Prepared for:

Anniston Calhoun County
Fort McClellan Joint Powers Authority
Anniston, Alabama

and

Matrix Environmental Services, LLC
Anniston, Alabama

FINAL (100%) DESIGN REPORT

LANDFILL COVER SYSTEMS LANDFILL 3 AND FILL AREA NORTHWEST OF REILLY AIRFIELD McCLELLAN, ANNISTON, ALABAMA

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1. INTRODUCTION

This design report has been prepared by GeoSyntec Consultants (GeoSyntec) on behalf of the Anniston Calhoun County Fort McClellan Joint Powers Authority (JPA) and Matrix Environmental Services, LLC (MES) to guide the closure activities for Landfill 3 (LF3) and the Fill Area Northwest of Reilly Airfield (FANWR) at the former Fort McClellan (McClellan) in Anniston, Alabama.

1.1 Background of McClellan

McClellan is located in the foothills of the Appalachian Mountains of northeastern Alabama, near the cities of Anniston and Weaver in Calhoun County (Figure 1-1) approximately 60 miles northeast of Birmingham, 75 miles northwest of Auburn, and 95 miles west of Atlanta, Georgia. Between 1917 and 1999, the US government and US Army utilized McClellan as a training base for various purposes. In September 1999, McClellan was closed under Base Realignment and Closure. As part of the Environmental Services Cooperative Agreement with the US Army, the JPA has agreed to complete environmental remediation efforts necessary at LF3 and FANWR. In addition, the JPA has also entered into Cleanup Agreement AL4210020562 with the Alabama Department of Environmental Management (ADEM).

Both LF3 and FANWR were operated by the US Army and closed prior to the existence of Federal or state environmental regulations governing landfills. Neither LF3 nor the FANWR were closed with an engineered cap or cover system. To comply with the substantive intent of federal and state environmental regulations for historical (i.e., legacy) landfills, an engineered cover will be employed at both locations. This remedy will include the placement of a low-permeability cap designed to: (i) minimize future direct exposure to wastes which were disposed of at each location; (ii) promote and manage surface water drainage while controlling erosion; (iii) minimize leaching of contaminants to groundwater by limiting infiltration; and (iv) function with routine maintenance requirements typical of a cover system.

1.2 Design Report Objectives

The purpose of this report is to present the design documents that guide closure activities for LF3 and FANWR. The remedial closure of these two landfills involves the design and construction of an engineered low-permeability soil cover system.

The primary objective of this report is to present:

- a final cover system design intended to isolate soils and waste from future human contact, promote and manage surface water drainage while controlling erosion, and minimize leaching of contaminants to groundwater;
- a borrow investigation to identify suitable on-site sources of materials for the proposed engineered covers at LF3 and FANWR;
- a wetland delineation survey of the areas surrounding LF3 to identify potential impacts to the wetlands, a consideration during design and construction;
- a waste excavation and relocation plan for the southwest corner of FANWR to accommodate the future Industrial Access Road (IAR) right-of-way;
- a surface water management system design to route surface water to designated areas, protect the cover systems from damage caused by surface run-on and infiltration, and discharge surface water to existing surface water management systems and watercourses in accordance with applicable regulatory requirements;
- a Post-Closure Care Plan to maintain the integrity and effectiveness of the final cover systems for LF3 and FANWR during the post-closure care period; and
- the identification, preparation, and submittal of required permit applications.

1.3 Design Report Organization

The remainder of this design report is organized as follows:

- Section 2 – background overview of LF3 and FANWR;
- Section 3 –final cover system descriptions for LF3 and FANWR and discussion of pre-design investigations and design considerations;
- Section 4 – engineering design documents; and
- Section 5 – references cited within this document.

2. BACKGROUND

This section describes the existing site conditions for LF3 and FANWR and provides background information on waste disposal methods and waste streams.

2.1 Landfill 3 (LF3)

LF3, Parcel 80(6), is located in the northwestern corner of McClellan (Figure 2-1) and is approximately 23 acres in size. The landfill is bounded by the Anniston-Jacksonville Highway (Route 21) to the west, Gobbler Road to the east, wooded areas and the boundary of McClellan to the north, and wetlands and Cave Creek to the south.

LF3 is unlined and was constructed using trench/fill operations. Waste was placed in trenches to a maximum depth of 22 feet (ft). It served as the primary sanitary landfill at McClellan from 1946 to 1967. Reports indicate that landfill utilization included the disposal of residential/municipal refuse, industrial wastes (i.e., empty pesticide containers, paint containers, waste oil), and construction debris. Upon closure in 1967, the landfill was not capped. The inactive landfill is heavily vegetated with a mixed coniferous and deciduous forest.

The land surface at LF3 slopes gently to the north and east. Surface runoff drains to the north along the west and east sides of the landfill converging at the northeast corner of the site. Groundwater is encountered at depths between 20 and 50 ft below ground surface (bgs) at LF3. The flow of the shallow groundwater closely follows local topography.

Shallow native soils associated with LF3 consist of silty clays (i.e., CL or CH according to Unified Soil Classification System [USCS]).

2.2 Fill Area Northwest of Reilly Airfield (FANWR)

The FANWR is also located in the northwestern corner of McClellan, adjacent to the former Reilly Airfield and west-southwest of Reilly Lake (Figure 2-1) and is approximately eight acres in size. Adjacent to the estimated eastern boundary of the fill area is an escarpment. The northeastern boundary of the FANWR is adjacent to a number of streams and forested wetlands that form the headwaters of Reilly Lake.

The FANWR was first identified as a potential disposal area from a 1954 aerial photograph. Wastes reportedly disposed of include paint containers, fluorescent bulbs and ballasts, waste oils,

and construction debris. The maximum waste depth encountered during field investigation activities was 15 ft. The fill area was not capped upon closure circa 1970. The inactive fill area is heavily wooded and vegetated.

The land surface at FANWR is relatively flat with only a slight slope to the north and west. Surface run off appears to follow the topography. During boring and well installation activities, groundwater was generally encountered in clayey sand zones at depths up to 35 ft bgs. Perched groundwater was encountered in some cases in the waste (IT, 2002).

Soils underlying the FANWR are mapped as Cumberland gravelly loam, eroded type soil. The thickness of the alluvium ranges from 2 to 15 ft or more (IT, 2002). Shallow native soils are generally classified as a silty clay (i.e., USCS classification of CL or CH).

3. ENGINEERING DESIGN

This section describes the final cover systems for LF3 and FANWR and discusses the pre-design investigations and considerations incorporated into the design documents. The design basis and design criteria for the final cover systems are discussed in detail in the Final (Revision 1) Corrective Measures Implementation (CMI) Plan prepared by MES (MES, 2006).

3.1 Final Cover System Design

For LF3 and FANWR, the final cover systems will be an engineered low-permeability soil cover system comprised of a vegetative layer underlain by low-permeability material. A typical section of the cover system is illustrated in Figure 3-1. Components of the soil cover system include, from top to bottom:

- 6-inch vegetative soil layer (topsoil); and
- 18-inch low-permeability ($1x10^{-5}$ cm/sec) layer.

The horizontal limits of the final cover systems span the extent of the LF3 and FANWR waste boundaries identified in previous studies, as summarized in the CMI Plan (MES, 2006). Note, the landfill perimeter limit for LF3 has been adjusted in the northeast corner based on December 2006 LIDAR topography and the existing surface water feature. These limits were established so as to minimize future direct exposure to wastes which were disposed of at each location. The low-permeability layer was selected to minimize leaching of contaminants to groundwater by limiting infiltration through the cover system. The final design grades for LF3 range from a minimum of 1 percent [100 horizontal to 1 vertical (100H:1V)] to a maximum of 4 percent, and for FANWR, the final design grades range from 1 percent to 16 percent. The design grades for both LF3 and FANWR are appropriate for promoting surface water drainage from the cover systems while controlling erosion.

The cover systems for both LF3 and FANWR have also been designed to accommodate the potential or planned future use for each property. The design grades for the LF3 cover system were developed to allow for future active recreational or light industrial use; however, additional engineering design will be required for future development. If LF3 is developed in the future, the closure system will need to be evaluated or enhanced to accommodate any future use. The minimum design basis criteria established by the CMI Plan and this document will need to be addressed for any future end use scenario at LF3. For FANWR, the final cover system grading incorporates walking trails and a parking area for passive recreational use. In general, the design

grades and recreational surface for the walking trails were selected based on recommendations provided by the US Architectural and Transportation Barriers Compliance Board (*Recommendations for Accessibility Guidelines: Outdoor Areas FINAL REPORT,* September 1999). In addition, waste excavation and relocation will be performed at FANWR to accommodate the future IAR right-of-way as further discussed in Section 3.3.

