street, Suite 220
 Greenville, South Carolina 29601
 Telephone: (864) 421-9999
 Fax: (864) 421-9909

CLIENT: G-P Brewton
 PROJECT LOCATION: Brewton, Alabama

PROJECT: Well Installation-Main Landfill	WELL / BORING NO: MW-6 (LF)
PROJECT NO: 967.01.09	STARTED: 8/13/14 COMPLETED: 8/14/14
DRILLING COMPANY: Technical Drilling Services	NORTHING: 9783.3481 EASTING: 22880.6991
DRILLING METHOD: Hollow Stem Augers	ELEVATION: 102.66 ft M.P. ELEV: 105.34 ft
BOREHOLE DIAMETER: 8.25 IN	WATER: 26.60 ft TOC TOTAL DEPTH: 29.0 ft BGS
NOTES: Lithology based on TW-02 and soil cuttings.	LOGGED BY: H. Frank CHECKED BY: J. Wylie



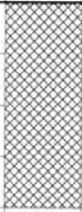
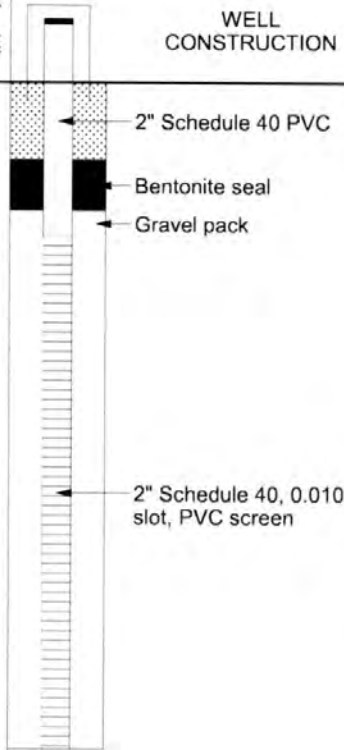
LOG A. EWIN04 G-P BREWTON.GPJ GINT US LAB.GDT 9/23/14

PROJECT: Well Installation-Main Landfill	WELL / BORING NO: MW-7 (LF)
PROJECT NO: 967.01.09	STARTED: 8/13/14 COMPLETED: 8/14/14
DRILLING COMPANY: Technical Drilling Services	NORTHING: 9804.8562 EASTING: 23357.3891
DRILLING METHOD: Hollow Stem Augers	ELEVATION 98.81 ft M.P. ELEV: 101.30 ft
BOREHOLE DIAMETER: 8.25 IN	WATER: 21.84 ft TOC TOTAL DEPTH: 26.0 ft BGS
NOTES:	LOGGED BY: H. Frank CHECKED BY: J. Wylie

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)	WELL CONSTRUCTION
5			Wood waste/organics, dark brown, dry.		21	0		2" Schedule 40 PVC
10			Wood waste/organics, dark brown, dry.		21	0		Bentonite seal
15		SP	SAND, beige to orange/brown (variable), poorly graded, very fine grained, loose, dry.		100	32		Native material (borehole collapse).
20		SP	SAND, tan, poorly graded, very fine grained, loose, moist.		50	35		Gravel pack
25		SW	SAND, brown, fine to coarse grained, rounded gravel, well graded, loose, wet.		100	47		2" Schedule 40, 0.010 slot, PVC screen
		SW	SAND, gray, very fine to fine grained with fine to coarse gravel, rounded to subangular, loose, wet.					
			Bottom of boring 26'					

LOG A E1WNN04 G-P BREWTON.GPJ GINT US LAB.GDT 9/23/14

PROJECT: Well Installation-Main Landfill	WELL / BORING NO: MW-8 (LF)
PROJECT NO: 967.01.09	STARTED: 8/13/14 COMPLETED: 8/14/14
DRILLING COMPANY: Technical Drilling Services	NORTHING: 8318.224 EASTING: 23382.31
DRILLING METHOD: Hollow Stem Augers	ELEVATION: 79.28 ft M.P. ELEV: 81.83 ft
BOREHOLE DIAMETER: 8.25 IN	WATER: 6.00 ft TOC TOTAL DEPTH: 13.0 ft BGS
NOTES: Lithology based on TW-7	LOGGED BY: H. Frank CHECKED BY: J. Wylie

