



Alabama Department of Environmental Management
adem.alabama.gov

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Montgomery, Alabama 36130-1463
(334) 271-7700 ■ FAX (334) 271-7950

October 5, 2021

Jim Bevill
Land and Mines Manager
Carbo Ceramics, Inc.
36 Arch Drive
Eufaula, AL 36027

RE: Draft Permit
Carbo-Belcher Bauxite Pit
NPDES Permit No. AL0082830
Barbour County (005)

Dear Mr. Bevill:

Transmitted herein is a draft of the above referenced permit. Please review the enclosed draft permit carefully. If previously permitted, the draft may contain additions/revisions to the language in your current permit. Please submit any comments on the draft permit to the Department within 30 days from the date of receipt of this letter.

Since the Department has made a tentative decision to issue the above referenced permit, ADEM Admin. Code r. 335-6-6-.21 requires a public notice of the draft permit followed by a period of at least 30 days for public comment before the permit can be issued. The United States Environmental Protection Agency will also receive the draft permit for review during the 30-day public comment period.

Any mining, processing, construction, land disturbance, or other regulated activity proposed to be authorized by this draft permit is prohibited prior to the effective date of the formal permit. Any mining or processing activity within the drainage basin associated with each permitted outfall which is conducted prior to Departmental receipt of certification from a professional engineer licensed to practice in the State of Alabama, that the Pollution Abatement/Prevention Plan was implemented according to the design plan, or notification from the Alabama Surface Mining Commission that the sediment control structures have been certified, is prohibited.

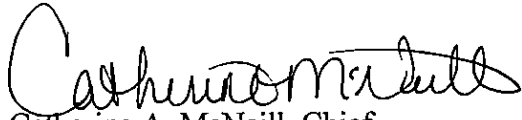
Please be aware that Part I.D of your permit requires that you apply for participation in the Department's web-based Electronic Environmental (E2) Reporting System Program for submittal of DMRs upon issuance of this permit unless valid justification as to why you cannot participate is submitted in writing. The E2 Program allows ADEM to electronically validate, acknowledge receipt, and upload data to the state's central wastewater database. This improves the accuracy of reported compliance data and reduces costs to both the regulated community and ADEM. The Permittee Participation Package may be downloaded online at <https://e2.adem.alabama.gov/npdes> or you may obtain a hard copy by submitting a written request or by emailing e2admin@adem.alabama.gov.



The Alabama Department of Environmental Management encourages you to voluntarily consider pollution prevention practices and alternatives at your facility. Pollution Prevention may assist you in complying with effluent limitations, and possibly reduce or eliminate monitoring requirements.

Should you have any questions concerning this matter, please contact Amber Hicks by email at amber.hicks@adem.alabama.gov or by phone at (334) 271-7975.

Sincerely,



Catherine A. McNeill, Chief
Mining and Natural Resource Section
Stormwater Management Branch
Water Division

CAM/anh File: DPER/46279

Enclosure

cc: Amber Hicks, ADEM
Environmental Protection Agency Region IV
Alabama Department of Conservation and Natural Resources
U.S. Fish and Wildlife Service
Alabama Historical Commission
Advisory Council on Historic Preservation
Alabama Department of Labor



NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM INDIVIDUAL PERMIT

PERMITTEE: Carbo Cermaics, Inc.
36 Arch Drive
Eufaula, Alabama 36027

FACILITY LOCATION: Carbo-Belcher Bauxite Pit
1544 County Road 79 S
Eufaula, AL 36027
Barbour County
T9N, R27E, S1

PERMIT NUMBER: AL0082830

DSN & RECEIVING STREAM: 001- Unnamed Tributary to White Oak Creek

In accordance with and subject to the provisions of the Federal Water Pollution Control Act, as amended, 33 U.S.C. §§1251-1378 (the "FWPCA"), the Alabama Water Pollution Control Act, as amended, Code of Alabama 1975, §§ 22-22-1 to 22-22-14 (the "AWPCA"), the Alabama Environmental Management Act, as amended, Code of Alabama 1975, §§22-22A-1 to 22-22A-16, and rules and regulations adopted thereunder, and subject further to the terms and conditions set forth in this permit, the Permittee is hereby authorized to discharge into the above-named receiving waters.

ISSUANCE DATE:
EFFECTIVE DATE:
EXPIRATION DATE:

Draft

Alabama Department of Environmental Management

**MINING AND NATURAL RESOURCE SECTION
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT**

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PART I DISCHARGE LIMITATIONS, CONDITIONS, AND REQUIREMENTS

A. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this Permit and lasting through the expiration date of this Permit, the Permittee is authorized to discharge from each point source identified on Page 1 of this Permit and described more fully in the Permittee's application, if the outfalls have been constructed and certified. Discharges shall be limited and monitored by the Permittee as specified below:

Parameter	Discharge Limitations			Monitoring Requirements	
	Daily Minimum	Monthly Average	Daily Maximum	Sample Type	Measurement Frequency ¹
pH 00400	6.0 s.u.	-----	9.0 s.u.	Grab	2/Month
Solids, Total Suspended 00530	-----	20.0 mg/L	30.0 mg/L	Grab	2/Month
Iron, Total (as Fe) 01045	-----	0.5 mg/L	1.0 mg/L	Grab	2/Month
Aluminum, Total (as Al) 01105	-----	1.0 mg/L	2.0 mg/L	Grab	2/Month
Flow, In Conduit or Thru Treatment Plant ² 50050	-----	Report MGD	Report MGD	Instantaneous	2/Month

B. REQUIREMENTS TO ACTIVATE A PROPOSED MINING OUTFALL

1. Discharge from any point source identified on Page 1 of this Permit which is a proposed outfall is not authorized by this Permit until the outfall has been constructed and certification received by the Department from a professional engineer, registered in the State of Alabama, certifying that such facility has been constructed according to good engineering practices and in accordance with the Pollution Abatement and/or Prevention (PAP) Plan.
2. Certification required by Part I.B.1. shall be submitted on a completed ADEM Form 432. The certification shall include the latitude and longitude of the constructed and certified outfall.
3. Discharge monitoring and Discharge Monitoring Report (DMR) reporting requirements described in Part I.C. of this Permit do not apply to point sources that have not been constructed and certified.
4. Upon submittal of the certification required by Part I.B.1. to the Department, all monitoring and DMR submittal requirements shall apply to the constructed and certified outfall.

¹ See Part I.C.2. for further measurement frequency requirements.

² Flow must be determined at the time of sample collection by direct measurement, calculation, or other method acceptable to the Department.

C. DISCHARGE MONITORING AND RECORD KEEPING REQUIREMENTS

1. Sampling Schedule and Frequency

- a. The Permittee shall collect at least one grab sample of the discharge to surface waters from each constructed and certified point source identified on Page 1 of this Permit and described more fully in the Permittee's application twice per month at a rate of at least every other week if a discharge occurs at any time during the two week period, but need not collect more than two samples per calendar month. Each sample collected shall be analyzed for each parameter specified in Part I.A. of this Permit.
- b. If the final effluent is pumped in order to discharge (e.g. from incised ponds, old highwall cuts, old pit areas or depressions, etc.), the Permittee shall collect at least one grab sample of the discharge from each point source identified on Page 1 of this Permit and described more fully in the Permittee's application each quarterly (three month) monitoring period if a discharge occurs at any time during the quarterly monitoring period which results from direct pumped drainage. Each sample collected shall be analyzed for each parameter specified in Part I.A. of this Permit.
- c. The Permittee may increase the frequency of sampling listed in Parts I.C.1.a and I.C.1.b; however, all sampling results must be reported to the Department and included in any calculated results submitted to the Department in accordance with this Permit.

2. Measurement Frequency

Measurement frequency requirements found in Part I.A. shall mean:

- a. A measurement frequency of one day per week shall mean sample collection on any day of discharge which occurs every calendar week.
- b. A measurement frequency of two days per month shall mean sample collection on any day of discharge which occurs every other week, but need not exceed two sample days per month.
- c. A measurement frequency of one day per month shall mean sample collection on any day of discharge which occurs during each calendar month.
- d. A measurement frequency of one day per quarter shall mean sample collection on any day of discharge which occurs during each calendar quarter.
- e. A measurement frequency of one day per six months shall mean sample collection on any day of discharge which occurs during the period of January through June and during the period of July through December.
- f. A measurement frequency of one day per year shall mean sample collection on any day of discharge which occurs during each calendar year.

3. Monitoring Schedule

The Permittee shall conduct the monitoring required by Part I.A. in accordance with the following schedule:

- a. MONITORING REQUIRED MORE FREQUENTLY THAN MONTHLY AND MONTHLY shall be conducted during the first full month following the effective date of coverage under this Permit and every month thereafter. More frequently than monthly and monthly monitoring may be done anytime during the month, unless restricted elsewhere in

this Permit, but the results should be reported on the last Discharge Monitoring Report (DMR) due for the quarter (i.e., with the March, June, September, and December DMRs).

- b. QUARTERLY MONITORING shall be conducted at least once during each calendar quarter. Calendar quarters are the periods of January through March, April through June, July through September, and October through December. The Permittee shall conduct the quarterly monitoring during the first complete calendar quarter following the effective date of this Permit and is then required to monitor once during each quarter thereafter. Quarterly monitoring may be done anytime during the quarter, unless restricted elsewhere in this Permit, but the results should be reported on the last DMR due for the quarter (i.e., with the March, June, September, and December DMRs).
- c. SEMIANNUAL MONITORING shall be conducted at least once during the period of January through June and at least once during the period of July through December. The Permittee shall conduct the semiannual monitoring during the first complete semiannual calendar period following the effective date of this Permit and is then required to monitor once during each semiannual period thereafter. Semiannual monitoring may be done anytime during the semiannual period, unless restricted elsewhere in this Permit, but it should be reported on the last DMR due for the month of the semiannual period (i.e., with the June and December DMRs).
- d. ANNUAL MONITORING shall be conducted at least once during the period of January through December. The Permittee shall conduct the annual monitoring during the first complete calendar annual period following the effective date of this Permit and is then required to monitor once during each annual period thereafter. Annual monitoring may be done anytime during the year, unless restricted elsewhere in this Permit, but it should be reported on the December DMR.

4. Sampling Location

Unless restricted elsewhere in this Permit, samples collected to comply with the monitoring requirements specified in Part I.A. shall be collected at the nearest accessible location just prior to discharge and after final treatment, or at an alternate location approved in writing by the Department.

5. Representative Sampling

Sample collection and measurement actions taken as required herein shall be representative of the volume and nature of the monitored discharge and shall be in accordance with the provisions of this Permit.

6. Test Procedures

For the purpose of reporting and compliance, Permittees shall use one of the following procedures:

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

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

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

In either case the measured value should be reported if the analytical result is at or above the ML and "0" reported for values below the ML.

- c. For parameters without an EPA established ML, interim ML, or matrix-specific ML, a report of less than the detection limit shall constitute compliance if the detection limit of all analytical methods is higher than the permit limit using the most sensitive EPA approved method. For the purpose of calculating a monthly average, "0" shall be used for values reported less than the detection limit.

The Minimum Level utilized for procedures identified in Parts I.C.6.a. and b. shall be reported on the Permittee's DMR. When an EPA approved test procedure for analysis of a pollutant does not exist, the Director shall approve the procedure to be used.

7. Recording of Results

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

- a. The facility name and location, point source number, date, time, and exact place of sampling or measurements;
- b. The name(s) of person(s) who obtained the samples or measurements;
- c. The dates and times the analyses were performed;
- d. The name(s) of the person(s) who performed the analyses;
- e. The analytical techniques or methods used including source of method and method number; and
- f. The results of all required analyses.

8. Routine Inspection by Permittee

- a. The Permittee shall inspect all point sources identified on Page 1 of this Permit and described more fully in the Permittee's application and all treatment or control facilities or systems used by the Permittee to achieve compliance with the terms and conditions of this Permit at least as often as the applicable sampling frequency specified in Part I.C.1 of this Permit.
- b. If required by the Director, the Permittee shall maintain a written log for each point source identified on Page 1 of this Permit and described more fully in the Permittee's application in which the Permittee shall record the following information:
 - (1) The date and time the point source and any associated treatment or control facilities or systems were inspected by the Permittee;

- (2) Whether there was a discharge from the point source at the time of inspection by the Permittee;
- (3) Whether a sample of the discharge from the point source was collected at the time of inspection by the Permittee;
- (4) Whether all associated treatment or control facilities or systems appeared to be in good working order and operating as efficiently as possible, and if not, a description of the problems or deficiencies; and
- (5) The name and signature of the person performing the inspection of the point source and associated treatment or control facilities or systems.

9. Records Retention and Production

- a. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Permit, and records of all data used to complete the above reports or the application for this Permit, for a period of at least three (3) years from the date of the sample collection, measurement, report, or application. This period may be extended by request of the Director at any time. If litigation or other enforcement action, under the AWPCA, AEMA, and/or the FWPCA, is ongoing which involves any of the above records, the records shall be kept until the litigation is resolved. Upon the written request of the Director, the Permittee shall provide the Director with a copy of any record required to be retained by this paragraph. Copies of these records should not be submitted unless requested.
- b. All records required to be kept for a period of three (3) years shall be kept at the permitted facility or an alternate location approved by the Department in writing and shall be available for inspection.

10. Monitoring Equipment and Instrumentation

All equipment and instrumentation used to determine compliance with the requirements of this Permit shall be installed, maintained, and calibrated in accordance with the manufacturer's instructions or, in the absence of manufacturer's instructions, in accordance with accepted practices. The Permittee shall develop and maintain quality assurance procedures to ensure proper operation and maintenance of all equipment and instrumentation. The quality assurance procedures shall include the proper use, maintenance, and installation, when appropriate, of monitoring equipment at the plant site.

D. DISCHARGE REPORTING REQUIREMENTS

1. Requirements for Reporting of Monitoring

- a. Monitoring results obtained during the previous three (3) months shall be summarized for each month on a Discharge Monitoring Report (DMR) Form approved by the Department, and submitted to the Department so that it is received by the Director no later than the 28th day of the month following the quarterly reporting period (i.e., on the 28th day of January, April, July, and October of each year).
- b. The Department utilizes a web-based electronic environmental (E2) reporting system for submittal of DMRs. **Except as allowed by Part I.D.1.c. or d., the Permittee shall submit all DMRs required by Part I.D.1.a. by utilizing the E2 reporting system.** The E2

reporting system Permittee Participation Package may be downloaded online at <https://e2.adem.alabama.gov/npdes>.

- c. If the electronic environmental (E2) reporting system is down (i.e. electronic submittal of DMR data is unable to be completed due to technical problems originating with the Department's system; this could include entry/submittal issues with an entire set of DMRs or individual parameters), permittees are not relieved of their obligation to submit DMR data to the Department by the required submittal date. However, if the E2 system is down on the 28th day of the month or is down for an extended period of time as determined by the Department when a DMR is required to be submitted, the facility may submit the data in an alternate manner and format acceptable to the Department. Preapproved alternate acceptable methods include faxing, e-mailing, mailing, or hand-delivery of data such that they are received by the required reporting date. Within five calendar days of the E2 system resuming operation, the Permittee shall enter the data into the E2 reporting system unless an alternate timeframe is approved by the Department. An attachment should be included with the E2 DMR submittal verifying the original submittal date (date of the fax, copy of dated e-mail, or hand-delivery stamped date).
- d. The permittee may submit a request to the Department for a temporary electronic reporting waiver for DMR submittals. The waiver request should include the permit number; permittee name; facility/site name; facility address; name, address, and contact information for the responsible official or duly authorized representative; a detailed statement regarding the basis for requesting such a waiver; and the duration for which the waiver is requested. Approved electronic reporting waivers are not transferrable. Permittees with an approved electronic reporting waiver for DMRs may submit hard copy DMRs for the period that the approved electronic reporting waiver request is effective. The Permittee shall submit the Department-approved DMR forms to the address listed in Part I.D.1.j.
- e. If the Permittee, using approved analytical methods as specified in Part I.C.6., monitors any discharge from a point source identified on Page 1 of this Permit and describe more fully in the Permittee's application more frequently than required by this Permit; the results of such monitoring shall be included in the calculation and reporting of values on the DMR Form, and the increased frequency shall be indicated on the DMR Form.
- f. In the event no discharge from a point source identified on Page 1 of this Permit and described more fully in the Permittee's application occurs during a monitoring period, the Permittee shall report "No Discharge" for such period on the appropriate DMR Form.
- g. The Permittee shall report "No Discharge During Quarterly Monitoring Period" on the appropriate DMR Form for each point source receiving pumped discharges pursuant to Part I.C.1.b. provided that no discharge has occurred at any time during the entire quarterly (three month) monitoring period.
- h. Each DMR Form submitted by the Permittee to the Department in accordance with Part I.D.1. must be legible and bear an original signature or electronic signature. Photo and electronic copies of the signature are not acceptable and shall not satisfy the reporting requirements of this Permit.
- i. All reports and forms required to be submitted by this Permit, the AWPCA, and the Department's rules and regulations, shall be signed by a "responsible official" of the Permittee as defined in ADEM Admin. Code r. 335-6-6-.09 or a "duly authorized representative" of such official as defined in ADEM Admin. Code r. 335-6-6-.09 and shall bear the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed

to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

- j. All DMRs, reports, and forms required to be submitted by this Permit, the AWPCA and the Department's rules and regulations, shall be addressed to:

Alabama Department of Environmental Management
Water Division, Mining and Natural Resource Section
Post Office Box 301463
Montgomery, Alabama 36130-1463

Certified and Registered Mail shall be addressed to:

Alabama Department of Environmental Management
Water Division, Mining and Natural Resource Section
1400 Coliseum Boulevard
Montgomery, Alabama 36110-2059

- k. Unless authorized in writing by the Department, approved reporting forms required by this Permit or the Department are not to be altered, and if copied or reproduced, must be consistent in format and identical in content to the ADEM approved form. Unauthorized alteration, falsification, or use of incorrectly reproduced forms constitutes noncompliance with the requirements of this Permit and may significantly delay processing of any request, result in denial of the request, result in permit termination, revocation, suspension, modification, or denial of a permit renewal application, or result in other enforcement action.
- l. If this Permit is a reissuance, then the Permittee shall continue to submit DMRs in accordance with the requirements of their previous permit until such time as DMRs are due as discussed in Part I.D.1.

2. Noncompliance Notification

- a. The Permittee must notify the Department if, for any reason, the Permittee's discharge:
- (1) Potentially threatens human health or welfare;
 - (2) Potentially threatens fish or aquatic life;
 - (3) Causes an in-stream water quality criterion to be exceeded;
 - (4) Does not comply with an applicable toxic pollutant effluent standard or prohibition established under Section 307(a) of the FWPCA, 33 U.S.C. §1317(a);
 - (5) Contains a quantity of a hazardous substance which has been determined may be harmful to the public health or welfare under Section 311(b)(4) of the FWPCA, 33 U.S.C. §1321(b)(4); or

- (6) Exceeds any discharge limitation for an effluent parameter as a result of an unanticipated bypass or upset.

The Permittee shall orally or electronically report any of the above occurrences, describing the circumstances and potential effects of such discharge to the Director within 24-hours after the Permittee becomes aware of the occurrence of such discharge. In addition to the oral or electronic report, the Permittee shall submit to the Director a written report as provided in Part I.D.2.c., no later than five (5) days after becoming aware of the occurrence of such discharge.

- b. If for any reason, the Permittee's discharge does not comply with any limitation of this Permit, the Permittee shall submit a written report to the Director as provided in Part I.D.2.c. This report must be submitted with the next Discharge Monitoring Report required to be submitted by Part I.D.1. of this Permit after becoming aware of the occurrence of such noncompliance.
- c. Any written report required to be submitted to the Director in accordance with Parts I.D.2.a. and b. shall be submitted using a Noncompliance Notification Form (ADEM Form 421) available on the Department's website (<http://adem.alabama.gov/DeptForms/Form421.pdf>) and include the following information:
 - (1) A description of the discharge and cause of noncompliance;
 - (2) The period of noncompliance, including exact dates and times, or if not corrected, the anticipated time the noncompliance is expected to continue; and
 - (3) A description of the steps taken and/or being taken to reduce or eliminate the noncomplying discharge and to prevent its recurrence.

3. Reduction, Suspension, or Termination of Monitoring and/or Reporting

- a. The Director may, with respect to any point source identified on Page 1 of this Permit and described more fully in the Permittee's application, authorize the Permittee to reduce, suspend, or terminate the monitoring and/or reporting required by this Permit upon the submission of a written request for such reduction, suspension, or termination by the Permittee provided:
 - (1) All mining, processing, or disturbance in the drainage basin(s) associated with the discharge has ceased and site access is adequately restricted or controlled to preclude unpermitted and unauthorized mining, processing, transportation, or associated operations/activity;
 - (2) Permanent, perennial vegetation has been re-established on all areas mined or disturbed for at least one year since mining has ceased in the drainage basin(s) associated with the surface discharge, or all areas have been permanently graded such that all drainage is directed back into the mined pit to preclude all surface discharges;
 - (3) Unless waived in writing by the Department, the Permittee has been granted, in writing, a 100% Bond Release, if applicable, by the Alabama Department of Industrial Relations and, if applicable, by the Surface Mining Commission for all areas mined or disturbed in the drainage basin(s) associated with the discharge;
 - (4) Unless waived in writing by the Department, the Permittee has submitted inspection reports prepared and certified by a Professional Engineer (PE)

registered in the State of Alabama or a qualified professional under the PE's direction which certify that the facility has been fully reclaimed or that water quality remediation has been achieved. The first inspection must be conducted approximately one year prior to and the second inspection must be conducted within thirty days of the Permittee's request for termination of monitoring and reporting requirements;

- (5) All surface effects of the mining activity such as fuel or chemical tanks, preparation plants or equipment, old tools or equipment, junk or debris, etc., must be removed and disposed of according to applicable state and federal regulations;
 - (6) The Permittee's request for termination of monitoring and reporting requirements contained in this Permit has been supported by monitoring data covering a period of at least six consecutive months or such longer period as is necessary to assure that the data reflect discharges occurring during varying seasonal climatological conditions;
 - (7) The Permittee has stated in its request that the samples collected and reported in the monitoring data submitted in support of the Permittee's request for monitoring termination or suspension are representative of the discharge and were collected in accordance with all Permit terms and conditions respecting sampling times (e.g., rainfall events) and methods and were analyzed in accordance with all Permit terms and conditions respecting analytical methods and procedures;
 - (8) The Permittee has certified that during the entire period covered by the monitoring data submitted, no chemical treatment of the discharge was provided;
 - (9) The Permittee's request has included the certification required by Part I.D.1.d. of this Permit; and
 - (10) The Permittee has certified to the Director in writing as part of the request, its compliance with (1) through (9) above.
- b. It remains the responsibility of the Permittee to comply with the monitoring and reporting requirements of this Permit until written authorization to reduce, suspend, or terminate such monitoring and/or reporting is received by the Permittee from the Director.

E. OTHER REPORTING AND NOTIFICATION REQUIREMENTS

1. Anticipated Noncompliance

The Permittee shall give the Director written advance notice of any planned changes or other circumstances regarding a facility which may result in noncompliance with permit requirements.

2. Termination of Discharge

The Permittee shall notify the Director, in writing, when all discharges from any point source(s) identified on Page 1 of this Permit and described more fully in the Permittee's application have permanently ceased.

3. Updating Information

- a. The Permittee shall inform the Director of any change in the Permittee's mailing address or telephone number or in the Permittee's designation of a facility contact or officer(s) having the authority and responsibility to prevent and abate violations of the AWPCA, the

AEMA, the Department's rules and regulations, and the terms and conditions of this Permit, in writing, no later than ten (10) days after such change. Upon request of the Director, the Permittee shall furnish the Director with an update of any information provided in the permit application.

- b. If the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information with a written explanation for the mistake and/or omission.

4. Duty to Provide Information

- a. The Permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, suspending, terminating, or revoking and reissuing this Permit, in whole or in part, or to determine compliance with this Permit. The Permittee shall also furnish to the Director upon request, copies of records required to be maintained by this Permit.
- b. The Permittee shall furnish to the Director upon request, within a reasonable time, available information (name, phone number, address, and site location) which identifies offsite sources of material or natural resources (mineral, ore, or other material such as iron, coal, coke, dirt, chert, shale, clay, sand, gravel, bauxite, rock, stone, etc.) used in its operation or stored at the facility.

F. SCHEDULE OF COMPLIANCE

The Permittee shall achieve compliance with the discharge limitations specified in Part I.A. of this Permit in accordance with the following schedule:

Compliance must be achieved by the effective date of this Permit.

PART II OTHER REQUIREMENTS, RESPONSIBILITIES, AND DUTIES

A. OPERATIONAL AND MANAGEMENT REQUIREMENTS

1. Facilities Operation and Management

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

2. Pollution Abatement and/or Prevention Plan

The Pollution Abatement and/or Prevention (PAP) Plan shall be prepared and certified by a registered Professional Engineer (PE), licensed to practice in the State of Alabama, and shall include at a minimum, the information indicated in ADEM Admin. Code r. 335-6-9-.03 and ADEM Admin. Code ch. 335-6-9 Appendices A and B. The PAP Plan shall become a part of this Permit and all requirements of the PAP Plan shall become requirements of this Permit pursuant to ADEM Admin. Code r. 335-6-9-.05(2).

3. Best Management Practices (BMPs)

- a. Unless otherwise authorized in writing by the Director, the Permittee shall provide a means of subsurface withdrawal for any discharge from each point source identified on Page 1 of this Permit and described more fully in the Permittee's application. Notwithstanding the above provision, a means of subsurface withdrawal need not be provided for any discharge caused by a 24-hour precipitation event greater than a 10-year, 24-hour precipitation event.
- b. Dilution water shall not be added to achieve compliance with discharge limitations except when the Director has granted prior written authorization for dilution to meet water quality requirements.
- c. The Permittee shall minimize the contact of water with overburden, including but not limited to stabilizing disturbed areas through grading, diverting runoff, achieving quick growing stands of temporary vegetation, sealing acid-forming and toxic-forming materials, and maximizing placement of waste materials in back-fill areas.
- d. The Permittee shall prepare, submit to the Department for approval, and implement a Best Management Practices (BMPs) Plan for containment of any or all process liquids or solids, in a manner such that these materials do not present a potential for discharge, if so required by the Director. When submitted and approved, the BMP Plan shall become a part of this Permit and all requirements of the BMP Plan shall become requirements of this Permit.
- e. **Spill Prevention, Control, and Management**

The Permittee shall prepare, implement, and maintain a Spill Prevention, Control and Countermeasures (SPCC) Plan acceptable to the Department that is prepared and certified by a Professional Engineer (PE), registered in the State of Alabama, for all onsite petroleum product or other pollutant storage tanks or containers as required by applicable state (ADEM Admin. Code r. 335-6-6-.12(r)) and federal (40 C.F.R. §§112.1-.7) regulations. The Permittee shall implement appropriate structural and/or non-structural spill prevention, control, and/or management sufficient to prevent any spills of pollutants from entering a

ground or surface water of the State or a publicly or privately owned treatment works. Careful consideration should be applied for tanks or containers located near treatment ponds, water bodies, or high traffic areas. In most situations this would require construction of a containment system if the cumulative storage capacity of petroleum products or other pollutants at the facility is greater than 1320 gallons. Any containment system used to implement this requirement shall be constructed of materials compatible with the substance(s) contained and shall prevent the contamination of groundwater. Such containment systems shall be capable of retaining a volume equal to 110 percent of the capacity of the largest tank for which containment is provided. The applicant shall maintain onsite or have readily available flotation booms to contain, and sufficient material to absorb, fuel and chemical spills and leaks. Soil contaminated by chemical spills, oil spills, etc., must be immediately cleaned up or be removed and disposed of in an approved manner.

- f. All surface drainage and storm water runoff which originate within or enters the Permittee's premises and which contains any pollutants or other wastes shall be discharged, if at all, from a point source identified on Page 1 of this Permit and described more fully in the Permittee's application.
- g. The Permittee shall take all reasonable precautions to prevent any surface drainage or storm water runoff which originates outside the Permittee's premises and which contains any pollutants or other wastes from entering the Permittee's premises. At no time shall the Permittee discharge any such surface drainage or storm water runoff which enters the Permittee's premises if, either alone or in combination with the Permittee's effluent, the discharge would exceed any applicable discharge limitation specified in Part I.A. of this Permit.

4. Biocide Additives

- a. The Permittee shall notify the Director in writing not later than sixty (60) days prior to instituting the use of any biocide corrosion inhibitor or chemical additive in any cooling or boiler system(s) regulated by this Permit. Notification is not required for additives that should not reasonably be expected to cause the cooling water or boiler water to exhibit toxicity as determined by analysis of manufacturer's data or testing by the Permittee. Such notification shall include:
 - (a) Name and general composition of biocide or chemical;
 - (b) 96-hour median tolerance limit data for organisms representative of the biota of the water(s) which the discharge(s) enter(s);
 - (c) Quantities to be used;
 - (d) Frequencies of use;
 - (e) Proposed discharge concentrations; and
 - (f) EPA registration number, if applicable.
- b. The use of any biocide or chemical additive containing tributyl tin, tributyl tin oxide, zinc, chromium, or related compounds in any cooling or boiler system(s) regulated by the Permit is prohibited except as exempted below. The use of a biocide or additive containing zinc, chromium or related compounds may be used in special circumstances if (1) the permit contains limits for these substances, or (2) the applicant demonstrates during the application process that the use of zinc, chromium or related compounds as a biocide or additive will not pose a reasonable potential to violate the applicable State water quality

standards for these substances. The use of any additive, not identified in this Permit or in the application for this Permit or not exempted from notification under this Permit is prohibited, prior to a determination by the Department that permit modification to control discharge of the additive is not required or prior to issuance of a permit modification controlling discharge of the additive.

5. Facility Identification

The Permittee shall clearly display prior to commencement of any regulated activity and until permit coverage is properly terminated, the name of the Permittee, entire NPDES permit number, facility or site name, and other descriptive information deemed appropriate by the Permittee at an easily accessible location(s) to adequately identify the site, unless approved otherwise in writing by the Department. The Permittee shall repair or replace the sign(s) as necessary upon becoming aware that the identification is missing or is unreadable due to age, vandalism, theft, weather, or other reason.

6. Removed Substances

Solids, sludges, filter backwash, or any other pollutants or other wastes removed in the course of treatment or control of wastewaters shall be disposed of in a manner that complies with all applicable Department rules and regulations.

7. Loss or Failure of Treatment Facilities

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

8. Duty to Mitigate

The Permittee shall promptly take all reasonable steps to minimize or prevent any violation of this Permit or to mitigate and minimize any adverse impact to waters resulting from noncompliance with any discharge limitation specified in Part I.A. of this Permit, including such accelerated or additional monitoring of the discharge and/or the receiving waterbody as is necessary to determine the nature and impact of the noncomplying discharge.

B. BYPASS AND UPSET

1. Bypass

- a. Any bypass is prohibited except as provided in Parts II.B.1.b. and c.
- b. A bypass is not prohibited if:
 - (1) It does not cause any applicable discharge limitation specified in Part I.A. of this Permit to be exceeded;
 - (2) The discharge resulting from such bypass enters the same receiving water as the discharge from the permitted outfall;
 - (3) It is necessary for essential maintenance of a treatment or control facility or system to assure efficient operation of such facility or system; and

- (4) The Permittee monitors the discharge resulting from such bypass at a frequency, at least daily, sufficient to prove compliance with the discharge limitations specified in Part I.A. of this Permit.
- c. A bypass is not prohibited and need not meet the discharge limitations specified in Part I.A. of this Permit if:
- (1) It is unavoidable to prevent loss of life, personal injury, or severe property damage;
 - (2) There are no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if the Permittee could have installed adequate backup equipment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
 - (3) The Permittee submits a written request for authorization to bypass to the Director at least ten (10) days, if possible, prior to the anticipated bypass or within 24 hours of an unanticipated bypass, the Permittee is granted such authorization, and Permittee complies with any conditions imposed by the Director to minimize any adverse impact to waters resulting from the bypass.
- d. The Permittee has the burden of establishing that each of the conditions of Parts II.B.1.b. or c. have been met to qualify for an exception to the general prohibition against bypassing contained in Part II.B.1.a. and an exemption, where applicable, from the discharge limitations specified in Part I.A. of this Permit.

2. Upset

- a. Except as provided in Parts II.B.2.b. and c., a discharge which results from an upset need not meet the applicable discharge limitations specified in Part I.A. of this Permit if:
- (1) No later than 24-hours after becoming aware of the occurrence of the upset, the Permittee orally reports the occurrence and circumstances of the upset to the Director; and
 - (2) No later than five (5) days after becoming aware of the occurrence of the upset, the Permittee furnishes the Director with evidence, including properly signed, contemporaneous operating logs, design drawings, construction certification, maintenance records, weir flow measurements, dated photographs, rain gauge measurements, or other relevant evidence, demonstrating that:
 - (i) An upset occurred;
 - (ii) The Permittee can identify the specific cause(s) of the upset;
 - (iii) The Permittee's treatment facility was being properly operated at the time of the upset; and
 - (iv) The Permittee promptly took all reasonable steps to minimize any adverse impact to waters resulting from the upset.
- b. Notwithstanding the provisions of Part II.B.2.a., a discharge which is an overflow from a treatment facility or system, or an excess discharge from a point source associated with a treatment facility or system and which results from a 24-hour precipitation event larger

than a 10-year, 24-hour precipitation event is not exempted from the discharge limitations specified in Part I.A. of this Permit unless:

- (1) The treatment facility or system is designed, constructed, and maintained to contain the maximum volume of wastewater which would be generated by the facility during a 24-hour period without an increase in volume from precipitation and the maximum volume of wastewater resulting from a 10-year, 24-hour precipitation event or to treat the maximum flow associated with these volumes.

In computing the maximum volume of wastewater which would result from a 10-year, 24-hour precipitation event, the volume which would result from all areas contributing runoff to the individual treatment facility must be included (i.e., all runoff that is not diverted from the mining area and runoff which is not diverted from the preparation plant area); and

- (2) The Permittee takes all reasonable steps to maintain treatment of the wastewater and minimize the amount of overflow or excess discharge.
- c. The Permittee has the burden of establishing that each of the conditions of Parts II.B.2.a. and b. have been met to qualify for an exemption from the discharge limitations specified in Part I.A. of this Permit.

C. PERMIT CONDITIONS AND RESTRICTIONS

1. Prohibition against Discharge from Facilities Not Certified

- a. Notwithstanding any other provisions of this Permit, if the permitted facility has not obtained or is not required to obtain a permit from the Alabama Surface Mining Commission, any discharge(s) from any point or nonpoint source(s) from the permitted facility which was not certified to the Department on a form approved by the Department by a professional engineer, registered in the State of Alabama, as being designed, constructed, and in accordance with plans and specifications reviewed by the Department is prohibited; or
- b. Notwithstanding any other provisions of this Permit, if the permitted facility has obtained or is required to obtain a permit from the Alabama Surface Mining Commission, any discharge(s) from any point or nonpoint source(s) from the permitted facility which is associated with a treatment facility which was not constructed and certified to the Alabama Surface Mining Commission pursuant to applicable provisions of said Commission's regulations, is prohibited until the Permittee submits to the Alabama Surface Mining Commission, certification by a professional engineer, registered in the State of Alabama, certifying that such facility has been constructed in accordance with plans and specifications approved by the Alabama Surface Mining Commission. This requirement shall not apply to pumped discharges from the underground works of underground coal mines where no surface structure is required by the Alabama Surface Mining Commission, provided the Department is notified in writing of the completion or installation of such facilities, and the pumped discharges will meet permit effluent limits without treatment.

2. Permit Modification, Suspension, Termination, and Revocation

- a. This Permit may be modified, suspended, terminated, or revoked and reissued, in whole or in part, during its term for cause, including but not limited to, the following:

- (1) The violation of any term or condition of this Permit;
 - (2) The obtaining of this Permit by misrepresentation or the failure to disclose fully all relevant facts;
 - (3) The submission of materially false or inaccurate statements or information in the permit application or reports required by the Permit;
 - (4) The need for a change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge;
 - (5) The existence of any typographical or clerical errors or of any errors in the calculation of discharge limitations;
 - (6) The existence of material and substantial alterations or additions to the facility or activity generating wastewater which occurred after permit issuance which justify the application of permit conditions that are different or absent in the existing permit;
 - (7) The threat of the Permittee's discharge on human health or welfare; or
 - (8) Any other cause allowed by ADEM Admin. Code ch. 335-6-6.
- b. The filing of a request by the Permittee for modification, suspension, termination, or revocation and reissuance of this Permit, in whole or in part, does not stay any Permit term or condition of this Permit.

