Ameren

Ameren Services

August 7, 2013

Mr. Darrell G. Hartley, Chief, Permits Unit
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176

RE: Construction Permit Application for a Proposed Utility Waste Landfill, Ameren Missouri Labadie Energy Center, Franklin County, Missouri, Response to Comment Letter dated May 7, 2013

On behalf of Ameren Missouri, I am submitting the following documents to address and respond to the Solid Waste Management Program's ("SWMP") review comments in the letter dated May 7, 2013:

- Detailed Response to SWMP's comments in the May 7, 2013 comment letter.
- Five (5) copies of revised sections to the report titled "Ameren Missouri Labadie Energy Center Franklin County Missouri Construction Permit Application for a Proposed Utility Waste Landfill, Franklin County, Missouri, January, 2013". New title pages and a complete Table of Contents denoting which sections of the report have been revised are included.
- Five (5) complete copies of the associated set of revised plan sheets.
- A Table of Revisions indicating the text sections, tables, figures and appendices of the February 2013 permit application documents that have been revised are included with this cover letter. The Table of Revisions includes instruction for replacing the original section of the report with the REVISED sections.

Copies of identical revised application documents are being submitted to Franklin County.

With this submittal it is our understanding that review of the application by the SWMP will continue. If you have any questions or require additional information regarding the revised Construction Permit Application documents, please contact Paul Reitz, of Reitz & Jens, Inc., at (314) 993-4132.

1901 Chouteau Avenue
PO Box 66149, MC 602
St. Louis, MO 63166-6149
Ameren.com

Thank you for your review of this application. If I can be of assistance, I can be reached at (314) 554-2388.

Sincerely,

Paul R. Pike
Environmental Science Executive

Enclosures

cc: J. Feldman, County Engineer, Franklin County, w/enclosure
R. Martin, MDNR, w/o enclosure
B. Roth-Roffy, MDNR, w/o enclosure

Construction Permit Application
Proposed Utility Waste Landfill
Ameren Missouri Labadie Energy Center
Franklin County Missouri

Response to MDNR-SWMP Review Comments

August 5, 2013

Prepared For:

Ameren MISSOURI

Prepared by:

REITZ & JENS, INC.
CONSULTING ENGINEERS
50 YEARS

and

GREDELL Engineering Resources, Inc.
ENVIRONMENTAL ENGINEERING LAND-AIR-WATER

SCHEDULE CJG-S23

The following will address the comments made by the Missouri Department of Natural Resources' Solid Waste Management Program (MDNR-SWMP) in their May 7, 2013 letter to Paul Pike at Ameren Missouri reviewing the Construction Permit Application (CPA) for Ameren Missouri's proposed Utility Waste Landfill (UWL) at the Labadie Energy Center in Franklin County Missouri. Applicable portions of the Construction Permit Application have been revised as indicated by our below responses to the MDNR-SWMP comments and comments made by Franklin County's Independent Registered Professional Engineer (IRPE). Five (5) copies of the revised sections of the CPA are transmitted with this response. MDNR-SWMP's comments are repeated below followed by our responses highlighted in blue.

It is our professional opinion that the Labadie UWL design and operating procedures provided in the revised CPA are conservative in addressing all potential design requirements; meet all requirements of the Missouri Solid Waste Management Law and Rules and Franklin County ordinances; and are in accordance with generally accepted engineering practice.

COMMENT RESPONSES:

Application

MDNR 1 Please be advised that issuance of the Water Protection Program Land Disturbance Permit and Floodplain Development Permit is not required by the SWMP for issuance of a construction permit. However, the SWMP must have a copy of each permit prior to issuance of an *Operating Permit.* **Response:** Following issuance of a Construction Permit for the UWL, but prior to the start of construction, Ameren Missouri will obtain the required local and state Water Protection Program Land Disturbance permits for the site. Copies of each permit will be provided to MDNR. Franklin County's Floodplain Development Permit for the UWL has been added to Appendix H.

MDNR 2 As referenced in Section 3.15 (page 3-30), an easement and access agreement to the proposed utility waste landfill and soil borrow areas must be executed between the responsible parties and the Department's SWMP. However, the easement and access agreement must be executed prior to issuance of an *Operating Permit.* If possible, you may file the agreement prior to issuance of the Construction Permit, but it is not a requirement for the issuance of a Construction Permit. Please use the current easement form provided to Gredell Engineering. **Response:** Section 3.15 has been revised to clarify that an easement and access agreement will be executed between the responsible parties and the Department's SWMP following issuance of a Construction Permit, at the time of application for an Operating Permit. The most current MDNR easement form will be used when easements and access agreements are executed.

MDNR 3 Please be aware you must obtain the required permits from the Missouri Department of Transportation and Franklin County for roadway alterations prior to February 3, 2014. **Response:** The portion of Labadie Bottom Road that will be altered to accommodate construction of the UWL is owned and maintained by Franklin County. Labadie Bottom Road is not regulated by the Missouri Department of Transportation. Franklin County issued a July 24,

2013 letter stating that they agree in concept with the road alternations shown in the CPA. Detailed design plans will be completed and the required Franklin County approvals and permits will be obtained before construction of these road modifications. Section 2.3 and Appendix F have been revised to clarify this procedure and requirement.

MDNR 4 Please provide a revised letter from Explorer Pipeline which acknowledges construction of berms over the pipeline in two proposed locations is acceptable. **Response:** Explorer Pipeline's January 28, 2013 letter to Ameren that was included in Appendix V was in response to a November 15, 2013 email from Ameren that explicitly stated that "2 roads will be installed perpendicularly over the pipeline…at a height of around 15'". Explorer's January 28 letter, while not specifically acknowledging that these roads would require soil berms to cross the pipeline, did acknowledge that they would need to be removed if access to the pipeline was required and directed Ameren to install culverts over the pipeline to avoid potential ponding created by the berms. Section 2.7 has been revised to clarify this correspondence with Explorer. In addition, copies of Ameren's November 15, 2012 email explaining their request to Explorer in more detail and Explorer's January 28, 2013 response have been added to Appendix V.

MDNR 5 In Appendix K, the concrete Fabri-Form mat thickness is incorrect. Please correct. **Response:** Appendix K has been revised to state the correct thickness of the Fabric-Formed Concrete Mat (FCM), 2.2 inches, as previously indicated in Section 3.3.2.3.

Plans

MDNR 6 Per 10 CSR 80-11.010(4)(B)2.A., please show the setbacks to wetland areas and other buffers on Sheet 3. **Response:** Sheets 3, 5, 10 and 19 have been revised to identify a minimum 25 foot buffer between the limits of disturbance and jurisdictional wetland areas. A note has also been added to Sheet 3 regarding the limited activities allowed north of the Ineffective Flow Boundary (i.e. no fill may be placed north of the Ineffective Flow Boundary).

MDNR 7 Per 10 CSR 80-11.010(8)(B)1.F., please show the location of all National Pollution Discharge Elimination System (NPDES) outfalls where this new facility will drain to on Sheet 4. **Response:** Leachate and stormwater that cannot be utilized within the UWL limits for dust control or for conditioning of the ash prior to disposal in the UWL will be pumped back to ash ponds at the plant for discharge through NPDES Outfall 002. The plant map showing the location of Outfall 002 has been added to the lower left-hand corner of Sheet 4.

MDNR 8 Remove Note 2 from Sheets 6-9 and 11-14. **Response:** Note 2 has been removed from revised plan Sheets 6 through 9 and 11through14, and the notes on each Sheet have been renumbered as appropriate.

MDNR 9 Please depict the limits of Fabri-Form installation along all berms on all sheets that illustrate the location of the material. **Response:** Sheets 6 through 9 and 11 through 14 have been revised to show the installation of FCM on all exterior berms. Because of the large scale of Sheets 5 and 10 a note was added to each sheet to address this comment.

MDNR 10 Indicate, through hatching or another method, the stormwater entity along the east berm between the waste cell and basin on Sheet 7. **Response:** Sheets 6 through 9 and 11 through14 have been revised to identify the stormwater inlets (the stormwater entities) between the appropriate cells and stormwater ponds.

MDNR 11 Show arrows from call-out details to their corresponding features on Sheet 8. **Response:** Sheet 8 has been revised to show arrows from call-out details to their corresponding features on the sheet.

MDNR 12 Please reword Note 1 on Sheet 16. Stormwater management ponds are included in the permitted boundary. **Response:** Sheet 16 has been revised to correct Note 1.

MDNR 13 As depicted on Detail 1 on Sheet 19 (interior berm detail), vegetative growth will be required to be established on soil compacted to 1 x 10^{-5}cm/s. Please provide alternatives to provide a sufficient layer for vegetation to thrive on these slopes. **Response:** Reference our response to MDNR comment 9. The appropriate plan sheets, including Sheet 19, have been revised to show the installation of FCM on all exterior slopes eliminating the need for vegetative growth on these slopes.

Seismic and Static Analysis

MDNR 14 Please provide a detailed narrative to describe the engineering approach taken for the seismic analysis. The narrative shall justify all engineering assumptions and properties used in the analysis. Please provide a similar narrative for the static stability analysis. **Response:** Appendix J has been revised to provide detailed narratives describing the engineering approach used for the seismic and static stability analysis. Section 2.8.6 has been revised to reflect the results of the updated seismic and static stability analysis results.

MDNR 15 Per 10 CSR 80-11.010(4)(B)4.A., please discuss mitigation needed in the event of a seismic event leading to liquefaction prior to sufficient overburden placement. Please verify conservative ash and soil unit weights were used for this analysis. **Response:** Appendix J, Section 3.3.2.2, and Section 4.2.2 have been revised to describe the mitigation steps that will be followed in the event of a seismic event leading to liquefaction prior to sufficient overburden placement. Additional information has been added to Appendix J to verify conservative ash and soil unit weights have been used for this analysis.

Geotechnical Analysis

MDNR 16 Per 10 CSR 80-11.010(4)(B)5.D., please indicate location and quantity of closure cover material dedicated to the Department, and depict this area on Sheet 3 of the plans. **Response:** Final cover needs are calculated in Appendix K to be 591,000 cubic yards of soil. Sheet 3 shows the outside toe of the exterior berms (the approximate limits of disturbance) to be 225 acres (Appendix K). During construction of the landfill, we previously indicated that 1.5 feet of soil suitable for final cover would be excavated from within the berm limits to establish

the base construction grade. With 5% swell, the total soil volume generated during this site preparation was approximately 572,000 cubic yards, leaving a deficit of 19,000 cubic yards. By increasing the depth of initial soil stripping to 1.75 feet, sufficient soil will be removed to provide all final cover. As a cell is developed, a minimum of 1.75 feet of soil will be stripped on average from the cell and stockpiled within the landfill footprint outside all jurisdictional areas and will be dedicated to the Department for final cover. Therefore the area shown on Sheet 3 as the outside toe of berm is the limit and location of the soil that is dedicated to MDNR for final cover. Appendix K and Sections 1.2, 2.9.1, 3.2.2, 3.3.4, 3.12.1, 3.12.1.1, and 4.9 of the engineering report have been revised to reflect these provisions for dedicated final cover soil. The location of the final cover stockpile in Cell 4 has been added to Sheet 3 of the plans.

MDNR 17 Per 10 CSR 80-11.010(5)(A)4.A., please provide a bearing capacity and factor of safety calculation. Please verify conservative ash and soil unit weights were used for this analysis. **Response:** Settlement and bearing capacity analyses have been performed on the in-place foundation material beneath the disposal area and the results are provided in Appendix J. The effect of foundation material settlement on the liner and leachate collection have been evaluated and accounted for in the design of the liner grades and exterior berm elevations. Appendix J has been revised to tabulate range of material properties used in the settlement and bearing capacity evaluations.

MDNR 18 How was the applied load calculated for settlement analysis? Please verify conservative ash and soil unit weights were used for this analysis. **Response:** Text revisions have been made in the Appendix J narrative to clarify how the settlement analysis was performed and the material properties used.

Leachate Collection System (LCS)

MDNR 19 Per 10 CSR 80-11.010(9)(B), please verify and justify leachate reuse calculations considering placement of ash taken from ash ponds as described in the engineering report. This ash will have higher moisture content than ash from the precipitators. **Response:** The leachate reuse calculations have been reviewed and verified in consideration of ash being relocated from the existing ash pond to the new UWL. This ash will be wind-rowed and allowed to dry in the ash pond prior to being placed in the UWL. The leachate collection system as currently designed is adequate. Section 3.7.1 and 4.5 of the engineering report have been revised accordingly.

MDNR 20 Please verify conservative ash and soil unit weights were used for pipe crushing analysis. **Response:** The pipe crushing calculations in Appendix Y have been revised using conservative ash and soil unit weights consistent with the values provided in revised Appendix J.