3.2 Pre-Design Investigations

3.2.1 On-Site Borrow Source Investigation

A borrow study to identify suitable on-site sources of materials for the proposed engineered covers at LF3 and FANWR was initiated in late March 2006. Five areas were identified by MES and the JPA as potential borrow sources (see Figures 3-2 and 3-3). Borrow Area Site No. 1 (BAS-1) is located south of LF3 and is bounded by Gobbler Road to the east and wetlands to the west and south. BAS-2 is approximately 0.6 miles east of LF3 and is bounded by Reilly Airfield to the northwest and an asphalt road (referred to as Falcon Road) to the southeast. BAS-3 is just over 0.9 miles southeast of LF3 and FANWR. This area is bounded by asphalt roads (referred to as Goode Road and Mount Road) to the west and north, respectively. BAS-4 is approximately 3 miles southwest of LF3 and FANWR. This area is bounded by Summerall Gate Road to the south and Route 21 to the west; the area will be developed as a future Lowe's of North Anniston. BAS-5, known as Trench Hill, is located directly south of Landfill 4 and is bounded by Ranger Avenue to the east.

The soil cover systems will include an 18-inch thick barrier (low-permeability, 1 X 10^{-5} cm/sec) soil layer and 6-inch topsoil layer. Structural fill material will also be required for general construction activities including build out of the cover system to proposed final grades. The low permeability layer soil and structural fill will likely consist of a clay material (i.e., CL or CH according to the USCS). The topsoil layer will likely consist of a loamy soil (i.e., not more than 25% clay and not less than 10%).

The results from the geotechnical tests indicate that the clay material at BAS-1, BAS-2, BAS-4, and BAS-5 is ideal for the cover system low permeability barrier soil and structural fill layers. The soil material at BAS-3, if needed, has a slightly higher sand content, and therefore may be more suitable for structural fill. Based on field observations and the test pit logs, topsoil from BAS-1, BAS-3, and BAS-5 is available in very limited quantities. At BAS-2, the soil material in the upper horizon could be amended with organic materials (i.e., mulch or sludge) and additional nutrients to support the vegetation layer. The upper six inches of material from

BAS-4 is ideal for topsoil. This material has sufficient organic matter content that when amended with the recommended amounts of nutrients should support the vegetative layer.

An estimated quantity of approximately 200,000 cubic yards (CY) of soil material will be required for construction. Approximately 80,000 CY will be required to construct the low-permeability layer for the LF3 and FANWR cover systems, and approximately 115,000 CY of structural fill will be required for both cover systems and general construction activities. The available volume of material at BAS-1 is approximately 51,000 CY; BAS-2 is approximately 156,000 CY; and BAS-5 is approximately 246,000 CY. Prior to construction, approximately 200,000 CY of material from BAS-4 will be excavated and stockpiled within the grassed areas of Reilly Airfield (see Figure 3-2). The material from BAS-2 supplemented with the stockpiled material from BAS-4 should provide the required quantity of clay material necessary for construction. If required during construction, additional material may be obtained from BAS-1, BAS-3, or BAS-5.

BAS-3 is located in an area with difficult/limited access and steep topography. From an access perspective, BAS-3 is less than ideally situated to serve as a borrow area source without access upgrades.

BAS-4 is the only potential borrow source located within an area of McClellan where there is a known likelihood of encountering munitions and explosives of concern (MEC). The potential for encountering MEC at BAS-4 is deemed to be "low" since this area has already been cleared by the US Army (*Site Specific Final Report M1.01 Parcel and M3 Miscellaneous Property Fort McClellan, Alabama*, March 2003). In the event that soils from this area are used as a borrow source, On-Call MEC support services will be provided during any excavation activities that are conducted. On-Call MEC support services include providing initial MEC awareness training and periodic site inspections. Construction personnel will be given a safety briefing by the JPA's MEC Management Team. Personnel will be instructed on visual MEC recognition, MEC hazards, and MEC notification procedures. If MEC is encountered during construction activities, a reassessment of the site will be conducted by the JPA's MEC Management Team to determine if the potential for encountering MEC is still low. If the potential for encountering MEC is raised, there may be a need for additional construction support to include surface and subsurface clearance of MEC in the borrow area excavation footprint prior to conducting any further intrusive activities. The material from BAS-4 will be screened by MES for MEC prior to stockpiling on Site.

Approximately, 27,000 CY will be required for the LF3 and FANWR topsoil layers. Again, the available volume of material from the stockpiles and BAS-2, amended with the appropriate nutrients, should provide the required quantity necessary for construction.

The borrow source evaluation report complete with soil characterization is included as Appendix I of the Final (Revision 1) CMI Plan prepared by MES (MES, 2006) and Appendix A of the Borrow Area Management Plan (Bid Documents, Volume III of IV).

3.2.2 Wetlands Assessment and Delineation

In April and May 2006, desktop reviews and field studies were conducted to delineate the extent of jurisdictional wetlands and waters of the US located near LF3. Jurisdictional wetland boundaries were previously delineated within the area by Shaw Environmental, Inc. in November 2003 and subsequently verified by the US Army Corps of Engineers (USACE) Mobile District (Shaw, 2003). Approval of the jurisdictional determination was granted for a five-year period on 2 April 2003. However, only wetlands observed within a 200-foot perimeter of the landfills were delineated; wetlands occurring beyond this perimeter were approximated. The April and May 2006 field surveys delineated the extent of wetlands occurring beyond the previously selected 200-foot perimeter.

Ten wetlands were observed during the field surveys. Nine of these wetlands were identified as USACE jurisdictional wetlands; one wetland (Wetland E, adjacent to the southern perimeter of LF3) is judged to be an isolated, non-USACE jurisdictional wetland, however USACE concurrence is pending. Wetland boundaries were flagged with standard orange surveyor flagging, numbered sequentially, and field located with a sub-meter accurate GPS unit. In addition, six waters of the US were identified within the project area during the field surveys. Locations and boundaries of these waters were not surveyed with GPS, as project area LIDAR topographic maps accurately depict locations and approximate dimensions of jurisdictional waters.

Both the wetland and waters of US boundaries have not been verified by the USACE Mobile District and are considered preliminary until USACE conducts a Jurisdictional Determination (JD) of wetlands/waters of the US. A request for Jurisdiction Determination was submitted to the USACE in August 2006 and is currently pending.

The surveyed wetland boundaries and waters of the US are depicted on Figure 3-4 and illustrated on Drawing No. 2 (See Drawings, Appendix B). The limits of work for both LF3 and FANWR are outside of the jurisdictional wetlands and waters of the US, and therefore, construction activities will not impact these areas. However, given the proximity of these features to both LF3 and FANWR, appropriate erosion and sediment control measures will be executed prior to earth disturbing activities. For the isolated, non-USACE jurisdictional wetland adjacent to the southern perimeter of LF3, impacts to the wetland shall be kept to a minimum

during LF3 final cover system construction. The contractor may elect to adjust proposed final grades in the vicinity of the wetland in order to minimize disturbance.

3.3 Design Considerations

3.3.1 Timber Clearing and Tree Stump Removal

The trees located within LF3, FANWR, and BAS-2 have been harvested. This work was completed in January 2007. Trees suitable for harvest were cut and removed from the site. The remaining stumps are in general no taller than 6 inches in total height. For both LF3 and FANWR, most of the stumps and root mass will remain in place. Along the perimeters of LF3 and FANWR, the tree stumps will be ground to a height equal to the surrounding ground surface. Root mass and rooted vegetation will remain in place. "Loose" organics and debris (i.e., tree limbs, leaves, mulch, tree grindings, etc.) will be removed prior to construction of the soil cover system. GeoSyntec judges that it is technically acceptable to allow the tree stumps and root mass to remain given that: (i) surface water infiltration through the final cover system will be minimized by the low permeability barrier layer; and (ii) the stumps and root mass encapsulated within the structural fill should remain stable and any degradation should not create a void. In the unlikely event that a void results from degradation, it will not compromise the integrity or performance of the final cover system.

Trees not suitable for harvest remain within the footprint of LF3, FANWR, and BAS-2 and will need to be cleared. Clearing will also be required at the perimeters of LF3 and FANWR, specifically along the northern perimeter of FANWR where the surface water detention pond will be located. The cut timber in this area may be used as subgrade reinforcement beneath the pond berms. This clearing will be performed as part of construction activities for this project in 2007.

3.3.2 Waste Excavation and Relocation at FANWR

As shown on Drawing No. 2, the southwestern corner of FANWR, approximately 0.4 acres, is located within the future right-of-way of the IAR. To accommodate the future development, nearly 0.7 acres of waste from a depth of 2 to 12 ft will be excavated and relocated within the perimeter limits of FANWR (Figure 3-5). The excavation will proceed using 2H:1V side slopes around the perimeter of the excavation area to a depth of 12 ft (Figure 3-6). Implementation of the excavation plan will remove approximately 19,500 CY of waste/soil material and result in a new southern perimeter limit located approximately 30 ft north of the IAR right-of-way. The excavation will be backfilled with structural fill to final grade as shown on Drawing No. 8.

The excavated waste materials will be placed and regraded in a 4-acre area within the FANWR as indicated on Figure 3-5. A 3H:1V waste slope will be constructed along a portion of the northern perimeter limits of the FANWR to create the necessary airspace for the excavated volume (Figure 3-6). Over this area, the waste thickness will range from 1 to 10 ft. It is intended that the soil like material excavated from this area will be reserved and utilized to cover the waste material after placement in the FANWR.

