HISTORY OF CONSTRUCTION FOR EXISTING CCR SURFACE IMPOUNDMENT
PLANT GASTON GYPSUM POND
40 CFR 257.73(c)(1)(i)-(xii)

(i) Site Name and Ownership Information:

Site Name: E.C. Gaston Steam Plant

Site Location: Wilsonville, Alabama
Site Address: 31972 Highway 25
Wilsonville, Alabama 35186

Owner: Alabama Power Company
Owner Address: 600 North 18th Street
Birmingham, AL 35203

CCR Impoundment Name: Plant Gaston Gypsum Pond
NID ID: N/A

EPA's "Disposal of Coal Combustion Residuals from Electric Utilities" Final Rule (40 C.F.R. Part 257 and Part 261), §257.73(c)(1), requires the owner or operator of an existing CCR surface impoundment to compile a history of construction. To the extent feasible, the following information is provided:

(ii) CCR Unit Location Map

See Location Map in the Appendix.

(iii) Purpose of CCR Impoundment: The E.C. Gaston Steam Plant is a 5 unit electric generating facility; Units 1-4 were originally coal-fired units but are were recently converted to gas–fired units with the ability to be coal-fired, while Unit 5 remains coal-fired only. The Plant Gaston Gypsum Pond is designed to receive and store coal combustion residuals produced during the electric generating process at Plant Gaston.

(iv) Watershed Description: Plant Gaston is located within both the Lower Yellowleaf Creek HUC-12 watershed which has a total area of 29,120 acres and the Hay Spring Branch HUC-12 watershed which has a total area of 27,197 acres. The gypsum pond unit is located entirely within the Hay Spring Branch watershed. Both the Lower Yellowleaf Creek and Hay Spring Branch watersheds are located within the Lower Coosa HUC-8 watershed which has a drainage area of 1,255,891 acres.

(v) Description of physical and engineering properties of CCR impoundment foundation/abutments:

The foundation soils beneath the impoundment are comprised of residuum of dolomite, limestone and shale, typically classified as highly plastic clays and silty clays, with occasional chert content. Based on borings conducted prior to construction of the impoundment, the elevation of the top of the underlying

bedrock ranges from 355 feet to 395 feet (approx.). The geologic properties of the site are characterized by carbonate rocks of the Knox Group of the Cambrian and Ordovician age. When weathered, the carbonate rocks can yield cherty residual clay or incipient karst type topography. Visible karst topography has not been noted within the Gypsum Pond since it became operational.

(vi) Summary of Site Preparation and Construction Activities: The Gypsum Pond facility was originally built in the 1980's for dry ash storage, but was never utilized. In the late 2000's, the storage area was converted to an impoundment for gypsum storage. The existing dikes were razed to the former ground surface elevation and rebuilt with structural fill in accordance with the specifications for the new impoundment. Some material was reused as fill, and additional fill was borrowed from adjacent areas on the plant property. The entire impoundment footprint was proofrolled with a loaded tandem axle dump truck. Where excavations were made, there were a couple of locations where surficial exposures of karst features were noted. These features were treated with inverted filter construction prior to the placement of any new fill or liner sections.

The storage cell occupies 41.3 acres, while the sedimentation pond is 12.1 acres. The dikes consist of 2.5(H):1(V) slopes, with 2% slopes on the crest. The construction of the impoundment was completed in 2010.

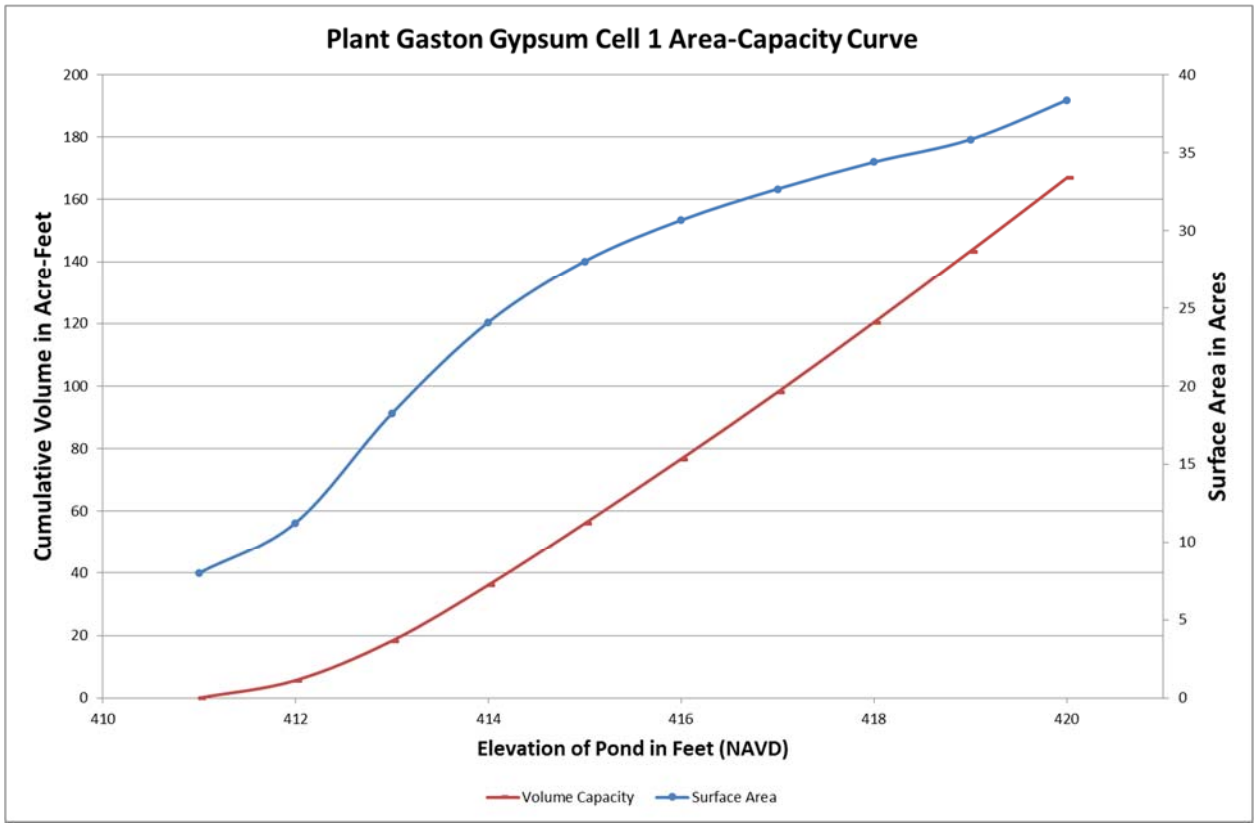
(vii) Engineering Diagram:

The following drawings reflecting the construction of the Plant Gaston Gypsum Pond can be found in the Appendix:

- E5C11030 – Cell 1 – Overall Site Layout Plan
- EC511034 – Cell 1 – Overall Site Grading and Drainage Plan
- EC511038 – Cell 1 – Sections and Details Sheet 1
- E5C11039 – Cell 1 – Sections and Details Sheet 2
- EC511049 – Cell 1 - Sections and Details Sheet 4

(viii) Description of Instrumentation: The Plant Gaston Gypsum Pond has no instrumentation.

(ix) Area-capacity curves:



(x) Spillway/Diversion design features and capacity calculations:

The facility consists of a CCR storage area (Cell 1) and a sedimentation pond. The inflow design flood consists of the rainfall that falls within the limits of the surface impoundment, runoff from approximately 14 acres of adjoining watershed, and a nominal amount (relative to the rainfall) of process flows. Stormwater is temporarily stored within the limits of the surface impoundment and discharged through a stop log riser system connected to a 36-inch discharge pipe that routes discharges to the sedimentation pond. The pool elevation in the sedimentation pond ranges from EL 406 ft to EL 407 ft. The auxiliary spillway elevation is EL 414.5 ft.

The inflow design flood has been calculated using the National Resources Conservations Service method (also known as the Soil Conservation Service (SCS) method) using the 1000-yr storm event required for a Significant hazard potential facility. Runoff curve number data was determined using Table 2-2A from the Urban Hydrology for Small Watersheds (TR-55). Appendix A and B from the TR-55 were used to determine the rainfall distribution methodology. Precipitation values were determined from NOAA's Precipitation Frequency Data Server (Atlas-14).

The NRCS provided information on the soil characteristics and hydrologic groups present at the site. It was determined that the hydrological group "D" should be used to best reflect the characteristics of the soils on site. This information was placed into Hydraflow Hydrographs 2013 and used to generate

appropriate precipitation curves, storm basin routing information, and resulting rating curves to evaluate surface impoundment capacity.

Calculations indicate the unit can safely store and pass the inflow design storm.

(xi) Provisions for surveillance, maintenance and repair: Inspections of dams and dikes are critical components and are conducted on a regular basis—at least annually by professional dam safety engineers and at least weekly by trained plant personnel. In addition, inspections are performed after unusual events such as storms. The inspections provide assurance that structures are sound and that action is taken, as needed, based on the findings. Safety inspections include numerous checklist items. Specific items vary from site to site but may include observations of such things as pond levels, weather conditions, rainfall since the prior inspection, conditions of slopes and drains, erosion, animal damage, ant hills, alignment of retaining structures and more. Dam safety engineers assess any maintenance or remediation performed since the previous inspection, check the status of work recommended at prior inspections, ensure that the posting of emergency notification information is up to date and evaluate any items noted during plant personnel inspections.

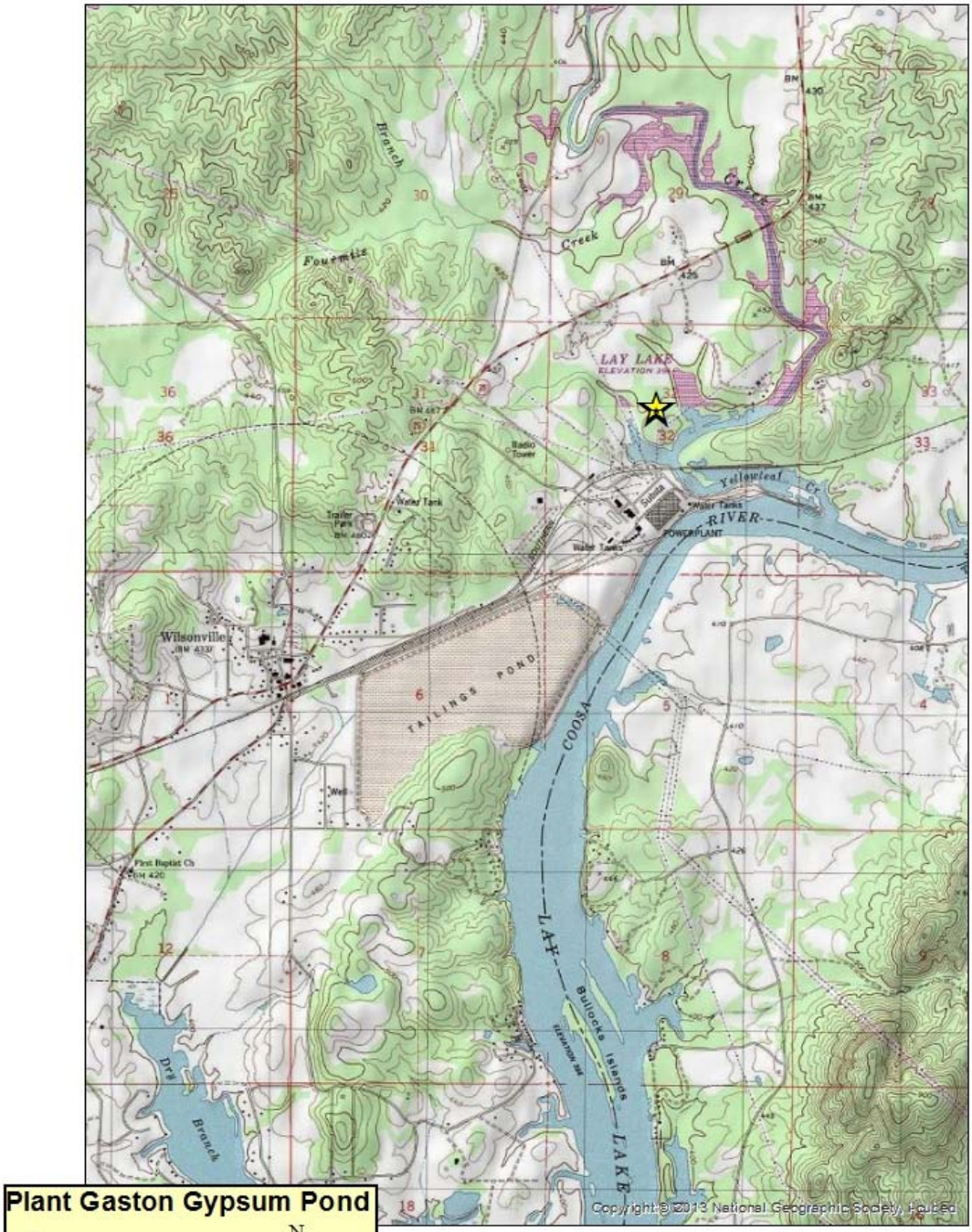
Construction specifications:

The following specifications relevant to the construction of the Plant Gaston Gypsum Pond can be found in the Appendix:

- Technical Specification Section 31, Construction of Cell 1 and Sedimentation Pond of the Gypsum Storage Facility at Plant Gaston
- E5C – Cell 1 – Drawing Index, Notes, and Specifications

(xii) Known record of structural instability: There are no known instances of structural instability at the CCR unit.

Appendix



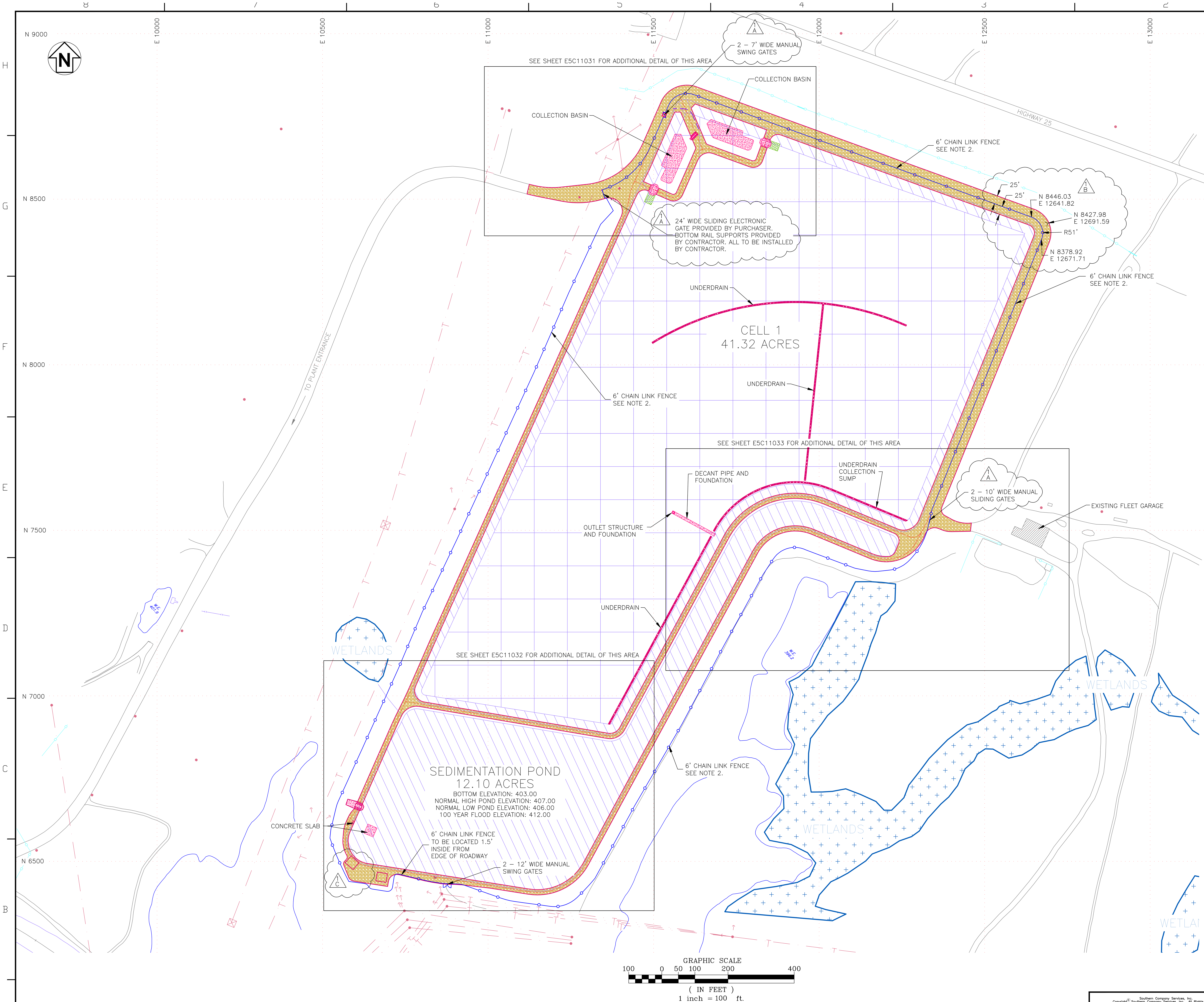
Plant Gaston Gypsum Pond

Gypsum Pond Location

USA Topo Maps

N

0 0.25 0.5 1 Miles



LEGEND

- EXISTING TRANSMISSION LINES, GUYS, AND POLES
- EXISTING EDGE OF PAVING
- EXISTING FENCE
- EXISTING SIGNS & IMPROVEMENTS
- EXISTING BUILDINGS
- EXISTING CONCRETE
- EXISTING CONTOURS
- PROPOSED MAJOR CONTOURS
- PROPOSED MINOR CONTOURS
- WETLANDS DELINEATION
- BORROW AREA LIMITS
- WATER SURFACE
- PROPOSED FENCING
- PROPOSED EDGE OF PAVING
- PROPOSED ROAD/DIKE CENTERLINE
- PROPOSED STORM DRAIN
- PROPOSED STORM DRAINAGE STRUCTURE
- DRAINAGE FLOWLINE
- EROSION PROTECTION
- HDPE LINER (60 MIL, TEXTURED)
- GSE FABRINET (6 OZ, DOUBLE SIDED) AND HDPE LINER (60 MIL, TEXTURED)
- HDPE LINER (USED AS EROSION CONTROL ONLY)
- PROPOSED CONCRETE PAVING
- PROPOSED 8" TRACKING SURFACE

NOTE:
1. SEE SHEET E5C11027 FOR DRAWING INDEX LIST.
2. FENCE LOCATION TO BE DETERMINED ACCORDING TO THE PURCHASER'S REPRESENTATIVE UNLESS NOTED OTHERWISE.