Groundwater Monitoring

MDNR 21 The submitted document indicates the prevailing groundwater flow direction during periods of high river elevations is generally eastward. Conversely, Appendix W, Groundwater Hydraulic Data Summary, states "During periods of relatively low river elevations (November-

February) the prevailing direction of groundwater flow was north-northwest toward the river." The proposed locations of several wells designated as upgradient may potentially be in the groundwater flow path during periods of relatively low river elevations. In the event that the upgradient monitoring wells intercept downgradient groundwater, they may not provide sufficient data as initially intended. **Response:** We agree that some of the wells may change from upgradient to downgradient based on future groundwater elevations and flow directions. The evaluation of groundwater monitoring data in this alluvial setting will be an ongoing process, over the course of many sampling events, to develop background and flow data that will allow the groundwater regime to be better quantified and understood. The installation of additional groundwater monitoring wells will be evaluated at that time.

MDNR 22 As documented in the 2011 Detailed Site Investigation (DSI) of the site, groundwater flow direction in this alluvial setting fluctuates seasonally. As a result of the DSI, 22 proposed groundwater monitoring wells have been designated as downgradient and 7 wells have been designated as upgradient for the purpose of this groundwater monitoring program. In the event that data collected from a designated upgradient well has shown to be characteristic of a downgradient well, the well designation may need to be changed and the well spacing requirements for that monitoring area may need to be modified and justified. **Response:** As noted in the response to comment 21, the evaluation of groundwater monitoring data in this alluvial setting will be an ongoing process over the course of many sampling events. However, we do not believe it is prudent or necessary to change to the well designations or well spacing requirements at this time.

MDNR 23 Section 8.3 states that the facility will have two potential methods for purging of the groundwater monitoring wells prior to sampling. These purging methods consist of a purge/recover sampling method and the low-flow sampling method. It is encouraged that the facility implement a sampling procedure that will minimize the drawdown and agitation, and mixing of the stagnant casing waters. The use of bailers is not a prohibited sampling method, but the purging/recover method and sampling with a bailer may produce sample results that are biased and that are not representative to the groundwater. Therefore, it is strongly recommended that the facility implement a sampling method using the low-flow dedicated pumps. **Response:** The groundwater sampling and analysis plan was written to provide flexibility in regard to field sampling procedures as allowed by regulation. Ameren Missouri currently uses a low-flow sampling method and dedicated sampling equipment to obtain background water quality samples from the wells. There are currently no plans to revise these field procedures.

MDNR 24 In Appendix 2, titled "Missouri Solid Waste Management Rule Constituents for Detection Monitoring (10 CSR 80-11.010, Appendix I)", please include the constituent molybdenum to the sampling list. It is requested to sample for molybdenum because this constituent has been identified as a pollutant of concern by EPA's documents on coal ash, In addition, in the NPDES permit Ameren is required to have for water discharges, molybdenum was identified during the Technology Based Effluent Limit (TBEL) determination required for the coal ash pond. With molybdenum's presence in the ash pond discharge and EPA's

identification of it as a pollutant of concern, the Water Protection Program requests that molybdenum monitoring be established and added to the sampling list. **Response:** The detection monitoring parameters listed in Appendix 2 of the Groundwater Sampling and Analysis Plan (Appendix Q of the CPA) have been revised to include molybdenum. Appendix 2 has also been revised to reflect the analytical methods and practical quantization limits established by the contract laboratory.

MDNR 25 During our April 4, 2013, site visit, the SWMP observed relocation of two groundwater monitoring wells to accommodate operation of a traveling irrigation boom supplied by water from a nearby irrigation well. A recent review of the DSI approval reveals, the Geological Survey Program expressly required information regarding the status and analysis of the influence of an operational well be provided during the permitting stage of the project. This information was not provided in the application as required. This evaluation and analysis shall be provided or the well shall be permanently decommissioned prior to the second quarter of background sampling. **Response:** The existing agricultural irrigation well northeast of Cell 3 will remain operational during operation of the UWL, and when used, will operate at an estimated rate of 1,200 gpm. This well is only operated periodically during periods of dry weather, typically for durations of up to four days. At Ameren's request, Flynn Drilling Company has reviewed the well and verified its approximate capacity. Our separate analysis determined that the well's operation will have unmeasurable impacts on the groundwater levels in the adjacent groundwater monitoring wells. However, to avoid possible impacts created by operation of this well, groundwater sampling events will occur a minimum of 24 hours after the agricultural irrigation well was last operated. Section 3.10.2 and 4.5.3, and Appendix Q and W of the engineering report have been revised to include the well analysis and reflect this procedure.

Franklin County Zoning Requirements

MDNR 26 Perimeter berm settlement will likely result in elevation below the calculated 500-year flood elevations. **Response:** The perimeter berms will be constructed to a minimum elevation of 488. As part of ongoing UWL operation and maintenance, both during operation and post closure, the top of berm elevation will be periodically determined by level survey. If the top elevation of the exterior berms settles below the 500-year elevation of 487.6, suitable fill will be added to the perimeter roads on the top of the berm to raise the minimum berm elevation to 488.0. Section 2.8.3 has been revised to reflect this operational procedure.

MDNR 27 Settlement of the bottom liner will likely result in less than two feet of separation from liner bottom and the normal water table elevation as defined by Reitz and Jens. **Response:** To address Franklin County's ordinance, the bottom liner grades were designed in anticipation of the settlement predicted in Appendix J so that the majority of the bottom of the soil component remains at least 2 feet above the Natural Water Table elevation of 464.

MDNR 28 The exterior slopes of the intermediate berms are not covered with Fabri-Form concrete mat. **Response:** Sheets 6 through 9 and 11 through 14, and Section 3.3.2.1 and 3.3.2.3 have been revised to show the installation of FCM on all exterior berms.

We believe that the above responses and the revised sections of the CPA address all of the comments raised by MDNR-SWMP in their May 7, 2013 review letter.

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Ameren Missouri Labadie Energy Center
Proposed Utility Waste Landfill
Franklin County, Missouri

Table of Revisions
August 2013

Main Report		Revised	Not Revised	Instructions
Report Covers		X		Replace originals with Revised versions
MDNR Construction Permit Application Form			X	No Change
Construction Permit Application Report Title Page, Table of Contents and Text		X		Replace Cover, Table of Contents and entire original Text with entire Revised versions (summary of revisions below)
CPA Text Revisions				**Summary of Revisions**
	Section 1.0	X		Revised Sections 1.2 and 1.4
	Section 2.0	X		Revised Sections 2.3, 2.7, 2.8.3, 2.8.6, and 2.9.1
	Section 3.0	X		Revised Sections 3.2.2, 3.3.2.1, 3.3.2.2, 3.3.2.3, 3.3.4, 3.7.1, 3.10.2, 3.12, 3.12.1, 3.12.1.1, and 3.15
	Section 4.0	X		Revised Sections 4.1.4, 4.2.2, 4.4, 4.5, 4.5.3, 4.6.1, 4.7.2, 4.8.3, and 4.9
CD with PDF Copies of Report and Plan Sheets		X		Replace original CD with Revised version
List of Tables				
Table 1a	Applicable Regulatory References		X	No Change
Table 1b	Groundwater Quality Data		X	No Change
List of Figures				
Figure 1	Site Location Map		X	No Change
Figure 2	Sequence of Cell Construction		X	No Change
Figure 3	Entrance Sign Detail		X	No Change
List of Appendices				
Appendix A	Property Deeds		X	No Change
Appendix B	Articles of Organization		X	No Change
Appendix C	Good Standing Certificate		X	No Change
Appendix D	Violation History Disclosure Form	X		Replace original Appendix D with Revised version.
Appendix E	Request for Recommendation from East Central Solid Waste Management District, Region I		X	No Change
Appendix F	Franklin County Requirements	X		Replace original Appendix F with Revised version
Appendix G	Adjacent Landowners or Landowners within 1000 feet		X	No Change
Appendix H	Floodplain Documentation	X		Replace original Appendix H with Revised version
Appendix I	Wetland Assessment		X	No Change
Appendix J	Report Titled "Geotechnical Engineering Report for Construction Permit Application" by Reitz & Jens, dated 11/30/12	X		Replace entire original Appendix J with entire Revised version (summary of revisions below)
Appendix J List of Figures				**Summary of Revisions**
	Figure 1 - Plan of Site, Proposed UWL, Borings and CPT Soundings...		X	No Change
	Figure 2 - Generalized Soil Profile, Section A-A'		X	No Change
	Figure 3 - Generalized Soil Profile, Section B-B'		X	No Change
	Figure 4 - Generalized Soil Profile, Section C-C'		X	No Change
	Figure 5 - Generalized Soil Profile, Section D-D'		X	No Change
	Figure 6 - Graphic Depiction of Materials for Stability Analyses	X		New
	Figure 7 - Graphic Depiction of Materials for Seismic Analyses	X		New
	Figure 8 - Graphic Depiction of Materials for Settlement Analyses	X		New
	Figure 9 - Proposed Concrete Erosion Protection for Permanent Ext. Berms	X		Renumbered figure (previously Figure 6)
	Figure 10 - Calculation of Factor of Safety Against Heave ...Uplift	X		Renumbered figure number (previously Figure 7)
Appendix J List of Appendices				**Summary of Revisions**
	Appendix A - Investigation of Potential Clay Liner Borrow Site at Callaway	X		Boring Log B-10 (corrected elev.) Revided
	Appendix A1 - Supplemental Testing of Potential Clay Borrow from		X	No Change
	Appendix B - Laboratory Testing of Coal Combustion Products		X	No Change
	Appendix C - Results of Seismic Risk Analyses		X	No Change
	Appendix D - Results of Liquefaction Analyses	X		Figure D-3 Revised
	Appendix E - Results of Slope Stability Analyses	X		Table E-1 Revised
		X		Table E-2 Revised
		X		Figure E-6 and output Revised
		X		Figure E-13 and output Revised
		X		Figure E-20 and output Revised
		X		Figure E-27 and output Revised
		X		Figure E-31 Revised
		X		Figure E-34 and output Revised
		X		New Figure E-43 and output
		X		New Figure E-44 and output
		X		New Figure E-45 and output
	Appendix F - Results of Settlement Analyses	X		New Figure F-8, Plan of Loading Stresses
	Appendix G - Design of Fabric-Formed Concrete Mat (FCM)	X		Calculation sheet Revised

Ameren Missouri Labadie Energy Center
Proposed Utility Waste Landfill
Franklin County, Missouri

Table of Revisions
August 2013

Main Report		Revised	Not Revised	Instructions
Appendix K	Soil Material Volume and Balance Calculations	X		Replace original Appendix K with Revised version
Appendix L	Landfill Life Estimate		X	No Change
Appendix M	Erosion Calculations		X	No Change
Appendix N	Stormwater Calculations		X	No Change
Appendix O	H.E.L.P. Model Results		X	No Change
Appendix P	Construction Quality Assurance Plan		X	No Change
Appendix Q	Groundwater Sampling and Analysis Plan	X		Replace original Cover, Table of Contents, and entire original Text with entire Revised versions
	Appendix Q List of Appendices			
	Appendix 1 - Driller's Logs and Monitoring Well Construction Details		X	No Change
	Appendix 2 - Missouri Solid Waste Management Rule - Constituents for Detection Monitoring (10 CSR 80-11.010, Appendix I)	X		Replace original Appendix 2 with Revised version (added Molybdenum as Chemical Constituent)
	Appendix 3 - Field Equipment Calibration Forms and Procedures		X	No Change
	Appendix 4 - Sample Container and Preservation Guidelines and Groundwater Sampling Bottle Inventory Form		X	No Change
	Appendix 5 - Monitoring Well Field Inspection Form		X	No Change
	Appendix 6 - Field Sampling Log and Volume Tracking Log Forms		X	No Change
	Appendix 7 - Example Chain-of-Custody Field Record Form		X	No Change
	Appendix 8 - Decision Flow Charts		X	No Change
Appendix R	Closure and Post-Closure Plan		X	No Change
Appendix S	Utility Waste Landfill Emergency Contacts		X	No Change
Appendix T	Recordkeeping and Reporting Forms		X	No Change
Appendix U	Draft FAI		X	No Change
Appendix V	Survey Plat	X		Replace original Appendix V with Revised version
Appendix W	Groundwater Hydraulic Data	X		Replace original Appenidx W with Revised version
Appendix X	Documentation of Groundwater Monitoring Well Design		X	No Change
Appendix Y	Miscellaneous Engineering Calculations			
Appendix Y(a)	Leachate Pipe and Pump Calculations	X		Replace original Appendix Y(a) with Revised version
Appendix Y(b)	Estimated Maximum Settlements Leachate		X	No Change
Appendix Y(c)	Water Management Calculations		X	No Change
Appendix Y(d)	Flood Mitigation Calculations	X		Replace original Appendix Y(d) with Revised version
Appendix Y (e)	Geosynthetics Design Calculations		X	No Change
Appendix Z	Groundwater Demonstration		X	No Change
	List of Plan Sheets			
Sheet 1	Cover Sheet	X		Replace original Sheet 1 with Revised version
Sheet 2	Existing Site Conditions		X	No Change
Sheet 3	Project Overview	X		Replace original Sheet 3 with Revised version1
Sheet 4	Land Use and Zoning within 1/4 mile	X		Replace original Sheet 4 with Revised version
Sheet 5	Overall Bottom Grading Plan (Top of Liner)	X		Replace original Sheet 5 with Revised version
Sheet 6	Cell 1 Grading Plan (Top of Liner)	X		Replace original Sheet 6 with Revised version
Sheet 7	Cell 2 Grading Plan (Top of Liner)	X		Replace original Sheet 7 with Revised version
Sheet 8	Cell 3 Grading Plan (Top of Liner)	X		Replace original Sheet 8 with Revised version
Sheet 9	Cell 4 Grading Plan (Top of Liner)	X		Replace original Sheet 9 with Revised version
Sheet 10	Overall Final Grading Plan	X		Replace original Sheet 10 with Revised version
Sheet 11	Phase 1 Final Grading Plan	X		Replace original Sheet 11 with Revised version
Sheet 12	Phase 2 Final Grading Plan	X		Replace original Sheet 12 with Revised version
Sheet 13	Phase 3 Final Grading Plan	X		Replace original Sheet 13 with Revised version
Sheet 14	Phase 4 Final Grading Plan	X		Replace original Sheet 14 with Revised version
Sheet 15	Geomembrance and Cover Details		X	No Change
Sheet 16	Stormwater Pond Storage and Transfer Details	X		Replace original Sheet 16 with Revised version
Sheet 17	Liner Details		X	No Change
Sheet 18	Miscellaneous Details 1		X	No Change
Sheet 19	Miscellaneous Details 2	X		Replace original Sheet 19 with Revised version
Sheet 20	Leachate Collection System Details		X	
Sheet 21	Stormwater Drainage Details		X	
Sheet 22	Cross Sections A-A' and B-B'	X		Replace original Sheet 22 with Revised version
Sheet 23	Cross Sections C-C' and D-D'	X		Replace original Sheet 23 with Revised version

