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DEPARTMENT OF ENERGY
National Nuclear Security Administration
Washington, DC 20585

National Nuclear Security Administration

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NMED Hazardous Waste Bureau

Mr. James Bearzi
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Dear Mr. Bearzi:

Attached are two hard copies and one electronic copy of the completion report for the Los Alamos Airport Landfills, including SWMUs 73-001(a-d) and 73-004(d). This report covers actions taken as defined in the Remedy Design Work Plan for the Los Alamos Airport Landfills which the New Mexico Environment Department approved in March 2006.

Sincerely,

David R. Gregory
Federal Project Manager
Environmental Operations

EO: 2BE-024

Attachments

cc w/o attachments:
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NWI-4212-001
Project No. 4200

Remedy Completion Report
DOE-LASO TA-73 Airport Landfill
SWMUs 73-001(a) and 73-001(d)

April 2007

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Prepared for the
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Los Alamos Site Office
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Remedy Completion Report
DOE-LASO TA-73 Airport Landfill
SWMUs 73-001(a) and 73-001(d)

NWI-4212-001

Approved by

Doug Jorgensen, Project Manager	4/11/07 Date
Berg Keshian, Engineer of Record	4/11/07 Date

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ACRONYMS

CDRs	Construction deficiency reports
CFR	*Code of Federal Regulations*
DDA	Debris Disposal Area
DOE	United States Department of Energy
HASP	Health and Safety Plan
HDPE	high-density polyethylene
HP-2	Hangar pad #2
MSE	Mechanically-stabilized earth
NMED	New Mexico Environment Department
RCP	reinforced concrete pipe
RDWP	Remedy Design Work Plan
SSO	Site Safety Officer
TRM	turf reinforcement mat

Remedy Completion Report
DOE-LASO TA-73 Airport Landfill
SWMUs 73-001(a) and 73-001(d)

April 2007

1. INTRODUCTION

This Remedy Completion Report describes construction of the final remedy for the U.S. DOE-LASO SWMUs 73-001(a) and 73-001(d), referred to as the Airport Landfill and Debris Disposal Area (DDA), respectively. The RCRA Facility Investigation (LANL 1998), the Voluntary Corrective Measures Plan (LANL 2002) and Remedy Design Work Plan (RDWP) (NWI 2006) for these SWMUs are available in the administrative record.

The completed remedy is summarized below. Field changes to the RDWP design are described in Appendix C and are incorporated on the final as-built drawings and specifications, provided in Section 4.

1.1 Report organization

This report provides the content required for a Remedy Completion Report as stated in the "Compliance Order on Consent" (NMED 2005), referred to hereinafter as the Consent Order, Section VII.E.6.a., and includes:

1. A summary of work completed
2. A statement, signed by a registered professional engineer, that the remedy has been completed in accordance with the Department approved work plan for the remedy
3. As-built drawings and specifications signed and stamped by a registered professional engineer.
4. Copies of the results of all monitoring, including sampling and analysis, and other data generated during the remedy implementation, if not already submitted in a progress report.
5. Copies of all waste disposal records, if not already submitted in a progress report.
6. Certification of the report, signed by a responsible official of both DOE and the co-operator.

Work completed is described in Section 2. The Engineers statement and certification by DOE are provided in Sections 3 and 4, respectively. As-built drawings and supporting calculations are provided in Section 5.

Test pads were required by NMED for the infiltration layer soils and for the MatCon cover (NMED 2006). Results of acceptance testing for these features are summarized in Section 6. Testing results are provided on the CD in Appendix A.

Appendices include:

- Appendix A: Results of testing (CD)
- Appendix B: Disposal manifest for Freon-113 container
- Appendix C: Field changes
- Appendix D: Photos.

2. SUMMARY OF WORK COMPLETED

The principal features of work completed as part of the TA-73 Airport Landfill closure include:

- Regrading and compaction of the main landfill surface, and the north and east slopes
- Construction of five concrete hangar pads on the main landfill surface
- Construction of a MatCon asphalt cap on the main landfill surface
- Construction of a gas collection system beneath the MatCon surface
- Construction of a stormwater collection system
- Construction of a lower concrete retaining wall and an upper mechanically-stabilized earth (MSE) wall at the toe of the east slope
- Construction of a low-permeability soil/geocomposite/vegetated soil cover on the upper east slope and the north slope
- Placement of additional cover soil, regrading and revegetation of the DDA.

Each of these features is discussed in detail below. Quality control, field changes, and construction deficiencies and resolutions are discussed for each.

2.1 Waste relocation and regrading

Extensive relocation of waste was required to achieve the final grades shown on Drawing 2002AB. Photos taken prior to construction and during waste relocation are provided in Appendix D. A preconstruction survey established the initial grades and locations of significant features. The existing interim soil cover was removed and stockpiled for use as common borrow prior to excavation of waste. The areal extent of waste, the volume of waste relocated and types of waste encountered are described below.

Quality assurance during waste relocation and regrading included visual observations by the QCSM that waste was placed in thin lifts and compacted as placed, as per Specification 02266. Waste was consistently compacted beyond the requirements of the specification using multiple passes with a 10 ton vibratory roller. Objects such as appliances were crushed with the trackhoe excavator or dozer before rolling. Tires were segregated and placed in deeper fill areas. Larger competent materials, e.g. concrete, etc. were bedded in softer materials where possible and were not stacked or piled. In general waste was relocated and compacted so as to provide as stable a subgrade as possible for the final closure cover.

2.1.1 Extent of waste

Potholes and trenches were excavated on the north, south and west sides of the landfill prior to the start of waste relocation and cap construction, to determine the areal extent of waste and to set the required final cover limits. Drawing 2002 AB shows the locations of the excavations, which were referenced in field drawings to the preconstruction survey stakes. The presence or absence of waste in the excavations was noted on the field drawings.

Locations shown on the north side of the landfill are the northern limits of waste prior to construction, as determined by trenching north to south. Waste observed in the northwest corner was relocated onto the main landfill with a minimum 1-ft offset from the final cover limits.

Waste was observed east of Wall 1 during construction of the wall foundation. Waste east of Wall 1 was excavated and relocated onto the main landfill after construction of the wall was complete. The west side of the Wall 1 foundation is the limit of waste in this area, and the east side of the wall foundation is the limit of the final cover.

The original design called for all waste to be removed from the southeast corner of the landfill, in the expectation that natural ground would be encountered at shallow depths in that area. Initial excavation indicated deeper fills than anticipated, and the design was revised to extend the cover eastward until natural ground was encountered. Drawing 2002AB shows the final alignment of the southeast corner of the cap. Waste immediately adjacent to the taxiway was relocated onto the main landfill surface to achieve the required minimum 1-ft offset of waste within the final cover limits.

Potholing locations on the south side of the landfill are shown on drawing 2002AB. Debris was encountered at depths of 3 to 10 ft on the south side near the taxiway. This material appeared to be fill used in construction of the airport taxiway and runway, e.g. pieces of brick and asphalt, rather than the municipal solid waste observed elsewhere in the landfill. These observations were consistent with drilling logs for wells in this area (LP-1 through LP-4) as documented in the RFI Report (LANL 1998) Attachment 4-15, which also show 3 to 10 ft of fill. Fill was distinguished from landfill refuse in the drilling logs. This material was not relocated but was covered by the MatCon asphalt, and the liner under the drainage channel.

Potholing locations on the west side of the landfill are also shown on Drawing 2002AB. Additional excavation was done in this area prior to the start of cap construction to locate the existing storm sewer line and repair damaged areas, and to locate a possible existing water line which was not found. The occurrence or absence of waste in the excavations was noted. The storm sewer line and possible water line locations were found to be located in clean fill. The potholing results showed no waste within approximately 30 ft of the west end of the final cover limits.

2.1.2 Volumes of waste relocated

Approximately 50,000 cubic yards (cy) of waste were relocated during construction to achieve the required final grades and to consolidate waste within the capped area. Most of the material was removed from the east slope, placed on the upper landfill surface and compacted as it was placed. Lesser amounts were removed from the north slope and similarly placed on the upper landfill surface and compacted.

2.1.3 Types of waste encountered

Wastes encountered during construction were consistent with the RFI Report (LANL 1998) description of the TA-73 landfill as receiving only municipal waste. No hazardous, toxic or radioactive materials were observed during waste relocation, based on visual observations and on-site health and safety monitoring, as described in Section 2.1.4; with the exception of the discovery of two unknown containers and three compressed gas cylinders with valves missing during waste relocation. One container and the three compressed gas cylinders were inspected by the LANL Emergency Management Response Team. The cylinders were determined to be safe, but the unknown container was sealed and the contents were not evident. Rinchem Company from Albuquerque was contracted to determine the contents. After sampling and testing was performed, the container was determined to be empty and clean. The container was disposed of back into the landfill.

The second unknown container was suspected to contain Freon-113. Rinchem packaged, transported and arranged for disposal of the container. The container was accepted for stabilization and landfilling at the Veolia Environmental Services hazardous waste facility in Henderson, CO, and assigned wastestream number RC7641. Copies of the Uniform Hazardous Waste Manifest and the Waste Acceptance Notification are provided in Appendix B. This was the only waste disposed of off-site during the project.

2.1.4 On-site monitoring during relocation

Hazardous substances in air were monitored daily during waste relocation by the Site Safety Officer (SSO) as required by the Health and Safety Plan (HASP) (NWI 2006). Organic vapor concentrations, flammability, hydrogen sulfide, carbon monoxide, and oxygen were monitored using a Multi Rae Plus photoionization detector/specific gas monitoring instrument. A Sensidyne Model AP – 20S Gas Detection Pump was used throughout the project monitoring for specific gases such as benzene due to reported detection in soil gas during the RFI investigation, and very low OSHA permissible exposure limits. A Ludlum Model 12 count ratemeter was used to determine background radioactivity levels and for ongoing surveys of waste exposed during excavation and relocation.

Personal sampling pumps were placed on employees to collect actual exposure levels for benzene and metals, in particular cadmium and lead, over an eight hour work-shift to determine the actual employee exposures. Air sampling pumps were also placed on the perimeter fence around the project to monitor hazardous constituent concentrations at the fenceline.

Organic vapor concentrations in air during waste relocation were consistently below exposure limits stated in the HASP at all locations. Radiation levels were consistently at or below the background levels established prior to construction. Employee exposures were below the permissible exposure limits for benzene, cadmium and lead. All on-site monitoring results are available in the project file upon request.

2.1.5 Final grades

Final grades for the completed landfill surface are shown in Figure 2002AB. Grades range from about 0.5% across the hangar pads, and 1 to 2% across the MatCon surface and east slope drainage bench; to 3h:1v (33%) and 4h:1v (25%) on the vegetated north and east slopes.

2.2 Hangar pads

Five concrete hangar pads were constructed as shown on as-built Drawings 2002AB, 3003AB and 3004AB. Final as-built construction specifications are provided in Section 03300. Hangar pads 1 through 3 are 203 ft 7 in by 60 ft each, and vary from 6-in to 2-ft in thickness. Hangar pads 4 and 5 are 196 ft 1 in by 63 ft 1 in each, and vary from 9-in to 2-ft in thickness. All construction joints were sealed and the entire surface was sealed with Sealhard® concrete sealer on all pads. Product literature and certifications for all materials are available in the project submittal register.

Originally six pads were planned. Hangar Pad 6 (farthest east) as shown on the original Drawing 2002A was deleted as described in FCN-4200-008, due to potentially excessive differential settlement, as described in the Weston Solutions, Inc. elastic settlement calculations dated 04/19/06 and provided to NMED on 5/31/06. Potential settlement is greatest at the east end of the landfill where fills are deepest. Differential settlement from center to edge of Pad 6 could be as much as 4 inches, likely resulting in cracking. For this reason, Pad 6 was proposed to be deleted and replaced with aircraft tie-downs, in a 05/02/06 meeting with Bob Enz of DOE-LASO, Kyle Zimmerman of Los Alamos County, Berg Keshian of Weston Solutions, Inc. and Engineer of Record, and John Keck of North Wind, Inc. This proposal was

accepted by both DOE-LASO and Los Alamos County. Utility poles required to supply each hangar with electricity were also added to the design at that time.

The pad design shown on Drawing 3003AB was modified during the course of construction to improve constructability. Hangar pads 1 through 3 were constructed using the original design, and pads 4 and 5 were constructed using the revised design shown on Drawing 3004AB. Other field changes related to hangar pad construction are documented in Appendix C.

Hangar pad construction began with relocating and compacting waste as discussed previously. When the required waste fill elevation was reached, the stockpiled interim cover material was placed, proofrolled and the grade beams excavated. A single lift of aggregate base course was then placed and compacted to a final thickness of 4-in.

The hangar pads were then formed and rebar installed. The hangar pads were poured in sections. Most of the pours were performed in early morning, when temperatures and the chance of rain were lower. Hangar pad #2 (HP-2) was the first of the five pads constructed at the airport landfill. A gap or void was observed on the west side at an expansion joint, where the cork had been displaced during the concrete pour. The resulting gap or void shown in Appendix D was identified as a construction deficiency and tracked as CDR-001.

The construction process was revised to better fasten the cork to the concrete, and the deficiency was not observed on subsequent hangar pads. Repair procedures and products were discussed with the concrete subcontractor, DOE-LASO and the USACE representatives. Comments were incorporated and the repairs were performed as per the procedure. The repairs were inspected and accepted by the QCSM and CDR-001 was closed.

Quality assurance during hangar pad construction by the QCSM included observing placement and compaction, checking final thickness of replaced interim cover material and aggregate base subgrade, and inspecting forming and rebar placement. The geotechnical lab subcontractor tested the subgrade for moisture and density using a nuclear gauge, under the oversight of the QCSM. On-site concrete testing during pouring included casting cylinders for 7-, 14- and 28-day break tests; and measuring slump, air content and temperature at random by the geotechnical lab subcontractor. The USACE provided on-site quality oversight for the DOE-LASO throughout the hangar pad construction.

The QCSM observed each concrete pour, and checked the concrete mix formulation on each weight ticket. Addition of water and water reducer on site and at the mix plant was controlled by the QCSM and field engineer to meet requirements for slump. All 28-day cylinder break tests exceeded the required 4000 psi. Results of testing are provided in Appendix A.

Sealhard® concrete sealer was applied to the exposed surfaces. Photos of the completed hangar pads are provided in Appendix D.

2.3 Gas collection system

Approximately 3400 linear feet of gas collection piping were installed, as shown on Drawings 2010AB and 2011AB. No significant field changes were required during construction. Quality assurance during construction included inspection of materials and certifications as received, and inspection of the installation, for compliance with drawings and Specification 02730. Product literature and certifications for all materials are available in the project submittal register. Photos of the construction are provided in Appendix D.

2.4 MatCon cover

4.87 acres (211,953 sq ft) of the main landfill were covered with a single 4-in lift (finished thickness) of MatCon pavement. Drawing 2002AB "Landfill Top of Cap Grading Plan" shows the extent of MatCon and finished slopes. No field changes were made to the MatCon design during construction. Photos of the construction are provided in Appendix D.

Cold joints occurred in two locations during MatCon placement and compaction, due to interruptions of the asphalt supply and cold ambient temperatures, resulting in CDR-003 and -004, respectively. Cold joints created during placement are required to be repaired under the MatCon guide specifications. The length of the cold joint was milled 2", tack coated and new material placed and compacted to achieve final grade. The repairs were inspected and accepted by the QCSM. The areas passed density testing requirements, and the CDRs were closed.

Quality assurance during the MatCon cover construction included inspection and observation by the QCSM, process oversight at the mix plant and on-site by the MatCon subcontractor, and mix plant and on-site testing by the geotechnical testing subcontractor. The USACE provided on-site quality oversight for the DOE-LASO throughout the MatCon construction. The QA/AC report for the MatCon installation including the mix design, mix plant inspection and approval, preliminary test pad, and testing and construction at the main landfill are provided in Appendix A. The MatCon installation and final surfaces are shown in photos provided in Appendix D.

The completed MatCon surface was cored at 12 locations as shown in the photos provided in Appendix D Cored locations were backfilled with MatCon hot mix. The hydraulic conductivity of the MatCon cores was below the limits of the ASTM D5084 procedure as performed by the testing laboratory, which has previously measured permeabilities below 1E-09 cm/sec for earthen materials using this method. The requirement that the test pad cores have a saturated hydraulic conductivity less than the value of 1E-08 cm/sec used in numerical modeling to establish RCRA Subtitle C cover equivalence, as described in the RDWP (NWI 2006), was therefore met. The laboratory test report is provided in Appendix A.

2.5 North and east slope covers

Approximately 3 acres of the north and east slopes were covered with the infiltration layer/drainage geocomposite/turf reinforcement mat (TRM) cover configuration shown in Drawings 2005AB and 2025AB. Drawing 2002AB shows the areas covered with TRM. Construction details for each element of slope cover construction are discussed below.

2.5.1 Infiltration layer and geosynthetic drainage composite

Approximately 3 acres of the north and east slopes were covered with infiltration layer soil and geosynthetic drainage composite as shown in Figure 2002D, 2005C and 2025A. A test pad was constructed for the infiltration layer soil as per Specification 02200 and tested prior to full-scale construction, as described in Section 5.2.1. Testing results were provided to NMED on 08/31/06, and are summarized in Section 6 and are provided in full in Appendix A. Saturated hydraulic conductivity for samples collected from each of the three lifts ranged from 3.1E-07 to 4.4E-08 cm/sec. The construction methods used to achieve the required permeability of less than 1E-05 cm/sec for the infiltration layer test pads were subsequently used for the full-scale construction.

Field changes during installation of the north and east slope covers included increasing the compaction requirement for infiltration layer soils to 100% of Standard Proctor dry density, to achieve the required 1E-05 cm/sec saturated hydraulic conductivity based on the results of test pad construction. Quality

assurance during construction of the infiltration layer included visual inspection of received infiltration layer soils, monitoring material placement and compaction of soil in 6-inch lifts, and field moisture and density determinations by the geotechnical testing laboratory subcontractor.

Quality assurance during installation of the geosynthetic drainage composite included inspection of materials and certifications as received, and inspection of the installation as per specifications and drawings. Product literature and certifications for all materials are available in the project submittal register.

2.5.2 Topsoil

Topsoil used for the north slope was imported to the site from an off-site borrow source owned by Parker Construction Co. Topsoil analysis results are provided in Appendix A. This soil was amended with compost purchased from Los Alamos County, using a blend of about 1 part compost to 20 parts topsoil. The compost was comprised of biosolids from Los Alamos County wastewater treatment plants, mixed with wood chips and stable waste for composting. Composting is performed in a windrow about 6 feet high and 40 feet long which is built and mixed with a front end loader. The windrow was turned and monitored according to requirements under Title 40 of the *Code of Federal Regulations* [CFR], Part 503) to produce Grade A compost which was tested for bacteria before being released. Compost testing results are provided in Appendix A. No fertilizer was added.

The topsoil and compost sources used for the north slope were completely consumed and therefore topsoil used for the east slope and DDA consisted of a local silty sand, amended with Biosol fertilizer, at a rate of 200 lbs/acre.

No significant field changes were required during installation of the topsoil course. Quality control during installation of the topsoil course included monitoring lift thickness and compaction by wheel rolling and dozer tracking only.

2.5.3 Vegetative cover

Vegetative cover was applied to approximately three acres of the north and east slopes and five acres of the DDA. Specification 02932 provided seeding guidelines. Table 2-1 lists the actual mix applied, based on the guidelines. Seeding was performed by broadcasting on the north slope at approximately 35 lbs live seed per acre. Seeding was performed on the east slope and DDA at 30-37 lbs live seed per acre by hydroseeding and hydromulching. Approximately 2000/bs per acre mulch were applied.

Table 2-1. Seed mix applied to north and east slopes and DDA.

Species	Scientific name	% of mix
Blue grama	Bouteloua gracilis	10%
Sideoats grama	Bouteloua curtipendla	15%
Indian ricegrass	Oryzopsis hymenoides	15%
Mountain brome	Bromus marginatus	15%
Thickspike wheatgrass	Agropyron dasystachyum	20%
Sheep fescue	Festuca ovina	15%

Table 2-1 continued

Species	Scientific name	% of mix
Firewheel	Gaillardia pulchella	2%
Fringed sage	Artemisia frigida	1%
Blue flax	Linum perenne lewisii	4%
Palmer penstemon	Penstemon palmeri	2%
Prairie coneflower	Ratibida columnifera	1%

No field changes were required during installation of the vegetated cover. Quality assurance included visual inspection of the seed certification tags, and the application rate and compliance with Specification 02932.

2.5.4 Geosynthetic slope protection

Drawing 2002AB shows the coverage of geosynthetic slope protection. Due to availability of materials several types were used including:

- Western Excelsior PP5-8 permanent erosion control blanket on slopes shallower than 4h:1v
- Greenfix America CFG 2000 permanent erosion control mat on slopes steeper than 4h:1v

The areas receiving TRMs were broadcast seeded with the native plant mix listed in Table 2-1 before placing the geosynthetics. Photos of the construction are provided in Appendix D.

Field changes related to geosynthetic slope protection are documented in Appendix C. Quality assurance during construction included inspection of materials and certifications as received, and inspection of placement as per specifications and drawings. Product literature and certifications for materials are available in the project submittal register.

2.6 Stormwater system

A storm water management system was installed to drain the paved areas, including over 1700 feet of high-density polyethylene (HDPE) and reinforced concrete pipe (RCP), 10 precast concrete drop inlets, and 1000 ft of poured in place concrete trench drains adjacent to the hangar pads. A 500-ft lined riprap drainage channel was constructed between the completed landfill cover and the adjacent aircraft taxiway.

Stormwater system features are shown on as-built drawings 2003AB, 2021AB and 2022AB. Photos of the construction are provided in Appendix D. The existing storm sewer line shown on Figure 2002D was left in place, because it is located in clean fill and is still in use.

Quality assurance during construction included inspection of materials and certifications as received, and inspection of installation as per specifications and drawings. Field changes related to the stormwater system are documented in Appendix C. Product literature and certifications for materials are available in the project submittal register.

2.7 Retaining walls

2.7.1 Wall 1

Drawings 2006 AB and 3000AB through 3002AB show the final as-built condition of Wall 1, which is a cast in place reinforced concrete cantilevered wall. Wall heights shown on Drawing 3000AB (top of wall elevation – top of foundation elevation) can be compared to design heights shown on Drawing 3001AB to determine locations of sections. Section 03300 contains as-built construction specifications for Wall 1. Total completed length of Wall 1 is 290 feet. The maximum height is 24 ft. Photos of Wall 1 construction are provided in Appendix D.

Prior to construction, the Wall 1 alignment was cleared and graded sufficiently to allow access for a CME 75 rotary drilling rig. Borings were drilled along the alignment of Wall 1 to determine the depth, competency and bearing strength of the underlying strata. Boring logs and a location map are provided in Appendix A. The borings indicated approximately 10 to 15 feet of fill overlying soft nonwelded tuff, overlying dense welded tuff. Standard penetration tests and rock quality index were measured and visual observations recorded.

Based on the greater than expected depth to dense welded tuff, the Wall 1 design was revised to rest on the softer nonwelded tuff in some locations. The height of the wall was held constant, while the elevations at the bottom of the foundation and top of the wall were dropped 5 ft. The foundation was overexcavated until natural material was encountered. Structural fill was placed and compacted in the excavation prior to pouring the foundation of the wall. The Wall 1 design was otherwise unchanged. Supporting calculations for the Wall 1 redesign are provided in Section 5.

The Wall 1 construction sequence is shown in photos in Appendix D. A haul road was constructed to the toe of the east slope and the downhill edge was protected using jersey barriers with reinforcing steel. Waste and natural tuff was then excavated to establish required grades, and relocated to the main landfill surface and compacted. The Wall 1 foundation was then cut to the required elevations.

Wall 1 was constructed in sections, south to north. The foundation for each section was formed and poured and allowed to cure before the overlying wall was poured. Two concrete pumper trucks were used to deliver concrete to the foundation. The supply of concrete from the mix plant was interrupted twice during pours of the foundation, resulting in formation of cold joints. Construction deficiency reports (CDRs) were written for each occurrence and a repair method was submitted to DOE-LASO and approved by the ER. The uncured concrete was removed to at least 6 inches below the depth of the top mat of rebar and allowed to cure. The surface was cleaned to remove loose material and Weldcrete, a concrete bonding agent, was applied prior to the next pour. Supporting calculations to evaluate the required strength of the cold joint are provided in Section 5. Repairs were completed to the satisfaction of the ER and the QCSM. Product literature and certifications for materials are available in the project submittal register. Field changes related to Wall 1 construction are provided in Appendix C.

Quality assurance during Wall 1 construction included observing placement and compaction of structural fill in the foundation excavation and inspecting forming and rebar placement by the QCSM; and nuclear gauge testing of the subgrade for moisture and density by the geotechnical lab subcontractor. The USACE provided on-site quality oversight for the DOE-LASO throughout Wall 1 construction. On-site concrete testing during pouring included pouring cylinders for 7-, 14- and 28-day break tests; and measuring concrete slump, air content and temperature; at random at a minimum frequency of 1 truckload per every 10 truckloads, by the geotechnical lab subcontractor.

The QCSM observed each concrete pour, and checked the concrete mix formulation on each weight ticket. Addition of water on site and at the mix plant was controlled by the QCSM and field engineer to meet requirements for water:cement mix ratio and for slump. All 28-day cylinder break tests exceeded the required 3000 psi. Results of testing are provided in Appendix A.

2.7.2 Walls 2a and 2b

As-built Drawing 2006AB shows the as-built condition of Walls 2a and 2b, which are MSE walls. Design drawings and supporting calculations prepared by the vendor are provided in Section 5. Section 02273 contains as-built construction specifications for Walls 2a and 2b.

The MSE walls were redesigned during construction to accommodate the reduced elevation of the top of Wall 1, the occurrence of rock observed during the excavation of the Wall 1 foundation, and the final east slope configuration based on an assessment of the cut and fill balance. A continuous MSE wall was eliminated and two partial walls used instead. Field changes related to MSE wall construction are documented in Appendix C.

The total completed lengths of Walls 2a and 2b are 71 ft and 110 ft, respectively. Wall 2a rises in height from 7 ft at the south end to 15 ft at the north end. Wall 2b rises in height from 23 ft at the south end to 7.5 ft at the north end. Photos are provided in Appendix D.

Walls 2a and 2b were built on the compacted structural backfill behind Wall 1. Quality assurance during construction included observing and inspecting placement and compaction of the structural fill behind Wall 1 and the MSE wall backfill, and nuclear gauge testing of the subgrade and MSE wall backfill for moisture and density by the geotechnical lab subcontractor. Test results are provided in Appendix A.