The potential for encountering munitions and explosives of concern (MEC) at FANWR is deemed to be "low" since this area has already been cleared by the US Army (*Site Specific Final Report M1.01 Parcel and M3 Miscellaneous Property Fort McClellan, Alabama*, March 2003). On-Call MEC support services will be provided during excavation activities. On-Call MEC support services include providing initial MEC awareness training and periodic site inspections. Construction personnel will be given a safety briefing by the JPA's MEC Management Team. Personnel will be instructed on visual MEC recognition, MEC hazards, and MEC notification procedures. If MEC is encountered during construction activities, a reassessment of the site will be conducted by the JPA's MEC Management Team to determine if the potential for encountering MEC is still low. If the potential for encountering MEC is raised, there may be a need for additional construction support to include surface and subsurface clearance of MEC in the excavation footprint prior to conducting any further intrusive activities.

3.3.3 100-yr Floodplain Impact

Portions of LF3 are located within the 100-year floodplain, but outside of the regulatory floodway for Cave Creek (Figure 3-7). The Base Flood Elevation (BFE) is shown as 744 ft above mean sea level (MSL) in the area of the landfill. Construction of the final cover system will elevate the final grades of LF3 above the BFE. Based on a review of federal and local regulations, the Federal Emergency Management Agency (FEMA) and the City of Anniston (City) permit development within the floodplain, with the condition that the BFE cannot be raised greater than one foot by the development impacts.

The City's Floodplain Administrator agreed to grant permission to fill in the floodplain as long as it could be demonstrated that the impacts of the final cover system for LF3 on the BFE of Cave Creek in the vicinity of the landfill do not exceed one foot. To evaluate the potential impact, analyses were performed for the peak discharge in Cave Creek from a 100-year design flood event. Floodplain analyses were performed using the Hydrologic Engineering Center – River Analysis System (HEC-RAS). Based on the analysis results, the final cover system of LF3 will increase the 100-year BFE of Cave Creek between 0.26 and 0.35 ft in the vicinity of LF3. The impact is less than one foot, as required by the City and FEMA. Draft analysis results were presented to the City's Floodplain Administrator on 31 August 2006. The floodplain analysis is

not included with this report, but will be submitted to the City as part of the development permit as discussed in Section 5.

In addition to the analysis, the Letter of Map Revision - Fill (LOMR-F) applies to this project, as the landfill area will be elevated by fill (i.e., final cover) and no longer be inundated by the base flood. The LOMR-F application will be submitted to FEMA post-construction when as-built survey information is available to confirm the design elevations.

4. DESIGN DOCUMENTS

This section discusses the design documents that will guide implementation of the closure activities.

4.1 Design Calculations

Engineering design calculations were developed to demonstrate the viability and suitability of remedial design elements for the Site. The results of these calculations provide the basis for details and plans of the closure remedy manifested in the drawings and technical specifications. Design calculations performed include surface water management systems for LF3 and FANWR and settlement evaluation.

4.1.1 Surface Water Management System

The surface water management systems for LF3 and FANWR final cover system designs consider surface water run-on from outside the LF3 and FANWR boundaries and surface water run-off from within the LF3 and FANWR boundaries. The function of the surface water management systems is to (i) route surface water to designated locations where it can be appropriately managed; (ii) protect the cover systems from damage caused by surface water run-on and infiltration; and (iii) discharge surface water to existing surface water management systems and watercourses in accordance with applicable requirements. The surface water management systems for LF3 and FANWR are independent and are designed as integrated cover system components for each area. Surface water management during construction will be the contractor's responsibility as defined in the Technical specifications presented in Appendix C.

The surface water management systems comply with the following federal and state standards:

- Code of Federal Regulations, 40 CFR Part 122, National Pollution Discharge Elimination System (NPDES) Program;
- ADEM Field Operations Division – Water Quality Program, Chapter 335-6-12, NPDES; and
- Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Area (Alabama SWCC, 2003).

For LF3, the final cover system design grades vary from a minimum of 1 percent to approximately 4 percent (see Drawing No. 4). Runoff from this area will be managed by diversion berm/channel structures distributed over the entire cover system for LF3. These structures are 1.5-foot high benches constructed on the final cover system. Structures on the western side of LF3 will drain to the existing channel located adjacent to the western perimeter of the landfill. Structures located on the eastern side of LF3 will drain to a new perimeter channel to be constructed adjacent to the eastern boundary of the landfill. The runoff collected in the diversion structures will be detained within the bermed channels and released over time by 6-inch diameter, horizontal, corrugated metal pipes. The number of pipes at each structure is dependent upon the storm runoff volume, peak discharge rate, and available storage volume.

For the FANWR, the final cover system design grades vary from a minimum of 1 percent to approximately 8 percent (see Drawing No. 8). A large portion of the cover system within the fill area perimeter slopes north/northeast. The runoff from this area will be collected in a stormwater detention pond located along the northeast perimeter, outside of the FANWR. The detention pond is designed as a trapezoidal channel with a constant 2 percent longitudinal slope, 3H:1V side slopes and a controlled overflow structure. The runoff collected in the detention pond will be released through a principal spillway, composed of a vertical riser pipe and a horizontal barrel directing flow towards the ravine located to the east of the FANWR. In addition, several perimeter channels will be constructed to divert surface water run-on from FANWR and channel surface water run-off from FANWR to the detention pond.

The surface water management systems for LF3 and FANWR discharge surface water run-off at a rate compatible with the pre-development run-off rates. The surface water management structures for LF3 and FANWR are designed to accommodate a 25-yr, 24-hour duration storm event and for FANWR to divert the peak flow resulting from a 100-year, 24-hour duration design storm event through the emergency spillway.

The complete calculation packages, *Design & Analysis of the Surface Water Management System for Landfill 3 and Fill Area Northwest of Reilly Airfield* are included in Appendix A.

4.1.2 Settlement

The objective of the settlement evaluation was to assess the impact of total and differential settlement on the final cover system performance. The final cover settlements for LF3 and the FANWR were evaluated. Given that: (i) the waste sources are similar for both LF3 and FANWR, (ii) the depth of waste is greater at LF3, and (iii) the final cover systems are similar; settlements due to final cover placement were calculated for LF3 only. Differential settlement of

the LF3 cover system was also considered. These calculated settlements are considered representative of the anticipated settlement at FANWR.

The final cover settlements were analyzed using one-dimensional consolidation theory, which considers both short-term primary compression and long-term secondary compression of the waste in the landfill. The effect of the settlements on the cover system final grades was also evaluated.

Settlement results indicate that the maximum primary settlement and total settlement that will occur beneath 7 ft of final cover material are 0.81 and 1.1 ft respectively. Based on calculated post-primary and secondary settlement cover system grades, the cover system will not maintain positive drainage. However, it is anticipated that primary settlement will occur prior to final grading due to subgrade preparation and placement and compaction effort associated with the construction of the final cover system; thus, minimizing the impact of total settlement on final cover system performance. Negligible tensile strains occur due to primary or secondary settlement.

The complete settlement calculation package, *Cover System Settlement Analysis*, is included in Appendix A.

4.1.3 Quantity Estimate

The objective of the quantity estimate was to identify materials and estimate material quantities required for construction of the final cover systems. For each material, applicable construction drawing details, sections, and plans were used to calculate the quantities. Quantities were calculated using measurements and dimensions from the drawings or by using the grid/prismoidal volume method within the computer program Land Development Desktop for AutoCAD.

Quantities provided in the calculation package are estimated quantities (i.e., assumed to be within ± 10% of the estimated quantity based on the accuracy of the existing topographic survey). Quantities were provided for the purpose of developing the engineers cost estimate and are not provided for the purpose of ordering or procuring materials. The construction contractor will be responsible for determining material quantities for these purposes.

The complete calculation package, *Quantity Estimate,* is included in Appendix A.

4.2 Drawings

The drawings incorporate the design elements of the closure remedy. The different design elements are presented in a manner that facilitates review of the principal design concepts. There are 18 sheets in the drawing set. The drawings include:

- Drawing No. 1 – Title Sheet;
- Drawing No. 2A – Existing Site Conditions;
- Drawing No. 2B – Site Development Plan – Areas for Contractor Hauling and Laydown
- Drawing No. 3 – Site Development Plan – Landfill 3;
- Drawing No. 4 – Final Cover System Grading Plan – Landfill 3;
- Drawing No. 5 – Final Cover System Grading Plan – Landfill 3 Construction Control;
- Drawing No. 6 – Site Development Plan – Fill Area Northwest of Reilly Airfield;
- Drawing No. 7 – Waste Relocation Grading Plan and Sections – Fill Area Northwest of Reilly Airfield;
- Drawing No. 8 – Final Cover System Grading Plan – Fill Area Northwest of Reilly Airfield;
- Drawing No. 9 – Recreational Development Plan – Fill Area Northwest of Reilly Airfield;
- Drawing No. 10 – Landfill 3 South-North Sections;
- Drawing No. 11 – Landfill 3 West-East Sections;
- Drawing No. 12 – Fill Area Northwest of Reilly Airfield Sections;
- Drawing No. 13 – Final Cover System Details;
- Drawing No. 14 – Surface Water Management Details I;
- Drawing No. 15 – Surface Water Management Details II;

- Drawing No. 16 – Surface Water Management Details III;
- Drawing No. 17 – Miscellaneous Details; and
- Drawing No. 18 – Construction Control Points.

The drawings are provided in Appendix B. AutoCAD files for the drawings are provided on CD-ROM with Appendix B.