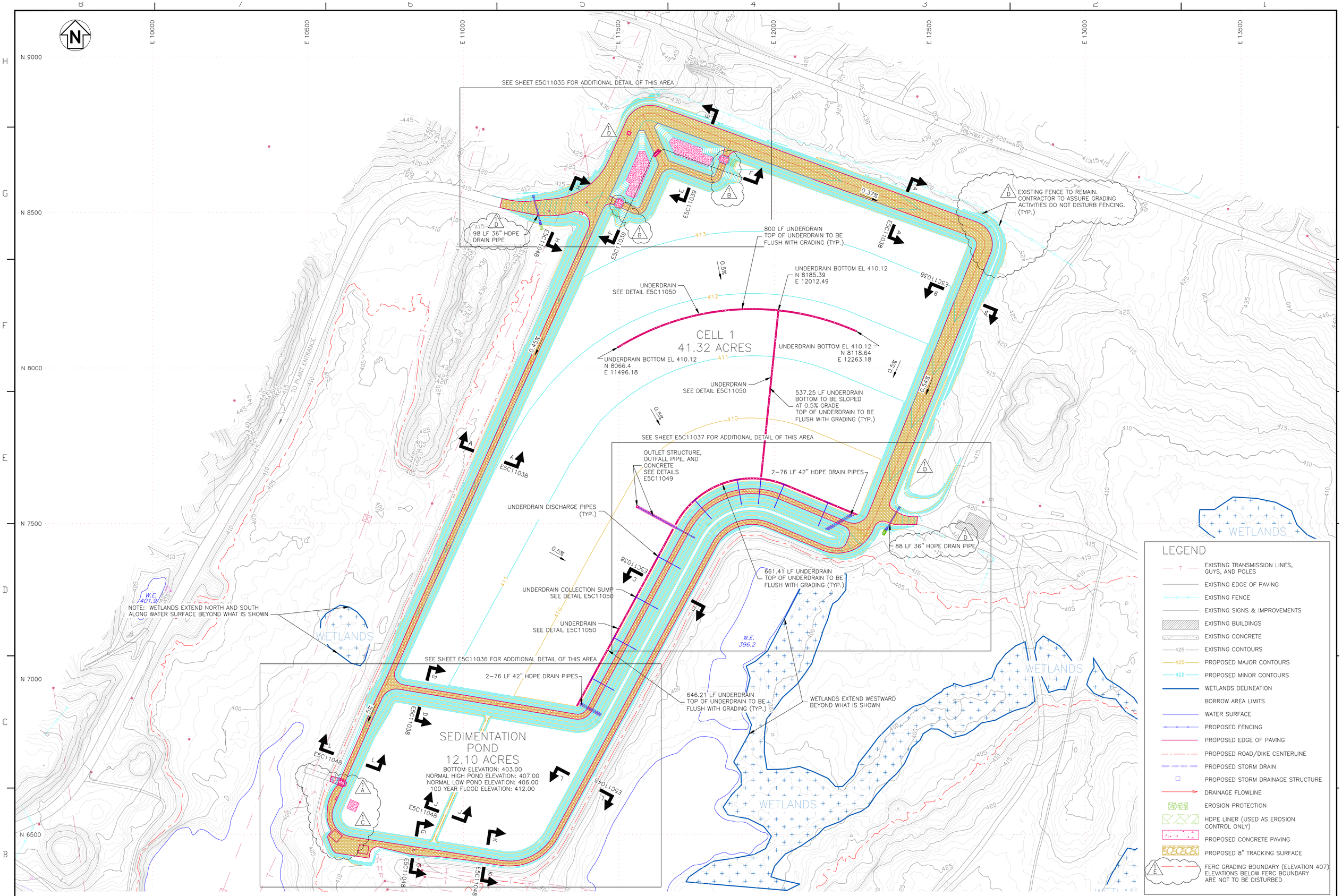
ADVANCE PRINT

Southern Company Generation Engineering and Construction Services
FOR
Alabama Power Company

PLANT GASTON – UNIT 5 FGD PROJECT
GYPSUM STORAGE FACILITY – CELL 1
OVERALL SITE LAYOUT PLAN

REVISION	DATE	DESCRIPTION	BY	CHK'D	CIVIL APPR	ELECT APPR	S/C APPR	MECH APPR	DISC MGR
1	2/27/09	A. REVISED FENCING AND GATES B. ADDITIONAL ACCESS ROAD C. ADDITIONAL CRANE PAD	AEI	RCB	MDA	MDC	GIL	DRD	CKT
0	12/19/08	ISSUED FOR CONSTRUCTION EWO: 2120DE	AEI	RCB	MDA	MDC	GIL	DRD	CKT

SCALE	PROJ I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
1"=100'	211100	E5C11030	1	FINAL	1



LEGEND

- EXISTING TRANSMISSION LINES, GUYS, AND POLES
- EXISTING EDGE OF PAVING
- EXISTING FENCE
- EXISTING SIGNS & IMPROVEMENTS
- EXISTING BUILDINGS
- EXISTING CONCRETE
- 425 EXISTING CONTOURS
- 425 PROPOSED MAJOR CONTOURS
- 422 PROPOSED MINOR CONTOURS
- WETLANDS DELINEATION
- BORROW AREA LIMITS
- WATER SURFACE
- PROPOSED FENCING
- PROPOSED EDGE OF PAVING
- PROPOSED ROAD/DIKE CENTERLINE
- PROPOSED STORM DRAIN
- PROPOSED STORM DRAINAGE STRUCTURE
- DRAINAGE FLOWLINE
- EROSION PROTECTION
- HDPE LINER (USED AS EROSION CONTROL ONLY)
- PROPOSED CONCRETE PAVING
- PROPOSED 8" TRACKING SURFACE
- FERC GRADING BOUNDARY (ELEVATION 407) ELEVATIONS BELOW FERC BOUNDARY ARE NOT TO BE DISTURBED

GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

NOTE:
SEE SHEET E5C11027 FOR DRAWING INDEX LIST.

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FOR
Alabama Power Company

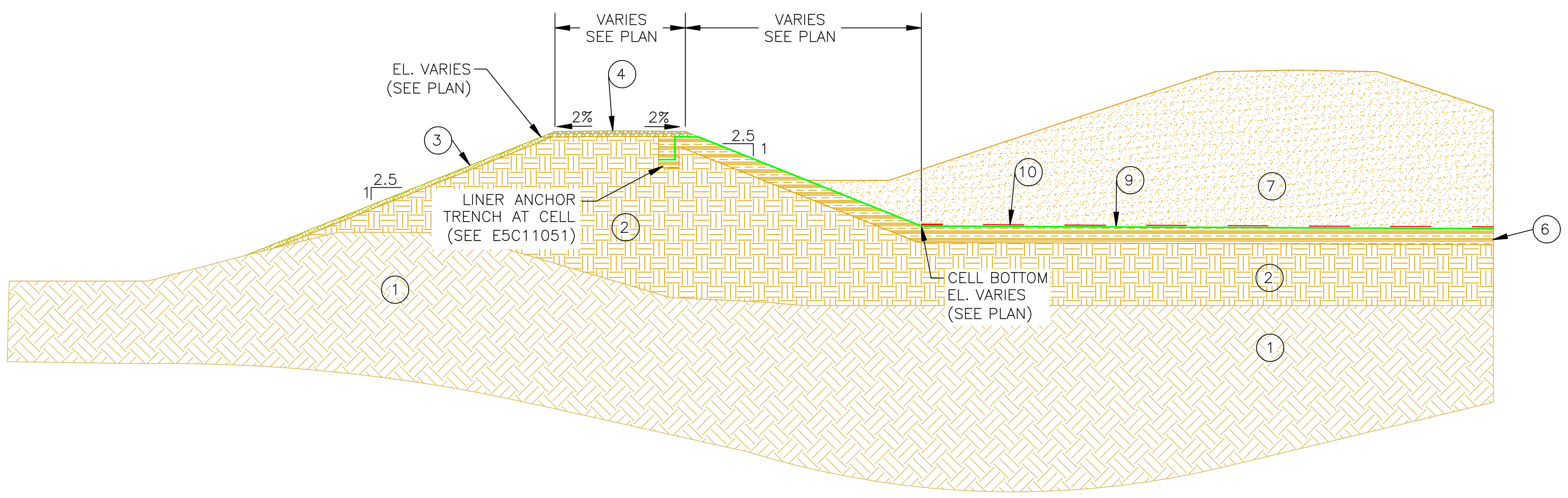
PLANT GASTON – UNIT 5 FGD PROJECT
GYPSUM STORAGE FACILITY – CELL 1
OVERALL SITE GRADING AND DRAINAGE PLAN

REVISION	DATE	DESCRIPTION
1	2/27/09	A. SEDIMENTATION POND EMERGENCY SPILLWAY B. REVISED EAST AND WEST SPILLWAY ELEVATIONS C. ADDITIONAL CRANE PAD AREA D. REVISED DIKE LAYOUT AND ASSOCIATED GRADING AND DRAINAGE E. REVISED LEGEND TO INCLUDE FERC BOUNDARY
0	12/19/08	ISSUED FOR CONSTRUCTION EWO: 2120DE

BY	CHK'D	CIVIL APPR	ELECT APPR	I/C APPR	MECH APPR	DISC MGR
AEI	RCB	MDA	MDC	GIL	DRD	CKT
AEI	RCB	MDA	MDC	GIL	DRD	CKT

SCALE	PROJ I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
1"=100'	211100	E5C11034	1	FINAL	1

ANSI E 44x34 Acad2008



SECTION A-A
E5C11034
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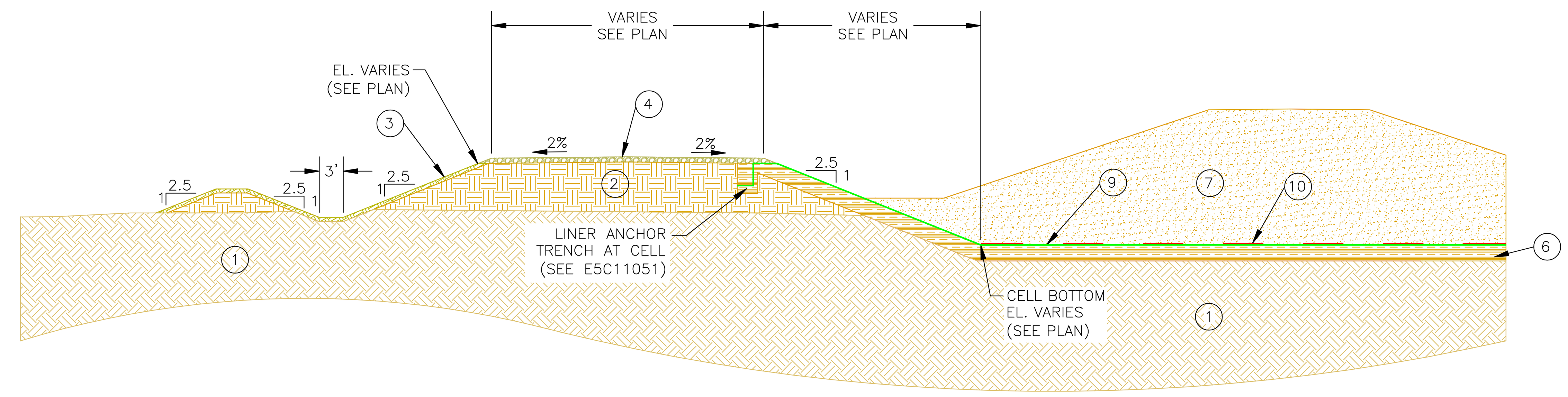

SECTION B-B
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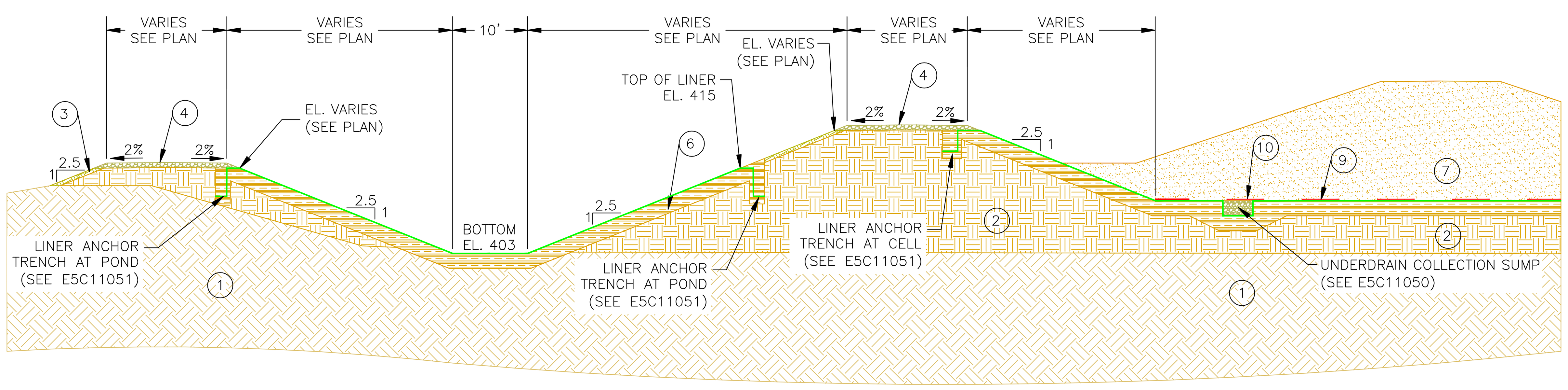

SECTION C-C
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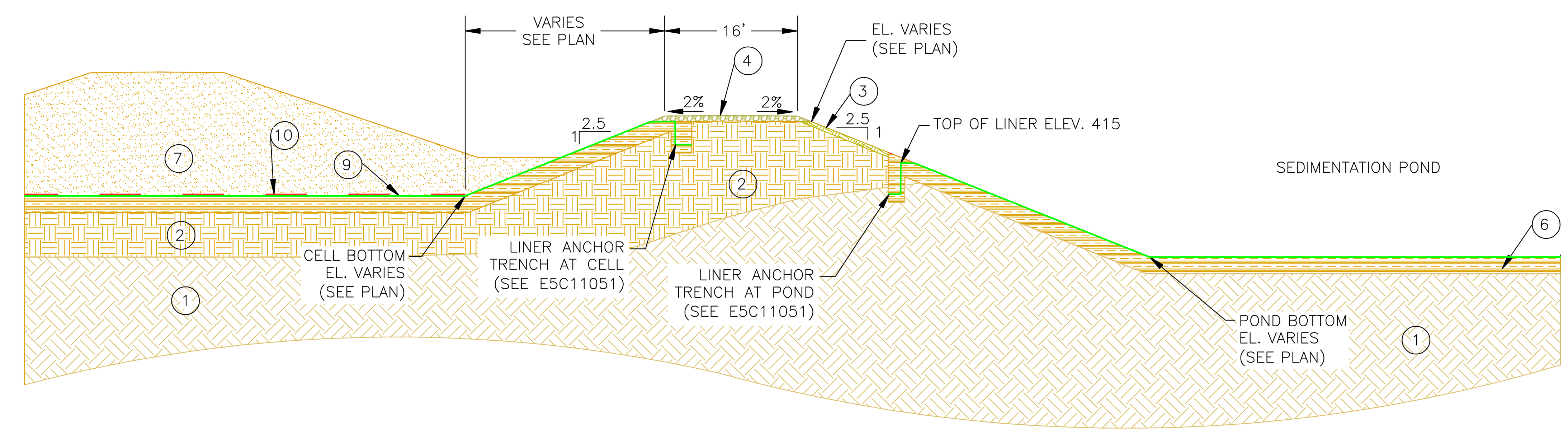

SECTION D-D
E5C11034
N.T.S.

MATERIALS LEGEND

No.	Material
1	IN SITU SOIL
2	COMPACTED SUBGRADE
3	TOPSOIL 4" TO 6" FINAL THICKNESS AND GRASSED
4	TRACKING SURFACE 8" THICK GRADED AGGREGATE BASE
5	FLOWABLE FILL MATERIAL
6	24" THICK COMPACTED CLAY SUBGRADE MATERIAL (FREE OF ANY DEBRIS THAT COULD PUNCTURE THE HDPE LINER)
7	FUTURE GYPSUM FILL (BY OTHERS)
8	ROLLER COMPACTED CONCRETE (THICKNESS VARIES)
9	60 MIL HDPE LINER
10	GEOCOMPOSITE DRAINAGE NET (GDN)

SEE E5C11027 AND TECHNICAL SPECIFICATIONS FOR DESCRIPTION AND CLASSIFICATION OF MATERIALS.

NOTE:
SEE SHEET E5C11027 FOR DRAWING INDEX LIST.

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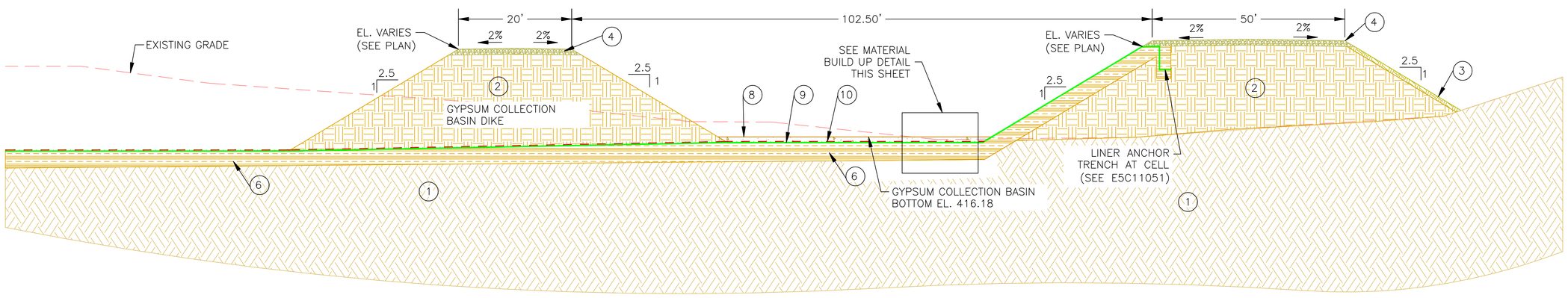
Southern Company Generation Engineering and Construction Services
FOR
Alabama Power Company

PLANT GASTON – UNIT 5 FGD PROJECT
GYPSUM STORAGE FACILITY – CELL 1
SECTIONS & DETAILS
SHEET 1

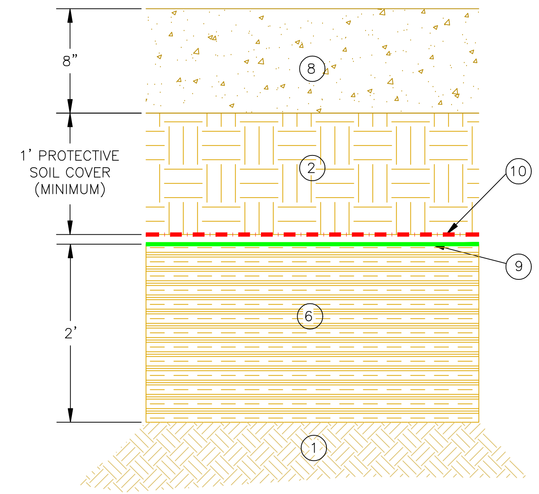
REVISION 0 DATE 12/19/08
ISSUED FOR CONSTRUCTION
EWO: 2120DE

BY	CHK'D	CIVIL APPR	ELECT APPR	I/C APPR	MECH APPR	DISC MGR	SCALE	PROJ I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
AEI	RCB	MDA	MDC	GIL	DRD	CKT	N.T.S.	211100	E5C11038	1	FINAL	0

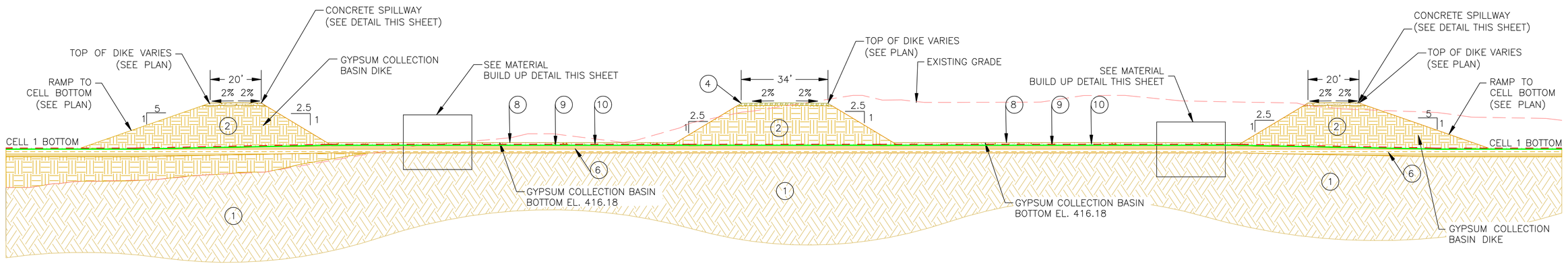
ANSI E: 44x34 Acad2004



SECTION E-E
E5C11034 & E5C11035
N.T.S.



MATERIAL BUILD UP DETAIL
N.T.S.