3. Automatic Expiration of Permits for New or Increased Discharges

- a. Except as provided by ADEM Admin. Code r. 335-6-6-.02(g) and 335-6-6-.05, if this Permit was issued for a new discharger or new source, it shall expire eighteen months after the issuance date if construction has not begun during that eighteen month period.
- b. Except as provided by ADEM Admin. Code r. 335-6-6-.02(g) and 335-6-6-.05, if any portion of this Permit was issued or modified to authorize the discharge of increased quantities of pollutants to accommodate the modification of an existing facility, that portion of this Permit shall expire eighteen months after this Permit's issuance if construction of the modification has not begun within eighteen month period.
- c. Construction has begun when the owner or operator has:
 - (1) Begun, or caused to begin as part of a continuous on-site construction program:
 - (i) Any placement, assembly, or installation of facilities or equipment; or
 - (ii) Significant site preparation work including clearing, excavation, or removal of existing buildings, structures, or facilities which is necessary for the placement, assembly, or installation of new source facilities or equipment; or
 - (2) Entered into a binding contractual obligation for the purpose of placement, assembly, or installation of facilities or equipment which are intended to be used in its operation within a reasonable time. Options to purchase or contracts which can be terminated or modified without substantial loss, and contracts for feasibility, engineering, and design studies do not constitute a contractual obligation under the paragraph. The entering into a lease with the State of

Alabama for exploration and production of hydrocarbons shall also be considered beginning construction.

- d. The automatic expiration of this Permit for new or increased discharges if construction has not begun within the eighteen month period after the issuance of this Permit may be tolled by administrative or judicial stay.

4. Transfer of Permit

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

5. Groundwater

Unless authorized on page 1 of this Permit, this Permit does not authorize any discharge to groundwater. Should a threat of groundwater contamination occur, the Director may require groundwater monitoring to properly assess the degree of the problem, and the Director may require that the Permittee undertake measures to abate any such discharge and/or contamination.

6. Property and Other Rights

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

D. RESPONSIBILITIES

1. Duty to Comply

- a. The Permittee must comply with all terms and conditions of this Permit. Any permit noncompliance constitutes a violation of the AWPCA, AEMA, and the FWPCA and is grounds for enforcement action, for permit termination, revocation and reissuance, suspension, modification, or denial of a permit renewal application.
- b. The Permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the FWPCA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this Permit has not yet been modified to incorporate the effluent standard, prohibition or requirement.
- c. For any violation(s) of this Permit, the Permittee is subject to a civil penalty as authorized by the AWPCA, the AEMA, the FWPCA, and Code of Alabama 1975, §§22-22A-1 et. seq., as amended, and/or a criminal penalty as authorized by Code of Alabama 1975, §22-22-1 et. seq., as amended.

- d. The necessity to halt or reduce production or other activities in order to maintain compliance with the conditions of this Permit shall not be a defense for a Permittee in an enforcement action.
- e. Nothing in this Permit shall be construed to preclude or negate the Permittee's responsibility or liability to apply for, obtain, or comply with other ADEM, federal, state, or local government permits, certifications, licenses, or other approvals.
- f. The discharge of a pollutant from a source not specifically identified in the permit application for this Permit and not specifically included in the description of an outfall in this Permit is not authorized and shall constitute noncompliance with this Permit.
- g. The Permittee shall take all reasonable steps, including cessation of production or other activities, to minimize or prevent any violation of this Permit or to minimize or prevent any adverse impact of any permit violation.

2. Change in Discharge

- a. The Permittee shall apply for a permit modification at least 180 days in advance of any facility expansion, production increase, process change, or other action that could result in the discharge of additional pollutants, increase the quantity of a discharged pollutant, or that could result in an additional discharge point. This requirement also applies to pollutants that are not subject to discharge limitations in this Permit. No new or increased discharge may begin until the Director has authorized it by issuance of a permit modification or a reissued permit.
- b. The Permittee shall notify the Director as soon as it knows or has reason to believe that it has begun or expects to begin to discharge any pollutant listed as a toxic pollutant pursuant to Section 307(a) of the FWPCA, 33 U.S.C. §1317(a), any substance designated as a hazardous substance pursuant to Section 311(b)(2) of the FWPCA, 33 U.S.C. §1321(b)(2), any waste listed as a hazardous waste pursuant to Code of Alabama 1975, §22-30-10, or any other pollutants or other wastes which is not subject to any discharge limitations specified in Part I.A. of this Permit and was not reported in the Permittee's application, was reported in the Permittee's application in concentrations or mass rates lower than that which the Permittee expects to begin to be discharged, or has reason to believe has begun to be discharged.

3. Compliance with Toxic or Other Pollutant Effluent Standard or Prohibition

If any applicable effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Sections 301(b)(2)(C),(D),(E) and (F) of the FWPCA, 33 U.S.C. §1311(b)(2)(C),(D),(E), and (F); 304(b)(2) of the FWPCA, 33 U.S.C. §1314(b)(2); or 307(a) of the FWPCA, 33 U.S.C. §1317(a), for a toxic or other pollutant discharged by the Permittee, and such standard or prohibition is more stringent than any discharge limitation on the pollutant specified in Part I.A. of this Permit or controls a pollutant not limited in Part I.A. of this Permit, this Permit shall be modified to conform to the toxic or other pollutant effluent standard or prohibition and the Permittee shall be notified of such modification. If this Permit has not been modified to conform to the toxic or other pollutant effluent standard or prohibition before the effective date of such standard or prohibition, the authorization to discharge in this Permit shall be void to the extent that any discharge limitation on such pollutant in Part I.A. of this Permit exceeds or is inconsistent with the established toxic or other pollutant effluent standard or prohibition.

4. Compliance with Water Quality Standards and Other Provisions

- a. On the basis of the Permittee's application, plans, or other available information, the Department has determined that compliance with the terms and conditions of this Permit

will assure compliance with applicable water quality standards. However, this Permit does not relieve the Permittee from compliance with applicable State water quality standards established in ADEM Admin. Code ch. 335-6-10, and does not preclude the Department from taking action as appropriate to address the potential for contravention of applicable State water quality standards which could result from discharges of pollutants from the permitted facility.

- b. Compliance with Permit terms and conditions notwithstanding, if the Permittee's discharge(s) from point source(s) identified on Page 1 of this Permit cause(s) or contribute(s) to a condition in contravention of State water quality standards, the Department may require abatement action to be taken by the Permittee, modify the Permit pursuant to the Department's rules and regulations, or both.
- c. If the Department determines, on the basis of a notice provided pursuant to Part II.C.2. of this Permit or any investigation, inspection, or sampling, that a modification of this Permit is necessary to assure maintenance of water quality standards or compliance with other provisions of the AWPCA or FWPCA, the Department may require such modification and, in cases of emergency, the Director may prohibit the noticed act until the Permit has been modified.

5. Compliance with Statutes and Rules

- a. This Permit has been issued under ADEM Admin. Code div. 335-6. All provisions of this division, that are applicable to this Permit, are hereby made a part of this Permit. A copy of this division may be obtained for a small charge from the Office of General Counsel, Alabama Department of Environmental Management, 1400 Coliseum Blvd., Montgomery, AL 36110-2059.
- b. This Permit does not authorize the noncompliance with or violation of any Laws of the State of Alabama or the United States of America or any regulations or rules implementing such laws. FWPCA, 33 U.S.C. Section 1319, and Code of Alabama 1975, Section 22-22-14.

6. Right of Entry and Inspection

The Permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law to:

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

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

- a. If the Permittee intends to continue to discharge beyond the expiration date of this Permit, the Permittee shall file with the Department a complete permit application for reissuance of this Permit at least 180 days prior to its expiration.

- b. If the Permittee does not desire to continue the discharge(s) allowed by this Permit, the Permittee shall notify the Department at least 180 days prior to expiration of this Permit of the Permittee's intention not to request reissuance of this Permit. This notification must include the information required in Part I.D.4.a. and be signed by an individual meeting the signatory requirements for a permit application as set forth in ADEM Admin. Code r. 335-6-6-.09.

- c. Failure of the Permittee to submit to the Department a complete application for reissuance of this Permit at least 180 days prior to the expiration date of this Permit will void the automatic continuation of this Permit provided by ADEM Admin. Code r. 335-6-6-.06; and should this Permit not be reissued for any reason, any discharge after the expiration of this Permit will be an unpermitted discharge.

PART III ADDITIONAL REQUIREMENTS, CONDITIONS, AND LIMITATIONS

A. CIVIL AND CRIMINAL LIABILITY

1. Tampering

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

2. False Statements

Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this Permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished as provided by applicable State and Federal law.

3. Permit Enforcement

This NPDES Permit is a Permit for the purpose of the AWPCA, the AEMA, and the FWPCA, and as such all terms, conditions, or limitations of this Permit are enforceable under State and Federal law.

4. Relief From Liability

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

B. OIL AND HAZARDOUS SUBSTANCE LIABILITY

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

C. AVAILABILITY OF REPORTS

Except for data determined to be confidential under Code of Alabama 1975, §22-22-9(c), all reports prepared in accordance with the terms of this Permit shall be available for public inspection at the offices of the Department. Effluent data shall not be considered confidential. Knowingly making any false statement in any such report may result in the imposition of criminal penalties as provided for in Section 309 of the FWPCA, 33 U.S.C. §1319, and Code of Alabama 1975, §22-22-14.

D. DEFINITIONS

1. Alabama Environmental Management Act (AEMA) - means Code of Alabama 1975, §§22-22A-1 et. seq., as amended.
2. Alabama Water Pollution Control Act (AWPCA) - means Code of Alabama 1975, §§22-22-1 et. seq., as amended.
3. Average monthly discharge limitation - means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar

month divided by the number of "daily discharges" measured during that month (zero discharge days shall not be included in the number of "daily discharges" measured and a less than detectable test result shall be treated as a concentration of zero if the most sensitive EPA approved method was used).

4. Arithmetic Mean - means the summation of the individual values of any set of values divided by the number of individual values.
5. Bauxitic clay - means a refractory clay containing bauxite which is mined for use as a refractory material and is not usable as an aluminum ore.
6. Bauxitic clay mine - means an area, on or beneath land, used or disturbed in activity related to the extraction, removal, or recovery of bauxitic clay from natural or artificial deposits, including active mining, reclamation, and mineral storage areas.
7. BOD - means the five-day measure of the pollutant parameter biochemical oxygen demand
8. Bypass - means the intentional diversion of waste streams from any portion of a treatment facility.
9. CBOD - means the five-day measure of the pollutant parameter carbonaceous biochemical oxygen demand.
10. Controlled Surface Mine Drainage – means any surface mine drainage that is pumped or siphoned from the active mining area.
11. Daily discharge - means the discharge of a pollutant measured during any consecutive 24-hour period in accordance with the sample type and analytical methodology specified by the discharge permit.
12. Daily maximum - means the highest value of any individual sample result obtained during a day.
13. Daily minimum - means the lowest value of any individual sample result obtained during a day.
14. Day - means any consecutive 24-hour period.
15. Department - means the Alabama Department of Environmental Management.
16. Director - means the Director of the Department or his authorized representative or designee.
17. Discharge - means "[t]he addition, introduction, leaking, spilling or emitting of any sewage, industrial waste, pollutant or other waste into waters of the state." Code of Alabama 1975, §22-22-1(b)(8).
18. Discharge monitoring report (DMR) - means the form approved by the Director to accomplish monitoring report requirements of an NPDES Permit.
19. DO - means dissolved oxygen.
20. Dry process bauxitic clay and kaolin processing plants and associated areas - means facilities engaged in crushing, screening, drying, or stockpiling of bauxitic clay or kaolin including the processing facility, plant roads, stockpiles, and any other areas associated with the facility. Facilities which use any form of wet processing or chemical treatment are excluded under this definition.
21. E. coli – means the pollutant parameter Escherichia coli.
22. 8HC - means 8-hour composite sample, including any of the following:

- a. The mixing of at least 5 equal volume samples collected at constant time intervals of not more than 2 hours over a period of not less than 8 hours between the hours of 6:00 a.m. and 6:00 p.m. If the sampling period exceeds 8 hours, sampling may be conducted beyond the 6:00 a.m. to 6:00 p.m. period.
 - b. A sample continuously collected at a constant rate over period of not less than 8 hours between the hours of 6:00 a.m. and 6:00 p.m. If the sampling period exceeds 8 hours, sampling may be conducted beyond the 6:00 a.m. to 6:00 p.m. period.
23. EPA - means the United States Environmental Protection Agency.
24. Federal Water Pollution Control Act (FWPCA) - means 33 U.S.C. §§1251 et. seq., as amended.
25. Flow – means the total volume of discharge in a 24-hour period.
26. Geometric Mean - means the Nth root of the product of the individual values of any set of values where N is equal to the number of individual values. The geometric mean is equivalent to the antilog of the arithmetic mean of the logarithms of the individual values. For purposes of calculating the geometric mean, values of zero (0) shall be considered one (1).
27. Grab Sample - means a single influent or effluent portion which is not a composite sample. The sample(s) shall be collected at the period(s) most representative of the discharge.
28. Indirect Discharger - means a nondomestic discharger who discharges pollutants to a publicly owned treatment works or a privately owned treatment facility operated by another person.
29. Industrial User - means those industries identified in the Standard Industrial Classification manual, Bureau of the Budget 1967, as amended and supplemented, under the category “Division D – Manufacturing” and such other classes of significant waste producers as, by regulation, the Director deems appropriate.
30. Kaolin - means a refractory clay containing kaolinite.
31. Kaolin mine - means an area, on or beneath land, used or disturbed in activity related to the extraction, removal, or recovery of kaolin from natural or artificial deposits, including active mining, reclamation, and mineral storage areas.
32. mg/L - means milligrams per liter of discharge.
33. MGD - means million gallons per day.
34. Monthly Average - means, other than for E. coli bacteria, the arithmetic mean of all the composite or grab samples taken for the daily discharges collected in one month period. The monthly average for E. coli bacteria is the geometric mean of daily discharge samples collected in a one month period. The monthly average for flow is the arithmetic mean of all flow measurements taken in a one month period. (Zero discharges shall not be included in the calculation of monthly averages.)
35. New Discharger - means a person owning or operating any building, structure, facility or installation:
 - a. From which there is or may be a discharge of pollutants;
 - b. From which the discharge of pollutants did not commence prior to August 13, 1979, and which is not a new source; and

- c. Which has never received a final effective NPDES Permit for dischargers at that site.
36. New Source - means:
- a. A new source as defined for coal mines by 40 CFR Part 434.11 (1994); and
 - b. Any building, structure, facility, or installation from which there is or may be a discharge of pollutants, the construction of which commenced:
 - (1) After promulgation of standards of performance under Section 306 of FWPCA which are applicable to such source; or
 - (2) After proposal of standards of performance in accordance with Section 306 of the FWPCA which are applicable to such source, but only if the standards are promulgated in accordance with Section 206 within 120 days of their proposal.
37. NH₃-N - means the pollutant parameter ammonia, measured as nitrogen.
38. 1-year, 24-hour precipitation event - means the maximum 24-hour precipitation event with a probable recurrence interval of once in one year as defined by the National Weather Service and Technical Paper No. 40, "Rainfall Frequency Atlas of the U.S.," May 1961, or equivalent regional or rainfall probability information developed therefrom.
39. Permit application - means forms and additional information that are required by ADEM Admin. Code r. 335-6-6-.08 and applicable permit fees.
40. Point Source - means "any discernible, confined and discrete conveyance, including but not limited to any pipe, channel, ditch, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft from which pollutants are or may be discharged." Section 502(14) of the FWPCA, 33 U.S.C. §1362(14).
41. Pollutant - includes for purposes of this Permit, but is not limited to, those pollutants specified in Code of Alabama 1975, §22-22-1(b)(3) and those effluent characteristics, excluding flow, specified in Part I.A. of this Permit.
42. Pollutant of Concern - means those pollutants for which a water body is listed as impaired or which contribute to the listed impairment.
43. Pollution Abatement and/or Prevention Plan (PAP Plan) – mining operations plan developed to minimize impacts on water quality to avoid a contravention of the applicable water quality standards as defined in ADEM Admin. Code r. 335-6-9-.03
44. Preparation, Dry - means a dry preparation facility within which the mineral/material is cleaned, separated, or otherwise processed without use of water or chemical additives before it is shipped to the customer or otherwise utilized. A dry preparation plant includes all ancillary operations and structures necessary to clean, separate, or otherwise process the mineral/material, such as storage areas and loading facilities. Dry preparation also includes minor water spray(s) used solely for dust suppression on equipment and roads to minimize dust emissions.
45. Preparation, Wet - means a wet preparation facility within which the mineral/material is cleaned, separated, or otherwise processed using water or chemical additives before it is shipped to the customer or otherwise utilized. A wet preparation plant includes all ancillary operations and structures necessary to clean, separate, or otherwise process the mineral/material, such as storage areas and loading facilities. Wet preparation also includes mineral extraction/processing by dredging, slurry pumping, etc.

46. Privately Owned Treatment Works - means any devices or system which is used to treat wastes from any facility whose operator is not the operator of the treatment works, and which is not a "POTW".
47. Publicly Owned Treatment Works (POTW) - means a wastewater collection and treatment facility owned by the State, municipality, regional entity composed of two or more municipalities, or another entity created by the State or local authority for the purpose of collecting and treating municipal wastewater.
48. Receiving Stream - means the "waters" receiving a "discharge" from a "point source".
49. Severe property damage - means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
50. 10-year, 24-hour precipitation event - means that amount of precipitation which occurs during the maximum 24-hour precipitation event with a probable recurrence interval of once in ten years as defined by the National Weather Service and Technical Paper No. 40, "Rainfall Frequency Atlas of the U.S.," May 1961, or equivalent regional or rainfall probability information developed therefrom.
51. TKN - means the pollutant parameter Total Kjeldahl Nitrogen.
52. TON - means the pollutant parameter Total Organic Nitrogen.
53. TRC - means Total Residual Chlorine.
54. TSS – means the pollutant parameter Total Suspended Solids
55. Treatment facility and treatment system - means all structures which contain, convey, and as necessary, chemically or physically treat mine and/or associated preparation plant drainage, which remove pollutants limited by this Permit from such drainage or wastewater. This includes all pipes, channels, ponds, tanks, and all other equipment serving such structures.
56. 24HC - means 24-hour composite sample, including any of the following:
 - a. The mixing of at least 12 equal volume samples collected at constant time intervals of not more than 2 hours over a period of 24 hours;
 - b. A sample collected over a consecutive 24-hour period using an automatic sampler composite to one sample. As a minimum, samples shall be collected hourly and each shall be no more than one twenty-fourth (1/24) of the total sample volume collected; or
 - c. A sample collected over a consecutive 24-hour period using an automatic composite sampler composited proportional to flow.
57. 24-hour precipitation event - means that amount of precipitation which occurs within any 24-hour period.
58. 2-year, 24-hour precipitation event - means the maximum 24-hour precipitation event with a probable recurrence interval of once in two years as defined by the National Weather Service and Technical Paper No. 40, "Rainfall Frequency Atlas of the U.S.," May 1961, or equivalent regional or rainfall probability information developed therefrom.
59. Upset - means an exceptional incident in which there is an unintentional and temporary noncompliance with technology-based permit discharge limitations because of factors beyond the control of the Permittee. An upset does not include noncompliance to the extent caused by

operational error, improperly designed treatment facilities, inadequate facilities, lack of preventive maintenance, or careless or improper operation.

60. Waters - means "[a]ll waters of any river, stream, watercourse, pond, lake, coastal, ground or surface water, wholly or partially within the State, natural or artificial. This does not include waters which are entirely confined and retained completely upon the property of a single individual, partnership, or corporation unless such waters are used in interstate commerce." Code of Alabama 1975, §22-22-1(b)(2). "Waters" include all "navigable waters" as defined in §502(7) of the FWPCA, 33 U.S.C. §1362(7), which are within the State of Alabama.
61. Week - means the period beginning at twelve midnight Saturday and ending at twelve midnight the following Saturday.
62. Weekly (7-day and calendar week) Average – is the arithmetic mean of all samples collected during a consecutive 7-day period or calendar week, whichever is applicable. The calendar week is defined as beginning on Sunday and ending on Saturday. Weekly averages shall be calculated for all calendar weeks with Saturdays in the month. If a calendar week overlaps two months (i.e., the Sunday is in one month and the Saturday in the following month), the weekly average calculated for the calendar week shall be included in the data for the month that contains the Saturday.

E. 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.

F. PROHIBITIONS AND ACTIVITIES NOT AUTHORIZED

1. Discharges from disposal or landfill activities as described in ADEM Admin. Code div. 335-13 are not authorized by this Permit unless specifically approved by the Department.
2. Relocation, diversion, or other alteration of a water of the State is not authorized by this Permit unless specifically approved by the Department.
3. Lime or cement manufacturing or production and discharge of process waters from such manufacturing or production is not authorized by this Permit unless specifically approved by the Department.
4. Concrete or asphalt manufacturing or production and discharge of process waters from such manufacturing or production is not authorized by this Permit unless specifically approved by the Department.
5. The discharge of wastewater, generated by any process, facility, or by any other means not under the operational control of the Permittee or not identified in the application for this Permit or not identified specifically in the description of an outfall in this Permit is not authorized by this Permit.

G. DISCHARGES TO IMPAIRED WATERS

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

2. Facilities that discharge into a receiving stream which is listed on the State of Alabama's §303(d) list of impaired waters, and with discharges that contain the pollutant(s) for which the waters are impaired, must within six (6) months of the Final §303(d) list approval, document in its BMP plan how the BMPs will control the discharge of the pollutant(s) of concern, and must ensure that there will be no increase of the pollutants of concern. A monitoring plan to assess the effectiveness of the BMPs in achieving the allocations must also be included in the BMP plan.

3. If the facility discharges to impaired waters as described above, it must determine whether a TMDL has been developed and approved or established by EPA for the listed waters. If a TMDL is approved or established during this Permit cycle by EPA for any waters into which the facility discharges, the facility must review the applicable TMDL to see if it includes requirements for control of any water discharged by the Permittee. Within six (6) months of the date of TMDL approval or establishment, the facility must notify the Department on how it will modify its BMP plan to include best management practices specifically targeted to achieve the allocations prescribed by the TMDL, if necessary. Any revised BMP plans must be submitted to the Department for review. The facility must include in the BMP plan a monitoring component to assess the effectiveness of the BMPs in achieving the allocations.

**ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
WATER DIVISION**

NPDES INDIVIDUAL PERMIT RATIONALE

Company Name: Carbo Cermaics
Facility Name: Carbo-Belcher Bauxite Pit
County: Barbour County
Permit Number: AL0082830
Prepared by: Amber Hicks
Date: October 5, 2021
Receiving Waters: Unnamed Tributary to White Oak Creek
Permit Coverage: Dry Process Bauxitic Clay Mine, Dry Preparation, Transportation and Storage, and Associated Areas
SIC Code: 1459 and 1455

The Department has made a tentative determination that the available information is adequate to support issuance of this permit.

This proposed permit covers a bauxitic clay mining pit and associated dry preparation areas.

This proposed permit authorizes treated discharges into a stream segment, other State waters, or local watershed that currently has a water quality classification of Fish and Wildlife (F&W) (ADEM Admin. Code r. 335-6-10-.09). If the requirements of the proposed permit are fully implemented, the facility will not discharge pollutants at levels that will cause or contribute to a violation of the F&W classification.

Full compliance with the proposed permit terms and conditions is expected to be protective of instream water quality and ensure consistency with applicable instream State water quality standards for the receiving stream.

The bauxitic clay mining discharge limitations for Total Suspended Solids, Total Iron as Fe, and Total Aluminum as Al are based on best professional judgement with consideration given to bauxite ore limitations established in 40 CFR Part 440.20.

The instream water quality standards for pH in streams classified as Fish and Wildlife are 6.0 – 8.5 s.u. per ADEM Admin. Code r. 335-6-10-.09. However, a daily maximum pH limit of 9.0 s.u. is occasionally allowed by the Department for precipitation driven discharges. During precipitation events, if the background stream flow is expected to be great enough to allow for adequate dilution of the discharge to maintain an in-stream pH of less than or equal to 8.5 s.u., as it is in this case, a daily maximum of 9.0 s.u. is permitted. Therefore, this Permit imposed the pH limitations of 6.0 s.u. (daily minimum) and 9.0 s.u. (daily maximum). Regardless, the discharge shall not cause the in-stream pH to deviate more than 1.0 s.u. from the normal or natural pH, nor be less than 6.0 s.u. nor greater than 8.5 s.u.

The applicant has requested, in accordance with 40 CFR Part 122.21 and their NPDES permit application, a waiver from testing for the Part A, B, and C pollutants listed in the EPA Form 2C and 2D that are not addressed in their application. They have also certified that due to the processes involved in their mining activity these pollutants are believed to be not present in the waste stream.

The Pollution Abatement/Prevention (PAP) plan for this facility has been prepared by a professional engineer (PE) registered in the State of Alabama and is designed to ensure reduction of pollutants in the waste stream to a level that, if operated properly, the discharge will not contribute to or cause a violation of applicable State water quality standards. The proposed permit terms and conditions are predicated on the basis of ensuring a reduction of pollutants in the discharge to a level that reduces the potential of contributing to or causing a violation of applicable State water quality standards.

In accordance with ADEM Admin. Code R. 335-6-3-.07 the design professional engineer, as evidenced by their seal and/or signature on the application, has accepted full responsibility for the effectiveness of the waste treatment facility to treat the permittee's effluent to meet NPDES permit limitations and requirements, and to fully comply with Alabama's water quality standards, when such treatment facilities are properly operated.

If there is a reasonable potential that a pollutant present in the treated discharges from a facility could cause or contribute to a contravention of applicable State water quality standards above numeric or narrative criteria, 40 CFR Part 122 requires the Department to establish effluent limits using calculated water quality criterion, establish effluent limits on a case-by-case basis using criteria established by EPA, or establish effluent limits based on an indicator parameter. Based on available information, potential pollutants discharged from this facility, if discharged within the concentrations allowed by this permit, would not have a reasonable potential to cause or contribute to a contravention of applicable State water quality standards.

If the requirements of the proposed permit are fully implemented, there is reasonable assurance that the pollutants will not be present in the discharge at levels of concern and/or the facility will not discharge pollutants at levels that will cause or contribute to a violation of applicable State water quality standards in the receiving water.

The applicant is not proposing discharges of pollutants to a water of the State with an approved Total Maximum Daily Load (TMDL).

The applicant is not proposing discharges into a stream segment or other State water that is included on Alabama's current CWA §303(d) list.

The applicant is proposing discharges of pollutant(s) to an ADEM identified Tier I water.

The proposed permit action does not authorize new or increased discharges of pollutants to receiving waters determined by the Department to be waters where the quality exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water (Tier II).

**ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
WATER DIVISION**

ANTIDEGRADATION RATIONALE

Company Name: Carbo Ceramics, Inc.
Facility Name: Carbo-Belcher Bauxite Pit
County: Barbour
Permit Number: AL0082830
Prepared by: Amber Hicks
Date: October 5, 2021
Receiving Waters: Unnamed Tributary to White Oak Creek
Stream Category: Tier II as defined by ADEM Admin. Code 335-6-10-.12
Discharge Description: Dry Process Bauxitic Clay Mine, Dry Preparation, Transportation and Storage, and Associated Areas

The following preliminary determination was prepared in accordance with ADEM Admin. Code 335-6-10-.12(7)(c):


The Department has reviewed the information submitted by applicant in accordance with ADEM Admin. Code 335-6-10-.12(9). The applicant has demonstrated that there are no technically or economically viable treatment options in its alternatives analysis that would completely eliminate a direct discharge.

The permit applicant has indicated that the following economic and social benefits will result from this project:

1. The Permittee will not hire workers for this facility. Contractors will be transferred from a current site to this site to work.
2. The Permittee states that the employment of local contractors who mine and haul the minerals will be maintained.
3. The Permittee will allow for the closure of a known environmental and possible health hazard by supplying materials for the closure.

The Department has determined that the discharge proposed by the permit applicant is necessary for important economic and social development in the area of the outfall location in the receiving water.

Reviewed By:
Date:

Catherine McNeill
10-5-21 

**ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (ADEM)
NPDES INDIVIDUAL PERMIT APPLICATION (MINING OPERATIONS)**

Instructions: This form should be used to submit an application for an NPDES individual permit to authorize discharges from surface & underground mineral, ore, or mineral product mining, quarrying, excavation, borrowing, hydraulic mining, storage, processing, preparation, recovery, handling, loading, storing, or disposing activities, and associated areas including pre-mining site development, construction, excavation, clearing, disturbance, and reclamation. Please complete all questions. Respond with "N/A" as appropriate. Incomplete or incorrect answers or missing signatures will delay processing. Attach additional comments or information as needed. If space is insufficient, continue on an attached sheet(s) as necessary. Commencement of activities applied for as detailed in this application are not authorized until permit coverage has been issued by the Department. Please type or print legibly in blue or black ink.

R# 20-00010 \$ 5820.00

PURPOSE OF THIS APPLICATION

- Initial Permit Application for New Facility
 Initial Permit Application for Existing Facility (e.g. facility previously permitted less than 5 acres)
 Modification of Existing Permit
 Reissuance of Existing Permit
 Reissuance & Modification Existing Permit
 Reissuance & Transfer of Existing Permit
 Revocation and Reissuance of Existing Permit
 Other

RECEIVED

I. GENERAL INFORMATION

FEB 03 2020

NPDES Permit Number (Not applicable if initial permit application): <u>AL 082830</u>	County(s) in which Facility is Located: BARBOUR
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STORM WATER
MANAGEMENT BRANCH

Company/Permittee Name: CARBO CERAMICS, INC.			Facility Name (e.g., Mine Name, Pit Name, etc.): CARBO-BELCHER BAUXITE PIT		
Mailing Address of Company/Permittee: 36 ARCH DRIVE			Physical Address of Facility (as near as possible to entrance): .4 MILES EAST OF 1564 COUNTY ROAD 79 SOUTH		
City: EUFAULA	State: ALABAMA	Zip: 36027	City: EUFAULA	State: ALABAMA	Zip: 36027
Permittee Phone Number: 334-687-7005 EXT. 3515	Permittee Fax Number: 334-687-6136	Latitude and Longitude of entrance: 31.776189, -85.291786			

Responsible Official (as described on page 12 of this application): JIM BEVILL			Responsible Official Title: LANDS & MINES MANAGER		
Mailing Address of Responsible Official: 36 ARCH DRIVE			Physical Address of Responsible Official: 36 ARCH DRIVE		
City: EUFAULA	State: ALABAMA	Zip: 36027	City: EUFAULA	State: ALABAMA	Zip: 36027
Phone Number of Responsible Official: 334-687-7005 EXT. 3515	Fax Number of Responsible Official: 334-687-6136	Email Address of Responsible Official: jbevill@carboceramics.com			

Facility Contact: CHRIS DASINGER		Facility Contact Title: MINE PLANNER			
Physical Address of Facility Contact: 35 ARCH DRIVE		Phone Number of Facility Contact: 334-6890205		Fax Number of Facility Contact: 334-687-6136	
City: EUFAULA	State: ALABAMA	Zip: 36027	Email Address of Facility Contact: cdasinger@carboceramics.com		

II. MEMBER INFORMATION

A. Identify the name, title/position, and unless waived in writing by the Department, the residence address of every officer, general partner, LLP partner, LLC member, investor, director, or person performing a function similar to a director, of the applicant, and each person who is the record or beneficial owner of 10 percent or more of any class of voting stock of the applicant, or any other responsible official(s) of the applicant with legal or decision making responsibility or authority for the facility:

Name:	Title/Position:	Physical Address of Residence (P.O. Box is Not Acceptable)
<u>ROGER RIFFER</u>	<u>VP OF OPERATIONS</u>	<u>575 N DAIRY ASHFORD ROAD, HOUSTON, TX 77079</u>
_____	_____	_____
_____	_____	_____

B. Other than the "Company/Permittee" listed in Part I., identify the name of each corporation, partnership, association, and single proprietorship for which any individual identified in Part II.A. is or was an officer, general partner, LLP partner, LLC member, investor, director, or individual performing a function similar to a director, or principal (10% or more) stockholder, that had an Alabama NPDES permit at any time during the five year (60 month) period immediately preceding the date on which this form is signed:

Name of Corporation, Partnership, Association, or Single Proprietorship:	Name of Individual from Part II.A.:	Title/Position in Corporation, Partnership, Association, or Single Proprietorship:
<u>NONE</u>	_____	_____
_____	_____	_____
_____	_____	_____

III. LEGAL STRUCTURE OF APPLICANT

A. Indicate the legal structure of the "Company/Permittee" listed in Part I:

Corporation Association Individual Single Proprietorship Partnership LLP LLC

Government Agency: _____ Other: _____

B. If not an individual or single proprietorship, is the "Company/Permittee" listed in Part I. properly registered and in good standing with the Alabama Secretary of State's Office? (If the answer is "No," attach a letter of explanation.) Yes No

C. Parent Corporation and Subsidiary Corporations of Applicant, if any: NONE

D. Land Owner(s): JEAN B. BRYAN, 1463 COUNTY ROAD 79 SOUTH, EUFAULA, AL 36027

E. Mining Sub-contractor(s)/Operator(s), if known: NONE KNOWN

IV. COMPLIANCE HISTORY

A. Has the applicant ever had any of the following:

	Yes	No
(1) An Alabama NPDES, SID, or UIC permit suspended or terminated?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(2) An Alabama license to mine suspended or revoked?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(3) An Alabama or federal mining permit suspended or terminated?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(4) A reclamation bond, or similar security deposited in lieu of a bond, or portion thereof, forfeited?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(5) A bond or similar security deposited in lieu of a bond, or portion thereof, the purpose of which was to secure compliance with any requirement of the Alabama Water Improvement Commission or Alabama Department of Environmental Management, forfeited?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

(If the response to any item of Part IV.A. is "Yes," attach a letter of explanation.)

B. Identify every Warning Letter, Notice of Violation (NOV), Administrative Action, or litigation issued to the applicant, parent corporation, subsidiary, general partner, LLP partner, or LLC member and filed by ADEM or EPA during the three year (36 months) period preceding the date on which this form is signed. Indicate the date of issuance, briefly describe alleged violations, list actions (if any) to abate alleged violations, and indicate date of final resolution:

NONE

V. OTHER PERMITS/AUTHORIZATIONS

A. List any other NPDES, State Oil & Gas Board (OGB) Class II Injection well permits, or other environmental permits (including permit numbers), authorizations, or certifications that have been applied for or issued within the State by ADEM, EPA, Alabama Surface Mining Commission (ASMC), Alabama Department of Labor (ADOL), or other agency, to the applicant, parent corporation, subsidiary, or LLC member for this operation whether presently effective, expired, suspended, revoked or terminated:

AI0082171, AL0082368, AL0082708, AL008241, AI0082104

B. List any other NPDES or other ADEM permits (including permit numbers), authorizations, or certifications that have been applied for or issued within the State by ADEM, EPA, OGB, ASMC, or ADOL to the applicant, parent corporation, subsidiary, or LLC member for other facilities whether presently effective, expired, suspended, revoked, or terminated:

VI. PROPOSED SCHEDULE

Anticipated Activity Commencement Date: _____ Completed _____ Anticipated Activity Completion Date: _____

VII. ACTIVITY DESCRIPTION & INFORMATION

A. Proposed Total Area of the Permitted Site: 42.36 acres Proposed Total Disturbed Area of the Permitted Site: 23.21 acres

B. Township(s), Range(s), Section(s): T-9-N, R-27-E, Sec 1

C. Detailed Directions to Site:
Head S from Baker Hill, Al on US Hwy 79 S, 4.5 miles on left is haul road

D. Is/will this operation:

Yes	No	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(1) an existing facility which currently results in discharges to State waters?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	(2) a proposed facility which will result in a discharge to State waters?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(3) be located within any 100-year flood plain?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(4) discharge to Municipal Separate Storm Sewer?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(5) discharge to waters of or be located in the Coastal Zone?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(6) need/have ADEM UIC permit coverage?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(7) be located on Indian/historically significant lands?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(8) need/have ADEM SID permit coverage?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(9) need/have ASMC permit coverage?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	(10) need/have ADOL permit coverage?
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(11) generate, treat, store, or dispose of hazardous or toxic waste? (If "Yes," attach a detailed explanation.)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	(12) be located in or discharge to a Public Water Supply (PWS) watershed or be located within 1/2 mile of any PWS well?