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)	WELL CONSTRUCTION
			ASH, gravel, gray brown (Fill).					
5		SP	SAND, brown grading to gray, poorly graded very fine to fine grain, loose, wet.					
		SP	SAND, brown grading to gray, poorly graded fine to medium grain, loose to medium dense, wet.					
10		SP	SAND, gray, poorly graded fine grain with some medium to coarse and trace of fine gravel, medium dense, wet.					
15			Bottom of boring 13'.					
20								
25								

LOG A EWN04 G-P BREWTON.GPJ GINT US LAB.GDT 9/23/14

PROJECT: Well Installation-Main Landfill	WELL / BORING NO: TW-04
PROJECT NO: 967.01.09	STARTED: 11/4/13 COMPLETED: 8/14/14
DRILLING COMPANY: Technical Drilling Services	NORTHING: 9113.445 EASTING: 22131.8037
DRILLING METHOD: GeoProbe 6610DT	ELEVATION: 80.48 ft M.P. ELEV: 83.06 ft
BOREHOLE DIAMETER: 2.25 IN	WATER: 7.95 ft TOC TOTAL DEPTH: 15.0 ft BGS
NOTES: Converted to permanent piezometer.	LOGGED BY: H. Frank CHECKED BY: J. Wylie

DEPTH (ft)	GRAPHIC LOG	USCS	DESCRIPTION	SAMPLE	RECOV. (%)	BLOW COUNTS	PID (ppm)	WELL CONSTRUCTION
5			Ash, fill material Soil sample collected from 8.5'.		60			
10		SC	SAND, clayey, gray, poorly graded fine grain sand, wet.		60			
15		SP	SAND, black grading to gray, poorly graded very fine to fine grain sand, saturated.		80			
15			Bottom of boring 15'.					

LOG A EWNN04 G-P BREWTON.GPJ GINT US LAB:GDT 9/23/14

APPENDIX B

**Hydraulic Conductivity Determination
Summary**

	MW-8 Test 1	MW-8 Test 2
Type of Evaluation (Hvorslev or Bouwer-Rice)	Bouwer-Rice	Bouwer-Rice
Initial Displacement (ft)	0.736	0.743
Depth to Water Table from TOC (ft)	6.00	6.00
Depth to Bottom of Aquifer (ft) ¹	30	30
Saturated Thickness (ft)	24.00	24.00
Depth to Bottom of Well from TOC (ft)	16.10	16.10
Static Water Column Length (ft)	10.1	10.10
Depth from Water Table to Top of Screen (ft)	0.1	0.10
Actual Screen Length (ft)	10	10
Aqtesolv Screen Length (ft)	10	10
Transducer Depth (ft)	9.6	9.6
Kv/Kh Ratio ³	0.01	0.01
Well Diameter (inches)	2.0	2.0
Radius of Well Casing (ft)	0.083	0.083
Slug/Bailer Diameter (inches)	1.50	1.50
Slug/Bailer Length (inches)	48.0	48.0
Radius of Equipment (ft)	0.0625	0.0625
Packer Radius (ft)	NA	NA
Diameter of Borehole (in)	8.25	8.25
Radius of Borehole (in)	4.13	4.13
Radius of Well Screen (ft)	0.34	0.34
Radius of Well Skin (ft)	0.34	0.34
Effective Porosity of Filter Pack ²	0.32	0.32