SECTION F-F
E5C11034 & E5C11035
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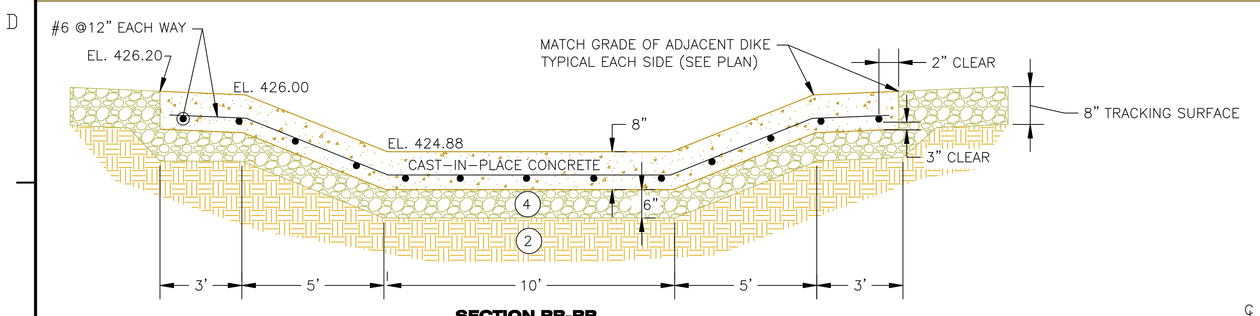
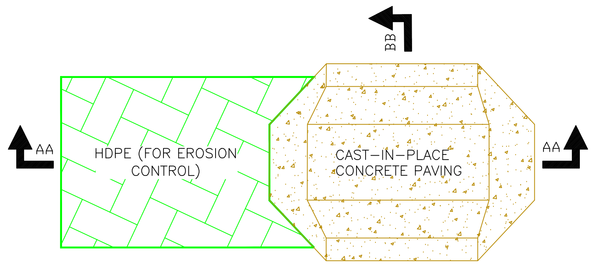
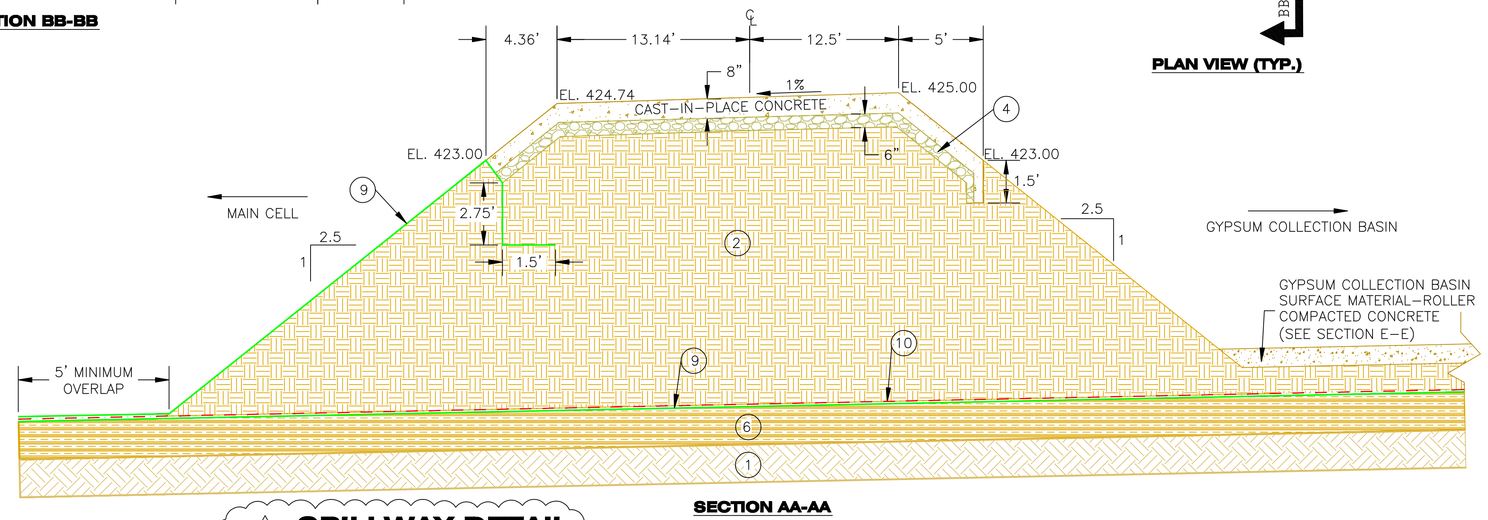


SECTION BB-BB



PLAN VIEW (TYP.)

NOTES:
1. FLUME LAYOUT TO BE AS SHOWN ON PLAN.
2. ELEVATIONS SHOWN ARE TO TOP OF FINISHED CONCRETE.
3. AGGREGATE BASE TO BE TYPE "B" (COMPACTED TO 90% MODIFIED PROCTOR DENSITY OR AS APPROVED BY OWNER'S REPRESENTATIVE).
4. SURFACE TO BE BROOM FINISHED.



SECTION AA-AA

SPILLWAY DETAIL
E5C11035
N.T.S.

MATERIALS LEGEND

1	IN SITU SOIL	6	24" THICK COMPACTED CLAY SUBGRADE MATERIAL (FREE OF ANY DEBRIS THAT COULD PUNCTURE THE HDPE LINER)
2	COMPACTED SUBGRADE	7	FUTURE GYPSUM FILL (BY OTHERS)
3	TOPSOIL 4" TO 6" FINAL THICKNESS AND GRASSED	8	ROLLER COMPACTED CONCRETE (THICKNESS VARIES)
4	TRACKING SURFACE 8" THICK GRADED AGGREGATE BASE	9	60 MIL HDPE LINER
5	FLOWABLE FILL MATERIAL	10	GEOCOMPOSITE DRAINAGE NET (GDN)

SEE E5C11027 AND TECHNICAL SPECIFICATIONS FOR DESCRIPTION AND CLASSIFICATION OF MATERIALS.

NOTE:
SEE SHEET E5C11027 FOR DRAWING INDEX LIST.

ADVANCE PRINT

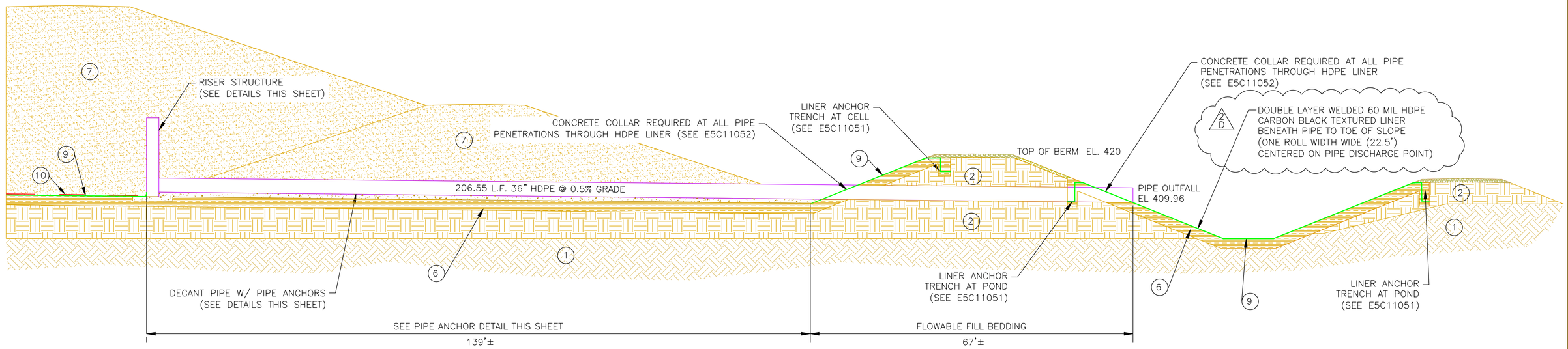
REVISION	DATE	BY	CHK'D	CIVIL APPR	ELECT APPR	I/C APPR	MECH APPR	DISC MGR
1	2/27/09	AEI	RCB	MDA				CKT
A. REVISED SECTION E-E PER REVISED DIKE LAYOUT B. REVISED ELEVATIONS ON SPILLWAY DETAIL								
0	12/19/08	AEI	RCB	MDA	MDC	GIL	DRD	CKT
ISSUED FOR CONSTRUCTION EWO: 2120DE								

Southern Company Generation
Engineering and Construction Services
FOR
Alabama Power Company

PLANT GASTON – UNIT 5 FGD PROJECT
GYPSUM STORAGE FACILITY – CELL 1
SECTIONS & DETAILS
SHEET 2

SCALE	PROJ I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
N.T.S.	211100	E5C11039	1	FINAL	1

ANSI E 44x34 Acad2004



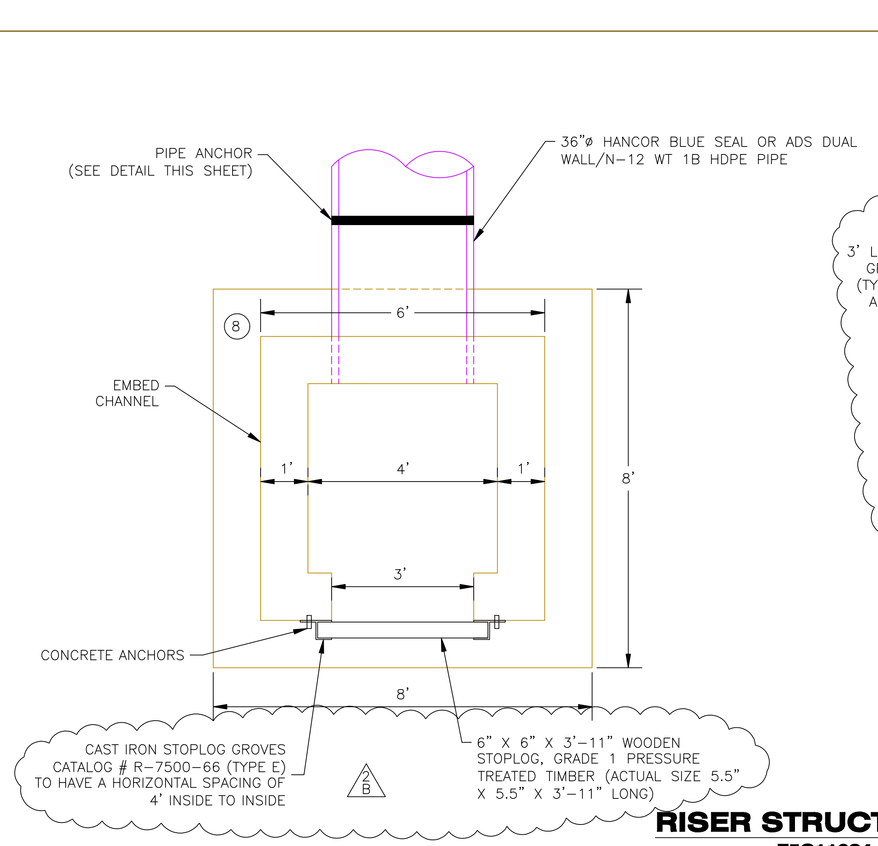
DECANT PIPE & RISER STRUCTURE SECTION

E5C11034 & E5C11037
N.T.S.

MATERIALS LEGEND

1. IN SITU SOIL
2. COMPACTED SUBGRADE
3. TOPSOIL 4" TO 6" FINAL THICKNESS AND GRASSED
4. TRACKING SURFACE 8" THICK GRADED AGGREGATE BASE
5. FLOWABLE FILL MATERIAL
6. 24" THICK COMPACTED CLAY SUBGRADE MATERIAL (FREE OF ANY DEBRIS THAT COULD PUNCTURE THE HDPE LINER)
7. FUTURE GYPSUM FILL (BY OTHERS)
8. CAST-IN-PLACE CONCRETE (THIS SHEET ONLY)
9. 60 MIL HDPE LINER
10. GEOCOMPOSITE DRAINAGE NET (GDN)

SEE E5C11027 AND TECHNICAL SPECIFICATIONS FOR DESCRIPTION AND CLASSIFICATION OF MATERIALS.



RISER STRUCTURE SECTION

E5C11034 & E5C11037
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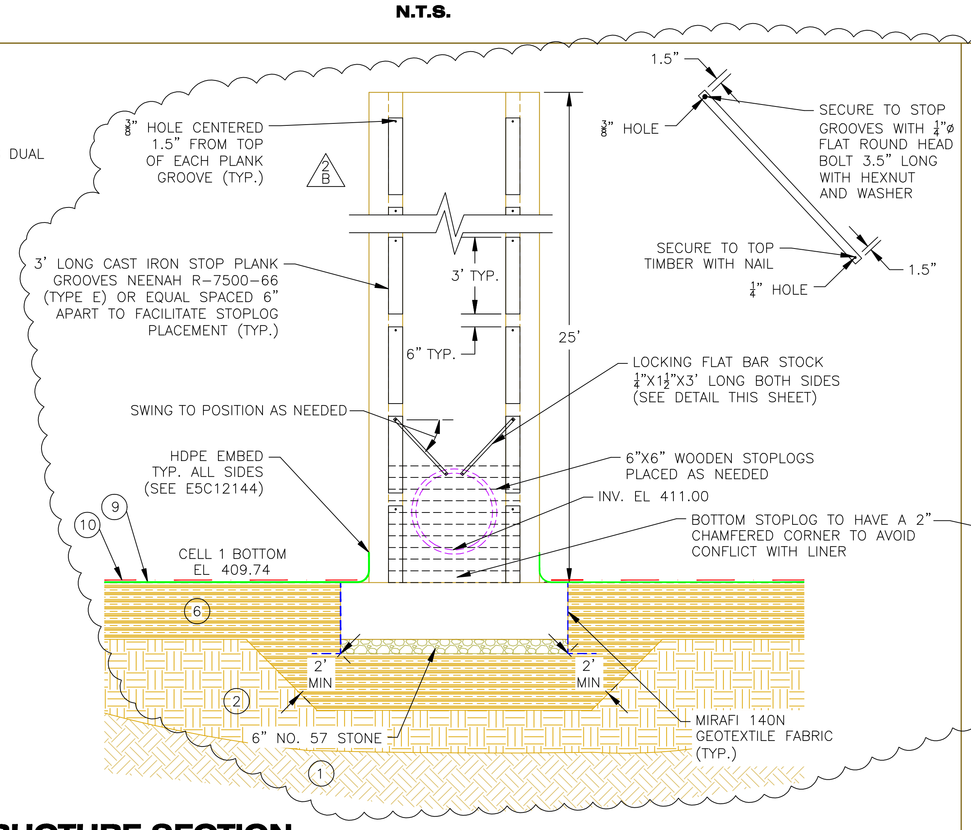
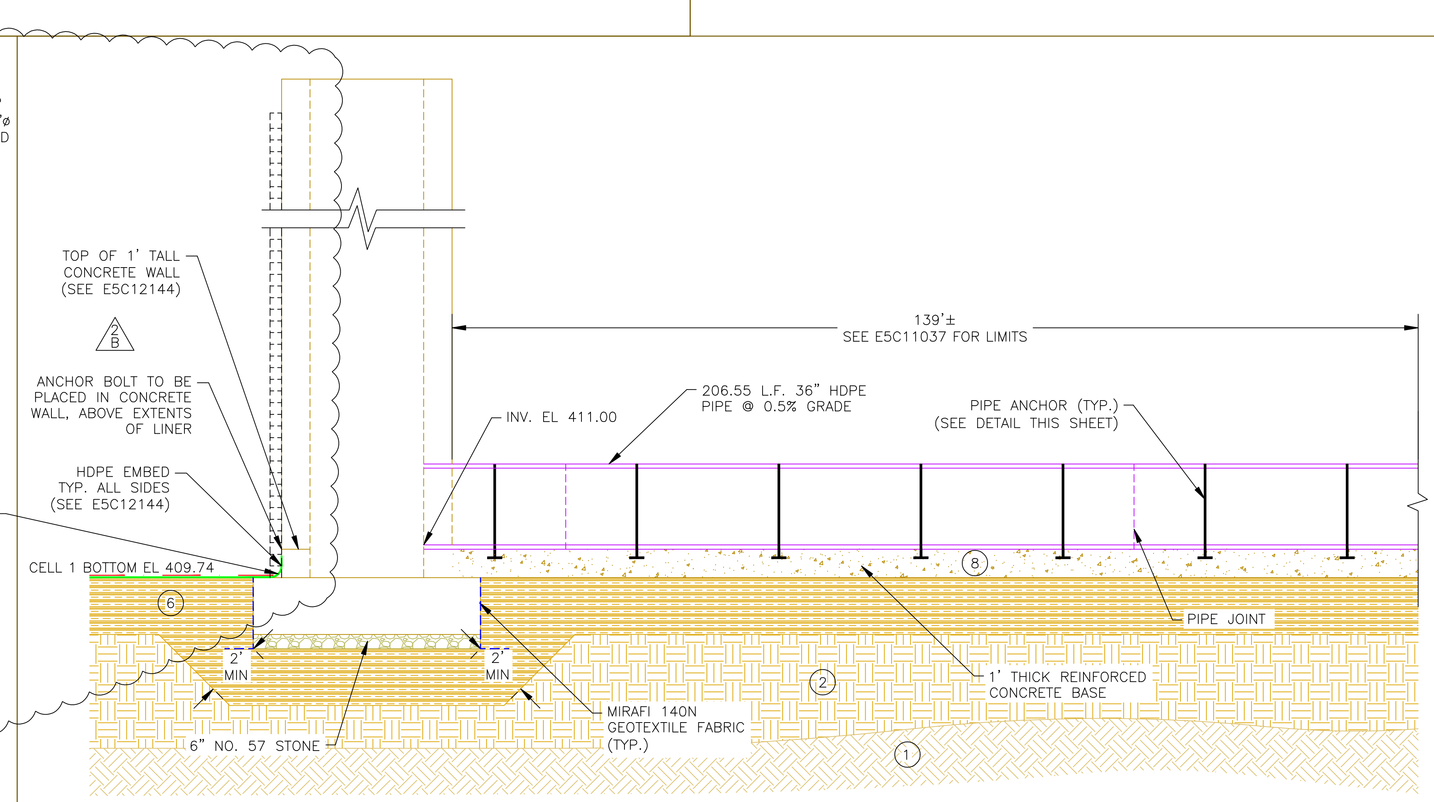
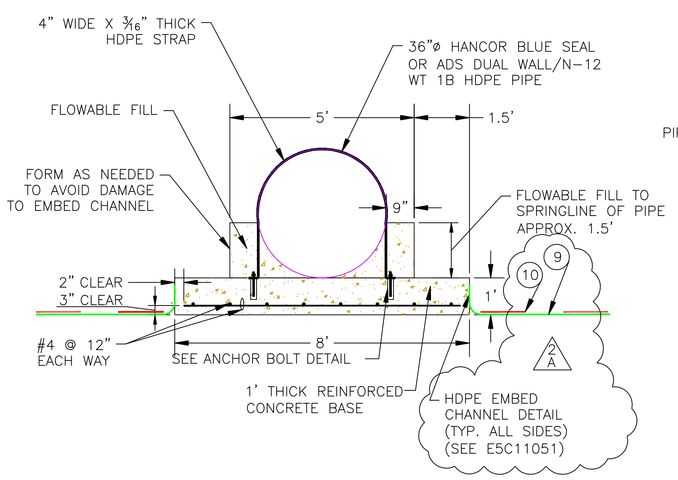
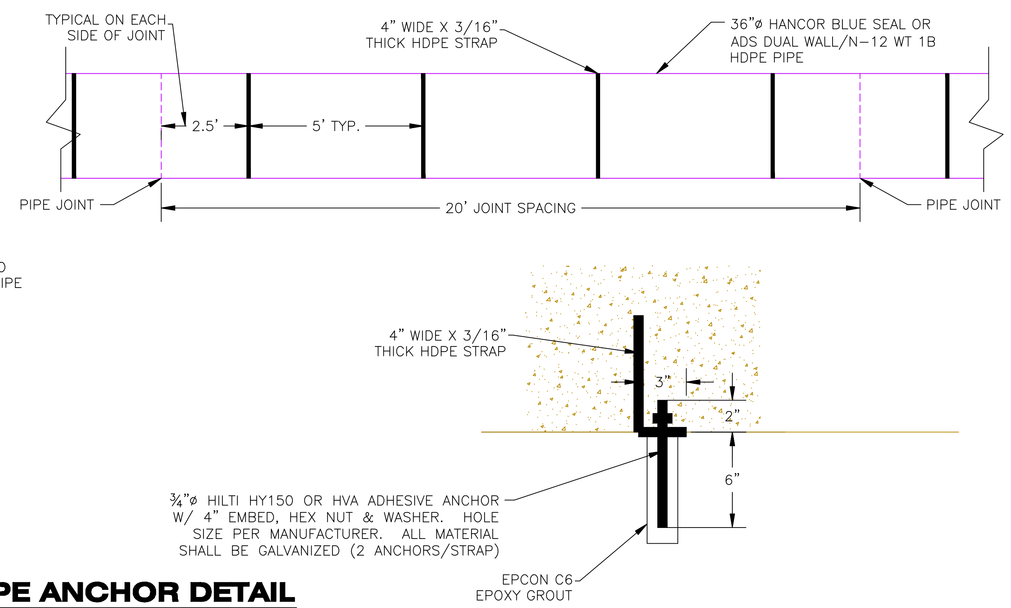




RISER STRUCTURE & DECANT PIPE

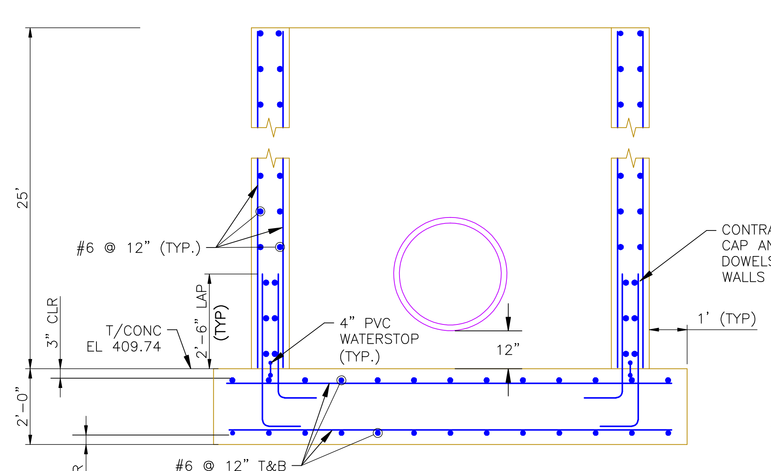
E5C11033, E5C11034, & E5C11037
N.T.S.