The QCSM and site superintendent also inspected wall alignment and dimensions. The USACE provided on-site quality oversight for the DOE-LASO during Wall 2a and 2b construction. Structural fill used for Wall 1, 2a and 2b foundations and backfill was inspected visually on delivery and tested as required by as-built Specification 02200 and Section 2.0 of Tensar Construction Requirements.

2.7.3 Surface covers behind retaining walls

The original design assumptions included removing all waste from the area between Walls 1 and 2. This was not feasible due to the depth of waste encountered behind Wall 1 during construction. Therefore the bench between Walls 1 and 2 was covered using the geosynthetic liner and geotextile configuration used for drainage benches, in order to meet the requirement to cover all waste. Field changes required are described in FCN-4200-037 and shown on Drawing 2005AB Detail 5. The geosynthetic liner system as shown in the Drawing 2025AB detail, “Typical geosynthetic placement at retaining walls” was placed starting 2-ft behind face of Wall 2, at a depth of 2-ft below the bottom of the wall, to the back of Wall 1. A 3-ft wide strip of riprap was placed adjacent to Wall 1 and sloped laterally from the center of the wall to each end of the wall at 0.5%. The remainder of the surface was completed with 6” of topsoil with turf reinforcement mat. Photos of the construction are provided in Appendix D.

The bench and slopes behind Wall 2 are covered with the low-permeability soil/geocomposite/vegetated soil cover shown in Drawing 2025AB Section N. Quality assurance during construction of the surface covers included inspection by the QCSM of the geotextile and geosynthetic liner placement, placement of the riprap, placement of the topsoil and the turf reinforcement mat. Dimensions, materials and installation procedures were checked against Drawings 2005 and 2006 and specifications 06005 and 06020.

2.7.4 Final east slope configuration

The final east slope configuration changed from the original design as a result of lowering Wall 1, reconfiguring Wall 2 and realigning the drainage bench; and due to differences in the actual quantity of waste produced during relocation vs. preconstruction estimates. As a final check, slope stability was evaluated at two critical sections using geotechnical parameter values for the actual soils used and as-built grades. The factor of safety at the critical sections was determined to be greater than 1.5.

2.8 DDA cover

The extent of the DDA was initially surveyed and elevations were staked. Topsoil was added and the surface regraded over a total of five acres to achieve the minimum cover requirement of 12 inches. The finished surface was hydroseeded and hydromulched using the seed mix listed in Table 2-1. The final surface elevations are shown on Drawing 2015AB.

No field changes were required during installation of the DDA cover. Quality assurance included inspection of surveying and staking, inspection of topsoil addition as per Specification 02200, visual inspection of the seed certification tags, and checking the application rate and compliance with Specification 02932. Photos of the DDA cover construction are provided in Appendix D.

3. STATEMENT BY ENGINEER OF RECORD

This certification was prepared in accordance with generally accepted engineering principles and practice pursuant to the requirements of Section VII.E.6 of the March 1, 2005, Compliance Order on Consent signed by the New Mexico Environment Department (NMED) and the United States Department of Energy (DOE) and the Regents of the University of California for a registered professional engineer's certification. These activities have been performed with the care and skill ordinarily exercised by members of the profession practicing under similar conditions in the same manner or in a similar locality. I make no other warranty either expressed or implied. I certify that, the investigation and/or remediation was conducted in accordance with the Remedy Design Work Plan, approved by NMED on March 20, 2006. The information presented in this report is, to the best of my knowledge and belief, true, accurate, and complete.

Berg Keshian, PE
Engineer of Record
NM PE No. 8590

4. CERTIFICATION BY DOE

CERTIFICATION BY THE ENVIRONMENTAL STEWARDSHIP–
ENVIRONMENTAL REMEDIATION & SURVEILLANCE PROGRAM
TECHNICAL REPRESENTATIVES

Document Title: Remedy Completion Report DOE-LASO TA-73 Airport Landfill
SWMUs 73 001(a) and 73-001(d)

I certify under penalty of law that these documents and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

_____ Date: _____
Robert Enz, Project Manager
Environmental Restoration Program
Department of Energy/Los Alamos Site Office

or

_____ Date: _____

Assistant Area Manager of Environmental Projects
Department of Energy/Los Alamos Site Office

5. AS-BUILT DRAWINGS AND SPECIFICATIONS

As-built drawings and specifications signed and stamped by the Engineer of Record are provided in this section. Changes to the original design, based on field conditions and other necessities, are incorporated in the as-built specifications and drawings. The most significant changes are described as Field Changes in Appendix C. None of the changes affect the required functions and performance of the final cover system.

3. STATEMENT BY ENGINEER OF RECORD

This certification was prepared in accordance with generally accepted engineering principles and practice pursuant to the requirements of Section VII.E.6 of the March 1, 2005, Compliance Order on Consent signed by the New Mexico Environment Department (NMED) and the United States Department of Energy (DOE) and the Regents of the University of California for a registered professional engineer's certification. These activities have been performed with the care and skill ordinarily exercised by members of the profession practicing under similar conditions in the same manner or in a similar locality. I make no other warranty either expressed or implied. I certify that, the investigation and/or remediation was conducted in accordance with the Remedy Design Work Plan, approved by NMED on March 20, 2006. The information presented in this report is, to the best of my knowledge and belief, true, accurate, and complete.

Berg Keshian, PE
Engineer of Record
NM PE No. 8590

BERG KESHIAN, JR.
NEW MEXICO
8590
REGISTERED PROFESSIONAL ENGINEER

4-1-07

4. CERTIFICATION BY DOE

**CERTIFICATION BY THE ENVIRONMENTAL STEWARDSHIP–
ENVIRONMENTAL REMEDIATION & SURVEILLANCE PROGRAM
TECHNICAL REPRESENTATIVES**

Document Title: Remedy Completion Report DOE-LASO TA-73 Airport Landfill
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I certify under penalty of law that these documents and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

_____ Date: 4/10/07
Robert Erlz, Project Manager
Environmental Restoration Program
Department of Energy/Los Alamos Site Office

or

_____ Date: _____

Assistant Area Manager of Environmental Projects
Department of Energy/Los Alamos Site Office

U.S. DEPARTMENT OF ENERGY

LOS ALAMOS SITE OFFICE

TA-73 AIRPORT LANDFILLS

FINAL CLOSURE AS-BUILT, REV. AB

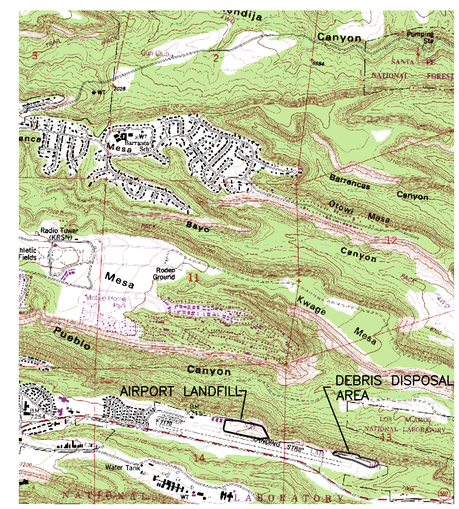
LIST OF DRAWINGS:

DRAWING NO.	TITLE
COVER	COVER SHEET/INDEX OF DRAWINGS
1000	GENERAL NOTES, UTILITY LIST & LEGEND
2000	NOT USED
2001	NOT USED
2002	LANDFILL – TOP OF CAP GRADING PLAN
2003	LANDFILL – STORM SEWER PLAN AND PROFILE
2004	GENERAL SITE DETAILS
2005	CAPPING SYSTEM DETAILS SHEET 1 OF 2
2006	WALL 1 PLAN
2007	NOT USED
2008	NOT USED
2009	NOT USED
2010	LANDFILL – GAS COLLECTION SYSTEM PLAN
2011	LANDFILL – GAS COLLECTION SYSTEM DETAILS
2012	NOT USED
2013	NOT USED
2014	NOT USED
2015	DEBRIS DISPOSAL AREA – TOP OF CAP GRADING PLAN
2016	NOT USED
2017	NOT USED
2018	NOT USED
2019	NOT USED
2020	NOT USED
2021	STORMWATER CONTROL DETAILS
2022	NOT USED
2023	NOT USED
2024	HANGAR PLAN
2025	CAPPING SYSTEM DETAILS SHEET 2 OF 2
3000	STRUCTURAL WALL 1 PLAN
3001	STRUCTURAL WALL 1 SECTIONS
3002	STRUCTURAL WALL 1 DETAILS
3003	8 UNIT HANGAR FOUNDATION PLAN
3004	3 UNIT HANGAR FOUNDATION PLAN

LOS ALAMOS COUNTY, NM

W.O. NO. 13104.002.001.7000

APRIL 11, 2007



LOCATION MAP

1"=2,000'

North Wind \ WESTON SOLUTIONS TEAM

AS-BUILT

GENERAL NOTES

1. BASE MAP OBTAINED FROM:
   GISLAB
   MAP NO. M200001
   FEBRUARY 26, 2002
2. DEBRIS DISPOSAL AREA GROUND SURVEY BY:
   ALBUQUERQUE SURVEYING COMPANY INC.
   FEBRUARY 2004
3. HORIZONTAL DATUM: STATE PLANE COORDINATE SYSTEM NAD83
   (SOUTH ZONE) US SURVEY UNITS
   VERTICAL DATUM: NAVD88 US SURVEY FOOT UNITS
4. NORTHWIND\WESTON TEAM SHALL HEREAFTER BE REFERRED TO AS THE CONTRACTOR.

LIST OF UNDERGROUND USERS

ONE CALL SYSTEM TELEPHONE NO. 1–505–260–1990
nmonecall.org (REFERENCE COMPANY CODE 645)

USER'S NAME	TELEPHONE
LOS ALAMOS COUNTY	505–260–1990
LOS ALAMOS CABLE	800–826–1954
PNM GAS	800–464–7462
USWEST COMMUNICATIONS	800–573–1311
COMCAST	505–260–1990
QWEST COMMUNICATIONS	800–321–2537

IN CASE OF EMERGENCY CALL 1–866–DIG–NMOC (1–866–344–6662)
DURING REGULAR BUSINESS HOURS.

AIRPORT MONUMENTS

DESCRIPTION	SPC	GEODETIC	ELEVATION
R/W 27	1774918.731 1637374.111	35° 52' 41.413" N 106° 15' 36.974" W	7087.890
R/W 9	1776111.273 1631956.007	35° 52' 53.197" N 106° 16' 42.822" W	7170.640
MONUMENT A0001 "AIRPORT"	1775240.121 1634333.458	35° 52' 44.586" N 106° 16' 13.927" W	7136.000

NOTES:

1. RUNWAY END MONUMENTS ARE ALUMINUM CAPS MARKED LS 8670.
2. MONUMENT A0001 IS BRASS CAP MARKED LIMBAUGH "AIRPORT".
3. LAT/LONG, SPC, AND ELEVATION DATA SHOWN ABOVE IS FROM CONTROL SURVEY MAP PERFORMED BY JIM BOTSFORD, NMPS #5211, OCTOBER 2002.
4. ELEVATION IS MSL IN FEET.

LEGEND

PROPERTY LINE
FENCE
SEWER
WATER
7200 EXISTING CONTOUR
7200 PROPOSED CONTOUR
CONTROL POINT
7145.55 SPOT ELEVATION

NO.	DATE	APPR.	REVISION
AB	4/11/07	BK	AS–BUILT
A	3/20/06	BK	ISSUED FOR CONSTRUCTION
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW

LOS ALAMOS SITE OFFICE
TA–73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind WESTON SOLUTIONS TEAM

CHECKED	RWM	6/22/05
DES. ENG.	AH	6/22/05
PROJ. ENG.	AH	6/22/05
PROJ. MGR.	BK	6/22/05
APPROVED	BK	6/22/05
APPROVED		

CLIENT APPROVALS | DATE

BERG KESHIAN NEW MEXICO PROFESSIONAL ENGINEER 4/11/07

GENERAL NOTES, UTILITY LIST & LEGEND

DRAWN. D.PASATIERI	DATE 02/06/04	DWG. NO. 1000	REV. NO. AB
SCALE N.T.S.	W.O. NO. 13104.002.001	SHT. ___ OF ___	

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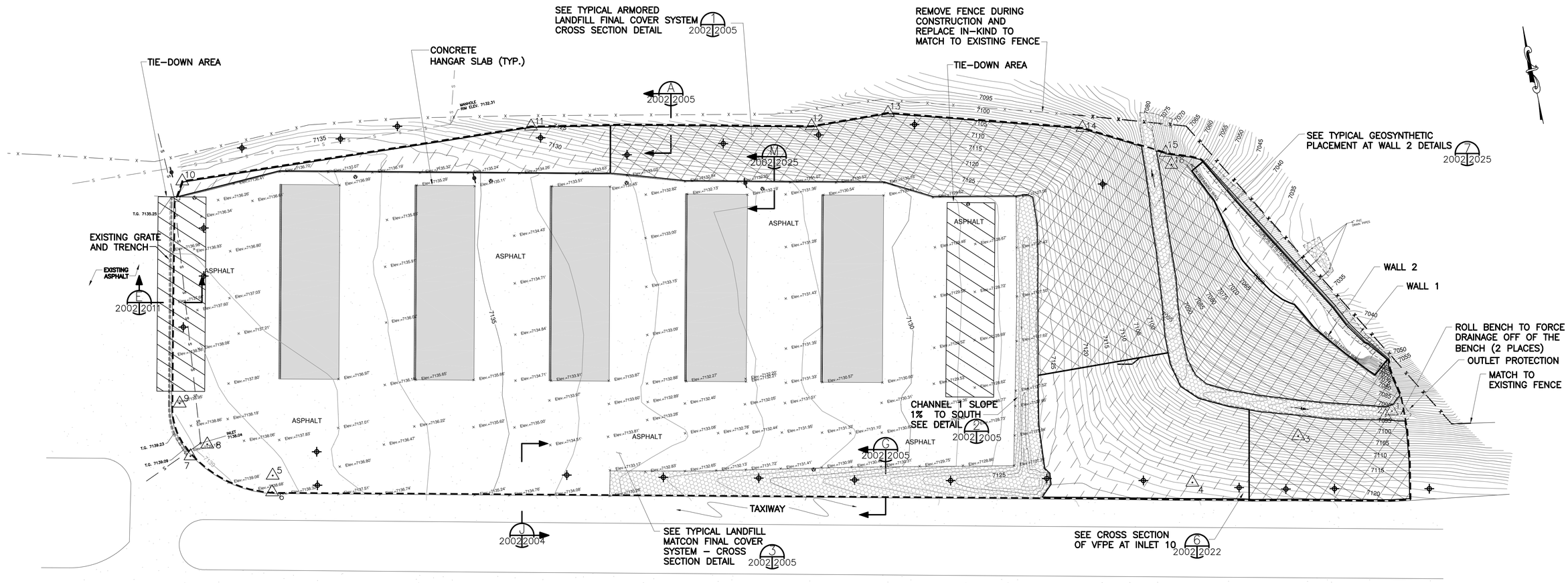

PLAN
1"=50'

NOTES:

1. FOR STORM SEWER PLAN AND PROFILE, SEE DRAWING 2003.
2. FOR GAS COLLECTION SYSTEM PLAN, SEE DRAWING 2010.
3. FOR HANGER LAYOUT PLAN, SEE DRAWING 2024.
4. THE LIMIT OF WASTE IS OFF-SET INSIDE THE LIMIT OF THE FINAL COVER SYSTEM A MINIMUM DISTANCE OF 1-FOOT.

TOP OF CAP CONTROL POINTS

NO.	NORTHING	EASTING
1	1775673.657	1635063.617
2	1775669.858	1635056.092
3	1775668.462	1634962.619
4	1775644.003	1634844.563
5	1775850.718	1633907.199
6	1775833.912	1633902.975
7	1775888.377	1633827.472
8	1775896.792	1633847.191
9	1775944.609	1633827.924
10	1776170.955	1633878.790
11	1776151.145	1634246.793
12	1776090.652	1634533.180
13	1776087.664	1634614.125
14	1776030.101	1634809.330
15	1775986.716	1634888.951
16	1775973.170	1634892.218

LEGEND

- PROPERTY BOUNDARY
- LIMIT OF LANDFILL FINAL COVER SYSTEM
- 7130 EXISTING GROUND SURFACE
- 1 CONTROL POINT
- BENCH FLOW DIRECTION
- EXISTING FENCE
- NEW FENCE/RELOCATED EXISTING FENCE
- EXISTING SEWER LINE
- STORM SEWER PIPE
- TRENCHING/POTHOLING LOCATION
- UTILIITY POLE
- GAS VENT RISER
- APPROXIMATE EXTENT OF GREEN FIX AMERICA CFG2000 TRM
- APPROXIMATE EXTENT OF WESTERN EXCELSIOR PP5-8 TRM

50 0 50 100
SCALE: 1"=50'

NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION
C	7/14/06	BK	REVISED FINAL GRADES, MATCON LIMIT & WALL LAYOUTS				
B	5/18/06	BK	UPDATED EXISTING SURVEY GRADES AND REVISED FINAL GRADES				
A	3/20/06	BK	ISSUED FOR CONSTRUCTION				
2	2/22/06	BK	REVISED PER NMED COMMENTS				
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW	AB	4/11/07	BK	AS-BUILT
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW	D	9/21/06	BK	ADD CHANNEL 1 CALLOUT

LOS ALAMOS SITE OFFICE
TA-73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind | WESTON SOLUTIONS TEAM

CHECKED RWM	6/22/05	CLIENT APPROVALS	DATE
DES. ENG. SW	6/22/05		
PROJ. ENG. AH	6/22/05		
PROJ. MGR. BK	6/22/05		
APPROVED BK	6/22/05		
APPROVED			

RONALD BERG KESHIAN NEW MEXICO ENGINEER PROFESSIONAL ENGINEER 4/11/07

LANDFILL
TOP OF CAP GRADING PLAN

DRAWN	DATE	DWG. NO.	REV. NO.
D.PASATIERI	02/06/04	2002	AB
SCALE 1"=50'	W.O. NO. 13104.002.001	SHT. ___ OF ___	

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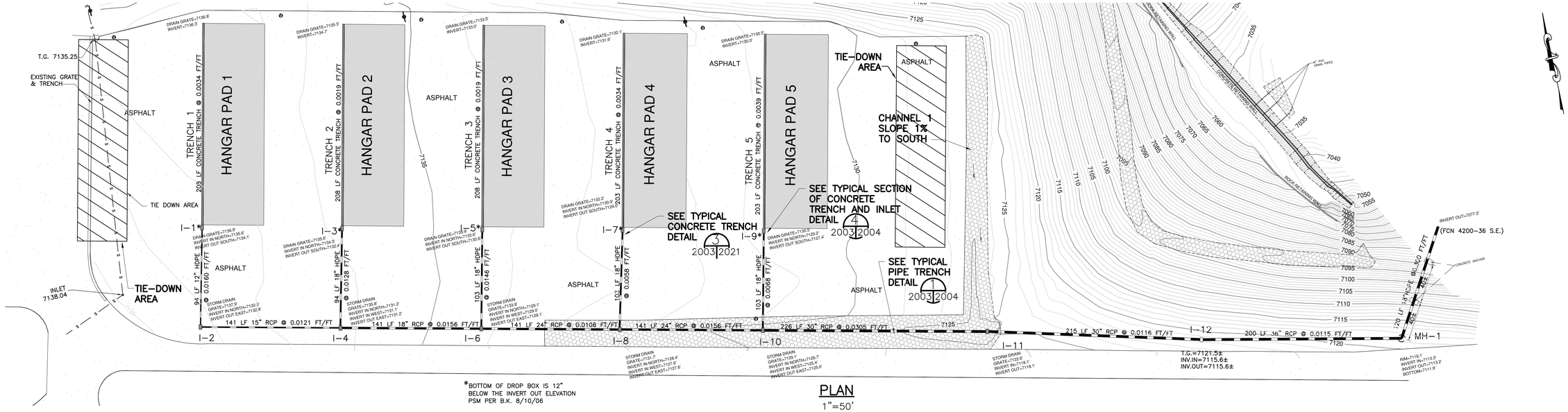
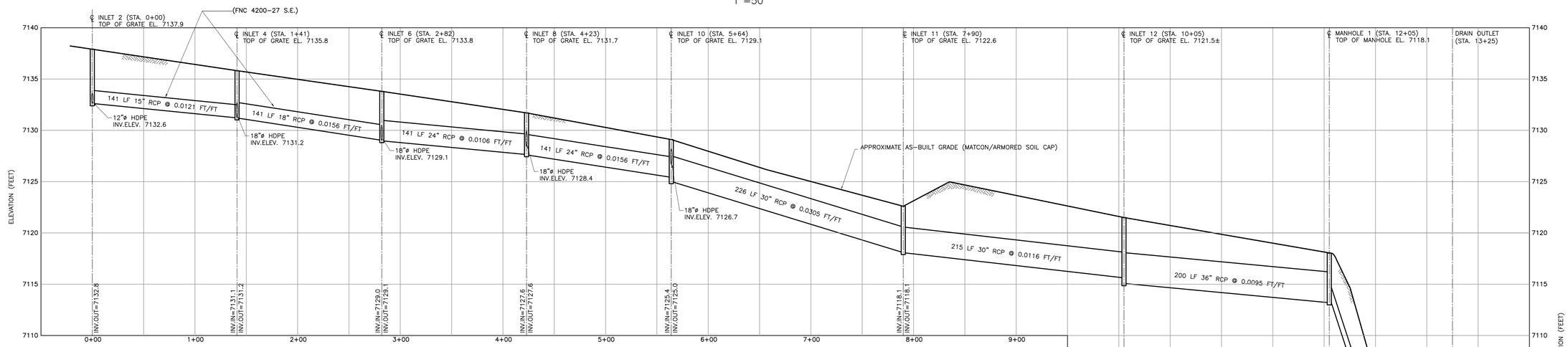


*BOTTOM OF DROP BOX IS 12" BELOW THE INVERT OUT ELEVATION PSM PER B.K. 8/10/06

PLAN

1"=50'



STORM SEWER PROFILE

1"=50' HORIZ.
1"=5' VERT.

LEGEND

- EXISTING STORM SEWER PIPE
- EXISTING STORM SEWER INLET
- UTILITY POLE
- GAS VENT RISER
- I-10 STORM SEWER INLET
- MH-1 STORM SEWER MANHOLE
- STORM SEWER CONCRETE TRENCH
- STORM SEWER PIPE

NOTES:

1. SEE DRAWING 2004 FOR STORM SEWER DETAILS.

5 0 5 10
SCALE: 1"=5' VERT.

50 0 50 100
SCALE: 1"=50' HORIZ.

NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION
C	8/08/06	BK	REVISED STORM SEWER INVERTS AND SLOPES				
B	7/14/06	BK	REVISED FINAL GRADES, MATCON LIMIT AND WALL LAYOUTS				
A	3/20/06	BK	ISSUED FOR CONSTRUCTION				
2	2/22/06	BK	REVISED PER NMED COMMENTS				
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW	AB	4/11/07	BK	AS-BUILT
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW	D	9/21/06	BK	ADD CHANNEL 1 CALLOUT

LOS ALAMOS SITE OFFICE
TA-73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind | WESTON SOLUTIONS TEAM

CHECKED	RWM	DATE	6/22/05
DES. ENG.	SW		6/22/05
PROJ. ENG.	AH		6/22/05
PROJ. MGR.	BK		6/22/05
APPROVED	BK		6/22/05
APPROVED			

CLIENT APPROVALS | DATE

BERG KESHIAN NEW MEXICO REGISTERED PROFESSIONAL ENGINEER

LANDFILL STORM SEWER PLAN AND PROFILE

DRAWN	D.PASATIERI	DATE	02/06/04	DWG. NO.	2003	REV. NO.	AB
SCALE	1"=50'	W.O. NO.	13104.002.001	SHT.	OF		

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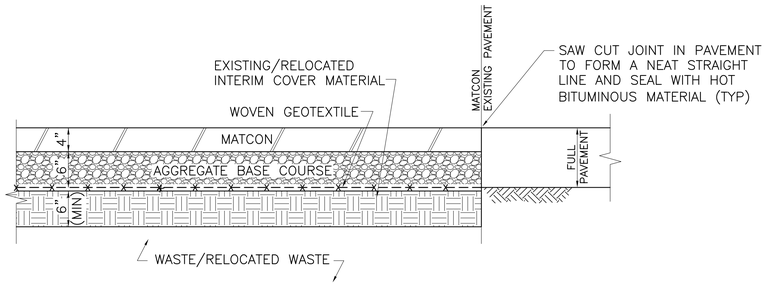
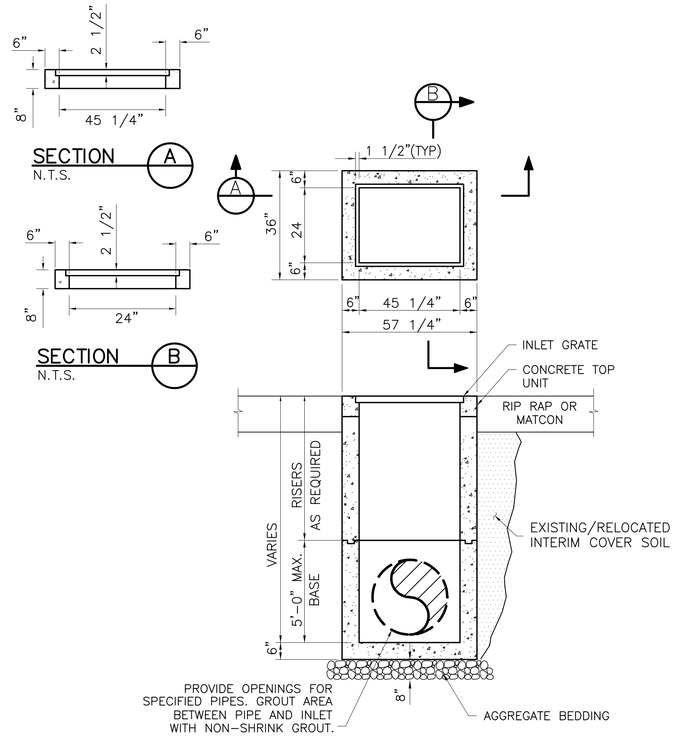


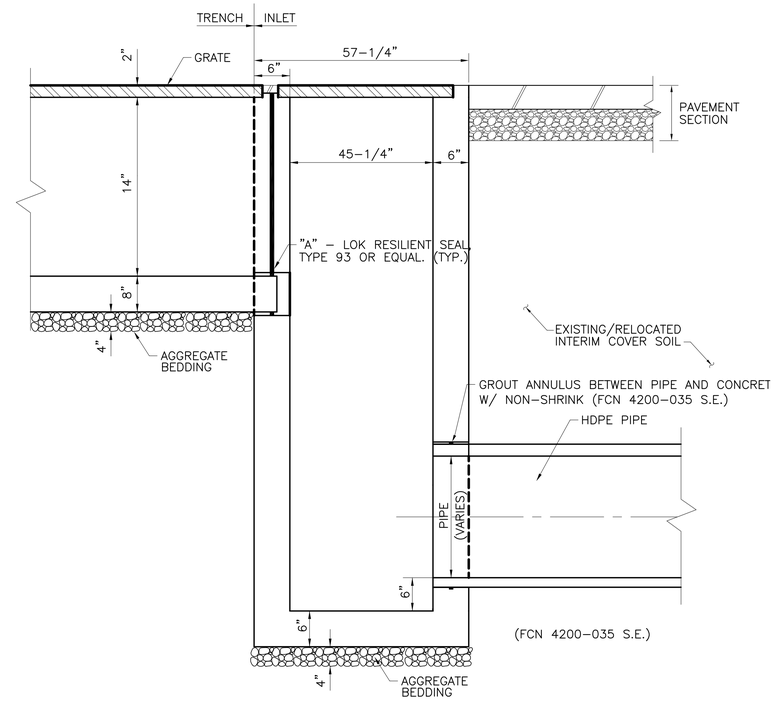
TYPICAL PAVEMENT JOINT

DETAIL J
N.T.S. 2002 2004



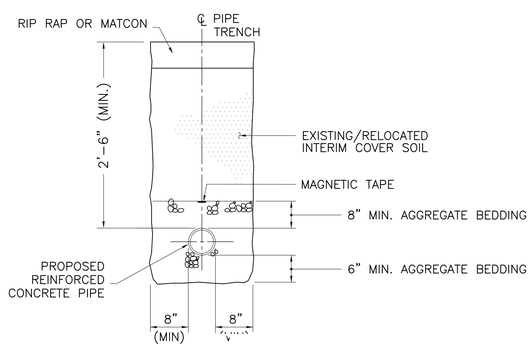
STORMWATER INLETS 1 TO 13
N.T.S.