¹ Assumed using bottom elevation of aquifer

² Assume 33% for #1 sand (fine), 32% for #2 sand

³ Typical default value for ratio of vertical hydraulic conductivity

Prepared by: HJF Checked by: DMR

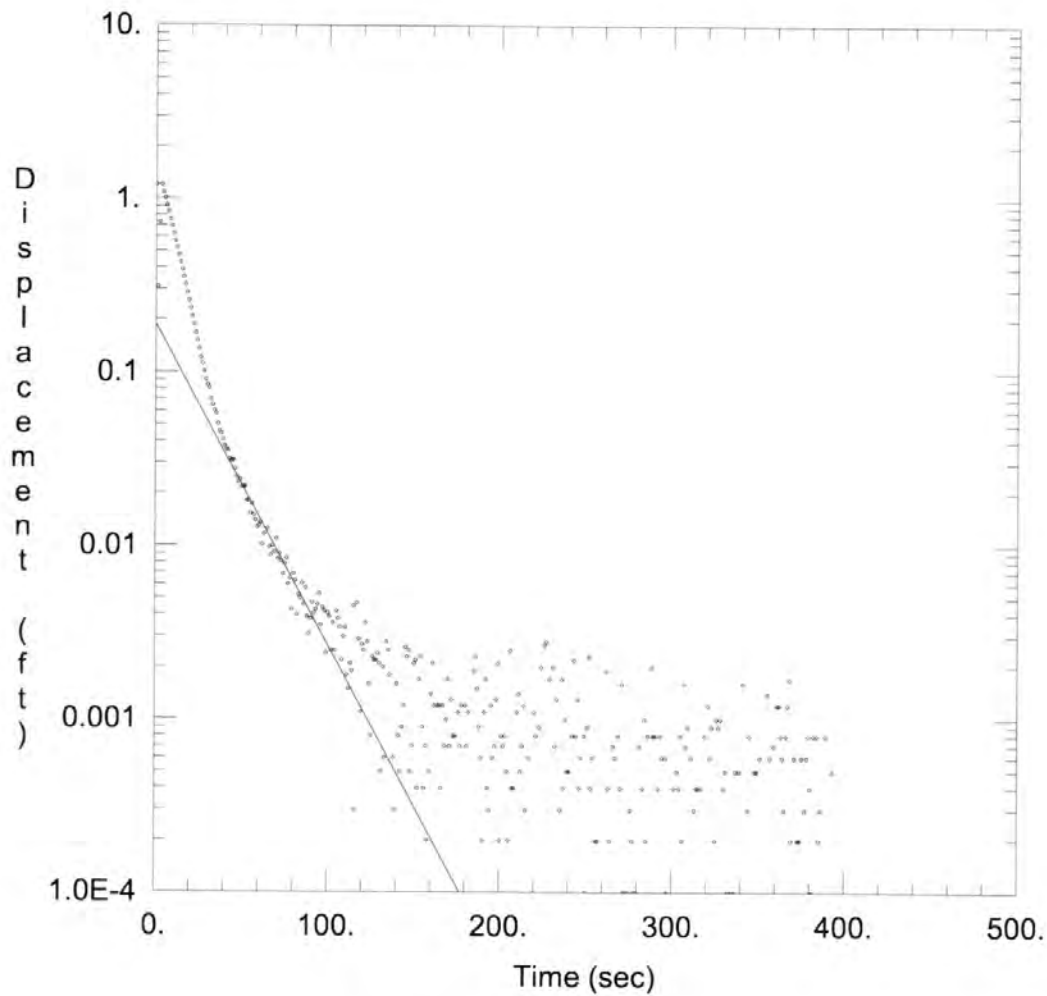
**SUMMARY OF AQTESOLV RESULTS
 GEORGIA-PACIFIC BREWTON, LLC
 MAIN LANDFILL PERMIT NO. 27-05
 BREWTON, ALABAMA**

Landfill Well ID	Slug Test Number	Hydraulic Conductivity (cm/sec)	
		Measured	Average
MW-2	Test 1	4.30E-02	3.17E-02
	Test 2	2.82E-02	
	Test 3	4.08E-02	
	Test 4	1.79E-02	
	Test 5	2.86E-02	
MW-3	Test 1	2.34E-02	1.61E-02
	Test 2	8.83E-03	
MW-6	Test 1	1.64E-02	1.51E-02
	Test 2	1.37E-02	
MW-7	Test 1	3.08E-02	2.98E-02
	Test 2	2.89E-02	
MW-8	Test 1	1.46E-02	1.31E-02
	Test 2	1.16E-02	
AVERAGE (ALL VALUES)		2.36E-02	
HIGHEST CONDUCTIVITY		4.30E-02	
LOWEST CONDUCTIVITY		8.83E-03	

Prepared By: HJF Checked By: DMR

Notes

Slug tests for wells MW-2 and MW-3 conducted May 13, 2009.



MW-6, TEST 1

Data Set: P:\GP Brewton.967\01.Landfill\13.New Well Installation\Slug Tests\MW-6 Test1.aqt
 Date: 09/23/14 Time: 21:48:47

PROJECT INFORMATION

Company: SynTerra
 Client: Georgia-Pacific Brewton, LLC
 Project: 967.01.13
 Location: Brewton, AL
 Test Date: August 15, 2014