VIII. MATERIAL TO BE REMOVED, PROCESSED, OR TRANSLOADED

List relative percentages of the mineral(s) or mineral product(s) that are proposed to be and/or are currently mined, quarried, recovered, prepared, processed, handled, transloaded, or disposed at the facility. If more than one mineral is to be mined, list the relative percentages of each mineral by tonnage for the life of the mine.

_____ Dirt &/or Chert	_____ Sand &/or Gravel	_____ Coal product, coke	_____ Talc	_____ Crushed rock (other)
_____ Bentonite	_____ Industrial Sand	_____ Shale &/or Common Clay	_____ Marble	_____ Sandstone
_____ Coal	_____ Kaolin	_____ Coal fines/refuse recovery	_____ Chalk	_____ Slag, Red Rock
_____ Fire clay	_____ Iron ore	_____ Dimension stone	_____ Granite	_____ Phosphate rock
100% Bauxitic Clay	_____ Bauxite Ore	_____ Limestone, crushed limestone and dolomite		
_____ Gold, other trace minerals:	_____	Other:	_____	
Other:	_____	Other:	_____	
Other:	_____	Other:	_____	

IX. PROPOSED ACTIVITY TO BE CONDUCTED

A. Type(s) of activity presently conducted at applicant's existing facility or proposed to be conducted at facility (check all that apply):

<input checked="" type="checkbox"/> Surface mining	<input type="checkbox"/> Underground mining	<input checked="" type="checkbox"/> Quarrying	<input type="checkbox"/> Auger mining	<input type="checkbox"/> Hydraulic mining
<input type="checkbox"/> Within-bank mining	<input type="checkbox"/> Solution mining	<input checked="" type="checkbox"/> Mineral storing	<input type="checkbox"/> Lime production	<input type="checkbox"/> Cement production
<input type="checkbox"/> Synthetic fuel production	<input type="checkbox"/> Alternative fuels operation	<input type="checkbox"/> Mineral dry processing (crushing & screening)	<input type="checkbox"/> Mineral wet preparation	
<input type="checkbox"/> Other beneficiation & manufacturing operations	<input checked="" type="checkbox"/> Mineral loading	<input type="checkbox"/> Chemical processing or leaching		
<input checked="" type="checkbox"/> Construction related temporary borrow pits/areas	<input checked="" type="checkbox"/> Mineral transportation	<input type="checkbox"/> rail	<input type="checkbox"/> barge	<input checked="" type="checkbox"/> truck
<input type="checkbox"/> Preparation plant waste recovery	<input type="checkbox"/> Hydraulic mining, dredging, instream or between stream-bank mining			
<input checked="" type="checkbox"/> Grading, clearing, grubbing, etc.	<input checked="" type="checkbox"/> Pre-construction ponded water removal	<input checked="" type="checkbox"/> Excavation		
<input checked="" type="checkbox"/> Pre-mining logging or land clearing	<input type="checkbox"/> Waterbody relocation or other alteration	<input type="checkbox"/> Creek/stream crossings		
<input type="checkbox"/> Onsite construction debris or equipment storage/disposal	<input type="checkbox"/> Onsite mining debris or equipment storage/disposal			
<input checked="" type="checkbox"/> Reclamation of disturbed areas	<input type="checkbox"/> Chemicals used in process or wastewater treatment (coagulant, biocide, etc.)			
<input type="checkbox"/> Adjacent/associated asphalt/concrete plant(s)	<input type="checkbox"/> Low volume sewage treatment package plant			
<input type="checkbox"/> Other: _____				

B. Primary SIC Code: 1400 NAICS Code: 212393 Description: MINING & QUARRYING OF NONMETALLIC MI
 Secondary SIC Code(s): _____ NAICS Code: _____ Description: _____

C. Narrative Description of the Activity: PROPOSED PIT SHALL BE MINED FOR BAUXITE CLAY

X. FUEL – CHEMICAL HANDLING, STORAGE & SPILL PREVENTION CONTROL & COUNTERMEASURES (SPCC) PLAN

A. Will fuels, chemicals, compounds, or liquid waste be used or stored onsite? Yes No

B. If "Yes," identify the fuel, chemicals, compounds, or liquid waste and indicate the volume of each:

<i>Volume</i>	<i>Contents</i>	<i>Volume</i>	<i>Contents</i>	<i>Volume</i>	<i>Contents</i>
_____ gallons	_____	_____ gallons	_____	_____ gallons	_____
_____ gallons	_____	_____ gallons	_____	_____ gallons	_____

C. If "Yes," a detailed SPCC Plan with acceptable format and content, including diagrams, must be attached to application in accordance with ADEM Admin. Code R. 335-6-6-.12(r). Unless waived in writing by the Department on a programmatic, categorical, or individual compound/chemical basis, Material Safety Data Sheets (MSDS) for chemicals/compounds used or proposed to be used at the facility must be included in the SPCC Plan submittal.

XI. POLLUTION ABATEMENT & PREVENTION (PAP) PLAN

A. For non-coal mining facilities, a PAP Plan in accordance with ADEM Admin. Code r. 335-6-9-.03 has been completed and is attached as part of this application. Yes No

B. For coal mining facilities, a detailed PAP Plan has been submitted to ASMC according to submittal procedures for ASMC regulated facilities. Yes No

(1) If "Yes" to Part XI.B., provide the date that the PAP Plan was submitted to ASMC: APRIL, 2014

(2) If "No" to Part XI.B., provide the anticipated date that the PAP Plan will be submitted to ASMC: N/A

XII. ASMC REGULATED ENTITIES

A. Is this coal mining operation regulated by ASMC? Yes No

B. If "Yes", provide copies as part of this application of any pre-mining hydrologic sampling reports and Hydrologic Monitoring Reports which have been submitted to ASMC within the 36 months prior to submittal of this application.

XIII. TOPOGRAPHIC MAP SUBMITTAL

Attach to this application a 7.5 minute series U.S.G.S. topographic map(s) or equivalent map(s) no larger than, or folded to a size of 8.5 by 11 inches (several pages may be necessary), of the area extending to at least one mile beyond property boundaries. The topographic or equivalent map(s) must include a caption indicating the name of the topographic map, name of the applicant, facility name, county, and township, range, & section(s) where the facility is located. Unless approved in advance by the Department, the topographic or equivalent map(s), at a minimum, must show:

- (a) An accurate outline of the area to be covered by the permit
- (b) An outline of the facility
- (c) All existing and proposed disturbed areas
- (d) Location of discharge areas
- (e) Proposed and existing discharge points
- (f) Perennial, intermittent, and ephemeral streams
- (g) Lakes, springs, water wells, wetlands
- (h) All known facility dirt/improved access/haul roads
- (i) All surrounding unimproved/improved roads
- (j) High-tension power lines and railroad tracks
- (k) Buildings and structures, including fuel/water tanks
- (l) Contour lines, township-range-section lines
- (m) Drainage patterns, swales, washes
- (n) All drainage conveyance/treatment structures (ditches, berms, etc.)
- (o) Any other pertinent or significant feature

XIV. DETAILED FACILITY MAP SUBMITTAL

Attach to this application a 1:500 scale or better, detailed auto-CAD map(s) or equivalent map(s) no larger than, or folded to a size of 8.5 by 11 inches (several pages may be necessary), of the facility. The facility map(s) must include a caption indicating the name of the facility, name of the applicant, facility name, county, and township, range, & section(s) where the facility is located. Unless approved in advance by the Department, the facility or equivalent map(s), at a minimum, must show:

- (a) Information listed in Item XIII (a) – (o) above
- (b) If noncoal, detailed, planned mining progression
- (c) If noncoal, location of topsoil storage areas
- (d) Location of ASMC bonded increments (if applicable)
- (e) Location of mining or pond cleanout waste storage/disposal areas
- (f) Other information relevant to facility or operation
- (g) Location of facility sign showing Permittee name, facility name, and NPDES Number

XV. RECEIVING WATERS

List the requested permit action for each outfall (issue, reissue, add, delete, move, etc.), outfall designation including denoting "E" for existing and "P" for proposed outfalls, name of receiving water(s), whether or not the stream is included in a TMDL, latitude and longitude (to seconds) of location(s) of each discharge point, distance of receiving water from outfall in feet, number of disturbed acres, the number of drainage acres which will drain through each treatment system, outfall, or BMP, and if the outfall discharges to an ADEM listed CWA Section 303(d) waterbody segment at the time of application submittal.

Action	Outfall E/P	Receiving Water	Latitude	Longitude	Distance to Rec. Water	Disturbed Acres	Drainage Acres	ADEM WUC	303(d) Segment (Y/N)	TMDL Segment* (Y/N)
ISSUE	001P	UT TO WHITE OAK CREEK	31.778125	-85.286449	600 ft	23.21	23.21	F&W	N	N

*If a TMDL Compliance Schedule is requested, the following should be attached as supporting documentation: (1) Justification for the requested Compliance Schedule (e.g. time for design and installation of control equipment, etc.); (2) Monitoring results for the pollutant(s) of concern which have not previously been submitted to the Department (sample collection dates, analytical results (mass and concentration), methods utilized, MDL/ML, etc. should be reported as available); (3) Requested interim limitations, if applicable; (4) Date of final compliance with the TMDL limitations; and (5) Any other additional information available to support the requested compliance schedule.

XVI. DISCHARGE CHARACTERIZATION

A. EPA Form 2C, EPA Form 2D, and/or Modified EPA Form 2C Submittal

Yes, pursuant to 40 CFR §122.21, the applicant requests a waiver for completion of EPA Form 2C, EPA Form 2D, and the modified EPA Form 2C and certifies that the operating facility will discharge treated stormwater only, unless waived in writing by the Department on a programmatic, categorical, or individual compound/chemical basis that chemical/compound additives are not used, and that there are no process, manufacturing, or other industrial operations or wastewaters, including but not limited to lime or cement production, synfuel operations, etc., and that coal and coal products are not mined nor stored onsite.

No, the applicant does not request a waiver and a complete EPA Form 2C, EPA Form 2D, and/or modified EPA Form 2C is attached.

B. The applicant is required to supply the following information separately for every P or E outfall. If necessary, attach extra sheets. List expected average daily discharge flow rate in cfs and gpd, frequency of discharge in hours per day and days per month, average summer and winter temperature of discharge(s) in degrees centigrade (C), average pH in standard units, average daily discharge in pounds per day of BOD₅, Total Suspended Solids, Total Iron, Total Manganese, and Total Aluminum (if bauxite or bauxitic clay):

Outfall E/P	Information Source - # of Samples	Flow cfs	Flow gpd	Frequency hours/day	Frequency days/month	Sum/Win Temp, °C	pH s.u.	BOD ₅ lbs/day	TSS lbs/day	Tot Fe lbs/day	Tot Mn lbs/day	Tot Al lbs/day
001P	1	59.00	104,000	Precipitation driven	Precipitation Driven	26	8	5	50	0	0	0.5

C. The applicant is required to supply the following information separately for every P or E outfall. If necessary, attach extra sheets. Identify and list expected average daily discharge in pounds per day of any other pollutant(s) listed in EPA Form 2C, Item V – Intake And Effluent Characteristics, Parts A, B, & C that are not referenced in Part XV.B., that you know is present or have reason to believe could be present in the discharge(s) at levels of concern:

Outfall E/P	Reason Believed Present	Information Source - # of Samples									
			lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
N/A											

XVII. DISCHARGE STRUCTURE DESCRIPTION & POLLUTANT SOURCE

The applicant is required to supply outfall number(s) as it appears on the map(s) required by this application [If this application is for a modification to an existing permit do not change the numbering sequence of the permitted outfalls], describe each, (e.g., pipe, spillway, channel, tunnel, conduit, well, discrete fissure, or container), and identify the origin of pollutants. The response must be precise for each outfall. If the discharge of pollutants from any outfall is the result of commingling of waste streams from different origins, each origin must be completely described.

Outfall	Discharge structure Description	Description of Origin of pollutants	Surface Discharge	Groundwater Discharge	Wet Prep -Other Production Plant	Pumped or Controlled Discharge	Low Volume STP	Other
001P	CONCRETE PIPE	8,9 & 10	X	X	N/A	N/A	N/A	N/A

Origin of Pollutants – typical examples:
 (1) Discharge of drainage from the underground workings of an underground coal mine, (2) Discharge of drainage from a coal surface mine, (3) Discharge of drainage from a coal preparation plant and associated areas, (4) Discharge of process wastewater from a gravel-washing plant, (5) Discharge of wastewater from an existing source coal preparation plant, (6) Discharge of drainage from a sand and gravel pit, (7) Pumped discharge from a limestone quarry, (8) Controlled surface mine drainage (pumped or siphoned), (9) Discharge of drainage from mine reclamation, or (10) Other (describe below).

XVIII. PROPOSED NEW OR INCREASED DISCHARGES

A. Pursuant to ADEM Admin. Code Chapter 335-6-10-.12(9), responses to the following questions must be provided by the applicant requesting NPDES permit coverage for new or expanded discharges of pollutant(s) to Tier 2 waters (except discharges eligible for coverage under general permits). As part of the permit application review process, the Department is required to consider, based on the applicant's demonstration, whether the proposed new or increased discharge to Tier 2 waters is necessary for important economic or social development in the area in which the waters are located.

- Yes. New/increased discharges of pollutant(s) or discharge locations to Tier 2 waters are proposed.
- No. New/increased discharges of pollutants(s) or discharge locations to Tier 2 waters are not proposed.

B. If "Yes," complete Items 1 through 6 of this Part (XVIII.B.), ADEM Form 311-Alternative Analysis, and either ADEM Form 312 or ADEM Form 313-Calculation of Total Annualized Project Costs (Public-Sector or Private-Sector, whichever is applicable). ADEM Form 312 or ADEM Form 313, whichever, is applicable, should be completed for each technically feasible alternative evaluated on ADEM Form 311. ADEM Forms can be found on the Department's website at www.adem.alabama.gov/DeptForms. **Attach additional sheets/documentation and supporting information as needed.**

(1) What environmental or public health problem will the discharge be correcting?

NONE, THE SITE IN UNDERGOING RECLAMATION AND NO MINING ACTIVITIES ARE TAKING PLACE.

(2) How much will the discharger be increasing employment (at its existing facility or as a result of locating a new facility)?

NONE, THE SITE IN UNDERGOING RECLAMATION AND NO MINING ACTIVITIES ARE TAKING PLACE.

(3) How much reduction in employment will the discharger be avoiding?

NONE, THE SITE IN UNDERGOING RECLAMATION AND NO MINING ACTIVITIES ARE TAKING PLACE.

(4) How much additional state or local taxes will the discharger be paying?

NONE, THE SITE IN UNDERGOING RECLAMATION AND NO MINING ACTIVITIES ARE TAKING PLACE.

(5) What public service to the community will the discharger be providing?

NONE, THE SITE IN UNDERGOING RECLAMATION AND NO MINING ACTIVITIES ARE TAKING PLACE.

(6) What economic or social benefit will the discharger be providing to the community?

NONE, THE SITE IN UNDERGOING RECLAMATION AND NO MINING ACTIVITIES ARE TAKING PLACE.

XIX. POLLUTION ABATEMENT & PREVENTION (PAP) PLAN SUMMARY (must be completed for all outfalls)

Y	N	N/A	Outfall(s):
X			Runoff from all areas of disturbance is controlled
X			Drainage from pit area, stockpiles, and spoil areas directed to a sedimentation pond
X			Sedimentation basin at least 0.25 acre/feet for every acre of disturbed drainage
X			Sedimentation basin cleaned out when sediment accumulation is 60% of design capacity
X			Trees, boulders, and other obstructions removed from pond during initial construction
X			Width of top of dam greater than 12'
X			Side slopes of dam no steeper than 3:1
X			Cutoff trench at least 8' wide
X			Side slopes of cutoff trench no less than 1:1
X			Cutoff trench located along the centerline of the dam
X			Cutoff trench extends at least 2' into bedrock or impervious soil
X			Cutoff trench filled with impervious material
X			Embankments and cutoff trench 95% compaction standard proctor ASTM
X			Embankment free of roots, tree debris, stones >6" diameter, etc.
X			Embankment constructed in lifts no greater than 12"
X			Spillpipe sized to carry peak flow from a one year storm event
X			Spillpipe will not chemically react with effluent
X			Subsurface withdrawal
X			Anti-seep collars extend radially at least 2' from each joint in spillpipe
X			Splashpad at the end of the spillpipe
X			Emergency Spillway sized for peak flow from 25-yr 24-hr event if discharge not into PWS classified stream
		X	Emergency spillway sized for peak flow from 50-yr 24-hr event if discharge is into PWS classified stream
X			Emergency overflow at least 20' long
X			Side slopes of emergency spillway no steeper than 2:1
X			Emergency spillway lined with riprap or concrete
X			Minimum of 1.5' of freeboard between normal overflow and emergency overflow
X			Minimum of 1.5' of freeboard between max. design flow of emergency spillway and top of dam
X			All emergency overflows are sized to handle entire drainage area for ponds in series
X			Dam stabilized with permanent vegetation
X			Sustained grade of haul road <10%
X			Maximum grade of haul road <15% for no more than 300'
X			Outer slopes of haul road no steeper than 2:1
X			Outer slopes of haul road vegetated or otherwise stabilized
		X	Detail drawings supplied for all stream crossings
X			Short-Term Stabilization/Grading And Temporary Vegetative Cover Plans
X			Long-Term Stabilization/Grading And Permanent Reclamation or Water Quality Remediation Plans

IDENTIFY AND PROVIDE DETAILED EXPLANATION FOR ANY "N" OR "N/A" RESPONSE(s):

Surface runoff does not discharge into a PWS.
 There are no new stream crossings proposed for this project. Stream crossings are existing.

XX. POLLUTION ABATEMENT & PREVENTION (PAP) PLAN REVIEW CHECKLIST

Y	N	N/A	
X			PE Seal with License #
X			Name and Address of Operator
X			Legal Description of Facility
General Information:			
X			Name of Company
X			Number of Employees
X			Products to be Mined
X			Hours of Operation
X			Water Supply and Disposition
Topographic Map:			
X			Mine Location
		X	Location of Prep Plant
X			Location of Treatment Basins
X			Location of Discharge Points
X			Location of Adjacent Streams
1" - 500' or Equivalent Facility Map:			
X			Drainage Patterns
X			Mining Details
X			All Roads, Structures Detailed
X			All Treatment Structures Detailed
Detailed Design Diagrams:			
X			Plan Views
X			Cross-section Views
X			Method of Diverting Runoff to Treatment Basins
Narrative of Operations:			
X			Raw Materials Defined
X			Processes Defined
X			Products Defined
Schematic Diagram:			
X			Points of Waste Origin
X			Collection System
X			Disposal System
Post Treatment Quantity and Quality of Effluent:			
X			Flow
X			Suspended Solids
X			Iron Concentration
X			pH
Description of Waste Treatment Facility:			
		X	Pre-Treatment Measures
		X	Recovery System
X			Expected Life of Treatment Basin
X			Schedule of Cleaning and/or abandonment
Other:			
X			Precipitation/Volume Calculations/Diagram Attached
X			BMP Plan for Haul Roads
X			Measures for Minimizing Impacts to Adjacent Stream i.e., Buffer Strips, Berms, etc.
X			Methods for Minimizing Nonpoint Source Discharges
X			Facility Closure Plans
		X	PE Rationale(s) For Alternate Standards, Designs or Plans

IDENTIFY AND PROVIDE DETAILED EXPLANATION FOR ANY "N" OR "N/A" RESPONSE(S):

No proposed preparation plant.
 No pre-treatment measures or recovery system applies to this project.
 No alternatives applied.

XXI. INFORMATION

Contact the Department prior to submittal with any questions or to request acceptable alternate content/format. Be advised that you are not authorized to commence regulated activity until this application can be processed, publicly noticed, and approval to proceed is received in writing from the Department.

EPA Form(s) 1 and 2F need not be submitted unless specifically required by the Department. EPA Form(s) 2C and/or 2D are required to be submitted unless the applicant is eligible for a waiver and the Department grants a waiver, or unless the relevant information required by EPA Form(s) 2C and/or 2D are submitted to the Department in an alternative format acceptable to the Department.

Planned/proposed mining sites that are greater than 5 acres, that mine/process coal or metallic mineral/ore, or that have wet or chemical processing, must apply for and obtain coverage under an Individual NPDES Permit prior to commencement of any land disturbance. Such coverage may be requested via this ADEM Form 315.

The applicant is advised to contact:

- (1) The Alabama Surface Mining Commission (ASMC) if coal, coal fines, coal refuse, or other coal related materials are mined, transloaded, processed, etc.;
(2) The Alabama Department of Labor (ADOL) if conducting non-coal mining operations;
(3) The Alabama Historical Commission for requirements related to any potential historic or culturally significant sites;
(4) The Alabama Department of Conservation and Natural Resources (ADCNR) for requirements related to potential presence of threatened/endangered species; and
(5) The US Army Corps of Engineers, Mobile or Nashville Districts, if this project could cause fill to be placed in federal waters or could interfere with navigation.

The Department must be in receipt of a completed version of this form, including any supporting documentation, and the appropriate processing fee [including Greenfield Fee and Biomonitoring & Toxicity Limits fee(s), if applicable], prior to development of a draft NPDES permit. The completed form, supporting documentation, and the appropriate fees must be submitted to:

Water Division
Alabama Department of Environmental Management
Post Office Box 301463
Montgomery, Alabama 36130-1463
Phone: (334) 271-7823
Fax: (334) 279-3051
h2omail@adem.alabama.gov
www.adem.alabama.gov

XXII. PROFESSIONAL ENGINEER (PE) CERTIFICATION

A detailed, comprehensive Pollution Abatement & Prevention (PAP) Plan must be prepared, signed, and certified by a professional engineer (PE), registered in the State of Alabama, and the PE must certify as follows:

"I certify on behalf of the applicant, that I have completed an evaluation of discharge alternatives (Item XVIII) for any proposed new or increased discharges of pollutant(s) to Tier 2 waters and reached the conclusions indicated. I certify under penalty of law that technical information and data contained in this application, and a comprehensive PAP Plan including any attached SPCC plan, maps, engineering designs, etc. acceptable to ADEM, for the prevention and minimization of all sources of pollution in stormwater and authorized related process wastewater runoff has been prepared under my supervision for this facility utilizing effective, good engineering and pollution control practices and in accordance with the provisions of ADEM Admin. Code Division 335-6, including Chapter 335-6-9 and Appendices A & B. If the PAP Plan is properly implemented and maintained by the Permittee, discharges of pollutants can reasonably be expected to be effectively minimized to the maximum extent practicable and according to permit discharge limitations and other permit requirements. The applicant has been advised that appropriate pollution abatement/prevention facilities and structural & nonstructural management practices or Department approved equivalent management practices as detailed in the PAP Plan must be fully implemented and regularly maintained as needed at the facility in accordance with good sediment, erosion, and other pollution control practices, permit requirements, and other ADEM requirements to ensure protection of groundwater and surface water quality."

Address 706 12th Street, Phenix City, AL 36867 PE Registration # 30447
Name and Title (type or print) Christopher Rogers Phone Number 334.297.2423.
Signature [Signature] Date Signed 1/30/2020

XXIII. RESPONSIBLE OFFICIAL SIGNATURE*

This application must be signed by a Responsible Official of the applicant pursuant to ADEM Admin. Code Rule 335-6-6-.09 who has overall responsibility for the operation of the facility.

"I certify under penalty of law that this document, including technical information and data, the PAP Plan, including any SPCC plan, maps, engineering designs, and all other attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the PE and other person or persons under my supervision who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine or imprisonment for knowing violations.

"A comprehensive PAP Plan to prevent and minimize discharges of pollution to the maximum extent practicable has been prepared at my direction by a PE for this facility utilizing effective, good engineering and pollution control practices and in accordance with the provisions of ADEM Admin. Code Division 335-6, including Chapter 335-6-9 and Appendices A & B, and information contained in this application, including any attachments. I understand that regular inspections must be performed by, or under the direct supervision of, a PE and all appropriate pollution abatement/prevention facilities and structural & nonstructural management practices or Department approved equivalent management practices identified by the PE must be fully implemented prior to and concurrent with commencement of regulated activities and regularly maintained as needed at the facility in accordance with good sediment, erosion, and other pollution control practices and ADEM requirements. I understand that the PAP Plan must be fully implemented and regularly maintained so that discharges of pollutants can reasonably be expected to be effectively minimized to the maximum extent practicable and according to permit discharge limitations and other requirements to ensure protection of groundwater and surface water quality. I understand that failure to fully implement and regularly maintain required management practices for the protection of groundwater and surface water quality may subject the Permittee to appropriate enforcement action.

"I certify that this form has not been altered, and if copied or reproduced, is consistent in format and identical in content to the ADEM approved form.

"I further certify that the discharges described in this application have been tested or evaluated for the presence of non-stormwater discharges and any non-mining associated beneficiation/process pollutants and wastewaters have been fully identified."

Name (type or print) <u>Jim Beville</u>	Official Title <u>Geologist</u>
Signature <u>J Beville</u>	Date Signed <u>1/31/20</u>

*335-6-6-.09 Signatories to Permit Applications and Reports.

- (1) The application for an NPDES permit shall be signed by a responsible official, as indicated below:
 - (a) In the case of a corporation, by a principal executive officer of at least the level of vice president, or a manager assigned or delegated in accordance with corporate procedures, with such delegation submitted in writing if required by the Department, who is responsible for manufacturing, production, or operating facilities and is authorized to make management decisions which govern the operation of the regulated facility;
 - (b) In the case of a partnership, by a general partner;
 - (c) In the case of a sole proprietorship, by the proprietor; or
 - (d) In the case of a municipal, state, federal, or other public entity by either a principal executive officer, or ranking elected official.

POLLUTION ABATEMENT/PREVENTION (PAP) PLAN
FOR
CARBO-BELCHER BAUXITE PIT
OF
CARBO CERAMICS, INC.

January 29, 2020

BARRETT-SIMPSON, INC.
706 12TH STREET
Phenix City, AL 36867
(334) 297-2423

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APPENDIX A – CONSTRUCTION DETAILS

APPENDIX B – SITE LAYOUT & SURFACE WATER FLOW DIAGRAM

APPENDIX C – DETAILED FACILITY MAP

APPENDIX D – SCHEMATIC FLOW DIAGRAM

APPENDIX E – RUNOFF HYDROGRAPHS

APPENDIX F – TYPICAL BMPS

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I. INTRODUCTION:

This Pollution Abatement/Prevention (PAP) plan is a required part of an application for a NPDES Permit. The Carbo-Belcher Bauxite Pit, will be located in Section 01, T-9-N, R-27-E, Barbour County, Alabama. This application is being prepared in accordance with the rules and regulations of the Alabama Department of Environmental Management (ADEM). A thorough field review of the proposed site has been conducted prior to the compilation and submittal of this plan. The existing conditions and geology of the proposed site has been evaluated to determine the potential for bauxite mining, to calculate runoff coefficients, and determine the sediment control measures required.

The PAP plan is presented in two parts, which includes a narrative description of the operation and treatment requirements, drainage maps, design plans, and discharge calculations. The narrative description is intended to address the format as outlined by the ADEM Admin. Code R. 335-6-9, as well as present the basis for the designs as further detailed in the PAP Plan. Drawings as presented in the PAP Plan were derived from rules and regulations of the ADEM Admin. Code R. 335-6-9, Appendix "A" and Appendix "B", as well as from other generally accepted design data sources primarily from the U.S. Department of Agriculture's Natural Resource Conservation Service.

II. OPERATOR

The operator of this pit is CARBO Ceramics, Inc. Their business address is:

36 Arch Drive
Eufaula, AL 36027

The proposed pit will lie within a property owned by James R. Holsombeck. The area that is to be disturbed is more particularly described as follows:

Commencing at the Southwest $\frac{1}{4}$ of the Southeast $\frac{1}{4}$, of Section 1, Township 9 North, Range 27 East, Barbour County, Alabama; thence N00°31'04"E a distance of 148.17 feet to a rebar and the Point of Beginning; thence N00°26'18"W a distance of 531.95 feet to a rebar; thence N24°27'57"E a distance of 765.71 feet to a rebar; thence S66°18'30"E a distance of 902.52 feet to a rebar; thence S06°17'49"E a distance of 587.48 feet to a rebar; thence S76°48'11"W a distance of 1236.60 feet to the Point of Beginning, and containing 23.208 acres.

III. GENERAL INFORMATION

This facility is now in the reclamation phase and no mining is taking place. The product that was mined was bauxite clay. There will be no other land disturbing activities performed on the site.

IV. TOPOGRAPHIC MAP

A site drainage map indicating topography, areas of excavation, proposed mineral stockpile areas, proposed topsoil stockpile areas, drainage diversionary structures, treatment ponds, and discharge points is provided as part of this plan.

V. METHOD OF DIVERTING SURFACE WATER RUNOFF

The site drainage map shows topography and all diversionary structures. The treatment pond is located using natural topography to minimize the construction of diversionary structures. Drainage from all spoil, stockpile areas, excavation areas, loading areas, equipment storage areas, and any other areas of disturbance related to the mining site will be directed to a permitted treatment structure prior to discharging. Any minor areas of disturbance that drainage cannot feasibly be routed to a treatment pond will be graded and will be vegetated with annual and perennial grasses and will have effective Best Management Practices (BMP's) for the control of non-point source pollution fully implemented and maintained at all times. To reduce turbidity of water leaving the site, Alum flocculant shall be used to settle out soil particles from the water discharged from the pond.

VI. RAW MATERIALS, PROCESSES AND PRODUCTS

The material that was mined was bauxite clay. There will be no washing or screening of any of the raw materials at this site.

VII. SCHEMATIC DIAGRAM

A schematic diagram showing each process that creates wastewater, the wastewater collection system has been provided as part of this PAP plan.

VIII. POST TREATMENT QUANTITY AND QUALITY OF EFFLUENT

Runoff calculations have been provided as part of this plan to determine flow and to size the discharge structures. An existing treatment pond will allow adequate settling times for the expected particles sizes to reduce suspended solids concentrations to meet effluent

limits. The treatment pond will provide adequate oxidation for the removal of iron and other metals to a concentration within the permit requirements. The pH of the effluent will be between 6.0 su and 8.5 su or as allowed by the permit. To reduce turbidity of water leaving the site, Alum flocculant shall be used to settle out soil particles from the water discharged from the pond.

IX. WASTE TREATMENT FACILITIES

The primary method of treatment for the removal of expected pollutants will be settling. The existing sediment pond has adequate capacity to detain all surface runoff for a 24-hour 25-year storm event. The sediment pond will allow sedimentation to ensure that silt does not leave the site. All aspects of the proposed sediment pond shall be in accordance with the requirements of the PAP Plan checklist. To reduce turbidity of water leaving the site, Alum flocculant shall be used to settle out soil particles from the water discharged from the pond.

The sediment pond at a minimum will provide 0.25 acre-feet of storage for every acre of disturbed land draining to the pond. All trees, brush, boulders, and other objects that would impair compaction will be removed from the pond prior to construction. The minimum width at the top of the dam will be at least 12 feet. The side slopes of the dam will be no steeper than 3:1. At least 80% coverage of annual and perennial grasses will be established on the embankments of the dam. A cutoff trench will be constructed along the center of the dam and will extend at least 2 feet into the bedrock. The cutoff trench will be at least 8 feet wide, the side slopes will no less than 1:1, and it will be filled with impervious material compacted to 95% compaction standard proctor ASTM. The dam will also be compacted 95% compaction standard proctor ASTM. The embankments will be constructed in lifts less than 12 inches.

The spill-pipe is sized to carry peak flow from the 25-year, 24 hour storm event, and are constructed of material that will not chemically react with the effluent. Anti-seep collars will extend radially at least 2 feet from each joint in the spill-pipes. A splash pad constructed of riprap will be installed at the discharge pipe to prevent erosion from the discharge.

The dam will be equipped with an emergency spillway sized for the peak flow from 100-year, 24-hour storm event. The emergency overflow will be at least 20 feet long, lined with riprap, and the side slopes will be no steeper than 2:1. There will be at least 1.5 feet of freeboard between the normal overflow and the emergency overflow, and there will be at least 1.5 feet of freeboard between the maximum design flow of the emergency spillway and the top of the dam.

The treatment pond shall be maintained until mining has ceased, the site has been completely reclaimed, and the operator has received written permission from ADEM to remove the treatment ponds. Accumulated sediments/sludge in the treatment ponds will be removed when the ponds have lost 60% of their liquid storage capacity due to sedimentation.

X. SEDIMENT CONTROL FOR HAUL ROADS

The access and haul roads will have a sustained grade of no greater than 10%, with a maximum grade no greater 15% for 300 feet. The outer slope will be no steeper than 2:1 and will maintain 80% coverage of annual and perennial grasses. Effective BMP's will be installed and maintained at all times. The roads will be crowned and properly ditched. Also, water bars and wing ditches will be installed where appropriate. Typical designs for these structures are included as part of this plan. There will be no stream crossing at this facility. If it becomes necessary to construct a stream crossing the certified design plans will be submitted to ADEM for their review.

XI. LOCATION OF ALL STREAMS ADJACENT TO MINING AREA

The topographic map submitted as part of this plan shows all water bodies. The mining operation will provide a 50-foot minimum buffer zone around streams. If a buffer zone cannot be maintained ADEM will be contacted regarding construction of a designed berm to protect the stream. There will be no new stream crossings for this permit.

XII. NON-POINT SOURCE POLLUTION

By virtue of the fact that all disturbed areas are graded such that the drainage will carry sediment to the ponds, non-point sources of pollution are not expected for this project.

XIII. PUBLIC WATER SUPPLY IMPOUNDMENT

This facility will not discharge to a stream segment classified as a Public Water Supply.

XIV. SPILL PREVENTION CONTROL & COUNTERMEASURES PLAN

Fuel will not be stored on-site; therefore, a SPCC plan has not been developed.

XV. RUNOFF CALCULATIONS

Runoff calculations were calculated to ensure that the existing sediment basin on the site provided adequate volume for the proposed mine site. All numbers are based on a 25-year, 24-hour storm event and calculated using the Modified Rational Method. All variables and conclusions can be seen in the table below:

<i>Pond #</i>	<i>Area, ac</i>	<i>Length, ft</i>	<i>Slope, %</i>	<i>Tc, min</i>	<i>Flow, cfs</i>	<i>Req'd Storage, cu. ft.</i>
<i>1</i>	<i>18.0</i>	<i>1000</i>	<i>10</i>	<i>11</i>	<i>91.26</i>	<i>60,232</i>

Pond #1

Required Stormwater Storage: 60,232 cubic feet

Available Stormwater Storage: 75,489 cubic feet

XVI. RECLAMATION PROCEDURE

As mining is completed in an area, the area shall be dressed to eliminate any piles of dirt, or low areas which will hold water, with terraces to keep erosion to a minimum, and grassed. A sump shall be maintained at the low end of all reclamation work until a satisfactory stand of grass is obtained.

During construction and reclamation, erosion control measures such as hay bales, riprap, cleared trees, and other acceptable methods will be utilized as needed to minimize erosion.

XVII. BMP TYPICALS (attached)

Pipe and Spillway Detail
 Typical section for Constructed Dam
 Swale Detail
 Outlet Protection Detail
 Flow Schematic

XVIII. CHEMICALS/COMPOUNDS AND POTENTIAL TOXICITY SOURCES

No chemicals/compounds shall be used on this project which would contaminate any of the existing creeks.

XIX. EPA FORM 2D and/or EPA FORM 2C

EPA Form 2C & 2D were not completed because only stormwater runoff will be discharged from the proposed facility.

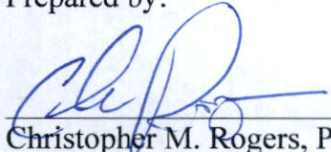
XX. COPY OF ASMC REQUIRED WATER QUALITY RELATED DATA AND INFORMATION

No information pertaining to the ASMC is attached or included because this project is only for non-coal mining operations. ASMC regulates coal mining operations.

CERTIFICATION

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, of those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for willful violations.”