NOTES:
1. STRUCTURES MUST MEET AASHTO HS-20 LOADING.
2. CONCRETE COMPRESSIVE STRENGTH SHALL BE 4,000 PSI.
3. REINFORCEMENT STEEL SHALL MEET ASTM A-185.



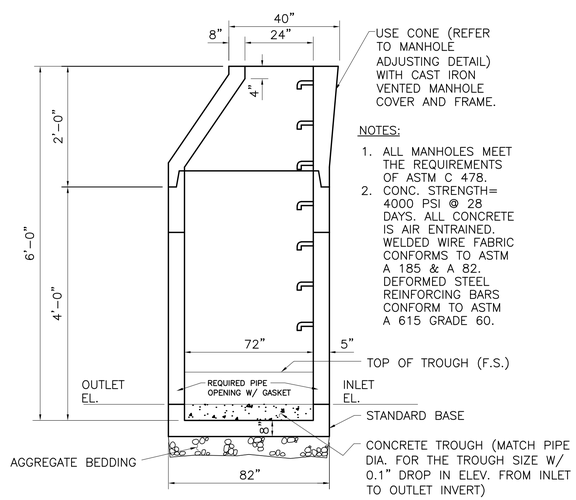
TYPICAL SECTION OF CONCRETE TRENCH & INLET

DETAIL 4
N.T.S. 2003 2004



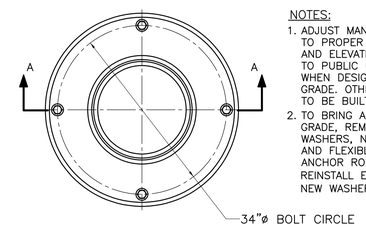
TY NCH

DETAIL 1
N.T.S. 2003 2004 2011



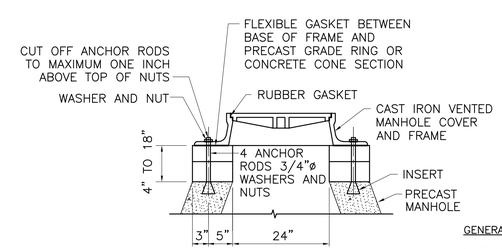
NOTES:
1. ALL MANHOLES MEET THE REQUIREMENTS OF ASTM C 478.
2. CONC. STRENGTH= 4000 PSI @ 28 DAYS. ALL CONCRETE IS AIR ENTRAINED. WELDED WIRE FABRIC CONFORMS TO ASTM A 185 & A 82. DEFORMED STEEL REINFORCING BARS CONFORM TO ASTM A 615 GRADE 60.

72" DIA. PRECAST MANHOLE 1
N.T.S.



PLAN

NOTES:
1. ADJUST MANHOLE FRAME AND COVER TO PROPER GRADE, CROSS SLOPE, AND ELEVATION IN SPACE DEDICATED TO PUBLIC USE, TRAVELED WAY, OR WHEN DESIGNATED TO MEET EXISTING GRADE. OTHERWISE PRECAST MANHOLE TO BE BUILT WITHOUT TRANSITION.
2. TO BRING AN INTERIM SETTING TO FINAL GRADE, REMOVE EXISTING ANCHOR RODS, WASHERS, NUTS, FRAME AND COVER, AND FLEXIBLE GASKET. INSTALL NEW ANCHOR RODS, GRADE RINGS AND REINSTALL EXISTING FRAME/COVER, AND NEW WASHERS/NUTS.



SECTION

MANHOLE ADJUSTING DETAIL
N.T.S.

GENERAL NOTE:
1. PRIOR TO ORDERING CONCRETE PRODUCTS, FIELD VERIFY DIMENSIONS AND OBTAIN WRITTEN APPROVAL FROM THE ENGINEER.

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NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION
B	4/11/07	BK	AS-BUILT				
A	3/20/06	BK	ISSUED FOR CONSTRUCTION				
2	2/22/06	BK	REVISED PER NMED COMMENTS				
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW				
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW				

LOS ALAMOS SITE OFFICE
TA-73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind | WESTON SOLUTIONS TEAM

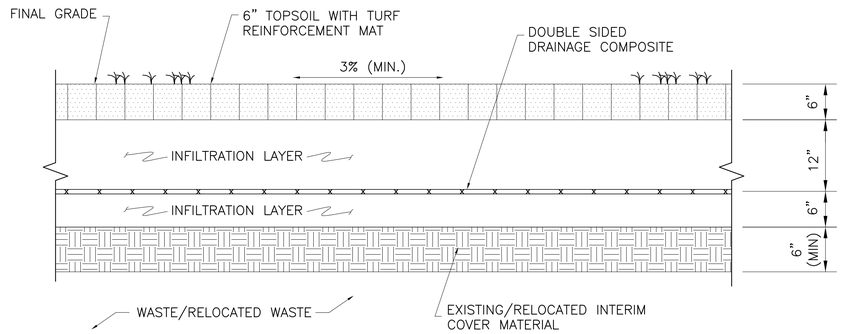
CHECKED	RWM	6/22/05
DES. ENG.	SW	6/22/05
PROJ. ENG.	AH	6/22/05
PROJ. MGR.	BK	6/22/05
APPROVED	BK	6/22/05
APPROVED		

CLIENT APPROVALS | DATE

BERG KESHIAN NEW MEXICO PROFESSIONAL ENGINEER 4/11/07

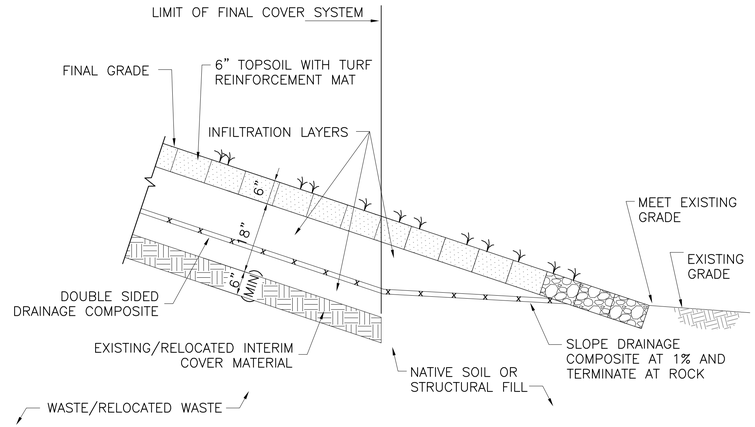
GENERAL SITE DETAILS

DRAWN	DATE	DWG. NO.	REV. NO.
D,PASATIERI	02/06/04	2004	AB
SCALE N.T.S.	W.O. NO. 13104.002.001	SHT. ___ OF ___	



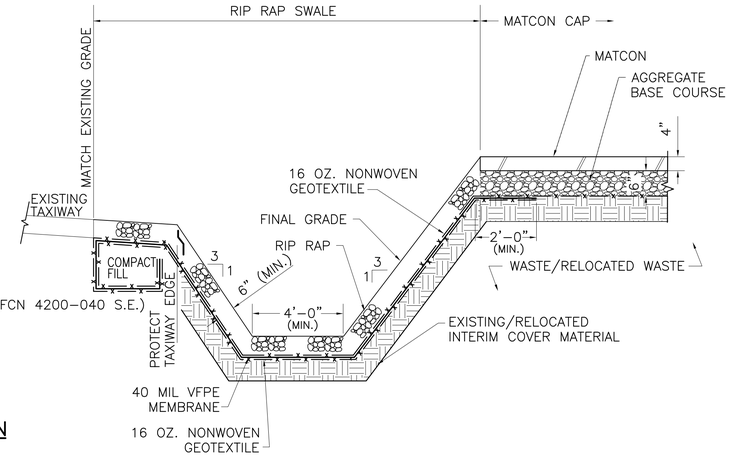
TYPICAL ARMORED LANDFILL FINAL COVER SYSTEM

DETAIL 1 (2002 | 2005)
N.T.S.



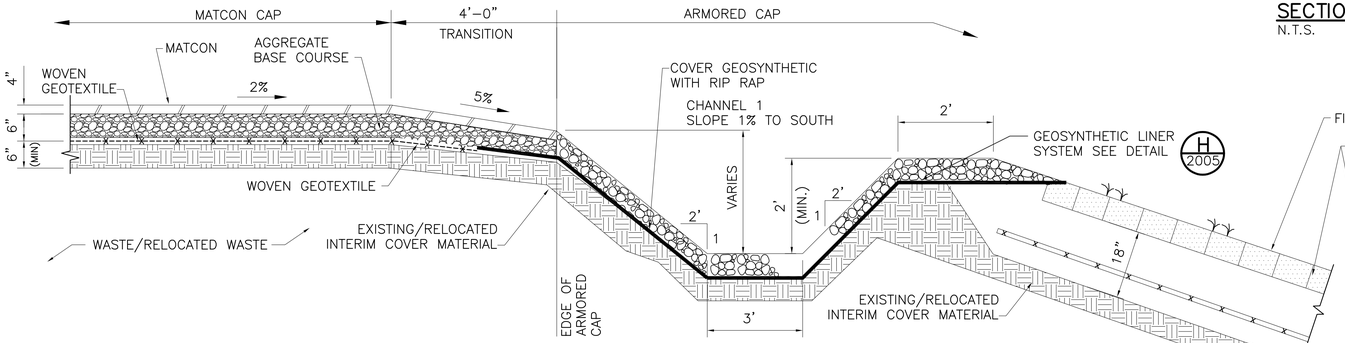
TYPICAL NORTH FACE TOE OF SLOPE – CROSS SECTION

SECTION A (2002 | 2005)
N.T.S.



TYPICAL TAXIWAY SIDE SLOPE

SECTION G (2002 | 2005)
N.T.S.

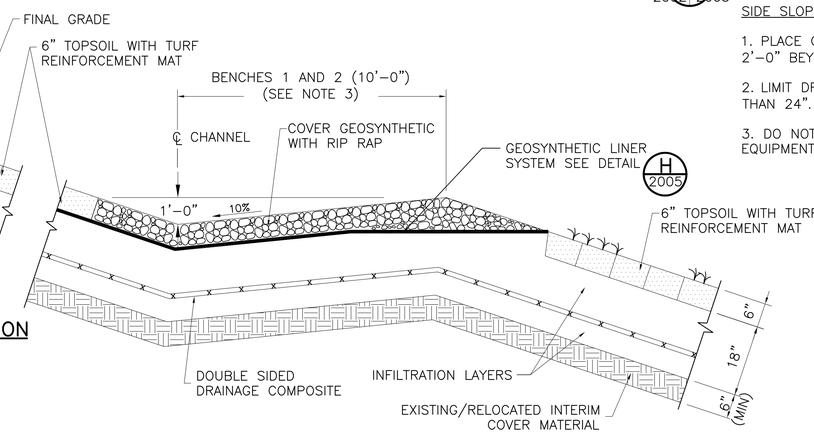


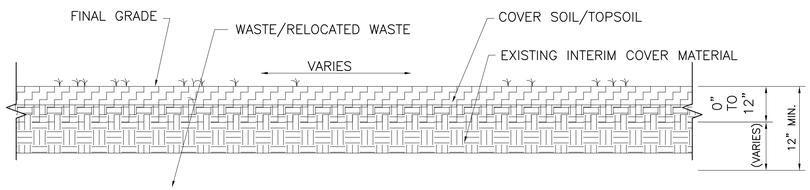
TYPICAL SIDE SLOPE – CROSS SECTION

DETAIL 2 (2002 | 2005)
N.T.S.

SIDE SLOPE NOTES:

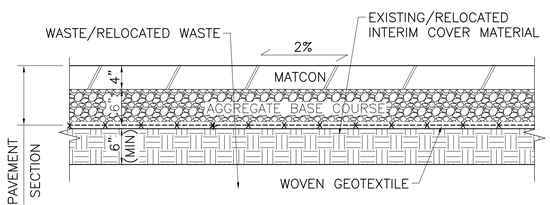
1. PLACE GEOSYNTHETIC COMPONENTS AT LEAST 2'–0" BEYOND THE LIMIT OF THE MATCON.
2. LIMIT DROP HEIGHT OF RIP RAP TO NO MORE THAN 24".
3. DO NOT MOVE RIP RAP WITH MECHANICAL EQUIPMENT AFTER IT HAS BEEN PLACED.





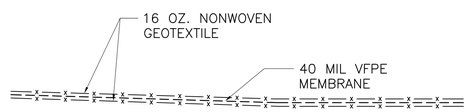
TYPICAL DDA FINAL COVER SYSTEM – CROSS SECTION

DETAIL 4 (2015 | 2005)
N.T.S.



TYPICAL LANDFILL MATCON FINAL COVER SYSTEM CROSS SECTION

DETAIL 3 (2002 | 2005)
N.T.S.



TYPICAL GEOSYNTHETIC LINER SYSTEM – CROSS SECTION

DETAIL H (2005)
N.T.S.

GENERAL NOTES:

1. FINAL GRADE DETAILS ARE SHOWN AT 4H:1V SLOPE FOR INFORMATIONAL PURPOSES ONLY. ACTUAL GRADES SHALL BE AS INDICATED ON DRAWING 2002 AND 2015.
2. REFER TO DRAWING 2021 FOR STORMWATER CONTROL DETAILS PERTAINING TO THE SWALE DETAILS.
3. THE LIMIT OF WASTE IS OFF–SET INSIDE THE LIMIT OF THE FINAL COVER SYSTEM A MINIMUM DISTANCE OF 1–FOOT.
4. REFER TO DRAWING 2002 FOR EXTENT OF TRM TYPES.

NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION
C	9/21/06	BK	REVISED SLOPE DETAILS				
B	8/08/06	BK	REVISED SLOPE DETAILS				
A	3/20/06	BK	ISSUED FOR CONSTRUCTION				
2	2/22/06	BK	REVISED PER NMED COMMENTS				
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW				
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW	AB	4/11/07	BK	AS–BUILT

LOS ALAMOS SITE OFFICE
TA–73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind | WESTON SOLUTIONS TEAM

CHECKED	RWM	DATE	6/22/05
DES. ENG.	AH		6/22/05
PROJ. ENG.	AH		6/22/05
PROJ. MGR.	BK		6/22/05
APPROVED	BK		6/22/05
APPROVED			

CLIENT APPROVALS | DATE

BERG KESHIAN NEW MEXICO LICENSED PROFESSIONAL ENGINEER 4/11/07

CAPPING SYSTEM DETAILS
SHEET 1 OF 2

DRAWN	DATE	DWG. NO.	REV. NO.
D.PASATIERI	02/06/04	2005	AB
SCALE N.T.S.	W.O. NO. 13104.002.001	SHT. ___ OF ___	

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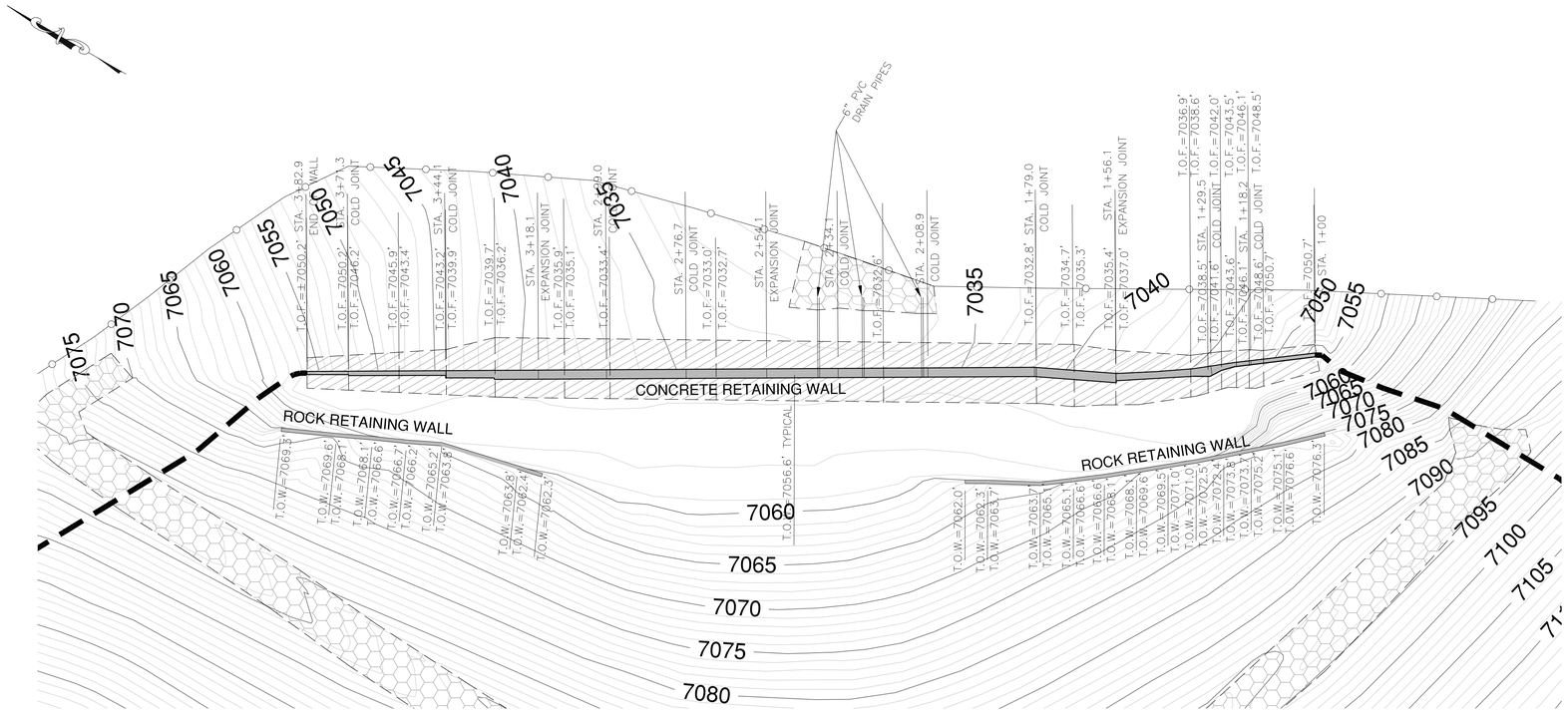

PLAN

20 10 0 20 40

SCALE: 1"=20'-0"

NOTE:

1. FOR WALL ELEVATION DRAWINGS, SEE DRAWING 3000.

LEGEND

7125	AS-BUILT GRADE
	LIMIT OF LANDFILL FINAL COVER SYSTEM
	GRAVEL BENCH

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NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION
AB	4/11/07	BK	AS-BUILT				
A	3/20/06	BK	ISSUED FOR CONSTRUCTION				
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW				
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW				

LOS ALAMOS SITE OFFICE
TA-73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind | WESTON SOLUTIONS TEAM

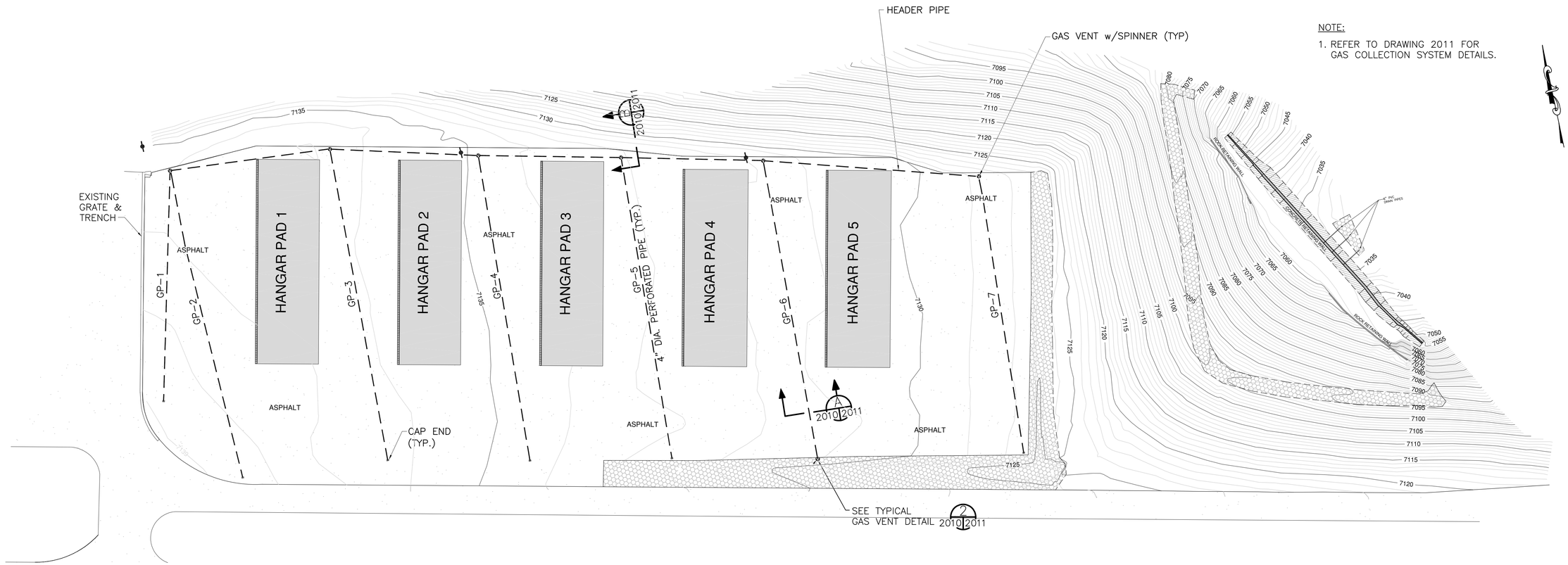
CHECKED	RWM	DATE	6/22/05
DES. ENG.	PSM		6/22/05
PROJ. ENG.	AH		6/22/05
PROJ. MGR.	BK		6/22/05
APPROVED	BK		6/22/05
APPROVED			

CLIENT APPROVALS | DATE

BERG KESHIAN NEW MEXICO PROFESSIONAL ENGINEER

WALL 1
PLAN

DRAWN D.PASATIERI	DATE 02/06/04	DWG. NO. 2006	REV. NO. AB
SCALE AS SHOWN	W.O. NO. 13104.002.001	SHT. ___ OF ___	



NOTE:

1. REFER TO DRAWING 2011 FOR GAS COLLECTION SYSTEM DETAILS.

PLAN

1"=50'

LEGEND

7130	AS-BUILT GRADE
	CONCRETE TRENCH DRAIN
	GAS VENT RISER
GP-1	GAS COLLECTION PIPE
	UTILITY POLE
	GRAVEL DRAINAGE TRENCH

50 0 50 100

SCALE: 1"=50'

NO.	DATE	APPR.	REVISION
AB	4/11/07	BK	AS-BUILT
B	7/14/06	BK	REVISED FINAL GRADES, LIMIT OF MATCON AND GAS PIPE LOCATION
A	3/20/06	BK	ISSUED FOR CONSTRUCTION
2	2/22/06	BK	REVISED PER NMED COMMENTS
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW

LOS ALAMOS SITE OFFICE
TA-73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind | WESTON SOLUTIONS TEAM

CHECKED	RWM	6/22/05
DES. ENG.	SW	6/22/05
PROJ. ENG.	AH	6/22/05
PROJ. MGR.	BK	6/22/05
APPROVED	BK	6/22/05
APPROVED		

CLIENT APPROVALS | DATE

BERG KESHIAN NEW MEXICO LICENSED PROFESSIONAL ENGINEER 14107

LANDFILL GAS COLLECTION SYSTEM PLAN

DRAWN D.PASATIERI	DATE 02/06/04	DWG. NO. 2010	REV. NO. AB
SCALE 1"=50'	W.O. NO. 13104.002.001	SHT. ___ OF ___	

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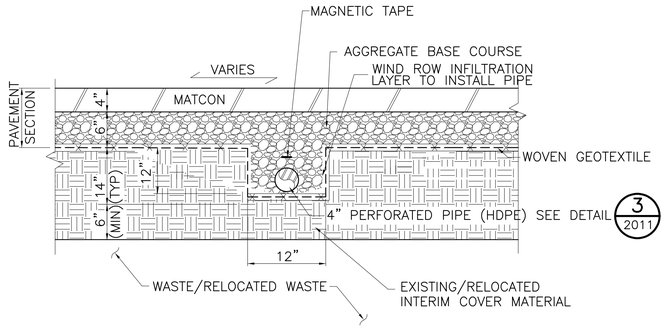
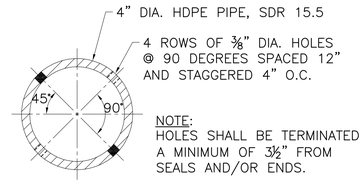


TYPICAL GAS COLLECTION TRENCH SECTION UNDER THE MATCON

N.T.S

SECTION A
N.T.S. 2010 2011

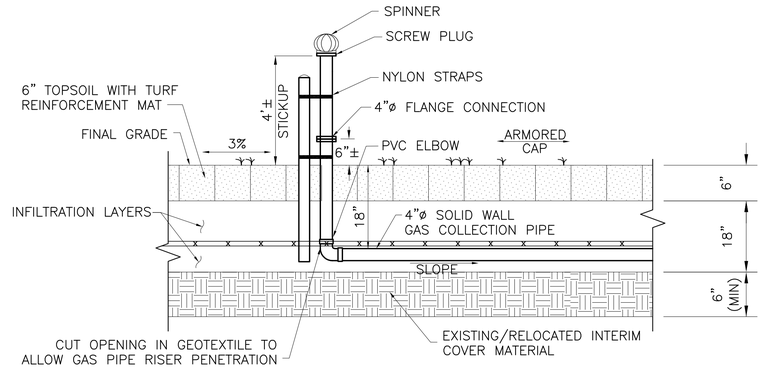
NOTE:
PLACE PIPE ON 115' CENTER TO CENTER SPACING (MAX.)