AQUIFER DATA

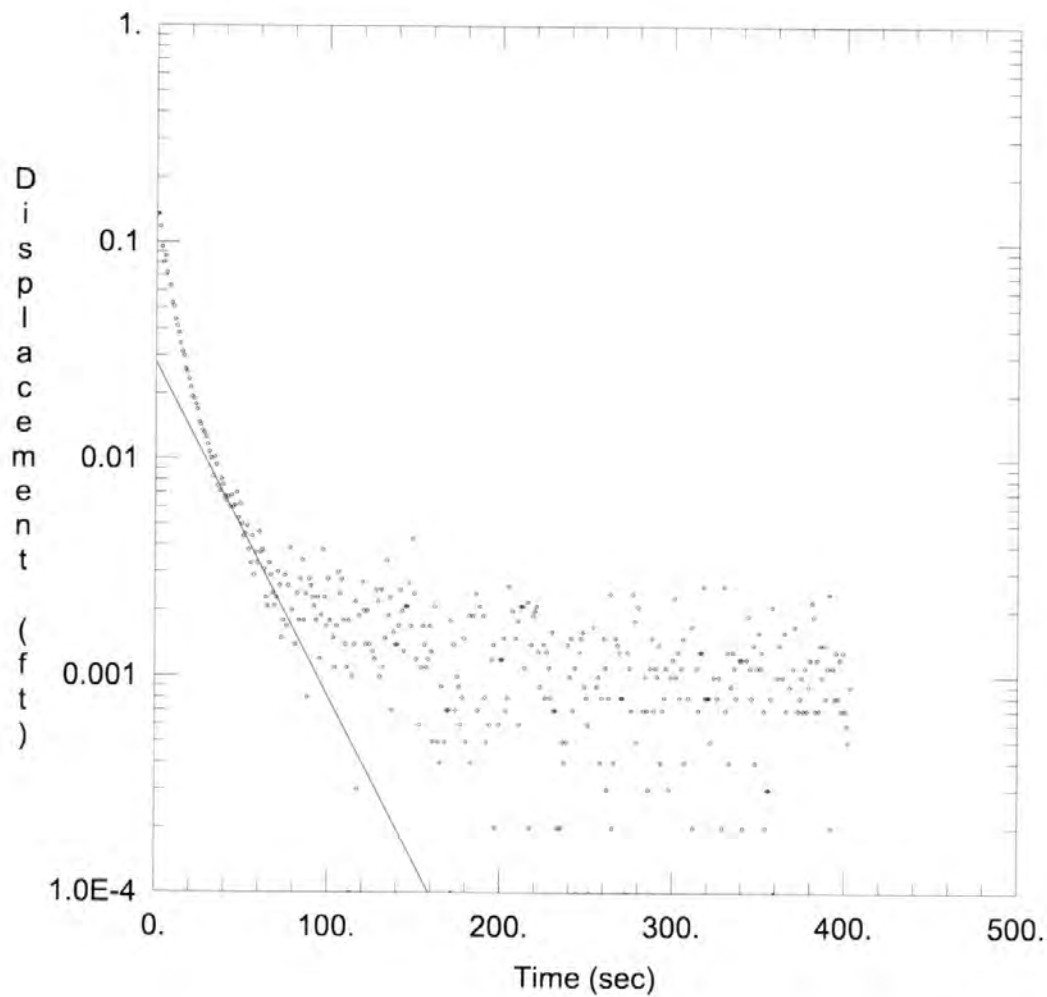
Saturated Thickness: 23.4 ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-6)

Initial Displacement: 1.209 ft Static Water Column Height: 5.08 ft
 Total Well Penetration Depth: 5.08 ft Screen Length: 5.08 ft
 Casing Radius: 0.083 ft Well Radius: 0.34 ft
 Gravel Pack Porosity: 0.32

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.01644 cm/sec $v_0 = 0.1878$ ft



MW-6, TEST 2

Data Set: P:\GP Brewton.967\01.Landfill\13.New Well Installation\Slug Tests\MW-6 Test2.aqt
 Date: 09/23/14 Time: 21:54:17

PROJECT INFORMATION

Company: SynTerra
 Client: Georgia-Pacific Brewton, LLC
 Project: 967.01.13
 Location: Brewton, AL
 Test Date: August 15, 2014