PRINT DIST.		
REVISIONS		
REV.	W.O.	SYM
1		1
08/02/13: UPDATED LEGEND; AND DRAWING INDEX		

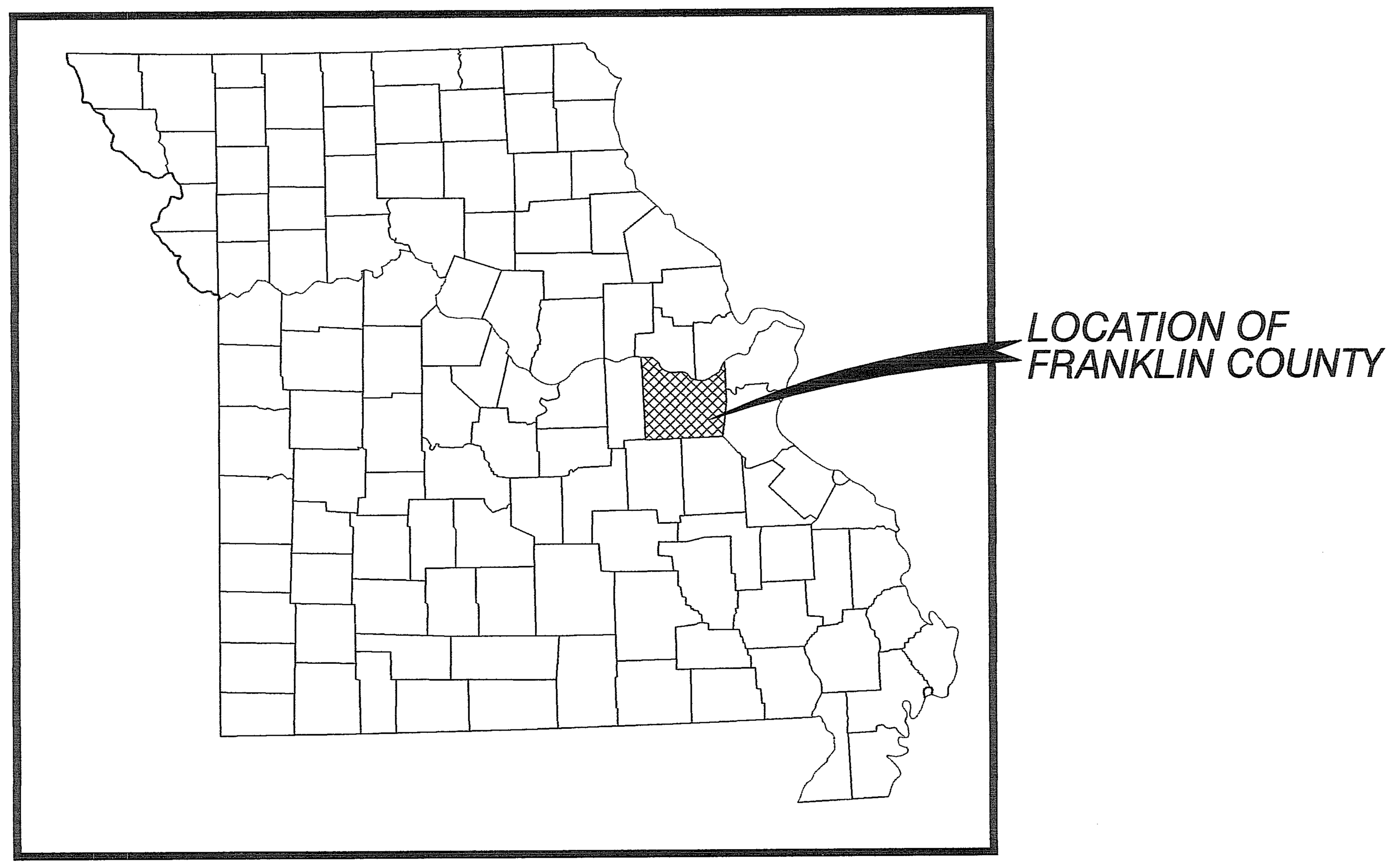
Ameren MISSOURI

LABADIE ENERGY CENTER
PROPOSED UTILITY WASTE LANDFILL
FRANKLIN COUNTY, MISSOURI
JANUARY 2013
REVISED AUGUST 2013

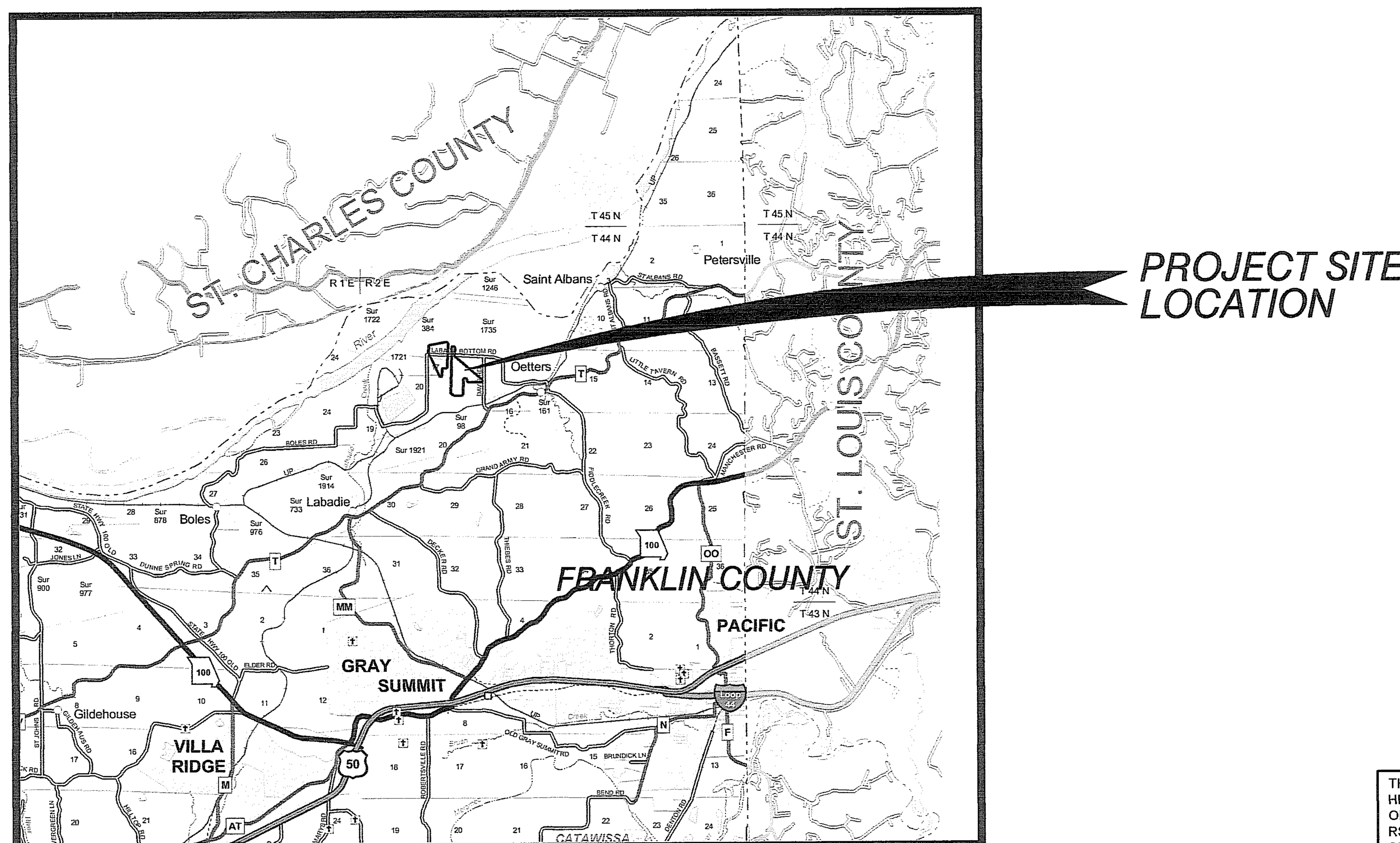
LEGEND

- 550 - EXISTING MAJOR CONTOUR
- 552 - EXISTING MINOR CONTOUR
- 520 - PROPOSED MAJOR CONTOUR
- 525 - PROPOSED MINOR CONTOUR
- PL - PROPERTY LINE (APPROX.)
- EXISTING TREE LINE
- EXISTING SWALE
- EXISTING FEMA FLOOD BOUNDARY
- 1/4 MILE FACILITY BOUNDARY
- PERIMETER FENCING
- UNPAVED ROAD
- EXISTING EASEMENT
- PROPOSED WASTE BOUNDARY
- G - EXISTING GAS PIPELINE
- UT - EXISTING UNDERGROUND TELEPHONE
- FO - EXISTING FIBER OPTIC
- OE - EXISTING OVERHEAD ELECTRIC
- FM - PROPOSED FORCE MAIN
- SFM - PROPOSED STORM WATER FORCE MAIN
- EXISTING RAILROAD
- PROPOSED UTILITY WASTE LANDFILL PERMIT BOUNDARY
- PROPOSED UTILITY WASTE LANDFILL OUTSIDE TOE OF SLOPE
- PROPOSED UTILITY WASTE LANDFILL INSIDE TOE OF SLOPE
- ROW - EXISTING RIGHT-OF-WAY
- XXXXXX - NORTHING AND EASTING MISSOURI STATE PLANE COORDINATE SYSTEM
- DRAINAGE ARROWS
- LANDFILL CROSS SECTION LINE
- 12 FOOT WIDE PERIMETER ROAD
- TOP OF BERM ROAD
- LIMESTONE RIP-RAP PROTECTION LAYER
- FABRIC-FORMED FILTER-POINT CONCRETE MAT (FCM) (1)
- JURISDICTIONAL WETLANDS
- MW-XX - PROPOSED MONITORING WELL
- METAL TRANSMISSION TOWER
- PP - EXISTING POWER POLE
- IRRIGATION WELL
- SURVEY MONUMENT
- CULVERT
- SLOPE INDICATOR
- % SLOPE - DIRECTION OF FLOW/PERCENT SLOPE
- ANU - ZONING DESIGNATION
- PUMP
- S - PROPOSED SUMP
- T - LEACHATE STORAGE TANK
- PS - PROPOSED PUMP STATION
- V - VALVE
- EXISTING RESIDENCE
- L9 - LETDOWN STRUCTURE / EMERGENCY SPILLWAY

INDEX OF DRAWINGS



STATE OF MISSOURI



SITE LOCATION MAP

N.T.S.