4.3 Technical Specifications

Technical specifications refer to the minimum requirement parameters and installation procedures for materials used to construct the final cover systems. The technical specifications for general requirements, sitework, and equipment include the following:

Division 1 – General Requirements

- Section 01010 – Summary of Work
- Section 01025 – Measurement and Payment
- Section 01030 – Health and Safety
- Section 01035 – Permits
- Section 01094 – Definitions
- Section 01100 – Environmental Protection
- Section 01200 – Project Meetings
- Section 01310 – Progress Schedules
- Section 01350 – Submittals
- Section 01380 – Project Photographs
- Section 01400 – Quality Control
- Section 01505 – Mobilization and Demobilization
- Section 01510 – Temporary Utilities

- Section 01520 – Temporary Facilities
- Section 01560 – Temporary Controls (Erosion and Sedimentation)
- Section 01580 – Project Signs
- Section 01590 – Field Offices
- Section 01700 – Contract Close-out
- Section 01720 – Project Record Documents
- Section 01740 – Warranty of Construction

Division 2 – Sitework

- Section 02010 – Survey
- Section 02110 – Site Preparation
- Section 02115 – Clearing and Grubbing
- Section 02200 – Earthwork
- Section 02204 – Topsoil and Vegetation
- Section 02206 – Waste Excavation and Handling
- Section 02208 – Crushed Stone Roadways and Walking Paths
- Section 02209 – Riprap and Drainage Aggregate
- Section 02720 – Geotextile Separator
- Section 02830 – Split Rail Fence

Division 11 – Equipment

- Section 11001 – Temporary Storage Tanks

- Section 11002 – Piping and Appurtenances
- Section 11003 – Emission Control Equipment
- Section 11004 – Decontamination Equipment

Technical specifications for construction are included as Appendix C.

4.4 Construction Quality Assurance Plan

The purpose of the Construction Quality Assurance (CQA) Plan is to assure that design requirements are satisfied for the different components of the closure remedy and to present the principles and practices of CQA required during the closure of LF3 and FANWR. Quality management involves both quality assurance and quality control activities performed to verify that construction activities meet the drawings and technical specifications.

The CQA Plan presents definitions and use of terms, defines roles of responsibility and authority, discusses qualifications for CQA personnel, and presents monitoring activities, sampling & testing strategies, and required documentation. The CQA Plan has been developed to be used in conjunction with drawings and technical specifications and is included herein as Appendix D.

4.5 Post-Closure Care Plan

The Post-Closure Care (PCC) Plan addresses the requirements outlined in Part VI of Cleanup Agreement AL4210020562 between ADEM and the JPA. As such, the objective of the PCC Plan is to verify that the final cover systems are performing as expected/designed and to maintain the integrity of the closure systems. The PCC Plan presents the procedures and protocols for operations and maintenance activities associated with the final cover and surface water management systems during the post-closure care period.

Inspections of the Site will be completed quarterly throughout the duration of the post-closure care period, but at a frequency of not less than annually. Inspections will be conducted as soon as practical after major storms events, possible flooding events, or other events that may result in damage to the closure systems, but only at such time as the safety and health of inspection personnel can be assured. The JPA reserves the right to petition ADEM for reduced inspection frequency as a part of the five year remedy review.

The final cover systems for LF3 and FANWR have been designed with the intent to minimize the inspection, monitoring, and maintenance requirements. However, in consideration of the limitations of construction materials subject to typical service conditions and weather, it is anticipated that annual re-seeding and final grade redressing over portions of the cover system will need to be performed. The Post-Closure Care Plan is included as Appendix E.

5. PERMITS AND APPROVALS

In accordance with federal, state, and local regulations, GeoSyntec is currently preparing the following permits for project implementation.

- National Pollutant Discharge Elimination System (NPDES) General Construction Stormwater Permit. This permit will be submitted to the Birmingham Branch of ADEM – Field Operation Division and includes completing a Notice of Registration (NOR). As part of the NOR, a Construction Best Management Practices Plan (CBMPP) will also be submitted. The CBMPP will address pollution abatement/prevention management and structural/nonstructural best management practices (BMPs) needed for the various construction activities. The CBMPP will be developed in accordance with good sediment, erosion, and other pollution control practices to protect water quality.

- Land Disturbance Permit (LDP). This permit will be submitted to the City and includes completing a standard application for land disturbing activities. Copies of both the NPDES general construction stormwater permit and the approved CBMPP will also be submitted as part of the LDP.

- Local Development Permit. This permit will be submitted to the City and includes completing a standard application for permit to develop in a special flood hazard area. As part of the application, the floodplain analysis package (discussed in Section 3.3) and drawings will also be submitted.

On behalf of the JPA and MES, GeoSyntec submitted draft permits to the City in November 2006. The City had no comments on the draft permit package, therefore a final permit package will be submitted in mid February 2007 for review and approval.

The construction contractor will be responsible for obtaining any additional permits required to perform the work as outlined in the design documents, including:

- City of Anniston building permit;

- City of Anniston business license; and

- State of Alabama contractor license.

6. REFERENCES

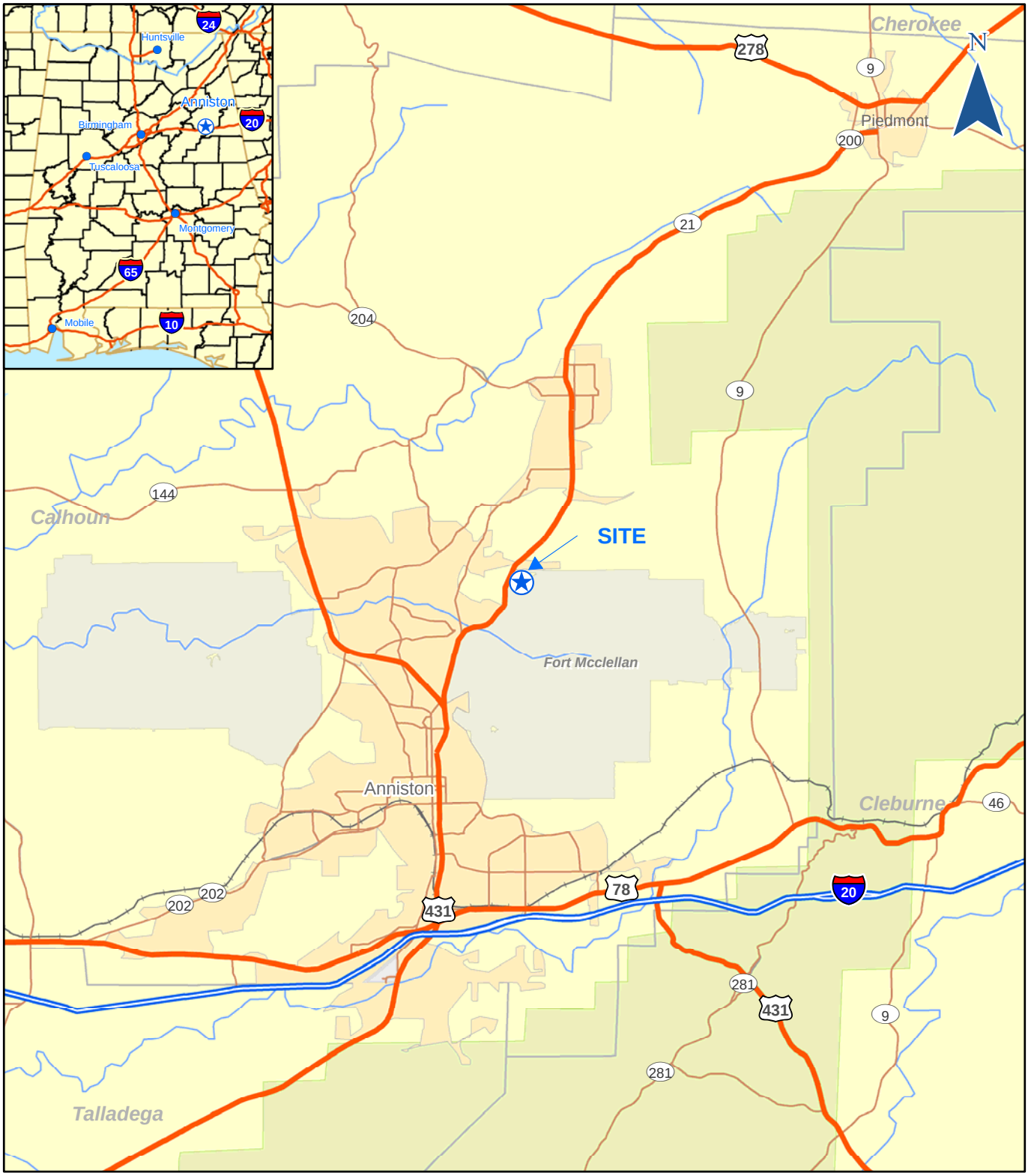
Alabama Soil and Water Conservation Committee (SWCC), *Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas*, June 2003.

IT Corporation, "*Site Investigation and Fill Area Definition Report Parcels 78(6), 79(6), 80(6), 81(5), 175(5), 230(7), 227(7), 126(7), 229(7), 231(7), 233(7), and 82(7), Fort McClellan, Calhoun County Alabama*," Volume 1 of 6, Prepared for US Army Corps of Engineers, Mobile District, Task Order CK09, Revision 1, March 2002.