SECTION

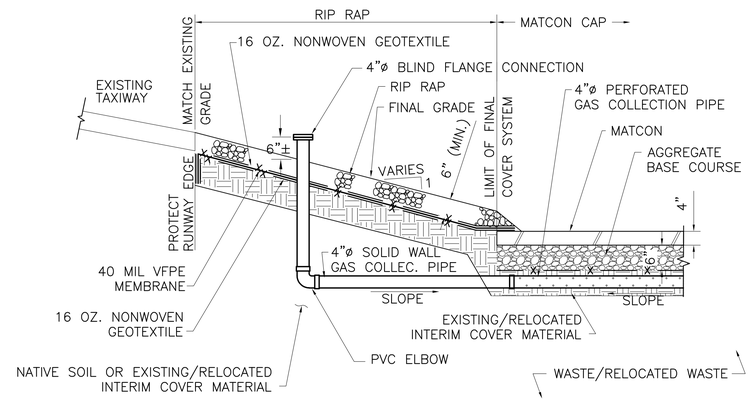
GAS COLLECTION PIPE PERFORATION

DETAIL 3
N.T.S 2011



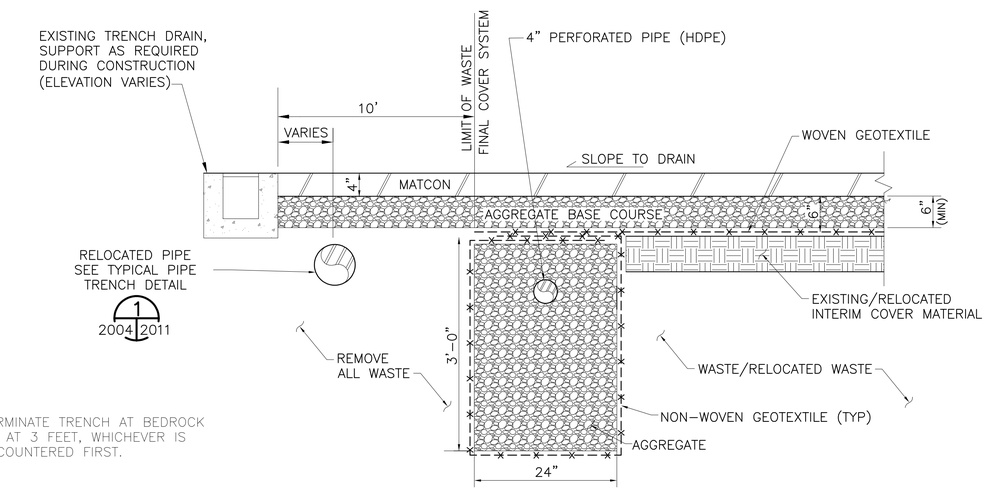
TYPICAL GAS VENT

DETAIL 1
2010 2011



TYPICAL "T" GAS VENT

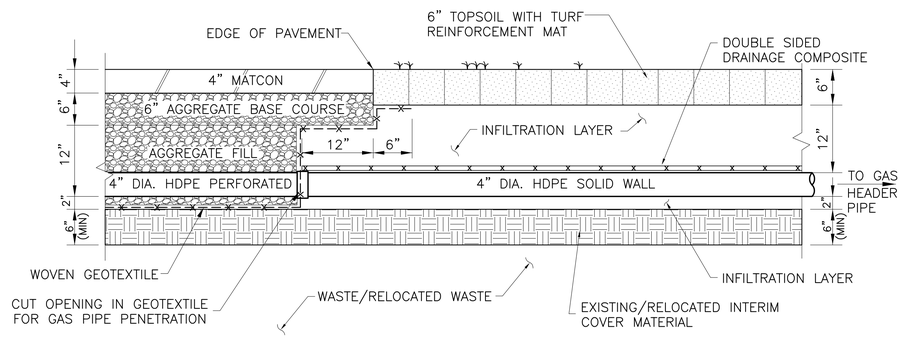
DETAIL 2
N.T.S. 2010 2011



NOTE:
1. TERMINATE TRENCH AT BEDROCK OR AT 3 FEET, WHICHEVER IS ENCOUNTERED FIRST.

GAS COLLECTION TRENCH SECTION AT TRENCH DRAIN

SECTION E
N.T.S. 2002 2010 2011



TYPICAL SECTION FOR GAS COLLECTION PIPE AT MATCON EDGE

SECTION B
SCALE: 2010 2011
1"=10' HORIZ.
1"=1' VERT.

NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION
AB	4/11/07	BK	AS-BUILT				
A	3/20/06	BK	ISSUED FOR CONSTRUCTION				
2	2/22/06	BK	REVISED PER NMED COMMENTS				
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW				
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW				

LOS ALAMOS SITE OFFICE
TA-73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind | WESTON SOLUTIONS TEAM

CHECKED	RWM	DATE	6/22/05	CLIENT APPROVALS	DATE
DES. ENG.	AH		6/22/05		
PROJ. ENG.	AH		6/22/05		
PROJ. MGR.	BK		6/22/05		
APPROVED	BK		6/22/05		
APPROVED					

BERG KESHIAN NEW MEXICO PROFESSIONAL ENGINEER

LANDFILL
GAS COLLECTION SYSTEM DETAILS

DRAWN	DATE	DWG. NO.	REV. NO.
D.PASATIERI	02/06/04	2011	AB
SCALE: AS SHOWN	W.O. NO. 13104.002.001	SHT. ___ OF ___	

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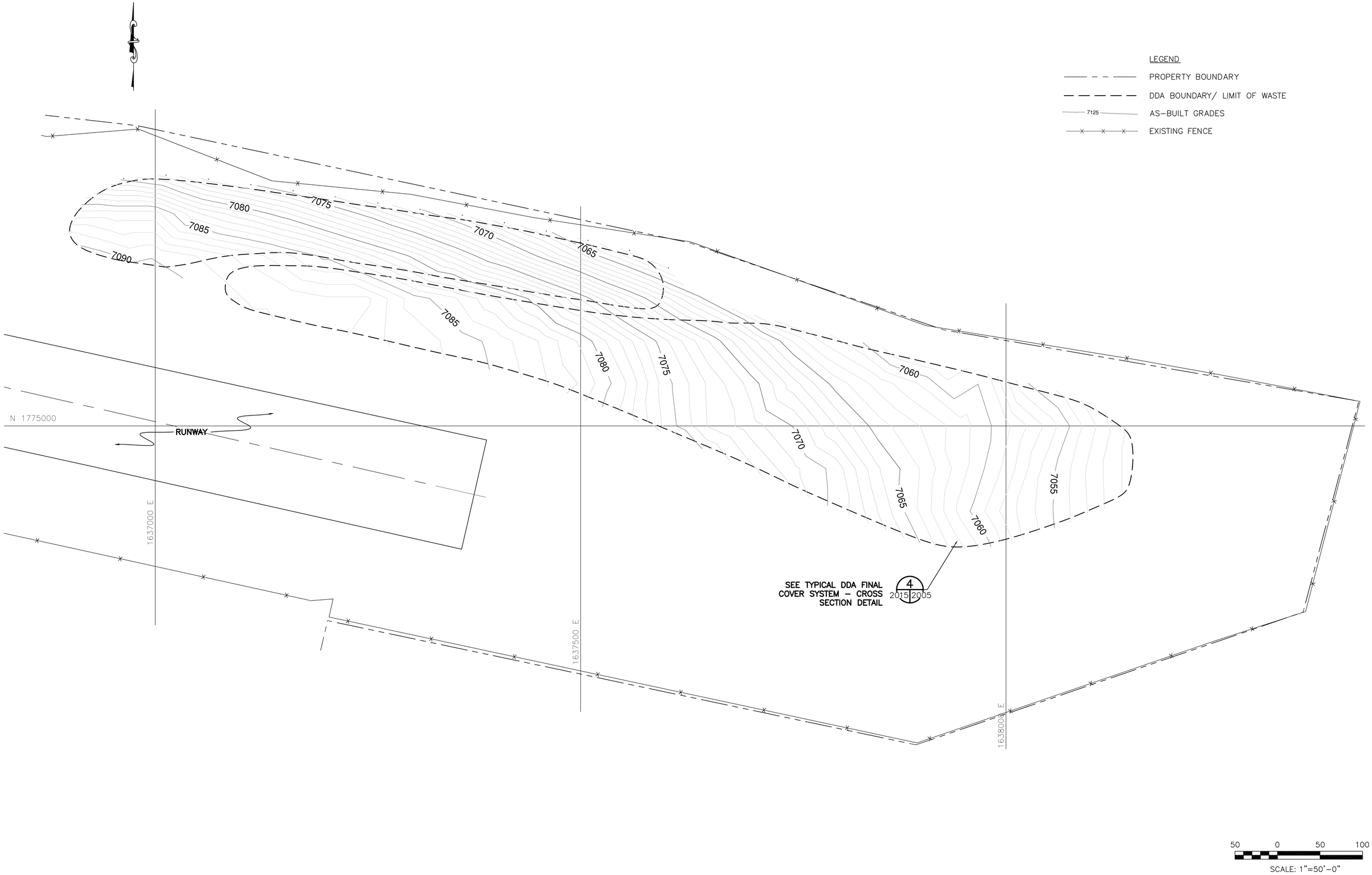

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NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION
AB	4/11/07	BK	AS-BUILT				
A	3/20/06	BK	ISSUED FOR CONSTRUCTION				
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW				
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW				

LOS ALAMOS SITE OFFICE
TA-73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind WESTON SOLUTIONS TEAM

CHECKED	RWM	6/22/05
DES. ENG.	SW	6/22/05
PROJ. ENG.	AH	6/22/05
PROJ. MGR.	BK	6/22/05
APPROVED	BK	6/22/05
APPROVED		

CLIENT APPROVALS | DATE

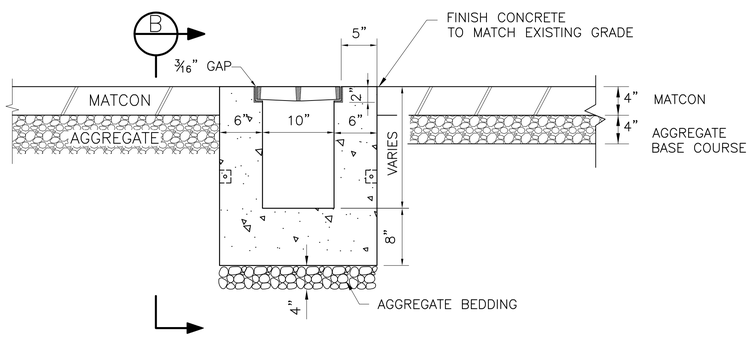
BERG KESHIAN NEW MEXICO PROFESSIONAL ENGINEER

DEBRIS DISPOSAL AREA
TOP OF CAP GRADING PLAN

DRAWN	DATE	DWG. NO.	REV. NO.
D.PASATIERI	02/06/04	2015	AB
SCALE: AS SHOWN	W.O. NO.: 13104.002.001	SHT. ___ OF ___	

TABLE 1 : CHANNEL CHARACTERISTICS

CHANNEL	DESIGN FLOW (CFS)	CHANNEL DIMENSIONS						FLOW CHARACTERISTICS			CHANNEL BED PROTECTION
		BED SLOPE (%)	T (FT)	D (FT)	B (FT)	z1	z2	d (FT)	F (FT)	VELOCITY (FPS)	
CHANNEL 1	5.87	2.00	VARIES	VARIES	2	3	3	0.54	VARIES	3.03	R-3 RIP RAP
BENCH 1	2.93	4.00	14	1	N/A	4	10	0.39	0.61	2.81	R-3 RIP RAP
BENCH 2	3.91	4.00	14	1	N/A	4	10	0.43	0.57	3.02	R-3 RIP RAP

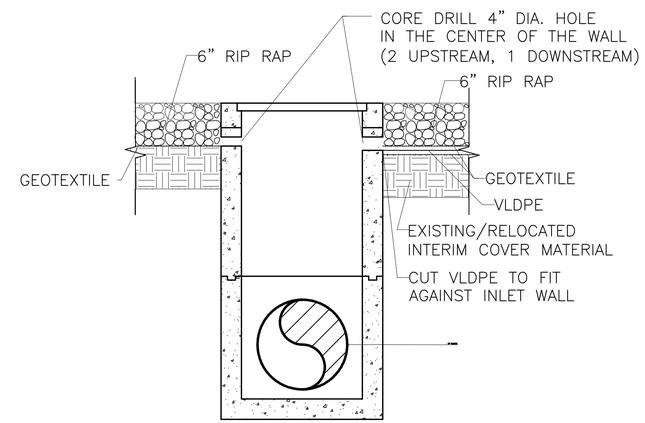


CONCRETE TRENCH TYPICAL

N.T.S.

DETAIL 3 (2003 | 2021)

N.T.S.



CROSS SECTION OF VLDPE AT INLET 10

DETAIL 6 (2002 | 2022)

N.T.S.

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NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION
AB	4/11/07	BK	AS-BUILT				
A	3/20/06	BK	ISSUED FOR CONSTRUCTION				
2	2/22/06	BK	REVISED PER NMED COMMENTS				
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW				
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW				

LOS ALAMOS SITE OFFICE
TA-73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

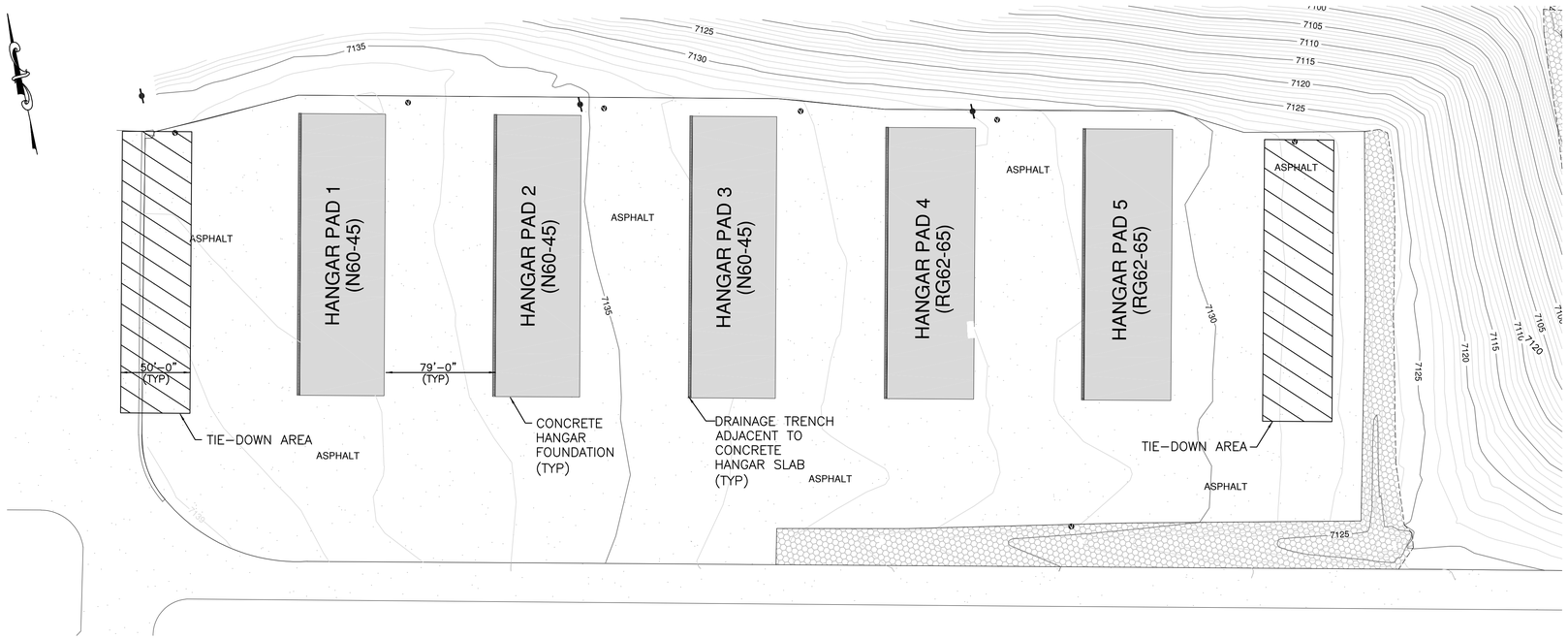
North Wind | WESTON SOLUTIONS TEAM

CHECKED	RWM	DATE 6/22/05	CLIENT APPROVALS	DATE
DES. ENG.	SW	6/22/05		
PROJ. ENG.	AH	6/22/05		
PROJ. MGR.	BK	6/22/05		
APPROVED	BK	6/22/05		
APPROVED				

BERG KESHIAN NEW MEXICO REGISTERED PROFESSIONAL ENGINEER 4/11/07

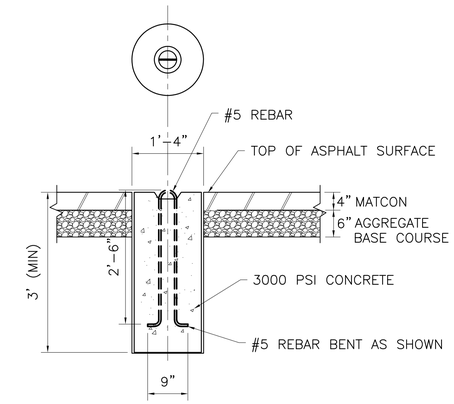
STORMWATER CONTROL DETAILS

DRAWN	DATE	DWG. NO.	REV. NO.
D.PASATIERI	02/06/04	2021	AB
SCALE N.T.S.	W.O. NO. 13104.002.001	SHT. ___ OF ___	



PLAN

1"=50'



TYPICAL TIE-DOWN DETAIL

N.T.S.

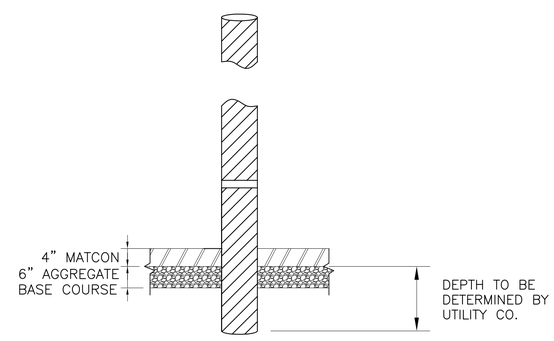
GENERAL NOTES:

1. INSTALL UTILITY POLES AT NORTH END OF HANGARS FOR FUTURE USE.

2. GUTTERS AND DOWNSPOUTS SHALL BE PROVIDED ON ALL HANGARS. DOWNSPOUTS ON THE WEST SIDE SHALL DISCHARGE INTO THE TRENCH DRAINS. LEADERS SHALL BE INSTALLED ON THE EAST SIDE AND SHALL DISCHARGE BEYOND THE CONCRETE/MATCON INTERFACE.

3. APPROXIMATELY 27 TIE-DOWN ANCHORS WILL BE INSTALLED. LOCATIONS WILL BE DETERMINED IN THE FIELD.

4. SEE DRAWING 3003 FOR ACTUAL HANGAR FOUNDATION DIMENSIONS.



UTILITY POLE PENETRATION DETAIL

N.T.S.

LEGEND

- 7125 — AS-BUILT GRADES
- UTILIITY POLE
- GAS VENT RISER
- GRAVEL DRAINAGE TRENCH
- STORM SEWER CONCRETE TRENCH

50 0 50 100

SCALE: 1"=50'

NO.	DATE	APPR.	REVISION
AB	4/11/07	BK	AS-BUILT
A	4/20/06	BK	ISSUED FOR CONSTRUCTION, MODIFIED DWG. 2024, ADDED DWG. 3003
2	2/22/06	BK	REVISED PER NMED COMMENTS
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW

LOS ALAMOS SITE OFFICE
TA-73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind | WESTON SOLUTIONS TEAM

CHECKED	RWM	6/22/05
DES. ENG.	AH	6/22/05
PROJ. ENG.	AH	6/22/05
PROJ. MGR.	BK	6/22/05
APPROVED	BK	6/22/05
APPROVED		

CLIENT APPROVALS | DATE

BERG KESHIAN NEW MEXICO REGISTERED PROFESSIONAL ENGINEER 4/11/07

HANGAR PLAN

DRAWN	DATE	DWG. NO.	REV. NO.
D.PASATIERI	02/06/04	2024	AB
SCALE 1"=50'	W.O. NO. 13104.002.001	SHT. ___ OF ___	

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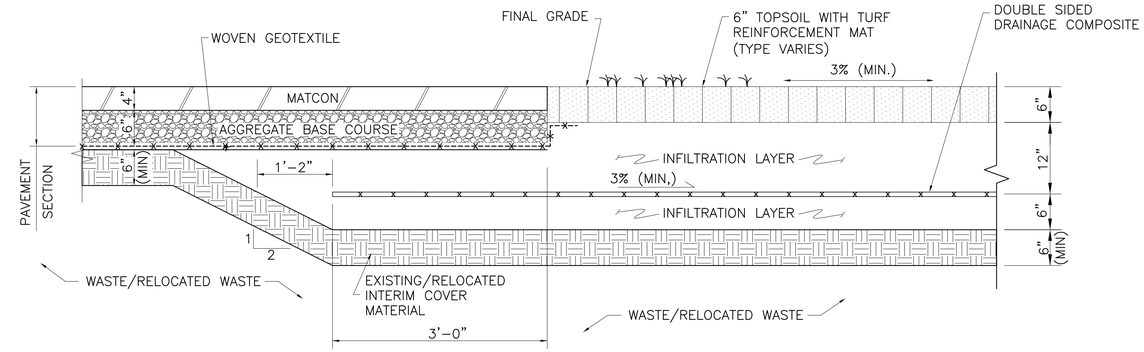
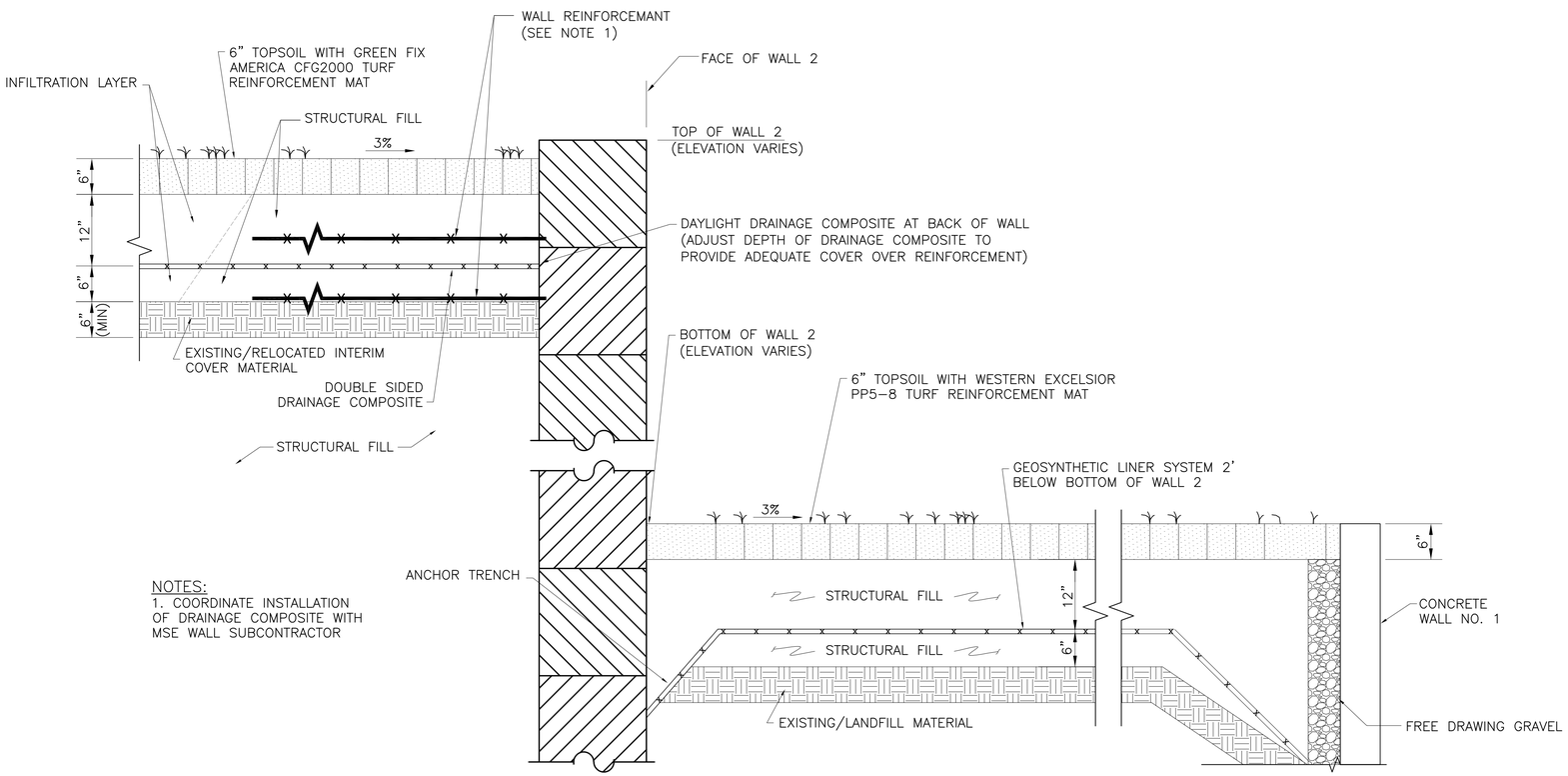