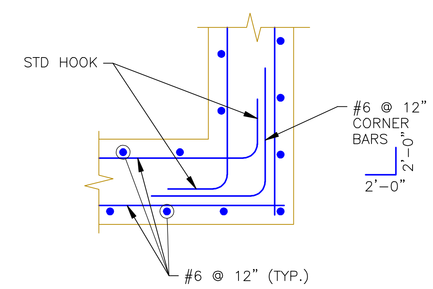
PIPE ANCHOR DETAIL

N.T.S.



RISER STRUCTURE REINFORCEMENT DETAIL

(FOR REFERENCE ONLY SEE SHEET E5C12144)
N.T.S.



TYP. CORNER BAR DETAIL

N.T.S.

NOTES:
1. SEE SHEET E5C11027 FOR DRAWING INDEX LIST, NOTES AND SPECIFICATIONS.
2. CONCRETE STRUCTURE AND REINFORCING DETAILS ON THIS SHEET ARE FOR REFERENCE ONLY. SEE SHEET E5C12144 FOR CONSTRUCTION INFORMATION.
3. TO PREVENT POSSIBLE FLOTATION OF STOPLOGS, USE LOCKING FLAT BAR STOCK AS SHOWN. (2 SETS REQUIRED FOR ALTERNATING PLACEMENT). SHIM STOPLOGS AGAINST GROOVES TO PREVENT MOVEMENT. JOIN STOPLOGS TO EACH PRECEDING LOG AS NEEDED.

ADVANCE PRINT

Southern Company Generation Engineering and Construction Services
FOR
Alabama Power Company

PLANT GASTON – UNIT 5 FGD PROJECT
GYPSUM STORAGE FACILITY – CELL 1
SECTIONS & DETAILS
SHEET 4

EWO: 2120DE

REVISION	DATE	BY	CHK'D	CIVIL APPR	ELECT APPR	I/C APPR	MECH APPR	DISC MGR
2	4/29/09	AEI	RCB	MDA	MDC	GIL	DRD	CKT
A. REVISED EMBED NOTE B. REVISED RISER STOPLOG PLACEMENT AND GROOVES C. REVISED NOTES D. ADDITIONAL OUTFALL LINER NOTE								
1	2/27/09	AEI	RCB	MDA	MDC	GIL	DRD	CKT
A. REVISED LINER AND CONCRETE PIPE BASE LOCATION								
0	12/19/08	AEI	RCB	MDA	MDC	GIL	DRD	CKT
ISSUED FOR CONSTRUCTION								

SCALE	PROJ I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
N.T.S.	211100	E5C11049	1	FINAL	2

ANSI E 44x34 Acad2008

DRAWING INDEX:
PLANT E.C. GASTON UNIT 5 – FGD PROJECT – GYPSUM STORAGE AREA – CELL 1

E5C11027–CELL 1–DRAWING INDEX, NOTES, AND SPECIFICATIONS
E5C11028–CELL 1–EXISTING SITE CONDITIONS
E5C11029–CELL 1–SITE PREPARATION PLAN
E5C11030–CELL 1–OVERALL SITE LAYOUT PLAN
E5C11031–CELL 1–SITE LAYOUT PLAN–CELL 1 GYPSUM COLLECTION BASINS
E5C11032–CELL 1–SITE LAYOUT PLAN–SEDIMENTATION POND
E5C11033–CELL 1–SITE LAYOUT PLAN–SEDIMENTATION POND CANAL
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REFERENCE:

STRUCTURAL DRAWINGS:
E5C12140–GYPSUM STORAGE ELECTRICAL BUILDING FOUNDATION
E5C12142–OUTDOOR CONCRETE–GYPSUM STORAGE POND–FOUNDATION PLAN
E5C12143–OUTDOOR CONCRETE–GYPSUM STORAGE POND–SECTIONS & DETAILS
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ELECTRICAL DRAWINGS:
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E5E30044–GYPSUM STORAGE POND ELECTRICAL DUCT RUN & PUMP PLATFORM LOCATION

MECHANICAL DRAWINGS:
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E5M22310 SHEET 1 PIPING PLAN – CLEAR POND PUMP PIPING
E5M22310 SHEET 2 SECTIONS – CLEAR POND PUMP PIPING
B

TECHNICAL SPECIFICATION REFERENCE:

1. REFER TO TECHNICAL SPECIFICATION SECTION 31 FOR CONSTRUCTION OF CELL 1 GYPSUM SLURRY POND OF THE GYPSUM STORAGE AREA.

GENERAL CONSTRUCTION NOTES:
1. THE CONTRACTOR SHALL OBTAIN FROM THE PURCHASER DESIGNATED ACCESS DIRECTIONS ACROSS THE PLANT PROPERTY.
2. EXISTING ACCESS AND PLANT ROADS SHALL BE MAINTAINED AND REPAIRED IF NECESSARY DURING CONSTRUCTION BY THE CONTRACTOR TO THE SATISFACTION OF THE PURCHASER'S REPRESENTATIVE.
3. THE CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTING HIS OWN STANDARD QUALITY CONTROL AND QUALITY ASSURANCE PROGRAM OR PRACTICES AND SHALL INSTITUTE ANY ADDITIONAL CONTROLS OR PROCEDURES IN ACCORDANCE WITH PROVEN INDUSTRY PRACTICE TO ASSURE COMPLIANCE WITH THESE DRAWINGS AND TECHNICAL SPECIFICATIONS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PLANNING AND OPERATING ANY DEWATERING, SURFACE WATER RUNOFF CONTROL, PROVISIONS FOR DRAINAGE FOR EXCAVATIONS, AND FOR THE PLACEMENT OF MATERIALS. CONTRACTOR TO COORDINATE WITH PURCHASER'S REPRESENTATIVE PRIOR TO DISCHARGING ANY WATER. SUCH DEWATERING WORK SHALL BE AT NO ADDITIONAL EXPENSE TO THE PURCHASER.
5. THE CONTRACTOR SHALL STAY OUT OF DESIGNATED WETLANDS. THESE WETLANDS HAVE BEEN MARKED BY THE PURCHASER. SHOULD ANY OF THE MARKERS BE DISTURBED, THE CONTRACTOR SHALL NOTIFY THE PURCHASER IMMEDIATELY. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR PROTECTION OF THE WETLANDS. ANY RESTORATION AND ALL ASSOCIATED COSTS WILL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PURCHASER.
6. ALL GRADE ELEVATIONS SHOWN ON DRAWINGS ARE FINISH GRADE.
7. COORDINATE SYSTEM IS A PLANT GRID SYSTEM. CONTRACTOR SHALL COORDINATE AND VERIFY CONTROL MONUMENT LOCATIONS AND ELEVATIONS WITH PURCHASER'S REPRESENTATIVE PRIOR TO COMMENCING ANY SURVEY WORK.
8. ALL WORK SHALL CONFORM TO A.L.D.O.T. STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION (CURRENT EDITION).
9. SEE A.L.D.O.T. STANDARD SPECIFICATION FOR HIGHWAY CONSTRUCTION (CURRENT EDITION) SECTION 825 "CRUSHED AGGREGATE BASE MATERIALS" FOR SPECIFICATIONS ON AGGREGATE BASE TO BE PLACED ON ROADWAY. TYPE 'A' MATERIAL TO BE USED.
10. STONE MATERIAL TO BE COMPACTED TO 90% MODIFIED PROCTOR DENSITY OR AS APPROVED BY PURCHASER'S REPRESENTATIVE.
11. SUBGRADE IN CUT AREAS AND EXISTING GRADE IN FILL AREAS TO BE PROOF ROLLED AND VERIFIED BY PURCHASER'S REPRESENTATIVE TO BE SUFFICIENTLY COMPACTED PRIOR TO ANY EARTH FILL AND/OR STONE FILL BEING PLACED UPON IT.
12. ANY NECESSARY EARTH FILL SHALL BE FREE OF ORGANICS, DEBRIS, AND VEGETATION. THE FILL SHALL CONSIST OF CLEAN SAND, SILT OR CLAY MIXTURES. EARTH FILL SHALL BE PLACED IN UNIFORM LAYERS OF 8 TO 10 INCHES, NOMINAL THICKNESS, LOOSE MEASUREMENT. FILL MATERIAL TO BE COMPACTED TO 95% STANDARD PROCTOR DENSITY OR AS APPROVED BY PURCHASER'S REPRESENTATIVE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL REQUIRED BORROW EXCAVATION MATERIAL. PRIOR TO PLACING OF FILL MATERIAL, SCARIFY SURFACE OF GROUND TO A DEPTH OF 6". MOISTURE CONTENT OF LOOSENED MATERIAL SHALL BE SUCH THAT IT WILL BOND TO THE FIRST LAYER OF FILL MATERIAL.
13. ALL SURFACE STONE MATERIALS AND SELECT FILL BASE SHALL BE PLACED UNIFORMLY SUCH THAT AFTER COMPACTION IT WILL MEET THE WIDTH AND THICKNESS REQUIREMENTS SHOWN ON THE DRAWINGS.
14. PRIOR TO ANY OTHER CONSTRUCTION, A STABILIZED CONSTRUCTION ENTRANCE SHALL BE CONSTRUCTED AT THE POINT OF ENTRY TO THE SITE. CONSTRUCTION ENTRANCE SHALL BE A MINIMUM OF 20' IN WIDTH AND 50' IN LENGTH. STONE SIZE SHALL BE IN ACCORDANCE WITH NATIONAL STONE ASSOCIATION R–2 (1.5 – 3.5 INCH STONE). CONSTRUCTION ENTRANCE SHALL HAVE A MINIMUM PAD THICKNESS OF 6 INCHES.
15. CONTRACTOR TO USE CAUTION WHEN WORKING UNDER OR NEAR TRANSMISSION LINES. REQUIRED CLEARANCES FROM EQUIPMENT AND PERSONNEL PERFORMING WORK NEAR HIGH VOLTAGE POWER LINES ARE SPECIFIED IN OSHA 1910.333.
16. STORM PIPE SHALL BE ADS N–12 HDPE DUAL WALL PIPE (CORRUGATED EXTERIOR WALL/SMOOTH INTERIOR WALL), OR APPROVED EQUAL UNLESS NOTED OTHERWISE. ALL JOINTING, INSTALLATION, TRENCHING AND BEDDING SHALL CONFORM TO MANUFACTURER'S GUIDELINES.
17. SLOPE PAVED HEADWALLS TO BE PER A.L.D.O.T. DRAWING HW–614–SP.
18. ALL CUT AND FILL SLOPES SHALL BE A MINIMUM OF 2.5 HORIZONTAL TO 1 VERTICAL EXCEPT WHERE NOTED ON PLANS.

EROSION AND SEDIMENT CONTROL NOTES:
1. THE CONTRACTOR SHALL ABIDE BY AND IMPLEMENT THE STORM WATER POLLUTION PREVENTION PLAN (SWPP PLAN) ENTITLED "CONSTRUCTION BEST MANAGEMENT PRACTICES PLAN FOR GASTON GYPSUM PROJECT".
2. PRIOR TO CONSTRUCTION, ANY NECESSARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND PUT INTO PLACE, AND ANY REQUIRED DIVERSION BERMS, DITCHES AND OTHER STORM WATER MANAGEMENT STRUCTURES SHALL BE CONSTRUCTED AS NEEDED. THESE AND OTHER APPROPRIATE MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AS MAY BE REQUIRED BY THE SWPP PLAN.
3. ALL EROSION AND SEDIMENT CONTROL AT THE SITE SHALL BE PERFORMED IN ACCORDANCE WITH THE ALABAMA HANDBOOK FOR EROSION CONTROL, SEDIMENT CONTROL AND STORMWATER MANAGEMENT ON CONSTRUCTION SITES AND URBAN AREAS, LATEST EDITION.
4. AT LOCATIONS WHERE CLASS I RIP RAP IS USED FOR SLOPE PROTECTION, USE MIRAFI 180N OR APPROVED EQUAL FOR UNDERLYING FILTER FABRIC.

EARTHWORK AND CONSTRUCTED FILL NOTES:

1. CELL DIKES, CELL ACCESS RAMPS, AND GENERAL FILL AREAS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS SECTION 31 FOR THE CONSTRUCTION OF CELL 1 GYPSUM SLURRY POND OF THE GYPSUM STORAGE AREA.
2. EARTH FILL MATERIAL SHALL BE OBTAINED FROM APPROVED BORROW AREAS AS DESIGNATED OR APPROVED BY THE PURCHASER.
3. ALL EARTHWORK CONSTRUCTION SHALL BE DONE TO THE LINES, GRADES, AND CROSS SECTIONS SHOWN ON THE DRAWINGS. THE CONTRACTOR WILL ESTABLISH ALL NECESSARY BENCHMARKS AND BASE LINES REQUIRED FOR THE WORK.

HIGH DENSITY POLYETHYLENE (HDPE) LINER NOTES:

1. THE BOTTOM AND INTERIOR SLOPE OF THE CELL AND PONDS SHALL BE LINED WITH 60 MIL TEXTURED HDPE CARBON BLACK LINER AS SHOWN ON THE DRAWINGS AND AS DESCRIBED IN THE TECHNICAL SPECIFICATIONS SECTION 31.
2. THE HDPE LINER SHALL BE STORED, HANDLED AND INSTALLED ACCORDING TO THE TECHNICAL SPECIFICATIONS SECTION 31 AND AS PER THE MANUFACTURER'S GUIDELINES AND INSTRUCTIONS.
3. FOR ALL PENETRATIONS TO LINER REFER TO DETAIL DRAWINGS AND MANUFACTURER'S REQUIREMENTS.

GEOCOMPOSITE DRAINAGE NET AND UNDERDRAIN COLLECTION SUMPS NOTES:

1. A GEOCOMPOSITE DRAINAGE NET SHALL BE INSTALLED ABOVE THE HDPE LINER ACROSS THE BOTTOM AREA OF THE CELL AS SHOWN ON THE DRAWINGS AND AS DESCRIBED IN THE TECHNICAL SPECIFICATIONS SECTION 31.
2. THE GEOCOMPOSITE DRAINAGE NET SHALL BE GSE FABRINET DOUBLE SIDED 6 OZ. GEOCOMPOSITE, AND SHALL CONSIST OF ONE LAYER OF HDPE DRAINAGE NET BETWEEN TWO LAYERS OF GEOTEXTILE TO CREATE A DOUBLE SIDED GEOCOMPOSITE. THE GEOTEXTILE SHALL BE A NON–WOVEN NEEDLE PUNCHED POLYETHYLENE.
3. THE GEOCOMPOSITE DRAINAGE NET SHALL BE STORED, HANDLED AND INSTALLED ACCORDING TO THE TECHNICAL SPECIFICATIONS AND AS PER MANUFACTURER'S GUIDELINES AND INSTRUCTIONS.
4. WATER COLLECTED BY THE GEOCOMPOSITE DRAINAGE NET WILL BE COLLECTED IN UNDERDRAIN COLLECTION SUMPS. THE UNDERDRAIN COLLECTION SUMPS SHALL BE LOCATED AND CONSTRUCTED AS SHOWN ON THE DRAWINGS.
5. THE GEOCOMPOSITE DRAINAGE NET WILL HENCE BE REFERRED TO AS "GDN".
6. GEOTEX 1001 FILTER FABRIC (OR APPROVED EQUAL) WILL BE USED TO WRAP UNDERDRAIN COLLECTION SUMPS AS NOTED ON DETAIL.

CONCRETE NOTES:

1. DESIGN MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE FOLLOWING LATEST STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE MODIFIED ON THE DESIGN DRAWINGS:
   –ACI–318 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE
   –ACI–315 MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES
   –ACI–347R RECOMMENDED PRACTICE FOR CONCRETE FORMWORK
   –CRSI RECOMMENDED PRACTICE FOR PLACING REINFORCING STEEL
2. ALL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI IN 28 DAYS, UNLESS OTHERWISE NOTED.
3. USE TYPE I/II PORTLAND CEMENT AND W/C RATIO OF .45.
4. CONCRETE SHALL HAVE A FLY ASH CONTENT EQUAL TO 15–30% OF THE TOTAL CEMENTITIOUS MATERIAL, UNLESS OTHERWISE APPROVED BY THE DESIGNING ENGINEER. FLY ASH SHALL CONFORM TO REQUIREMENTS OF ASTM C618, CLASS F.
5. IF READY–MIX CONCRETE IS USED FROM AN APPROVED SUPPLIER, ALL CONCRETE SHALL BE PLACED WITHIN 1½ HOURS AFTER MIXING.
6. CONCRETE SLABS SHALL HAVE A STEEL TROWEL FINISH.
7. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60. WELDED STEEL WIRE FABRIC SHALL BE ASTM A185 PLAIN TYPE.
8. CHAMFER ALL EXPOSED EXTERNAL CORNERS OF CONCRETE ¾" WITH A 45 DEGREE CHAMFER, UNLESS OTHERWISE NOTED.
9. ALL REINFORCING SHALL HAVE 2" MINIMUM COVER OF CONCRETE WHERE FORMS ARE USED AND 3" MINIMUM COVER WHEN POURED AGAINST THE GROUND.
10. EMBEDMENT AND SPLICE LENGTHS FOR REINFORCING STEEL SHALL CONFORM TO ACI–318, UNLESS OTHERWISE NOTED.
11. ALL REINFORCING BAR HOOKS SHOWN ON DRAWINGS SHALL BE ACI STANDARD 90 DEGREE HOOKS, UNLESS OTHERWISE NOTED.
12. REBAR FABRICATOR SHALL OBTAIN APPROVAL OF HIS DETAIL DRAWINGS BEFORE BEGINNING FABRICATION, UNLESS OTHERWISE NOTED IN PURCHASE ORDER.

CONCRETE LINING SYSTEM:
1. ALL CONCRETE THAT WILL BE EXPOSED TO OR IN CONTACT WITH GYPSUM AND/OR GYPSUM SLURRY WATER SHALL BE COATED WITH CHEMPRUF 2410 LINING SYSTEM BY ATLAS MINERALS & CHEMICALS, INC. OR APPROVED EQUAL. THIS EXCLUDES ROLLER COMPACTED CONCRETE LOCATED IN THE GYPSUM COLLECTION BASINS.
2. THE LINING SYSTEM MATERIALS SHALL BE STORED, HANDLED AND APPLIED PER MANUFACTURER'S GUIDELINES AND INSTRUCTIONS.
3. THE LINING SYSTEM SHALL BE APPLIED BY A KNOWLEDGEABLE AND EXPERIENCED SPECIALTY CONTRACTOR.

METAL LINING SYSTEM:
1. ALL METAL THAT WILL BE EXPOSED TO OR IN CONTACT WITH GYPSUM AND/OR GYPSUM SLURRY WATER SHALL BE COATED WITH CHEMPRUF 2410 LINING SYSTEM BY ATLAS MINERALS & CHEMICALS, INC. OR APPROVED EQUAL.
2. THE LINING SYSTEM MATERIALS SHALL BE STORED, HANDLED AND APPLIED PER MANUFACTURER'S GUIDELINES AND INSTRUCTIONS.
3. THE LINING SYSTEM SHALL BE APPLIED BY A KNOWLEDGEABLE AND EXPERIENCED SPECIALTY CONTRACTOR.