Matrix Environmental Services, "*Final (Revision 1) Corrective Measures Implementation Plan Landfill 3 and the Fill Area Northwest of Reilly Airfield Parcels 80(6) and 229(7), McClellan, Anniston, Alabama*," Prepared for the Anniston Calhoun County Fort McClellan Development Joint Powers Authority of Anniston, Alabama, October 2006.

Shaw, *Final Wetlands Determination, Landfills and Fill Areas,* Fort McClellan, Alabama, Prepared for the US Army Corps of Engineers, Mobile District, November 2003.

SITE LOCATION - McCLELLAN - ANNISTON, ALABAMA



Source: ESRI Streetmap USA 2005

2 1 0 2 4
Miles

GeoSyntec Consultants

FIGURE NO.	1-1
PROJECT NO.	GR3762
DATE	FEBRUARY 2007
FILE NO.	SITE.MXD

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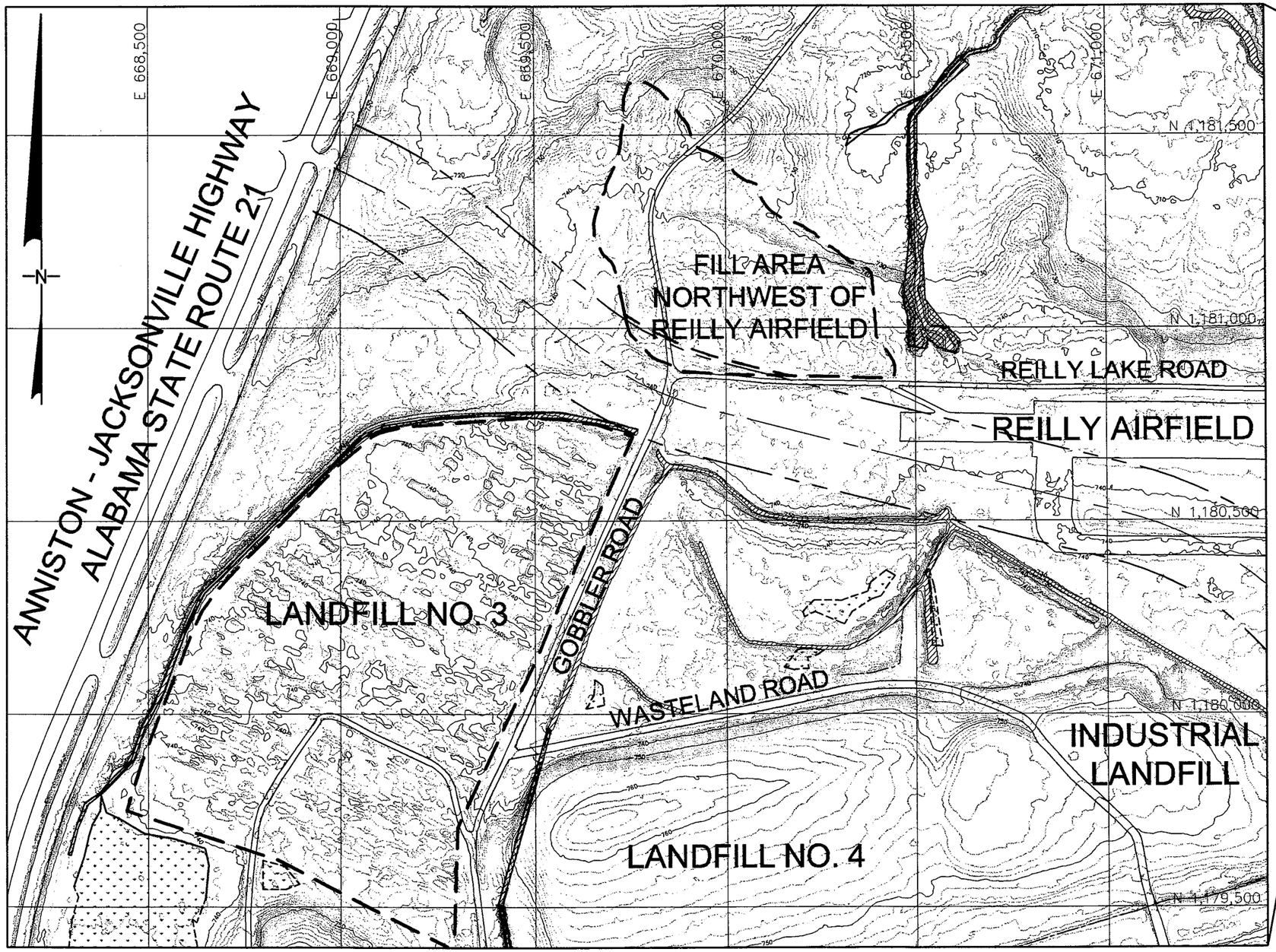
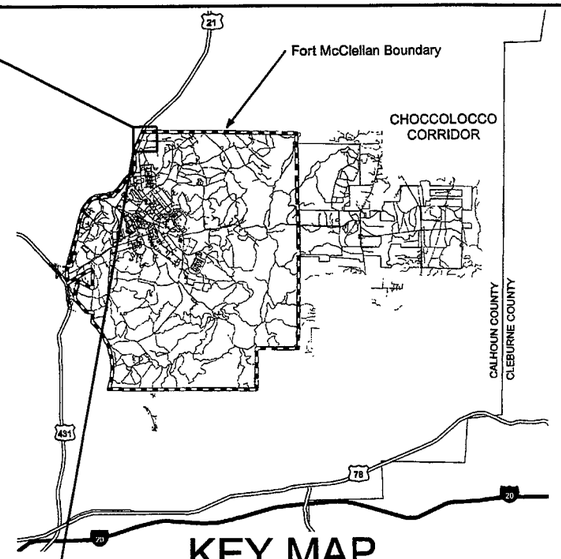




KEY MAP

LEGEND

- EXISTING GROUND ELEVATION (FEET) (NOTE 1)
- EXISTING ROAD
- LANDFILL/FILL AREA PERIMETER LIMIT
- STREAM CENTERLINE
- INDUSTRIAL ACCESS ROAD RIGHT-OF-WAY
- JURISDICTIONAL WETLAND (SURVEYED BOUNDARY) (NOTE 2)
- JURISDICTIONAL WETLAND (PRELIMINARY SURVEYED BOUNDARY) (NOTE 3)
- JURISDICTIONAL WATERS OF THE UNITED STATES (NOTE 2)

NOTES:

1. TOPOGRAPHY DEVELOPED USING LIDAR TECHNOLOGY PERFORMED BY OPTIMAL GEOMATICS OF HUNTSVILLE, ALABAMA ON 17 DECEMBER 2005.
2. LOCATIONS OF JURISDICTIONAL WETLANDS AND WATERS WERE OBTAINED FROM "FINAL WETLAND DETERMINATION, LANDFILLS AND FILL AREAS," BY SHAW ENVIRONMENTAL, INC. DATED 17 NOVEMBER 2003.
3. WETLAND DELINEATION CONDUCTED BY GEOSYNTEC CONSULTANTS IN APRIL AND MAY 2006. WETLAND BOUNDARIES ARE PRELIMINARY PENDING U.S. ARMY CORPS OF ENGINEERS JURISDICTIONAL DETERMINATION.

0 300' 600'