TYPICAL INTERFACE BETWEEN MATCON AND ARMORED CAP

SECTION M
N.T.S. 2002 2005



NOTES:
1. COORDINATE INSTALLATION OF DRAINAGE COMPOSITE WITH MSE WALL SUBCONTRACTOR

TYPICAL GEOSYNTHETIC PLACEMENT AT WALL 2

DETAIL 7
N.T.S. 2002 2025

NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION
AB	4/11/06	BK	AS-BUILT				
A	3/20/06	BK	ISSUED FOR CONSTRUCTION				
2	2/22/06	BK	REVISED PER NMED COMMENTS				
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW				
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW				

LOS ALAMOS SITE OFFICE
TA-73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind | WESTON SOLUTIONS TEAM

CHECKED	RWM	DATE	6/22/05
DES. ENG.	AH		6/22/05
PROJ. ENG.	AH		6/22/05
PROJ. MGR.	BK		6/22/05
APPROVED	BK		6/22/05
APPROVED			

CLIENT APPROVALS | DATE

CAPPING SYSTEM DETAILS
SHEET 2 OF 2

DRAWN D.PASATIERI	DATE 02/06/04	DWG. NO. 2025	REV. NO. AB
SCALE N.T.S.	W.O. NO. 13104.002.001	SHT. ___ OF ___	

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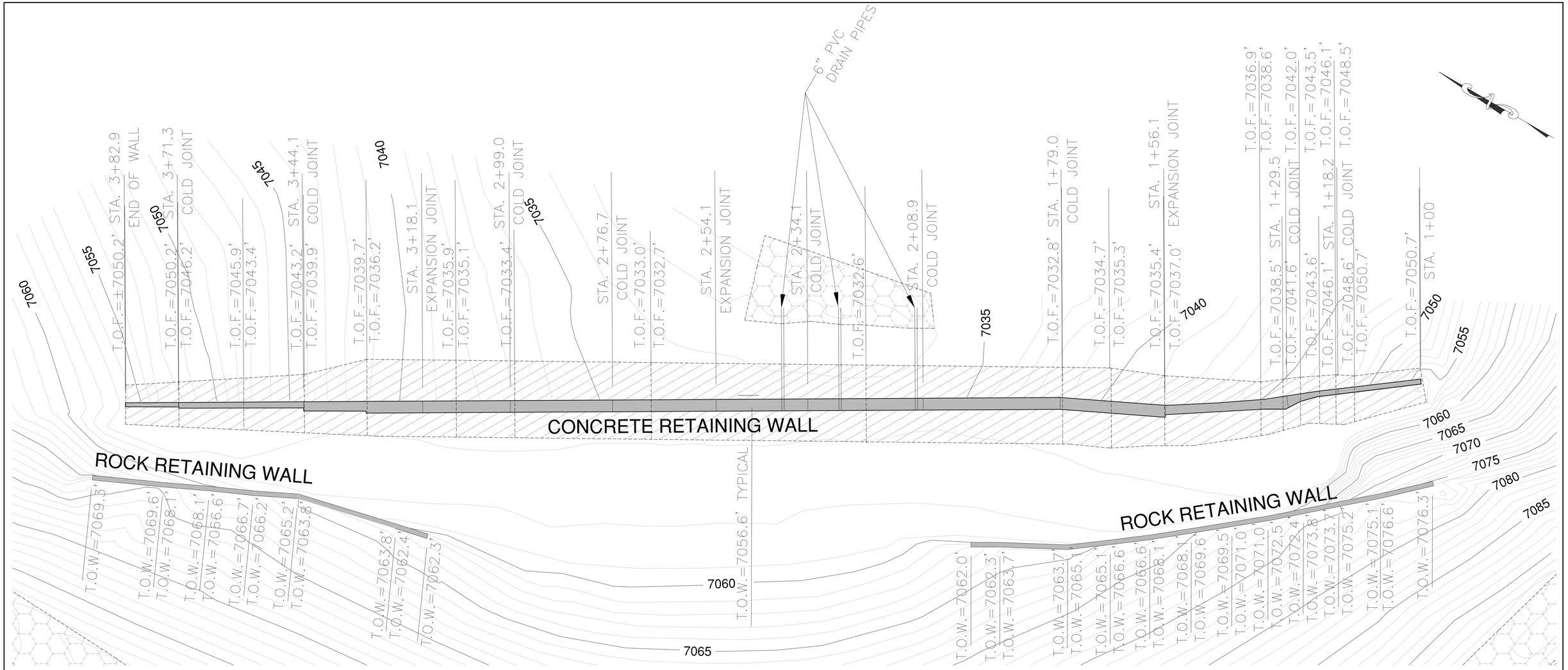


WALL 1 PLAN

SCALE: 1"=10'

GENERAL NOTES:

1. SEE DRAWING 2002 FOR SITE GRADES.
2. SEE DRAWING 3002 FOR JOINT SYMBOLS AND DETAILS.

STRUCTURAL NOTES:

1. EXCAVATIONS INTO FILL MATERIAL OR WEATHERED BEDROCK SHALL BE EXTENDED AT LEAST 1-FOOT BELOW THE BOTTOM ELEVATION OF THE WALL FOOTING.
2. THE EXPOSED EXCAVATED SUBGRADE SHALL BE PROOF-ROLLED UNTIL THE SURFACE IS OBSERVED BY THE ENGINEER OR DESIGNEE TO BE DENSE, STABLE AND UNYIELDING.
3. SOFT AREAS IDENTIFIED BY PROOF-ROLLING SHALL BE OVER-EXCAVATED A DEPTH OF 1-FOOT. THE NEWLY EXPOSED SURFACE SHALL BE PROOF-ROLLED AS REQUIRED ABOVE. ONCE A STABLE SURFACE IS ESTABLISHED, THE EXCAVATION SHALL BE BACKFILLED AS REQUIRED BELOW.
4. STRUCTURAL FILL ACCEPTABLE TO THE ENGINEER OR DESIGNEE SHALL BE PLACED BELOW THE FOOTING ELEVATION IN LOOSE LIFTS NOT EXCEEDING 14 INCHES IN THICKNESS AND COMPACTED TO AT LEAST 95% OF ITS MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D1557.
5. IN AREAS WHERE BOTTOM OF FOOTING IS NOT EMBEDDED A MINIMUM OF 2 FT. INTO BEDROCK, AN AREA 5' IN WIDTH SHALL BE EXCAVATED IN FRONT OF THE TOE OF THE FOOTING TO THE BOTTOM OF THE FOOTING OR TO BEDROCK, WHICHEVER COMES FIRST, AND THEN BACKFILL WITH STRUCTURAL FILL TO 9" ABOVE THE TOP OF FOOTING AND COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY.(FCN 4200-026 J.F.K.)

10 0 10 20

HORIZ. SCALE: 1"=10'

THIS DRAWING WAS PREPARED BY *THE CONSTRUCTION PARTNERSHIP INC*, *(TCPI)* EXTON, PA. SUPPORTING DESIGN CALCULATIONS SIGNED AND SEALED BY *THE CONSTRUCTION PARTNERSHIP INC.*, EXTON, PA.

NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION
AB	4/11/07	BK	AS-BUILT				
B	7/14/06	BK	REVISED FINAL GRADES AND WALL LAYOUT				
A	3/20/06	BK	ISSUED FOR CONSTRUCTION				
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW				
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW				

LOS ALAMOS SITE OFFICE
TA-73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind WESTON SOLUTIONS TEAM

		DATE
CHECKED	JJF	6/22/05
DES. ENG.	JJF	6/22/05
PROJ. ENG.	AH	6/22/05
PROJ. MGR.	BK	6/22/05
APPROVED	BK	6/22/05
APPROVED		

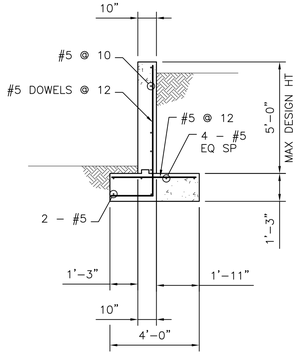
CLIENT APPROVALS | DATE

BERG KESHIAN NEW MEXICO PROFESSIONAL ENGINEER 7/11/07

STRUCTURAL WALL 1 PLAN

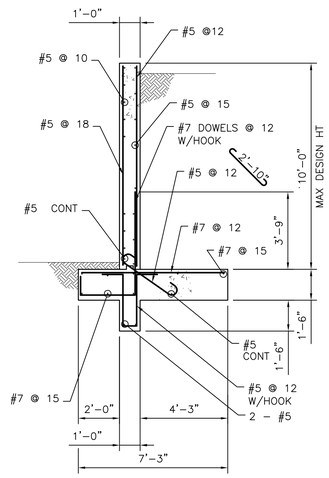
DRAWN	DATE	DWG. NO.	REV. NO.
JAS	02/06/04	3000	AB
SCALE: AS NOTED	W.O. NO. 13104.002.001	SHT. ___ OF ___	

G:\ACADPROJ\13104.002.001LANL\AS-BUILT\3000Rev6.DWG



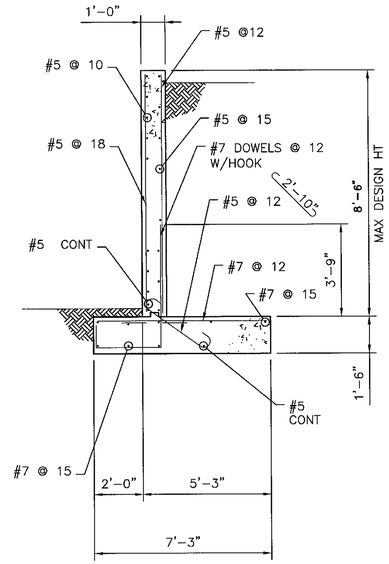
RETAINING WALL A

SCALE: 3/8"=1'–0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS



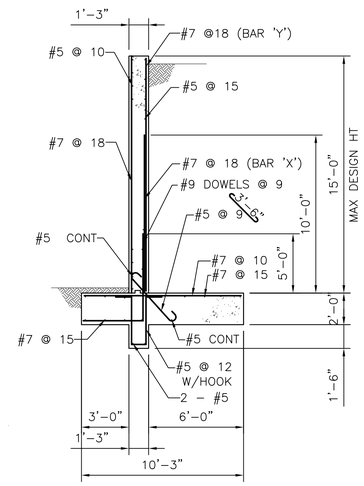
RETAINING WALL B

SCALE: 3/8"=1'–0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS



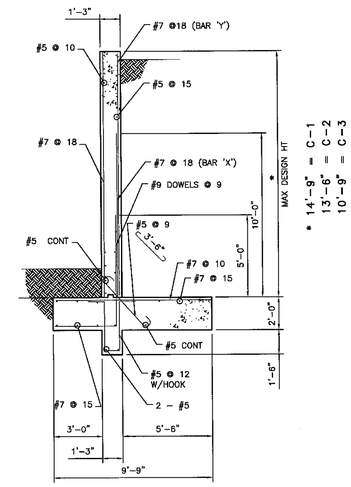
RETAINING WALL B–1 & B–2

SCALE: 3/8"=1'–0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS



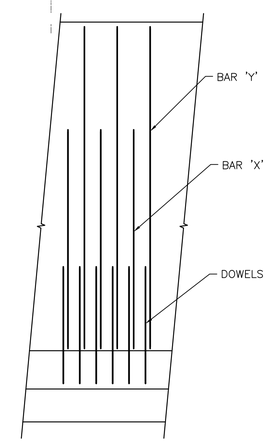
RETAINING WALL C

SCALE: 1/4"=1'–0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS



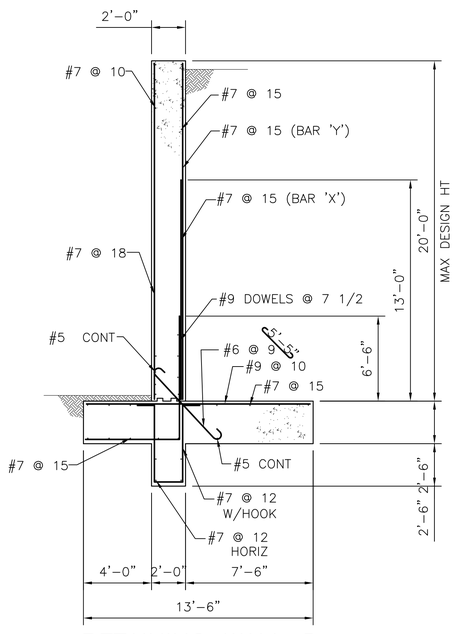
RETAINING WALL C–1, C–2 & C–3

SCALE: 1/4"=1'–0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS



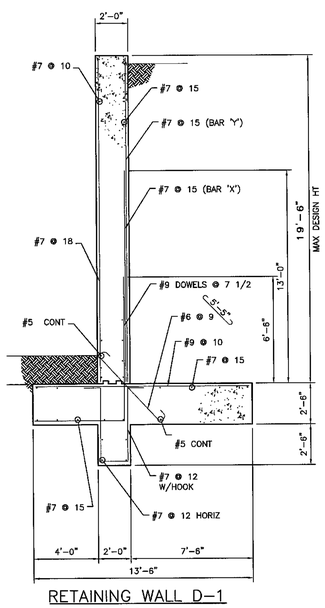
ELEVATION BACK FACE RETAINING WALL VERTICAL REBAR ARRANGEMENT

SCALE: NONE



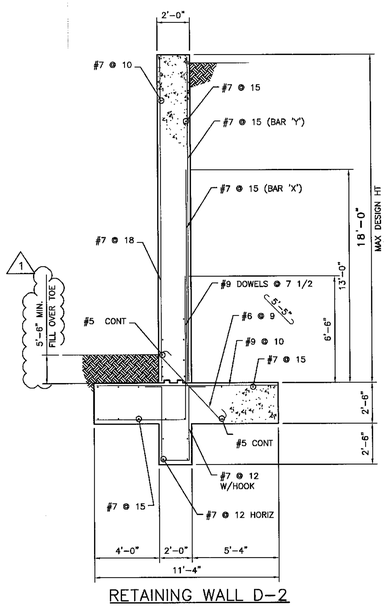
RETAINING WALL D

SCALE: 1/4"=1'–0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS



RETAINING WALL D–1

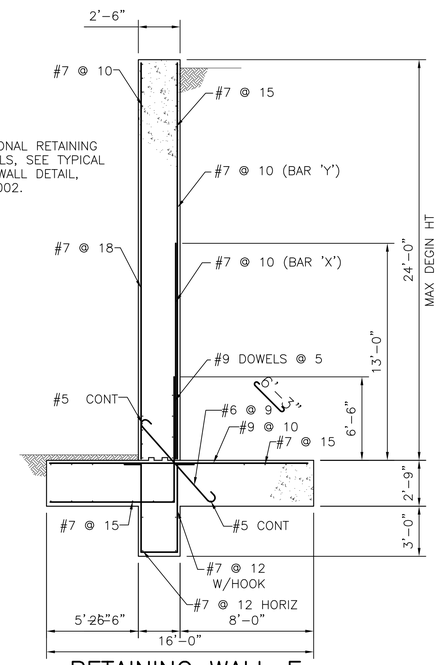
SCALE: 1/4"=1'–0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS



RETAINING WALL D–2

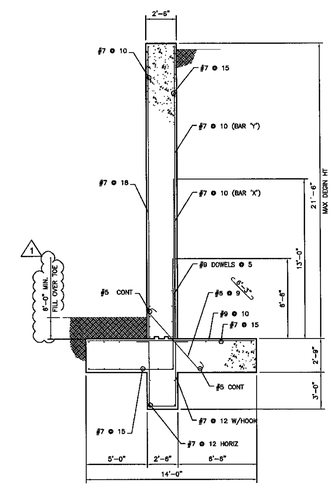
SCALE: 1/4"=1'–0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS

NOTE:
FOR ADDITIONAL RETAINING WALL DETAILS, SEE TYPICAL RETAINING WALL DETAIL, DWG NO 3002.



RETAINING WALL E

SCALE: 1/4"=1'–0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS



RETAINING WALL E–1
(STA. 1+58 TO 1+69)

SCALE: 3/16"=1'–0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS

NOTE:
FOR ADDITIONAL RETAINING WALL DETAILS, SEE TYPICAL RETAINING WALL DETAIL, DWG NO 3002.

THIS DRAWING WAS PREPARED BY *THE CONSTRUCTION PARTNERSHIP INC*, *(TCPI)* EXTON, PA. SUPPORTING DESIGN CALCULATIONS SIGNED AND SEALED BY *THE CONSTRUCTION PARTNERSHIP INC.*, EXTON, PA.

NO.	DATE	APPR.	REVISION
AB	4/11/07	BK	AS–BUILT
B	7/14/06	BK	MODIFIED WALL SECTIONS
A	3/20/06	BK	ISSUED FOR CONSTRUCTION
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW

NO.	DATE	APPR.	REVISION

LOS ALAMOS SITE OFFICE
TA–73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind | WESTON SOLUTIONS TEAM

CHECKED	JJF	DATE	6/22/05
DES. ENG.	JJF		6/22/05
PROJ. ENG.	AH		6/22/05
PROJ. MGR.	BK		6/22/05
APPROVED	BK		6/22/05
APPROVED			

CLIENT APPROVALS | DATE

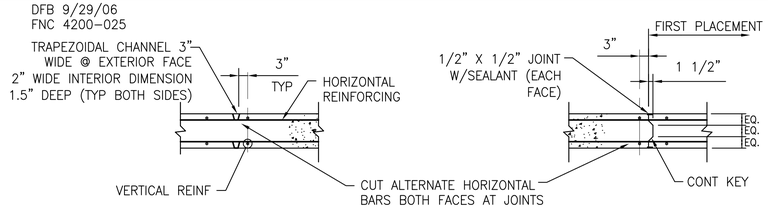
BERG KESHIAN NEW MEXICO REGISTERED PROFESSIONAL ENGINEER
4/11/07

STRUCTURAL WALL 1
SECTIONS

DRAWN	JAS	DATE	02/06/04	DWG. NO.	3001	REV. NO.	AB
SCALE	3/8"=1'–0"	W.O. NO.	13104.002.001	SHT.	OF		

G:\CADPROJ\13104.002.001LANL\AS–BUILT\3001Rev6.DWG

DFB 9/29/06
FNC 4200–025



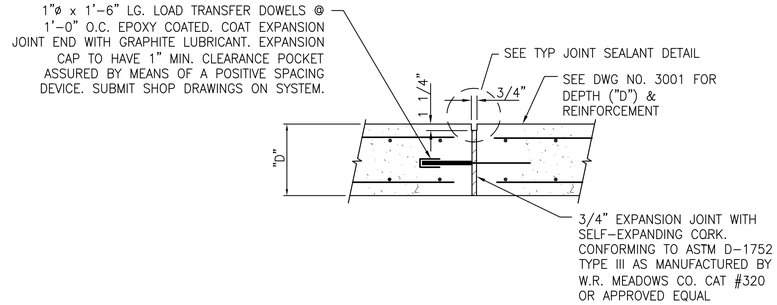
CONTRACTION JOINT (CTJ)

CONSTRUCTION JOINT

VERTICAL JOINT DETAIL – CONCRETE WALL

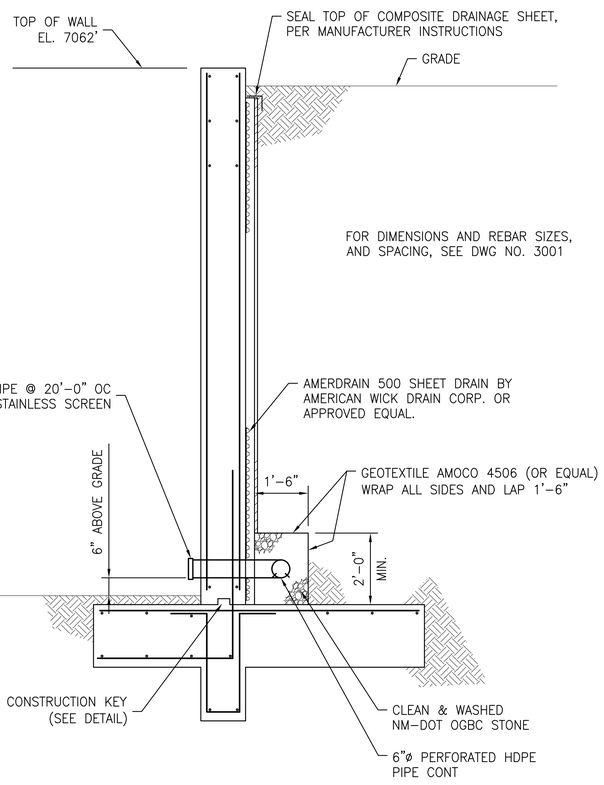
SCALE: NONE

NOTES:
1. PRIOR TO SECOND PLACEMENT OF WALL AT CONSTRUCTION JOINTS, ABRASIVE BLAST OR CHIP FIRST PLACEMENT FACE JOINT TO REMOVE LAITANCE, HONEY COMBING, ETC. CLEAN WITH WATER AND STIFF BRUSH WITH "WELD CRETE" OR EPOXY BONDING AGENT.



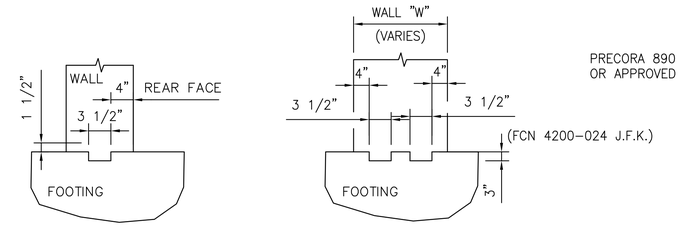
WALL CONTROL EXPANSION JOINT DETAIL (EJ)

SCALE: NONE



TYPICAL RETAINING WALL DETAIL

SCALE: NONE



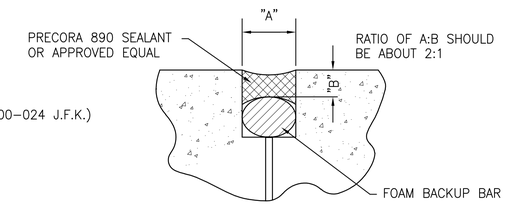
WALLS "A" THRU "C"

WALLS "D" AND "E"

TYPICAL WALL – FOOTING CONSTRUCTION KEYS

SCALE: NONE

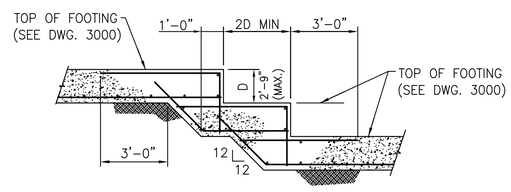
NOTES:
1. PRIOR TO SECOND PLACEMENT OF WALL AT CONSTRUCTION JOINTS, ABRASIVE BLAST OR CHIP FIRST PLACEMENT FACE JOINT TO REMOVE LAITANCE, HONEY COMBING, ETC. CLEAN WITH WATER AND STIFF



JOINT SEALANT DETAIL

SCALE: NONE

REBAR LAP LENGTHS		
BAR SIZE	LAP LENGTH (HORIZONTAL)	LAP LENGTH (VERTICAL)
#5	3'–3"	3'–0"
#7	4'–3"	3'–9"
#9	5'–6"	4'–9"



(A/3000) VERTICAL JOINT DETAIL CONCRETE FOOTING

SCALE: NONE

(FCN 4200–025 J.F.K.)

NOTES:

DESIGN CRITERIA:
1.0 THE RETAINING WALL WAS DESIGNED IN ACCORDANCE WITH IBC 2003, ASCE 7–02, AND ACI 318–02.
2.0 SEISMIC DESIGN CRITERIA:

2.1 SEISMIC USE GROUP: I
2.2 SEISMIC DESIGN CATEGORY: C
2.3 SDS = 0.40 (SHORT PERIOD)
2.4 SD1 = 0.12 (1 SEC. PERIOD)
2.5 SOIL SITE CLASS: B

CONCRETE NOTES:
1.0 CONCRETE & REINFORCEMENT STEEL

1.1 CONSTRUCTION SHALL CONFORM TO AMERICAN CONCRETE INSTITUTE (ACI) CODE 318–02.
1.2 CONCRETE STRENGTH SHALL BE A MINIMUM OF 3,000 P.S.I. (28 DAY COMPRESSIVE STRENGTH).
1.2.1 MAXIMUM WATER CEMENT RATIO 0.46 (lbs/lbs)
1.2.2 CEMENT FACTOR (BAGS/C.Y.) MIN. 7.00
1.2.3 SLUMP RANGE (INCHES) 1–3
1.2.4 ALL CONCRETE SHALL BE AIR ENTRAINED, AND SHALL HAVE AN AIR CONTENT OF 3.5 TO 6.0% (FNC 4200–029 J.F.K.)

2.0 REINFORCEMENT SHALL BE NEW DEFORMED STEEL BARS HAVING A MINIMUM YIELD STRESS OF 60,000 P.S.I., IN ACCORDANCE WITH LATEST ASTM SPECIFICATION A615, GRADE 60, AND SUPPLEMENT S–1.

3.0 CONCRETE PROTECTION (COVER) FOR REINFORCEMENT SHALL BE AS FOLLOWS:
3.1.1 CAST AGAINST EARTH : 3 INCHES
3.1.2 FORMED SURFACE TO BE EXPOSED TO FLUID OR IN CONTACT WITH EARTH: 2 INCHES

4.0 AT SPLICES, BARS ARE TO BE LAPPED IN ACCORDANCE WITH ACI 318–02 AND THE TABLE SHOWN ON THIS DWG.

5.0 CONCRETE SHALL BE WET CURED FOR A MINIMUM OF SEVEN (7) DAYS. (THE USE OF AN APPROVED LIQUID MEMBRANE–FORMING CURING COMPOUND IS PERMITTED).

6.0 THE PROTECTION OF CONCRETE DURING PLACEMENT IN EITHER COOL AND COLD WEATHER, OR HOT WEATHER SHALL MEET THE MINIMUM REQUIREMENTS OF ACI 318–02.