Prepared by:



Christopher M. Rogers, PE #30447
Barrett-Simpson, Inc.

1/30/2020

Date

XXI. DESIGN DATA

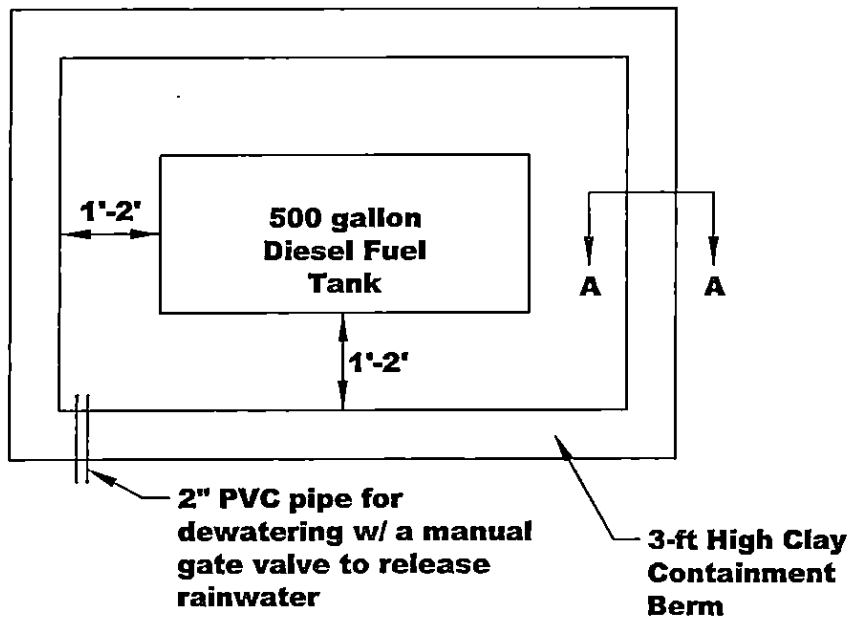
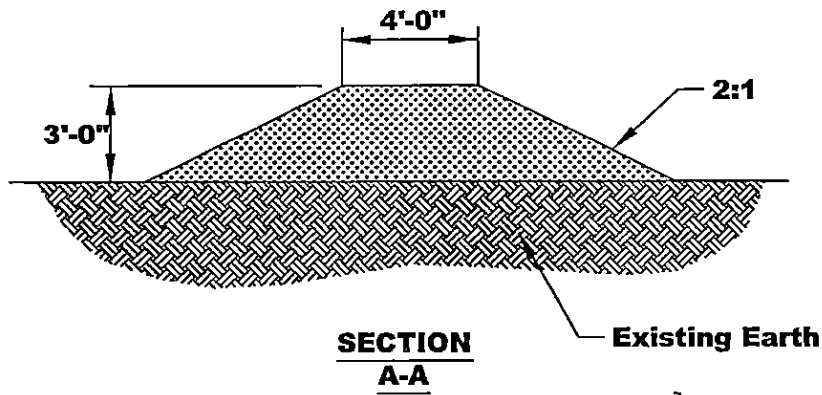
001P

DISTURBED AREA = 5.0 AC. X 1/4 AC. FT/AC. = 1.25
THEREFORE: 1.25 AC. FT. POND REQ'D (54,450 CUBIC FEET)

DRAINAGE AREA – 21.0 AC.
THEREFORE, REQ'D: 1 - 18" PIPE
1 - 10' x 1.5' SPILLWAY

POND VOLUME REQUIRED: 1.25 AC. FT.
POND VOLUME PROVIDED: 1.73 AC. FT.

APPENDIX A
CONSTRUCTION DETAILS



PLAN VIEW

**CONTAINMENT BASIN FOR
500-GAL DIESEL FUEL TANK**

NOT TO SCALE



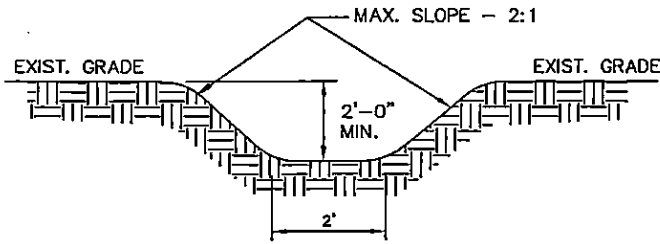
BARRETT-SIMPSON, INC.
Civil Engineers & Land Surveyors

706 A 12th STREET, PHENIX CITY, AL 36868 (PH 334-297-2423, FAX 334-297-2449)
223 S. 9th STREET, OPELIKA, AL 36801 (PH 334-745-7026, FAX 334-745-4367)
121 W. BROAD STREET, EUFAULA, AL 36027 (PH 334-687-4257, FAX 334-687-8829)

PROJECT:
SHEET TITLE:
LOCATION:
TOPOGRAPHIC MAP:
SCALE:
DATE:

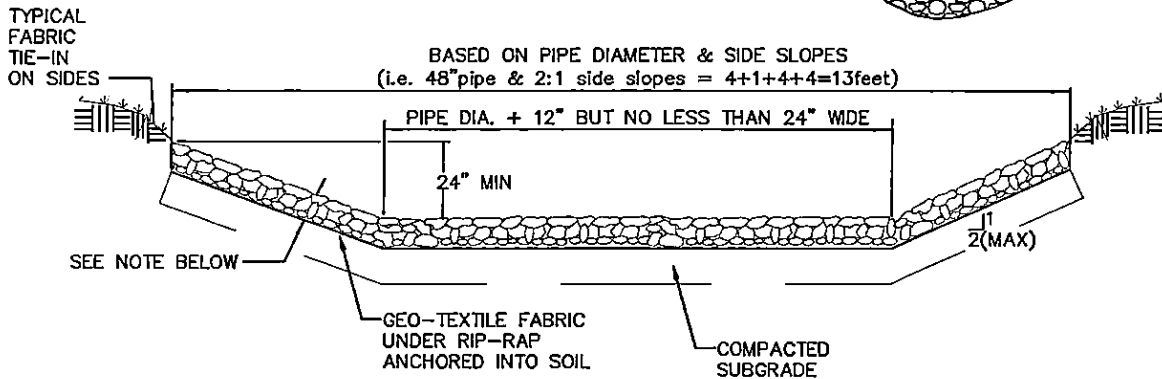
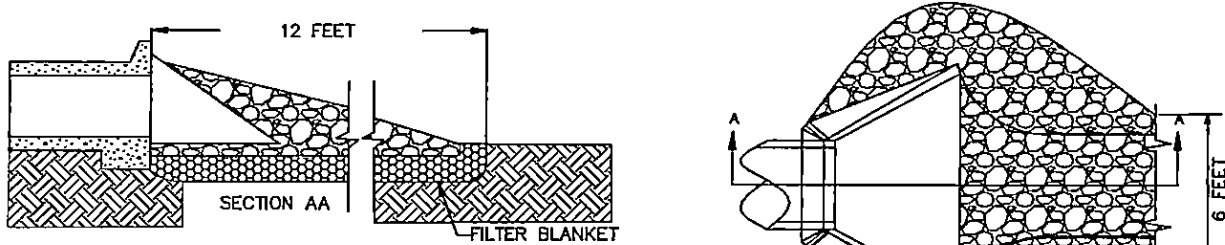
Carbo-Belcher- Bauxite Pit
Fuel Containment Diagram
Barbour County, AL
Baker Hill, Ala.
None

November 05, 2014



GRASSED SWALE & DIVERSION CHANNEL DETAIL

NOT TO SCALE



NOTES:

1. STONE SIZE SHALL BE AN AVERAGE SIZE OF 9". APRON THICKNESS SHALL BE A MINIMUM OF 15 INCHES.

INSTALLATION INSTRUCTIONS

1. Excavate trench area by depth required for outlet.
2. Get excavation work inspected and approved engineer.
3. Install geo-textile fabric and tie into soil as required using trenches and/or staples.
4. Get fabric installation approved by engineer.
5. Install riprap in size and quantities as indicated on Sheet EC-4.

OUTLET PROTECTION DETAIL

NOT TO SCALE

APPLICANT:	Carbo Ceramics, Inc.
FACILITY NAME:	Carbo-Belcher - Bauxite Pit
Section/Township/Range:	Sec. 01, T-9-N, R-27-E

SHEET TITLE:	Misc. Erosion Control Details
LOCATION:	Barbour County, AL
TOPOGRAPHIC MAP:	Barker Hill, Ala.
SCALE:	N/A
DATE:	November 05, 2014

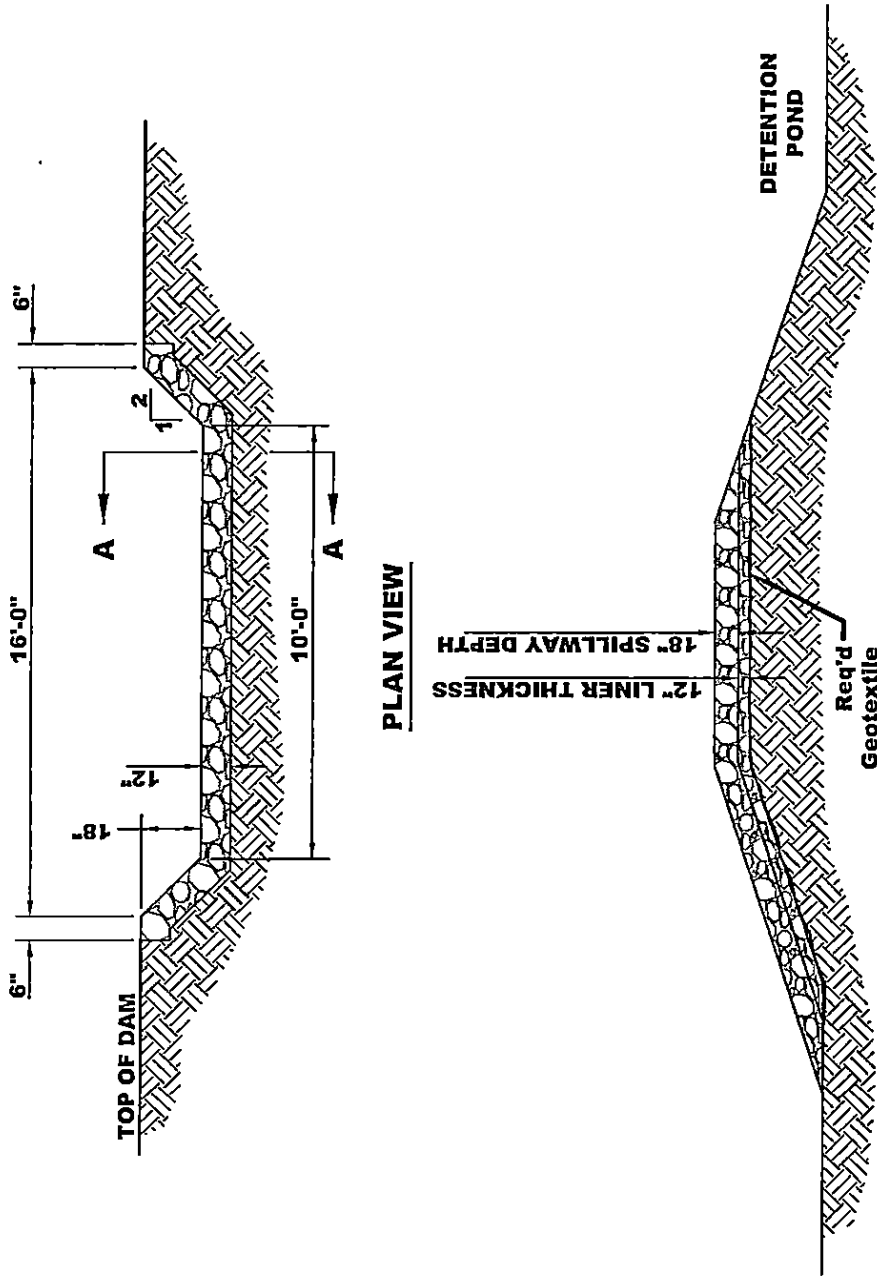


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121 W. BROAD STREET, EUFAULA, AL 36027 (PH 334-687-4257, FAX 334-687-8829)

NOTES:

1. Spillway bottom slope shall not exceed 3%.
2. All rip-rap shall be Class I.
3. Spillway Detail is applicable to Pond 1 & Pond 2.
4. Rip-rap shall extend to the bottom of the pond dam.



PLAN VIEW

SECTION A-A

EMERGENCY SPILLWAY DETAIL

NOT TO SCALE



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121 W. BROAD STREET, EUFAULA, AL 36027 (PH 334-687-4257, FAX 334-687-8829)

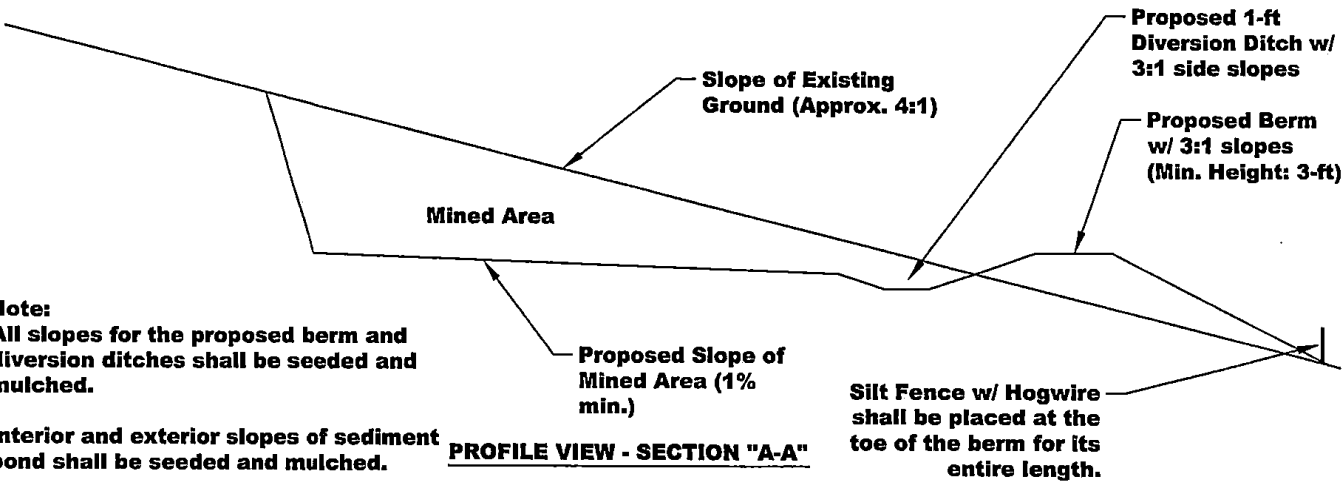
PROJECT: Carbo-Belcher - Bauxite Pit
SHEET TITLE: Emergency Spillway Detail
LOCATION: Barbour County, AL
TOPOGRAPHIC MAP: Baker Hill, Ala.
SCALE: None
DATE: November 05, 2014



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121 W. BROAD STREET, EUFALA, AL 36027 (PH 334-687-4257, FAX 334-687-8829)



Note:
All slopes for the proposed berm and diversion ditches shall be seeded and mulched.

Interior and exterior slopes of sediment pond shall be seeded and mulched.

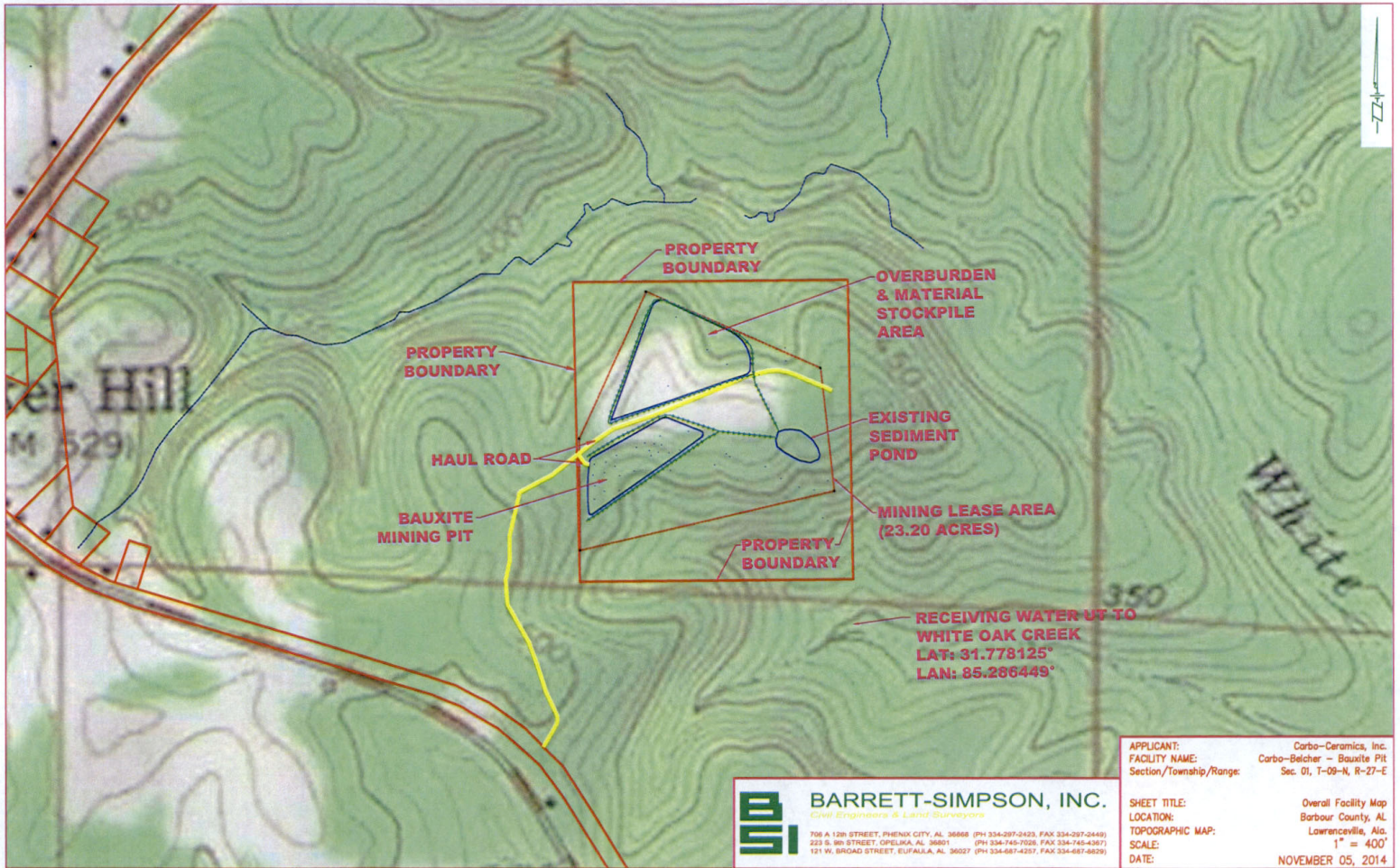
PROFILE VIEW - SECTION "A-A"

Silt Fence w/ Hogwire shall be placed at the toe of the berm for its entire length.

PROJECT: Carbo-Belcher - Bauxite Pit
 SHEET TITLE: Berm & Diversion Detail
 LOCATION: Barbour County, AL
 TOPOGRAPHIC MAP: Baker Hill, Ala.
 SCALE: None
 DATE: November 05, 2014

APPENDIX B

**SITE LAYOUT & SURFACE WATER
FLOW DIAGRAM**



APPLICANT: Carbo-Ceramics, Inc.
 FACILITY NAME: Carbo-Belcher - Bauxite Pit
 Section/Township/Range: Sec. 01, T-09-N, R-27-E


BARRETT-SIMPSON, INC.
 Civil Engineers & Land Surveyors
706 A 12th STREET, PHENIX CITY, AL 36868 (PH) 334-297-0423, FAX 334-297-0449;
 223 S. 9th STREET, OPELKA, AL 36851 (PH) 334-745-7028, FAX 334-745-4367;
 121 W. BROAD STREET, EUFALLA, AL 36527 (PH) 334-687-4297, FAX 334-687-8629)

SHEET TITLE: Overall Facility Map
 LOCATION: Barbour County, AL
 TOPOGRAPHIC MAP: Lawrenceville, Ala.
 SCALE: 1" = 400'
 DATE: NOVEMBER 05, 2014

APPENDIX C

DETAILED FACILITY MAP



- EROSION CONTROL NOTES:**
1. RIP-RAP CHECK DAMS (CD) SHALL BE INSTALLED IN DIVERSION DITCHES A 100 FT. INTERVALS (MIN.)
 2. ALL DISTURBED AREAS (EXCLUDING MINING AREA, STOCKPILE AREA & OVERBURDEN AREA) SHALL BE SEEDED W/ TEMPORARY (TS) & PERMANENT SEEDING (PS) AND SHALL BE MULCHED (MU).
 3. WHEN SEDIMENT IS REMOVED FROM THE PONDS, IT SHALL BE STOCKPILED IN THE OVERBURDEN STOCKPILE AREA.
 4. TYPE "A" SILT FENCE (SB) SHALL BE INSTALLED AT THE LOWEST ELEVATION OF ALL AREAS THAT HAVE DISTURBED LAND TO ENSURE SEDIMENT DOES NOT LEAVE THE SITE.
 5. CONSTRUCTION EXIT PADS (CEP) SHALL BE INSTALLED WHERE THE HAUL ROAD COUNTY ROAD.



NOTE:
ALL STORM WATER IN MINING AREA SHALL BE SELF CONTAINED WITHIN THE MINE. GROUNDWATER AND STORMWATER THAT ENTERS THE PIT SHALL BE PUMPED TO THE SEDIMENT POND FOR SETTLING PRIOR TO DISCHARGE.

APPROX. LOCATION OF REQ'D FACILITY IDENTIFICATION SIGN. SIGN SHALL INCLUDE PERMITTEE NAME, FACILITY NAME & NPDES NUMBER

RECEIVING WATER
UT TO WHITE OAK CREEK
LAT: 34.778125°
LAN: 85.285448°

Survey

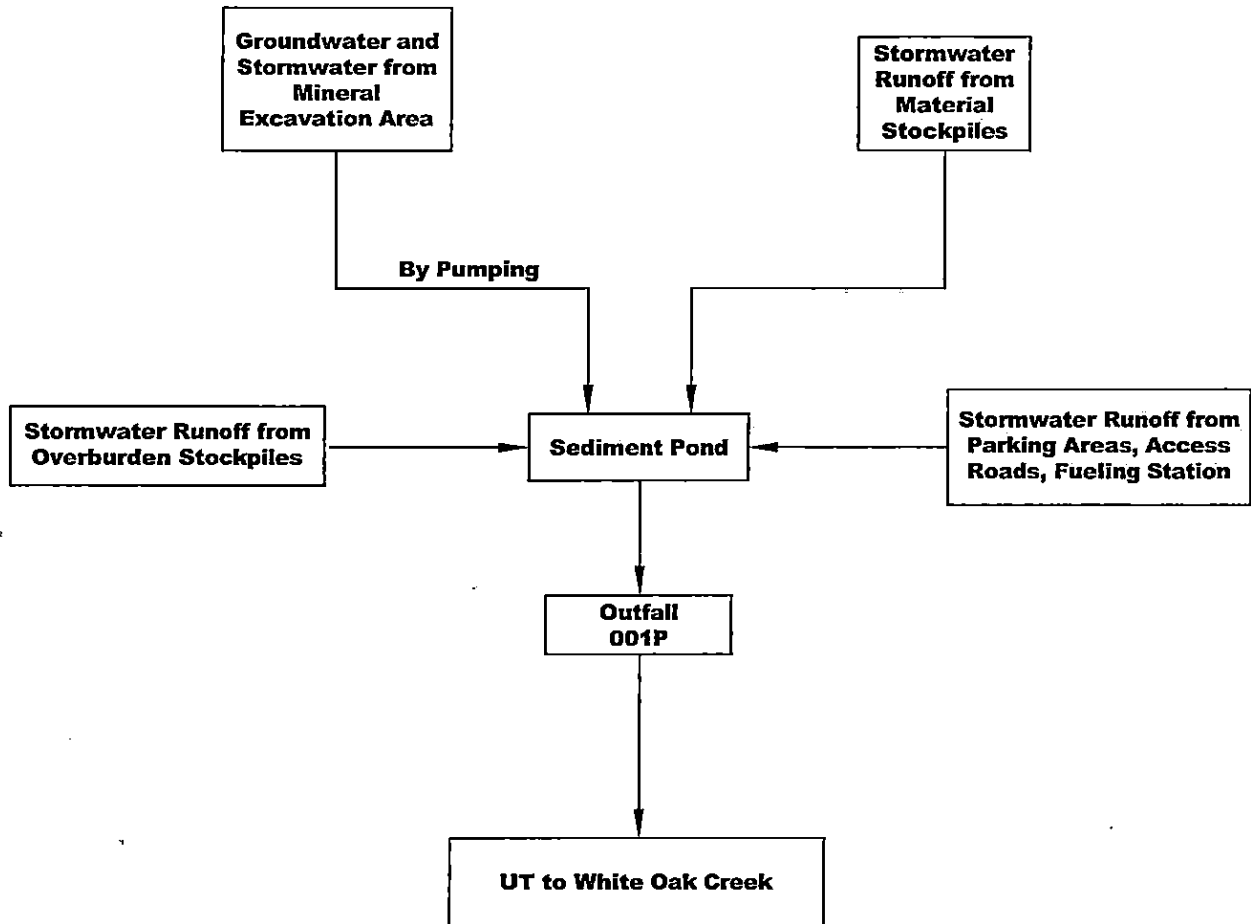
1297.1'

75

ESI **BARRETT-SIMPSON, INC.**
Civil Engineers & Land Surveyors
706 A 12th STREET, PHENIX CITY, AL 36868 (PH 334-297-2423, FAX 334-297-2440)
222 S. 9th STREET, OPELOUSA, AL 36801 (PH 334-743-7030, FAX 334-743-9277)
121 W. BRAD STREET, EUPAULA, AL 36027 (PH 334-687-4237, FAX 334-687-8829)

APPLICANT:	Carbo-Ceramics, Inc.
FACILITY NAME:	Carbo-Belcher - Boule PH
Section/Township/Range:	Sec. 1, T-9-N, R-27-E
SHEET TITLE:	Detailed Facility Map
LOCATION:	Barbour County, AL
TOPOGRAPHIC MAP:	Baker Hill, Ala.
SCALE:	1" = 300'
DATE:	November 05, 2014

APPENDIX D
SCHEMATIC FLOW DIAGRAM



BARRETT-SIMPSON, INC.
Civil Engineers & Land Surveyors

706 A 12th STREET, PHENIX CITY, AL 36868 (PH 334-297-2423, FAX 334-297-2449)
 223 S. 9th STREET, OPELIKA, AL 36801 (PH 334-745-7026, FAX 334-745-4367)
 121 W. BROAD STREET, EUFAULA, AL 36027 (PH 334-687-4257, FAX 334-687-8829)

PROJECT: Carbo-Belcher- Bauxite Pit
 SHEET TITLE: Schematic Diagram
 LOCATION: Barbour County, AL
 TOPOGRAPHIC MAP: Baker Hill, Ala.
 SCALE: None
 DATE: November 05, 2014

APPENDIX E

RUNOFF HYDROGRAPHS

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Hydrograph Summary Report

Hydroflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	62.75	1	11	41,413	---	---	---	Carbo-Belcher Bauxite Pits
New.gpw					Return Period: 2 Year		Thursday, 01 / 15 / 2015		

FAA Formula Tc Worksheet

Tc = 1.8(1.1 - C) x Flow length^{0.5} / Watercourse slope^{0.25} Flow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Hyd. No. 1

Carbo-Belcher Bauxite Pits

Description

Flow length (ft) = 1000.00

Watercourse slope (%) = 10.00

Runoff coefficient (C) = 0.70

Time of Conc. (min) = 11

Hydrograph Report

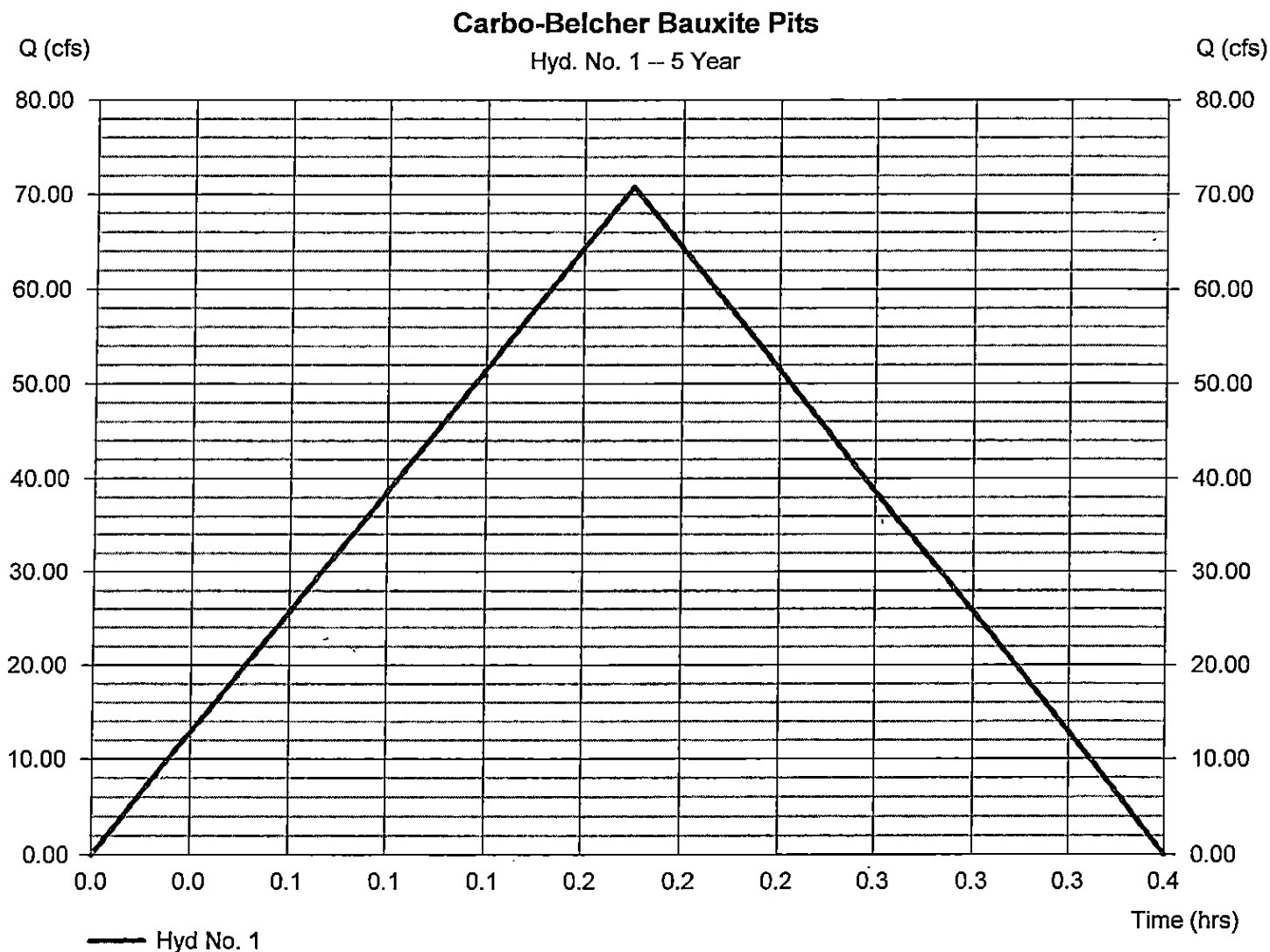
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 01 / 15 / 2015

Hyd. No. 1

Carbo-Belcher Bauxite Pits

Hydrograph type	= Rational	Peak discharge	= 70.82 cfs
Storm frequency	= 5 yrs	Time to peak	= 0.18 hrs
Time interval	= 1 min	Hyd. volume	= 46,743 cuft
Drainage area	= 18.000 ac	Runoff coeff.	= 0.7
Intensity	= 5.621 in/hr	Tc by FAA	= 11.00 min
IDF Curve	= COLUMBUS.IDF	Asc/Rec limb fact	= 1/1



Hydrograph Report

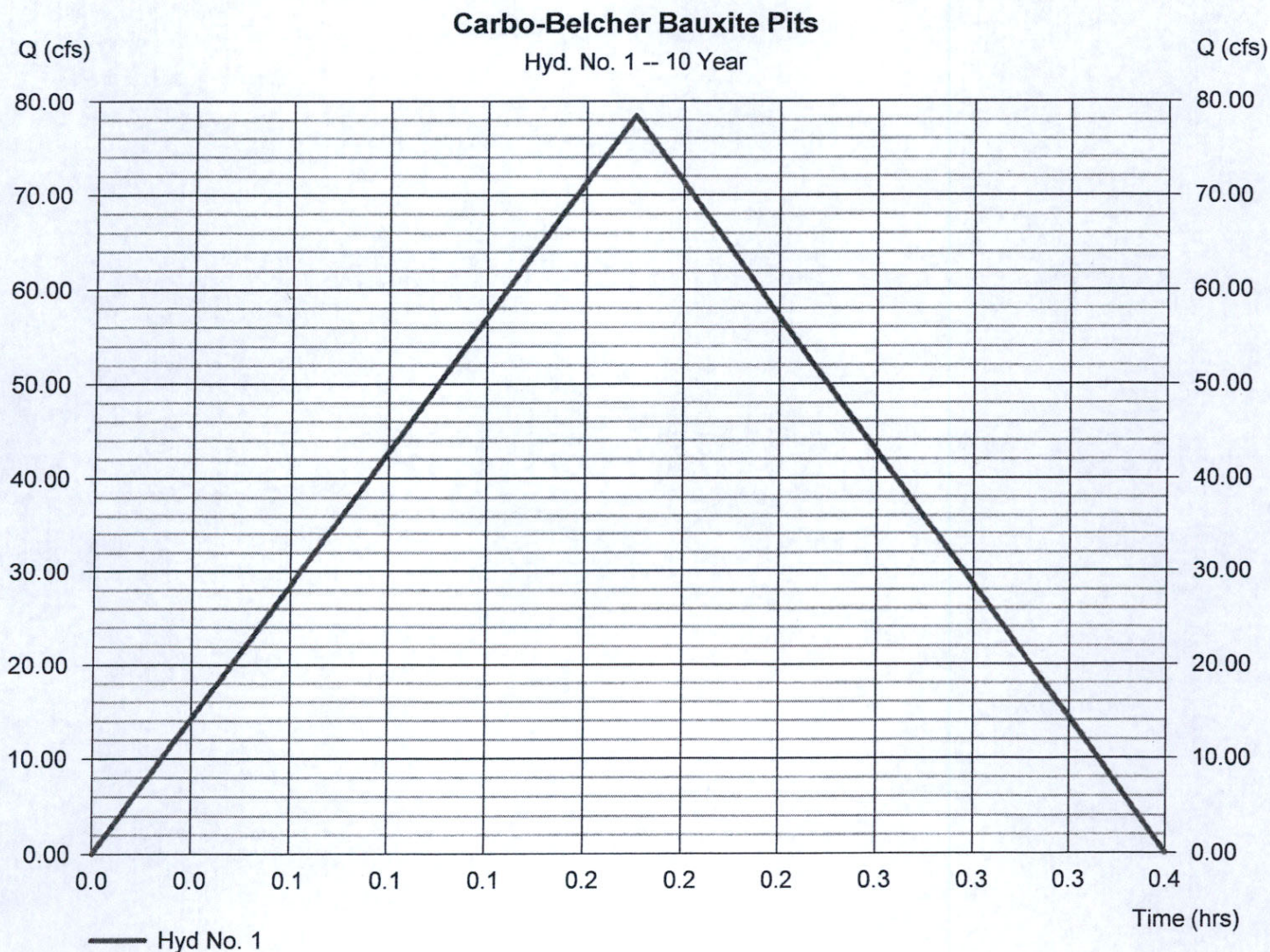
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 01 / 15 / 2015

Hyd. No. 1

Carbo-Belcher Bauxite Pits

Hydrograph type	= Rational	Peak discharge	= 78.48 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.18 hrs
Time interval	= 1 min	Hyd. volume	= 51,798 cuft
Drainage area	= 18.000 ac	Runoff coeff.	= 0.7
Intensity	= 6.229 in/hr	Tc by FAA	= 11.00 min
IDF Curve	= COLUMBUS.IDF	Asc/Rec limb fact	= 1/1