FLOWABLE FILL NOTES:

1. FOR DECANT PIPE BACKFILL, A FLY ASH/CEMENT FLOWABLE FILL MIX SHALL CONSIST OF THE FOLLOWING:
–2000 LBS OF CLASS "F" FLY ASH
–150 LBS OF CEMENT
–200 LBS OF CONCRETE SAND (OPTIONAL)
–87 GALLONS OF WATER (POTABLE)
2. ALL FLOWABLE FILL TO SET 72 HOURS PRIOR TO PLACING COMPACTED SOIL BACKFILL ON FLOWABLE FILL.
3. TO PREVENT FLOTATION, HOLD–DOWN STRAPS SHALL BE USED ON THE DISCHARGE PIPES PRIOR TO PLACING FLOWABLE FILL. SEE DETAILS.

A

PERIMETER CHAIN LINK FENCE NOTES:

1. A PERIMETER CHAIN LINK FENCE AND GATES SHALL BE INSTALLED AS SHOWN ON THE DRAWINGS AND AS SPECIFIED BY THE PURCHASER. THE FENCE SHALL EXTEND 6 FEET ABOVE THE GROUND AND 1 FOOT BELOW GROUND. IT IS TO HAVE 3 STRANDS OF BARBED WIRE AT 45 DEGREES ON TOP OF THE CHAIN LINK. AN ELECTRONIC VEHICULAR GATE PROVIDED BY THE PURCHASER SHALL BE INSTALLED WHERE REQUESTED BY THE PURCHASER. ALL OTHER GATES TO BE PROVIDED BY CONTRACTOR.

PIPES AND OUTLET STRUCTURE:
1. THE HORIZONTAL PIPE FOR THE OUTLET STRUCTURE ASSEMBLY SHALL BE HANCOR BLUE SEAL OR ADS N–12 HDPE DUAL WALL PIPE OR APPROVED EQUAL. THE PIPE SHALL HAVE A SMOOTH INTERIOR WALL AND ANGULAR EXTERIOR CORRUGATIONS.
2. TO MINIMIZE JOINTS AND JOINT INSTALLATION, PIPE SHALL BE FURNISHED IN THE MAXIMUM NON–CUSTOM LENGTHS.
3. PIPE JOINTS SHALL BE WATERTIGHT ACCORDING TO THE MANUFACTURER'S GUIDELINES AND INSTRUCTIONS, AND SHALL CONTAIN A REINFORCED BELL.
4. THE RISER ASSEMBLY WILL CONSIST OF A THREE SIDED CONCRETE BOX WITH A SERIES OF STOP LOGS TO BE ADDED AS NEEDED. SEE DETAIL.
5. ALL PIPES AND ASSOCIATED APPURTENANCES SHALL BE INSTALLED AND JOINED ACCORDINGLY TO MANUFACTURER'S GUIDELINES AND INSTRUCTIONS.
6. PIPES FOR THE INTERIOR PERIMETER DITCH CULVERTS SHALL BE HANCOR BLUE SEAL OR ADS N–12 HDPE DUAL WALL PIPE OR APPROVED EQUAL. THE PIPES SHALL HAVE A SMOOTH INTERIOR WALL AND ANGULAR EXTERIOR CORRUGATIONS.
7. 12" ø COLLECTOR PIPES FOR THE UNDERDRAIN COLLECTION SUMP, ADJOINING TEES, AND PIPES LEADING FROM THE COLLECTOR PIPES TO THE SEDIMENTATION POND SHALL BE HANCOR BLUE SEAL OR ADS N–12 HDPE DUAL WALL PIPE OR APPROVED EQUAL. THE PIPES SHALL HAVE A SMOOTH INTERIOR WALL AND ANGULAR EXTERIOR CORRUGATIONS. ONLY THE COLLECTOR PIPES SHALL BE PERFORATED.

GRASSING – PERMANENT/TEMPORARY SEEDING:

1. ALL DISTURBED AND/OR EXPOSED AREAS THAT WILL REMAIN EXPOSED FOR MORE THAN THIRTEEN DAYS SHALL BE SEEDED, MULCHED AND FERTILIZED UPON REACHING FINAL GRADES.
2. AREAS OF STRUCTURAL FILL SHALL BE GRASSED UPON REACHING FINAL GRADES AT NO ADDITIONAL COST TO THE PURCHASER.
3. TOPSOIL SHALL BE PLACED TO A FINAL COVER THICKNESS OF 4 INCHES TO 6 INCHES ON AREAS THAT RECEIVING GRASSING.
4. THE FOLLOWING SCHEDULE INDICATES THE RECOMMENDED SPECIES, PLANTING DATES, AND SEEDING RATES. THE AREAS SHALL BE SEEDED ACCORDING TO THE BEST MIX FOR PLANT GASTON VICINITY DURING THE TIME OF YEAR SEEDING APPLICATION SHALL OCCUR. SHELBY COUNTY IS LOCATED WITHIN THE NORTH GEOGRAPHICAL AREA OF THE STATE. REFERENCE THE ALABAMA HANDBOOK FOR EROSION CONTROL, SEDIMENT CONTROL AND STORMWATER MANAGEMENT ON CONSTRUCTION SITES AND URBAN AREAS, LATEST EDITION FOR FURTHER INFORMATION. UNLESS OTHERWISE SPECIFIED THE CONTRACTOR SHALL SUBMIT A PROPOSED MIX TO THE PURCHASER FOR APPROVAL BEFORE GRASSING OPERATIONS BEGIN. THE FOLLOWING VEGETATION SCHEDULE IS RECOMMENDED FOR PLANT GASTON:

VARIETY	SEEDING RATE (LBS/AC)	SEEDING DATES
COMMON BERMUDA GRASS	10	APRIL 1 – JULY 1
BERMUDA GRASS, HYBRID (LAWN TYPES)	SOLID SOD	ANYTIME
BERMUDA GRASS, HYBRID (LAWN TYPES)	SPRIGS 1/SQ FT	MARCH 1 TO AUGUST 1
FESCUE, TALL	40–50	SEPT. 1 TO NOV. 1
SERICEA	40–60	MARCH 15 – JULY 15
SERICEA & COMMON BERMUDA GRASS	40–60 10	MARCH 15 – JULY 15

IN THE ABSENCE OF SOIL TEST DATA, THE FOLLOWING FERTILIZATION RATES SHALL BE USED:

VEGETATION	N–P–K	FERTILIZER RATES PER ACRE
GRASS ALONE	8–24–24	400 LBS
GRASS–LEGUME MIXTURE	8–24–24	400 LBS
LEGUME ALONE	0–20–20	500 LBS

5. AFTER SEEDING, AN EROSION CONTROL BIODEGRADABLE STRAW BLANKET SHALL BE INSTALLED ON THE EXTERIOR (2.5:1) SLOPES OF THE DIKES. THIS MATERIAL SHALL BE A BIONET S150BN DOUBLE NET STRAW BLANKET BY NORTH AMERICAN GREEN, OR APPROVED EQUAL.
6. THE BLANKET SHALL BE INSTALLED PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. HOWEVER, THE BLANKET SHALL BE TACKED TO THE GROUND AS NECESSARY TO WITHSTAND THE UPWARD GROWTH OF GRASS AND TO PERMIT THE ESTABLISHMENT OF GRASS THROUGH THE BLANKET. FAILURE TO ACCOMPLISH THIS WILL REQUIRE THAT THE AFFECTED AREA BE RE–GRASSED AND REDONE TO THE SATISFACTION OF THE PURCHASER'S REPRESENTATIVE.
7. SLOPES LESS THAN 3:1 SHALL BE MULCHED WITH BAHIA HAY MULCH OR WITH OTHER SUITABLE MATERIAL.
8. WATER REQUIRED TO PROMOTE A SATISFACTORY GROWTH SHALL BE FURNISHED BY THE PURCHASER AND APPLIED BY THE CONTRACTOR.
9. ALL DITCHES LOCATED OUTSIDE THE CELL WILL BE GRASSED.

ADVANCE PRINT

Southern Company Generation Engineering and Construction Services FOR
Alabama Power Company

PLANT GASTON – UNIT 5 FGD PROJECT
GYPSUM STORAGE FACILITY – CELL 1
DRAWING INDEX, NOTES, AND SPECIFICATIONS

REVISION	DATE	DESCRIPTION	BY	CHK'D	CIVIL APPR	ELECT APPR	I/C APPR	MECH APPR	DISC MGR
1	2/27/09	A. REVISION TO "PERIMETER CHAIN LINK FENCE NOTES" B. REVISION TO "REFERENCE" LIST	AEI	RCB	MDA	MDC	GIL	DRD	CKT
0	12/19/08	ISSUED FOR CONSTRUCTION EWO: 2120DE	AEI	RCB	MDA	MDC	GIL	DRD	CKT

SCALE	PROJ I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
NONE	211100	E5C11027	1	FINAL	1

ANSI E: 44x34 Acad2008

Appendix B: Construction Specifications

INQUIRY NUMBER SCS-29239

SOUTHERN COMPANY GENERATION
ENGINEERING AND CONSTRUCTION SERVICES

TECHNICAL SPECIFICATION SECTION 31

FOR THE

CONSTRUCTION OF CELL 1 AND
SEDIMENTATION POND

OF THE

GYPSUM STORAGE FACILITY

AT

PLANT GASTON

ALABAMA POWER COMPANY

Prepared By: Rachel A. Mudd Date: 12/4/2008

Reviewed By:

Name – Discipline	Initials	Date
A. James C. Pegues – ES&EE	JCP	12/12/08
B. Patrick M. Gordon – Civil Design	PMG	12/12/08

Approved By: JB Smith, Civil Design Supervisor Date: 12/12/08

REVISIONS

NO.	DESCRIPTION	BY	REVIEWED	APPROVED	DATE
0	Issued for Construction	RAM	JCP/PMG	JBS	12/12/08
1	Issued after Pre-bid meeting	RAM	JCP/PMG	JBS	1/22/09
2	Added RCC section (Section 6.0)	RAM	JCP/PMG	JBS	2/6/09
3	Added ASTM D 698 option for RCC testing (Section 6.2.1.2)	RAM	JCP/PMG	JBS	4/3/09
4	Revisions to Section 2.6 and 2.8	JCP	PMG	JBS	8/21/09

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**TECHNICAL SPECIFICATION SECTION 31
FOR THE CONSTRUCTION OF CELL 1 AND
SEDIMENTATION POND
OF THE
GYPSUM STORAGE FACILITY
AT
PLANT GASTON
ALABAMA POWER COMPANY**

1.0 GENERAL

Plant Gaston is a fossil fueled electric generating plant located in Shelby County, Alabama, just northeast of the city of Wilsonville. The purpose of this work is to develop the first of two planned cells as a disposal area for gypsum generated from flue gas desulphurization equipment.

1.1 GENERAL INFORMATION

1.1.1 These Specifications, all related attachments and associated documents cover the furnishing of all materials (unless otherwise noted), labor, supervision, equipment, and tools required for the construction of the Gypsum Storage Cell 1 at Plant Gaston. The technical and construction requirements, including notes, Specifications, and design data continue on the Drawings. The Drawings and Notes are an integral part of these Specifications.

1.1.2 The provisions of these Specifications shall govern unless otherwise specified in the contract documents. In case of conflicting requirements, the contract documents shall govern. Discrepancies between the Drawings and the Specifications shall be brought to the attention of the Purchaser for resolution before the performance of the work. In the case of discrepancies between the scale dimensions on the Drawings and the dimensions the written dimensions shall govern.

1.1.3 The Contractor shall ensure that all work is performed in accordance with the Occupational Safety and Health Act of 1970 and other Standards and Codes listed herein (latest revision).

1.1.4 The Contractor shall receive, unload, haul to site, handle, store, place, and secure all materials and equipment. Any security measures taken for the protection of the Contractor’s equipment shall be at his expense.

1.1.5 The Contractor shall furnish and keep in good working condition at all times sufficient equipment of the proper design and capacity to do all work described under these Specifications and in accordance with the established schedule.

1.1.6 The Contractor shall furnish appropriate equipment for minimizing fugitive dust.

1.1.7 The Contractor shall comply with all applicable state and county regulations concerning hazardous material disposal and burning operations, if allowed by the Purchaser. The Contractor shall have the responsibility for obtaining any necessary permits for these activities.

1.1.8 All earthwork, including ramps and access roads, done for the convenience of the Contractor shall be done at his expense. Such work will be restored to its original elevation at the Contractor's expense if the Purchaser so desires.

1.1.9 The Contractor shall install, at his expense, any drainage piping required because of the Contractor's mode of operation including his ramps and roads.

1.1.10 The Contractor shall provide traffic control during roadway related construction activities and material deliveries. This shall be coordinated with other activities ongoing at the plant. If within active and congested areas around the plant, traffic control shall include flag persons, barriers, and other control aids to provide for the safe routing of traffic in the affected area.

1.1.11 The Contractor shall be responsible for hiring a qualified third party quality assurance firm or firms to handle all quality assurance testing. This shall be at the Contractor's expense.

1.1.12 The Contractor shall inform the Purchaser of any existing wells encountered within the footprint of the construction or the proposed borrow area that have not been previously abandoned. If present and abandonment is necessary, these wells shall be abandoned by the Purchaser. Monitoring wells shall not be damaged or destroyed by construction activities. Any monitoring well damaged or destroyed by the Contractor and his activities shall be replaced at no cost to the Purchaser.

1.2 APPLICABLE DOCUMENTS

1.2.1 Drawings – Reference Inquiry Package for Drawing List.

1.2.2 The following Codes, Standards, Specifications, Publications, and/or Regulations shall be made part of these Specifications and will become part of the contract entered into for performance of the work covered herein. The latest edition in effect at the time of the contract shall apply. Other codes and standards shall be incorporated as referenced in this document. The omission of any Codes and/or Standards from this list does not relieve the Contractor of his responsibility to

follow the latest revision of all applicable codes and standards for conducting the work.

Occupational Safety and Health Administration

- Occupational Safety and Health Act of 1970

American Society for Testing and Materials (ASTM)

- ASTM D 422 – Standard Test Method for Particle-Size Analysis of Soils
- ASTM D 698 – Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort
- ASTM D 1556 – Standard Test Method for Density and Unit Weight of Soil In - Place by the Sand Cone Method
- ASTM D 2216 - Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D 2434 - Standard Test Method for Permeability of Granular Soils (Constant Head)
- ASTM D 2487 - Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- ASTM D 2488 - Description and Identification of Soils (Visual-Manual Procedure)
- ASTM D 6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil – Aggregate In Place by Nuclear Methods
- ASTM D 2937 - Standard Test Method for Density of Soil In Place by the Drive Cylinder Method
- ASTM D 4643 - Standard Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method
- ASTM D 4959 - Standard Test Method for Determination of Water (Moisture) Content of Soil by Direct Heating Method
- ASTM D 1587 - Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes

- ASTM D 4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D 792 – Standard Test Methods for Density and Specific Gravity (relative density) and Density of Plastics by Displacement
- ASTM D 1004 - Standard Test Method for Tear Resistance of Plastic Film and Sheeting
- ASTM D 1238 - Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
- ASTM D 1505 - Standard Test Method for Density of Plastics by the Density-Gradient Technique
- ASTM D 1603 - Standard Test Method for Carbon Black in Olefin Plastics
- ASTM D 3895 - Standard Test Method for Oxidative Induction Time of Polyolefins by Differential Scanning Calorimetry
- ASTM D 4218 - Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
- ASTM D 4833 - Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
- ASTM D 5199 - Standard Test Method for Measuring the Nominal Thickness of Geosynthetics
- ASTM D 5397 - Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test
- ASTM D 5596 - Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
- ASTM D 5721 - Standard Practice for Air-Oven Aging of Polyolefin Geomembranes
- ASTM D 5885 - Standard Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High Pressure Differential Scanning Calorimetry
- ASTM D 5994 - Standard Test Method for Measuring Core Thickness of Textured Geomembranes

- ASTM D 6392 – Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods

- ASTM D 6693 - Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes

Geosynthetic Research Institute GRI Standards

- GM 10 - The Stress Crack Resistance of HDPE Geomembrane Sheet

- GM 11 - Accelerated Weathering of Geomembranes using a Fluorescent UVA Device

- GM 12 - Asperity Measurement of Textured Geomembranes Using a Depth Gage

- GM 13 - Test Properties, Testing Frequency and Recommended Warranty for High Density Polyethylene (HDPE) Geomembranes

Corps of Engineers EM-LST, Appendix VII, Falling-Head Permeability Test

Codes specific to the local county

Alabama Department of Environmental Management regulations

Environmental Protection Agency (EPA) regulations

2.0 EARTHWORK

2.1 SITE CONDITIONS

2.1.1 The Contractor shall visit the site and acquaint himself with site conditions, utility locations, and the proposed scope of work.

2.1.2 Soil borings have been performed at the gypsum disposal site and the borrow area. The locations of these borings are shown on the Drawings. The boring logs are available to the Contractor for review.

2.1.3 Bulk samples have been obtained from inside the storage facility footprint as well as the borrow area. The general areas of these bulk samples are available for

inspection by the Contractor. The results of soil laboratory testing on bulk samples from the borrow area are also available to the Contractor for review.

2.1.4 The field testing, measurements, and associated laboratory testing performed by the Purchaser have been conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions. The Purchaser assumes no responsibility for the accuracy of the investigations, the resulting data, or the interpretation; nor does the Purchaser guarantee that the materials and conditions will not vary from those indicated by the investigations. In addition, the Purchaser will not be responsible for any deduction, interpretation, or conclusion drawn by the Contractor.

2.2 LINES AND GRADES

2.2.1 The project shall be constructed to the elevations, lines, grades and cross sections shown on applicable Drawings. The Purchaser reserves the right to increase the foundation widths, change the embankment slopes, and to make such other changes in the embankment sections as conditions indicate are necessary for the construction of a safe and permanent structure. The Contractor shall be compensated for changes in plan and/or sections resulting in changes of quantities of materials.

2.2.2 The soil within the proposed dike footprint shall be removed down to base grade. The soil may be used for dike construction material if it meets the specifications of Section 2.5 and may be used for compacted clay subgrade if it meets the specifications of section 2.6. The Contractor should expect to encounter some unsuitable material for dike construction or clay subgrade when removing this soil.

2.3 CLEARING, GRUBBING, AND STRIPPING

2.3.1 Clearing, grubbing and stripping will be required to prepare the work area for construction.

2.3.2 Prior to any clearing or grubbing operations, adequate erosion control measures should be in place. At a minimum, all federal, state and local guidelines should be followed. In addition, any details from the erosion control plan, *Construction Best Management Practices Plan for Gaston Gypsum Project*, should be followed.

2.3.3 Vegetated areas within the construction footprint shall be cleared, grubbed, and stripped of any vegetation, organic matter and/or any other debris. Stripped

topsoil shall be stockpiled at a location on the site to be designated by the Project Construction Manager.

2.3.4 The grubbed area shall be harrowed and raked with a tractor-mounted root rake to collect all small material previously overlooked. The tractor shall be of adequate size to achieve a minimum of 4 inches penetration of the root rake teeth. The root rake teeth shall not be more than 12 inches apart.

2.3.5 Trees, stumps, and brush cleared from the above areas shall be disposed of by burning, if allowed by the Purchaser, by mulching, or by removal from the site. All burning shall be performed in accordance with state and local regulations. Burn pits shall be located outside of the construction area, borrow area, outside of future cell construction, and off right-of-ways.

2.3.6 Burning operations, if permitted by the Purchaser, shall be conducted only in previously cleared areas and away from standing timber, structures, or other flammable materials. Materials to be burned shall be properly stacked, by dozers, in piles sufficiently large enough to facilitate the complete burning of all the materials in the pile. The Contractor shall be subject to all public laws governing such burning operations and shall be responsible for any damage to life or property as a result of burning either on the Purchaser's property or the property of others. Fires shall not be started unless tractors are available in the immediate vicinity to check the spread of fire outside the cleared area. Fires shall be guarded at all times and shall be under constant attendance until they have burned out or have been extinguished.

2.3.7 Spoil material shall be disposed of only in areas to be designated by the Purchaser. The Contractor shall slope the spoil area for drainage, implement necessary erosion control measures, and provide a perennial stand of vegetation.

2.4 SUBGRADE PREPARATION

2.4.1 Soils excavated from the site are generally suitable for fill material.

2.4.2 Erosion and sediment control measures shall be prepared and placed first, where necessary or where indicated in the erosion control plan, *Construction Best Management Practices Plan for Gaston Gypsum Project*.

2.4.3 Existing overburden soils shall be excavated to the excavation limits indicated on the drawings. Material suitable for topsoil and material to be used as fill material shall be stockpiled separately.