7.0 DO NOT BACKFILL UNTIL CONCRETE HAS CURED A MINIMUM OF SEVEN (7) DAYS. CONFIRM CONCRETE STRENGTH BY BREAK TEST.

GEOTECHNICAL NOTES:

1.0 ALL EXCAVATIONS SHALL BE COMPLETED IN COMPLIANCE WITH OSHA REQUIREMENTS FOR EXCAVATION (29 CFR PART 1926 SUBPART B).

2.0 BACKFILL SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH THE REQUIREMENTS OF SPECIFICATION SECTION 02200.

3.0 BACKFILL PLACED IN NARROW FILLS SHALL CONSIST OF MATERIAL THAT IS NOT SUSCEPTIBLE TO SELF–WEIGHT CONSOLIDATION OR SETTLEMENT. ENGINEER APPROVAL OF BACKFILL MATERIAL TO BE USED IN NARROW FILLS SHALL BE OBTAINED PRIOR TO USE.

TOPOGRAPHICAL NOTES:

1.0 ALL DIMENSIONS AND GRADES SHOWN ON THE DRAWINGS SHALL BE FIELD VERIFIED PRIOR TO START OF CONSTRUCTION.

THIS DRAWING WAS PREPARED BY *THE CONSTRUCTION PARTNERSHIP INC, (TCPI)* EXTON, PA. SUPPORTING DESIGN CALCULATIONS SIGNED AND SEALED BY *THE CONSTRUCTION PARTNERSHIP INC.*, EXTON, PA.

NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION
C	8/08/06	BK	CORRECTIONS PER CESPA EC–EF COMMENTS				
B	7/14/06	BK	MODIFIED WALL DETAILS				
A	3/20/06	BK	ISSUED FOR CONSTRUCTION				
2	2/22/06	BK	REVISED PER NMED COMMENTS				
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW				
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW	AB	4/11/07	BK	AS–BUILT

LOS ALAMOS SITE OFFICE
TA–73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind | WESTON SOLUTIONS TEAM

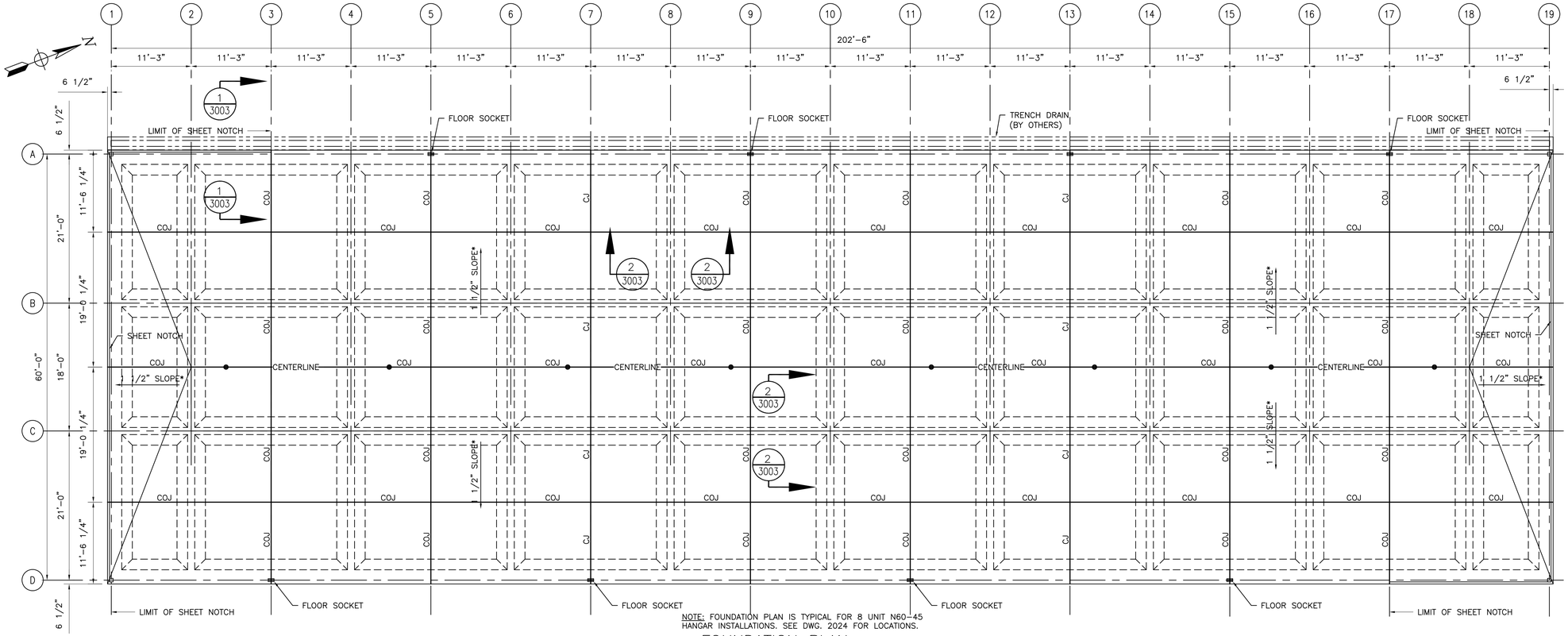
CHECKED	JJF	DATE	6/22/05	CLIENT APPROVALS	DATE
DES. ENG.	JJF		6/22/05		
PROJ. ENG.	AH		6/22/05		
PROJ. MGR.	BK		6/22/05		
APPROVED	BK		6/22/05		
APPROVED					

BERG KESHIAN NEW MEXICO LICENSED PROFESSIONAL ENGINEER 4/11/07

STRUCTURAL WALL I DETAILS

DRAWN	DATE	DWG. NO.	REV. NO.
JAS	02/06/04	3002	AB
SCALE: AS NOTED	W.O. NO. 13104.002.001	SHT. ___ OF ___	

G:\ACADPROJ\13104.002.001LANL\AS–BUILT\3002RevC.DWG



FOUNDATION PLAN

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO COMMENCING WORK. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

2. CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE AND LOCAL RULES AND REGULATIONS GOVERNING PERFORMANCE OF WORK.

3. DIMENSIONS ARE BASED UPON PRELIMINARY METAL BUILDING VENDOR PRINTS. CONTRACTOR TO COORDINATE WITH METAL BUILDING VENDOR TO OBTAIN FINAL CERTIFIED VENDOR PRINTS. NOTIFY ENGINEER OF ANY CHANGES FROM DESIGN DRAWING. BASIS OF DESIGN IS 8 UNIT N60-45 HANGER DESIGNED AND MANUFACTURED BY ERECT-A-TUBE, HARVARD, IL (815)943-4091.

EARTHWORK

1. ALL EXCAVATED MATERIAL SHALL BE DISPOSED OF PROPERLY. MATERIAL SHALL BE TESTED BEFORE IT IS USED AS BACKFILL. EXCESS MATERIAL SHALL BE REMOVED FROM SITE.

2. GRADE EXTERIOR PAVEMENT AWAY FROM BUILDING ON ALL SIDES WHERE BUILDING IS NOT PROTECTED BY TRENCH DRAIN.

CONCRETE

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH ACI 301 AND 318 LATEST EDITION.

2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.

3. ALL REINFORCING BARS SHALL MEET THE REQUIREMENTS OF ASTM A-615, GRADE 60. DETAILING SHALL CONFORM TO ACI 315, LATEST EDITION.

4. ALL REINFORCING SPLICES SHALL BE IN ACCORDANCE WITH ACI 318. PLACE BARS AT CONSTRUCTION JOINTS AS DETAILED OR SPECIFICALLY APPROVED BY ENGINEER.

5. PROVIDE 1/2" INCH TOOL EDGE ON ALL EXPOSED CORNERS.

6. CONTRACTOR SHALL SUBMIT REINFORCING STEEL SHOP DRAWINGS FOR REVIEW AT LEAST 10 WORKING DAYS PRIOR TO FABRICATION.

7. BAR CHAIRS, HIGH CHAIRS, SUPPORT BARS AND ALL OTHER ACCESSORIES SHALL BE PROVIDED IN ACCORDANCE WITH ACI AND CRSI STANDARDS.

8. ALL CONCRETE SHALL RECEIVE A STEEL TROWEL FINISH.

9. ANCHOR BOLTS SHALL BE IN ACCORDANCE WITH ASTM A-307.

10. NONSHRINK GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 7000 PSI.

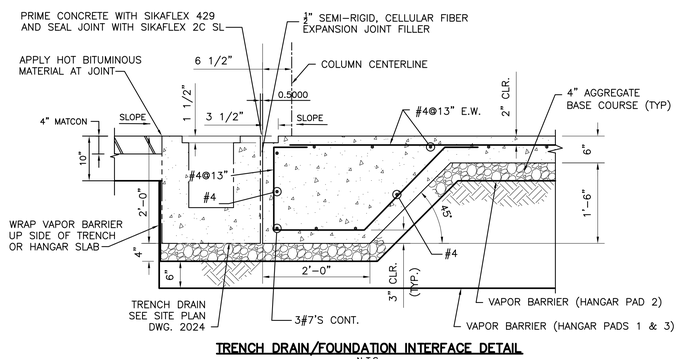
11. AGGREGATE BASE COURSE SHALL CONFORM TO NEW MEXICO DOT SPECIFICATIONS SECTION 304.21 FOR CLASS I BASE COURSE.

12. BOTTOM OF BASE PLATES FOR ALL EXTERIOR COLUMNS SHALL BE AT SAME ELEVATION. BOTTOM OF BASE PLATES FOR ALL INTERIOR COLUMNS SHALL BE BASED ON SLAB SLOPE.

13. THE USE OF 1/4" THICK LEVELING PLATES WITH SAME DIMENSIONS AND HOLE PATTERN AS THE BASE PLATES IS RECOMMENDED TO SET ELEVATIONS AND PROVIDE TEMPLATE FOR ANCHOR BOLTS.

14. FLOOR SOCKETS ARE EMBEDDED ITEMS SUPPLIED BY THE HANGER VENDOR AT TIME OF HANGAR INSTALLATION.

15. ANCHOR BOLTS SHALL BE DRILLED AND EPOXY-INSTALLED AT A LATER DATE AS DIRECTED BY THE ENGINEER.

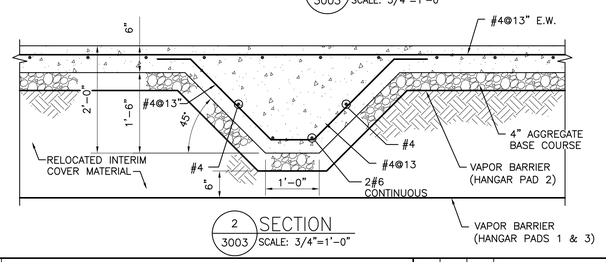


TRENCH DRAIN/FOUNDATION INTERFACE DETAIL

N.T.S.

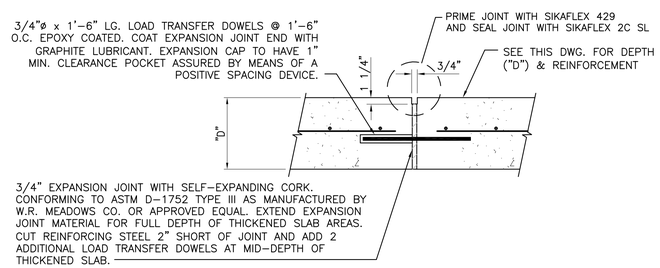
1 / 3003 SECTION

SCALE: 3/4"=1'-0"



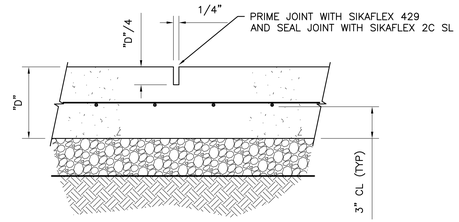
2 / 3003 SECTION

SCALE: 3/4"=1'-0"



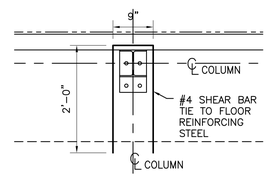
SLAB CONSTRUCTION/EXPANSION JOINT DETAIL (CJ)

SCALE: NONE



SLAB CONTROL JOINT DETAIL (COJ)

SCALE: NONE



NOTE: USE 180° BEND AND PLACE DIAGONALLY AT THE FOUR OUTSIDE CORNERS.

TYPICAL ENLARGED PLAN AT EXTERIOR COLUMN AND AT FLOOR SOCKETS

SCALE: 3/4" = 1'-0"

THIS DRAWING WAS PREPARED BY *THE CONSTRUCTION PARTNERSHIP INC, (TCPI)* EXTON, PA. SUPPORTING DESIGN CALCULATIONS SIGNED AND SEALED BY *THE CONSTRUCTION PARTNERSHIP INC.*, EXTON, PA.

BASIS OF DESIGN COLUMN REACTIONS FOR 8 UNIT N60-45 HANGER

COLUMN	Vdown	Vup	±Hx	±Hy	DESCRIPTION
B.1, B.19, C.1, C.19	4.28	1.84	2.64	1.00	ENDWALL COLUMNS
B.2, B.18, C.2, C.18	12.83	6.32	4.37	3.05	FIRST INTERIOR COLUMNS
B.4, B.6, B.8, B.10, B.12, B.14, B.16 C.4, C.6, C.8, C.10, C.12, C.14, C.16	17.11	7.49	4.37	3.05	INTERIOR COLUMNS
A.1, D.19	5.76	1.94	1.42	1.52	CORNER COLUMNS
A.3, D.17	13.79	3.48	1.00	3.05	SINGLE DOOR COLUMNS
A.7, A.11, A.15, D.5, D.9, D.13	20.68	5.06	1.00	3.05	DOUBLE DOOR COLUMNS
A.19, D.1	10.68	2.98	1.42	1.52	CORNER/DOOR COLUMNS
FS	N/A	N/A	N/A	3.05	FLOOR SOCKETS

NOTES:

1. THE FOUNDATION HAS BEEN DESIGNED USING THE COLUMN REACTIONS INDICATED. IF THE FINAL COLUMN REACTIONS ARE DIFFERENT, THE ENGINEER SHALL BE NOTIFIED.

2. ALL REACTIONS ARE IN KIPS. V = VERTICAL LOAD, H = HORIZONTAL LOAD.

3. Vup, Hx AND Hy ARE DUE TO WIND LOAD.

4. ALL HORIZONTAL REACTIONS CAN ACT IN POSITIVE OR NEGATIVE DIRECTION.

5. ALL COLUMN BASE PLATES ARE DESIGNED FOR FOUR 3/4" DIA. ANCHOR BOLTS, TO COMPLY WITH THE OSHA REGULATIONS OF MARCH 2003 FOR STEEL ERECTION.

NO.	DATE	APPR.	REVISION
AB	4/11/07	BK	AS-BUILT
C	7/14/06		MODIFIED HANGAR SLAB
B	6/22/06		ISSUED FOR CONSTRUCTION
A	04/19/06		ISSUED FOR REVIEW
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW

LOS ALAMOS SITE OFFICE
TA-73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind | WESTON SOLUTIONS TEAM

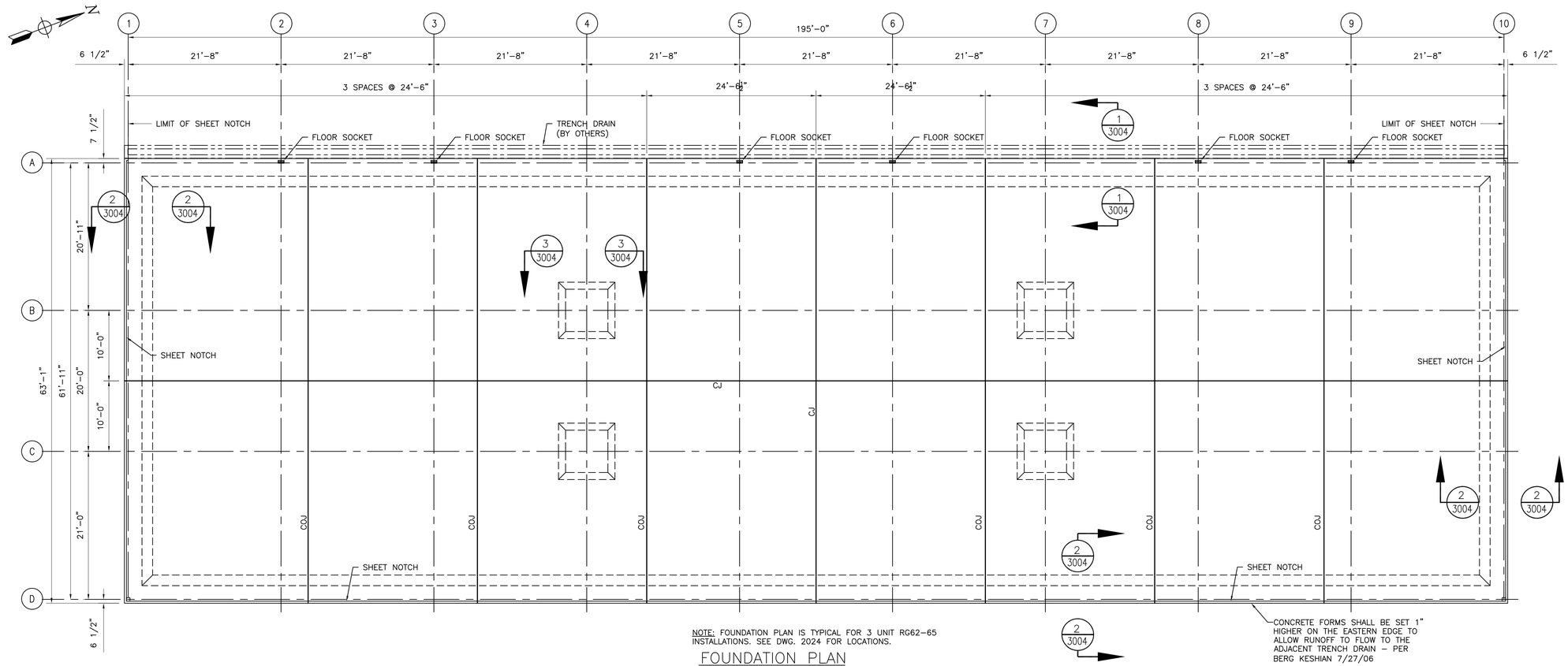
CHECKED	FWS	DATE	6/22/05
DES. ENG.	TB		6/22/05
PROJ. ENG.	AH		6/22/05
PROJ. MGR.	BK		6/22/05
APPROVED	BK		6/22/05
APPROVED			

CLIENT APPROVALS | DATE

8 UNIT N60-45 HANGER FOUNDATION PLAN

DRAWN: A. SPANIER	DATE: 02/06/06	DWG. NO.: 3003	REV. NO.: AB
SCALE: AS SHOWN	W.O. NO.: 13104.002.001	SHT. 1 OF 1	

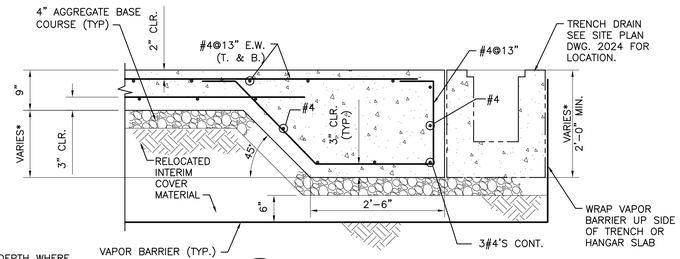
G:\ACADPROJ\13104.002.001LANL\AS-BUILT\3003RevC.dwg



NOTE: FOUNDATION PLAN IS TYPICAL FOR 3 UNIT RG62-65 INSTALLATIONS. SEE DWG. 2024 FOR LOCATIONS.

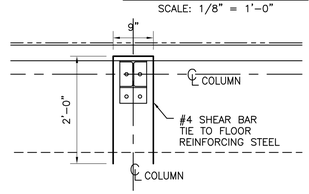
FOUNDATION PLAN

SCALE: 1/8" = 1'-0"



* INCREASE DEPTH WHERE REQUIRED TO PROVIDE A MINIMUM OF 2'-0" OF COVER BELOW FINISHED GRADE UP TO A MAXIMUM OF 4'-0" TOTAL DEPTH.

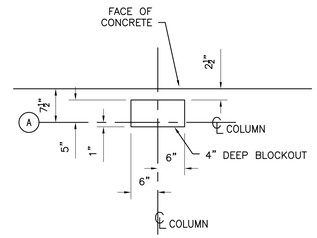
1/3004 SECTION
SCALE: 3/4" = 1'-0"



NOTE: USE 180° BEND AND PLACE DIAGONALLY AT THE FOUR OUTSIDE CORNERS.

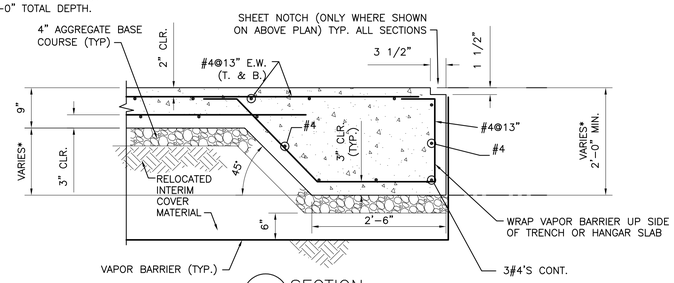
AT EXTERIOR COLUMN

SCALE: 3/4" = 1'-0"

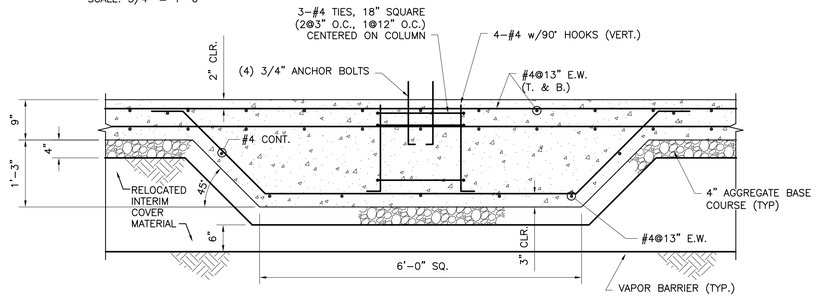


BLOCKOUT FOR FLOOR SOCKET

SCALE: 3/4" = 1'-0"



2/3004 SECTION
SCALE: 3/4" = 1'-0"



3/3004 SECTION
SCALE: 3/4" = 1'-0"

THIS DRAWING WAS PREPARED BY *THE CONSTRUCTION PARTNERSHIP INC*, *(TCPI)* EXTON, PA. SUPPORTING DESIGN CALCULATIONS SIGNED AND SEALED BY *THE CONSTRUCTION PARTNERSHIP INC.*, EXTON, PA.

LEGEND

CJ – SLAB CONSTRUCTION/EXPANSION JOINT

COJ – SLAB CONTROL JOINT

FOR SLAB CONSTRUCTION/EXPANSION JOINT AND FLOOR SLAB CONTROL JOINT DETAILS, SEE DRAWING 3003.

GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO COMMENCING WORK. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

2. CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE AND LOCAL RULES AND REGULATIONS GOVERNING PERFORMANCE OF WORK.

3. DIMENSIONS ARE BASED UPON PRELIMINARY METAL BUILDING VENDOR PRINTS. CONTRACTOR TO COORDINATE WITH METAL BUILDING VENDOR TO OBTAIN FINAL CERTIFIED VENDOR PRINTS. NOTIFY ENGINEER OF ANY CHANGES FROM DESIGN DRAWING. BASIS OF DESIGN IS 3 UNIT RG62-65 HANGAR DESIGNED AND MANUFACTURED BY ERECT-A-TUBE, HARVARD, IL (815)943-4091.

EARTHWORK

1. ALL EXCAVATED MATERIAL SHALL BE DISPOSED OF PROPERLY. MATERIAL SHALL BE TESTED BEFORE IT IS USED AS BACKFILL. EXCESS MATERIAL SHALL BE REMOVED FROM SITE.

2. GRADE EXTERIOR PAVEMENT AWAY FROM BUILDING ON ALL SIDES WHERE BUILDING IS NOT PROTECTED BY TRENCH DRAIN.

CONCRETE

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH ACI 301 AND 318 LATEST EDITION.

2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.

3. ALL REINFORCING BARS SHALL MEET THE REQUIREMENTS OF ASTM A-615, GRADE 60. DETAILING SHALL CONFORM TO ACI 315, LATEST EDITION.

4. ALL REINFORCING SPLICES SHALL BE IN ACCORDANCE WITH ACI 318. PLACE BARS AT CONSTRUCTION JOINTS AS DETAILED OR SPECIFICALLY APPROVED BY ENGINEER.

5. PROVIDE ½" TOOLED EDGE ON ALL EXPOSED CORNERS.

6. CONTRACTOR SHALL SUBMIT REINFORCING STEEL SHOP DRAWINGS FOR REVIEW AT LEAST 10 WORKING DAYS PRIOR TO FABRICATION.

7. BAR CHAIRS, HIGH CHAIRS, SUPPORT BARS AND ALL OTHER ACCESSORIES SHALL BE PROVIDED IN ACCORDANCE WITH ACI AND CRSI STANDARDS.

8. ALL CONCRETE SHALL RECEIVE A STEEL TROWEL FINISH.

9. ANCHOR BOLTS SHALL BE ADHESIVE ANCHORS MEETING HANGER VENDOR REQUIREMENTS.

10. NON-SHRINK GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 7000 PSI.

11. AGGREGATE BASE COURSE SHALL CONFORM TO NEW MEXICO DOT SPECIFICATIONS SECTION 304.21 FOR CLASS I BASE COURSE.

12. BOTTOM OF BASE PLATES FOR ALL EXTERIOR AND INTERIOR COLUMNS SHALL BE AT SAME ELEVATION.

13. THE USE OF 1/4" THICK LEVELING PLATES WITH SAME DIMENSIONS AND HOLE PATTERN AS THE BASE PLATES IS RECOMMENDED TO SET ELEVATIONS AND PROVIDE TEMPLATES FOR ANCHOR BOLTS.

14. FLOOR SOCKETS ARE EMBEDDED ITEMS SUPPLIED BY THE HANGAR VENDOR AT TIME OF HANGAR INSTALLATION, PROVIDE 6" WIDE X 12" LONG X 4" DEEP BLOCKOUT AT SOCKET LOCATIONS.