AQUIFER DATA

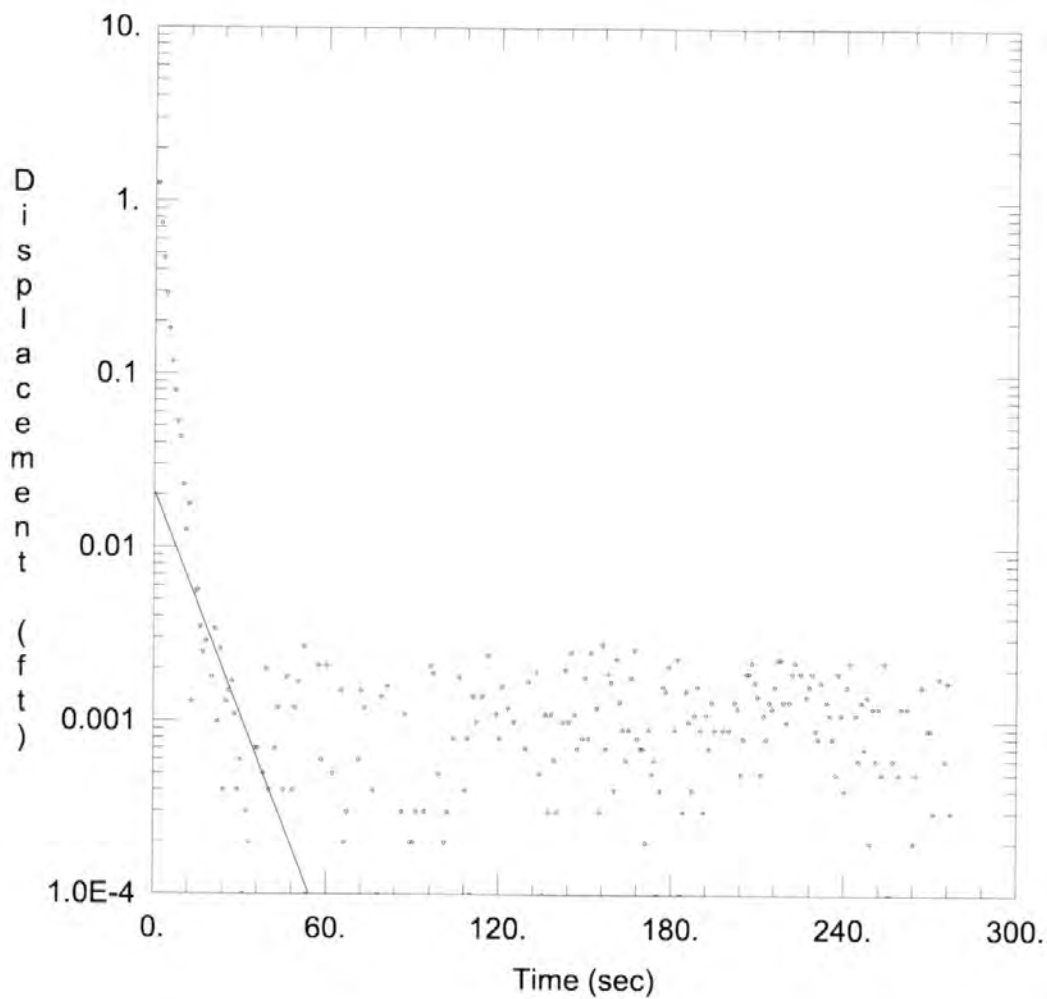
Saturated Thickness: 23.4 ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-6)

Initial Displacement: 0.1354 ft Static Water Column Height: 5.08 ft
 Total Well Penetration Depth: 5.08 ft Screen Length: 5.08 ft
 Casing Radius: 0.083 ft Well Radius: 0.34 ft
 Gravel Pack Porosity: 0.32

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.01371 cm/sec $v_0 = 0.02795$ ft



MW-7, TEST 1

Data Set: P:\GP Brewton.967\01.Landfill\13.New Well Installation\Slug Tests\MW-7 Test1.aqt
 Date: 09/23/14 Time: 21:54:04

PROJECT INFORMATION

Company: SynTerra
 Client: Georgia-Pacific Brewton, LLC
 Project: 967.01.13
 Location: Brewton, AL
 Test Date: August 15, 2014