NOTE:

MAP SOURCE IS "GENERAL HWY. MAP, FRANKLIN COUNTY, MISSOURI" BY THE MISSOURI DEPARTMENT OF TRANSPORTATION, SEPTEMBER 2005.

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Jefferson City, Missouri 65101
Telephone: (573) 659-9078
Facsimile: (573) 659-9079

PREPARED FOR Ameren MISSOURI

STATE OF MISSOURI
THOMAS R. GREDELL
NUMBER E-21137
REGISTERED PROFESSIONAL ENGINEER

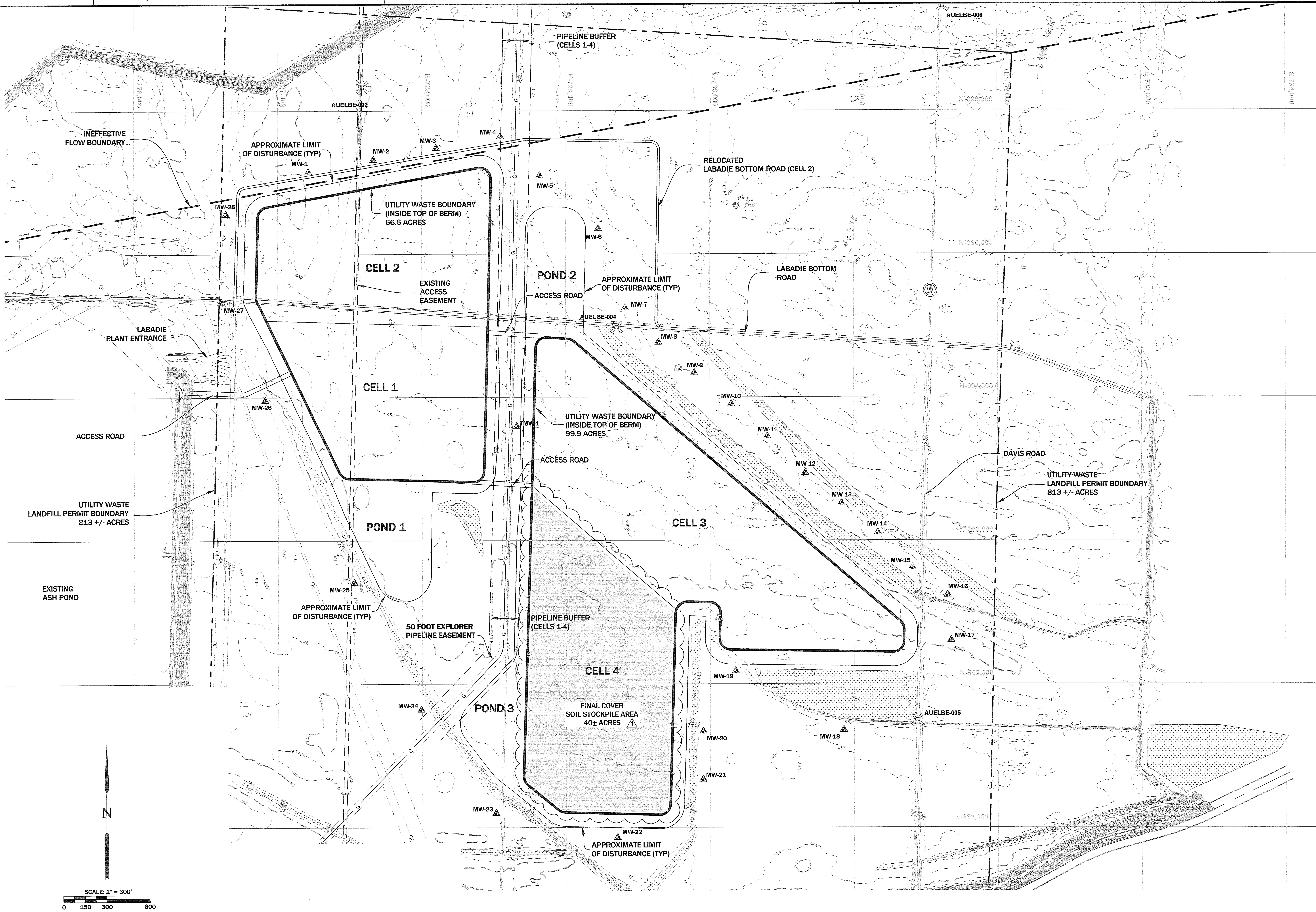
DRAWN	W.J.A. (G.E.R.)
CHKD.	R.L.R. (G.E.R.)
SUPV.	T.R.G. (G.E.R.)
APPD.	T.R.G. (G.E.R.)

SHEET 1
PROPOSED UTILITY WASTE LANDFILL
COVER SHEET

LOCATION		CLASS
001009	LABADIE ENERGY CENTER	02010

		REV.
Ameren MISSOURI ST. LOUIS, MISSOURI	JANUARY 2013	0

PRINT DIST.		
REVISIONS		
REV.	W.O.	SYM
1		1
08/02/13: ADD BORROW AREA. ADD NOTES.		



SURVEY MONUMENTS

MONUMENT ID	NORTHING	EASTING	ELEVATION
AUELBE-001	990484.82	726569.81	467.19
AUELBE-002	996166.50	727588.30	470.70
AUELBE-003	989921.39	728508.32	467.59
AUELBE-004	994487.78	729353.29	467.02
AUELBE-005	991746.97	731438.29	462.78
AUELBE-006	996729.00	731621.70	467.67

Missouri State Plane Coordinate System Datum:
Horizontal Datum NAD 1983;
Vertical Datum NAVD 1988

1 NOTES:
1. NO FILL MAY BE PLACED NORTH OF THE INEFFECTIVE FLOW BOUNDARY.
2. ALL LAND DISTURBANCE ACTIVITIES WILL HAVE A 25' MINIMUM SETBACK FROM JURISDICTIONAL WETLANDS WITH A STORMWATER BMP INSTALLED BETWEEN THE DISTURBANCE AND THE WETLAND DURING CONSTRUCTION. SEE DETAIL 4 ON SHEET 19.

1 SETBACK NOTES:
1. WETLAND = MIN. 25'
2. INEFFECTIVE FLOW AREA = MIN. 0'
3. PIPELINE SETBACK = VARIES

NOTES TO THE CONTRACTOR:

UNDERGROUND FACILITIES, STRUCTURES, AND UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE SURVEYS AND RECORDS AND THEREFORE, THEIR LOCATIONS MUST BE CONSIDERED APPROXIMATE ONLY. THERE MAY BE OTHERS, THE EXISTENCE OF WHICH IS AT PRESENT NOT KNOWN. VERIFICATION OF THE LOCATIONS OF UNDERGROUND UTILITIES, SHOWN OR NOT SHOWN, WILL BE THE RESPONSIBILITY OF THE CONSTRUCTION CONTRACTOR.

THE CONTRACTOR SHALL MAKE SUITABLE AND TIMELY REQUESTS TO ALL UTILITY OWNERS, PIPELINE OWNERS, OR OTHER PARTIES AFFECTED TO HAVE ALL NECESSARY ADJUSTMENTS OF PUBLIC OR PRIVATE UTILITIES, PIPE LINES, OR OTHER APPURTENANCES WITHIN, OR ADJACENT TO THE LIMITS OF CONSTRUCTION, AS SOON AS PRACTICAL OR POSSIBLE.

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PROFESSIONAL ENGINEER

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CHKD.	R.L.R. (G.E.R.)
SUPV.	T.R.G. (G.E.R.)
APPD.	T.R.G. (G.E.R.)

SHEET 3
PROPOSED UTILITY WASTE LANDFILL
PROJECT OVERVIEW

LOCATION		CLASS
001009	LABADIE ENERGY CENTER	02010

Ameren MISSOURI — ST. LOUIS, MISSOURI — JANUARY 2013 — REV. 0

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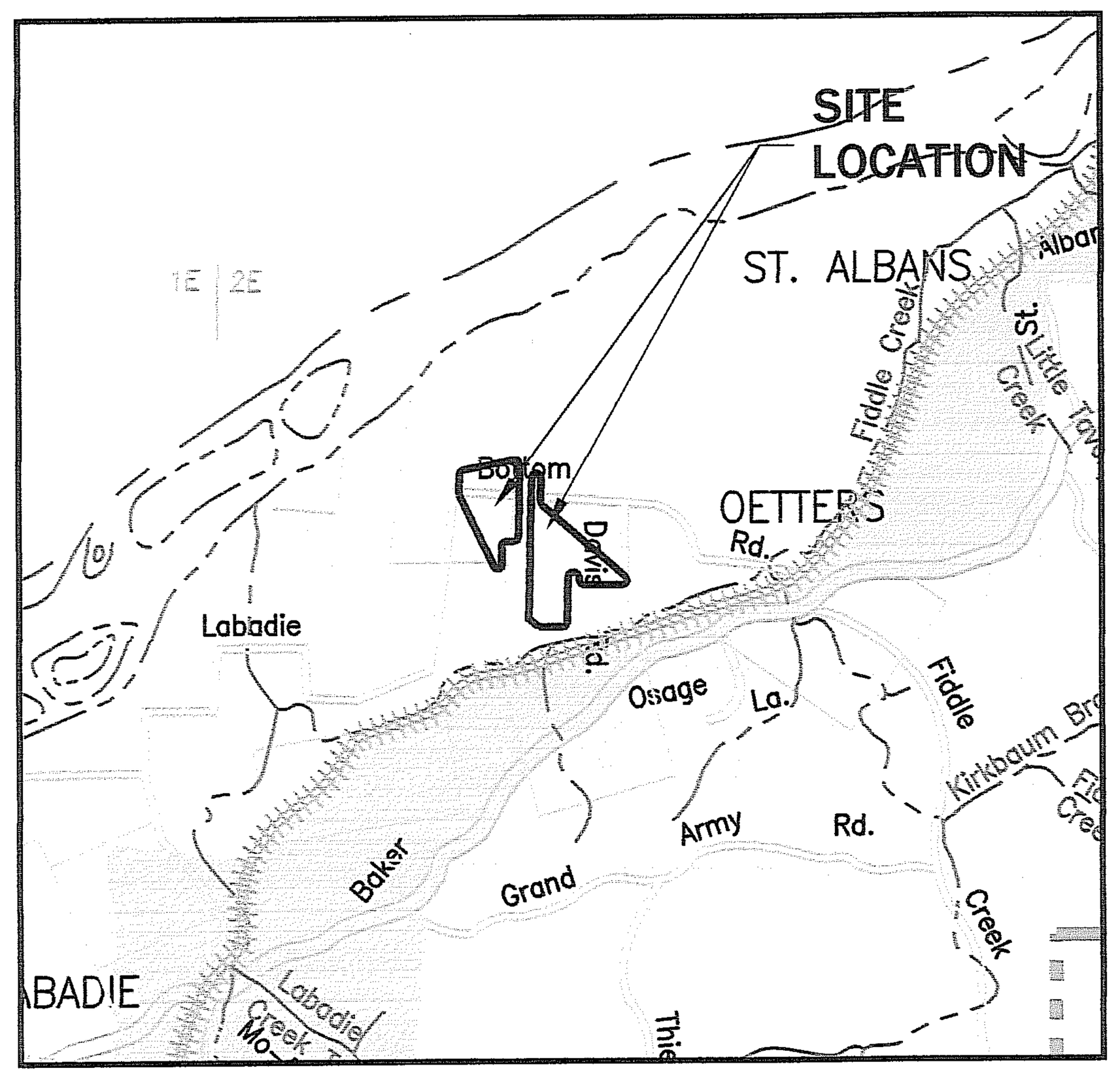
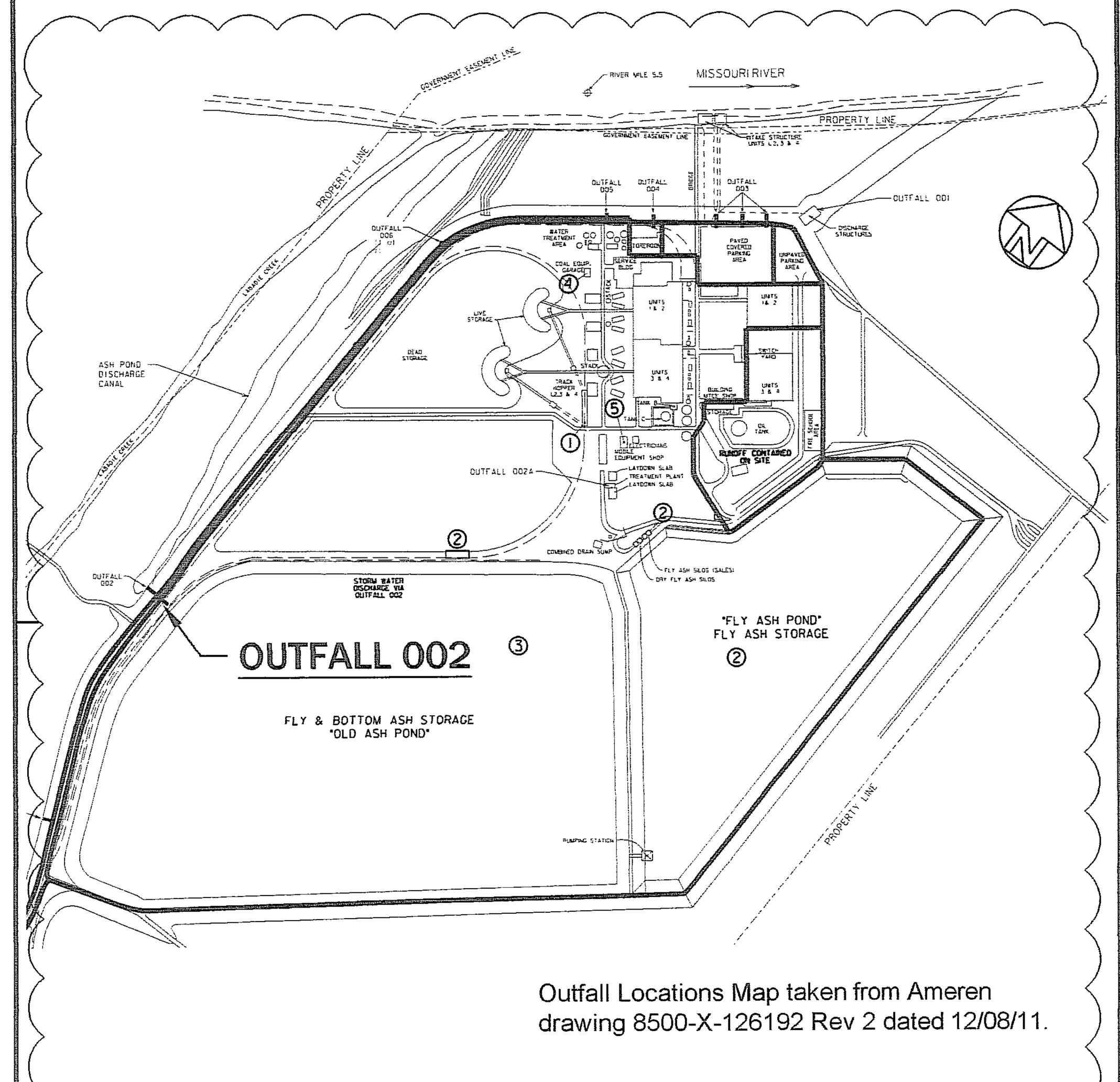
08/02/13: ADD OUTFALL LOCATION INSET.