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 01 / 15 / 2015

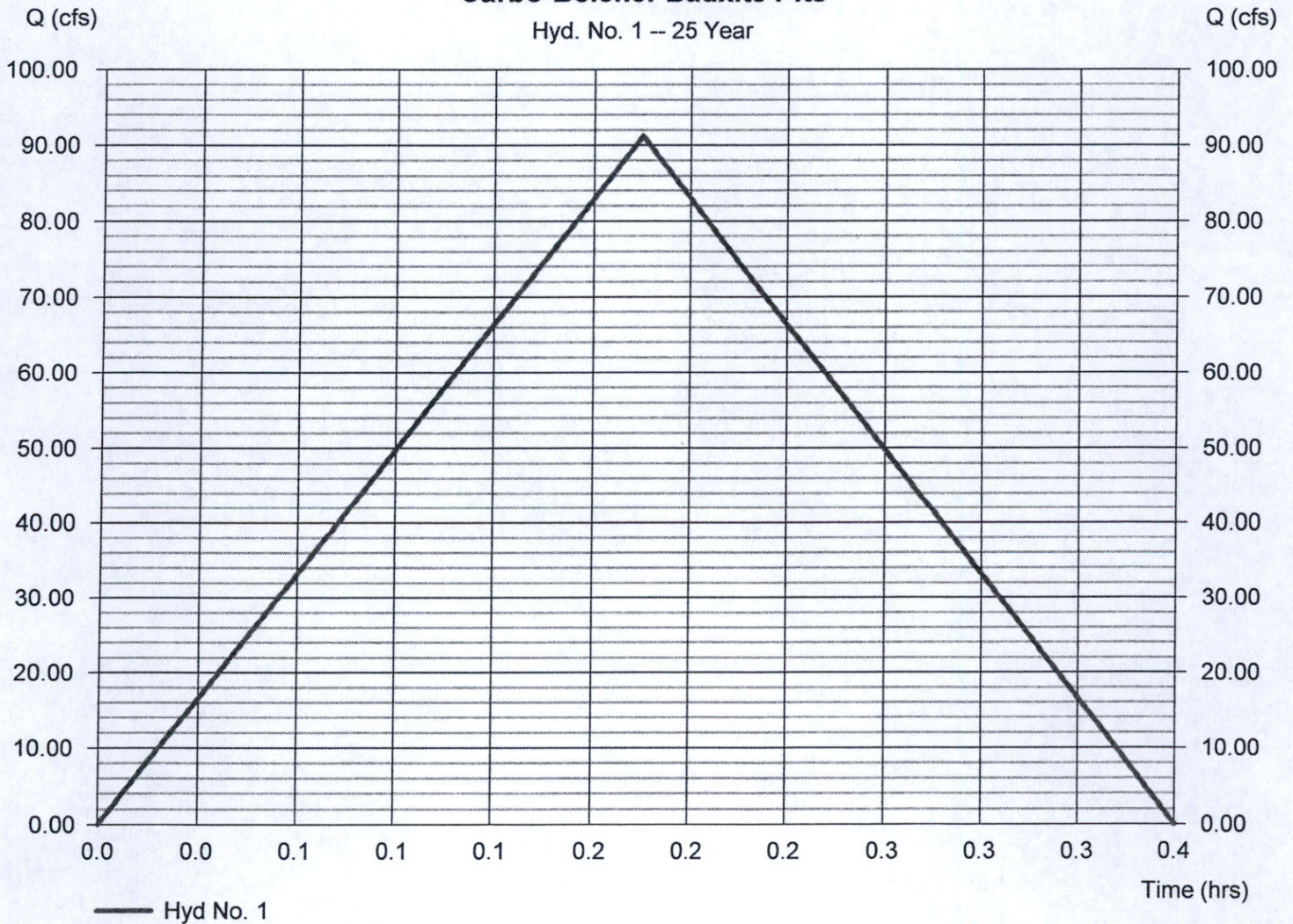
Hyd. No. 1

Carbo-Belcher Bauxite Pits

Hydrograph type	= Rational	Peak discharge	= 91.26 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.18 hrs
Time interval	= 1 min	Hyd. volume	= 60,232 cuft
Drainage area	= 18.000 ac	Runoff coeff.	= 0.7
Intensity	= 7.243 in/hr	Tc by FAA	= 11.00 min
IDF Curve	= COLUMBUS.IDF	Asc/Rec limb fact	= 1/1

Carbo-Belcher Bauxite Pits

Hyd. No. 1 -- 25 Year



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

Thursday, 01 / 15 / 2015

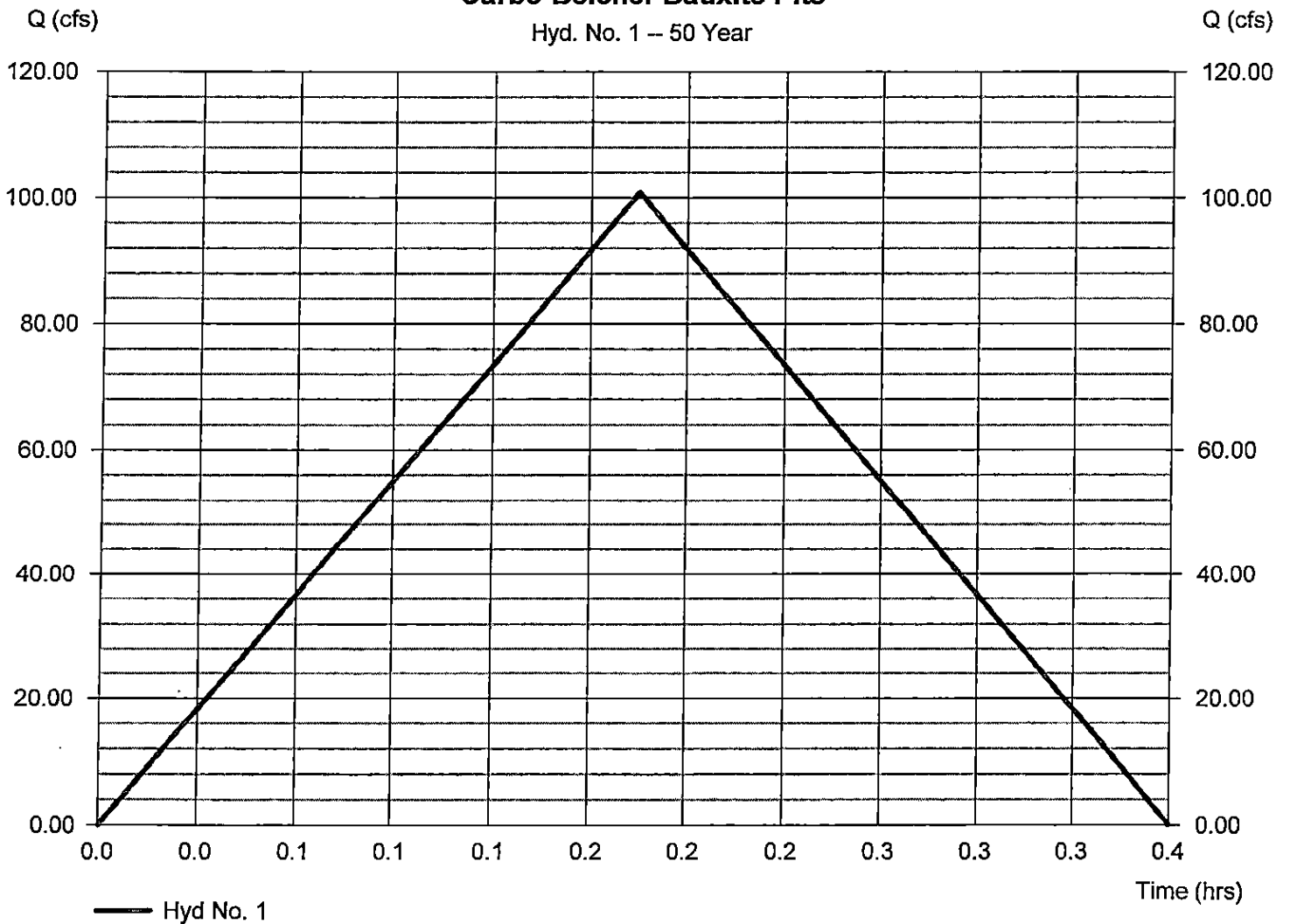
Hyd. No. 1

Carbo-Belcher Bauxite Pits

Hydrograph type	= Rational	Peak discharge	= 100.94 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.18 hrs
Time interval	= 1 min	Hyd. volume	= 66,623 cuft
Drainage area	= 18.000 ac	Runoff coeff.	= 0.7
Intensity	= 8.011 in/hr	Tc by FAA	= 11.00 min
IDF Curve	= COLUMBUS.IDF	Asc/Rec limb fact	= 1/1

Carbo-Belcher Bauxite Pits

Hyd. No. 1 -- 50 Year



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3

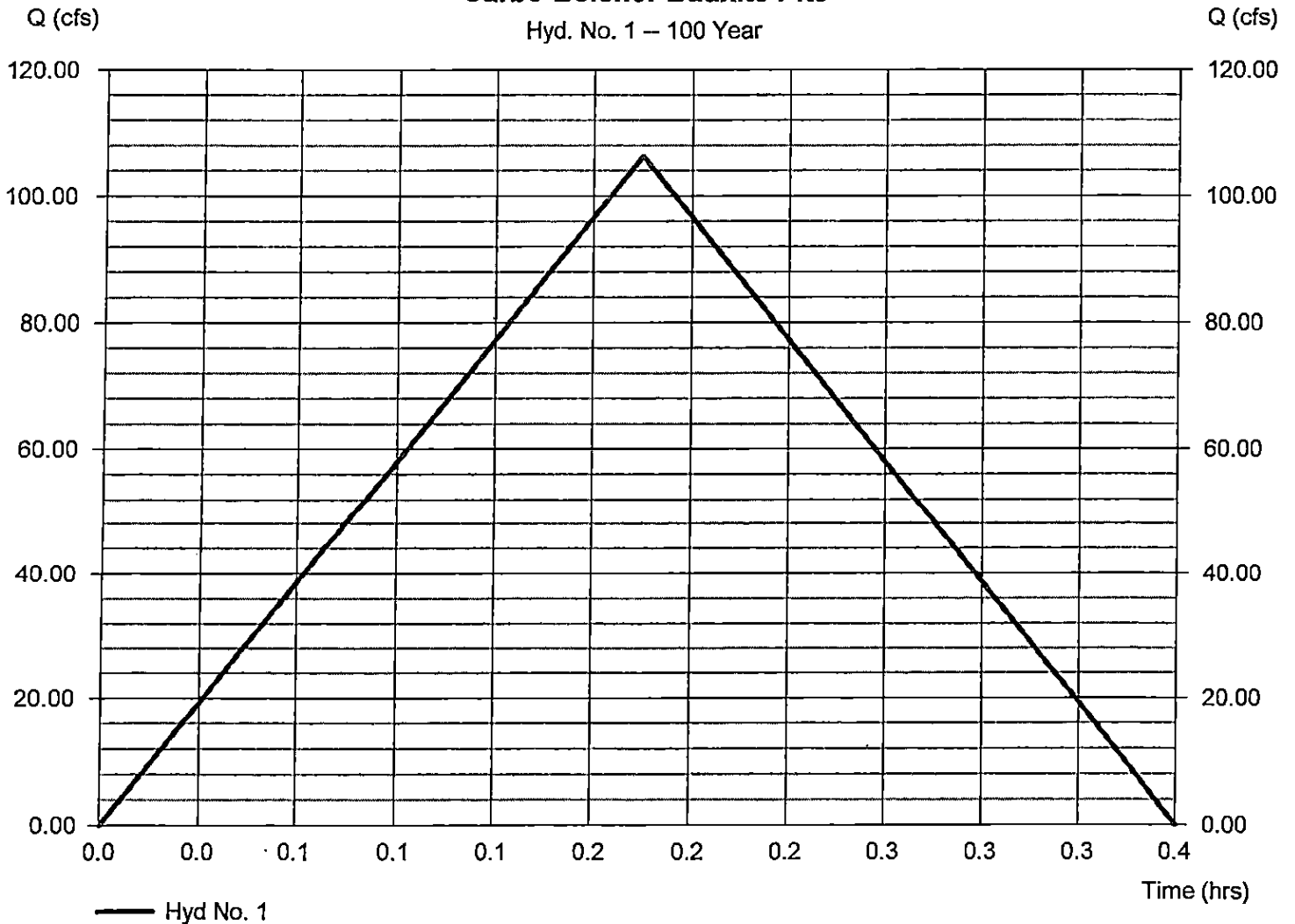
Thursday, 01 / 15 / 2015

Hyd. No. 1

Carbo-Belcher Bauxite Pits

Hydrograph type	= Rational	Peak discharge	= 106.31 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.18 hrs
Time interval	= 1 min	Hyd. volume	= 70,166 cuft
Drainage area	= 18.000 ac	Runoff coeff.	= 0.7
Intensity	= 8.438 in/hr	Tc by FAA	= 11.00 min
IDF Curve	= COLUMBUS.IDF	Asc/Rec limb fact	= 1/1

Carbo-Belcher Bauxite Pits
Hyd. No. 1 – 100 Year



APPENDIX E
TYPICAL BMP'S

Construction Exit Pad (CEP)



Practice Description

A construction pad is a stone base pad designed to provide a buffer area where mud and caked soil can be removed from the tires of construction vehicles to avoid transporting it onto public roads. This practice applies anywhere traffic will be leaving a construction site and moving directly onto a public road or street.

Planning Considerations

Roads and streets adjacent to construction sites should be kept clean for the general safety and welfare of the public. A construction exit pad (Figure CEP-1) should be provided where mud can be removed from construction vehicle tires before they enter a public road.

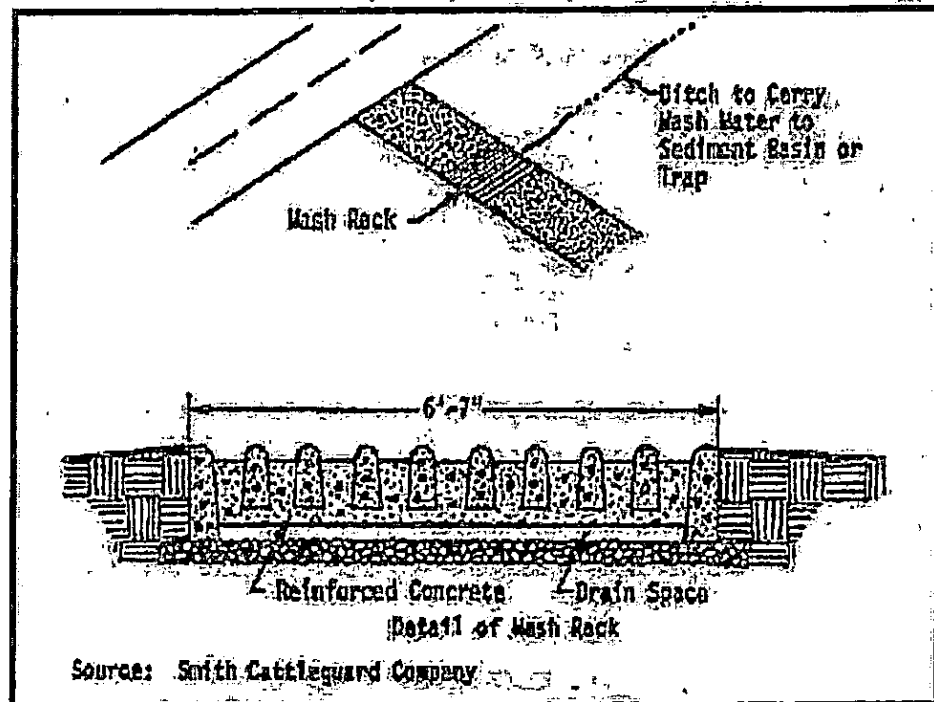


Figure CEP-2 Construction Exit with Wash Rack

If the construction exit pad is located in an area with soils that will not support traffic when wet, an underliner of geotextile will be required to provide stability to the pad.

Construction of stabilized roads throughout the development site should be considered to lessen the amount of mud transported by vehicular traffic. The construction exit pad should be located to provide for maximum use by construction vehicles.

Consideration should be given to limiting construction vehicles to only one ingress and egress point. Measures may be necessary to make existing traffic use the construction exit pad.

Design Criteria

Aggregate size

Aggregate should be Alabama Highway Department coarse aggregate gradation No.1.

Washing

A washing facility shall be provided if necessary to prevent mud and caked soil from being transported to public streets and highways. It shall be constructed of concrete, stone, and/or other durable materials. Provisions shall be provided for the mud and other material to be carried away from the washing facility to a sediment trap or basin to allow for settlement of the sediment from the runoff before it is released from the site.

Rock check dams (Figures CD-1 and CD-2) are easier to install with backhoes or other suitable equipment. The rock is usually purchased and some locations in the state may not have rock readily available. Rock should be considered carefully in areas to be mowed. Some rock may be washed downstream and should be removed before each mowing operation.

Log check dams (Figure CD-3) are more economical from a material cost standpoint since logs can usually be salvaged from clearing operations. The time and labor required would be greater for log check dams. Increased labor costs would offset the reduced material costs. Log check dams would not be permanent but would last long enough to get grass linings established.

Check dams constructed of hay bales (Figure CD-4) have the shortest life of the materials discussed and are only used as a temporary means to help establish a channel to vegetation. Hay bale check dams should not be used where permanent watercourse protection is needed and should only be used in concentrated flow areas where only minimal runoff occurs.

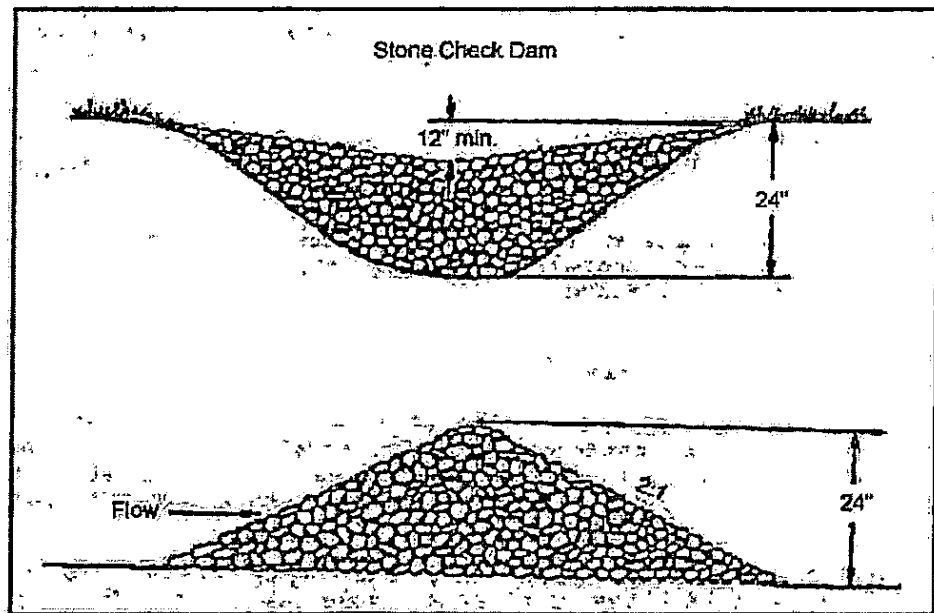


Figure CD-1 Profile of Typical Rock Check Dams

Check dams should be planned to be compatible with the other features such as streets, walks, trails, sediment basins and rights-of-way or property lines. Check dams are normally constructed in series and the dams should be located at a normal interval from other grade controls such as culverts or sediment basins.

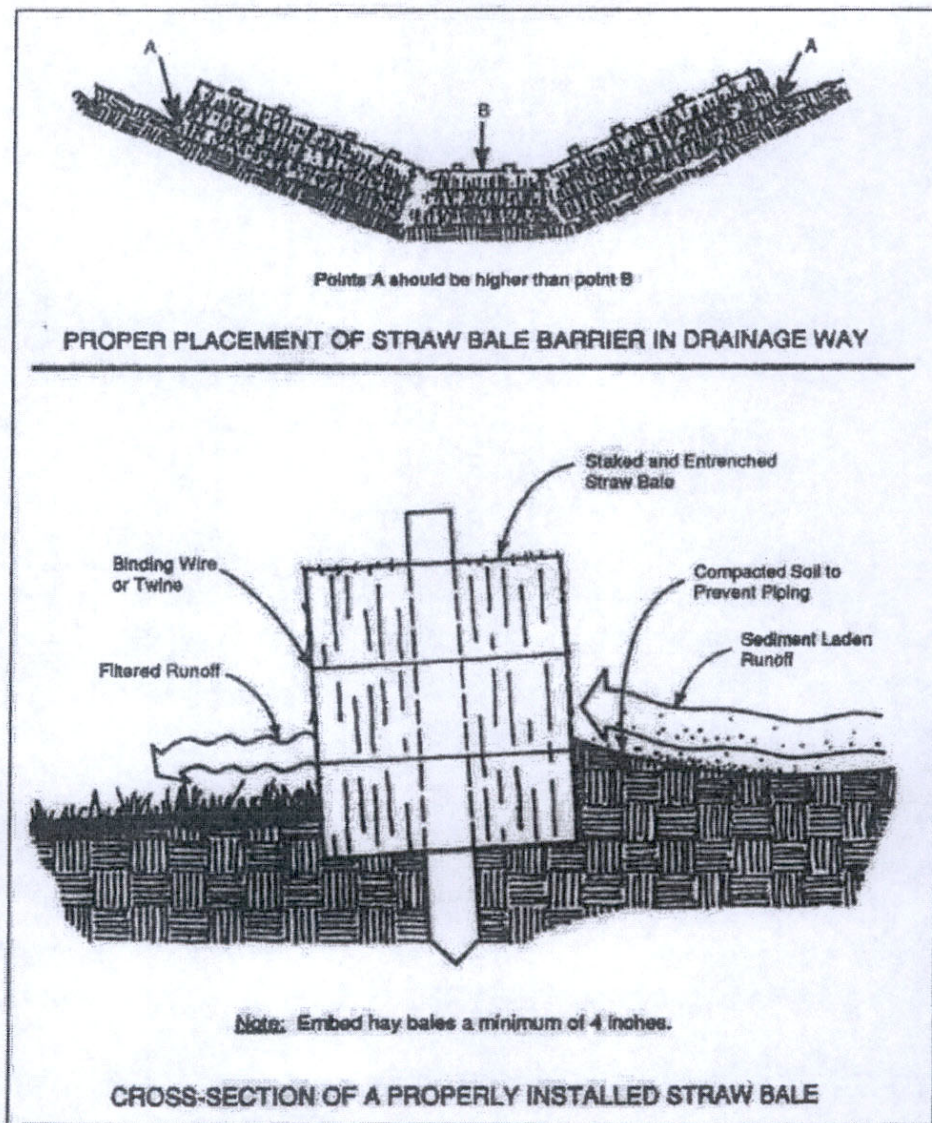


Figure CD-4 Typical Hay Bale Check Dam

Design Criteria

Formal design is not required. The following limiting factors should be adhered to when designing check dams.

Table CD-1 Requirements for Nonwoven Geotextile

Property	Test method	Class I	Class II	Class III	Class IV ¹
Tensile strength (lb) ²	ASTMD 4632 gab test	180 minimum	120 minimum	90 minimum	115 minimum
Elongation at failure (%) ²	ASTMD 4632	≥ 50	≥ 50	≥ 50	≥ 50
Puncture (pounds)	ASTMD 4833	80 minimum	60 minimum	40 minimum	40 minimum
Ultraviolet light (% residual tensile strength) ³	ASTMD 4355 150-hr exposure	70 minimum	70 minimum	70 minimum	70 minimum
Apparent opening size (AOS)	ASTMD 4751	As specified max. no. 40 ³	As specified max. no. 40 ³	As specified max. no. 40 ³	As specified max. no. 40 ³
Permittivity sec ⁻¹	ASTMD 4491	0.70 minimum	0.70 minimum	0.70 minimum	0.10 minimum

Table copied from NRCS Material Specification 592.

- 1 Heat-bonded or resin-bonded geotextile may be used for classes III and IV. They are particularly well suited to class IV. Needle-punched geotextile are required for all other classes.
- 2 Minimum average roll value (weakest principal direction).
- 3 U.S. standard sieve size.

Planning Considerations

Diversions are designed to intercept and carry excess water to a stable outlet.

Diversions can be useful tools for managing surface water flows and preventing soil erosion. On moderately sloping areas, they may be placed at intervals to trap and divert sheet flow before it has a chance to concentrate and cause rill and gully erosion. Simple water bars illustrate this concept (Figure DV-1).

Diversions may be placed at the top of cut or fill slopes to keep runoff from upgradient drainage areas off the slope. Diversions are also typically built at the base of steeper slopes to protect flatter developed areas which cannot withstand runoff water from outside areas. They can also be used to protect structures, parking lots, adjacent properties, and other special areas from flooding.

Diversions are preferable to other types of man-made stormwater conveyance systems because they more closely simulate natural flow patterns and characteristics. Flow velocities are generally kept to a minimum. When properly coordinated into the landscape design of a site, diversions can be visually pleasing as well as functional.

As with any earthen structure, it is very important to establish adequate vegetation as soon as possible after installation. It is usually important to stabilize the drainage area above the diversion so that sediment will not enter and accumulate in the diversion channel.

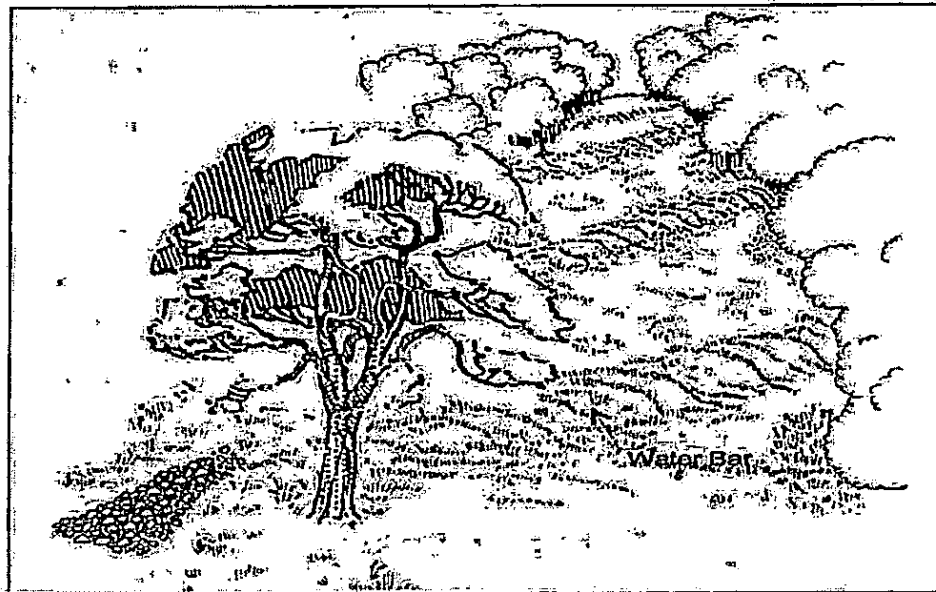


Figure DV-1 Water Bar

Table DV-2 Permissible Velocities

Soil Texture	Velocity in Feet/Second		
	Conditions of Vegetation		
	Poor	Fair	Good
Sand, Silt, Sandy Loam, Silt Loam	1.5	2.0	3.0
Silty Clay Loam, Sandy Clay Loam	2.5	3.0	4.0
Clay	3.0	4.0	5.0

Channel Design

The diversion channel may be parabolic, trapezoidal or v-shaped as shown in Figure DV-2 and should be designed in accordance with the procedure shown at the end of this standard. Land slope must be considered when choosing channel dimensions. On steeper slopes, narrow and deep channels may be required. On more gentle slopes, broad, shallow channels can be used to facilitate maintenance.

Ridge Design

The supporting ridge cross section should meet the configuration and requirements of Figure DV-2.

The side slopes should be no steeper than 2:1. Side slopes should be flatter, 5:1 to 10:1, when the diversion is to be permanent with mowing and other maintenance activities performed on or around it.

The width of the ridge at the design water elevation should be a minimum of 4 feet. The minimum freeboard should be 0.3 foot.

The design should include a 10% settlement factor.

Outlet

Diversions should have adequate outlets which will convey concentrated runoff without erosion. Acceptable outlets include practices such as Grassed Swale, Lined Swale, Drop Structure, Sediment Basin, and Stormwater Detention Basins.

Stabilization

Unless otherwise stabilized, the ridge and channel should be seeded within 14 days of installation in accordance with the Permanent Seeding or Temporary Seeding (whichever is applicable) practices.

Diversion Design

Table DV-1 through DV-16 may be used to facilitate the design of grass-lined diversions with parabolic cross sections. These tables are based on a retardance of "D" (vegetation newly cut) to determine V_1 for stability considerations. To determine channel capacity, choose a retardance of "C" when proper maintenance is expected; otherwise, design channel capacity based on retardance "B". Refer to Table DV-2 for maximum permissible velocities. The permissible velocities guide the selection of V_1 and should not be exceeded. It is good practice to use a value for V_1 that is significantly less than the maximum allowable when choosing a design cross section. When velocities approach the maximum allowable, flatter grades should be evaluated or a more erosion resistant liner such as riprap should be considered. After the diversion dimensions are selected in the design tables, the top width should be increased by 4 feet, and the depth by 0.3 foot, for freeboard.

Example Problem

Given

Q: 30 cfs
 Grade: 1%
 Soil: Sandy clay loam Condition of vegetation expected: fair
 Maintenance: low; will be cut only twice a year.
 Site will allow a top width of 26 feet.

Find

Diversion top width and depth that will be stable and fit site conditions.

Solution

From Table DV-2 use maximum permissible velocity of 3.0 ft./sec.

Since maintenance will be low use "B" retardance for capacity.

From Table DV-4 use retardance "D" and "B";
 grade 1% Top width = 21.0 feet + 4 feet = 25.0 feet.

Depth = 1.6 feet + 0.3 foot = 1.9 feet.

$V_2 = 1.3$ ft./sec.

Note: $V_1 < 3.0$ ft./sec.; Top width < 26 feet., design O.K.

Note: It is good practice to select a cross section that will give a velocity, V_1 , well below the maximum allowable whenever site conditions permit. Wide, shallow cross sections are more stable and require less maintenance. It is always prudent to evaluate flatter design grades in order to best fit diversions to the site and keep velocities well below maximum allowable.

Table DV-4
Parabolic Diversion Design Chart (Retardance "D" and "B",
Grade 1.00%)

V1 FOR RETARDANCE "D", TOP WIDTH (T), DEPTH (D), AND V2 FOR RETARDANCE "B"
Grade 1.00 Percent

Q, CFS	V1=2.0			V1=2.5			V1=3.0			V1=3.5			V1=4.0			V1=4.5			V1=5.0			V1=5.5			V1=6.0				
	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2		
5																													
10	9.7	1.6	1.0	8.2	2.0	1.2																							
15	14.8	1.9	1.0	10.2	1.7	1.3	6.5	2.2	1.5																				
20	20.2	1.5	1.0	13.8	1.7	1.3	9.0	1.9	1.8																				
25	25.1	1.5	1.0	17.4	1.7	1.3	12.2	1.8	1.8	8.5	2.2	2.0																	
30	30.1	1.5	1.0	21.0	1.8	1.3	14.9	1.8	1.7	10.8	2.1	2.1																	
35	35.1	1.5	1.0	24.7	1.8	1.3	17.5	1.8	1.7	12.6	2.0	2.1	8.9	2.4	2.5														
40	40.1	1.5	1.0	28.2	1.8	1.3	20.0	1.8	1.7	14.5	2.0	2.1	10.5	2.3	2.5														
45	45.1	1.5	1.0	31.7	1.8	1.3	22.5	1.8	1.7	16.4	2.0	2.1	12.1	2.2	2.5	8.2	2.8	2.9											
50	50.2	1.5	1.0	35.2	1.8	1.3	25.4	1.8	1.7	18.3	2.0	2.1	13.8	2.2	2.5	10.0	2.6	2.9											
55	55.2	1.5	1.0	38.8	1.8	1.3	27.9	1.8	1.7	20.3	1.9	2.1	15.1	2.2	2.5	11.2	2.5	3.0											
60	60.2	1.5	1.0	42.3	1.8	1.3	30.4	1.8	1.7	22.2	1.9	2.1	16.6	2.1	2.5	12.4	2.4	3.0											
65	65.2	1.5	1.0	45.8	1.8	1.3	32.9	1.8	1.7	24.0	1.9	2.1	18.0	2.1	2.5	13.6	2.4	3.0	8.9	3.1	3.5								
70	70.2	1.5	1.0	49.3	1.8	1.3	35.5	1.8	1.7	25.9	1.9	2.1	19.5	2.1	2.6	14.8	2.4	3.0	10.8	2.8	3.5								
75	75.2	1.5	1.0	52.8	1.8	1.3	38.0	1.8	1.7	28.2	1.9	2.1	20.9	2.1	2.6	16.0	2.3	3.0	11.6	2.8	3.5								
80	80.2	1.5	1.0	56.3	1.8	1.3	40.5	1.8	1.7	30.0	1.9	2.1	22.3	2.1	2.6	17.1	2.3	3.0	12.5	2.7	3.5								
85	85.2	1.5	1.0	59.8	1.8	1.3	43.0	1.8	1.7	31.9	1.9	2.1	23.7	2.1	2.6	18.3	2.3	3.0	13.5	2.7	3.5	6.8	3.3	3.9					
90	90.2	1.5	1.0	63.3	1.8	1.3	45.6	1.8	1.7	33.6	1.9	2.1	25.2	2.1	2.6	19.4	2.3	3.1	14.4	2.8	3.6	10.8	3.1	3.9					
95	95.2	1.5	1.0	66.9	1.8	1.3	48.1	1.8	1.7	35.5	1.9	2.1	26.6	2.1	2.6	20.5	2.3	3.1	15.3	2.8	3.6	12.0	3.0	3.9					
100	100.2	1.5	1.0	70.4	1.8	1.3	50.8	1.8	1.7	37.4	1.9	2.1	28.0	2.1	2.6	21.6	2.3	3.1	16.2	2.8	3.6	12.9	2.9	4.0					
105	105.3	1.5	1.0	73.9	1.8	1.3	53.1	1.8	1.7	39.2	1.9	2.1	29.8	2.1	2.6	22.8	2.3	3.1	17.1	2.8	3.6	13.7	2.9	4.0	10.8	3.4	4.3		
110	110.3	1.5	1.0	77.4	1.8	1.3	55.7	1.8	1.7	41.1	1.9	2.1	31.3	2.1	2.6	23.9	2.3	3.1	18.0	2.8	3.6	14.4	2.9	4.0	12.0	3.2	4.3		
115	115.3	1.5	1.0	80.9	1.8	1.3	58.2	1.8	1.7	42.9	1.9	2.1	32.7	2.1	2.6	25.0	2.3	3.1	18.9	2.8	3.6	15.2	2.8	4.0	12.7	3.2	4.3		
120	120.3	1.5	1.0	84.4	1.8	1.3	60.7	1.8	1.7	44.8	1.9	2.1	34.1	2.1	2.6	26.1	2.3	3.1	19.7	2.8	3.6	16.0	2.8	4.0	13.4	3.1	4.3		
125	125.3	1.5	1.0	88.0	1.8	1.3	63.2	1.8	1.7	46.7	1.9	2.1	35.5	2.1	2.6	27.2	2.2	3.1	20.6	2.8	3.6	16.8	2.8	4.0	14.1	3.1	4.3		
130	130.3	1.5	1.0	91.5	1.8	1.3	65.8	1.8	1.7	48.5	1.9	2.1	36.9	2.1	2.6	28.4	2.2	3.1	21.5	2.8	3.6	17.4	2.8	4.0	14.8	3.1	4.3		
135	135.3	1.5	1.0	95.0	1.8	1.3	68.3	1.8	1.7	50.4	1.9	2.1	38.3	2.1	2.6	29.5	2.2	3.1	22.4	2.8	3.6	18.2	2.8	4.0	15.5	3.0	4.3		
140	140.3	1.5	1.0	98.5	1.8	1.3	70.8	1.8	1.7	52.2	1.9	2.1	39.7	2.0	2.6	30.6	2.2	3.1	23.2	2.8	3.6	18.9	2.7	4.0	16.1	3.0	4.4		
145	145.3	1.5	1.0	102.0	1.8	1.3	73.3	1.8	1.7	54.1	1.9	2.1	41.1	2.0	2.6	32.1	2.2	3.0	24.1	2.8	3.6	19.7	2.7	4.0	16.8	3.0	4.4		
150	150.3	1.5	1.0	105.5	1.8	1.3	75.9	1.8	1.7	56.0	1.9	2.1	42.5	2.0	2.6	33.2	2.2	3.0	25.0	2.8	3.6	20.4	2.7	4.1	17.5	2.9	4.4		

RETARDANCE "D" AND "B"

NOTE: Width and Depth dimensions are in feet; Velocity measurements are in feet per second;
Depth "D" does not include allowance for freeboard or settlement.