AQUIFER DATA

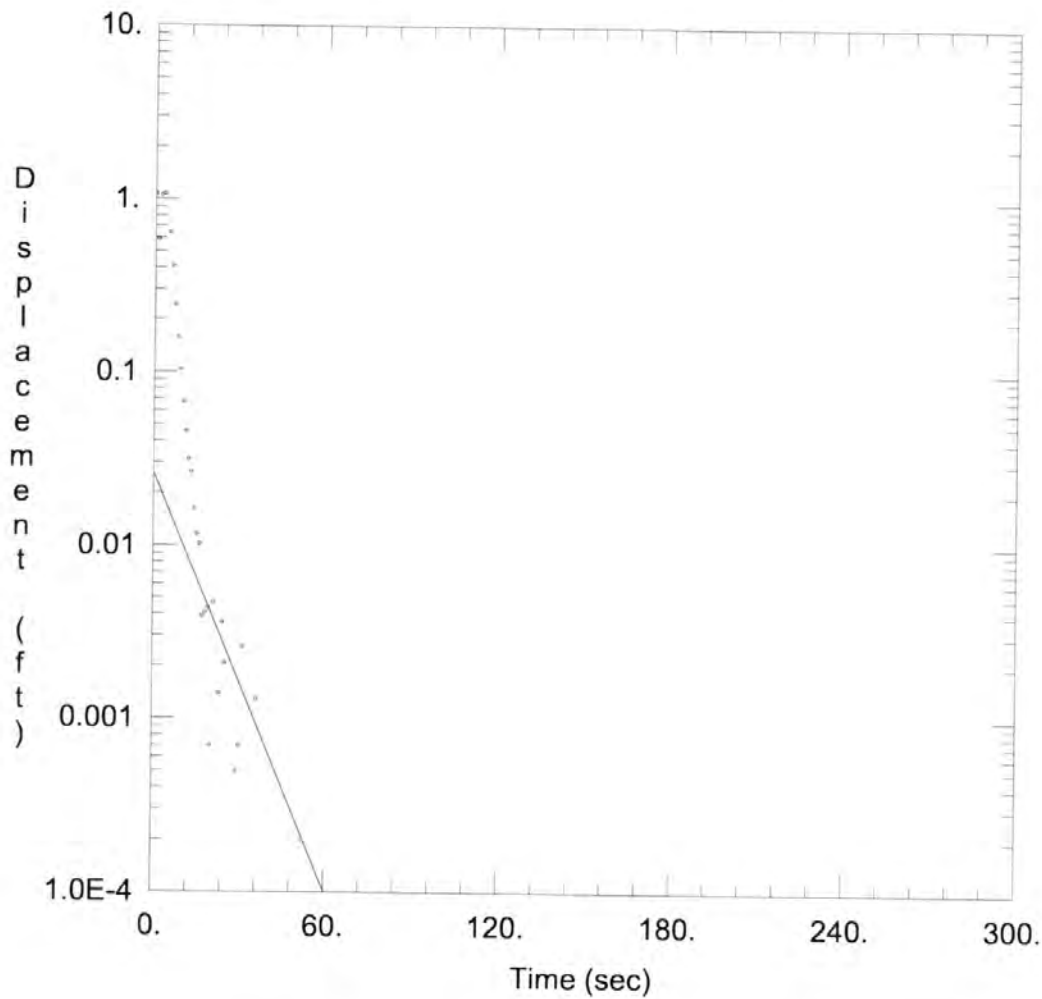
Saturated Thickness: 28.16 ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-7)

Initial Displacement: 1.263 ft Static Water Column Height: 6.76 ft
 Total Well Penetration Depth: 6.76 ft Screen Length: 6.76 ft
 Casing Radius: 0.083 ft Well Radius: 0.34 ft
 Gravel Pack Porosity: 0.32

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.03083 cm/sec v_0 = 0.02081 ft



MW-7, TEST 2

Data Set: P:\GP Brewton.967\01.Landfill\13.New Well Installation\Slug Tests\MW-7 Test2.aqt
 Date: 09/23/14 Time: 21:53:50

PROJECT INFORMATION

Company: SynTerra
 Client: Georgia-Pacific Brewton, LLC
 Project: 967.01.13
 Location: Brewton, AL
 Test Date: August 15, 2014