2.4.4 The entire cell subgrade shall be proof-rolled utilizing loaded, off-road trucks with a gross machine weight, including payload of 40 tons of soil, that will impart

approximately 7600 psf subgrade loading over a minimum tire width of 2 feet. Prior to receiving earth fill, the foundation area shall be scarified by harrowing or other suitable means.

2.4.5 Any areas failing proof roll shall be undercut and replaced with compacted structural soil fill and re-rolled.

2.4.6 No fill shall be placed on any part of the subgrade until such areas have been proof rolled and approved by the Purchaser.

2.4.7 Work flow shall be planned such that the first fill lift is placed soon after subgrade compaction to minimize subgrade exposure to inclement weather.

2.4.8 The Contractor shall be required to prepare the base and interior dike slopes, including the sedimentation pond, for installation of the HDPE liner surface as shown on the Drawings. All surfaces to be lined shall be smooth, free of all foreign and organic material, sharp objects, stones greater than ½-inch in diameter, or debris of any kind. These surfaces shall provide a firm, unyielding foundation with no sharp changes or abrupt breaks in grade.

2.5 STRUCTURAL EARTH FILL

2.5.1 Compacted dike material shall consist of the clayey sands (SC), sandy silts (ML), low plasticity clays (CL) and silty sands (SM) from the excavation of the borrow area and shall be placed and compacted in accordance with these Specifications and Drawings.

2.5.2 Pipe penetrations shall be encapsulated in flowable fill then surrounded with select structural soil fill as shown on the Drawings. The select structural fill material shall have a plasticity index (PI) of greater than 12, a minimum of 35% by weight passing the #200 sieve (per ASTM D-422), and a Unified Soil Classification System (USCS) designation of SC, CL, ML, or CH. The fill shall be tested using appropriate ASTM methods and be approved by the Project Construction Manager.

2.5.3 No particle greater in size than 3 inches shall be used as dike fill.

2.5.4 Fill materials from other places other than the borrow area may be used if they meet the requirements named in this section or if approved by the Project Construction Manager. The cut material located within the footprint of the gypsum cell may be used as dike material if the total organic carbon (TOC) content is less than 5% and if approved by the Project Construction Manager. Material with greater than 5% TOC may not be used under the footprint of the

dike or as structural dike fill. The contractor must provide laboratory analysis for approval by the Project Construction Manager.

2.5.5 Material with greater than 5% TOC may be used as structural dike fill if it is blended with other soil to fulfill the TOC requirement.

2.5.6 No earth fill shall be placed on any part of the dike foundation until such areas have been inspected and approved by the Project Construction Manager.

2.5.7 Earth fill shall be placed in uniform layers of 8 to 10 inches, nominal thickness, loose measurement. The fill material shall be placed one foot beyond the full width of the dike on each side. Each layer shall be kept level with the necessary grading equipment. Upon completion of compaction, fill slopes shall be cut back to the final slope. Particular care must be used to obtain the required compaction along the edges of the dike.

2.5.8 Quality control testing shall be performed on all earth fill in accordance with Section 2.8 of this Specification. No earth fill layer may be placed until the Project Construction Manager has verified that the underlying layer has met the compaction and/or moisture requirements.

2.5.9 If the compacted surface of any layer of material is determined to be too smooth to bond properly with the succeeding layers, it shall be loosened by harrowing, or as directed by the Project Construction Manger, before the succeeding layer is placed.

2.5.10 During the dumping and spreading processes, the Contractor shall maintain at all times a force of men adequate for removal of roots and debris from all earth fill materials and all stones greater than 3-inch maximum dimension.

2.5.11 Earth fill material for the dike shall be compacted to a minimum 95% maximum dry density, as determined by the Standard Proctor compaction test (ASTM D698). The moisture content of the earth fill at the time of placement shall be between -1% and +2% of the optimum moisture obtained by Standard Proctor compaction test. The Contractor shall strive to place the earth fill material on the wet side of optimum.

2.5.12 When moisture content is too low, the moisture content shall be adjusted to within the above specification prior to compaction. Moisture adjustment shall be by sprinkling and disking sufficiently to bring the moisture content within the specified range. Sprinkling and disking of the layer shall be done after deposition, but before compaction.

2.5.13 If the moisture content is too high, the Contractor will be permitted to stockpile and disk the earth fill material to promote drying to bring it back within the allowable moisture range. This drying must be done prior to placement.

2.5.14 Earth fill which cannot be compacted with roller equipment because of inadequate clearances shall be spread in 4-inch layers and compacted with power tampers to the extent required by the specifications for embankment material.

2.5.15 The Contractor will be required to remove any compacted material that does not comply with the compaction and/or moisture requirements and replace the compacted earth fill to comply with these Specifications at his own expense.

2.5.16 Excavations required for density and moisture tests shall be repaired by scarifying the walls of the excavation, backfilling, and compacting the fill material to the criteria specified in this Section.

2.5.17 At least one Proctor compaction check plug shall be produced for each type of soil being placed during the day to insure that the correct reference Proctor curves are being used for compaction check.

2.5.18 If the construction of the dike is interrupted, the Contractor shall be required to shape and smooth the last layer of earth fill material placed on the fill to provide a surface that will shed as much water as possible during the interruption. When the work is resumed, the Contractor shall be required to level, scarify and compact the last layer of earth fill material before placing additional layers.

2.5.19 Exterior dike slopes shall be grassed upon reaching final grade in accordance with the Vegetation Schedule.

2.6 COMPACTED CLAY SUBGRADE

2.6.1 A compacted clay subgrade shall be installed as the upper two feet of earth fill underlying the HDPE liner. The clay subgrade shall be placed and compacted in accordance with these Specifications and Drawings.

2.6.2 Compacted clay subgrade material shall have a in-place permeability equal to or less than 1×10^{-7} cm/sec, shall contain a minimum of 70% material passing the #200 sieve, shall have a plasticity index (PI) of between 15 and 35, shall have a maximum clod size of 2 inches, and shall be free of organics or other debris.

2.6.3 Prior to placement of the clay subgrade, the borrow material shall be sampled to verify the soil characteristics. A minimum of three soil samples of clay shall be obtained for laboratory testing from the borrow area actively being utilized for the clay subgrade placement. Laboratory testing on the soil samples shall include the

Standard Proctor density (ASTM D 698), permeability by constant head (ASTM D 2434) or falling head test, grain size distribution and hydrometer analysis (ASTM D 422), Atterberg Limits (ASTM D 4318) and in-place moisture (ASTM D 2216). The density and in-place moisture data should be used to make adjustments in the moisture level of the clay prior to and during placement of the material

2.6.4 Clay subgrade material shall be placed in uniform layers of 8 inches, nominal thickness, loose measurement. Each layer shall be kept level with the necessary grading equipment. Upon completion of compaction, fill slopes shall be cut back to the final slope.

2.6.5 Quality control testing shall be performed on the subgrade in accordance with Section 2.8 of this Specification. No clay subgrade layer may be placed until the Project Construction Manager has verified that the underlying layer has met the compaction, permeability, and/or moisture requirements.

2.6.6 If the compacted surface of any layer of material is determined to be too smooth to bond properly with the succeeding layers, it shall be loosened by harrowing, or as directed by the Project Construction Manger, before the succeeding layer is placed.

2.6.7 Clay subgrade material shall be compacted to a minimum 98% maximum dry density, as determined by the Standard Proctor compaction test (ASTM D 698), or to the percent compaction required to achieve the specified permeability, whichever is greater. The moisture content of the clay subgrade at the time of placement shall be 2 to 3 percent wet of optimum as determined by the Standard Proctor compaction test.

2.6.8 When moisture content is too low, the moisture content shall be adjusted to within the above specification prior to compaction. Moisture adjustment shall be by sprinkling and disking sufficiently to bring the moisture content within the specified range. Sprinkling and disking of the layer shall be done after deposition, but before compaction.

2.6.9 If the moisture content is too high, the Contractor will be permitted to stockpile and disk the subgrade material to promote drying to bring it back within the allowable moisture range. This drying must be done prior to placement.

2.6.10 Subgrade material which cannot be compacted with roller equipment because of inadequate clearances shall be spread in 4-inch layers and compacted with power tampers to the extent required by the specifications in this Section.

2.6.11 The Contractor will be required to remove any compacted material that does not comply with the compaction, moisture, and/or permeability requirements and

replace the compacted earth fill to comply with these Specifications at his own expense.

2.6.12 Excavations required for density and moisture tests shall be repaired by scarifying the walls of the excavation, backfilling, and compacting the fill material to the criteria specified in this Section.

2.6.13 At least one Proctor compaction check plug shall be produced for each type of soil being placed during the day to insure that the correct reference Proctor curves are being used for compaction check.

2.6.14 If the construction of the clay subgrade is interrupted, the Contractor shall be required to shape and smooth the last layer of earth fill material placed on the fill to provide a surface that will shed as much water as possible during the interruption. When the work is resumed, the Contractor shall be required to level, scarify and compact the last layer of subgrade material before placing additional layers.

2.6.15 The Contractor shall be required to repair erosion features, desiccation cracks, and other defects in the clay subgrade. All soils and sediments that have been transported onto the active clay subgrade placement areas from storm runoff shall be removed or graded away from the clay subgrade. All repairs to the subgrade shall be completed prior to the subsequent lift of clay material placed.

2.7 EARTHWORK EQUIPMENT

2.7.1 General

The Earthwork Contractor shall be responsible for providing all earthwork equipment necessary to perform the work set forth in these Specifications. The Contractor shall be responsible for maintaining the equipment during the contract period. Any delays in work activities due to equipment maintenance must be reported to the Project Construction Manager for determination of impacts on the schedule.

The Contractor shall be responsible for the cleaning of haul vehicles. The Contractor shall wash down the wheels, outside body, cab, undercarriage, etc. of all haul vehicles to prevent spreading material during transit of the equipment out of the boundary of the working area.

All of the Contractor’s equipment shall be operated in a safe, careful manner in accordance with these Specifications.

2.8 QUALITY CONTROL TESTING

2.8.1 Field density and moisture content testing shall be performed by a third party quality assurance firm at the Contractor's expense to verify that compaction requirements have been achieved. In-place field density testing of the compacted soil shall be performed in accordance with the procedure ASTM D 1556-00, the sand cone method. Test results reports should include both the moisture content and dry density, along with other data such as location, elevation, Proctor curve used for comparison, etc.

2.8.2 Testing procedures of in-place density and moisture content by nuclear methods is described in ASTM D 6938. The procedure may be used provided: 1) acceptable correlation with sand cone density test results can be obtained according to the guidelines of Section 8, "Calibration", of ASTM D 6938, and 2) the initial correlation results are reviewed and use of the nuclear device is approved by the Project Construction Manager. In addition, it shall be required that the testing agency or representative have the necessary licenses to operate a nuclear energy source, and to take all safety precautions per Section 6 of ASTM D 6938.

2.8.3 In the event of repeated failures, or water content and density test values plotting far from the Proctor curves used for comparison in computing percent compaction, it shall be the option of the Project Construction Manager to require one or two point Proctor checks (on the dry side of optimum) to verify that the proper Proctor curve is being referenced. If not, a new Proctor curve determined by a five-point test shall be required. The Contractor shall sample and perform the five-point testing, all at the Contractor's expense.

2.8.4 If the compaction requirements for a lift have not been achieved, the Purchaser shall direct the Contractor to either rework the lift to obtain the compaction requirements or remove and replace with a new lift for compaction, all at the Contractor's expense.

2.8.5 The in-place density testing frequency for the soil shall be one test for each 20,000 square feet of lift area or portion thereof for each lift, with a minimum of one test performed for each 200 lineal feet of dike per lift as measured parallel to the dike axis.

2.8.6 Quality control for the compacted embankment fill and the compacted clay subgrade shall be through field density testing performed to document that the required density and moisture content range, as defined in Section 2.6.7, is achieved. Density test results shall be compared to laboratory testing on borrow samples that have illustrated an ability to achieve a permeability less than or equal to 1×10^{-7} cm/sec using either the falling head or back pressure permeability test. Frequency of testing shall be as specified in Section 2.8.5. The results of all density testing shall be provided to the Purchaser or the Purchaser's Engineer for

review. If any density test result indicates either density or moisture content is outside the specified value or range, the Contractor shall rework or replace a section or entire lift of the clay layer being constructed, at the Contractor's expense. All reworked or replaced sections of clay subgrade shall be retested and shall meet the specified minimum density and moisture content range requirements.

2.8.7 The moisture content as determined by the nuclear gauge shall be adjusted, as needed, using the procedures outlined in ASTM D6938 Annex 4 "Field Moisture Content Adjustments" using direct heater methods in the field. Moisture content calibration and adjustment shall be made daily for each material type being used as fill for the compacted clay subgrade.

3.0 DRAINAGE DITCHES, CHANNELS AND SLOPES

3.1 GENERAL

3.1.1 All drainage channels and perimeter drainage ditches shall be excavated to the lines, grades, cross-sections, and elevations indicated on the Drawings. The waterways shall be free of bank projections or other irregularities which will impede normal flow.

3.1.2 All earth removed and not used in construction shall be disposed of so that it will not interfere with the functioning of the waterway.

3.1.3 All underdrain sumps located under the gypsum stack shall be lined with a 60 mil high density polyethylene (HDPE) liner and filled with #57 stone or an approved equivalent as shown on the Drawings.

4.0 HDPE LINER

4.1 QUALIFICATIONS OF CONTRACTOR WORK ACTIVITIES

4.1.1 The installation contractor shall be the manufacturer or a dealer trained to install the manufacturer's geomembrane. Installation shall be performed under the constant direction of a field installation supervisor who shall remain on site and be responsible, throughout the liner installation, for liner layout, seaming, testing, repairs, and all other activities by the Installer. The field installation supervisor shall have installed or supervised the installation of a minimum of 2,000,000 square feet of polyethylene geomembrane. Seaming shall be performed under the direction of a master seamer (who may also be the field installation supervisor) who has seamed a minimum of 2,000,000 square feet of polyethylene

geomembrane, using the same type of seaming apparatus specified for this project. The field installation supervisor and/or master seamer shall be present whenever seaming is performed.

4.2 MATERIALS

4.2.1 For all liner material specifications, see previously submitted Technical Specifications titled, "Purchase of High Density Polyethylene (HDPE) Liner for the Gypsum Storage Area Facility at Plant Gaston."

4.3 GEOMEMBRANE INSTALLATION

4.3.1 The geomembrane shall be packaged and shipped by appropriate means to ensure that no damage is incurred. The geomembrane shall be stored so as to be protected from puncture, dirt, grease, moisture and excessive heat. Damaged material shall be stored separately for repair or replacement. The rolls shall be stored on a prepared smooth surface (not wooden pallets) and shall not be stacked.

4.3.2 Off-loading and storage of the materials shall be the responsibility of the Contractor. The Contractor shall be responsible for replacing any damaged or unacceptable material at no cost to the Purchaser. No off-loading shall be done unless monitored by the Purchaser. Damage occurring during off-loading shall be documented by the Purchaser and the Contractor. The Purchaser shall be the final authority on determination of damage.

4.3.3 The Contractor shall inspect the subgrade preparation prior to liner installation. The subgrade shall be compacted in accordance with the project specifications. Weak or compressible areas which cannot be satisfactorily compacted should be removed and replaced with properly compacted fill. All surfaces to be lined shall be smooth, free of all foreign and organic material, sharp objects, or debris of any kind. The subgrade shall provide a firm, unyielding foundation with no sharp changes or abrupt breaks in grade. Standing water or excessive moisture shall not be allowed.

4.3.4 The Contractor, on a daily basis, shall approve the surface on which the geomembrane will be installed. After the supporting surface has been approved, it shall be the Contractor's responsibility to indicate to the Purchaser any changes to its condition that may require repair work.

4.3.5 The Contractor shall certify in writing that the subgrade on which the geomembrane is to be installed is acceptable. This shall be done prior to commencing work.

4.3.6 The installation of the geomembrane shall be in accordance with the manufacturer's recommendations. The Contractor shall submit a panel layout drawing and a detailed, written procedure for the Purchaser's review.

4.3.7 All seams and non-seam areas of the geomembrane shall be inspected by the inspector for defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. The surface of the geomembrane shall be clean at the time of inspection.

4.3.8 The anchor trench shall be excavated to the line, grade, and width shown on the project construction drawings, prior to liner system placement. Slightly rounded corners shall be provided in the trench to avoid sharp bends in the geomembrane.

4.3.9 The Contractor is responsible for ensuring that the geomembrane is handled and installed in such a manner that it is not damaged

4.3.10 The rolls shall be deployed using a spreader bar assembly attached to a loader bucket or by other methods approved by the Purchaser. The installer shall be responsible for the following:

- Equipment or tools shall not damage the geomembrane during handling, transportation and deployment.
- Personnel working on the geomembrane shall not smoke or wear damaging shoes.
- The method used to unroll the panels shall not cause scratches or crimps in the geomembrane and shall not damage the supporting soil.
- Adequate loading (e.g., sand bags or similar items that will not damage the geomembrane) shall be placed to prevent uplift by wind (in case of high winds, continuous loading is recommended along edges of panels to minimize risk of wind flow under the panels).
- Geomembrane deployment shall proceed between ambient temperatures of 32° F and 104° F. Placement can proceed below 32° F only after it has been verified by the inspector that the material can be seamed according to the specification. Geomembrane placement shall not be done during any precipitation, in the presence of excessive moisture (e.g., fog, rain, dew) or in the presence of excessive winds, as determined by the installation supervisor.

4.3.11 After placement of the geomembrane, a qualified third party provided at the Contractor's expense shall inspect the placement to ensure that all specifications of placement have been met. This third party inspector must be a qualified

inspector from the manufacturer's list of qualified inspectors. Documentation of inspection shall be submitted and kept as specified in section 9.0.

4.4 FIELD SEAMING

4.4.1 Field seams shall be made in accordance with the manufacturer's recommendations. The Contractor shall submit the proposed seaming procedures for the Purchaser's review.

4.4.2 Approved seaming processes are fusion and extrusion welding. On side slopes, seams shall be oriented in the general direction of maximum slope, i.e., oriented down, not across the slope. In corners and odd-shaped geometric locations, the number of field seams shall be minimized.

4.4.3 No base T-seam shall be closer than 5 feet from the toe of the slope. Seams shall be aligned with the least possible number of wrinkles and "fishmouths". If a fishmouth or wrinkle is found, it shall be relieved and cap-stripped.

4.4.4 Geomembrane panels must have a finished minimum overlap of 4 inches for fusion welding and 6 inches for extrusion welding.

4.4.5 Cleaning solvents may not be used unless the product is approved by the liner manufacturer.

4.5 FIELD TEST SEAMS

4.5.1 Field test seams shall be made in accordance with the manufacturer's recommendations. The Contractor shall submit the proposed testing procedures for the Purchaser's review.

4.5.2 Field test seams shall be conducted on the liner to verify that seaming conditions are satisfactory. Test seams shall be conducted at the beginning of each seaming period and at least once every 4 hours, for each seaming apparatus and personnel used that day.

4.5.3 All test seams shall be made in contact with the subgrade. Welding rod used for extrusion welding shall have the same properties as the resin used to manufacture the geomembrane. The Contractor shall provide QC certificates for the welding rods.

4.5.4 The Installer shall non-destructively test all field seams over their full length using either Vacuum Box Testing or Air Pressure Testing (for double fusion seams only).

4.6 DESTRUCTIVE SEAM TESTING

4.6.1 Destructive seam testing should be minimized to preserve the integrity of the liner. The Contractor shall provide the qualified third party inspector with one destructive test sample once per 500 feet of seam length from a location specified by the inspector.

4.6.2 Sampling Procedure

In order to obtain test results prior to completion of liner installation, samples shall be cut by the Installer as the seaming progresses. The Installer shall also record the date, location, and pass or fail description. All holes in the geomembrane resulting from obtaining the seam samples shall be immediately patched and vacuum tested.

4.6.3 Size and Disposition of Samples

The samples shall be 12 inches wide by 36 inches long with the seam centered lengthwise. The sample shall be cut into three equal-length pieces, one to be given to the qualified third party inspector, one to be given to the Purchaser, and one to the Installer.

4.6.4 Field Laboratory Testing

The inspector shall test ten 1-inch wide specimens from his sample, five specimens for shear strength and five for peel strength.

4.6.5 Independent Laboratory Testing

The Purchaser, at his discretion and expense, may send seam samples to a laboratory for testing. The test method and procedures to be used by the independent laboratory shall be the same as used in field testing.