Table Dv-6 Parabolic Diversion Design Chart (Retardance "D" and "B", Grade 4.00%)

V1 FOR RETARDANCE "D", TOP WIDTH (T), DEPTH (D), AND V2 FOR RETARDANCE "B"

Grade 4.00 Percent

Q CFS	V1=2.0			V1=3.0			V1=3.5			V1=4.0			V1=4.5			V1=5.0			V1=6.0		
	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2
5	10.1	0.9	0.9	7.0	1.0	1.1	4.9	1.1	1.1												
10	20.0	0.9	0.8	14.4	0.8	1.1	10.3	1.0	1.1	7.9	1.1	1.1	6.1	1.2	2.1	4.6	1.4	2.4			
15	30.7	0.9	0.8	21.5	0.9	1.1	15.1	1.0	1.1	12.0	1.1	1.1	8.4	1.1	2.1	7.4	1.2	2.5	8.6	1.4	2.5
20	40.9	0.9	0.8	28.6	0.9	1.3	20.9	1.0	1.1	16.3	1.0	1.3	12.8	1.1	2.1	10.1	1.2	2.6	8.6	1.3	2.6
25	51.7	0.8	0.8	35.6	0.8	1.3	27.1	1.0	1.1	20.3	1.0	1.3	16.0	1.1	2.1	12.7	1.2	2.6	10.3	1.3	2.6
30	62.5	0.8	0.8	42.5	0.8	1.3	33.8	1.0	1.1	24.4	1.0	1.3	19.2	1.1	2.1	15.2	1.2	2.6	12.5	1.3	2.9
35	73.6	0.8	0.8	49.7	0.8	1.3	40.8	1.0	1.1	28.3	1.0	1.3	22.4	1.1	2.1	18.0	1.2	2.6	14.4	1.2	2.9
40	84.8	0.8	0.8	57.2	0.8	1.3	47.8	1.0	1.3	32.4	1.0	1.3	25.6	1.1	2.1	20.6	1.2	2.6	16.5	1.2	2.9
45	96.0	0.8	0.8	64.4	0.8	1.3	54.9	1.0	1.3	36.4	1.0	1.3	28.8	1.1	2.1	23.1	1.2	2.6	18.9	1.2	2.9
50	107.2	0.8	0.8	71.5	0.8	1.3	62.2	1.0	1.3	40.5	1.0	1.3	32.0	1.1	2.1	25.7	1.2	2.6	20.9	1.2	2.9
55	118.4	0.8	0.8	78.7	0.8	1.3	69.8	1.0	1.3	44.8	1.0	1.3	35.2	1.1	2.1	28.2	1.2	2.6	23.0	1.2	2.9
60	129.8	0.8	0.8	85.8	0.8	1.3	77.7	1.0	1.3	49.3	1.0	1.3	38.4	1.1	2.2	30.8	1.2	2.6	25.1	1.2	2.9
65	142.8	0.8	0.8	93.0	0.8	1.3	87.0	1.0	1.3	53.9	1.0	1.3	41.6	1.1	2.2	33.4	1.2	2.6	27.2	1.2	2.9
70	154.1	0.8	0.8	100.1	0.8	1.3	97.1	1.0	1.3	58.7	1.0	1.3	44.7	1.1	2.2	35.8	1.2	2.6	29.2	1.2	2.9
75	165.3	0.8	0.8	107.3	0.8	1.3	107.3	1.0	1.3	63.7	1.0	1.3	47.9	1.1	2.2	38.5	1.2	2.6	31.3	1.2	2.9
80	176.0	0.8	0.8	114.4	0.8	1.3	118.6	1.0	1.3	69.7	1.0	1.3	51.1	1.1	2.2	41.0	1.2	2.6	33.4	1.2	2.9
85	187.0	0.8	0.8	121.5	0.8	1.3	130.0	1.0	1.3	74.3	1.0	1.3	54.3	1.1	2.2	43.6	1.2	2.6	35.5	1.2	2.9
90	198.0	0.8	0.8	129.7	0.8	1.3	141.0	1.0	1.3	79.2	1.0	1.3	57.5	1.1	2.2	46.2	1.2	2.6	37.6	1.2	2.9
95	194.1	0.8	0.8	136.9	0.8	1.3	152.2	1.0	1.3	84.3	1.0	1.3	60.7	1.1	2.2	48.7	1.2	2.6	39.7	1.2	2.9
100	204.4	0.8	0.8	143.0	0.8	1.3	164.4	1.0	1.3	89.9	1.0	1.3	63.9	1.1	2.2	51.3	1.2	2.6	41.7	1.2	2.9
105	214.8	0.8	0.8	149.2	0.8	1.3	176.8	1.0	1.3	95.0	1.0	1.3	67.1	1.1	2.2	53.9	1.2	2.6	43.6	1.2	2.9
110	224.8	0.8	0.8	157.4	0.8	1.3	189.8	1.0	1.3	100.0	1.0	1.3	70.3	1.1	2.2	56.4	1.2	2.6	45.6	1.2	2.9
115	233.0	0.8	0.8	164.5	0.8	1.3	201.1	1.0	1.3	105.0	1.0	1.3	73.5	1.1	2.2	59.0	1.2	2.6	47.5	1.2	2.9
120	243.2	0.8	0.8	171.7	0.8	1.3	212.3	1.0	1.3	110.1	1.0	1.3	76.7	1.1	2.2	61.5	1.2	2.6	49.9	1.2	2.9
125	253.5	0.8	0.8	179.8	0.8	1.3	223.8	1.0	1.3	115.1	1.0	1.3	79.8	1.1	2.2	64.1	1.2	2.6	52.0	1.2	2.9
130	263.7	0.8	0.8	188.0	0.8	1.3	235.5	1.0	1.3	120.1	1.0	1.3	83.0	1.1	2.2	66.7	1.2	2.6	54.1	1.2	2.9
135	273.9	0.8	0.8	197.1	0.8	1.3	247.0	1.0	1.3	125.2	1.0	1.3	86.2	1.1	2.2	69.2	1.2	2.6	56.1	1.2	2.9
140	283.1	0.8	0.8	206.3	0.8	1.3	258.2	1.0	1.3	131.2	1.0	1.3	89.4	1.1	2.2	71.8	1.2	2.6	58.2	1.2	2.9
145	293.5	0.8	0.8	207.4	0.8	1.3	251.4	1.0	1.3	117.3	1.0	1.3	82.8	1.1	2.2	74.4	1.2	2.6	60.3	1.2	2.9
150	303.5	0.8	0.8	214.6	0.8	1.3	258.7	1.0	1.3	121.3	1.0	1.3	84.3	1.1	2.2	76.9	1.2	2.6	62.4	1.2	2.9

RETARDANCE "D" AND "B"

NOTE: Width and Depth dimensions are in feet. Velocity measurements are in feet per second;
Depth "D" does not include allowance for freeboard or settlement.

Table DV-8 Parabolic Diversion Design Chart (Retardance "D" and "B", Grade 8.00%)

V1 FOR RETARDANCE "D", TOP WIDTH (T), DEPTH (D), AND V2 FOR RETARDANCE "B"
Grade 8.00 Percent

Q, CFB	V1=20			V1=30			V1=40			V1=50			V1=60			V1=80			V1=100		
	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2
1	14.0	0.7	0.1	15.1	0.7	1.0	16.2	0.8	1.3	17.3	0.8	1.6	18.4	0.9	1.9	19.5	1.0	2.1	20.6	1.1	2.3
10	24.0	0.7	0.5	26.1	0.7	1.0	28.2	0.8	1.3	30.3	0.8	1.6	32.4	0.9	1.9	34.5	1.0	2.1	36.6	1.1	2.3
15	41.9	0.7	0.9	46.1	0.7	1.0	50.2	0.8	1.3	54.3	0.8	1.6	58.4	0.9	1.9	62.5	1.0	2.1	66.6	1.1	2.3
20	64.8	0.7	0.9	70.1	0.7	1.0	76.2	0.8	1.3	82.3	0.8	1.6	88.4	0.9	1.9	94.5	1.0	2.1	100.6	1.1	2.3
25	92.9	0.7	0.9	100.1	0.7	1.0	108.2	0.8	1.3	116.3	0.8	1.6	124.4	0.9	1.9	132.5	1.0	2.1	140.6	1.1	2.3
30	124.0	0.7	0.9	133.1	0.7	1.0	142.2	0.8	1.3	151.3	0.8	1.6	160.4	0.9	1.9	169.5	1.0	2.1	178.6	1.1	2.3
35	158.0	0.7	0.9	168.1	0.7	1.0	178.2	0.8	1.3	188.3	0.8	1.6	198.4	0.9	1.9	208.5	1.0	2.1	218.6	1.1	2.3
40	194.0	0.7	0.9	205.1	0.7	1.0	216.2	0.8	1.3	227.3	0.8	1.6	238.4	0.9	1.9	249.5	1.0	2.1	260.6	1.1	2.3
45	232.0	0.7	0.9	244.1	0.7	1.0	256.2	0.8	1.3	268.3	0.8	1.6	280.4	0.9	1.9	292.5	1.0	2.1	304.6	1.1	2.3
50	272.0	0.7	0.9	285.1	0.7	1.0	298.2	0.8	1.3	311.3	0.8	1.6	324.4	0.9	1.9	337.5	1.0	2.1	350.6	1.1	2.3
55	314.0	0.7	0.9	328.1	0.7	1.0	342.2	0.8	1.3	356.3	0.8	1.6	370.4	0.9	1.9	384.5	1.0	2.1	398.6	1.1	2.3
60	358.0	0.7	0.9	373.1	0.7	1.0	388.2	0.8	1.3	403.3	0.8	1.6	418.4	0.9	1.9	433.5	1.0	2.1	448.6	1.1	2.3
65	404.0	0.7	0.9	420.1	0.7	1.0	436.2	0.8	1.3	452.3	0.8	1.6	468.4	0.9	1.9	484.5	1.0	2.1	500.6	1.1	2.3
70	452.0	0.7	0.9	469.1	0.7	1.0	488.2	0.8	1.3	507.3	0.8	1.6	526.4	0.9	1.9	545.5	1.0	2.1	564.6	1.1	2.3
75	502.0	0.7	0.9	520.1	0.7	1.0	540.2	0.8	1.3	560.3	0.8	1.6	580.4	0.9	1.9	600.5	1.0	2.1	620.6	1.1	2.3
80	554.0	0.7	0.9	573.1	0.7	1.0	594.2	0.8	1.3	614.3	0.8	1.6	634.4	0.9	1.9	654.5	1.0	2.1	674.6	1.1	2.3
85	608.0	0.7	0.9	628.1	0.7	1.0	648.2	0.8	1.3	668.3	0.8	1.6	688.4	0.9	1.9	708.5	1.0	2.1	728.6	1.1	2.3
90	664.0	0.7	0.9	685.1	0.7	1.0	706.2	0.8	1.3	727.3	0.8	1.6	748.4	0.9	1.9	769.5	1.0	2.1	790.6	1.1	2.3
95	722.0	0.7	0.9	744.1	0.7	1.0	766.2	0.8	1.3	788.3	0.8	1.6	810.4	0.9	1.9	832.5	1.0	2.1	854.6	1.1	2.3
100	782.0	0.7	0.9	805.1	0.7	1.0	828.2	0.8	1.3	851.3	0.8	1.6	874.4	0.9	1.9	897.5	1.0	2.1	920.6	1.1	2.3
105	844.0	0.7	0.9	868.1	0.7	1.0	892.2	0.8	1.3	916.3	0.8	1.6	940.4	0.9	1.9	964.5	1.0	2.1	988.6	1.1	2.3
110	908.0	0.7	0.9	933.1	0.7	1.0	958.2	0.8	1.3	983.3	0.8	1.6	1008.4	0.9	1.9	1033.5	1.0	2.1	1058.6	1.1	2.3
115	974.0	0.7	0.9	1000.1	0.7	1.0	1027.2	0.8	1.3	1054.3	0.8	1.6	1081.4	0.9	1.9	1108.5	1.0	2.1	1135.6	1.1	2.3
120	1042.0	0.7	0.9	1069.1	0.7	1.0	1097.2	0.8	1.3	1126.3	0.8	1.6	1155.4	0.9	1.9	1184.5	1.0	2.1	1213.6	1.1	2.3
125	1112.0	0.7	0.9	1140.1	0.7	1.0	1169.2	0.8	1.3	1199.3	0.8	1.6	1229.4	0.9	1.9	1259.5	1.0	2.1	1289.6	1.1	2.3
130	1184.0	0.7	0.9	1213.1	0.7	1.0	1244.2	0.8	1.3	1275.3	0.8	1.6	1306.4	0.9	1.9	1337.5	1.0	2.1	1368.6	1.1	2.3
135	1258.0	0.7	0.9	1288.1	0.7	1.0	1320.2	0.8	1.3	1352.3	0.8	1.6	1384.4	0.9	1.9	1416.5	1.0	2.1	1448.6	1.1	2.3
140	1334.0	0.7	0.9	1365.1	0.7	1.0	1398.2	0.8	1.3	1431.3	0.8	1.6	1464.4	0.9	1.9	1497.5	1.0	2.1	1530.6	1.1	2.3
145	1412.0	0.7	0.9	1444.1	0.7	1.0	1478.2	0.8	1.3	1512.3	0.8	1.6	1546.4	0.9	1.9	1580.5	1.0	2.1	1614.6	1.1	2.3
150	1492.0	0.7	0.9	1525.1	0.7	1.0	1560.2	0.8	1.3	1595.3	0.8	1.6	1630.4	0.9	1.9	1665.5	1.0	2.1	1700.6	1.1	2.3
155	1574.0	0.7	0.9	1608.1	0.7	1.0	1645.2	0.8	1.3	1681.3	0.8	1.6	1717.4	0.9	1.9	1753.5	1.0	2.1	1789.6	1.1	2.3
160	1658.0	0.7	0.9	1693.1	0.7	1.0	1732.2	0.8	1.3	1769.3	0.8	1.6	1806.4	0.9	1.9	1843.5	1.0	2.1	1880.6	1.1	2.3
165	1744.0	0.7	0.9	1780.1	0.7	1.0	1818.2	0.8	1.3	1857.3	0.8	1.6	1896.4	0.9	1.9	1935.5	1.0	2.1	1974.6	1.1	2.3
170	1832.0	0.7	0.9	1868.1	0.7	1.0	1907.2	0.8	1.3	1947.3	0.8	1.6	1987.4	0.9	1.9	2027.5	1.0	2.1	2067.6	1.1	2.3

RETARDANCE "D" AND "B"

NOTE: Width and Depth Dimensions are in feet. Velocity measurements are in feet per second;
Depth "D" does not include allowance for freeboard or overfillment.

Table DV-10 Parabolic Diversion Design Chart (Retardance "D" and "C", Grade .50%)

Grade .50 Percent

V1 FOR RETARDANCE "D", TOP WIDTH (T), DEPTH (D), AND V2 FOR RETARDANCE "C"

NOTE: Width and Depth dimensions are in feet. Velocity measurements are in feet per second.

RETARDANCE "D" AND "C"

Q	V1=25		V1=30		V1=35		V1=40		V1=45		V1=50		V1=55		V1=60	
	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D
150	01.3	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
145	01.2	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
140	01.1	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
135	01.1	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
130	01.0	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
125	01.0	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
120	00.9	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
115	00.9	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
110	00.8	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
105	00.8	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
100	00.8	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
95	00.7	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
90	00.7	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
85	00.7	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
80	00.6	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
75	00.6	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
70	00.6	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
65	00.5	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
60	00.5	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
55	00.5	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
50	00.4	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
45	00.4	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
40	00.4	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
35	00.3	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
30	00.3	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
25	00.3	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
20	00.2	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
15	00.2	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
10	00.1	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5
5	00.1	1.4	1.7	1.7	2.0	2.0	2.3	2.3	2.6	2.6	2.9	2.9	3.2	3.2	3.5	3.5

Table DV-12 Parabolic Diversion Design Chart (Retardance "D" and "C", Grade 2.00%)

V1 FOR RETARDANCE "D", TOP WIDTH (T), DEPTH (D), AND V2 FOR RETARDANCE "C"
Grade 2.00 Percent

Q cfs	V1=2.0			V1=2.5			V1=3.0			V1=3.5			V1=4.0			V1=4.5			V1=5.0			V1=5.5			V1=6.0		
	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2
5	0.0	0.0	1.0																								
10	12.4	0.0	1.5	8.1	0.0	2.0	5.9	1.0	2.8																		
15	16.6	0.0	1.5	12.3	0.0	2.0	8.3	1.0	2.9	6.0	1.1	3.0	4.7	1.4	3.6												
20	24.7	0.0	1.5	18.7	0.0	2.0	12.6	1.0	2.5	8.4	1.1	3.0	7.0	1.2	3.6	4.7	1.5	4.1									
25	30.0	0.0	1.5	20.8	0.0	2.0	15.9	1.0	2.4	11.6	1.1	3.0	8.0	1.2	3.6	6.6	1.3	4.1									
30	37.0	0.0	1.5	25.0	0.0	2.0	18.0	1.0	2.6	14.3	1.1	3.0	11.0	1.2	3.9	8.5	1.3	4.1	8.4	1.3	4.7						
35	43.2	0.0	1.5	29.1	0.0	2.0	22.2	1.0	2.5	18.9	1.0	3.0	12.9	1.1	3.5	10.1	1.3	4.1	7.2	1.4	4.7						
40	49.5	0.0	1.5	33.3	0.0	2.0	25.3	1.0	2.5	19.3	1.0	3.0	14.8	1.1	3.5	11.8	1.3	4.1	9.1	1.4	4.7	7.1	1.6	5.2			
45	55.6	0.0	1.5	37.4	0.0	2.0	28.5	1.0	2.5	21.7	1.0	3.0	16.7	1.1	3.5	13.1	1.3	4.1	10.4	1.4	4.7	8.2	1.6	5.2			
50	61.7	0.0	1.5	41.6	0.0	2.0	31.7	1.0	2.5	24.1	1.0	3.0	18.8	1.1	3.5	14.7	1.2	4.1	11.7	1.4	4.7	9.3	1.6	5.2	7.1	1.6	5.8
55	67.8	0.0	1.5	45.7	0.0	2.0	34.8	1.0	2.5	26.6	1.0	3.0	20.7	1.1	3.6	16.2	1.2	4.1	12.9	1.4	4.7	10.4	1.5	5.3	8.2	1.7	6.4
60	74.0	0.0	1.5	49.9	0.0	2.0	38.0	1.0	2.5	29.0	1.0	3.0	22.6	1.1	3.6	17.7	1.2	4.1	14.1	1.4	4.7	11.4	1.5	5.3	9.2	1.7	6.9
65	80.2	0.0	1.5	54.0	0.0	2.0	41.1	1.0	2.5	31.4	1.0	3.0	24.5	1.1	3.6	19.5	1.2	4.1	15.4	1.3	4.7	12.4	1.5	5.3	10.1	1.7	6.8
70	86.3	0.0	1.5	58.2	0.0	2.0	44.3	1.0	2.5	33.8	1.0	3.0	26.3	1.1	3.6	21.0	1.2	4.1	16.6	1.3	4.7	13.5	1.5	5.3	11.0	1.6	6.6
75	92.5	0.0	1.5	62.3	0.0	2.0	47.5	1.0	2.5	36.2	1.0	3.0	28.2	1.1	3.6	22.4	1.2	4.1	17.8	1.3	4.7	14.5	1.5	5.3	11.8	1.6	6.8
80	98.7	0.0	1.5	66.5	0.0	2.0	50.6	1.0	2.5	39.6	1.0	3.0	30.1	1.1	3.6	23.8	1.2	4.1	19.0	1.3	4.7	15.5	1.5	5.3	12.7	1.6	6.6
85	104.8	0.0	1.5	70.6	0.0	2.0	53.8	1.0	2.5	41.0	1.0	3.0	32.0	1.1	3.6	25.4	1.2	4.1	20.5	1.3	4.7	16.5	1.5	5.3	13.6	1.6	6.9
90	111.0	0.0	1.5	74.8	0.0	2.0	57.0	1.0	2.5	43.4	1.0	3.0	33.8	1.1	3.6	26.9	1.2	4.1	21.0	1.3	4.6	17.5	1.5	5.3	14.4	1.6	6.8
95	117.2	0.0	1.5	78.9	0.0	2.0	60.1	1.0	2.5	45.8	1.0	3.0	35.7	1.1	3.6	28.4	1.2	4.1	21.0	1.3	4.6	18.5	1.5	5.3	15.3	1.6	6.8
100	123.3	0.0	1.5	83.1	0.0	2.0	63.3	1.0	2.5	48.2	1.0	3.0	37.6	1.1	3.6	29.9	1.2	4.1	24.2	1.3	4.6	19.6	1.5	5.3	16.2	1.6	6.8
105	129.5	0.0	1.5	87.3	0.0	2.0	66.4	1.0	2.5	50.6	1.0	3.0	39.5	1.1	3.6	31.4	1.2	4.1	25.4	1.3	4.6	20.6	1.5	5.3	17.0	1.6	6.8
110	135.7	0.0	1.5	91.4	0.0	2.0	69.6	1.0	2.5	53.0	1.0	3.0	41.3	1.1	3.6	32.8	1.2	4.1	26.8	1.3	4.7	21.6	1.4	5.3	17.9	1.6	6.8
115	141.9	0.0	1.5	95.6	0.0	2.0	72.8	1.0	2.5	55.4	1.0	3.0	43.2	1.1	3.6	34.4	1.2	4.1	27.9	1.3	4.7	22.6	1.4	5.3	18.7	1.6	6.8
120	148.0	0.0	1.5	99.7	0.0	2.0	75.9	1.0	2.5	57.9	1.0	3.0	45.1	1.1	3.6	35.9	1.2	4.1	29.1	1.3	4.7	23.9	1.4	5.2	19.5	1.6	6.6
125	154.1	0.0	1.5	103.9	0.0	2.0	79.1	1.0	2.5	60.3	1.0	3.0	47.0	1.1	3.6	37.4	1.2	4.1	30.3	1.3	4.7	24.8	1.4	5.2	20.4	1.6	6.6
130	160.3	0.0	1.5	108.0	0.0	2.0	82.3	1.0	2.5	62.7	1.0	3.0	48.8	1.1	3.6	38.9	1.2	4.1	31.5	1.3	4.7	25.8	1.4	5.3	21.2	1.6	6.6
135	166.5	0.0	1.5	112.2	0.0	2.0	85.4	1.0	2.5	65.1	1.0	3.0	50.7	1.1	3.6	40.3	1.2	4.1	32.7	1.3	4.7	26.8	1.4	5.3	22.1	1.6	6.6
140	172.6	0.0	1.5	116.3	0.0	2.0	88.6	1.0	2.5	67.5	1.0	3.0	52.6	1.1	3.6	41.8	1.2	4.1	33.9	1.3	4.7	27.6	1.4	5.3	22.9	1.6	6.6
145	178.8	0.0	1.5	120.5	0.0	2.0	91.8	1.0	2.5	69.9	1.0	3.0	54.5	1.1	3.6	43.3	1.2	4.1	35.1	1.3	4.7	28.6	1.4	5.3	23.7	1.6	6.6
150	185.0	0.0	1.5	124.6	0.0	2.0	94.9	1.0	2.5	72.3	1.0	3.0	56.4	1.1	3.6	44.8	1.2	4.1	36.3	1.3	4.7	29.5	1.4	5.3	24.6	1.6	6.6

RETARDANCE "D" AND "C"

NOTE: Width and Depth dimensions are in feet; Velocity measurements are in feet per second;
Depth "D" does not include allowance for freeboard or settlement.

V1 FOR RETARDANCE "D", TOP WIDTH (T), DEPTH (D), AND V2 FOR RETARDANCE "C"

Grade 6.00 Percent

Q CFS	V1=2.0			V1=2.5			V1=3.0			V1=3.5			V1=4.0			V1=4.5			V1=5.0			V1=5.5			V1=6.0		
	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2
5	10.6	0.5	1.3	7.3	0.5	1.8	5.3	0.5	2.3	4.0	0.7	2.8	2.9	0.8	3.2												
10	21.1	0.6	1.3	14.7	0.6	1.8	10.9	0.6	2.3	8.4	0.7	2.8	6.6	0.7	3.2	5.3	0.8	3.8	4.2	0.8	4.3						
15	31.8	0.6	1.3	22.1	0.6	1.8	16.3	0.6	2.3	12.7	0.8	2.7	10.1	0.7	3.3	8.2	0.7	3.8	6.6	0.8	4.3	5.4	0.9	4.9	4.3	1.0	5.5
20	42.1	0.5	1.3	29.5	0.6	1.8	21.7	0.6	2.3	17.0	0.8	2.7	13.6	0.7	3.2	11.1	0.7	3.7	9.0	0.8	4.3	7.4	0.8	4.9	6.1	0.9	5.5
25	52.7	0.5	1.3	36.8	0.6	1.8	27.1	0.6	2.3	21.2	0.6	2.8	17.0	0.7	3.2	13.9	0.7	3.8	11.3	0.8	4.3	9.3	0.8	4.9	7.8	0.9	5.5
30	63.2	0.5	1.3	44.2	0.6	1.8	32.5	0.6	2.3	25.4	0.6	2.8	20.4	0.7	3.2	16.8	0.7	3.8	13.7	0.8	4.3	11.3	0.8	4.9	9.4	0.9	5.5
35	73.7	0.5	1.3	51.6	0.6	1.8	38.0	0.6	2.3	29.7	0.6	2.8	23.8	0.7	3.2	19.4	0.7	3.8	16.0	0.8	4.3	13.4	0.8	4.9	11.1	0.9	5.5
40	84.2	0.5	1.3	58.9	0.6	1.8	43.4	0.6	2.3	33.9	0.6	2.8	27.2	0.7	3.3	22.2	0.7	3.8	18.3	0.8	4.3	15.3	0.8	4.9	12.7	0.9	5.5
45	94.8	0.5	1.3	66.3	0.6	1.8	48.8	0.6	2.3	38.2	0.6	2.8	30.7	0.7	3.3	24.9	0.7	3.8	20.6	0.8	4.3	17.2	0.8	4.9	14.5	0.9	5.4
50	105.3	0.5	1.3	73.6	0.6	1.8	54.2	0.6	2.3	42.4	0.6	2.8	34.1	0.7	3.3	27.7	0.7	3.8	22.8	0.8	4.3	19.1	0.8	4.9	16.1	0.9	5.4
55	115.8	0.5	1.3	81.0	0.6	1.8	59.7	0.6	2.3	46.6	0.6	2.8	37.5	0.7	3.3	30.5	0.7	3.8	25.1	0.8	4.3	21.0	0.8	4.9	17.7	0.9	5.4
60	126.4	0.5	1.3	88.4	0.6	1.8	65.1	0.6	2.3	50.9	0.6	2.8	40.9	0.7	3.3	33.3	0.7	3.8	27.4	0.8	4.3	22.9	0.8	4.9	19.3	0.9	5.4
65	136.9	0.5	1.3	95.7	0.6	1.8	70.5	0.6	2.3	55.1	0.6	2.8	44.3	0.7	3.3	36.0	0.7	3.8	29.7	0.8	4.3	24.8	0.8	4.9	20.9	0.9	5.4
70	147.4	0.5	1.3	103.1	0.6	1.8	75.9	0.6	2.3	59.3	0.6	2.8	47.7	0.7	3.3	38.8	0.7	3.8	32.0	0.8	4.3	26.7	0.8	4.9	22.5	0.9	5.4
75	158.0	0.5	1.3	110.5	0.6	1.8	81.3	0.6	2.3	63.6	0.6	2.8	51.1	0.7	3.3	41.6	0.7	3.8	34.3	0.8	4.3	28.6	0.8	4.9	24.1	0.9	5.4
80	168.5	0.5	1.3	117.8	0.6	1.8	86.8	0.6	2.3	67.8	0.6	2.8	54.5	0.7	3.3	44.3	0.7	3.8	36.5	0.8	4.3	30.5	0.8	4.9	25.7	0.9	5.5
85	179.0	0.5	1.3	125.2	0.6	1.8	92.2	0.6	2.3	72.0	0.6	2.8	57.9	0.7	3.3	47.1	0.7	3.8	38.8	0.8	4.3	32.4	0.8	4.9	27.3	0.9	5.5
90	189.6	0.5	1.3	132.6	0.6	1.8	97.6	0.6	2.3	76.3	0.6	2.8	61.3	0.7	3.3	49.9	0.7	3.8	41.1	0.8	4.3	34.3	0.8	4.9	28.9	0.9	5.5
95	200.1	0.5	1.3	139.9	0.6	1.8	103.0	0.6	2.3	80.5	0.6	2.8	64.7	0.7	3.3	52.6	0.7	3.8	43.4	0.8	4.3	36.2	0.8	4.9	30.5	0.9	5.6
100	210.6	0.5	1.3	147.3	0.6	1.8	108.5	0.6	2.3	84.8	0.6	2.8	68.1	0.7	3.3	55.4	0.7	3.8	45.7	0.8	4.3	38.1	0.8	4.9	32.1	0.9	5.5
105	221.1	0.5	1.3	154.6	0.6	1.8	113.9	0.6	2.3	89.0	0.6	2.8	71.5	0.7	3.3	58.2	0.7	3.8	47.9	0.8	4.3	40.0	0.8	4.9	33.7	0.9	5.5
110	231.7	0.5	1.3	162.0	0.6	1.8	119.3	0.6	2.3	93.2	0.6	2.8	74.9	0.7	3.3	60.9	0.7	3.8	50.2	0.8	4.3	41.9	0.8	4.9	35.3	0.9	5.5
115	242.2	0.5	1.3	169.4	0.6	1.8	124.7	0.6	2.3	97.5	0.6	2.8	78.3	0.7	3.3	63.7	0.7	3.8	52.5	0.8	4.3	43.8	0.8	4.9	36.9	0.9	5.5
120	252.7	0.5	1.3	176.7	0.6	1.8	130.2	0.6	2.3	101.7	0.6	2.8	81.7	0.7	3.3	66.5	0.7	3.8	54.8	0.8	4.3	45.7	0.8	4.9	38.5	0.9	5.5
125	263.3	0.5	1.3	184.1	0.6	1.8	135.6	0.6	2.3	106.0	0.6	2.8	85.1	0.7	3.3	69.3	0.7	3.8	57.1	0.8	4.3	47.6	0.8	4.9	40.1	0.9	5.5
130	273.6	0.5	1.3	191.5	0.6	1.8	141.0	0.6	2.3	110.2	0.6	2.8	88.5	0.7	3.3	72.0	0.7	3.8	59.4	0.8	4.3	49.5	0.8	4.9	41.7	0.9	5.5
135	284.3	0.5	1.3	198.8	0.6	1.8	146.4	0.6	2.3	114.4	0.6	2.8	91.9	0.7	3.3	74.8	0.7	3.8	61.8	0.8	4.3	51.4	0.8	4.9	43.3	0.9	5.5
140	294.9	0.5	1.3	206.2	0.6	1.8	151.8	0.6	2.3	118.7	0.6	2.8	95.3	0.7	3.3	77.6	0.7	3.8	63.9	0.8	4.3	53.3	0.8	4.9	44.9	0.9	5.5
145	305.4	0.5	1.3	213.6	0.6	1.8	157.3	0.6	2.3	122.9	0.6	2.8	98.7	0.7	3.3	80.3	0.7	3.8	66.2	0.8	4.3	55.2	0.8	4.9	46.5	0.9	5.5
150	315.9	0.5	1.3	220.9	0.6	1.8	162.7	0.6	2.3	127.1	0.6	2.8	102.1	0.7	3.3	83.1	0.7	3.8	68.5	0.8	4.3	57.1	0.8	4.9	48.1	0.9	5.5

RETARDANCE "D" AND "C"

NOTE: Width and Depth dimensions are in feet; Velocity measurements are in feet per second;
Depth "D" does not include allowance for freeboard or settlement.