AQUIFER DATA

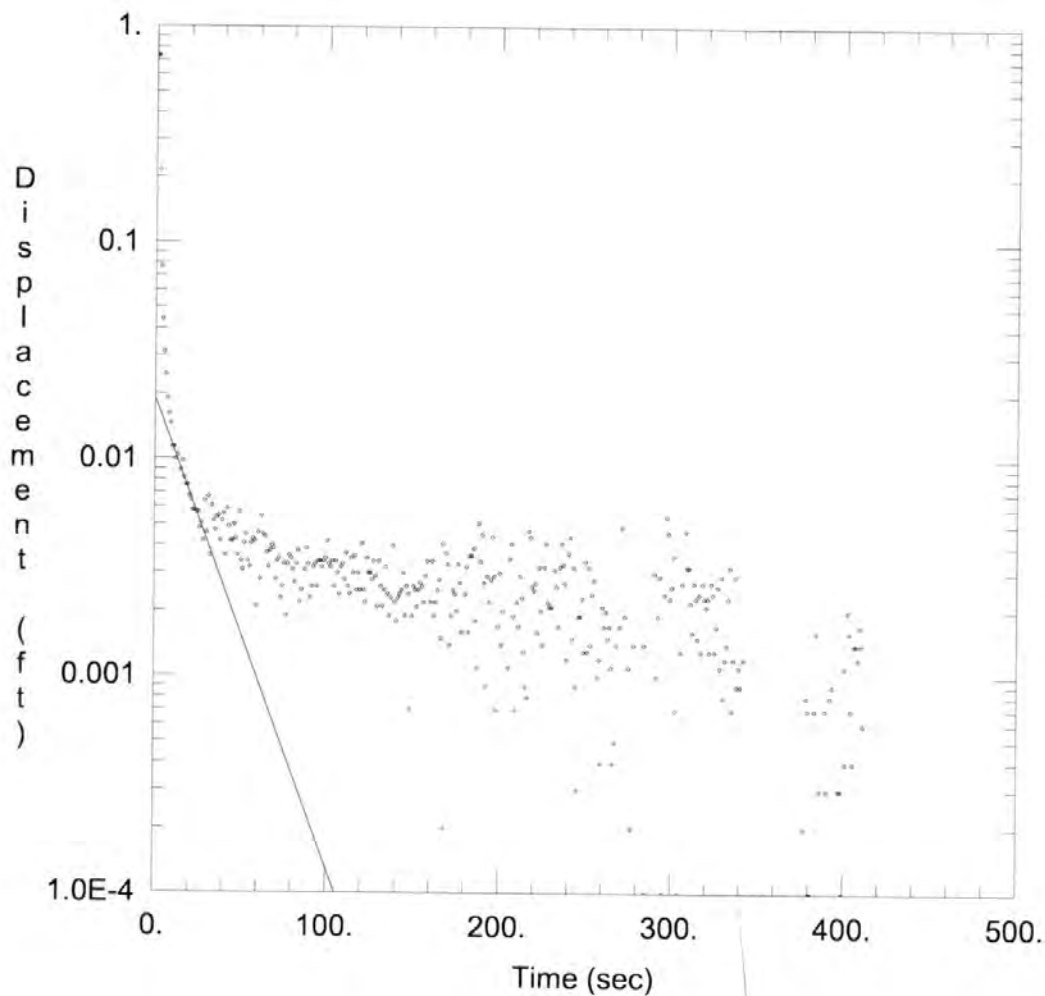
Saturated Thickness: 28.16 ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-7)

Initial Displacement: 1.071 ft Static Water Column Height: 6.76 ft
 Total Well Penetration Depth: 6.76 ft Screen Length: 6.76 ft
 Casing Radius: 0.083 ft Well Radius: 0.34 ft
 Gravel Pack Porosity: 0.32

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.02886 cm/sec v0 = 0.02596 ft



MW-8, TEST 1

Data Set: P:\IGP Brewton.967\01.Landfill\13.New Well Installation\Slug Tests\MW-8 Test1.aqt
 Date: 09/23/14 Time: 21:53:38

PROJECT INFORMATION

Company: SynTerra
 Client: Georgia-Pacific Brewton, LLC
 Project: 967.01.13
 Location: Brewton, AL
 Test Date: August 15, 2014