4.6.6 Procedures for Destructive Test Failure

The following procedures shall apply whenever a sample fails the field destructive test:

- The Installer shall cap strip the seam between the failed location and any passed test locations.

- The Installer can retrace the welding path to an intermediate location (usually 10 feet from the location of the failed test), and take a sample for an additional field test. If this test passes, then the seam shall be cap stripped between that

location and the original failed location. If the test fails, then the process is repeated.

- Over the length of seam failure, the Installer shall either cut out the old seam, reposition the panel and reseam, or add a cap strip.

4.6.7 Each suspect location in seam and non-seam areas shall be non-destructively tested as appropriate in the presence of the Inspector. Each location that fails the non-destructive testing shall be marked by the Inspector, and repaired accordingly.

4.6.8 Repair Procedures

- Defective seams shall be cap stripped or replaced.

- Small holes shall be repaired by extrusion welding a bead of extrudate over the hole. If the hole is larger than 1/4 inch, it shall be patched.

- Tears shall be repaired by patching. If the tear is on a slope or an area susceptible to stress and has a sharp end it must be rounded prior to patching.

- Blisters, large cuts and undispersed raw materials shall be repaired by patches.

- Patches shall be completed by extrusion welding. The weld area shall be ground no more than 10 minutes prior to welding. No more than 10% of the thickness shall be removed by grinding. Welding shall commence where the grinding started and must overlap the previous seam by at least 2 inches. Reseaming over an existing seam without regrinding shall not be permitted. The welding shall restart by grinding the existing seam and rewelding a new seam.

- Patches shall be round or oval in shape, made of the same geomembrane, and extend a minimum of 6 inches beyond the edge of defects.

4.6.9 Verification of Repairs

Each repair shall be non-destructively tested. Repairs that pass the non-destructive test shall be taken as an indication of an adequate repair. Failed tests indicate that the repair shall be repeated and retested until passing test results are achieved.

The Inspector shall keep daily documentation of all non-destructive and destructive testing. This documentation shall identify all seams that initially failed the test and include evidence that these seams were repaired and successfully retested.

4.7 BACKFILLING OF ANCHOR TRENCH

4.7.1 The anchor trench shall be backfilled by the Contractor. Trench backfill material shall be placed in accordance with the Manufacturer's recommendations.

4.7.2 Care shall be taken when backfilling the trenches to prevent any damage to the geomembrane. If damage occurs, it shall be repaired prior to backfilling.

4.8 GEOMEMBRANE ACCEPTANCE

The Installer shall retain all ownership and responsibility for the geomembrane until accepted by the Purchaser. Final acceptance is when all of the following conditions are met:

- Installation is finished
- Verification of the adequacy of all field seams and repairs, including associated testing, is complete.

5.0 GEOCOMPOSITE DRAINAGE MATERIAL

5.1 MATERIAL

5.1.1 For all geocomposite material specifications, see previously submitted Technical Specifications titled, "Purchase of Geocomposite Drainage Material for the Gypsum Storage Area Facility at Plant Gaston."

5.2 INSTALLATION

5.2.1 The material shall be deployed in such a manner as to continually keep the geocomposite sheet in sufficient tension to reduce folds and wrinkles.

5.2.2 In the presence of high wind, all material shall be weighted with sandbags or the equivalent.

5.2.3 The geocomposite shall be cut using a hook blade. If the material is being cut in place, special care must be taken to protect the underlying HDPE liner.

5.2.4 The material shall be connected to all drainage pipes as shown on the Drawings.

5.2.5 Care shall be taken not to entrap stones or excessive dust that could damage the geocomposite, or generate clogging of the drains or filters.

5.2.6 The material may be seamed by overlapping and tying the geonet with ties and overlapping the geotextile by either thermal bonding or sewing.

5.2.7 When overlapping the rolls side to side, the geonet shall be overlapped a minimum of 4 inches and tied. Tying shall be every 5 feet to 10 feet across the bottom of the panel and every 5 feet along the length of the geonet panel. The geocomposite in the drainage ditch shall be tied at one foot intervals.

5.2.8 When connecting geocomposite rolls end to end, the geonet shall be overlapped a minimum of one foot and tied every 12 inches across the roll. The geotextiles shall be overlapped and thermal bonded or sewn.

5.2.9 Tying of the geonet will be with plastic fasteners as recommended by the Manufacturer. Tying devices shall be white or yellow for easy inspection. Metallic devices are not allowed.

5.2.10 If the geocomposite is damaged and the tear or hole is less than 3 feet by 3 feet, the roll shall be cut and a butt joint placed. If the geonet is undamaged and the geotextile is damaged, a patch of geotextile shall be placed and shall be thermally bonded a minimum of 12 inches in all directions.

5.2.11 After placement of the geocomposite, a qualified third party provided at the Contractor's expense shall inspect the placement to ensure that all specifications of placement have been met. Documentation of inspection shall be submitted and kept as specified in section 9.0.

6.0 ROLLER COMPACTED (ZERO SLUMP) CONCRETE

6.1 MATERIAL

6.1.1 Roller compacted (zero slump) concrete (RCC) will be used to line the gypsum collection basins for the Phase I Gypsum Cell. The intent of the RCC is to provide a protective layer over the liner system in the starting cells. The RCC shall be proportioned by the Contractor so as to attain a compressive strength at 28 days of 3000 psi. The RCC shall be composed of cementitious materials, water, fine and coarse aggregate, and admixtures.

6.1.2 Cementitious Materials

6.1.2.1 Cementitious materials shall consist of Portland cement and pozzolan. The Portland cement shall conform to ASTM C 150, Type II.

6.1.2.2 Pozzolan shall conform to ASTM C 618, Type F Fly Ash. The pozzolan percentage of cementitious material shall not exceed 50 percent.

6.1.3 Water

Water shall be free of injurious amounts of oil, acid, salt, alkali, organic material or other deleterious substances.

6.1.4 Fine Aggregate

6.1.4.1 Fine aggregate shall consist of natural sand, manufactured sand, or a combination of the two.

6.1.4.2 The requirements for deleterious substances and soundness as required by ASTM C 33 shall govern.

6.1.4.3 Gradation of the fine aggregate shall be as follows:

Gradation Requirements RCC Fine Aggregate	
Sieve Size	**Percent Passing by Weight**
3/8-in	100
No. 4	95 – 100
No. 8	75 – 95
No. 16	55 – 80
No. 30	35 – 60
No. 50	24 – 40
No. 100	12 – 28
No. 200	8 - 18

In addition, the fine aggregate, as delivered to the mixer, shall have a fineness modulus of not less than 2.1 and not more than 2.75.

6.1.5 Coarse Aggregate

6.1.5.1 Coarse aggregate shall consist of crushed stone.

6.1.5.2 Limits for deleterious substances and physical property requirements shall meet the requirements of Table 3 of ASTM C 33 for Class Designation 4M.

6.1.5.3 Gradation of the coarse aggregate shall generally conform to the gradation requirements for ASTM C 33 No. 57 stone.

6.1.6 Admixtures

6.1.6.1 Admixtures to serve as a water reducing agent (WRA) shall be used. The WRA shall meet the requirements of ASTM C 494 Type A (water reducing) or Type D (water reducing and retarding.) Any WRA shall be added to and trial mix tested with the RCC mix to be used prior to its use in the field.

6.1.6.2 Admixtures for air-entrainment shall not be used.

6.2 INSTALLATION

6.2.1 Placement

6.2.1.1 The RCC shall be transported to the site in an open bed dump truck or similar equipment.

6.2.1.2 The RCC shall be end dumped in the designated area of use and shall be spread with a bulldozer, a front-end loader or other similar equipment. At no time shall the spreading equipment be allowed to operate directly on the surface of the liner system.

6.2.2 Compaction

6.2.1.1 After spreading, the RCC shall be compacted with a self-propelled, vibratory steel drum roller. Rollers shall not be operated in the vibratory mode unless they are moving. The target number of passes with the roller required to achieve the specified density will be determined at the time of construction. The actual density achieved during construction will be determined using a nuclear moisture-density gauge in accordance with ASTM C 1040. As an alternative, maximum dry density may be determined using the procedures described in ASTM D 698.

6.2.1.2 The RCC should be compacted to a minimum of 95 percent of the theoretical maximum density. The theoretical density will be determined using job mix proportions and Contractor supplied materials, using compaction techniques suitable for RCC and following the appropriate testing procedures used to determine theoretical unit weight of concrete as described in ASTM C 138.

6.2.1.3 The Contractor shall be responsible for the cleaning of haul and other vehicles. The Contractor shall wash down the wheels, outside body, cab, undercarriage, etc., of all haul vehicles to prevent spreading of material during transit of the equipment out of the boundary of the working area or onto the RCC surface.

6.3 TESTING

6.3.1 Field density testing shall be performed to verify that compaction requirements have been achieved. In-place field density testing of the compacted RCC shall be performed in accordance with the procedures of ASTM C 1040. Test results reported should include test method used (direct transmission or backscatter), density values, and other requirements of the ASTM standard. The testing equipment shall be calibrated as per the standard.

6.3.2 The Contractor shall provide a third party inspector to ensure quality control plans, programs, and practices are followed, and shall institute any additional controls or procedures in accordance with proven industry practice to assure compliance with the Special Conditions, Scope of Work, Technical Specifications, and Drawings.

6.3.3 The in-place density testing frequency for the RCC shall be one test for each 2,500 square feet of lift area or portion thereof for each lift, with a minimum of five tests per lift.

7.0 RISERS AND DISCHARGE PIPES

7.1 GENERAL

7.1.1 Riser and discharge pipes shall be of size and specifications as indicated in the Drawings.

7.1.2 Discharge pipes shall be placed on a concrete base and encased with a flowable fill up to the springline as shown on the Drawings. Hold down straps shall be attached to the base.

7.1.3 All pipes penetrating the dike structure shall be encased in a minimum of 12 inches of flowable fill above and below and 18 inches of flowable fill on the sides. Flowable fill shall meet the specifications shown on the Drawings.

7.1.4 Hold down straps shall be used on the pipe while placing the flowable fill.

7.1.5 The compacted fill material shall meet the requirements of Section 2.5.2 of this Specification and shall be placed in accordance with the same. It shall be clean

soil, free of roots, vegetation, rocks greater than 3 inches maximum dimension, or other objectionable material. If machine placement and compaction is not feasible, the fill material shall be placed in 4-inch lifts and hand compacted under and around the pipe to at least the same density as the adjacent fill material.

8.0 VEGETATION

8.1 GENERAL

8.1.1 A layer of topsoil 4-inches to 6-inches in final thickness shall be placed on all areas to be grassed. All disturbed areas not covered with liner material, as shown on the Drawings, shall be grassed. Topsoil shall be free of subsoil, clay, weeds, roots, and impurities. Hydroseeding methods may be used.

8.1.2 The Contractor shall produce a satisfactory stand of perennial grass in accordance with the vegetation schedule below. If it is necessary to repeat any or all the work, including plowing, fertilizing, watering, mulching and seeding, the Contractor shall repeat these operations until a satisfactory stand is obtained at no additional cost to the Purchaser.

Vegetation Schedule

Species	Seeding Rates	North Seeding Dates
Bermudagrass, Common	10 lbs/ac	April 1 to July 1
Bermudagrass, Hybrid (Lawn Types)	Solid Sod	Anytime
Bermudagrass, Hybrid (Lawn Types)	Sprigs 1/ft^2	March 1 to August 1
Fescue, Tall	40-50 lbs/ac	Sept. 1 to Nov. 1
Sericea	40-60 lbs/ac	March 15 to July 15
Sericea & Common Bermudagrass	40-60 lbs/ac 10 lbs/ac	March 15 to July 15

8.1.3 Final stabilization shall be defined as follows: all soil disturbing activities at the site have been completed, and that for unpaved areas and areas not covered by permanent structures, 100% of the soil surface is uniformly covered in permanent vegetation with a density of 70% or greater, or equivalent permanent stabilization measures (such as the use of rip rap, gabions, permanent mulches or geotextiles) have been employed.

8.1.4 Measures shall be taken to prevent erosion of the topsoil layer and vegetation until a full vegetative growth has been obtained. The Contractor shall make daily

inspections of the seeded areas and repair all eroded areas to the satisfaction of the Purchaser.

8.1.5 After seeding, an erosion control biodegradable straw blanket shall be installed on the exterior slopes of the dikes and any areas that have slopes of 3:1 or steeper. This material shall be a BioNet S150BN Double Net Straw Blanket by North American Green, or approved equal. The blanket shall be installed per manufacturer's installation instructions. However, the blanket shall be tacked as necessary to the ground to withstand the upward growth of grass and to permit the establishment of grass through the blanket. Failure to accomplish this will require that the effected area be re-grassed and redone to the satisfaction of the Project Construction Manager.

8.1.6 Graded areas that are to be grassed, which have slopes less steep than 3:1, shall be mulched with straw or other suitable material.

8.1.7 Water required to promote a satisfactory growth shall be furnished by the Purchaser and applied by the Contractor.

9.0 BORROW AREA

9.1 CLEARING, GRUBBING AND STRIPPING

9.1.1 Portions of the borrow area will require clearing, grubbing, and stripping prior to excavation. These areas shall be cleared, grubbed, and stripped of any vegetation, organic matter and/or any other debris. Stripped topsoil shall be stockpiled at a location on the site to be designated by the Purchaser's Representative.

9.1.2 The grubbed area shall be harrowed and raked with a tractor-mounted root rake to collect all small material previously overlooked. The tractor shall be of adequate size to achieve a minimum of four inches penetration of the root rake teeth. The root rake teeth shall not be greater than twelve inches apart.

9.1.3 Trees, stumps, and brush cleared from the above areas shall be disposed of by mulching and stockpiling or by removal from the site.

9.1.4 Grubbing and stripping shall be limited to five (5) feet outside the limits of any excavation or cut slopes.

9.1.5 Spoil material shall be disposed of only in areas to be designated by the Purchaser. The Contractor shall slope the spoil area for drainage, implement necessary erosion control measures, and provide a perennial stand of vegetation.

9.2 EROSION CONTROL

9.2.1 Erosion and sediment control measures shall be prepared and placed first, where necessary or where indicated in the erosion control plan, *Construction Best Management Practices Plan for Gaston Gypsum Project*. Additional measures shall be taken as required or as directed by the Purchaser to minimize erosion of soil.

9.2.2 During the course of this project, the Contractor shall plan and coordinate his work to minimize the amount of suspended soil particles entering rivers and streams or leaving the general work area and being deposited in undesirable places. Any property damage or fines resulting from the Contractor's negligence shall be borne by the Contractor.

9.2.3 The Contractor shall not excavate, uncover or denude areas of work until adequate erosion and sediment control measures are installed.

9.2.4 The Purchaser will inspect the sediment and erosion control practices employed to evaluate their effectiveness. Any deficiencies shall be immediately corrected by the Contractor at no cost to the Purchaser.

9.2.5 Erosion and sediment control measures shall be utilized and maintained as indicated in the Plans.

10.0 RECORDS

The quality control records of inspection and testing shall be compiled by the Contractor's Quality Control Inspector and provided to the Purchaser upon completion of the Project. Furthermore, copies of the daily inspection records and field quality control records shall be provided to the Purchaser on a weekly basis. All records shall be forwarded to the Plant's permanent file to be retained as a record of the project.

DRAWING INDEX:
PLANT E.C. GASTON UNIT 5 – FGD PROJECT – GYPSUM STORAGE AREA – CELL 1

REFERENCE:

STRUCTURAL DRAWINGS:
E5C12140–GYPSUM STORAGE ELECTRICAL BUILDING FOUNDATION
E5C12142–OUTDOOR CONCRETE–GYPSUM STORAGE POND–FOUNDATION PLAN
E5C12143–OUTDOOR CONCRETE–GYPSUM STORAGE POND–SECTIONS & DETAILS
E5C12144–OUTDOOR CONCRETE–GYPSUM STORAGE POND–OUTLET STRUCTURE–FOUNDATION PLAN & DETAILS

ELECTRICAL DRAWINGS:
E5E30043–GYPSUM STORAGE POND ELECTRICAL BUILDING EQUIPMENT & GROUNDING PLAN
E5E30044–GYPSUM STORAGE POND ELECTRICAL DUCT RUN & PUMP PLATFORM LOCATION

MECHANICAL DRAWINGS:
E5M22300 SHEET 1 PARTIAL PIPING PLAN–GYPSUM TRANSFER PIPING
E5M22300 SHEET 2 PARTIAL PIPING PLAN–GYPSUM TRANSFER PIPING
E5M22300 SHEET 3 PARTIAL PIPING PLAN–GYPSUM TRANSFER PIPING
E5M22300 SHEET 4 PARTIAL PIPING PLAN & DETAILS–GYPSUM TRANSFER PIPING
E5M22300 SHEET 5 PARTIAL PIPING PLAN–GYPSUM TRANSFER PIPING
E5M22300 SHEET 6 PARTIAL PIPING PLAN–GYPSUM TRANSFER PIPING
E5M22300 SHEET 7 SECTIONS–GYPSUM TRANSFER PIPING
E5M22300 SHEET 8 BILL OF MATERIAL–GYPSUM TRANSFER PIPING
E5M22310 SHEET 1 PIPING PLAN – CLEAR POND PUMP PIPING
E5M22310 SHEET 2 SECTIONS – CLEAR POND PUMP PIPING
B

TECHNICAL SPECIFICATION REFERENCE:

1. REFER TO TECHNICAL SPECIFICATION SECTION 31 FOR CONSTRUCTION OF CELL 1 GYPSUM SLURRY POND OF THE GYPSUM STORAGE AREA.

GENERAL CONSTRUCTION NOTES:
1. THE CONTRACTOR SHALL OBTAIN FROM THE PURCHASER DESIGNATED ACCESS DIRECTIONS ACROSS THE PLANT PROPERTY.
2. EXISTING ACCESS AND PLANT ROADS SHALL BE MAINTAINED AND REPAIRED IF NECESSARY DURING CONSTRUCTION BY THE CONTRACTOR TO THE SATISFACTION OF THE PURCHASER'S REPRESENTATIVE.
3. THE CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTING HIS OWN STANDARD QUALITY CONTROL AND QUALITY ASSURANCE PROGRAM OR PRACTICES AND SHALL INSTITUTE ANY ADDITIONAL CONTROLS OR PROCEDURES IN ACCORDANCE WITH PROVEN INDUSTRY PRACTICE TO ASSURE COMPLIANCE WITH THESE DRAWINGS AND TECHNICAL SPECIFICATIONS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PLANNING AND OPERATING ANY DEWATERING, SURFACE WATER RUNOFF CONTROL, PROVISIONS FOR DRAINAGE FOR EXCAVATIONS, AND FOR THE PLACEMENT OF MATERIALS. CONTRACTOR TO COORDINATE WITH PURCHASER'S REPRESENTATIVE PRIOR TO DISCHARGING ANY WATER. SUCH DEWATERING WORK SHALL BE AT NO ADDITIONAL EXPENSE TO THE PURCHASER.
5. THE CONTRACTOR SHALL STAY OUT OF DESIGNATED WETLANDS. THESE WETLANDS HAVE BEEN MARKED BY THE PURCHASER. SHOULD ANY OF THE MARKERS BE DISTURBED, THE CONTRACTOR SHALL NOTIFY THE PURCHASER IMMEDIATELY. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR PROTECTION OF THE WETLANDS. ANY RESTORATION AND ALL ASSOCIATED COSTS WILL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PURCHASER.
6. ALL GRADE ELEVATIONS SHOWN ON DRAWINGS ARE FINISH GRADE.
7. COORDINATE SYSTEM IS A PLANT GRID SYSTEM. CONTRACTOR SHALL COORDINATE AND VERIFY CONTROL MONUMENT LOCATIONS AND ELEVATIONS WITH PURCHASER'S REPRESENTATIVE PRIOR TO COMMENCING ANY SURVEY WORK.
8. ALL WORK SHALL CONFORM TO A.L.D.O.T. STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION (CURRENT EDITION).
9. SEE A.L.D.O.T. STANDARD SPECIFICATION FOR HIGHWAY CONSTRUCTION (CURRENT EDITION) SECTION 825 "CRUSHED AGGREGATE BASE MATERIALS" FOR SPECIFICATIONS ON AGGREGATE BASE TO BE PLACED ON ROADWAY. TYPE 'A' MATERIAL TO BE USED.
10. STONE MATERIAL TO BE COMPACTED TO 90% MODIFIED PROCTOR DENSITY OR AS APPROVED BY PURCHASER'S REPRESENTATIVE.
11. SUBGRADE IN CUT AREAS AND EXISTING GRADE IN FILL AREAS TO BE PROOF ROLLED AND VERIFIED BY PURCHASER'S REPRESENTATIVE TO BE SUFFICIENTLY COMPACTED PRIOR TO ANY EARTH FILL AND/OR STONE FILL BEING PLACED UPON IT.
12. ANY NECESSARY EARTH FILL SHALL BE FREE OF ORGANICS, DEBRIS, AND VEGETATION. THE FILL SHALL CONSIST OF CLEAN SAND, SILT OR CLAY MIXTURES. EARTH FILL SHALL BE PLACED IN UNIFORM LAYERS OF 8 TO 10 INCHES, NOMINAL THICKNESS, LOOSE MEASUREMENT. FILL MATERIAL TO BE COMPACTED TO 95% STANDARD PROCTOR DENSITY OR AS APPROVED BY PURCHASER'S REPRESENTATIVE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL REQUIRED BORROW EXCAVATION MATERIAL. PRIOR TO PLACING OF FILL MATERIAL, SCARIFY SURFACE OF GROUND TO A DEPTH OF 6". MOISTURE CONTENT OF LOOSENED MATERIAL SHALL BE SUCH THAT IT WILL BOND TO THE FIRST LAYER OF FILL MATERIAL.
13. ALL SURFACE STONE MATERIALS AND SELECT FILL BASE SHALL BE PLACED UNIFORMLY SUCH THAT AFTER COMPACTION IT WILL MEET THE WIDTH AND THICKNESS REQUIREMENTS SHOWN ON THE DRAWINGS.
14. PRIOR TO ANY OTHER CONSTRUCTION, A STABILIZED CONSTRUCTION ENTRANCE SHALL BE CONSTRUCTED AT THE POINT OF ENTRY TO THE SITE. CONSTRUCTION ENTRANCE SHALL BE A MINIMUM OF 20' IN WIDTH AND 50' IN LENGTH. STONE SIZE SHALL BE IN ACCORDANCE WITH NATIONAL STONE ASSOCIATION R-2 (1.5 – 3.5 INCH STONE). CONSTRUCTION ENTRANCE SHALL HAVE A MINIMUM PAD THICKNESS OF 6 INCHES.
15. CONTRACTOR TO USE CAUTION WHEN WORKING UNDER OR NEAR TRANSMISSION LINES. REQUIRED CLEARANCES FROM EQUIPMENT AND PERSONNEL PERFORMING WORK NEAR HIGH VOLTAGE POWER LINES ARE SPECIFIED IN OSHA 1910.333.
16. STORM PIPE SHALL BE ADS N-12 HDPE DUAL WALL PIPE (CORRUGATED EXTERIOR WALL/SMOOTH INTERIOR WALL), OR APPROVED EQUAL UNLESS NOTED OTHERWISE. ALL JOINTING, INSTALLATION, TRENCHING AND BEDDING SHALL CONFORM TO MANUFACTURER'S GUIDELINES.
17. SLOPE PAVED HEADWALLS TO BE PER A.L.D.O.T. DRAWING HW-614-SP.
18. ALL CUT AND FILL SLOPES SHALL BE A MINIMUM OF 2.5 HORIZONTAL TO 1 VERTICAL EXCEPT WHERE NOTED ON PLANS.

EROSION AND SEDIMENT CONTROL NOTES:
1. THE CONTRACTOR SHALL ABIDE BY AND IMPLEMENT THE STORM WATER POLLUTION PREVENTION PLAN (SWPP PLAN) ENTITLED "CONSTRUCTION BEST MANAGEMENT PRACTICES PLAN FOR GASTON GYPSUM PROJECT".
2. PRIOR TO CONSTRUCTION, ANY NECESSARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND PUT INTO PLACE, AND ANY REQUIRED DIVERSION BERMS, DITCHES AND OTHER STORM WATER MANAGEMENT STRUCTURES SHALL BE CONSTRUCTED AS NEEDED. THESE AND OTHER APPROPRIATE MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AS MAY BE REQUIRED BY THE SWPP PLAN.
3. ALL EROSION AND SEDIMENT CONTROL AT THE SITE SHALL BE PERFORMED IN ACCORDANCE WITH THE ALABAMA HANDBOOK FOR EROSION CONTROL, SEDIMENT CONTROL AND STORMWATER MANAGEMENT ON CONSTRUCTION SITES AND URBAN AREAS, LATEST EDITION.
4. AT LOCATIONS WHERE CLASS I RIP RAP IS USED FOR SLOPE PROTECTION, USE MIRAFI 180N OR APPROVED EQUAL FOR UNDERLYING FILTER FABRIC.

EARTHWORK AND CONSTRUCTED FILL NOTES:

1. CELL DIKES, CELL ACCESS RAMPS, AND GENERAL FILL AREAS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS SECTION 31 FOR THE CONSTRUCTION OF CELL 1 GYPSUM SLURRY POND OF THE GYPSUM STORAGE AREA.
2. EARTH FILL MATERIAL SHALL BE OBTAINED FROM APPROVED BORROW AREAS AS DESIGNATED OR APPROVED BY THE PURCHASER.
3. ALL EARTHWORK CONSTRUCTION SHALL BE DONE TO THE LINES, GRADES, AND CROSS SECTIONS SHOWN ON THE DRAWINGS. THE CONTRACTOR WILL ESTABLISH ALL NECESSARY BENCHMARKS AND BASE LINES REQUIRED FOR THE WORK.

HIGH DENSITY POLYETHYLENE (HDPE) LINER NOTES:

1. THE BOTTOM AND INTERIOR SLOPE OF THE CELL AND PONDS SHALL BE LINED WITH 60 MIL TEXTURED HDPE CARBON BLACK LINER AS SHOWN ON THE DRAWINGS AND AS DESCRIBED IN THE TECHNICAL SPECIFICATIONS SECTION 31.
2. THE HDPE LINER SHALL BE STORED, HANDLED AND INSTALLED ACCORDING TO THE TECHNICAL SPECIFICATIONS SECTION 31 AND AS PER THE MANUFACTURER'S GUIDELINES AND INSTRUCTIONS.
3. FOR ALL PENETRATIONS TO LINER REFER TO DETAIL DRAWINGS AND MANUFACTURER'S REQUIREMENTS.

GEOCOMPOSITE DRAINAGE NET AND UNDERDRAIN COLLECTION SUMPS NOTES:

1. A GEOCOMPOSITE DRAINAGE NET SHALL BE INSTALLED ABOVE THE HDPE LINER ACROSS THE BOTTOM AREA OF THE CELL AS SHOWN ON THE DRAWINGS AND AS DESCRIBED IN THE TECHNICAL SPECIFICATIONS SECTION 31.
2. THE GEOCOMPOSITE DRAINAGE NET SHALL BE GSE FABRINET DOUBLE SIDED 6 OZ. GEOCOMPOSITE, AND SHALL CONSIST OF ONE LAYER OF HDPE DRAINAGE NET BETWEEN TWO LAYERS OF GEOTEXTILE TO CREATE A DOUBLE SIDED GEOCOMPOSITE. THE GEOTEXTILE SHALL BE A NON-WOVEN NEEDLE PUNCHED POLYETHYLENE.
3. THE GEOCOMPOSITE DRAINAGE NET SHALL BE STORED, HANDLED AND INSTALLED ACCORDING TO THE TECHNICAL SPECIFICATIONS AND AS PER MANUFACTURER'S GUIDELINES AND INSTRUCTIONS.
4. WATER COLLECTED BY THE GEOCOMPOSITE DRAINAGE NET WILL BE COLLECTED IN UNDERDRAIN COLLECTION SUMPS. THE UNDERDRAIN COLLECTION SUMPS SHALL BE LOCATED AND CONSTRUCTED AS SHOWN ON THE DRAWINGS.
5. THE GEOCOMPOSITE DRAINAGE NET WILL HENCE BE REFERRED TO AS "GDN".
6. GEOTEX 1001 FILTER FABRIC (OR APPROVED EQUAL) WILL BE USED TO WRAP UNDERDRAIN COLLECTION SUMPS AS NOTED ON DETAIL.

CONCRETE NOTES:

1. DESIGN MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE FOLLOWING LATEST STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE MODIFIED ON THE DESIGN DRAWINGS:
   –ACI-318 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE
   –ACI-315 MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES
   –ACI-347R RECOMMENDED PRACTICE FOR CONCRETE FORMWORK
   –CRSI RECOMMENDED PRACTICE FOR PLACING REINFORCING STEEL
2. ALL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI IN 28 DAYS, UNLESS OTHERWISE NOTED.
3. USE TYPE I/II PORTLAND CEMENT AND W/C RATIO OF .45.
4. CONCRETE SHALL HAVE A FLY ASH CONTENT EQUAL TO 15-30% OF THE TOTAL CEMENTITIOUS MATERIAL, UNLESS OTHERWISE APPROVED BY THE DESIGNING ENGINEER. FLY ASH SHALL CONFORM TO REQUIREMENTS OF ASTM C618, CLASS F.
5. IF READY-MIX CONCRETE IS USED FROM AN APPROVED SUPPLIER, ALL CONCRETE SHALL BE PLACED WITHIN 1½ HOURS AFTER MIXING.
6. CONCRETE SLABS SHALL HAVE A STEEL TROWEL FINISH.
7. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60. WELDED STEEL WIRE FABRIC SHALL BE ASTM A185 PLAIN TYPE.
8. CHAMFER ALL EXPOSED EXTERNAL CORNERS OF CONCRETE ¾" WITH A 45 DEGREE CHAMFER, UNLESS OTHERWISE NOTED.
9. ALL REINFORCING SHALL HAVE 2" MINIMUM COVER OF CONCRETE WHERE FORMS ARE USED AND 3" MINIMUM COVER WHEN POURED AGAINST THE GROUND.
10. EMBEDMENT AND SPLICE LENGTHS FOR REINFORCING STEEL SHALL CONFORM TO ACI-318, UNLESS OTHERWISE NOTED.
11. ALL REINFORCING BAR HOOKS SHOWN ON DRAWINGS SHALL BE ACI STANDARD 90 DEGREE HOOKS, UNLESS OTHERWISE NOTED.
12. REBAR FABRICATOR SHALL OBTAIN APPROVAL OF HIS DETAIL DRAWINGS BEFORE BEGINNING FABRICATION, UNLESS OTHERWISE NOTED IN PURCHASE ORDER.

CONCRETE LINING SYSTEM:
1. ALL CONCRETE THAT WILL BE EXPOSED TO OR IN CONTACT WITH GYPSUM AND/OR GYPSUM SLURRY WATER SHALL BE COATED WITH CHEMPRUF 2410 LINING SYSTEM BY ATLAS MINERALS & CHEMICALS, INC. OR APPROVED EQUAL. THIS EXCLUDES ROLLER COMPACTED CONCRETE LOCATED IN THE GYPSUM COLLECTION BASINS.
2. THE LINING SYSTEM MATERIALS SHALL BE STORED, HANDLED AND APPLIED PER MANUFACTURER'S GUIDELINES AND INSTRUCTIONS.
3. THE LINING SYSTEM SHALL BE APPLIED BY A KNOWLEDGEABLE AND EXPERIENCED SPECIALTY CONTRACTOR.

METAL LINING SYSTEM:
1. ALL METAL THAT WILL BE EXPOSED TO OR IN CONTACT WITH GYPSUM AND/OR GYPSUM SLURRY WATER SHALL BE COATED WITH CHEMPRUF 2410 LINING SYSTEM BY ATLAS MINERALS & CHEMICALS, INC. OR APPROVED EQUAL.
2. THE LINING SYSTEM MATERIALS SHALL BE STORED, HANDLED AND APPLIED PER MANUFACTURER'S GUIDELINES AND INSTRUCTIONS.
3. THE LINING SYSTEM SHALL BE APPLIED BY A KNOWLEDGEABLE AND EXPERIENCED SPECIALTY CONTRACTOR.

FLOWABLE FILL NOTES:

1. FOR DECANT PIPE BACKFILL, A FLY ASH/CEMENT FLOWABLE FILL MIX SHALL CONSIST OF THE FOLLOWING:
–2000 LBS OF CLASS "F" FLY ASH
–150 LBS OF CEMENT
–200 LBS OF CONCRETE SAND (OPTIONAL)
–87 GALLONS OF WATER (POTABLE)
2. ALL FLOWABLE FILL TO SET 72 HOURS PRIOR TO PLACING COMPACTED SOIL BACKFILL ON FLOWABLE FILL.
3. TO PREVENT FLOTATION, HOLD-DOWN STRAPS SHALL BE USED ON THE DISCHARGE PIPES PRIOR TO PLACING FLOWABLE FILL. SEE DETAILS.

A

PERIMETER CHAIN LINK FENCE NOTES:

1. A PERIMETER CHAIN LINK FENCE AND GATES SHALL BE INSTALLED AS SHOWN ON THE DRAWINGS AND AS SPECIFIED BY THE PURCHASER. THE FENCE SHALL EXTEND 6 FEET ABOVE THE GROUND AND 1 FOOT BELOW GROUND. IT IS TO HAVE 3 STRANDS OF BARBED WIRE AT 45 DEGREES ON TOP OF THE CHAIN LINK. AN ELECTRONIC VEHICULAR GATE PROVIDED BY THE PURCHASER SHALL BE INSTALLED WHERE REQUESTED BY THE PURCHASER. ALL OTHER GATES TO BE PROVIDED BY CONTRACTOR.

PIPES AND OUTLET STRUCTURE:
1. THE HORIZONTAL PIPE FOR THE OUTLET STRUCTURE ASSEMBLY SHALL BE HANCOR BLUE SEAL OR ADS N-12 HDPE DUAL WALL PIPE OR APPROVED EQUAL. THE PIPE SHALL HAVE A SMOOTH INTERIOR WALL AND ANGULAR EXTERIOR CORRUGATIONS.
2. TO MINIMIZE JOINTS AND JOINT INSTALLATION, PIPE SHALL BE FURNISHED IN THE MAXIMUM NON-CUSTOM LENGTHS.
3. PIPE JOINTS SHALL BE WATERTIGHT ACCORDING TO THE MANUFACTURER'S GUIDELINES AND INSTRUCTIONS, AND SHALL CONTAIN A REINFORCED BELL.
4. THE RISER ASSEMBLY WILL CONSIST OF A THREE SIDED CONCRETE BOX WITH A SERIES OF STOP LOGS TO BE ADDED AS NEEDED. SEE DETAIL.
5. ALL PIPES AND ASSOCIATED APPURTENANCES SHALL BE INSTALLED AND JOINED ACCORDINGLY TO MANUFACTURER'S GUIDELINES AND INSTRUCTIONS.
6. PIPES FOR THE INTERIOR PERIMETER DITCH CULVERTS SHALL BE HANCOR BLUE SEAL OR ADS N-12 HDPE DUAL WALL PIPE OR APPROVED EQUAL. THE PIPES SHALL HAVE A SMOOTH INTERIOR WALL AND ANGULAR EXTERIOR CORRUGATIONS.
7. 12" ø COLLECTOR PIPES FOR THE UNDERDRAIN COLLECTION SUMP, ADJOINING TEES, AND PIPES LEADING FROM THE COLLECTOR PIPES TO THE SEDIMENTATION POND SHALL BE HANCOR BLUE SEAL OR ADS N-12 HDPE DUAL WALL PIPE OR APPROVED EQUAL. THE PIPES SHALL HAVE A SMOOTH INTERIOR WALL AND ANGULAR EXTERIOR CORRUGATIONS. ONLY THE COLLECTOR PIPES SHALL BE PERFORATED.

GRASSING – PERMANENT/TEMPORARY SEEDING:

1. ALL DISTURBED AND/OR EXPOSED AREAS THAT WILL REMAIN EXPOSED FOR MORE THAN THIRTEEN DAYS SHALL BE SEEDED, MULCHED AND FERTILIZED UPON REACHING FINAL GRADES.
2. AREAS OF STRUCTURAL FILL SHALL BE GRASSED UPON REACHING FINAL GRADES AT NO ADDITIONAL COST TO THE PURCHASER.
3. TOPSOIL SHALL BE PLACED TO A FINAL COVER THICKNESS OF 4 INCHES TO 6 INCHES ON AREAS THAT RECEIVING GRASSING.
4. THE FOLLOWING SCHEDULE INDICATES THE RECOMMENDED SPECIES, PLANTING DATES, AND SEEDING RATES. THE AREAS SHALL BE SEEDED ACCORDING TO THE BEST MIX FOR PLANT GASTON VICINITY DURING THE TIME OF YEAR SEEDING APPLICATION SHALL OCCUR. SHELBY COUNTY IS LOCATED WITHIN THE NORTH GEOGRAPHICAL AREA OF THE STATE. REFERENCE THE ALABAMA HANDBOOK FOR EROSION CONTROL, SEDIMENT CONTROL AND STORMWATER MANAGEMENT ON CONSTRUCTION SITES AND URBAN AREAS, LATEST EDITION FOR FURTHER INFORMATION. UNLESS OTHERWISE SPECIFIED THE CONTRACTOR SHALL SUBMIT A PROPOSED MIX TO THE PURCHASER FOR APPROVAL BEFORE GRASSING OPERATIONS BEGIN. THE FOLLOWING VEGETATION SCHEDULE IS RECOMMENDED FOR PLANT GASTON:

VARIETY	SEEDING RATE (LBS/AC)	SEEDING DATES
COMMON BERMUDA GRASS	10	APRIL 1 – JULY 1
BERMUDA GRASS, HYBRID (LAWN TYPES)	SOLID SOD	ANYTIME
BERMUDA GRASS, HYBRID (LAWN TYPES)	SPRIGS 1/SQ FT	MARCH 1 TO AUGUST 1
FESCUE, TALL	40-50	SEPT. 1 TO NOV. 1
SERICEA	40-60	MARCH 15 – JULY 15
SERICEA & COMMON BERMUDA GRASS	40-60 10	MARCH 15 – JULY 15

IN THE ABSENCE OF SOIL TEST DATA, THE FOLLOWING FERTILIZATION RATES SHALL BE USED:

VEGETATION	N-P-K	FERTILIZER RATES PER ACRE
GRASS ALONE	8-24-24	400 LBS
GRASS-LEGUME MIXTURE	8-24-24	400 LBS
LEGUME ALONE	0-20-20	500 LBS

5. AFTER SEEDING, AN EROSION CONTROL BIODEGRADABLE STRAW BLANKET SHALL BE INSTALLED ON THE EXTERIOR (2.5:1) SLOPES OF THE DIKES. THIS MATERIAL SHALL BE A BIONET S150BN DOUBLE NET STRAW BLANKET BY NORTH AMERICAN GREEN, OR APPROVED EQUAL.
6. THE BLANKET SHALL BE INSTALLED PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. HOWEVER, THE BLANKET SHALL BE TACKED TO THE GROUND AS NECESSARY TO WITHSTAND THE UPWARD GROWTH OF GRASS AND TO PERMIT THE ESTABLISHMENT OF GRASS THROUGH THE BLANKET. FAILURE TO ACCOMPLISH THIS WILL REQUIRE THAT THE AFFECTED AREA BE RE-GRASSED AND REDONE TO THE SATISFACTION OF THE PURCHASER'S REPRESENTATIVE.
7. SLOPES LESS THAN 3:1 SHALL BE MULCHED WITH BAHIA HAY MULCH OR WITH OTHER SUITABLE MATERIAL.
8. WATER REQUIRED TO PROMOTE A SATISFACTORY GROWTH SHALL BE FURNISHED BY THE PURCHASER AND APPLIED BY THE CONTRACTOR.
9. ALL DITCHES LOCATED OUTSIDE THE CELL WILL BE GRASSED.

ADVANCE PRINT

Southern Company Generation Engineering and Construction Services FOR
Alabama Power Company

PLANT GASTON – UNIT 5 FGD PROJECT
GYPSUM STORAGE FACILITY – CELL 1
DRAWING INDEX, NOTES, AND SPECIFICATIONS

REVISION	DATE	DESCRIPTION	BY	CHK'D	CIVIL APPR	ELECT APPR	I/C APPR	MECH APPR	DISC MGR
1	2/27/09	A. REVISION TO "PERIMETER CHAIN LINK FENCE NOTES" B. REVISION TO "REFERENCE" LIST	AEI	RCB	MDA	MDC	GIL	DRD	CKT
0	12/19/08	ISSUED FOR CONSTRUCTION EWO: 2120DE	AEI	RCB	MDA	MDC	GIL	DRD	CKT

SCALE	PROJ I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
NONE	211100	E5C11027	1	FINAL	1