FRANKLIN COUNTY ZONING DESIGNATION

LEGEND

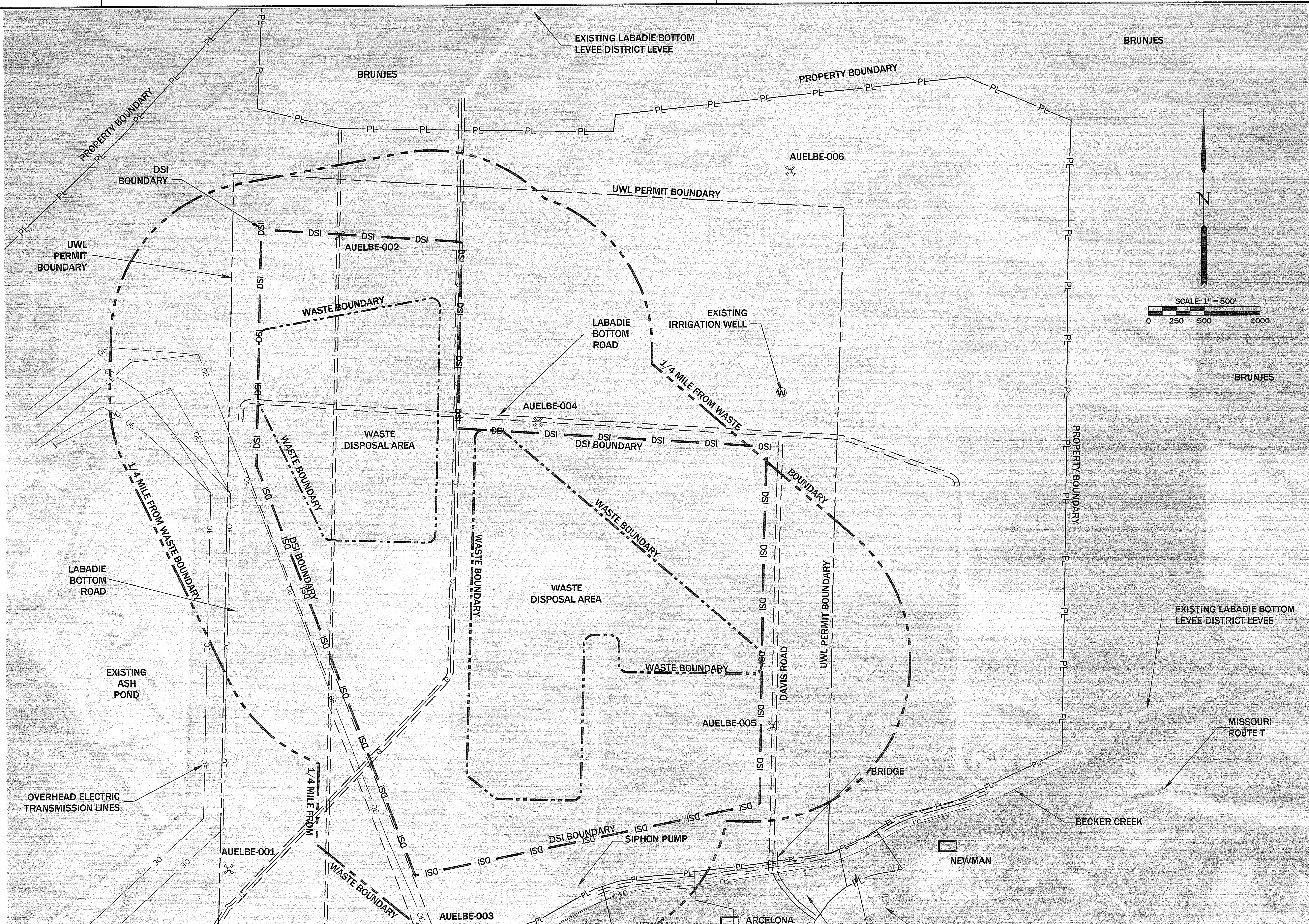
- Agricultural Non-Urban (ANU)
- Suburban Development (SD)
- Residential Development (RD)
- Residential Development 2 (RD-2)
- Community Development (CD)
- Highway Service (CA)
- Community Business (CA-3)
- General Commercial (CA-4)
- Industrial Development (ID)
- 1.5 Mile Urban Service Area



Outfall Locations Map taken from Ameren drawing 8500-X-126192 Rev 2 dated 12/08/11.

OUTFALL LOCATIONS ⚠

N.T.S.



NOTES

1. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE.
2. AERIAL PHOTOGRAPH PROVIDED BY REITZ AND JENS, INC. AERIAL DATE: MARCH 13, 2009. AERIAL PHOTOGRAPH MAY BE DISTORTED.
3. LAND USE WITHIN 1/4 MILE OF UTILITY WASTE BOUNDARY IS AGRICULTURAL.
4. NO MINED OR QUARRIED AREAS, MINE SHAFTS, OR MINE SPOIL AREAS LOCATED WITHIN 1/4 MILE OF WASTE BOUNDARY .
5. NO SPRINGS, LAKES, CAVES, OR SINKHOLES LOCATED WITHIN 1/4 MILE OF UTILITY WASTE BOUNDARY (STREAMS AND ROCK OUTCROPS NOTED).

SURVEY MONUMENTS

MONUMENT ID	NORTHING	EASTING	ELEVATION
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AUELBE-002	996166.50	727588.30	470.70
AUELBE-003	989921.39	728508.32	467.59
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AUELBE-006	996729.00	731621.70	467.67

Missouri State Plane Coordinate System Datum:
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PREPARED FOR Ameren MISSOURI

STATE OF MISSOURI — THOMAS R. GREDELL — NUMBER E-21137 — REGISTERED PROFESSIONAL ENGINEER

DRAWN W.J.A. (G.E.R.)	SHEET 4 PROPOSED UTILITY WASTE LANDFILL LAND USE AND ZONING WITHIN ONE QUARTER MILE		
CHKD. R.L.R. (G.E.R.)			
SUPV. T.R.G. (G.E.R.)			
APPD. T.R.G. (G.E.R.)	LOCATION 001009	LABADIE ENERGY CENTER	CLASS 02010
Ameren MISSOURI	ST. LOUIS, MISSOURI	JANUARY 2013	REV. 0

SCHEDULE CJG-S23

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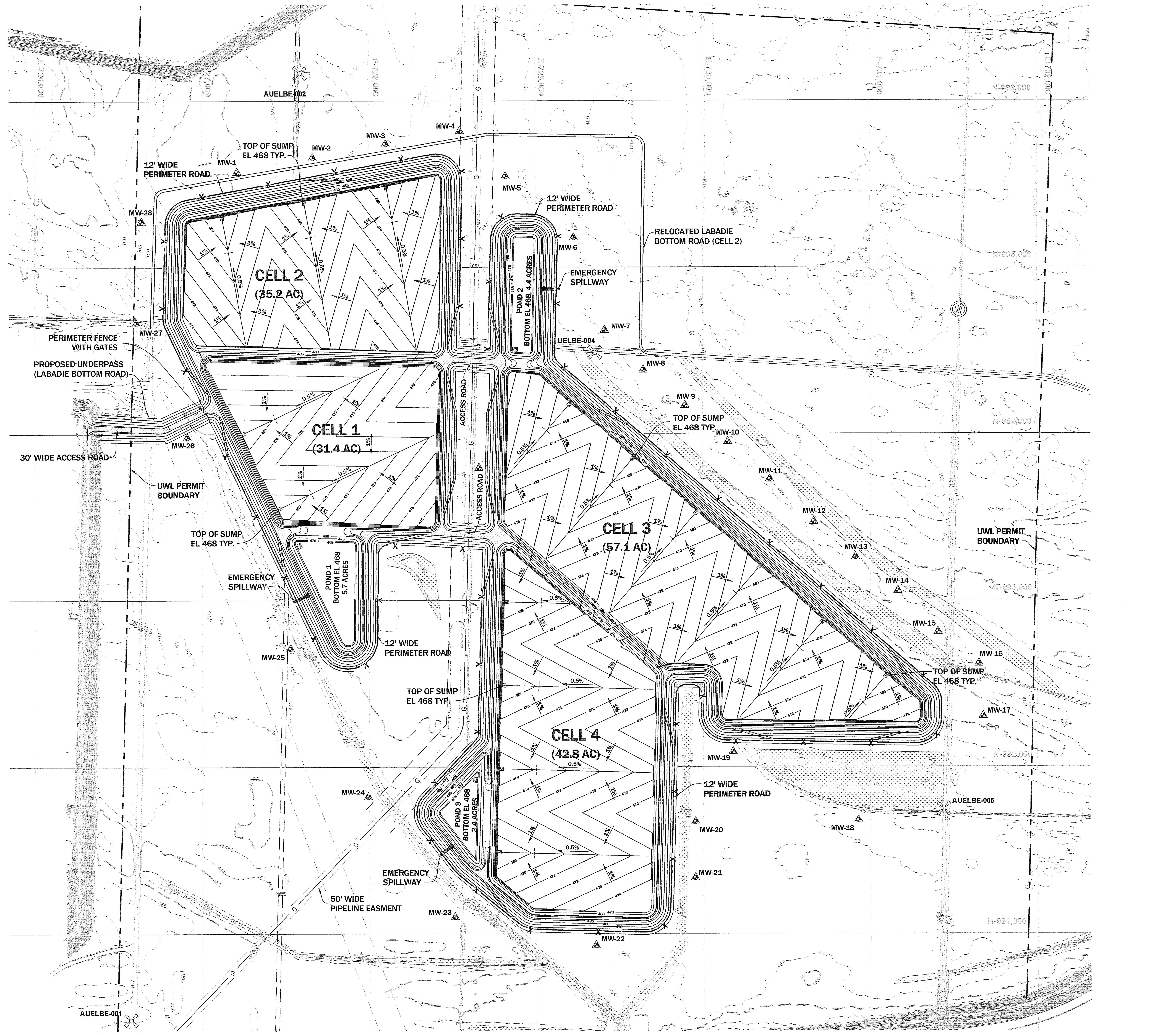

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MONUMENT ID	NORTHING	EASTING	ELEVATION
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AUELBE-002	996166.50	727588.30	470.70
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AUELBE-006	996729.00	731621.70	467.67

Missouri State Plane Coordinate System Datum:
Horizontal Datum NAD 1983;
Vertical Datum NAVD 1988

NOTES:

1. CELLS 1 & 3 AREAS WERE MEASURED TO INSIDE TOP OF EXTERIOR BERMS AND OUTSIDE TOE OF INTERIOR BERMS.
2. CELLS 2 & 4 AREAS WERE MEASURED TO INSIDE TOP OF EXTERIOR BERMS AND INSIDE TOE OF INTERIOR BERMS.
3. POND AREAS WERE MEASURED FROM THE INSIDE TOP OF BERM.
4. FABRIC-FORMED FILTER-POINT CONCRETE MAT (FCM) ON NON-WOVEN GEOTEXTILE FILTER TO BE PLACED ON THE OUTSIDE FACE OF ALL EXTERIOR BERMS. (1)
5. ALL LAND DISTURBANCE ACTIVITIES WILL HAVE A 25' MINIMUM SETBACK FROM JURISDICTIONAL WETLANDS WITH A STORMWATER BMP INSTALLED BETWEEN THE DISTURBANCE AND THE WETLAND DURING CONSTRUCTION. SEE DETAIL 4 ON SHEET 19.