Table DV-14 Parabolic Diversion Design Chart (Retardance "D" and "C", Grade 6.00%)

V1 FOR RETARDANCE "D", TOP WIDTH (T), DEPTH (D), AND V2 FOR RETARDANCE "C"
Grade 10.00 Percent

Q, CFS	V1=2.0			V1=2.5			V1=3.0			V1=3.5			V1=4.0			V1=4.5			V1=5.0			V1=5.5			V1=6.0		
	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2	T	D	V2
5	13.3	0.4	1.3	1.4	0.5	1.7	0.5	0.5	2.2	5.3	0.5	2.5	4.1	0.5	3.2	3.4	0.5	3.5	2.6	0.7	4.1						
10	21.0	0.4	1.3	16.7	0.5	1.7	11.5	0.5	2.2	10.9	0.5	2.5	8.5	0.5	3.2	7.1	0.5	3.5	5.9	0.5	4.1	4.9	0.7	4.7	4.0	0.7	5.3
15	30.9	0.4	1.3	28.0	0.5	1.7	20.7	0.5	2.2	18.3	0.5	2.5	12.8	0.5	3.2	10.9	0.5	3.5	9.0	0.5	4.1	7.5	0.5	4.7	5.3	0.7	5.2
20	43.2	0.4	1.3	37.4	0.5	1.7	27.6	0.5	2.2	21.7	0.5	2.7	17.0	0.5	3.2	14.4	0.5	3.5	12.1	0.5	4.1	10.2	0.5	4.6	8.5	0.7	5.2
25	58.5	0.4	1.3	48.7	0.5	1.7	34.5	0.5	2.2	27.1	0.5	2.7	21.3	0.5	3.2	18.1	0.5	3.5	15.1	0.5	4.1	12.7	0.5	4.7	10.5	0.7	5.2
30	79.8	0.4	1.3	66.1	0.5	1.7	47.4	0.5	2.2	32.5	0.5	2.7	23.5	0.5	3.2	21.7	0.5	3.5	18.1	0.5	4.1	15.2	0.5	4.7	12.9	0.7	5.2
35	101.1	0.4	1.3	83.4	0.5	1.7	48.3	0.5	2.2	37.9	0.5	2.7	29.5	0.5	3.2	25.3	0.5	3.5	21.1	0.5	4.1	17.8	0.5	4.7	15.1	0.7	5.2
40	108.4	0.4	1.3	74.7	0.5	1.7	54.2	0.5	2.2	43.3	0.5	2.7	34.0	0.5	3.2	29.0	0.5	3.5	24.1	0.5	4.1	20.3	0.5	4.7	17.2	0.7	5.2
45	119.7	0.4	1.3	84.1	0.5	1.7	62.1	0.5	2.2	48.8	0.5	2.7	38.3	0.5	3.2	32.6	0.5	3.5	27.2	0.5	4.1	22.0	0.5	4.7	19.4	0.7	5.2
50	133.0	0.4	1.3	93.4	0.5	1.7	69.0	0.5	2.2	54.2	0.5	2.7	42.5	0.5	3.2	36.2	0.5	3.5	30.2	0.5	4.1	25.4	0.5	4.7	21.5	0.7	5.2
55	148.3	0.4	1.3	102.6	0.5	1.7	75.9	0.5	2.2	60.0	0.5	2.7	46.8	0.5	3.2	39.8	0.5	3.5	33.2	0.5	4.1	27.9	0.5	4.7	23.7	0.7	5.2
60	169.8	0.4	1.3	112.1	0.5	1.7	82.9	0.5	2.2	65.0	0.5	2.7	51.0	0.5	3.2	43.4	0.5	3.5	36.2	0.5	4.1	30.5	0.5	4.7	25.9	0.7	5.2
65	172.9	0.4	1.3	121.4	0.5	1.7	89.7	0.5	2.2	70.4	0.5	2.7	55.3	0.5	3.2	47.1	0.5	3.5	39.2	0.5	4.1	33.0	0.5	4.7	28.0	0.7	5.2
70	188.2	0.4	1.3	130.0	0.5	1.7	96.5	0.5	2.2	76.0	0.5	2.7	59.5	0.5	3.2	50.7	0.5	3.5	42.2	0.5	4.1	35.5	0.5	4.7	30.2	0.7	5.2
75	199.5	0.4	1.3	140.1	0.5	1.7	103.9	0.5	2.2	81.2	0.5	2.7	63.8	0.5	3.2	54.3	0.5	3.5	45.2	0.5	4.1	38.1	0.5	4.7	32.3	0.7	5.2
80	212.8	0.4	1.3	149.5	0.5	1.7	110.9	0.5	2.2	86.7	0.5	2.7	68.0	0.5	3.2	57.9	0.5	3.5	48.3	0.5	4.1	40.8	0.5	4.7	34.5	0.7	5.2
85	228.1	0.4	1.3	158.5	0.5	1.7	117.4	0.5	2.2	92.1	0.5	2.7	72.3	0.5	3.2	61.5	0.5	3.5	51.3	0.5	4.1	43.1	0.5	4.7	36.6	0.7	5.2
90	259.4	0.4	1.3	168.1	0.5	1.7	124.3	0.5	2.2	97.9	0.5	2.7	76.5	0.5	3.2	65.2	0.5	3.5	54.3	0.5	4.1	45.7	0.5	4.7	38.8	0.7	5.2
95	252.7	0.4	1.3	177.5	0.5	1.7	131.2	0.5	2.2	102.9	0.5	2.7	80.8	0.5	3.2	68.8	0.5	3.5	57.3	0.5	4.1	48.2	0.5	4.7	40.9	0.7	5.2
100	266.0	0.4	1.3	186.5	0.5	1.7	138.1	0.5	2.2	108.3	0.5	2.7	85.0	0.5	3.2	72.4	0.5	3.5	60.3	0.5	4.1	50.7	0.5	4.7	43.1	0.7	5.2
105	279.2	0.4	1.3	195.2	0.5	1.7	145.0	0.5	2.2	113.7	0.5	2.7	89.3	0.5	3.2	76.0	0.5	3.5	63.3	0.5	4.1	53.3	0.5	4.7	45.2	0.7	5.2
110	292.6	0.4	1.3	205.5	0.5	1.7	151.9	0.5	2.2	119.2	0.5	2.7	93.5	0.5	3.2	79.6	0.5	3.5	66.4	0.5	4.1	55.8	0.5	4.7	47.4	0.7	5.2
115	308.9	0.4	1.3	214.9	0.5	1.7	159.0	0.5	2.2	124.6	0.5	2.7	97.8	0.5	3.2	83.3	0.5	3.5	69.4	0.5	4.1	58.3	0.5	4.7	49.5	0.7	5.3
120	319.2	0.4	1.3	224.2	0.5	1.7	165.7	0.5	2.2	130.0	0.5	2.7	102.0	0.5	3.2	86.9	0.5	3.5	72.4	0.5	4.1	60.9	0.5	4.7	51.7	0.7	5.3
125	332.5	0.4	1.3	233.5	0.5	1.7	172.6	0.5	2.2	135.4	0.5	2.7	106.3	0.5	3.2	90.6	0.5	3.5	75.4	0.5	4.1	63.4	0.5	4.7	53.8	0.7	5.3
130	345.8	0.4	1.3	242.9	0.5	1.7	179.5	0.5	2.2	140.9	0.5	2.7	110.5	0.5	3.2	94.1	0.5	3.5	78.4	0.5	4.1	66.0	0.5	4.7	56.0	0.7	5.3
135	359.1	0.4	1.3	252.2	0.5	1.7	186.4	0.5	2.2	146.2	0.5	2.7	114.8	0.5	3.2	97.7	0.5	3.5	81.4	0.5	4.1	68.5	0.5	4.7	58.1	0.7	5.3
140	372.4	0.4	1.3	261.5	0.5	1.7	193.3	0.5	2.2	151.7	0.5	2.7	119.0	0.5	3.2	101.3	0.5	3.5	84.4	0.5	4.1	71.0	0.5	4.7	60.3	0.7	5.3
145	385.7	0.4	1.3	270.9	0.5	1.7	200.2	0.5	2.2	157.1	0.5	2.7	123.3	0.5	3.2	105.0	0.5	3.5	87.3	0.5	4.1	73.8	0.5	4.7	62.5	0.7	5.3
150	399.0	0.4	1.3	280.2	0.5	1.7	207.1	0.5	2.2	162.5	0.5	2.7	127.5	0.5	3.2	108.6	0.5	3.5	90.5	0.5	4.1	76.1	0.5	4.7	64.6	0.7	5.3

RETARDANCE "D" AND "C"

NOTE: Width and Depth dimensions are in feet; Velocity measurements are in feet per second;
Depth "D" does not include allowance for freeboard or settlement.

Table DV-16 Parabolic Diversion Design Chart (Retardance "D" and "C",
Grade 10.00%)

barrier is the same as the installation for Straw Bale Sediment Traps. Silt fence is the only barrier covered in this edition of the handbook.

The success of silt fences depends on a proper installation so as to develop maximum efficiency of trapping. Silt fences should be carefully installed to meet the intended purpose.

A silt fence is specifically designed to retain sediment transported by sheet flow from disturbed areas, while allowing water to pass through the fence. Silt fences should be installed to be stable under the flows expected from the site. Silt fences should not be installed across streams, ditches, waterways, or other concentrated flow areas.

Silt fences are composed of woven geotextile supported between steel or wooden posts. Silt fences are commercially available with geotextile attached to the post and can be rolled out and installed by driving the post into the ground. This type of silt fence is simple to install, but more expensive than some other installations. Silt fences must be trenched in at the bottom to prevent runoff from undermining the fence and developing rills under the fence. Locations with high runoff flows or velocities should use wire reinforcement.

Design criteria

Silt fences are normally limited to situations in which only sheet or overland flow is expected. They normally cannot filter the volumes of water generated by channel flow. Silt fences are normally constructed of synthetic fabric (woven geotextile) and the life is expected to be the duration of most construction projects. Silt fence fabric should conform to the requirements of Table SB-1.

The drainage area behind the silt fence should not exceed $\frac{1}{4}$ acre per 100 linear feet of silt fence for non-reinforced fence and $\frac{1}{2}$ acre per 100 feet of wire reinforced fence. When all runoff from the drainage area is to be stored behind the fence (i.e. there is no stormwater disposal system in place) the maximum slope length behind the fence should not exceed those shown in the table below:

Type A Silt Fence

Type A fence is 36" wide with wire reinforcements. The wire reinforcement is necessary because this fabric allows almost 3 times the flow rate as type B silt fence. Type A silt fence should be used where runoff flows or velocities are particularly high or where slopes exceed a vertical height of 10 feet.

Provide a riprap splash pad or other outlet protection device for any point where flow may overtop the sediment fence. Ensure that the maximum height of the fence at a protected, reinforced, outlet does not exceed 1 foot and that support post spacing does not exceed 4 feet.

The silt fence should be installed as shown in Figure SB-2. Materials for posts and fasteners are shown in Tables SB-3 and SB-4. Details for overlap of the silt fence and fastener placement are shown in Figure SB-4.

Type C Silt Fence

Though only 22" wide, this filter fabric allows the same flow rate as Type B silt fence. Type C silt fence should be limited to use on minor projects, such as residential home sites or small commercial developments where permanent stabilization will be achieved in less than 6 months.

The silt fence should be installed as shown in Figure SB-3. Materials for posts and fasteners are shown in Tables SB-3 and SB-4. Details for overlap of the silt fence and fastener placement are shown in Figure SB-4.

Table SB-3 Post Size for Silt Fence

	Minimum Length	Type of Post	Size of Post
Type A	4'	Steel	1.3lb./ft. min.
Type B	4'	Soft Wood	3" diameter or 2X4
		Oak	1.5" X 1.5"
		Steel	1.3lb./ft. min.
Type C	3'	Soft Wood	2" diameter or 2X2
		Oak	1" X 1"
		Steel	.75lb./ft. min.

Table SB-4 Wood Post Fasteners for Silt Fence

	Gauge	Crown	Legs	Staples/Post
Wire Staples	17 min.	3/4" wide	1/2" long	5 min.
	Gauge	Length	Button Heads	Nail/Post
Nails	14 min.	1"	3/4" long	4 min.

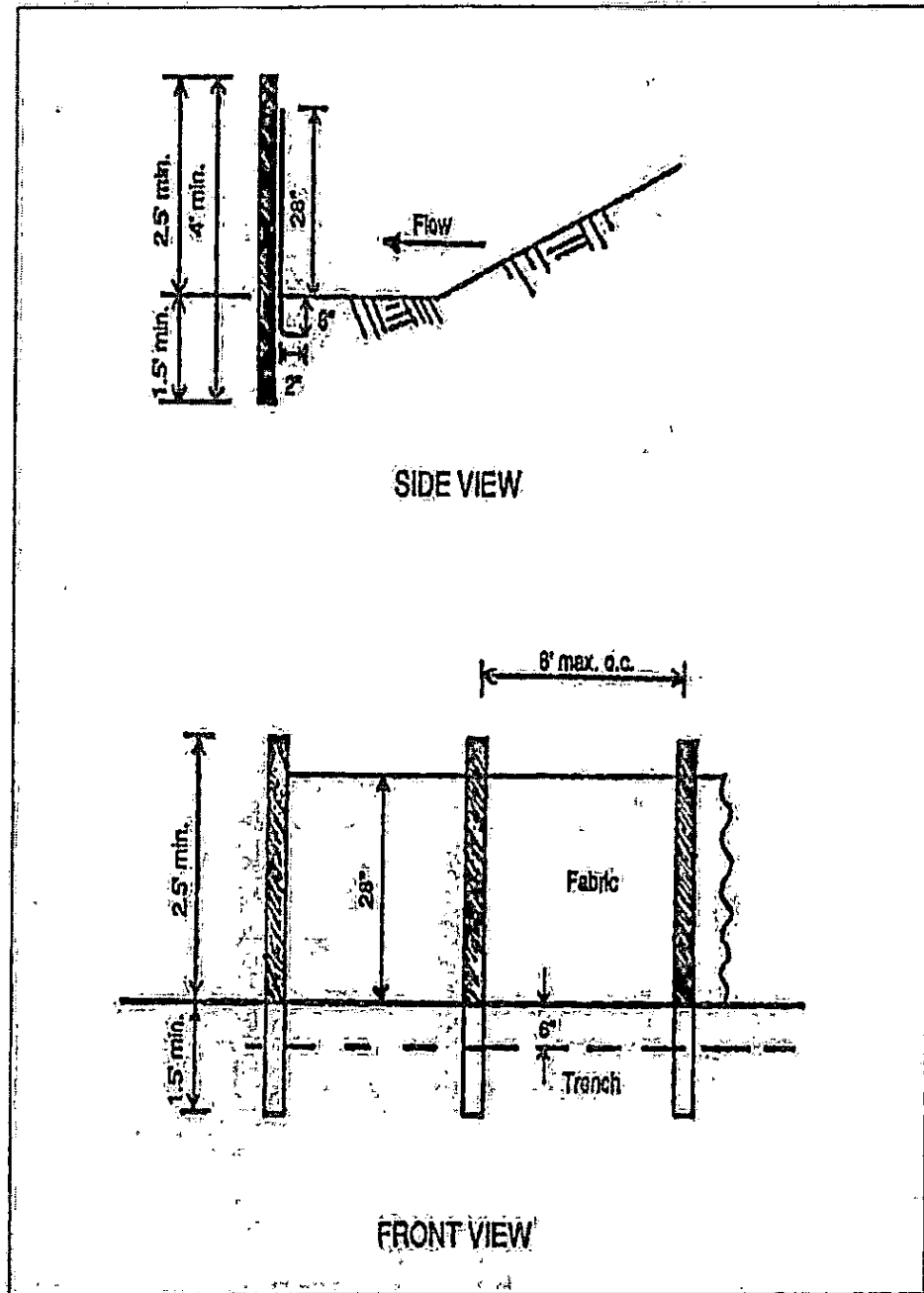


Figure SB-2 Silt Fence - Type B

- (1) For fabric material requirements see Table SB-1
- (2) For post material requirements see Tables SB-3 and SB-4

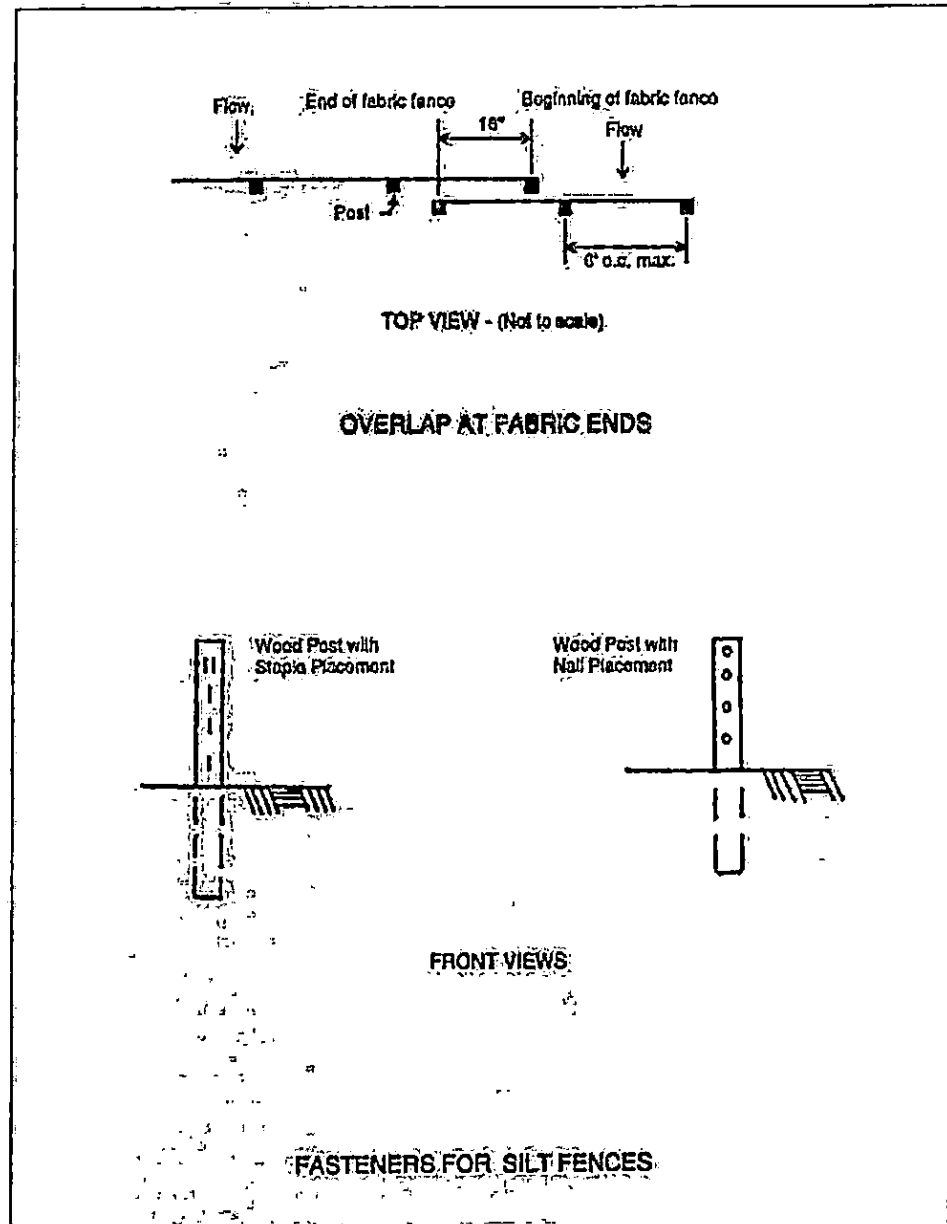


Figure SB-4 Silt Fence Installation Details

Planning Considerations

Sediment basins are needed where drainage areas are too large for other sediment control practices.

Select locations for basins during initial site evaluation. Locate basin so that sudden failure should not cause loss of life or serious property damage. Install sediment basins before any site grading takes place within the drainage area.

Select sediment basin sites to capture sediment from all areas that are not treated adequately by other sediment control measures. Always consider access for cleanout and disposal of the trapped sediment. Locations where a pond can be formed by constructing a low dam across a natural swale are generally preferred to sites that require excavation. Where practical, divert sediment-free runoff away from the basin.

Because the emergency spillway is actually used relatively frequently, it is generally stabilized using geotextile and riprap that can withstand the expected flows without erosive velocities. The spillway should be placed as far from the inlet of the basin as possible to maximize sedimentation before discharge. The spillway should be located in natural ground (not over the embankment) to the greatest extent possible.

The use of *Chemical Stabilization* (PAM) properly introduced into the turbid runoff water at the inlet of the basin and/or at the first baffle should be considered to help polish the discharge from the basin for meeting turbidity requirements.

Where heavy loads of coarse sediment is expected, a fore bay or sump area prior to the basin should be considered for capture of heavier particles.

Baffles

Porous baffles effectively spread the flow across the entire width of a sediment basin or trap and cause increased deposition within the basin. Water flows through the baffle material, but is slowed sufficiently to back up the flow, causing it to spread across the entire width of the baffle (Figure SBN-1). Spreading the flow in this manner utilizes the full cross section of the basin and reduces turbulence which shortens the time required for sediment to be deposited.

The installation should be similar to a sediment barrier (silt fence) (Figure SBN-2) utilizing posts and wire backing. The most proven material for a baffle is 700 - 900 g/m² coir erosion blanket (Figure SBN-3). Other materials proven by research to be equivalent in this application may be used. A support wire or rope across the top will help prevent excessive sagging if the material is attached to it with appropriate ties. Another option is to use a sawhorse type of support with the legs stabilized with rebar inserted into the basin floor. These structures work well and can be prefabricated off site and quickly installed.

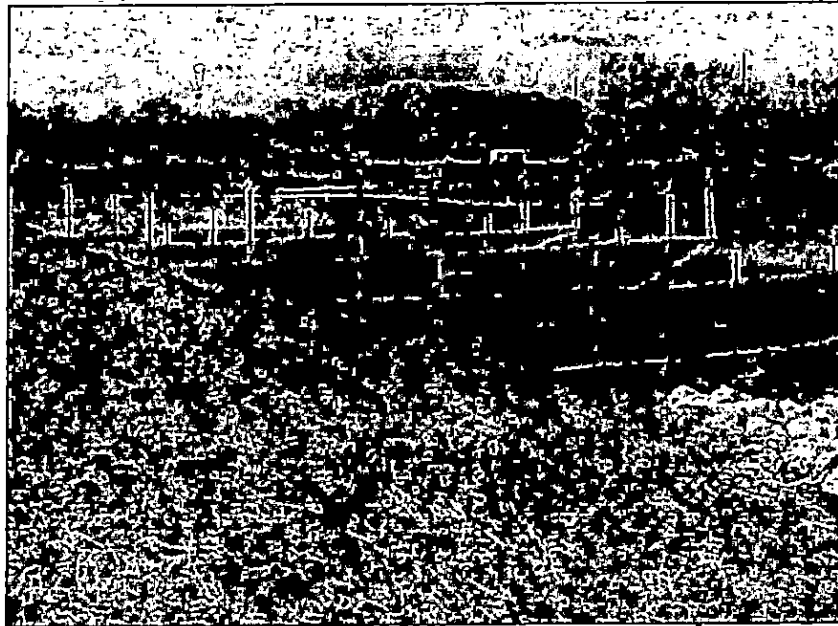


Figure SBN-3 Example of porous baffle made of 700 g/m² coir erosion blanket as viewed from the inlet

Skimmer

A skimmer is a sediment basin dewatering control device that withdraws water from the basin's water surface, thus removing the highest quality water for delivery to the uncontrolled environment. A skimmer is shown in Figure SBN-4. By properly sizing the skimmer's control orifice, the skimmer can be made to dewater a design hydrologic event in a prescribed period.

The costs of using a skimmer system are similar, or occasionally less, than a conventional rock outlet or perforated riser. However, the basin is more efficient in removing sediment. Another advantage of the skimmer is that it can be reused on future projects. Skimmers are generally maintenance free, but may require occasional maintenance to remove debris from the orifice.

A skimmer must dewater the basin from the top of the water surface. The rate of dewatering must be controlled. A dewatering time of 48 to 120 hours (2 to 5 days) is required for the basin to function properly.

Design Basin Life

Structures intended for more than 3 years of use should be designed as permanent structures. Procedures outlined in this section do not apply to permanent structures.

Dam Height

Maximum height should be 10 feet, measured from the designed (settled) top elevation of the dam to the lowest point of the original ground surface.

Basin Locations

Select areas that:

- Are not intermittent or perennial streams
- Allow a maximum amount of construction runoff to be brought into the structure
- Provide capacity for storage of sediment from as much of the planned disturbed area as practical
- Exclude runoff from undisturbed areas where practical
- Provide access for sediment removal throughout the life of the project
- Interfere minimally with construction activities

Basin Shape

Ensure that the flow length to basin width ratio is 2:1 or larger to improve trapping efficiency. Length is measured at the elevation associated with the minimum storage volume. Generally, the bottom of the basin should be level to ensure the baffles function properly. The area between the inlet and first baffle (fore bay) can be designed with reverse grade to improve the trapping efficiency.

Storage Volume

Ensure that the sediment storage volume of the basin is at least 3,600 cubic feet per acre for the area draining into the basin. Volume is measured below the emergency spillway crest. Remove sediment from the basin when approximately one-half of the storage volume has been filled.

Baffles

Space the baffles to create equal zones of volume within the basin.

The top of the baffle should be the same elevation as the maximum water depth flowing through the emergency spillway.

Baffles should be designed to go up the sides of the basin banks so water does not flow around the baffles. Most of the sediment will be captured in the inlet zone. Smaller particle size sediments are captured in the latter cells.

Table SBN-1. Faircloth Skimmer Selection Charts

1.5-inch skimmer (H = 0.125 ft)		2-inch skimmer (H = 0.167 ft)		2.5-inch skimmer (H = 0.167 ft)	
Orifice (in)	Outflow Rate (ft ³ /d)	Orifice (in)	Outflow Rate (ft ³ /d)	Orifice (in)	Outflow Rate (ft ³ /d)
None	2,079	None	5,429	None	9,548
1.0	809	1.0	924	1.0	1,039
0.5	193	0.5	231	0.5	250

3-inch skimmer (H = 0.25 ft)		4-inch skimmer (H = 0.333 ft)		5-inch skimmer (H = 0.333 ft)	
Orifice (in)	Outflow Rate (ft ³ /d)	Orifice (in)	Outflow Rate (ft ³ /d)	Orifice (in)	Outflow Rate (ft ³ /d)
None	10,588	None	16,863	None	26,276
1.5	2,541	2.5	8,181	3.5	16,035
1.0	1,136	2.0	5,236	3.0	11,781
0.5	289	1.5	2,945	2.5	8,181
		1.0	1,309	2.0	5,236
		0.5	327	1.5	3,715
				1.0	1,309
				0.5	327

6-inch skimmer (H = 0.417 ft)		8-inch skimmer (H = 0.5 ft)	
Orifice (in)	Outflow Rate (ft ³ /d)	Orifice (in)	Outflow Rate (ft ³ /d)
None	44,371	None	127,416
4.5	29,645	5.5	48,510
4.0	23,427	5.0	40,098
3.5	17,941	4.5	32,475
3.0	13,186	4.0	25,660
2.5	9,144	3.5	19,654
2.0	5,852	3.0	14,438
1.5	3,292	2.5	10,029
1.0	1,463	2.0	6,410
0.5	366	1.5	3,619
		1.0	1,598
		0.5	404

Example: Select a skimmer that will dewater a 20,000 ft³ sediment basin in 3 days.

Solution: First compute the required outflow rate as

$$Q = \frac{V}{t_d} = \frac{20000 \text{ ft}^3}{3d} = 6670 \text{ ft}^3/d$$

Now go the Selection Charts (Table SBN-1) and select an appropriate skimmer. If the 2-inch skimmer with no orifice is chosen, the outflow rate will be 5,429 ft³/d, which will require about 3.5 days to dewater the basin. An alternative might be to use a 4-inch skimmer with a 2.5 inch diameter orifice, which will have an outflow rate of 8,181 ft³/d and dewater the basin in about 2.5 days.

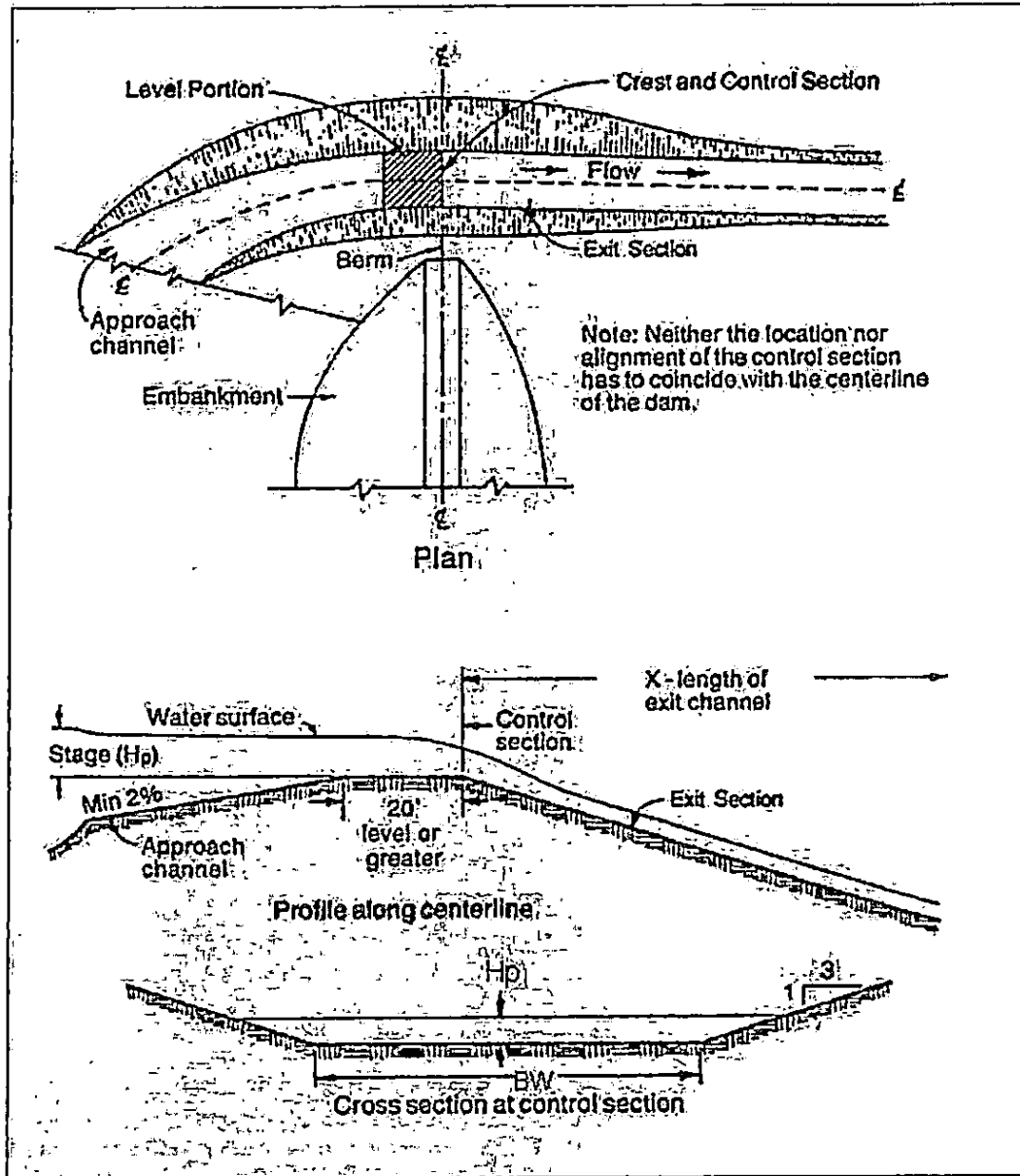


Figure SBN-5 Excavated grass spillway views

Erosion Protection

Minimize the area disturbed during construction. Divert surface water from disturbed areas. When possible, delay clearing the sediment impoundment area until the dam is in place. Keep the remaining temporary pool area undisturbed. Stabilize the spillway, embankment, and all disturbed areas with permanent vegetation. The basin bottom should also be established to a vegetative cover as this promotes sediment deposition.

Trap Efficiency

Improve sediment basin trapping efficiency by employing the following considerations in the basin design:

- **Surface area**—In the design of the settling pond, allow the largest surface area possible. The shallower the pool, the better.
- **Length**—Maximize the length-to-width ratio of the basin to provide the longest flow-path possible.
- **Baffles**—Provide a minimum of three porous baffles to evenly distribute flow across the basin and reduce turbulence.
- **Inlets**—Area between the sediment inlets and the basin bottom should be stabilized by geotextile material, riprap with geotextile, a pipe drop, or other similar methods (Figure SBN-6 shows the area with rocks). Inlets to basin should be located the greatest distance possible from the spillway.
- **Dewatering**—Allow the maximum reasonable detention period before the basin is completely dewatered (at least 48 hours).
- **Inflow rate**—Reduce the inflow velocity to nonerosive rates and divert all sediment-free runoff
- **Establish permanent vegetation** in the bottom and side slopes of the basin.
- **Introduce the appropriate PAM material** either at the turbulent entrance of the runoff water into the basin and/or apply to the first baffle. Apply the PAM according to manufacturer's recommendations.

Safety

Avoid steep side slopes. Fence basins properly and mark them with warning signs if trespassing is likely. Follow all State and local safety requirements.

Design Procedure

Step 1. Determine peak flow, Q_{10} , for the basin drainage area utilizing the NRCS runoff curve number method.

Step 2. Determine any site limitations for the sediment pool elevation, emergency spillway or top of the dam.

Step 3. Determine basin volumes:

- Compute minimum volume required (3,600 ft³/acre of drainage area).
- Specify sediment cleanout level to be clearly marked (one-half the design volume). Specify that the basin area is to be cleared after the dam is built.

Step 4. Determine area of basin, shape of basin, and baffles:

- Check length/width ratio (should be 2:1 or larger).
- Ensure the bottom of the basin is level.
- Design and locate a minimum of 3 coir baffles. The baffle spacing should produce equal volumes of storage within the basin when the basin is full. The top elevation of the baffles will be set in Step 7.

Step 5. Size the skimmer, skimmer orifice, and barrel pipe.

Use Table SBN-1 or the precise alternative design to size the orifice. Generally, a Schedule 40 PVC barrel pipe the same size as the skimmer arm is used under the embankment.

Step 6. Design the anti-seep collar.

Ensure that antiseep collar is no closer than 2 ft from a pipe joint and as close to the center of the embankment as possible. Collar must project at least 1.5 ft from the pipe and be watertight.

Step 7. Determine the emergency spillway dimensions.

Size the spillway bottom width and flow depth to handle the Q_{10} peak flow. Tables SBN-2 and SBN-3 can be used for the design process for grassed emergency spillways. Use appropriate design procedures for spillways with other surfaces. Set top of baffles at the elevation of the designed maximum flow depth of the emergency spillway.

Step 8. Spillway approach section.

Adjust the spillway alignment so that the control section and outlet section are straight. The entrance width should be 1.5 times the width of the control section with a smooth transition to the width of the control section. Approach channel should slope toward the reservoir no less than 2%.

Table SBN-2 Design Table for Vegetated Spillways Excavated in Erosion Resistant Soils (side slopes 3 horizontal: 1 vertical)

Discharge Q CFS	Slope Range		Bottom Width Feet	Stage Feet	Discharge Q CFS	Slope Range		Bottom Width Feet	Stage Feet
	Minimum Percent	Maximum Percent				Minimum Percent	Maximum Percent		
15	3.3	12.2	8	.83	80	2.8	5.2	24	1.24
	3.5	18.2	12	.69		2.8	9.0	28	1.14
20	3.1	8.8	8	.87	80	2.9	7.0	32	1.08
	3.2	13.0	12	.81		2.5	2.6	12	1.84
25	3.3	17.3	16	.70	80	2.5	3.1	18	1.61
	2.9	7.1	8	1.09		2.5	3.8	20	1.45
30	3.2	9.9	12	.91	80	2.7	4.5	24	1.32
	3.3	13.2	16	.79		2.6	5.3	28	1.22
35	3.3	17.2	20	.70	80	2.8	6.1	32	1.14
	2.9	6.0	8	1.20		2.5	2.8	18	1.71
40	3.0	8.2	12	1.01	100	2.6	3.3	20	1.54
	3.0	10.7	18	.88		2.6	4.0	24	1.41
45	3.3	13.8	20	.78	100	2.7	4.8	28	1.30
	2.8	5.1	8	1.30		2.7	6.3	32	1.21
50	2.8	6.9	12	1.10	100	2.9	8.1	36	1.13
	3.1	9.0	16	.94		2.5	2.8	20	1.71
55	3.1	11.3	20	.89	120	2.6	3.2	24	1.58
	3.2	14.1	24	.77		2.7	3.8	28	1.44
60	2.7	4.5	8	1.40	120	2.7	4.2	32	1.34
	2.9	6.0	12	1.18		2.7	4.8	36	1.28
65	2.9	7.8	16	1.03	120	2.5	2.7	24	1.71
	3.1	9.7	20	.91		2.5	3.2	28	1.59
70	3.1	11.9	24	.83	140	2.6	3.8	32	1.47
	2.6	4.1	8	1.49		2.6	4.0	36	1.39
75	2.8	5.3	12	1.23	140	2.7	4.5	40	1.30
	2.9	6.7	16	1.09		2.5	2.7	28	1.70
80	3.0	8.4	20	.98	160	2.5	3.1	32	1.59
	3.0	10.4	24	.89		2.6	3.4	36	1.49
85	2.7	3.7	8	1.57	160	2.6	3.8	40	1.40
	2.8	4.7	12	1.33		2.7	4.3	44	1.33
90	2.8	6.0	16	1.18	180	2.4	2.7	32	1.72
	2.9	7.3	20	1.03		2.4	3.0	36	1.60
95	3.1	9.0	24	.94	180	2.5	3.4	40	1.61
	2.6	3.1	8	1.73		2.6	3.7	44	1.43
100	2.7	3.8	12	1.47	200	2.5	2.7	36	1.70
	2.7	4.8	16	1.28		2.5	2.9	40	1.60
105	2.9	5.9	20	1.15	200	2.5	3.3	44	1.52
	2.9	7.3	24	1.05		2.6	3.8	48	1.45
110	3.0	6.8	28	.97	220	2.4	2.6	40	1.70
	2.5	2.8	8	1.85		2.5	2.9	44	1.61
115	2.8	3.3	12	1.60	220	2.5	3.2	48	1.63
	2.6	4.1	16	1.40		2.5	2.6	44	1.70
120	2.7	5.0	20	1.26	240	2.5	2.9	48	1.62
	2.8	6.1	24	1.15		2.6	3.2	52	1.54
125	2.9	7.0	28	1.05	250	2.4	2.6	48	1.70
	2.5	2.9	12	1.72		2.5	2.9	52	1.62
130	2.6	3.6	16	1.51	280	2.4	2.6	52	1.70
	2.7	4.3	20	1.35		2.5	2.8	56	1.69

Example of Table Use:

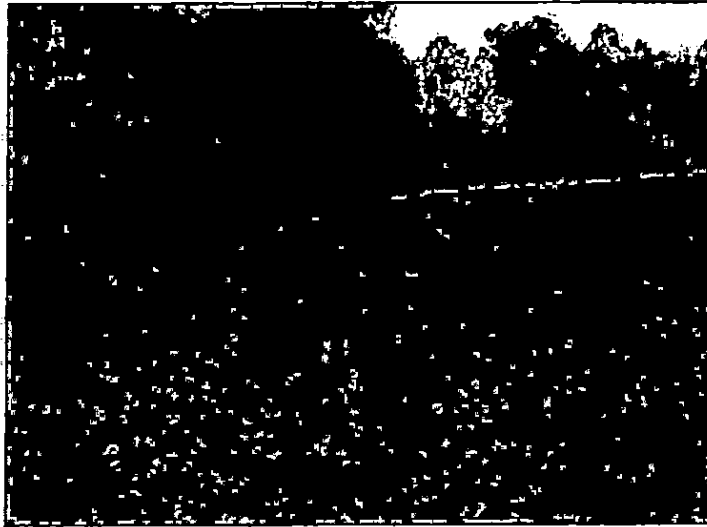
Given: Discharge, $Q_{10} = 87$ cfs, Spillway slope (exit section) = 4%.