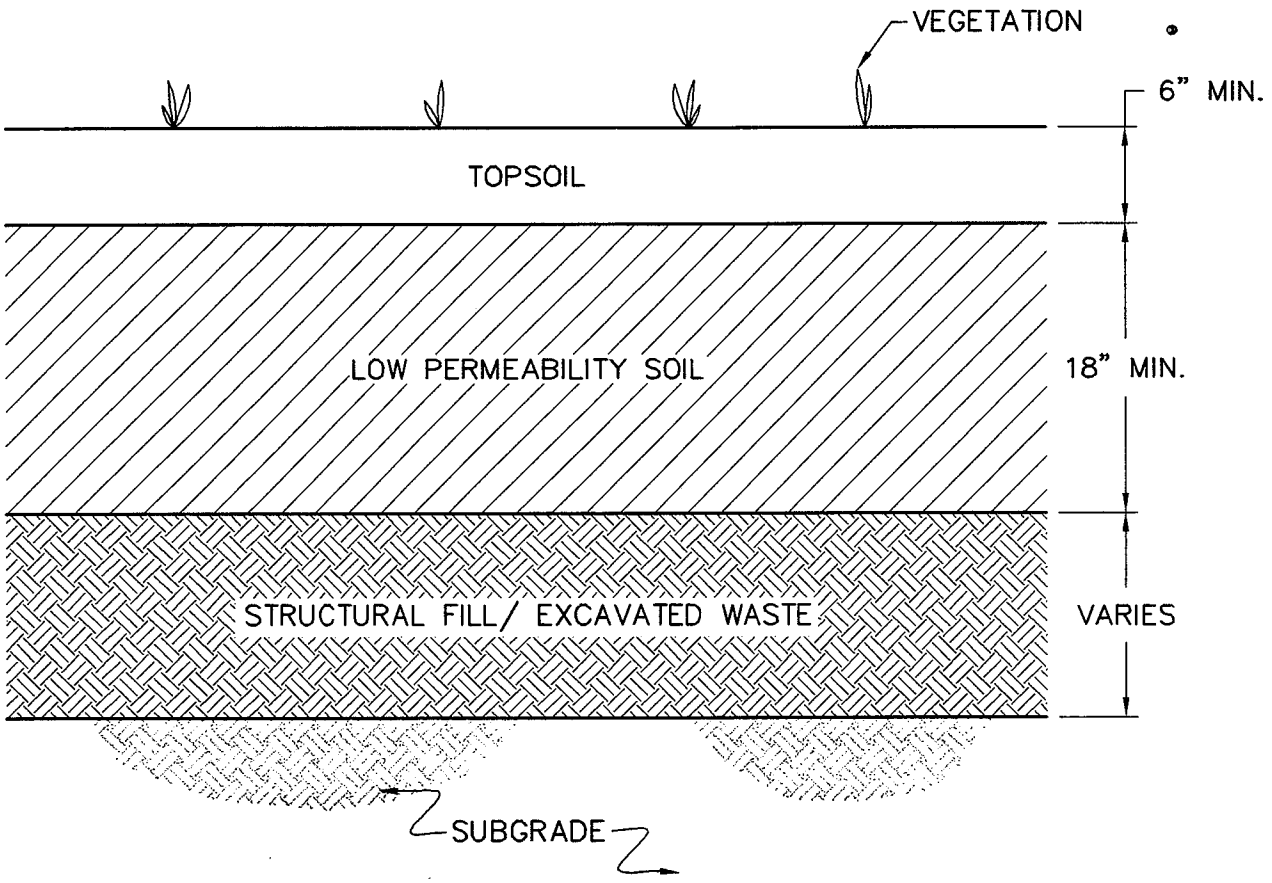
SCALE IN FEET

LANDFILL 3 AND FILL AREA NORTHWEST OF REILLY AIRFIELD

GeoSyntec Consultants
KENNESAW, GA

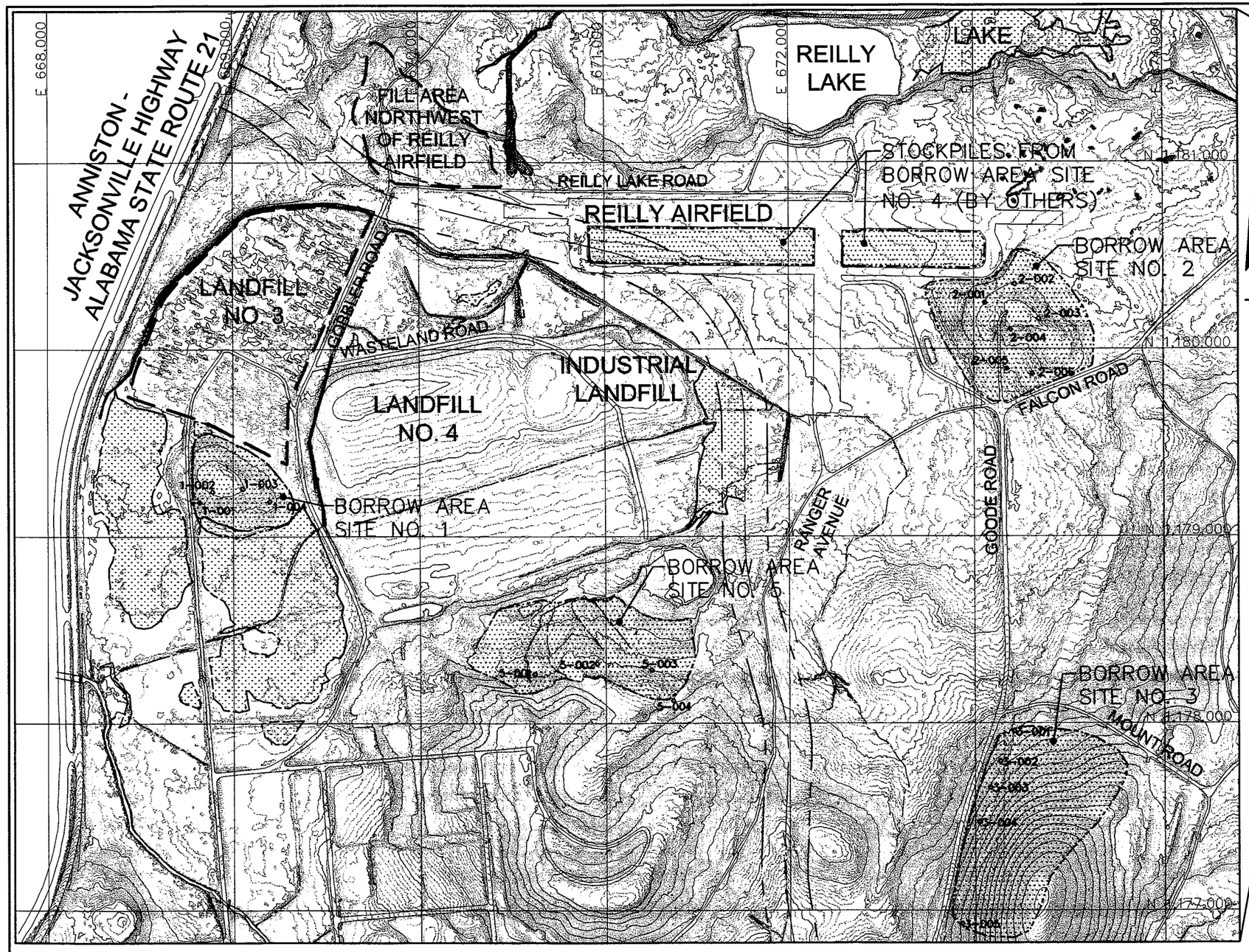
DATE:	FEBRUARY 2007	SCALE:	1"=300'
PROJECT NO.	GR3762	FILE NO.	3762BR11
DOCUMENT NO.	GA060435	FIGURE NO.	2-1

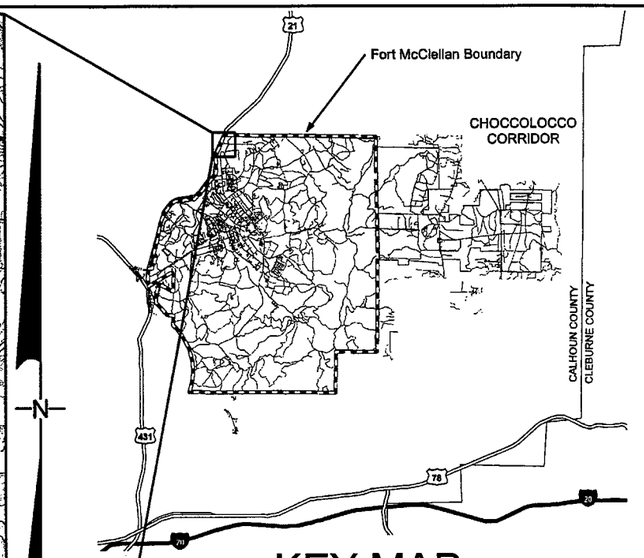
FINAL COVER SYSTEM DETAIL



SCALE: 1"=1'-0"

GeoSyntec Consultants KENNESAW, GA	DATE: FEBRUARY 2007	SCALE:	1"=1'
	PROJECT NO. GR3762	FILE NO.	3762BR10
	DOCUMENT NO. GA060435	FIGURE NO.	3-1





NOTES:

1. TOPOGRAPHY DEVELOPED USING LIDAR TECHNOLOGY PERFORMED BY OPTIMAL GEOMATICS OF HUNTSVILLE, ALABAMA ON 17 DECEMBER 2005.
2. LOCATIONS OF JURISDICTIONAL WETLANDS AND WATERS WERE OBTAINED FROM "FINAL WETLAND DETERMINATION, LANDFILLS AND FILL AREAS," BY SHAW ENVIRONMENTAL, INC. DATED 17 NOVEMBER 2003. FOR THE WETLAND LOCATED ALONG THE EASTERN PERIMETER OF LANDFILL 4, WETLAND BOUNDARIES WERE UNDETERMINED BEYOND 200 FEET OF LANDFILL BOUNDARY.
3. WETLAND DELINEATION CONDUCTED BY GEOSYNTEC CONSULTANTS IN APRIL AND MAY 2006. WETLAND BOUNDARIES ARE PRELIMINARY PENDING U.S. ARMY CORPS OF ENGINEERS JURISDICTIONAL DETERMINATION.
4. TEST PIT LOCATIONS ARE APPROXIMATE.