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PREPARED FOR Ameren MISSOURI

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NUMBER E-21137
REGISTERED PROFESSIONAL ENGINEER

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CHKD.	R.L.R. (G.E.R.)
SUPV.	T.R.G. (G.E.R.)
APPD.	T.R.G. (G.E.R.)

SHEET 5
PROPOSED UTILITY WASTE LANDFILL
OVERALL BOTTOM GRADING PLAN (TOP OF LINER)

LOCATION		CLASS
001009	LABADIE ENERGY CENTER	02010

Ameren MISSOURI — ST. LOUIS, MISSOURI — JANUARY 2013 — REV. 0

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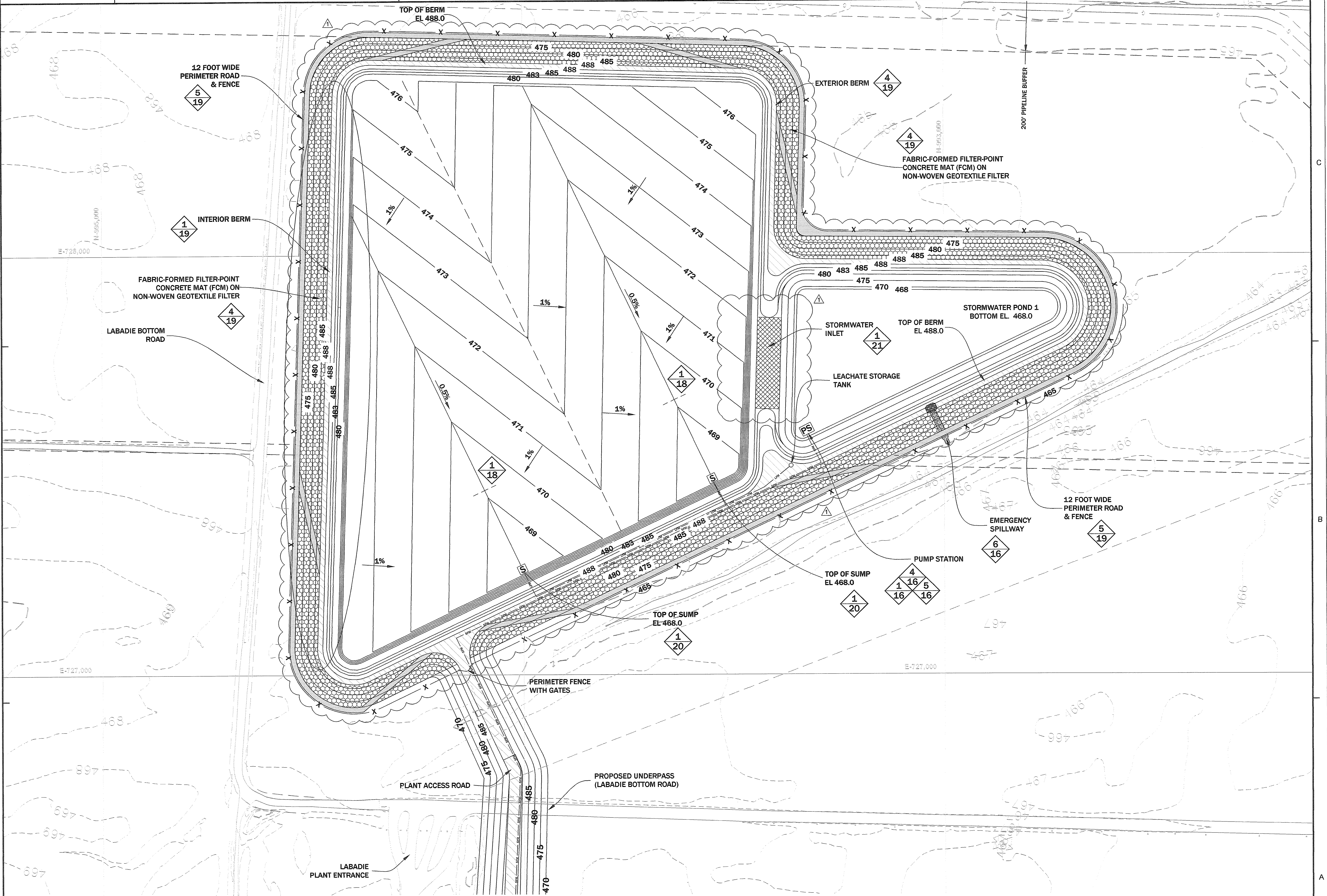
REVISIONS		
REV.	W.O.	SYM
1		1
08/02/13: REMOVED NOTE (2.); ADD FABRIC-FORMED ON OUTSIDE TOE OF SLOPE; ADD HATCHING IN STORMWATER INLET.		



NOTES:

1. THE CONTOUR INTERVAL OF THE DRAWING IS 5' ON 3:1 SLOPES, AND 1' IN OTHER AREAS UNLESS NOTED OTHERWISE.
2. SEE SHEET 16 FOR STORMWATER POND DETAILS.

SCALE: 1" = 100'
0 50 100 200

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PREPARED FOR Ameren MISSOURI

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THOMAS R. GREDELL
NUMBER EN-21137
REGISTERED PROFESSIONAL ENGINEER

DRAWN W.J.A. (G.E.R.)	SHEET 6 PROPOSED UTILITY WASTE LANDFILL CELL 1 GRADING PLAN (TOP OF LINER)	
CHKD. R.L.R. (G.E.R.)		
SUPV. T.R.G. (G.E.R.)		
APPD. T.R.G. (G.E.R.)	LOCATION 001009 — LABADIE ENERGY CENTER	CLASS 02010
Ameren MISSOURI — ST. LOUIS, MISSOURI	JANUARY 2013	REV. 0

SCHEDULE CJG-S23

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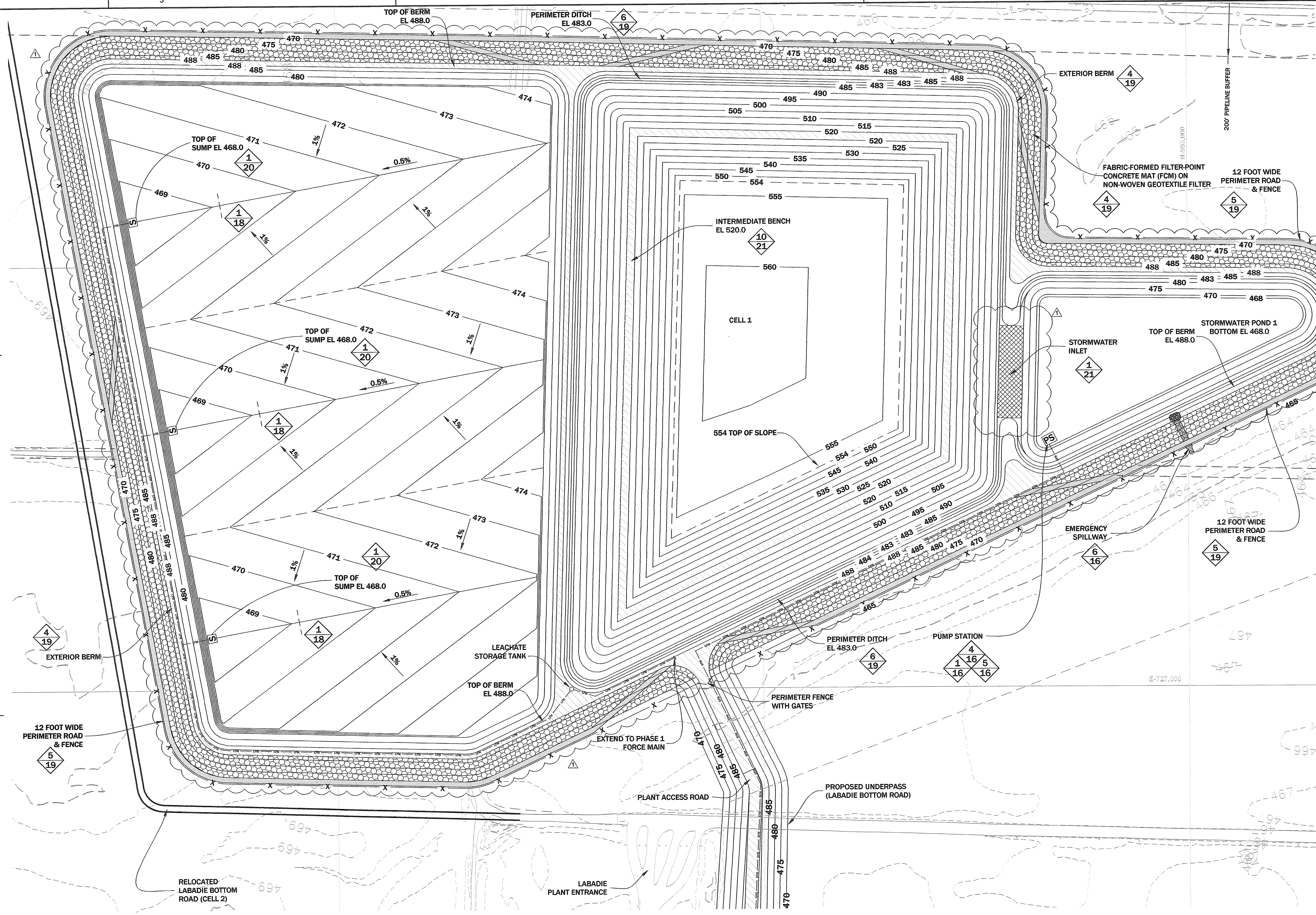
08/02/13: ADD FABRIC-FORMED TO OUTSIDE TOP OF BERM; ADD HATCH TO STORMWATER INLET; REMOVE NOTE (2.).		



NOTES:

1. THE CONTOUR INTERVAL OF THE DRAWING IS 5' ON 3:1 SLOPES, AND 1' IN OTHER AREAS UNLESS NOTED OTHERWISE.
2. SEE SHEET 16 FOR STORMWATER POND DETAILS.

N

SCALE: 1" = 100'

0 50 100 200

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SUPV.	T.R.G. (G.E.R.)
APPD.	T.R.G. (G.E.R.)

SHEET 7
PROPOSED UTILITY WASTE LANDFILL
CELL 2 GRADING PLAN (TOP OF LINER)

LOCATION		CLASS
001009	LABADIE ENERGY CENTER	02010

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08/02/13: ADD FABRIC-FORMED TO OUTSIDE TOP OF BERM; ADD HATCH TO STORMWATER INLET; REMOVE NOTE (2.).

TOP OF BERM EL 488.0

TOP OF SUMP EL 468.0

LEACHATE STORAGE TANK

STORMWATER INLET TO POND 2 SEE SHEET 5 FOR POND 2 GRADING

ACCESS ROAD TO CELL 2

12 FOOT WIDE PERIMETER ROAD & FENCE

EXTERIOR BERM

DAVIS ROAD

FABRIC-FORMED FILTER-POINT CONCRETE MAT (FCM) ON NON-WOVEN GEOTEXTILE FILTER

ACCESS ROAD TO CELL 1

INTERIOR BERM

200' PIPELINE BUFFER

SCALE: 1" = 100'

0 50 100 200

NOTES:

1. THE CONTOUR INTERVAL OF THE DRAWING IS 5' ON 3:1 SLOPES, AND 1' IN OTHER AREAS UNLESS NOTED OTHERWISE.
2. SEE SHEET 16 FOR STORMWATER POND DETAILS.
3. SEE SHEET 5 FOR POND 2 GRADING.