BASIS OF DESIGN COLUMN REACTIONS FOR 3 UNIT RG62-65

COLUMN	Vdown	Vup	±Hx	±Hy	DESCRIPTION
A.1, A.10	4.44	5.18	2.22	5.01	CORNER COLUMNS
A.2, A.3, A.5, A.6, A.8, A.9	8.87	6.71	3.66	3.04	SIDEWALL COLUMNS
A.4, A.7	8.87	6.14	1.47	6.08	SIDEWALL COLUMNS SINGLE DOOR COLUMNS
B.1, B.10	29.23	10.19	2.88	2.72	INTERIOR COLUMNS
B.4, B.7, C.4, C.7	58.47	19.07	2.88	3.04	SINGLE DOOR COLUMNS
C.1, C.10	29.23	10.91	2.88	2.72	CORNER/DOOR COLUMNS
D.1, D.10	16.56	6.21	2.22	2.57	DOUBLE DOOR COLUMNS
D.4, D.7	33.12	11.47	1.0	6.46	FLOOR SOCKETS
FS	N/A	N/A	N/A	4.29	

NOTES:

1. THE FOUNDATION HAS BEEN DESIGNED USING THE COLUMN REACTIONS INDICATED. IF THE FINAL COLUMN REACTIONS ARE DIFFERENT, THE ENGINEER SHALL BE NOTIFIED.

2. ALL REACTIONS ARE IN KIPS. V = VERTICAL, H = HORIZONTAL.

3. Vup, Hx AND Hy ARE DUE TO WIND LOAD.

4. ALL HORIZONTAL REACTIONS CAN ACT IN POSITIVE OR NEGATIVE DIRECTION.

5. ALL COLUMN BASE PLATES ARE DESIGNED FOR FOUR 3/4" DIA. ANCHOR BOLTS, TO COMPLY WITH THE OSHA REGULATIONS OF MARCH 2003 FOR STEEL ERECTION.

NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION
AB	4/11/07	BK	AS-BUILT				
A	7/14/06	BK	ISSUED FOR CONSTRUCTION				
1	6/30/05	BK	FINAL ISSUED TO NMED FOR PERMIT REVIEW				
0	6/2/05	AH	90% ISSUED TO DOE FOR REVIEW				

LOS ALAMOS SITE OFFICE
TA-73 AIRPORT LANDFILLS
LOS ALAMOS NEW MEXICO

North Wind | WESTON SOLUTIONS TEAM

CHECKED FWS	DATE 6/29/06	CLIENT APPROVALS	DATE
DES. ENG. TB	6/29/06		
PROJ. ENG. AH	6/22/05		
PROJ. MGR. BK	6/22/05		
APPROVED BK	6/22/05		
APPROVED			

BERG KESHIAN NEW MEXICO PROFESSIONAL ENGINEER 7/27/06

3 UNIT RG62-65 HANGAR FOUNDATION PLAN

DRAWN A. SPANIER	DATE 03/08/06	DWG. NO. 3004	REV. NO. AB
SCALE AS SHOWN	W.O. NO. 13104.002.001	SHT. 1 OF 1	

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CONSTRUCTION SPECIFICATIONS FOR LOS ALAMOS SITE OFFICE TA-73 AIRPORT LANDFILL

As-builts

April 2007

Prepared by:

North Wind, Inc.
1425 Higham Street
Idaho Falls, Idaho 83402

and
Weston Solutions, Inc.
3840 Commons Ave. NE
Albuquerque, NM 87109

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DIVISION 1

GENERAL REQUIREMENTS

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This Project is located at the Los Alamos County Airport, located in Los Alamos, NM. North Wind, Inc. has been contracted by the U.S. Department of Energy (DOE) Los Alamos Site Office (LASO) to design and construct a cover system for the Technical Area (TA)-73 Airport Landfill that is compliant with New Mexico Solid Waste Management Regulations (20 *New Mexico Administrative Code* [NMAC] 9.1). On April 1, 2003, the New Mexico Environment Department (NMED) granted conditional approval of the Voluntary Corrective Measures (VCM) Plan for an engineered alternative earthen final cover (NMED 2003).

B. Potential release sites (PRSs) 73-001(a)-99 Airport Landfill (main landfill) and 73-001(b)-99 Debris Disposal Area (DDA) are inactive PRSs and are listed in Table A within Module VIII of Los Alamos National Laboratory (LANL) Hazardous Waste Facility Permit (LANL 1996, 57486.1). Both landfill areas are located within TA-73 on DOE property, immediately north of the Los Alamos County Airport runway, between the runway and the edge of the mesa. The airport is currently operating under the management of Los Alamos County under lease from the DOE.

C. The main landfill area consists of a natural hanging valley into which municipal and LANL sanitary waste was disposed of for approximately 30 years. The west and south sides of the main landfill coincide approximately with the edges of the asphalt tie-down area and the asphalt taxiway to the hot pad, respectively. The north side extends approximately to the chain link security fence along the north side of the airport. To the east, the landfill extends to the end of the hanging valley.

D. The DDA lies east of the main landfill and consists of two roughly parallel trenches excavated to a maximum depth of approximately 35 feet (ft). To the west, the trenches extend to within approximately 150 ft of the windsock. To the east, the trenches extend approximately 800 ft beyond the end of the runway.

E. The main landfill covers a surface area of approximately 11.5 acres (AC). The DDA covers a surface area of approximately 5 AC.

F. Access to PRSs 73-001(a)-99 and 73-001(b)-99 is controlled by a perimeter fence around the entire airport. Access to the tarmac is limited to private airplane owners, operators, passengers, and other individuals with legitimate reasons to be there.

G. The work generally consists of the construction of a cap or cover over the existing 11.5-AC landfill. Waste from the east slope will be pulled back and relocated in order to reduce the excessively steep sideslope and to construct retaining walls. Waste will be excavated from the north slope to achieve an effective inclination of no steeper than 3H:1V. Waste will be excavated from the east slope to achieve an effective inclination of no steeper than 4H:1V except that steeper temporary slopes will be excavated to facilitate the construction of the retaining walls. The proposed cover configuration is an 18-inch (in.) infiltration layer and a 6-in. rock layer on the north and east sideslopes and an asphalt cap (MatCon™) over the flattop area. The purpose of the cover is to minimize moisture percolation through the landfill refuse and to prevent or reduce leaching and downward migration of contaminants. The work at the DDA consists of recontouring to provide a uniform cover thickness and reseeding. Both sites shall be graded to facilitate drainage and minimize erosion.

H. The work to be performed as described in this section is for the Contractor's general information only and is not intended to be a complete list of the work for this project. It is the Contractor's responsibility to determine the full scope of work required to complete this project on time, within budget, and in compliance with the Contract Documents. The scope of work is indicated by the requirements of each Specification.

I. The work includes, but is not limited to:

1. Construction of facilities and access roads as required for access to the sites.
2. Construction of erosion and sedimentation controls necessary for construction and post-construction.
3. Excavation and relocation of waste material from the north and east slopes of the main landfill and establishment of final grades.
4. Installation of a rock armor or other suitable material over the east and north slopes of the main landfill.
5. Construction of retaining walls at the toe of and on the east slope.
6. Construction of the MatCon™ cap on the flat portion of the main landfill.
7. Regrade the DDA to eliminate low spots and establish proper drainage.
8. Add topsoil to the DDA as needed to bring the topsoil thickness over the entire footprint to 12 in.
9. Revegetate denuded and/or disturbed areas at the main landfill and DDA.

J. The Contractor shall use the design documents, to include but not be limited to these Specifications and the Construction Drawings, to construct closure covers at the airport landfills.

K. The Contractor will coordinate work to minimize impacts to airport operations.

L. The Contractor is responsible for operating and maintaining all equipment, materials, systems, structures, and other physical features located within the designated construction boundary in a neat, safe, functional, and protected condition for the duration of the project. This responsibility pertains to all items located on the project site prior to start of the work, items brought onto the site by the Contractor, and items under construction.

1.02 DEFINITIONS

A. The Owner shall mean DOE.

B. The Contractor shall mean North Wind, Inc. Contractor responsibilities are specified in the North Wind, Inc. Project Management Plan for the LASO TA-73 Airport Landfill (PMP), Document number NW-ID-2003-073. Contractor personnel include Project Manager, Construction Manager, and Site Superintendent (SS).

C. The Engineer shall mean the Engineer of Record from Weston Solutions, Inc. The Engineer of Record shall be a Professional Engineer registered in the State of New Mexico in civil engineering. The Engineer of Record may designate someone to act on his behalf (including a North Wind employee), under his supervision. Weston Solutions, Inc. responsibilities are specified in the PMP.

D. The Subcontractor shall mean any individual or company contracted by the Contractor to provide services or perform work associated with the project.

E. The term “airport landfills” refers to both the inactive landfill and the DDA.

F. Where “as shown,” “as detailed,” “as noted,” “as indicated,” or words of like meaning are used in the Contractor documents, it shall be understood that reference is being made to the drawings unless otherwise noted.

PART 2 MATERIALS

Not Applicable

PART 3 EXECUTION

3.01 SPECIFICATIONS

The priority of Contract Documents is Specifications to Drawings to Project Scoping Plans. This flow-down means that the Specifications take precedence over the Drawings which take precedence over the ancillary Project Scoping Plans.

3.02 DRAWINGS

A. An index of Project drawings is shown on the Drawings.

B. Dimensions shown on the Drawings take precedence over scaled dimensions. Large-scale details have precedence over smaller scale.

REFERENCES

Los Alamos National Laboratory (LANL), January 1996. “LANL HSWA Module VIII Permit, 1996 Revision (guidance),” Los Alamos, New Mexico. (LANL 1996, 57486)

Los Alamos National Laboratory (LANL), October 2002. “Voluntary Corrective Measure Plan for Potential Release Sites 73-001(a)-99 and 73-001(b)-99,” Los Alamos National Laboratory document LA-UR-02-4433, Los Alamos, New Mexico. (LANL 2002, ER2002-0359).

New Mexico Environment Department (NMED), April 2003, “Conditional Approval of Voluntary Corrective Measures (VCM) Plan for Potential Release Sites (PRSs) 73-001(a)-99 and 73-001(b)-99,” letter from Vickie Maranville, NMED HWB, to Pete Nanos, Director and Everett Trollinger, Project Manager. (NMED 2003)

END OF SECTION

SECTION 01015

GENERAL CONDUCT OF WORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Coordination of Work.

B. Handling and Storage.

C. Referenced Standards.

1.02 RELATED SECTIONS AND REQUIREMENTS

A. Division 1 - General Requirements

B. Waste Management Plan for LASO TA-73 Airport Landfill (WMP), March, 2004

C. Construction Plan for LASO TA-73 Airport Landfill, March, 2004

1.03 COORDINATION OF WORK

A. The Contractor shall be responsible for the coordination of all work so that the Project can be completed within the time stipulated in the Contract. It is the Contractor's responsibility to review coordination of all work in detail with the Engineer and his other Contractors as necessary to avoid any misunderstanding.

B. The Contractor's Project Manager will serve as the point of contact for all communication.

C. The Contractor shall supervise and direct all work required under this Contract. The Contractor shall be solely responsible for the construction methodology, controls, techniques, sequences, procedures, or construction safety, except as required in Contract documents or in cases where written direction to the Contractor overrides the Contractor's choice. Major changes to the engineering design must be approved by the Engineer and the Owner.

D. The Contractor will restrict/control access to the site for construction personnel, equipment, and materials to the access-control points at the site.

1.04 HANDLING AND STORAGE

A. The Contractor shall, at the Contractor's expense, handle, haul, and distribute all materials and all surplus supplies on the different portions of the Work as necessary. Contractor shall provide suitable and adequate storage room for materials and equipment during the progress of the Work and be responsible for loss of, or damage to, materials and equipment furnished by the Contractor, until the final acceptance of the Work.

B. All excavated materials, construction equipment, materials and equipment to be incorporated in the Work shall be placed so as not to contaminate, damage, or delay the Work and so that free access can be had at all times to this project, and any other project, and to all installations in the vicinity of the Work.

1.06 REFERENCED STANDARDS

A. Referenced standards used throughout the Contract Documents to specify the quality of materials or workmanship shall refer to the latest edition of such standards that is accepted by the authority having jurisdiction, except where a specific edition is indicated in the Contract Documents.

1.07 WASTE MANAGEMENT

A. It is anticipated that the Contractor will encounter contamination while performing the work. Refer to the WMP for additional information and requirements.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01090

ABBREVIATIONS

PART 1 GENERAL

1.01 ABBREVIATIONS

A. Abbreviations used in these Contract Documents shall refer to and designate the following, as applicable:

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute
AOS	Apparent opening size
ASTM	American Society for Testing and Materials
BFM	Bonded Fiber Matrix
CA	Construction area
C_c	Coefficient of Gradation
CFR	*Code of Federal Regulations*
CLFMI	Chain Link Fence Manufacturers Institute
COR	Contracting Office Representative
CQCP	Construction Quality Control Plan
C_u	Uniformity Coefficient
CWA	Controlled Work Area
DDA	Debris Disposal Area
DOE	United States Department of Energy
EPA	United States Environmental Protection Agency
FAA	Federal Aviation Administration
FOD	Foreign objects debris
FS	Federal Specifications
GTL	Geotechnical testing laboratory
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
LANL	Los Alamos National Laboratory
LASO	Los Alamos Site Office
MatCon™	asphalt capping material
MARV	minimum average roll value
NMAC	*New Mexico Administrative Code*
NMDOT	New Mexico Department of Transportation
NMED	New Mexico Environment Department
NSA	National Stone Association
OFZ	Obstacle-free zone
OGBC	Open graded base course
OSHA	Occupational Safety and Health Act
PLS	Pure live seed
PMP	Project Management Plan
PPE	Personal protective equipment
PQAP	Project Quality Assurance Plan
PRS	Potential release site
PVC	Polyvinyl chloride
QA	Quality assurance
QC	quality control
RA	Restricted area
SS	Site Superintendent
SSO	Site Safety Officer
SWPPP	Storm Water Pollution Prevention Plan

TA	Technical Area
USCS	Unified Soil Classification System
USDA	United States Department of Agriculture
UV	Ultraviolet
WMP	Waste Management Plan
VCM	Voluntary Corrective Measure

UNITS OF MEASURE

AC	Acre
cm/sec	Centimeters per second
CY	Cubic yard(s)
dBA	Decibel A-weighted
F	Fahrenheit
ft	Foot (feet)
in.	Inch(es)
lb	Pound(s)
mph	Miles per hour
pcf	Pounds per cubic foot
psi	Pounds per square inch
ft^2	Square foot (feet)

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 GENERAL

1.01 WEEKLY MEETINGS

A. Weekly job meetings shall be conducted with the Engineer, Contractor and other designated parties to evaluate progress on the project to date. These meetings shall be held at Site Trailer at a scheduled time convenient to all parties.

B. It may periodically become necessary to have special meetings to resolve project conflicts in which all parties shall be required to attend.

C. Other items to be reviewed during weekly job meetings are:

1. Health and safety Issues.

2. Project schedule.

3. Coordinate construction activities with operational personnel.

4. Manpower requirements, etc.

5. Coordinate projected progress with other Prime Contractors, as applicable.

6. Review submittal schedules, expedite as required to maintain schedule.

7. Maintaining of quality and work standards.

8. Review any changes for:

a. Effect on Construction Schedule.

b. Cost Reductions.

9. Review next week's work items.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General Requirements.

B. Form of Schedules.

C. Content of Schedules.

D. Updating.

E. Submittals.

F. Distribution.

G. Coordination.

1.02 RELATED SECTIONS AND REQUIREMENTS

A. Division 1 - General Requirements.

B. Construction Plan for LASO TA-73 Airport Landfill, June 2005

1.03 GENERAL REQUIREMENTS

A. The construction schedule for the entire work is provided in the Contractor's Construction Plan for LASO TA-73 Airport Landfill. The construction schedule shall be revised monthly, or more frequently if directed by Engineer. based on the progress of work.

1.04 FORM OF SCHEDULES

A. Contractor will prepare manually or in computer generated format, a Work Breakdown Structure and Gantt schedule analysis. Exact format to be approved by the Engineer in accordance with 1.07 of this section.

B. Reproducible sheets at 11-in. x 17-in. shall be provided to the Engineer.

1.05 CONTENT OF SCHEDULES

A. Complete sequence of construction by activity.

1. Shop Drawings, Sealants, Concrete Mix Designs, Asphalt Mix Designs, Product Data, Samples and Guarantees.

2. Selection of finishes.

3. Product fabrication and delivery dates.

4. Dates for beginning, and completion of, each construction activity, specifically:

a. Mobilization

b. Site preparation

c. Waste Relocation and rough regrade

d. Retaining wall construction

e. Landfill cover installation

e. Acceptance Testing

f. Revegetation

g. Demobilization

5. Date(s) for final inspection and acceptance.

B. Identify Work of separate stages, or separate phases, or other logically grouped activities.

C. Projected percentage of completion for each item of Work as of first week of each month.

D. Provide subschedules as necessary to define critical portions of entire schedule.

E. Assign to each scheduled major activity a sum of money, the total of which shall equal the approved contract price.

1.06 UPDATING

A. Show all changes occurring since previous submission of updated schedule.

B. Indicate progress of each activity, show completion dates.

C. Include:

1. Major changes in scope.

2. Activities modified since previous updating.

3. Revised projections due to changes.

4. Other identifiable changes.

D. Provide narrative report, if necessary, to include:

1. Discussion of problem areas, including current and anticipated delay factors and their impact.

2. Corrective action taken, or proposed, and its effect.

3. Effect of change in schedules of other contractors.

4. Description of revisions:

a. Effect on schedule due to change of scope.

b. Revisions in duration of activities.

c. Other changes that may affect schedule.

1.07 SUBMITTALS

A. Submit initial schedules within ten (10) days after the date of contract execution.

1. The Engineer will review schedules and return review copy within ten (10) days after receipt.

2. If required, resubmit within seven (7) days after return of review copy.

B. Submit monthly updated schedule accurately depicting progress to first week of each month.

1.08 COORDINATION

A. Schedules of subcontractors will be available for inspection at the Engineer's request.

B. Contractor shall coordinate schedules with schedules of subcontractors.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01330

SURVEY DATA

PART 1 GENERAL

1.01 LINES, GRADES, AND MEASUREMENTS

A. The Contractor shall make all measurements and check all dimensions necessary for the proper construction of the Work called for by the Drawings and Specifications. During the execution of the Work, the Contractor shall make all necessary measurements to prevent misfitting in said work, and shall be responsible therefore and for the accurate construction of the Work.

1.02 DIMENSIONS OF EXISTING FEATURES

A. The dimensions and locations of existing structures, topography, and drainage swales are of critical importance in the installation or connection of new work, the Contractor shall verify such dimensions and locations in the field before the construction or fabrication of any structure, material or equipment.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01340

SHOP DRAWINGS, SAMPLES, AS-BUILTS, AND OTHER SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General Instruction.

B. Samples.

C. Shop Drawings.

D. Product Data.

1.02 RELATED SECTIONS AND REQUIREMENTS

A. Division 1 - General Requirements.

B. Construction Plan for LASO TA-73 Airport Landfill, June 2005.

C. Health and Safety Plan for LASO TA-73 Airport Landfill (HASP), June 2005

1.03 GENERAL INSTRUCTIONS

A. Within ten working days after the formal execution of the contract, the Contractor shall submit a Submittal Schedule to the Engineer. The Submittal Schedule shall be a sub-schedule to the Construction Schedule required under Section 01310 Subpart 1.05D, and shall include dates for submittal, approval, fabrication as appropriate, and delivery of the Work. This schedule shall also list samples and other submittals as planned by the Contractor and as required by the Contract Documents. The Engineer will review the schedule in accordance with the provisions of Section 01310 and return either approved or modified copies to the Contractor. Once accepted by the Engineer, the schedule shall be followed throughout the project unless superseded by a new schedule accepted by the parties involved. The Engineer will require ten working days to properly review this schedule. The Engineer will add or delete submittals required for review.

B. Information submitted as a separate submittal or as part of another submittal that has not been listed on the schedule as a required submittal will be scanned briefly by the Engineer. Such extraneous and unrequired information will be marked as "NO ACTION TAKEN" and returned.

C. When Shop Drawings are required by the various technical specification sections or elsewhere in the Contract Documents, the names and addresses of the proposed manufacturers (if different from those listed in the Contract Documents) shall be submitted prior to the submittal of the Shop Drawings so that the Engineer may consider and approve or disapprove the manufacturer and/or the supplier as to his or their ability to furnish a product meeting the requirements of the Contract Documents. This preliminary submittal is subject to final approval of the particular material or equipment. As requested, the Contractor or equipment supplier shall also submit data relating to the materials and equipment he proposes to incorporate into the work, in sufficient detail to enable the Engineer to identify the particular product in question and to form an opinion as to its conformity to the contract requirements. Such data shall be submitted in a manner similar to that specified for Shop Drawings.

D. The normal time allowed for review of Shop Drawings, and other submittals, is two calendar weeks after receipt of the submittal by the Engineer, or other party responsible for the review. Requirements for shorter review periods must be presented in writing by the Contractor.

E. Submittals shall be approved by the Contractor, as shown by the Contractor's approval marked on each copy. Submittals shall not be accepted from subcontractors, suppliers, manufacturers, or representatives. Submittals shall be identified by reference to Contract document number, drawing number, equipment number and specification section number, equipment or material schedule, or room numbers, as appropriate. Submittals shall be numbered consecutively by the Contractor, or equipment supplier, as appropriate. Resubmissions shall use the same number with a suffix added to identify each resubmission (i.e., "A" shall identify the first resubmission).

F. Minimum sheet size: 8-1/2-in. x 11-in.

G. Number of submittals required:

1. Shop Drawings: Submit the number of opaque reproductions, which the Contractor requires, plus four copies which will be retained.

2. As-Built Drawings: Submit one electronic version in AutoCAD 2004 or more recent version and one hard copy suitable for reproduction.

3. Product Data: Submit the number of copies which the Contractor requires, plus four copies which will be retained.

4. Samples: Submit the number stated in each specification section.

5. Certificates: Submit three copies which will be retained.

H. Submittals shall contain:

1. The date of submission and the dates of any previous submissions.

2. The Project title and number.

3. Contract identification.

4. The names of:

   a. Contractor.
   b. Supplier.
   c. Manufacturer.

5. Identification of the product, with the specification section number and other appropriate information.

6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the work or materials.

8. Applicable standards, such as American Society for Testing and Materials (ASTM) or Federal Specification (FS) numbers.

9. Identification of deviations from Contract Documents.

10. Identification of revisions on resubmittals.

11. 8 in. x 3 in. blank spaces for Contractor and the Engineer's review stamps.

12. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.

1.04 SCHEDULE OF VALUES

A. For all lump sum work, the Contractor shall submit a Schedule of Values.

B. The Schedule of Values shall be submitted to the Engineer within five (5) days after the Notice-to-Proceed.

C. The Schedule of Values shall be subject to the review and approval of the Engineer.

D. The Schedule of Values shall identify all the major elements of the work and the cost of each element. The total scheduled cost shall equal the contract price.

E. The Schedule of Values shall identify costs for all: mobilization, demobilization, and site preparation; establishment, maintenance and removal of erosion and sedimentation control; construction schedule preparation and updating; as-built documents, as well as: construction activities, generally broken down by structure, location, and specific location.

F. The approved Schedule of Values will form the basis for the values assigned to scheduled activities established in Section 01310.

1.05 SAMPLES

A. If the Engineer so requires, either prior to beginning or during the progress of the work, the Contractor or equipment supplier shall submit samples of materials for such special tests as may be necessary to demonstrate that they conform to the Specifications. Such samples, including concrete test cylinders, shall be furnished, taken, stored, packed, and shipped as directed, at the expense of the Contractor. Except as otherwise specified, the Contractor shall make arrangements for, and pay for, the actual tests.

B. All samples shall be packed so as to reach their destination in good condition, and shall be labeled to indicate the material represented, the name of the building or work and location for which the material is intended, and the name of the Contractor or equipment supplier submitting the sample.

C. To ensure consideration of samples, the Contractor or equipment supplier shall notify the Engineer in writing that the samples have been shipped and shall properly describe the samples in the letter. In no case shall the letter of notification be enclosed with the samples.

D. The Contractor or equipment supplier shall submit data and samples, or place his orders, sufficiently early to permit consideration, inspection, testing, and approval before the materials and equipment are needed for incorporation in the work.

E. When required, the Contractor or equipment supplier shall furnish to the Engineer triplicate copies of manufacturer's attesting to the accuracy of shop or Mill tests (or reports from independent testing laboratories) relative to materials, equipment performance ratings, and concrete data.

F. The materials and equipment used on the Work shall correspond with the samples submitted.

1.06 SHOP DRAWINGS

A. The Contractor or equipment supplier, as appropriate, shall submit for approval at least four (4) print copies (plus any additional copies required by the Contractor or subcontractors or equipment suppliers) of Shop Drawings of materials fabricated especially for this contract, and of equipment and materials for which such drawings are specifically requested in the Contract Documents. One copy, plus any additional copies provided, will be reviewed, stamped, and returned to the Contractor.

B. Such drawings shall show the principal dimensions, weights, structural and operating features, performance characteristics and capacities, wiring and piping diagrams, space required, clearances required, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawings. Show location, size, dimensions and embedment depth for anchor bolts. List special tools required to operate, and maintain equipment. Describe tool's purpose. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for this contract.

C. The Contractor or equipment supplier shall be responsible for the prompt submission of all Shop Drawings in accordance with the Shop Drawing Schedule so that there shall be no delay to the work due to the absence or lateness of such drawings.

D. No material shall be purchased or fabricated especially for this Contract until the required Shop Drawings have been submitted and reviewed as conforming to the Contract requirements. All materials and work involved in the construction shall then be as represented by said drawings.

E. Only Shop Drawings which have been checked and corrected by the fabricator should be submitted to the Contractor by the Contractor’s subcontractors and vendors. Prior to submitting Shop Drawings to the Engineer, the Contractor shall check thoroughly all such drawings so that the subject matter thereof conforms to the Drawings and Specifications in all respects. Shop Drawings which are correct shall be marked with the date, checker's name and indication of the Contractor's approval, and then shall be submitted to the Engineer; other drawings shall be returned to the fabricator or subcontractor for correction.

F. The Engineer review of Shop Drawings will follow a general check made to ascertain conformance with the design concept and functional results of the Project and compliance with the information given in the Contract Documents. The Contractor shall be responsible for dimensions to be confirmed and correlated at the job site and for coordination of the work of all trades. The Contractor, or equipment supplier if appropriate, shall also be responsible for information that pertains solely to the fabrication processes or to techniques of construction.