0 600' 1200'

SCALE IN FEET

LEGEND

- 730 — EXISTING GROUND ELEVATION (FEET) (NOTE 1)
- EXISTING ROAD
- LANDFILL/FILL AREA PERIMETER LIMIT
- STREAM CENTERLINE
- INDUSTRIAL ACCESS ROAD RIGHT-OF-WAY
- JURISDICTIONAL WETLAND (SURVEYED BOUNDARY) (NOTE 2)
- JURISDICTIONAL WETLAND (PRELIMINARY SURVEYED BOUNDARY) (NOTE 3)
- JURISDICTIONAL WATERS OF THE UNITED STATES (NOTE 2)
- SURFACE WATER FLOW DIRECTION
- BOUNDARY AREA OF POTENTIAL BORROW SITE/STOCKPILE AREA
- 2-002 TEST PIT LOCATION (NOTE 4)

ON-SITE BORROW AREA SITES NO. 1, NO. 2, NO. 3, AND NO. 5

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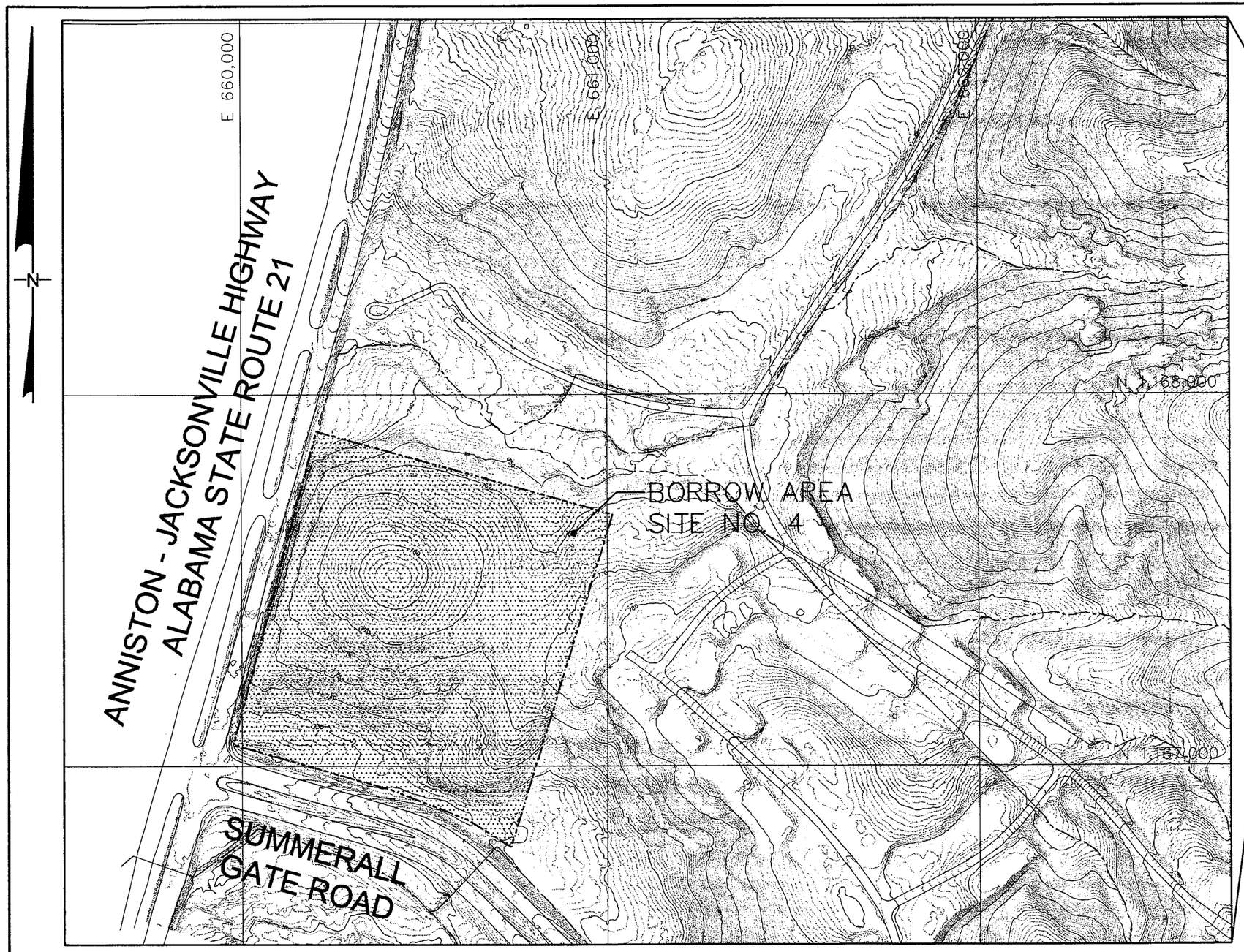
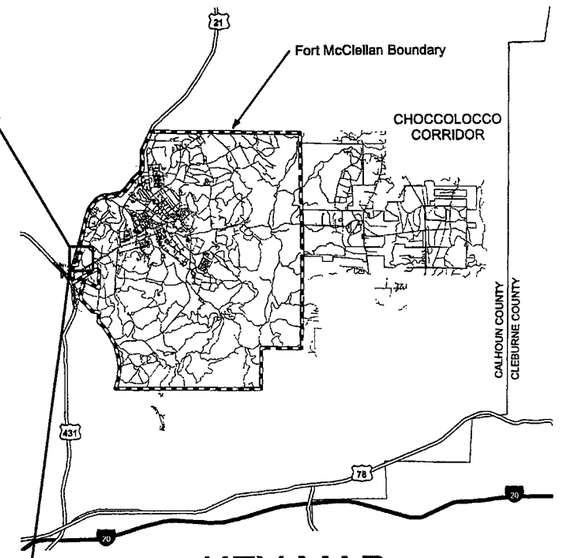
KENNESAW, GA

DATE:	FEBRUARY 2007	SCALE:	1"=600'
PROJECT NO.	GR3762	FILE NO.	3762BR03
DOCUMENT NO.	GA060435	FIGURE NO.	3-2





KEY MAP

LEGEND

- 730 — EXISTING GROUND ELEVATION (FEET) (NOTE 1)
- EXISTING ROAD
- STREAM CENTERLINE
- BOUNDARY AREA OF POTENTIAL BORROW SITE

0 300' 600'

SCALE IN FEET

ON-SITE BORROW AREA SITE NO. 4

NOTES:

1. TOPOGRAPHY DEVELOPED USING LIDAR TECHNOLOGY PERFORMED BY OPTIMAL GEOMATICS OF HUNTSVILLE, ALABAMA ON 17 DECEMBER 2005.

GeoSyntec Consultants
KENNESAW, GA

DATE:	FEBRUARY 2007	SCALE:	1"=300'
PROJECT NO.	GR3762	FILE NO.	3762BR08
DOCUMENT NO.	GA060435	FIGURE NO.	3-3

WETLANDS DELINEATION - APRIL AND MAY 2006 - McCLELLAN - ANNISTON, ALABAMA

Source: USGS Terraserver - March 7, 1997

500 250 0 500 1,000

Feet

Legend

- Surveyed Wetlands
- W/US (Waters of the U.S.)

GeoSyntec Consultants

FIGURE NO.	3- 4
PROJECT NO.	GR3762
DATE	FEBRUARY 2007
FILE NO.	DELINEATION.MXD

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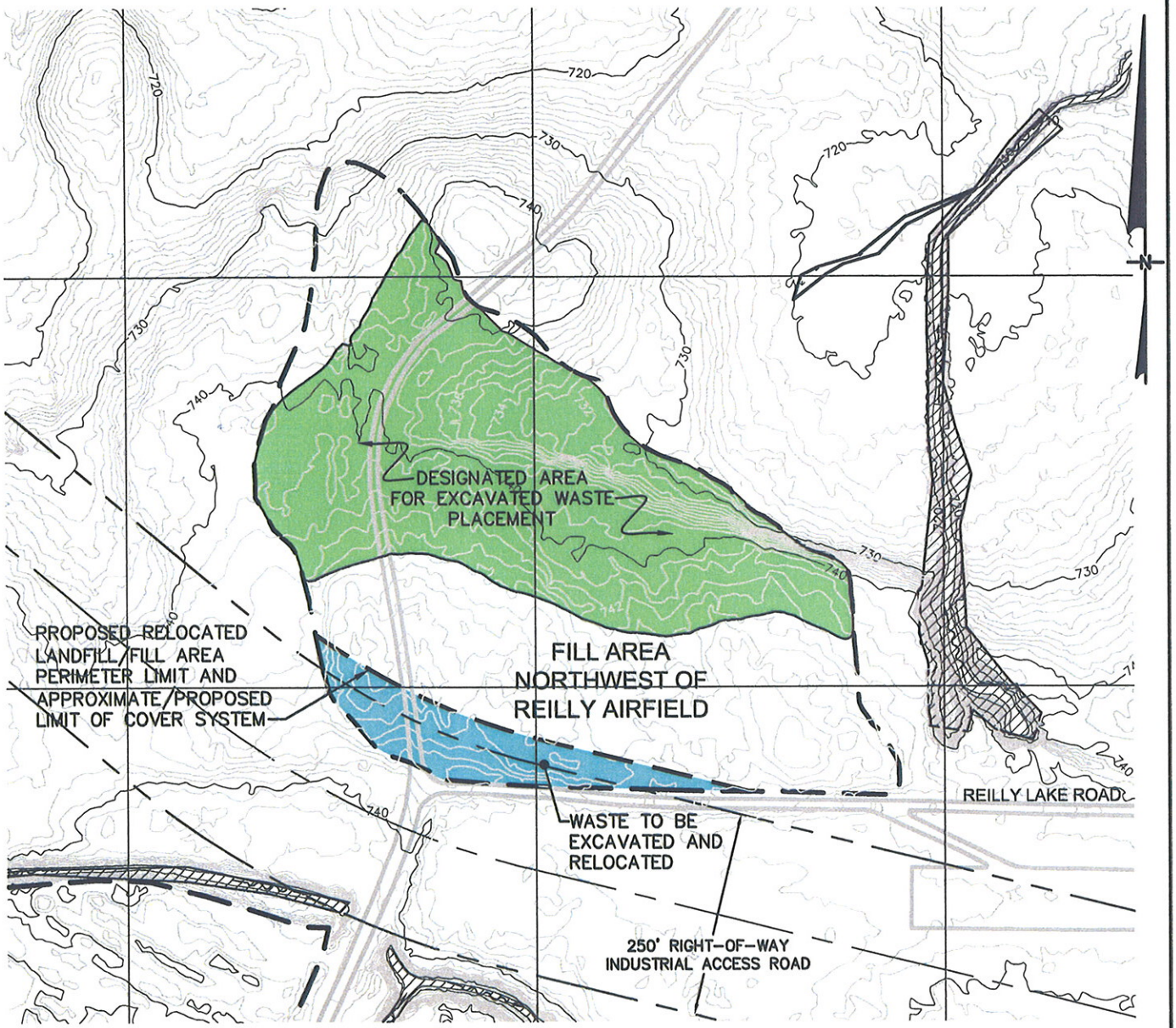
EXCAVATION AND WASTE RELOCATION
FILL AREA NORTHWEST REILLY AIRFIELD