Find: Bottom Width and Stage in Spillway.

Procedure: Using a discharge of 90 cfs, note that the spillway (exit section) slope falls within slope ranges corresponding to bottom widths of 24, 28, and 32 ft. Use bottom width of 32 ft, to minimize velocity. Stage in the spillway is 1.14 ft.

Note: Computations are based on: Roughness coefficient, $n = 0.40$ and a maximum velocity of 5.50 ft. per sec.

Mulching (MU)



Practice Description

Mulching is the application of plant residues such as straw or other suitable materials to the soil surface. Mulch protects the soil surface from the erosive force of raindrop impact and reduces the velocity of overland flow. It helps seedlings germinate and grow by conserving moisture, protecting against temperature extremes and controlling weeds. Mulch also maintains the infiltration capacity of the soil. Mulch can be applied to seeded areas to help establish plant cover. It can also be used in unseeded areas to protect against erosion over the winter or until final grading and shaping can be accomplished except in areas with concentrated flow.

Planning Considerations

Surface mulch is the most effective, practical means of controlling runoff and erosion on disturbed land prior to vegetation establishment. Mulch absorbs the energy associated with raindrops and thereby minimizes soil particle detachment, which is the initiation step of erosion.

Mulch also reduces soil moisture loss by evaporation, prevents crusting and sealing of the soil surface, moderates soil temperatures, and provides a suitable microclimate for seed germination.

Design Criteria

Site Preparation

Before mulching, complete the required site preparation. Site preparation includes grading, if needed, and seedbed preparation and fertilizing, liming and seeding if a planting is being made by means other than hydroseeding.

Spreading the Mulch

Select a mulch material based on the site and practice requirements, availability of material, and availability of labor and equipment. Table MU-1 lists commonly used mulches.

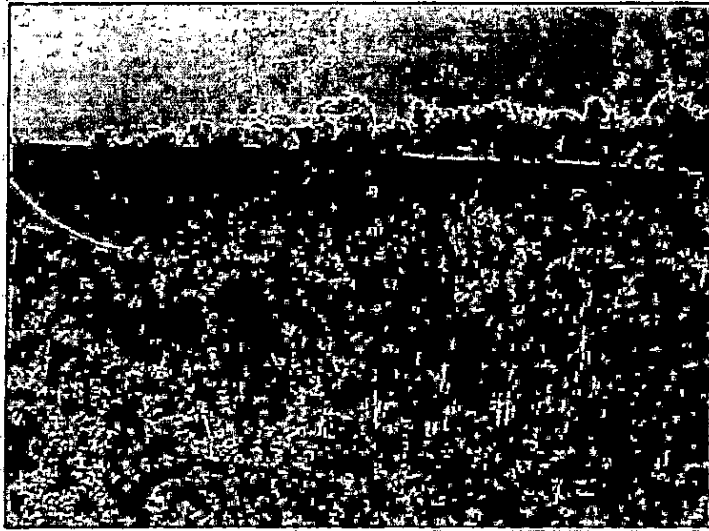
Uniformly spread organic mulches by hand or with a mulch blower at a rate which provides about 75% ground cover. When spreading straw mulch by hand, divide the area to be mulched into sections of approximately 1000 sq. ft. and place 70-90 pounds of straw (1 ½ to 2 bales) in each section to facilitate uniform distribution. Caution, an over-application of wheat straw will reduce stand success – do not over-apply wheat straw when mulching a seeding!

When straw mulch is subject to be blown away by wind, it must be anchored immediately after spreading. It can be anchored with a mulch anchoring tool or a regular farm disk, by setting the disk to run straight and adding weight to the disk. The disk should not be sharp enough to cut the straw. Disks can generally not be used on land with steep slopes. Application of a commercial tackifier through a hydroseeder is most practical for steep slopes and can be effective on any site.

Table MU-1 Mulching Materials and Application Rates

Material	Rate Per Acre and (Per 1000 ft. ²)	Notes
Straw with Seed	1 ½-2 tons (70 lbs-90 lbs)	Spread by hand or machine to attain 75% groundcover; anchor when subject to blowing.
Straw Alone (no seed)	2 ½-3 tons (115 lbs-160 lbs)	Spread by hand or machine; anchor when subject to blowing.
Wood Chips	5-6 tons (225 lbs-270 lbs)	Treat with 12 lbs. nitrogen/ton.
Bark	35 cubic yards (0.8 cubic yard)	Can apply with mulch blower.
Pine Straw	1-2 tons (45 lbs-90 lbs)	Spread by hand or machine; will not blow like straw.
Peanut Hulls	10-20 tons (450 lbs-900 lbs)	Will wash off slopes. Treat with 12 lbs. nitrogen/ton.

Temporary Seeding (TS)



Practice Description

Temporary seeding is the establishment of fast-growing annual vegetation from seed on disturbed areas. Temporary vegetation provides economical erosion control for up to a year and reduces the amount of sediment moving off the site.

This practice applies where short-lived vegetation can be established before final grading or in a season not suitable for planting the desired permanent species. It helps prevent costly maintenance operations on other practices such as sediment basins and sediment barriers. In addition, it reduces problems of mud and dust production from bare soil surfaces during construction. Temporary or permanent seeding is necessary to protect earthen structures such as dikes, diversions, grass-lined channels and the banks and dams of sediment basins.

Planning Considerations

Temporary vegetative cover can provide significant short-term erosion and sediment reduction before establishing perennial vegetation.

Temporary vegetation will reduce the amount of maintenance associated with sediment basins.

Temporary vegetation is used to provide cover for no more than 1 year. Permanent vegetation should be established at the proper planting time for permanent vegetative cover.

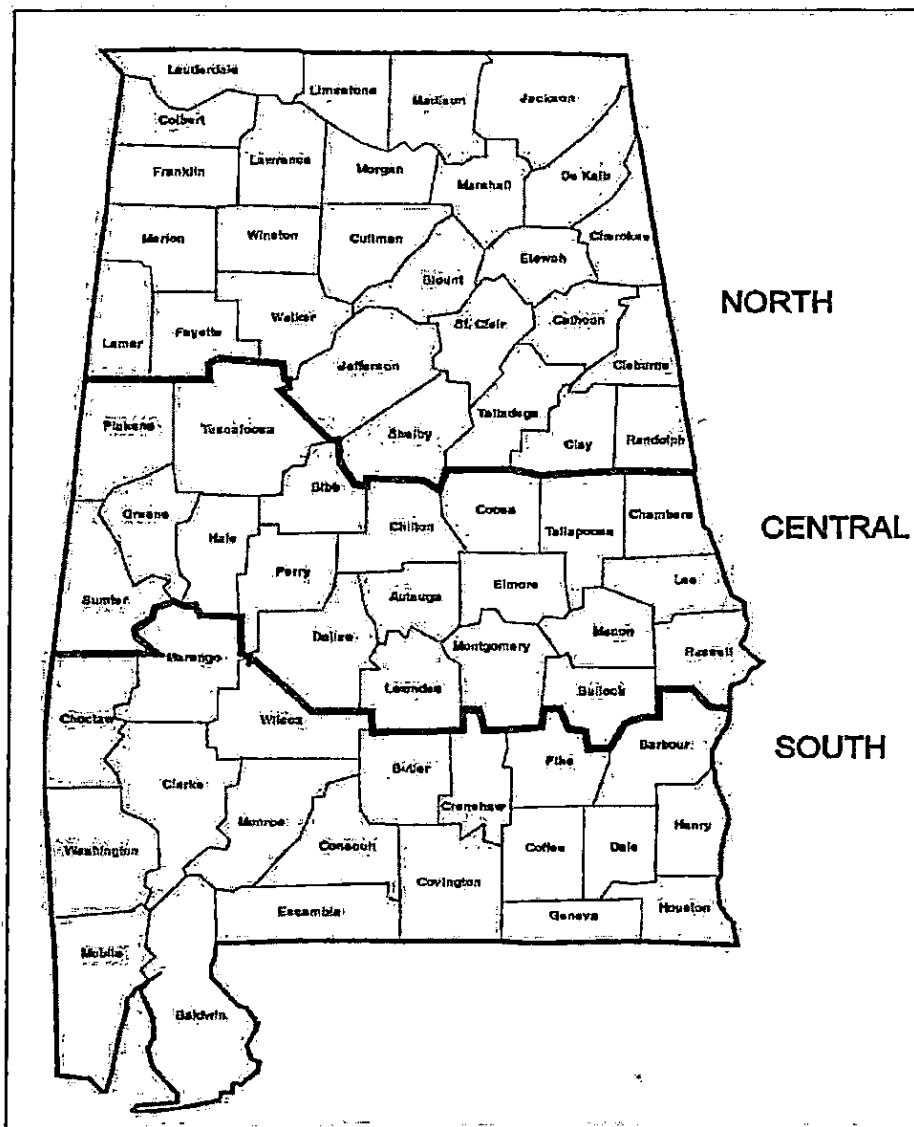


Figure TS-1 Geographical Areas for Species Adaptation and Seeding Dates

Seedbed Preparation

Good seedbed preparation is essential to successful plant establishment. A good seedbed is well pulverized, loose, and smooth. If soils become compacted during grading, loosen them to a depth of 6" to 8" using a ripper or chisel plow.

If rainfall has caused the surface to become sealed or crusted, loosen it just prior to seeding by disking, raking, harrowing, or other suitable methods. When hydroseeding methods are used, the surface should be left with a more irregular surface of clods.

Planting Methods

Seeding

Evenly apply seed using a cyclone seeder (broadcast), drill seeder, cultipacker seeder, or hydroseeder. Broadcast seeding and hydroseeding are appropriate for steep slopes where equipment cannot operate safely. Small grains should be planted no more than 1" deep, and grasses and legumes no more than ½" deep. Seed that are broadcast must be covered by raking or chain dragging, and then lightly firmed with a roller or cultipacker.

Hydroseeding

Surface roughening is particularly important when hydroseeding, as a roughened slope will provide some natural coverage for lime, fertilizer, and seed. The surface should not be compacted or smooth. Fine seedbed preparation is not necessary for hydroseeding operations; large clods, stones, and irregularities provide cavities in which seeds can lodge.

Mix seed, inoculant if required, and a seed carrier with water and apply as slurry uniformly over the area to be treated. The seed carrier should be a cellulose fiber, natural wood fiber or other approved fiber mulch material which is dyed an appropriate color to facilitate uniform application of seed. Use the correct legume inoculant at 4 times the recommended rate when adding inoculant to hydroseeder slurry. The mixture should be applied within one hour after mixing to reduce damage to seed.

Fertilizer should not be mixed with the seed-inoculant mixture because fertilizer salts may damage seed and reduce germination and seedling vigor. Fertilizer may be applied with a hydro seeder as a separate operation after seedlings are established.

Mulching

The use of an appropriate mulch provides instant cover and helps ensure establishment of vegetative cover under normal conditions and is essential to seeding success under harsh site conditions (see the Mulching practice for guidance). Harsh site conditions include the following: slopes steeper than 3:1 and adverse soils (soils that are shallow to rock, rocky, or high in clay or sand). Areas with concentrated flow should be treated differently and require a hydromulch formulated for channels or an appropriate erosion control blanket.

Plant selection for permanent vegetation should be based on plant characteristics, site and soil conditions, time of year of planting, method of planting, and the intended use of the vegetated area. Climate factors can vary widely in Alabama. Important plant attributes are discussed in *Vegetation Establishment for Erosion and Sediment Control* in Chapter 2.

Plant selection may include companion plants to provide quick cover on difficult sites, late seedings, or where the desired permanent cover may be slow to establish. Annuals are usually used for companion plants and should be selected carefully to prevent using a species that provide so much competition that it prevents the establishment of the desired species.

Seeding properly carried out within the optimum dates has a higher probability of success. It is also possible to have satisfactory establishment when seeding outside these dates. However, as plantings are deviated from the optimum dates, the probability of failure increases rapidly. Seeding dates should be taken into account in scheduling land-disturbing activities.

Site quality impacts both short-term and long-term plant success. Sites that have compacted soils, soils that are shallow to rock or have textures that are too clayey or too sandy should be modified whenever practical to improve the potential for plant growth and long-term cover success.

The operation of equipment is restricted on slopes steeper than 3:1, severely limiting the quality of the seedbed that can be prepared. Provisions for establishment of vegetation on steep slopes can be made during final grading. In construction of fill slopes, for example, the last 4-6" might not be compacted. A loose, rough seedbed with irregularities that hold seeds and lime and fertilizer is essential for hydroseeding. Cut slopes should be roughened (see *Land Grading practice*).

Proper mulching is critical to protect against erosion on steep slopes. When using straw, anchor with netting or asphalt. On slopes steeper than 2:1, jute, excelsior, or synthetic matting may be required.

The use of irrigation (temporary or permanent) will greatly improve the success of vegetation establishment.

Design Criteria

Plant Selection

Select plants that can be expected to meet planting objectives. To simplify plant selection, use Figure PS-1 *Geographical Areas for Species Adaptation and Seeding Dates* and Table PS-1, *Commonly Used Plants for Permanent Cover*. Mixtures commonly specified by the Alabama Department of Transportation are an appropriate alternative for plantings on rights-of-ways. Additional information related to plantings in Alabama is found in Chapter 2 under the section *Vegetation for Erosion and Sediment Control*.

Table PS-1 Commonly Used Plants for Permanent Cover with Seeding Rates and Dates

Species	Seeding Rates/Ac PLS	North	Seeding Dates	
			Central	South
Bahiagrass, Pensacola	40 lbs	—	Mar 1-July 1	Feb 1-Nov 1
Bermudagrass, Common	10 lbs	Apr 1-July 1	Mar 15-July 15	Mar 1-July 15
Bahiagrass, Pensacola Bermudagrass, Common	30 lbs 5 lbs	—	Mar 1-July 1	Mar 1-July 15
Bermudagrass, Hybrid (Lawn Types)	Solid Sod	Anytime	Anytime	Anytime
Bermudagrass, Hybrid (Lawn Types)	Sprigs 1/sq ft	Mar 1-Aug 1	Mar 1-Aug 1	Feb 15-Sep 1
Fescue, Tall	40-50 lbs	Sep 1-Nov 1	Sep 1-Nov 1	—
Sericea	40-60 lbs	Mar 15-July 15	Mar 1-July 15	Feb 15-July 15
Sericea & Common Bermudagrass	40-60 lbs 10 lbs	Mar 15-July 15	Mar 1-July 15	Feb 15-July 15
Switchgrass, Alamo	4 Lbs	Apr 1-Jun 15	Mar 15-Jun 15	Mar 15-Jun 15

PLS means pure live seed and is used to adjust seeding rates. For example, to plant 10 lbs PLS of a species with germination of 80% and 10% inert material, 10 lbs PLS = 10 lbs / % live seed = 10 / 0.70 = 14.3 lbs.

Seedbed Requirements

Establishment of vegetation should not be attempted on sites that are unsuitable due to compaction or inappropriate soil texture, poor drainage, concentrated overland flow, or steepness of slope until measures have been completed to correct these problems. To maintain a good stand of vegetation, the soil must meet certain minimum requirements as a growth medium. A good growth medium should have these attributes:

- Sufficient pore space to permit root penetration.
- Enough fine-grained soil material (silt and clay) to maintain adequate moisture and nutrient supply.
- Sufficient depth of soil to provide an adequate root zone. The depth to rock or impermeable layers such as hardpans should be 12" or more, except on slopes steeper than 2:1 where topsoiling is not feasible.
- A favorable pH range for plant growth, usually 6.0-6.5.

Cooperative Extension Service can provide information on obtaining soil tests. Commercial laboratories that make recommendations based on soil analysis may be used.

When soil tests are not available, use the following rates for application of soil amendments.

Lime (Agricultural Limestone or Equivalent – see Liming Materials)

Sandy soils: Use 1 ton/acre (exception on sandy soils – if the cover will be tall fescue and clover) use 2 tons/acre.

Clayey soils: 2 tons/acre.

(Do not apply lime to alkaline soils).

Fertilizer

Grasses alone: Use 400 lbs/acre of 8-24-24 or the equivalent. Apply 30 lbs of additional nitrogen when grass has emerged and begun growth (approximately 0.8lbs/1000 ft²).

Grass-legume mixtures: Use 800 to 1200 lbs/acre of 5-10-10 or the equivalent.

Legumes Alone: Use 800 to 1200 lbs/acre of 0-10-10 or the equivalent.

Note: Fertilizer can be blended to meet exact fertilizer recommendations. Take soil test recommendations to local fertilizer dealer for bulk fertilizer blends. This may be more economical than bagged fertilizer.

Application of Soil Amendments

Apply lime and fertilizer evenly and incorporate into the top 6" of soil by disking, chiseling or other suitable means during seedbed preparation. Operate machinery on the contour.

Seedbed Preparation

If needed, grade and shape to provide a surface on which equipment can safely and efficiently be used for seedbed preparation and seeding.

Install necessary sediment control practices before seedbed preparation and complete grading according to the approved plan.

Prepare a friable seedbed with tillage to a depth of at least 6". Break up large clods, alleviate compaction, and smooth and firm the soil into a uniform surface. Fill in or level depressions that can collect water.

Lime is not normally applied with a hydraulic seeder because it is abrasive but if necessary it can be added to the seed slurry and applied at seeding or it may be applied with the fertilizer mixture. Also lime can be blown onto steeper slopes in dry form.

Sprigging

Hybrid bermudagrass cannot be grown from seed and must be planted vegetatively. Vegetative methods of establishing common and hybrid bermudagrass, centipedegrass and zoysia include sodding, plugging and sprigging (see Sodding practice).

When sprigs are planted with a sprigging machine, furrows should be 4-6" deep and 2 feet apart. Place sprigs no farther than 2 feet apart in the row and so that at least one rooting node is in the furrow.

When broadcasting is used for sprig planting, broadcast sprigs at the specified rate (Table PS-1). Press into the top ½" to 2" of soil with a cultipacker or with a disk set nearly straight so that the sprigs are not brought back to the surface. A mulch tacking machine may be used to press sprigs into the soil.

Mulching

The use of mulch provides instant cover and helps ensure establishment of vegetation under normal conditions and is essential to seeding success under harsh site conditions (see Mulching practice). Harsh site conditions include: slopes steeper than 3:1 and adverse soils (shallow, rocky, or high in clay or sand). Areas with concentrated flow should be treated differently and require sod, a hydromulch formulated for channels or an appropriate erosion control blanket.

Irrigation

Moisture is essential for seed germination and vegetation establishment. Supplemental irrigation can be very helpful in assuring adequate stands in dry seasons or to speed development of full cover. It is a requirement for establishment of vegetation from sod and sprigs and should be used elsewhere when feasible. However, irrigation is rarely critical for low-maintenance vegetation planted at the appropriate time of the year.

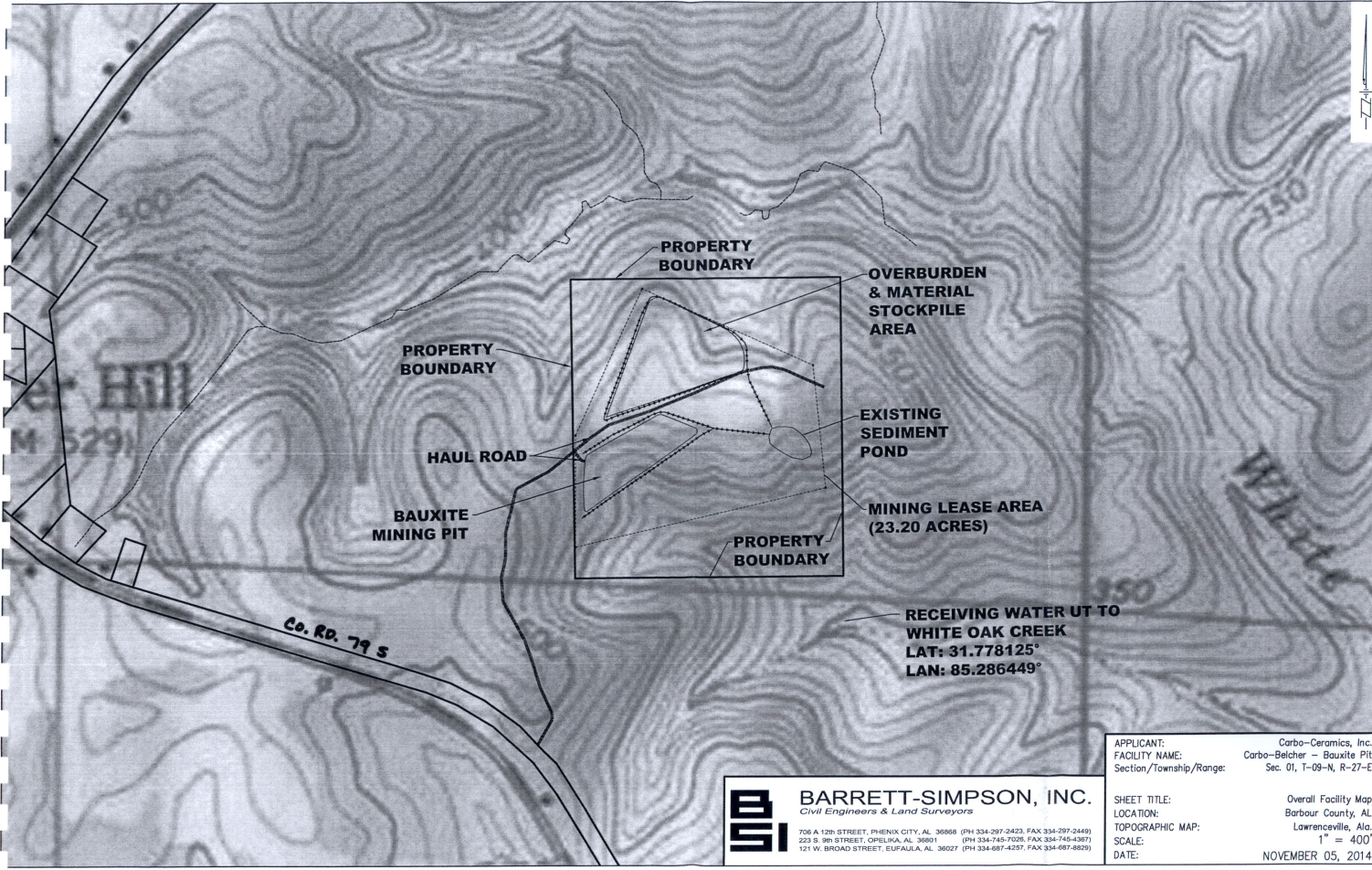
Water application rates must be carefully controlled to prevent runoff. Inadequate or excessive amounts of water can be more harmful than no supplemental water.

Maintenance

Generally, a stand of vegetation cannot be determined to be fully established until soil cover has been maintained for 1 full year from planting. Inspect vegetated areas for failure and make necessary repairs and vegetate as soon as possible.

If a stand has inadequate cover, reevaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand after seedbed

APPENDIX F
RAINFALL DATA



177

PROPERTY BOUNDARY

OVERBURDEN & MATERIAL STOCKPILE AREA

PROPERTY BOUNDARY

EXISTING SEDIMENT POND

HAUL ROAD

MINING LEASE AREA (23.20 ACRES)

BAUXITE MINING PIT

PROPERTY BOUNDARY

RECEIVING WATER UT TO WHITE OAK CREEK
 LAT: 31.778125°
 LAN: 85.286449°

Co. Rd. 79 S

APPLICANT: Carbo-Ceramics, Inc.
 FACILITY NAME: Carbo-Belcher - Bauxite Pit
 Section/Township/Range: Sec. 01, T-09-N, R-27-E

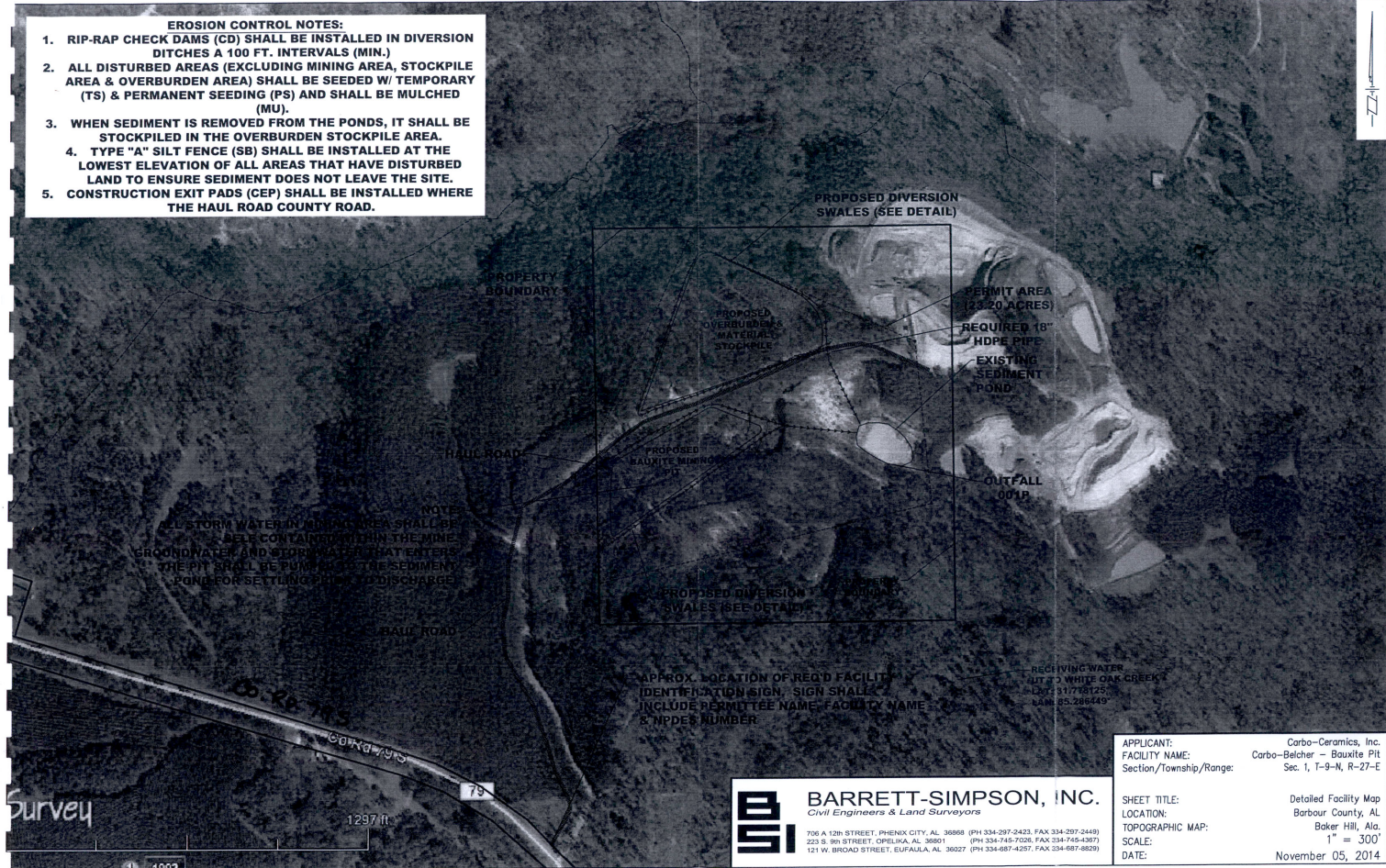
SHEET TITLE: Overall Facility Map
 LOCATION: Barbour County, AL
 Lawrenceville, Ala.
 SCALE: 1" = 400'
 DATE: NOVEMBER 05, 2014

BS **BARRETT-SIMPSON, INC.**
Civil Engineers & Land Surveyors

706 A 12th STREET, PHENIX CITY, AL 36868 (PH 334-297-2423, FAX 334-297-2449)
 223 S 3RD STREET, OPELIKA, AL 36801 (PH 334-745-7026, FAX 334-745-9373)
 121 W. BROAD STREET, EUFULA, AL 36027 (PH 334-687-4257, FAX 334-687-8829)

EROSION CONTROL NOTES:

1. RIP-RAP CHECK DAMS (CD) SHALL BE INSTALLED IN DIVERSION DITCHES A 100 FT. INTERVALS (MIN.)
2. ALL DISTURBED AREAS (EXCLUDING MINING AREA, STOCKPILE AREA & OVERBURDEN AREA) SHALL BE SEEDED W/ TEMPORARY (TS) & PERMANENT SEEDING (PS) AND SHALL BE MULCHED (MU).
3. WHEN SEDIMENT IS REMOVED FROM THE PONDS, IT SHALL BE STOCKPILED IN THE OVERBURDEN STOCKPILE AREA.
4. TYPE "A" SILT FENCE (SB) SHALL BE INSTALLED AT THE LOWEST ELEVATION OF ALL AREAS THAT HAVE DISTURBED LAND TO ENSURE SEDIMENT DOES NOT LEAVE THE SITE.
5. CONSTRUCTION EXIT PADS (CEP) SHALL BE INSTALLED WHERE THE HAUL ROAD COUNTY ROAD.



NOTE:
ALL STORM WATER IN DRAINAGE AREA SHALL BE KEPT CONTAINED WITHIN THE MINE. GROUND WATER AND STORM WATER THAT ENTERS THE PIT SHALL BE PUMPED TO THE SEDIMENT POND FOR SETTLING PRIOR TO DISCHARGE.

APPROX. LOCATION OF REQ'D FACILITY IDENTIFICATION SIGN. SIGN SHALL INCLUDE PERMITTEE NAME, FACILITY NAME & NPDES NUMBER.

RECHING WATER
UT 70 WHITE OAK CREEK
EXT: 31775125
CALL: 85-266449

Survey

1297 ft.

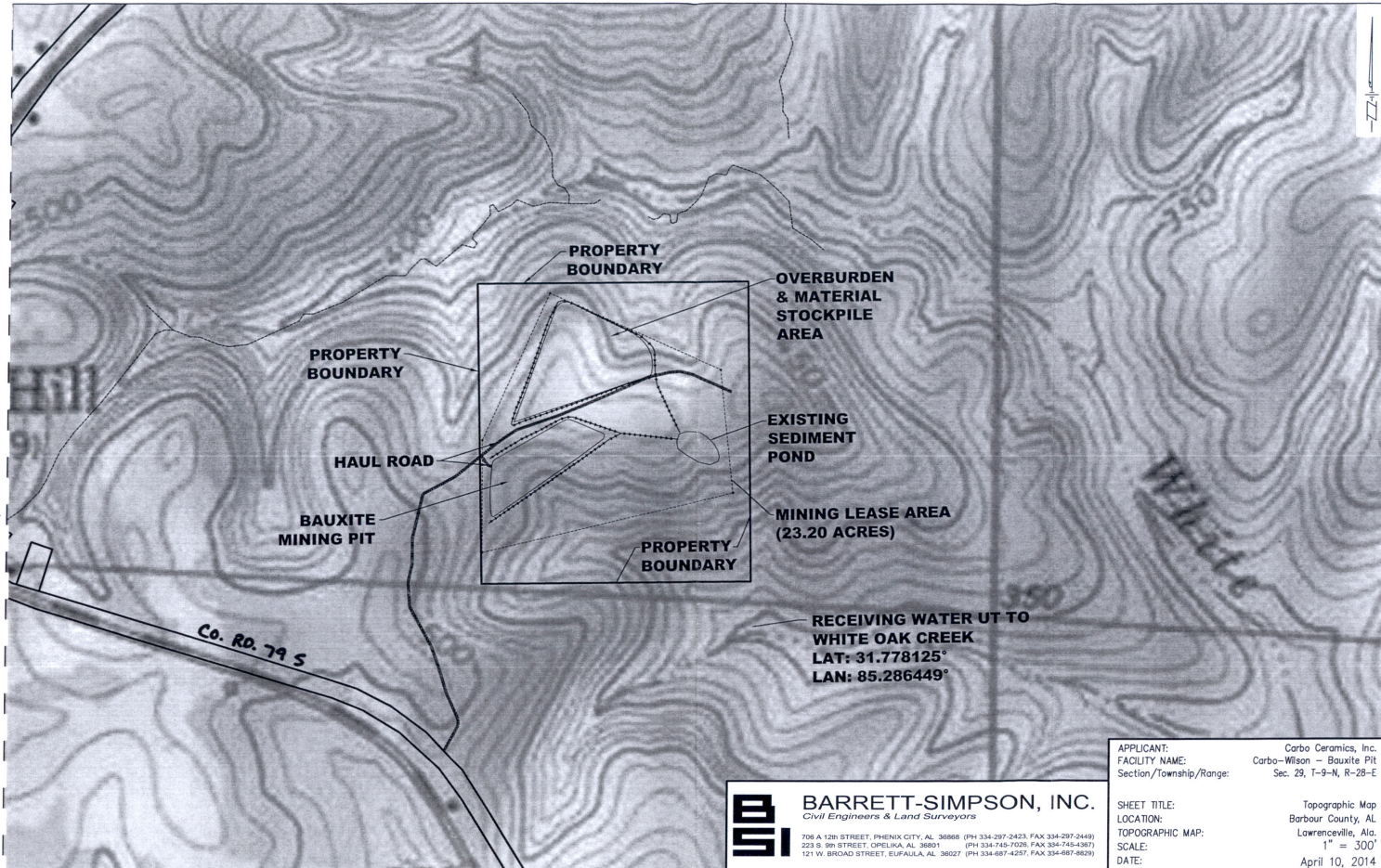


BARRETT-SIMPSON, INC.
Civil Engineers & Land Surveyors

705 A 12th STREET, PHENIX CITY, AL 36860 (PH) 334-297-2423, FAX 334-297-2449
223 S. 9th STREET, OPELIKA, AL 36801 (PH) 334-745-7026, FAX 334-745-4367
121 W. BROAD STREET, EUFaula, AL 36027 (PH) 334-687-4297, FAX 334-687-8629

APPLICANT: Carbo-Ceramics, Inc.
FACILITY NAME: Carbo-Belcher - Bauxite Pit
Section/Township/Range: Sec. 1, T-9-N, R-27-E

SHEET TITLE: Detailed Facility Map
LOCATION: Barbour County, AL
TOPOGRAPHIC MAP: Baker Hill, Ala.
SCALE: 1" = 300'
DATE: November 05, 2014



APPLICANT: Carbo Ceramics, Inc.
 FACILITY NAME: Carbo-Wilson - Bauxite Pit
 Section/Township/Range: Sec. 23, T-9-N, R-28-E

BSI **BARRETT-SIMPSON, INC.**
 Civil Engineers & Land Surveyors
 706 A 12th STREET, PHENIX CITY, AL 36888 (PH 334-297-2423, FAX 334-297-2449)
 223 S. 9th STREET, OPELKA, AL 36861 (PH 334-740-7028, FAX 334-743-8367)
 121 W. BROAD STREET, EUFALA, AL 36027 (PH 334-687-4257, FAX 334-687-8629)

SHEET TITLE: Topographic Map
 LOCATION: Barbour County, AL
 TOPOGRAPHIC MAP: Lawrenceville, Ala.
 SCALE: 1" = 300'
 DATE: April 10, 2014

ALABAMA DEPT OF

December 02, 2019

Check No 402503

Document No.	Date	Control No.	Amount	Discount	Net Amount
061219PERMIT	06/12/2019	5105699504	5,820.00	0.00	5,820.00
Total					5,820.00

RECEIVED

DEC 09 2019

**STORM WATER
MANAGEMENT BRANCH**

R#20-50510



December 4, 2019


ADEM
Attn: Amber Powell
1400 Coliseum Blvd
P.O. Box 301463
Montgomery, Al 36130-2400

Dear Ms. Powell:

In reference to a Permit Renewal Notice dated June 12, 2019 on Carbo's Belcher Bauxite Pit (NPDES Permit No. AL0082830). I have enclosed documents and the application fee in order to get an extension of the NPDES permit.

Let me know if I need to do anything else with ADEM regarding this mine.

I appreciate your help on this matter.

Sincerely,

Jim Bevill
Carbo Ceramics
Lands Manager

RECEIVED

DEC 09 2019

STORM WATER
MANAGEMENT BRANCH