AQUIFER DATA

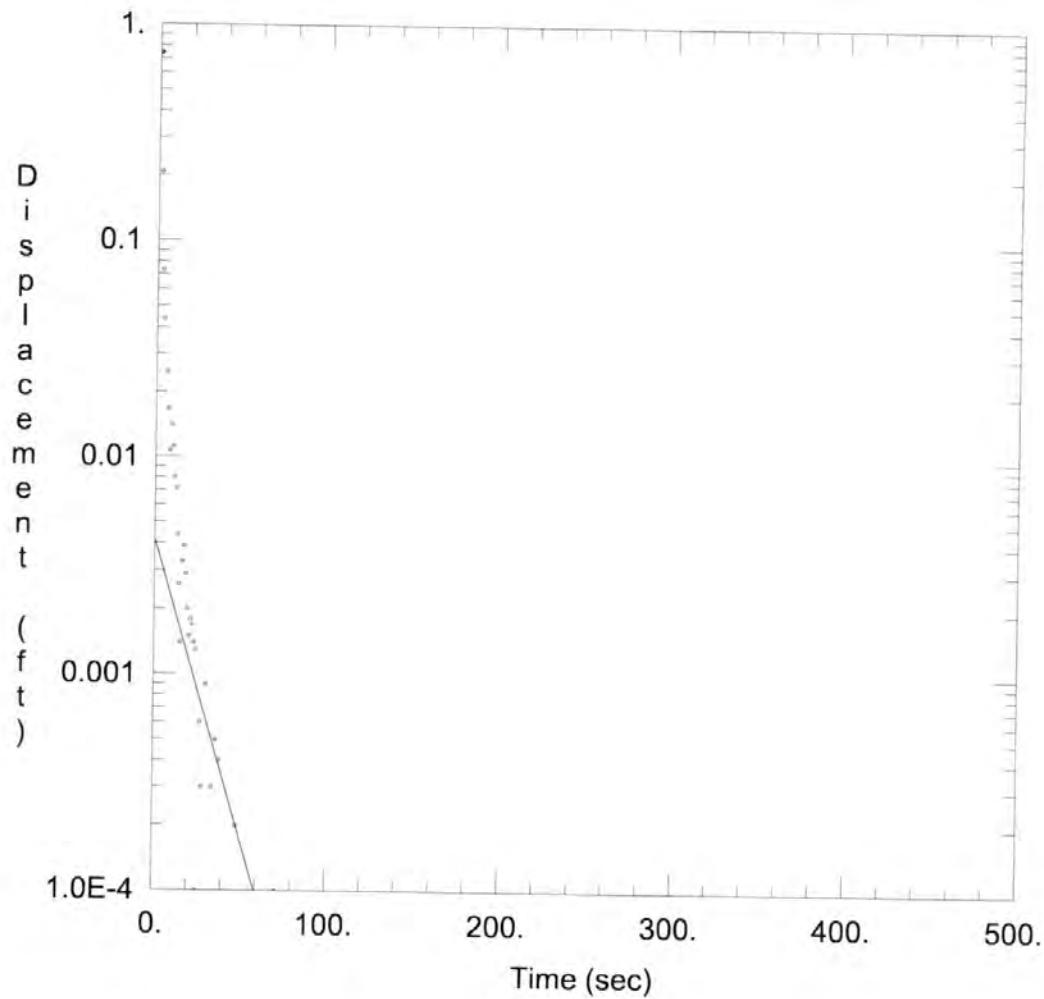
Saturated Thickness: 24. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-8)

Initial Displacement: 0.7362 ft Static Water Column Height: 10.1 ft
 Total Well Penetration Depth: 10. ft Screen Length: 10. ft
 Casing Radius: 0.083 ft Well Radius: 0.34 ft
 Gravel Pack Porosity: 0.32

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.01155 cm/sec v0 = 0.01885 ft



MW-8, TEST 2

Data Set: P:\GP Brewton.967\01.Landfill\13.New Well Installation\Slug Tests\MW-8 Test2.aqt
 Date: 09/23/14 Time: 21:53:22

PROJECT INFORMATION

Company: SynTerra
 Client: Georgia-Pacific Brewton, LLC
 Project: 967.01.13
 Location: Brewton, AL
 Test Date: August 15, 2014

AQUIFER DATA

Saturated Thickness: 24. ft Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW-8)

Initial Displacement: 0.743 ft Static Water Column Height: 10.1 ft
 Total Well Penetration Depth: 10. ft Screen Length: 10. ft
 Casing Radius: 0.083 ft Well Radius: 0.34 ft
 Gravel Pack Porosity: 0.32

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.01459 cm/sec v0 = 0.004129 ft



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(334) 271-7700 ■ FAX (334) 271-7950

January 6, 2020

MEMORANDUM

To: Blake Holden
Engineering Section
Solid Waste Branch

From: Wesley S. Edwards
Hydrogeology Section
Groundwater Branch

RE: Groundwater Monitoring Plan
Georgia-Pacific Brewton LLC Main LF #27-05
Brewton, Escambia County, Alabama

Summary

The Department has received the Groundwater Monitoring and Statistical Analysis Plan dated February 2015 (Revised August 2019) for the above referenced facility. The ADEM Solid Waste Branch requested that the Hydrogeology Unit review the groundwater modification and provide pertinent comments and recommendations. This report is a result of that request.

Comments and Recommendations

The submitted groundwater monitoring plan appears to be adequate to verify compliance with groundwater monitoring requirements listed in ADEM Admin Code r. 335-13-4-.27 at this time.