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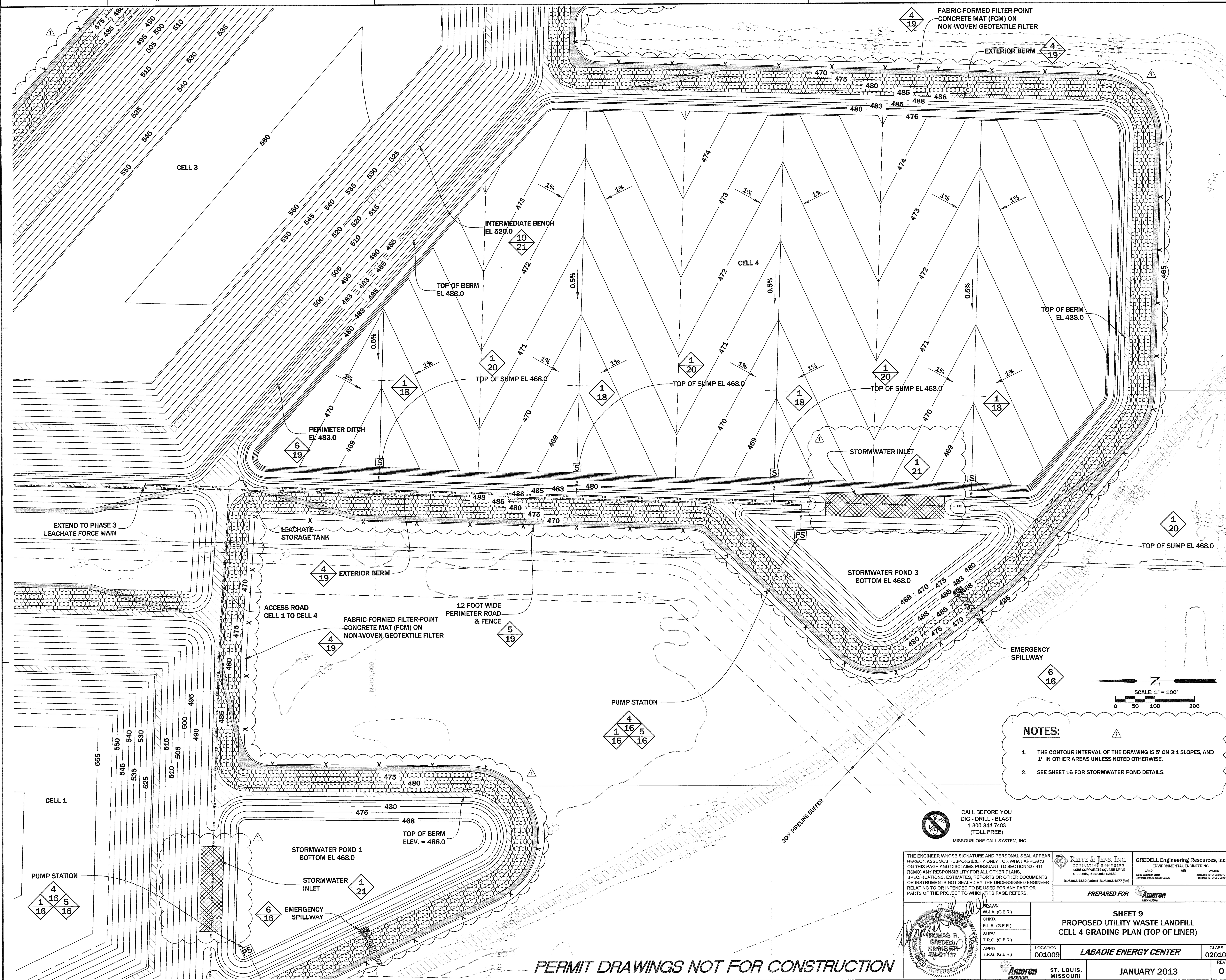
PREPARED FOR Ameren MISSOURI

STATE OF MISSOURI
THOMAS R. GREZLO
NUMBER E-21137
REGISTERED PROFESSIONAL ENGINEER

DRAWN M.J.A. (G.E.R.)	SHEET 8
CHKD. R.L.R. (G.E.R.)	PROPOSED UTILITY WASTE LANDFILL
SUPV. T.R.G. (G.E.R.)	CELL 3 GRADING PLAN (TOP OF LINER)
APPD. T.R.G. (G.E.R.)	LOCATION 001009 — LABADIE ENERGY CENTER — CLASS 02010
Ameren MISSOURI	ST. LOUIS, MISSOURI — JANUARY 2013 — REV. 0

PRINT DIST.		
REVISIONS		
REV.	W.O.	SYM
1		1

08/02/13: ADD FABRIC-FORMED TO OUTSIDE TOP OF BERM; ADD HATCH TO STORMWATER INLET; REMOVE NOTE (2.).



NOTES:

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CHKD.	R.L.R. (G.E.R.)
SUPV.	T.R.G. (G.E.R.)
APPD.	T.R.G. (G.E.R.)

SHEET 9
PROPOSED UTILITY WASTE LANDFILL
CELL 4 GRADING PLAN (TOP OF LINER)

LOCATION 001009 — LABADIE ENERGY CENTER — CLASS 02010

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REVISIONS		
REV.	W.O.	SYM
1		1
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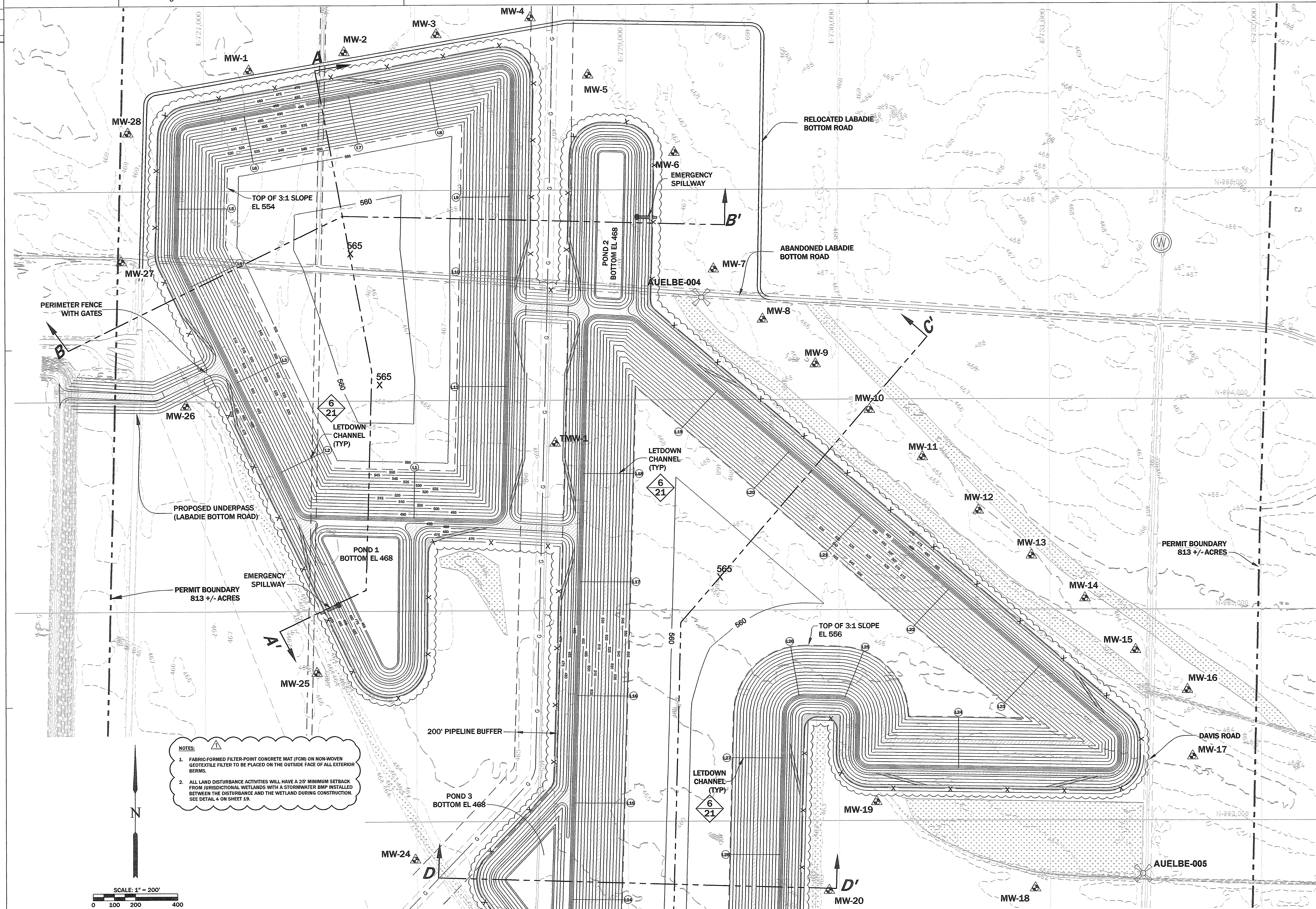

NOTES: 1

1. FABRIC-FORMED FILTER-POINT CONCRETE MAT (FCM) ON NON-WOVEN GEOTEXTILE FILTER TO BE PLACED ON THE OUTSIDE FACE OF ALL EXTERIOR BERMS.
2. ALL LAND DISTURBANCE ACTIVITIES WILL HAVE A 25' MINIMUM SETBACK FROM JURISDICTIONAL WETLANDS WITH A STORMWATER BMP INSTALLED BETWEEN THE DISTURBANCE AND THE WETLAND DURING CONSTRUCTION. SEE DETAIL 4 ON SHEET 19.

SURVEY MONUMENTS

MONUMENT ID	NORTHING	EASTING	ELEVATION
AUELBE-001	990484.82	726569.81	467.19
AUELBE-002	996166.50	727588.30	470.70
AUELBE-003	989921.39	728508.32	467.59
AUELBE-004	994487.78	729353.29	467.02
AUELBE-005	991746.97	731438.29	462.78
AUELBE-006	996729.00	731621.70	467.67

Missouri State Plane Coordinate System Datum:
Horizontal Datum NAD 1983;
Vertical Datum NAVD 1988

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LAND AIR WATER
1505 East High Street
Jefferson City, Missouri 65101
Telephone: (573) 659-9078
Facsimile: (573) 659-9079

PREPARED FOR Ameren MISSOURI

STATE OF MISSOURI — THOMAS R. GREDELL — NUMBER E-21137 — PROFESSIONAL ENGINEER
8-2-2013

DRAWN	W.J.A. (G.E.R.)
CHKD.	R.L.R. (G.E.R.)
SUPV.	T.R.G. (G.E.R.)
APPD.	T.R.G. (G.E.R.)