LEGEND

- LANDFILL/FILL AREA PERIMETER LIMIT
- DESIGNATED AREA FOR EXCAVATED WASTE PLACEMENT
- WASTE TO BE EXCAVATED AND RELOCATED

0 200' 400'

SCALE IN FEET

GeoSyntec Consultants, Kennesaw, GA	DATE: FEBRUARY 2007	SCALE:	1"=1'
	PROJECT NO. GR3762	FILE NO.	3762F005
	DOCUMENT NO. GA060435	FIGURE NO.	3-5

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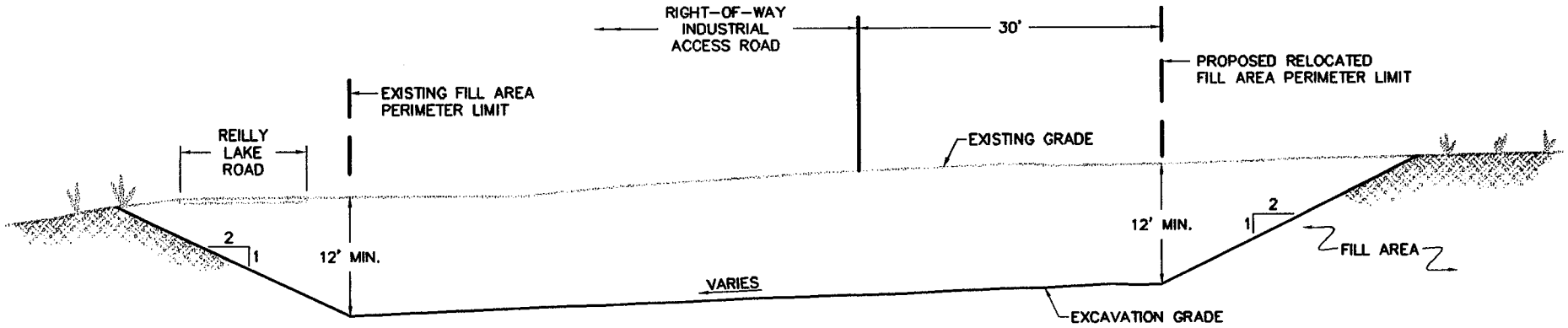
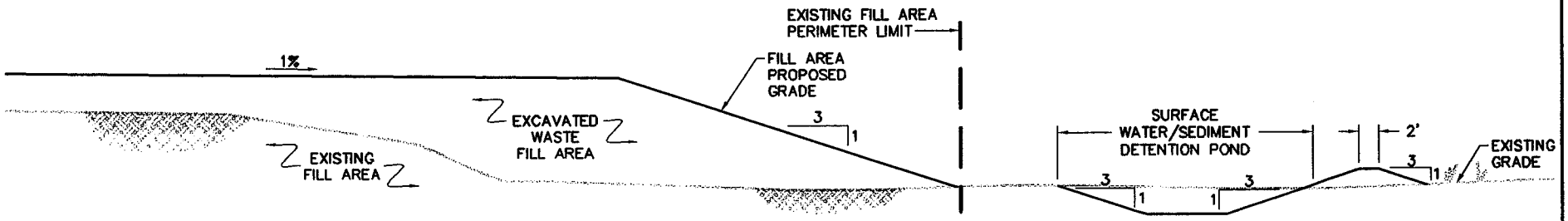
WASTE EXCAVATION SECTION: NORTH-SOUTH

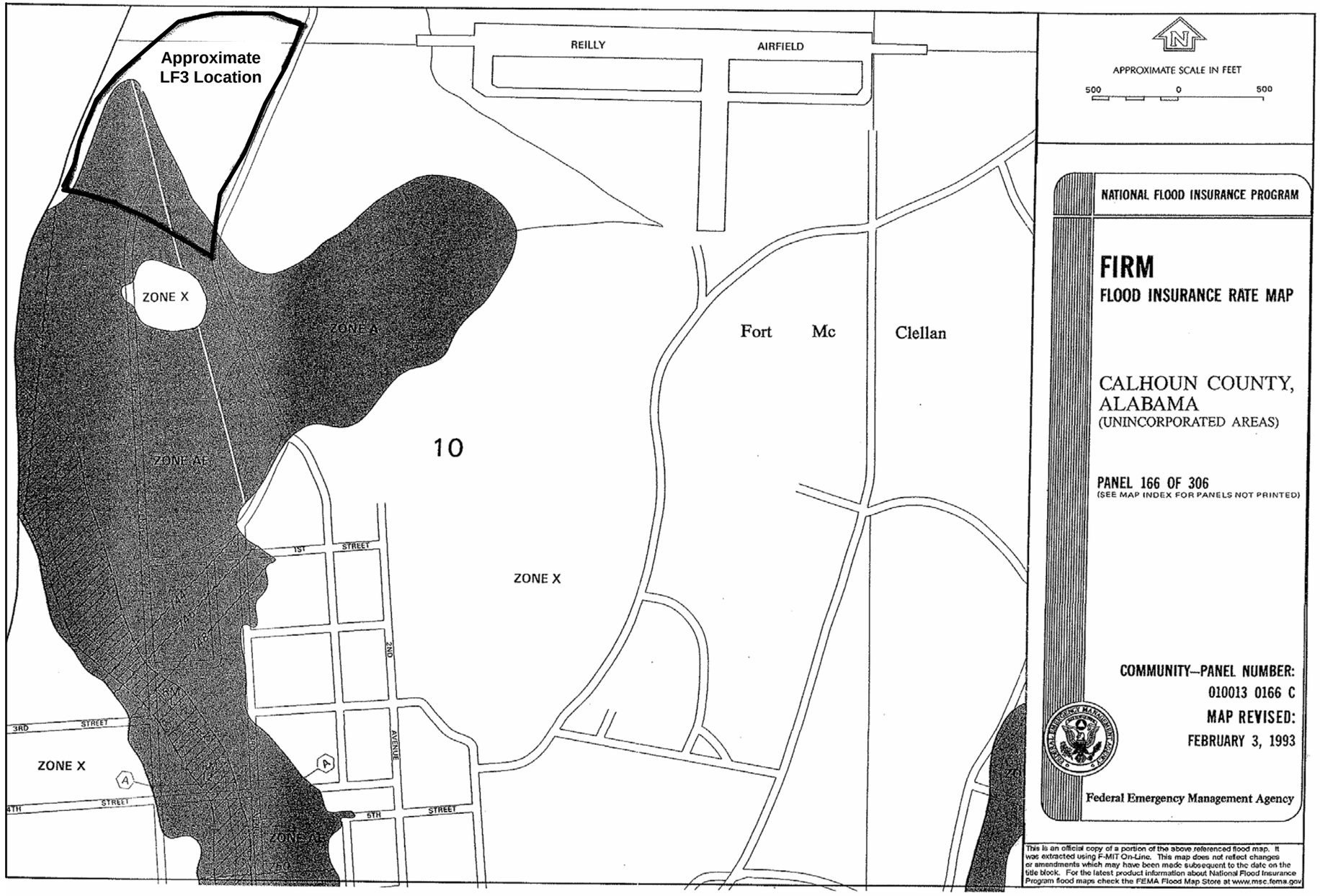


WASTE RELOCATION SECTION: NORTH-SOUTH



GeoSyntec Consultants
KENNESAW, GA

DATE:	FEBRUARY 2007	SCALE:	N.T.S.
PROJECT NO.	GR3762	FILE NO.	3762F004
DOCUMENT NO.	GA060435	FIGURE NO.	3-6



GeoSyntec Consultants
KENNESAW, GA

DATE:	NOVEMBER 2006	SCALE:	N.T.S.
PROJECT NO.	GR3762	FILE NO.	3762F005
DOCUMENT NO.	GA060435	FIGURE NO.	3–7