SHEET 10
PROPOSED UTILITY WASTE LANDFILL
OVERALL FINAL GRADING PLAN

LOCATION		CLASS
001009	*LABADIE ENERGY CENTER*	02010

Ameren MISSOURI — ST. LOUIS, MISSOURI — JANUARY 2013 — REV. 0

SCHEDULE CJG-S23

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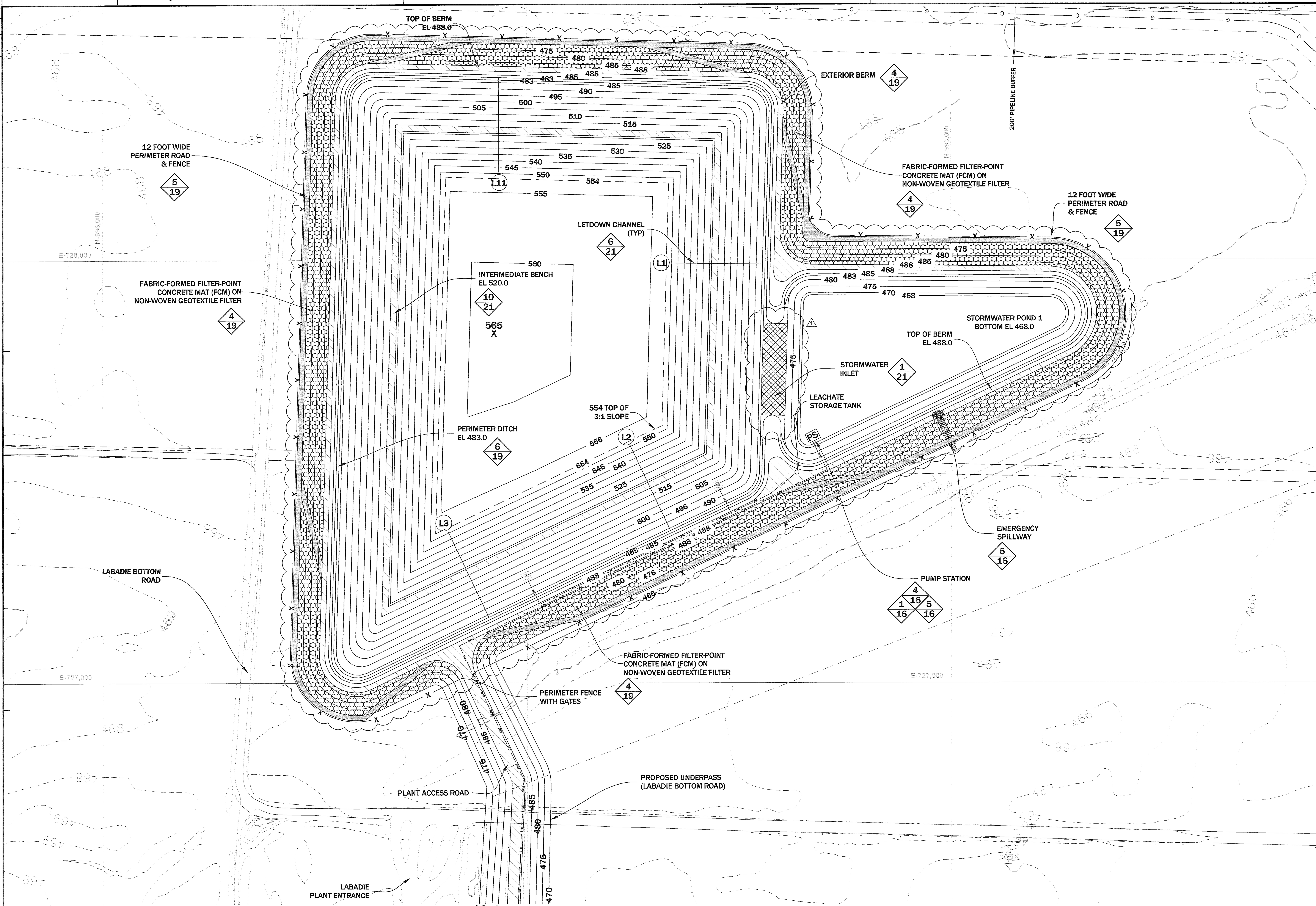
REV.	W.O.	SYM
1		1
08/02/13: REMOVED NOTE (2.); ADD FABRIC-FORM ON OUTSIDE FACE OF BERM; ADD HATCHING IN STORMWATER INLET.		



NOTES: 1

1. THE CONTOUR INTERVAL OF THE DRAWING IS 5' ON 3:1 SLOPES, AND 1' IN OTHER AREAS UNLESS NOTED OTHERWISE.
2. SEE SHEET 16 FOR STORMWATER POND DETAILS.
3. MONITORING WELLS SHOWN ON SHEETS 5 & 10.
4. LEACHATE TANK & FORCE MAIN LOCATIONS ARE SCHEMATIC AND ARE SUBJECT TO FINAL DESIGN AND OPERATING REVISIONS.

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APPD.	T.R.G. (G.E.R.)

SHEET 11
PROPOSED UTILITY WASTE LANDFILL
PHASE 1 FINAL GRADING PLAN

LOCATION		CLASS
001009	LABADIE ENERGY CENTER	02010

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REVISIONS		
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1		1

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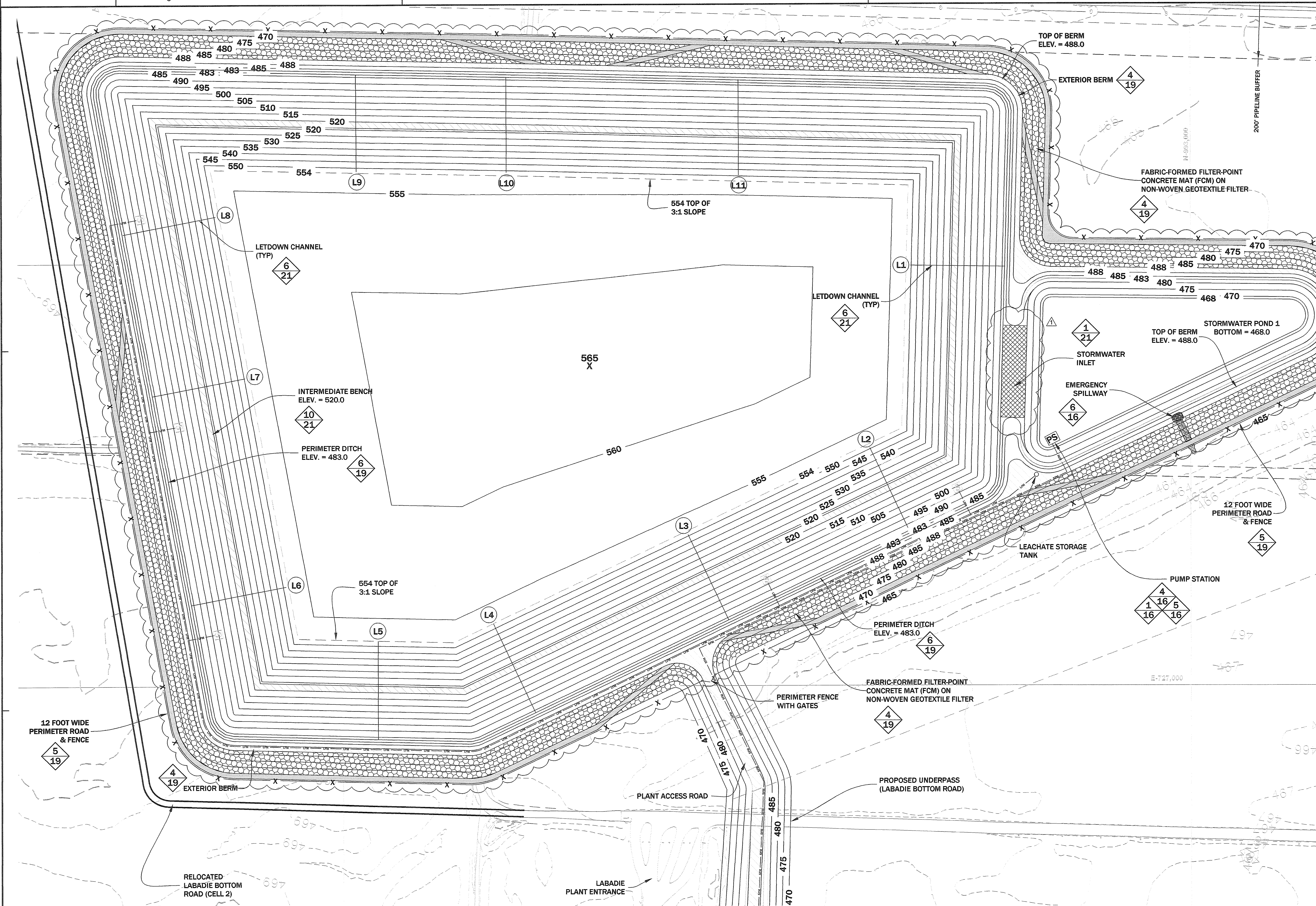

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N

SCALE: 1" = 100'
0 50 100 200

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SHEET 12
PROPOSED UTILITY WASTE LANDFILL
PHASE 2 FINAL GRADING PLAN

LOCATION 001009 — *LABADIE ENERGY CENTER* — CLASS 02010

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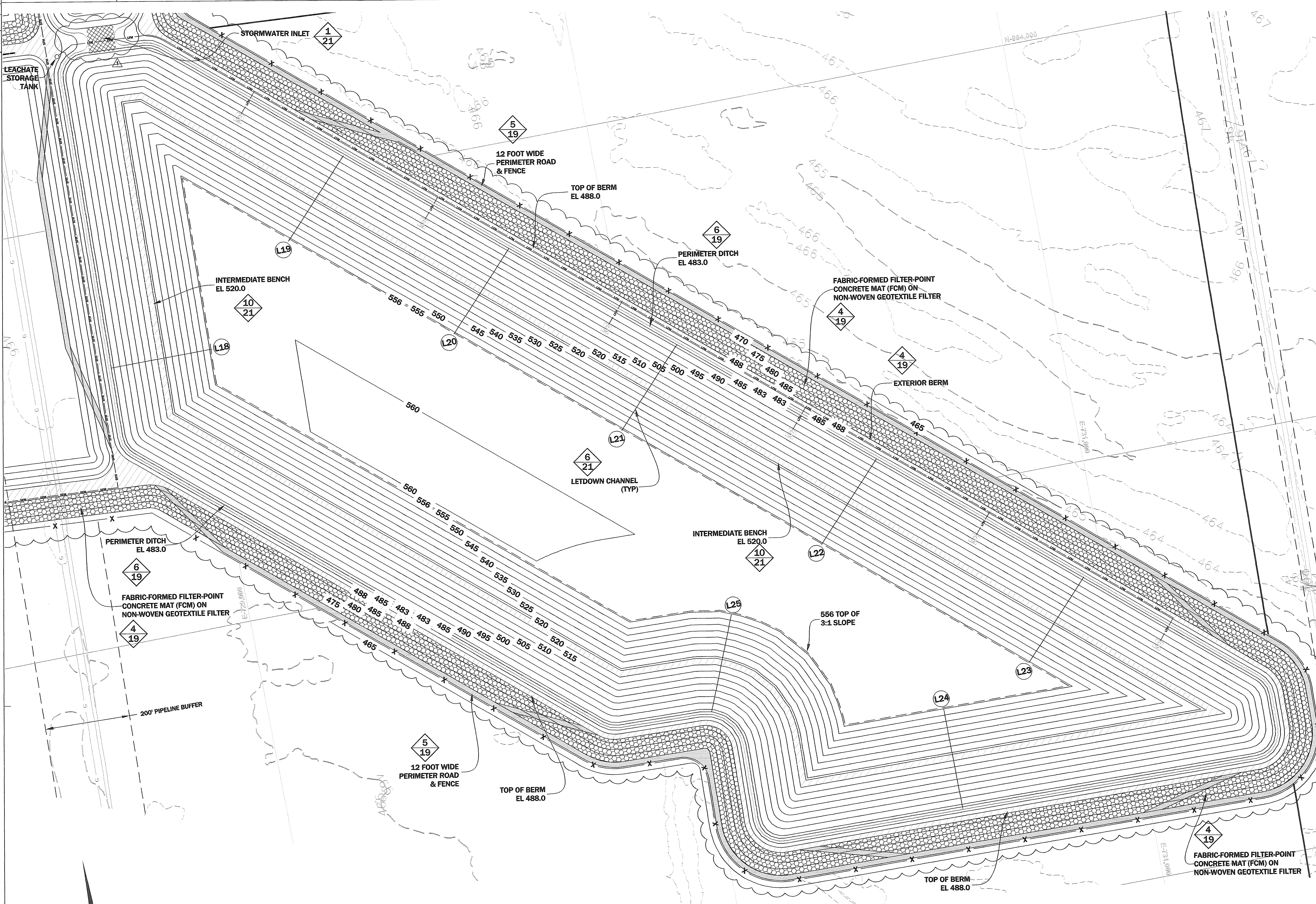

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APPD.	T.R.G. (G.E.R.)

SHEET 13
PROPOSED UTILITY WASTE LANDFILL
PHASE 3 FINAL GRADING PLAN

LOCATION		CLASS
001009	LABADIE ENERGY CENTER	02010

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REVISIONS

REV.	W.O.	SYM
1		1

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FABRIC-FORMED FILTER-POINT CONCRETE MAT (FCM) ON NON-WOVEN GEOTEXTILE FILTER (4/19)

LETDOWN CHANNEL (TYP) (6/21)

L22 L21 L20 L19 L25 L26 L27 L28 L29 L12 L13 L14 L15 L16 L17 L18

CELL 3

CELL 4

PERIMETER DITCH EL 483.0 (6/19)

12 FOOT WIDE PERIMETER ROAD & FENCE (5/19)

TOP OF BERM EL 488.0

EXTERIOR BERM (4/19)

556 TOP OF 3:1 SLOPE

INTERMEDIATE BENCH EL 520.0 (10/21)

EXTEND TO PHASE 3 LEACHATE FORCE MAIN

ACCESS ROAD CELL 1 TO CELL 4

200' PIPELINE BUFFER

PUMP STATION (4/16, 1/16, 5/16)

PS

STORMWATER INLET (1/21)

STORMWATER POND 3 BOTTOM EL 468.0

EMERGENCY SPILLWAY (6/16)

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0 50 100 200

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APPD.	T.R.G. (G.E.R.)

THOMAS R. GREDELL, P.E. NUMBER E-24137 REGISTERED PROFESSIONAL ENGINEER

SHEET 14
PROPOSED UTILITY WASTE LANDFILL PHASE 4 FINAL GRADING PLAN

LOCATION		CLASS
001009	LABADIE ENERGY CENTER	02010

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