G. The Engineer classifications are as follows:

APPROVED	(___)
APPROVED AS CORRECTED	(___)
REVISE AND RESUBMIT	(___)
REJECTED	(___)
NO ACTION TAKEN	(___)

H. The Contractor or equipment supplier shall make any corrections required by the Engineer and shall return the required number of corrected copies of Shop Drawings until approved.

I. At the time of each submission or resubmission, the Contractor or equipment supplier shall direct specific attention, in writing, to deviations that the Shop Drawings or samples may have from the requirements of the Contract Documents or corrections required by the Engineer on previous submissions.

J. The Contractor's stamp of approval on Shop Drawings and samples shall constitute a representation to the Engineer that the Contractor has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers and similar data (or he assumes full responsibility for doing so) and that the Contractor has reviewed or coordinated each Shop Drawing and sample with the requirements of the Contract Documents. Submittals received without this information will be returned without being reviewed by the Engineer.

K. The approval of Shop Drawings and samples shall not relieve the Contractor or equipment supplier from responsibility for any deviations from the requirements of the Contract Documents, unless the Engineer has been notified, in writing, and has given written approval to such deviation, nor shall any approval by the Engineer relieve the Contractor or equipment supplier from responsibility for errors and omissions in Shop Drawings.

1.07 PRODUCT DATA

A. Product data may be submitted instead of Shop Drawings when the information required for Shop Drawings is contained in Manufacturer's standard literature.

B. Manufacturer's standard catalog data, schematic drawings and diagrams:

1. Mark each copy to identify pertinent products or models.

2. Modify drawings and diagrams to delete information which is not applicable to the work.

3. Supplement standard information to provide information specifically applicable to the work.

1.08 CERTIFICATES

A. Types of certificates required are specified in respective Specification Sections.

B. Shop tests: Provide Manufacturer's sworn reports for actual product to be incorporated in the work.

C. Laboratory tests: Provide independent testing laboratory reports for actual product to be incorporated in the work.

D. Certificates of compliance: Provide Manufacturer's sworn statement or independent testing laboratory's report for products similar to those to be incorporated in the work with information indicating compliance with specifications. Test used to show compliance shall have been made within one year of the date of submission, unless approved otherwise by the Engineer.

E. Certified drawings: Provide certified drawings from the manufacturer as required in each specification section.

F. Refer to Section 01400 for certification requirements relative to an alternative to on-site sampling and testing.

1.09 AS-BUILT DOCUMENTS

A. The Site Superintendent will keep a record of all changes approved by the owner and all field changes, including changes to lines and grades.

B. The Contractor shall maintain one current record hard copy of all Specifications, Drawings, Addenda, Change Orders and Shop Drawings at the site. The documents shall be kept current, in good order, an annotated to show all changes made during the construction process and be clearly marked "AS-BUILT Documents." These As-Built documents shall be available for review by the Engineer during all normal working hours.

C. The Contractor shall submit to the Engineer, within 10 days after the completion of contract, one set of the above "AS-BUILT" documents containing all changes, additions or deviations from the original set of Documents that have been incorporated into the Work. The Contractor is responsible for the accuracy of these AS-BUILT documents.

D. The Engineer, within 15 days after receipt of the As-Built documents will produce a final electronic version of the As-Built documents provided by the contractor. The electronic version will be in AutoCAD 2004 or more recent version.

E. The Contractor shall include As-Built Documents in the submitted Schedule of Values.

1.10 PROGRESS PHOTOGRAPHS

A. The Contractor shall take progress photographs throughout the duration of the contract. Photographs shall be taken at weekly intervals or as may be specifically directed by the Owner.

B. Digital photographs shall be taken of each process to document status, progress, and quality. Selected color prints (4 per 8.5 x 11 page) shall be provided with monthly progress reports. Additional color prints shall be provided to the Engineer upon request.

C. Each digital photograph shall contain the date taken and formatted on an electronic file to contain a description, indicating the location, direction, and what is shown.

1.11 HASP

A. Refer to the HASP for requirements regarding environmental health and safety.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. The Contractor is responsible for quality control and shall establish and maintain an effective Project Quality Assurance Plan for LASO TA-73 Airport Landfill (PQAP).

B. The Construction Quality Control Plan for LASO TA-73 Airport Landfill (CQCP) shall cover all construction operations, both on site and off site and shall be keyed to the proposed construction sequence.

1.02 RELATED SECTIONS AND REQUIREMENTS

A. PQAP, November 2003.

B. CQCP, June 2005.

1.03 MATERIALS CERTIFICATION

A. For certain products, assemblies, and materials, in lieu of on-site sampling and testing procedures, the Engineer will accept from the Contractor the manufacturer's certification, with respect to the product(s) involved, upon the conditions set forth in the following paragraphs:

1. Certification shall state that the named product conforms to the Specifications and that representative samples have been sampled and tested as specified.

2. Certification shall be accompanied with a certified copy of the test results.

3. The certification shall give name and address of the manufacturer and the testing agency, the date of test, and shall set forth the means of identification which will permit field determination of the products delivered to the project as being one product covered by the certification.

4. The certification shall be duplicated with one (1) copy sent with shipment of the covered product to the Contractor and one (1) copy sent to the Engineer.

5. The Contractor shall be responsible for any additional costs for certification and for any costs of sampling and testing.

6. The Engineer reserves the right to require samples and test products to assure compliance with pertinent requirements with respect to fire certification of the products by the manufacturer thereof.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

A. The Contractor’s approved PQAP and CQCP defines the minimum construction requirements to be implemented to ensure that the approved design requirements are met or

exceeded. The quality assurance (QA) team will report to the Contractor's Project Manager on behalf of the Owner.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This section covers the installation, maintenance, and operation of all temporary facilities and controls at the site necessary to support the Contractor operations during the course of the Contract. These temporary facilities and controls will be removed at Contract completion, and include, but are not limited to, office trailers, haul roads, drain facilities, decontamination pads, staging areas, access controls, lighting, utilities, and janitorial services.

1.02 PROJECT SIGNS

A. The Contractor shall erect a Project sign board near the Highway 502 entrance to the site. The information on the sign board shall be protected from the weather elements and the information shall be legible at all times. The sign shall be installed at a location approved by the Engineer..

1. The Project sign shall be constructed of sturdy and moisture-resistant material.

2. The following information shall be displayed in painted black lettering, clearly visible from 100 ft:

U.S. DEPARTMENT OF ENERGY
LOS ALAMOS SITE OFFICE
TA-73 AIRPORT LANDFILL CLOSURE

B. The Contractor shall construct and install a Project Information Board at the entrance to the Temporary Facilities Area.

1. The Project sign shall be constructed of sturdy and moisture-resistant material.

2. The following information shall be displayed in painted black lettering,
a. Caution: Construction Area.
b. A list containing the following telephone numbers:
   (1) 911 or other local emergency telephone numbers.
   (2) Location of nearest telephone.
   (3) DOE-LASO Security telephone number.
   (4) DOE Contracting Office Representative (COR) name and telephone number.
   (5) Contractor Project Manager name and telephone number.
c. Primary and alternative site evacuation routes.
d. Hospital/emergency route map with written instructions and the route highlighted.
e. DOE “Whistle Blower Protection Notification” with applicable DOE name and telephone number (provided by DOE).
f. Davis-Bacon wages for Los Alamos County, NM.
g. Map showing site contamination.
h. Equal Employment Opportunity poster.
i. Occupational Safety and Health Administration (OSHA) poster.
j. DOE Poster—Contractor Employee Occupational or Health Complaint form (provided by DOE).

1.03 PRECAUTIONS AGAINST WEATHER

A. During adverse weather conditions and against the possibility thereof, the Contractor shall take all necessary precautions so that the Work shall be properly done and be satisfactory in all respects. When required, protection shall be provided by use of tarpaulins, wood and building paper shelters, or other approved means.

B. During cold weather (below 40° degrees Fahrenheit [F]), materials shall be preheated, if required, and the materials and adjacent structure into which they are to be incorporated shall be made and kept sufficiently warm so that a proper bond will take place and a proper curing, aging, or drying will result. Protected spaces shall be artificially heated by approved means which shall result in a moist or dry atmosphere according to the particular requirements of the work being protected. Ingredients for concrete and mortar shall be sufficiently heated so that the mixture shall be warm throughout when used.

1.04 TEMPORARY HEAT

A. If temporary heat is required for the protection of the Work, the Contractor shall provide and install heating apparatus, shall provide adequate and proper fuel, and shall maintain fires as required. Temporary heating apparatus shall be installed and operated in such manner that the finished work will not be damaged thereby. Temporary heating apparatus shall be of the types approved by local codes and ordinances governing the Work.

1.05 WATER SUPPLY

A. Water necessary for operations and fire protection will be obtained from the hydrant shown on the Drawings. The Contractor shall make all arrangements necessary to obtain water.

1.06 ELECTRICAL ENERGY

A. Suitable electrical power necessary to perform the work shall be obtained from sources at the airport, by the Contractor.

B. There shall be sufficient electric lighting, provided by the Contractor, so that all work may be properly conducted when there is not sufficient daylight in the work area.

C. The Contractor shall assume all risks of loss or damage of any kind to any vehicles, machinery, equipment, materials or supplies which it shall provide in doing the work.

1.07 SANITARY FACILITIES

A. The Contractor shall provide adequate sanitary conveniences meeting governing local and state codes and regulations for the use of those employed on the work site. Such conveniences shall be made available when the first employees arrive on the work site and shall be constructed and maintained in suitable numbers and at such points and in such manner as may be required or approved.

B. The Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use. The Contractor shall rigorously prohibit the committing of nuisances on the site of the Work, on the lands of the Government, or on adjacent property.

1.08 ACCESS/CONTAMINATION CONTROL

A. As construction progresses, the Contractor shall maintain contamination control boundaries between clean areas and areas of contamination.

B. Install access-control fencing to restrict, reduce, or eliminate access by the public. Fence type(s) shall be as indicated on the drawings.

C. Contamination-control fencing around contaminated areas shall be, at a minimum, colored, plastic, safety fencing or approved equal 4-ft high. Posts and fabric shall be secure and tight at all times.

D. The Contractor shall maintain site perimeter fences, gates and signs to prevent intrusion by the general public. Maintenance includes keeping fences taut, performing all minor repairs that do not require additional materials, and placement of signs.

E. If the Contractor uncovers any archaeological or historical artifacts or bones of unknown origins during the term of the Contract, the Contractor shall immediately halt operations in the vicinity of such a discovery and immediately notify the Owner. Further work in these areas shall not resume without written authorization from the Owner.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01560

TEMPORARY CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Safety and Protection.

B. Protection of the Public.

C. Site Control and Security.

D. Maintenance of Existing Operations.

E. Maintenance of Traffic.

F. Protection of Natural Water Courses.

G. Removal of Debris During Construction.

H. Final Cleaning.

I. Dust Control.

J. Noise Control.

K. Environmental Control.

1.02 RELATED SECTIONS AND REQUIREMENTS

A. Division 1 - General Requirements.

B. WMP.

C. HASP.

D. Storm Water Pollution Prevention Plan for LASO TA-73 Airport Landfill (SWPPP), June 2005.

E. Construction Plan for LASO TA-73 Airport Landfill.

1.03 SAFETY AND PROTECTION

A. Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. All employees on the work and other persons who may be affected thereby. Refer to the HASP for site safety and health procedures.

2. All the work and all materials or equipment to be incorporated therein, and any adjacent materials, equipment, or facilities, including that in storage on or off the site.

B. The Contractor shall notify owners of adjacent utilities when implementation of the work may affect them. All damage, injury or loss to any property referred to in paragraph 1.03 A.2 above caused, directly or indirectly, in whole or in part, by Contractor, any subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by the Contractor at the Contractor's expense.

C. The Contractor shall not load or permit any part of any structure to be loaded with a weight that would endanger its safety.

D. The Contractor shall provide protection of the work from freezing and other elements, which would be harmful to it. The Contractor shall furnish heat or protective shelters or temporary buildings as required for the protection of the work.

E. The Contractor shall take all necessary precautions for the safety of employees on the work, and shall comply with all applicable provisions of Federal, state, and local safety laws and building codes, and Project requirements in order to prevent accidents or injury to persons on, about, or adjacent to the premises where the work is being performed. The Contractor shall erect and properly maintain at all times, as required by the Project and by the conditions and progress of the work, all necessary safeguards and barricades for the protection of employees on the work and the safety of others employed near the work and the public, and shall post danger signs and warning lights warning against the hazards created by dangerous features of the construction including, but not limited to, protruding nails, excavations, scaffolding, stairways, and falling materials.

F. The Contractor shall designate a responsible member of its organization on the work whose duty shall be the prevention of accidents. The name and position of the person so designated shall be reported in writing to the Owner.

G. The Contractor shall immediately report in writing to the Owner, giving full details, all serious accidents which arise out of or in connection with the performance of the work, whether on or adjacent to the site, which cause death, personal injury, or property damage. In addition, if death or serious injury or substantial property damage is caused, the accident shall be reported immediately by telephone or messenger to the Owner. If a claim is made or suit is filed by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Owner, giving full details of the claim.

H. The Contractor shall assume all risks of loss or damage of any kind to any vehicles, machinery, equipment, materials, or supplies which it shall provide in doing the work.

I. The Contractor shall take all precautions to prevent damage to the work by the elements, storms, or by water entering the site of the work directly or through the ground. In case of damage by the elements, storm, or water, the Contractor shall make repairs or replacements or rebuild such parts of the work as the Engineer may require in order that the work may be completed by the Contract Documents. If Contractor believes that additional work done by the Contractor, which arose from causes beyond the Contractor's control, entitles him to an increase in the Contract Price or an extension of the Contract Time, he may make a claim thereof as provided herein.

J. The Contractor shall comply with all insurance requirements stated in the Contract Documents.

K. It is anticipated that the Contractor may encounter contamination while performing the work; refer to the WMP and the HASP for additional information and requirements.

1.04 PROTECTION OF THE PUBLIC

A. The Contractor shall conduct work so as to interfere as little as possible with the operating personnel of the site or those persons that may have business at the site. Wherever necessary or required, and at the Contractor's own expense, the Contractor shall maintain fences, furnish full-time or part-time watchmen, guards, and like protective personnel, maintain lights, and take such additional precautions as may be necessary to protect life and property.

1.05 SITE CONTROL AND SECURITY

A. Site control and security will be maintained at the airport project site during all activities to prevent unauthorized personnel from entering the work area and to maintain airport perimeter security requirements. Entry into and exit out of the airport and construction areas (CA) will be controlled through the appropriate use of barriers, signs, and other measures in accordance with *Code of Federal Regulations* (CFR) 29 CFR 1910.144, "Safety Color Code for Marking Physical Hazards" (CFR 2003e) and 29 CFR 1910.145, "Specifications for Accident Prevention Signs and Tags" (CFR 2003f).

B. Signs that are routinely lost because of high winds and will be replaced as soon as possible the next working day following discovery.

C. Three types of site control designations (areas) will be used to meet Hazardous Waste Operations and Emergency Response (HAZWOPER), construction, and Federal Aviation Administration (FAA) site control requirements. These areas based on the potential hazards, complexity of work tasks, duration of project tasks, location and number of non-project personnel near the project area, and to prevent entry of personnel and equipment into the obstacle-free zone (OFZ). Radiologically controlled areas are not anticipated but could be established if radioactive materials or article are encountered. The three areas are

- CAs (general CA boundary)
- Controlled work area (CWA) (established for higher hazard tasks within the CA)
- Restricted area (RA) (OFZ and other areas where entry is not permitted)

D. The existing airport perimeter fence and gates provide general security and access control. This fence will be maintained during all construction activities and access to the project CA will be controlled. Only authorized project personnel and authorized visitors (visitors must have official business on site, receive HASP orientation briefing, and have proper personal protective equipment [PPE] for the area they will access) will be allowed access to the CA. Project construction and administrative areas (field trailer) will be delineated and posted to prevent inadvertent entry by persons conducting normal airport operations or maintenance tasks.

E. All personnel are required to sign in and out of the site access log located in the field trailer.

F. Where warranted, designated traffic routes may also be established. These areas also will be posted to prevent inadvertent entry by unauthorized personnel. Project personnel will also be prohibited from entering airport operational areas (not turned over for construction activities) to minimize the impact on airport operations and to reduce the likelihood of distributing foreign objects debris (FOD) on the tarmac and taxiway.

G. The CAs at the site will be the primary activity locations (main landfill and DDA). The CA boundary will be delineated using the existing airport perimeter fence and other temporary construction fencing where deemed appropriate. All areas beyond the construction field trailer will be considered a CA for site control purposes (whether delineated and posted or

not) and all training, badging, and PPE requirements apply. The primary access points to the CA will be clearly posted with "Construction Area" or similar caution signs. Only authorized personnel may enter the CA..

H. CWAs will be established to alert personnel within the CA of tasks or activities with increased hazards and to limit the number of workers and equipment in these areas. CWAs will also be used when there is a potential for exposure to site contaminants beyond the immediate work area. CWAs will control the flow of equipment and personnel through the use of established entry/exit points and traffic lanes. The boundary of the CWA may be marked with a combination of stanchions or posts and delineated with rope or ribbon and include warning signs or other demarcation. Only the minimum number of personnel required to safely perform the project tasks will be allowed into the CWA. All personnel who enter the CWA will have adequate training and wear the appropriate level of PPE for the degree and type of hazards present.

I. RAs will be established to prevent access to certain areas during the course of the project. Examples of RAs include the OFZ around the active runway, the area within 6 ft of the unprotected edge of the east slope above the Pueblo Canyon wall, and other areas designated throughout the course of the project. Entry into RAs is prohibited without authorization from the Site Safety Officer (SSO), SS, and Construction Manager. Entry will not be authorized without a compelling reason and only after other options not requiring entry have been considered and deemed not feasible by the SSO, SS and Construction Manager. If the OFZ must be entered, then coordination with airport operations personnel prior to entry is also required.

J. Additional PPE, communications equipment, and materials may be required for entry into RAs. A separate personnel control log will be maintained by the SS for entry into RAs and access will be limited to only essential personnel. Name of individuals entering along with time of entry and exit will be documented. The two-person rule (buddy system) will be required for all RA with the second person positioned immediately outside the RA and entering only when required.

1.06 MAINTENANCE OF THE EXISTING OPERATIONS

A. Airport surfaces shall be swept and washed as needed.

B. The Contractor must plan and implement construction activities to ensure daily airport operations are not impacted. Operation of the other facilities cannot be interrupted, stopped, or rerouted, unless approved by the Los Alamos County Airport Manager.

C. Failure of the Contractor to comply with the requirements of this Paragraph 1.05 will be considered a sufficient cause for the Owner to shut down the work. The Contractor will not be entitled to any extra compensation resulting from such a shutdown.

1.07 MAINTENANCE OF TRAFFIC

A. The Contractor shall carry on all work so that other site traffic will have access to all existing gravel roads, driveways, and facilities.

1.08 PROTECTION OF NATURAL WATERCOURSES

A. The Contractor shall use all care possible to prevent sedimentation and other pollution of waters during construction. Prohibited practices include, but are not limited to:

1. Dumping of soil material into streams or on stream.

2. Operating of equipment in streams.

3. Pumping of silt-laden water from trenches, containment sumps, or other excavations into streams.

4. Disposing of debris in streams and surrounding areas.

B. All erosion and sediment control work shall comply with Section 02930 of these Specifications, the Contractor's approved SWPPP and all applicable requirements of governing authorities having jurisdiction. The Contractor shall provide the necessary strawbales, silt sacks, silt fence, and/or other temporary erosion-control measures to contain all work activities. The Engineer may require additional erosion control measures should conditions warrant.

C. Erosion control measures shall be established at the beginning of construction and maintained during the entire period of construction. On-site areas that are subject to severe erosion, and off-site areas that are especially vulnerable to damage from erosion and/or sedimentation are to be identified by the Contractor and will receive special attention.

D. All land-disturbing activities are to be planned and conducted so as to minimize the size of the area to be exposed at any one time and to minimize the length of the time of exposure.

E. Surface water runoff originating upgrade of exposed areas should be controlled to reduce erosion and sediment loss during the period of exposure.

F. All land-disturbing activities are to be planned and conducted so as to minimize off-site sedimentation damage.

1.09 REMOVAL OF DEBRIS DURING CONSTRUCTION

A. During its progress, the work and the adjacent areas affected thereby, shall be kept clean and all rubbish, surplus materials, and unneeded construction equipment shall be properly removed and all damage repaired at the expense of the Contractor.

B. Airport taxiways and runways shall be kept free of debris. They will be swept or washed free of debris, as needed.

C. Where materials or debris has washed or flowed into or has been placed in watercourses, ditches, gutters, drains, catch basins, or elsewhere as a result of the Contractor's operations, such material or debris shall be entirely removed and properly disposed of during progress of the work, and the watercourses, ditches, gutters, drains, catch basins, and other facilities kept in neat, clean and functioning conditions.

1.10 FINAL CLEANING

A. On or before the completion of the work, the Contractor shall, unless otherwise directed in writing by the Owner, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools, and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect, and cover all organic material and material containing organic matter in, under, and around privies, houses, and other buildings used by him; shall remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by the Contractor's operations in a neat and satisfactory condition.

B. The Contractor shall restore or replace, subject to the approval of the Owner, any property damaged by the Contractor's work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. Suitable materials, equipment,

and methods shall be used for such restoration as approved by the Owner, or as required elsewhere in the Contract Documents.

1.11 DUST CONTROL

A. During the progress of the work, the Contractor shall conduct operations and maintain the area of activities so as to minimize the creation and dispersion of dust.

B. The Contractor shall control dust within the construction boundaries shown on the Drawings. Dust suppression shall include all roadways, stockpiles, and other areas.

C. Dust suppression activities shall be conducted as necessary.

D. The Contractor shall take necessary measures to eliminate dust. Visible dust is not allowed. The Contractor may use techniques that include, but are not limited to the use of a water truck and other methods described in the Contractor's Construction Plan to control dust on excavations and access roads.

E. Water for dust control sprinkling shall be clean, free of salt, oil, and other injurious materials.

1.12 NOISE CONTROL

A. Noise may not exceed 65 decibel A-weighted (dBA) at the site boundary during construction.

B. All work that would generate noise that could affect adjacent facilities is to be conducted during hours as designated by the Owner.

C. The Contractor is to review any excessively noisy activities with the Owner in sufficient time to permit a complete evaluation of the effects of such noise on the operations at the site and on adjacent facilities before the work is started.

1.13 ENVIRONMENTAL CONTROL

A. The Contractor is responsible for controlling all emissions into the environment in order to comply with all regulatory requirements.

B. Any accidental emissions must be reported in accordance with the WMP.

1.14 CONTAMINATED MATERIAL SPILLS

A. To avoid fuel spills during refueling, an assigned individual will always be present during refueling, and will be aware of the location and operation of the shut-off valve of the fuel tanker. Small equipment such as generators or pumps will be placed over bermed heavy mil plastic. If refueling spills or leaks occur, the bermed plastic will contain the pollutants until proper cleanup and disposal. Drip pans may also be used for refueling, or for placement under equipment that is leaking or has the potential to leak.

B. A spill kit containing a first aid kit, airhorn, PPE for cleanup activities, shovel, leather gloves, and appropriate absorbents (e.g., pillows, tubes, sand or vermiculite, pads, paper towels, etc.) will be readily available to control and contain spills. Site personnel will be trained in the use of the spill kit and in spill notification procedures.

C. Spills of non-petroleum products (e.g., fertilizers) will be minimized by proper handling of containers. To the extent possible, transfer of material from large storage containers to small application containers will occur at the materials storage area.

D. The SS shall report all spills or unauthorized discharges, regardless of amount, to the Contractor's Project Manager, the Contractor's Construction Manager, and the LANL Office of Emergency Management Response (S-8). Refer to the WMP for notification phone numbers. This notification will occur as soon as possible after the discharge, but in no event more that 24 hours after the discharge. The following information will be reported:

- The name, address, and telephone number of the person or persons in charge of the facility, as well as the owner or operator of the facility
- The name and address of the facility
- The date, time, location, and duration of the discharge
- The source and cause of discharge
- A description of the discharge, including its chemical composition
- The estimated volume of the discharge
- Actions taken to mitigate immediate damage from the discharge

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01600

MATERIALS AND EQUIPMENT, PRODUCT OPTIONS, AND SUBSTITUTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General Material and Equipment Requirements.

B. Procedures for Substitutions.

1.02 RELATED SECTIONS AND REQUIREMENTS

A. Division 1 - General Requirements.

1.03 GENERAL MATERIAL AND EQUIPMENT REQUIREMENTS

A. Unless otherwise indicated on the Drawings or Specifications, only new materials and equipment shall be incorporated in the work. All materials and equipment furnished by the Contractor, or equipment supplier as appropriate, to be incorporated in the work shall be subject to the inspection and approval of the Engineer. No material shall be processed for, fabricated for, or delivered to the work without prior approval of the Engineer.

B. For the purpose of indicating the standards of type, quality, design, and performance of materials and equipment to be provided under this contract, various materials and equipment are named in the Contract Documents, as commercial brands or equal.

C. The manufacturer(s) named are listed as the approved vendor, or equipment supplier if appropriate, in preparing the Bid. The list is based on the Engineer's knowledge of or experience with the various manufacturers and does not represent that the manufacturers listed will meet the detailed requirements of the Specification. It is the responsibility of the Contractor, or equipment supplier if appropriate, in preparing the Bid to inform and be satisfied that the manufacturer selected for each item of equipment or material will meet the detailed requirements of the Contract Documents, whether the manufacturer selected is one of the named manufacturers or not.

1.04 PRODUCT OPTIONS AND SUBSTITUTIONS

A. The Contract Documents have been prepared using particular items of equipment and material in order to provide a complete set of plans and specifications. These are the materials and manufacturer that will not be substituted unless approved by the Engineer. As-Built drawings shall be maintained by the installing contractor showing the materials actually installed.

B. The following procedures will be followed relative to substitutions:

1. The General Contractor as part of the Bid shall submit a list of requested and approved substitutions which shall be accompanied by the following information:

a. Catalog cuts of the proposed equipment.

b. Other drawings and manufacturer's information as necessary to fully describe the equipment or material as intended for its specific use in this project.

c. For major equipment that is an integral part of the process, the submittal shall include a letter from the manufacturer certifying that the recommended substitution will meet the performance requirements for that piece of equipment.

d. Identification of changes required in the installation of the substituted equipment or material compared to the information presented in the Contract Documents.

2. The Engineer shall briefly review the requested substitution and determine the acceptability of the substituted equipment or material. This brief review will not relieve the Contractor of the responsibility for the proper functioning of the equipment or material. The Engineer will retain the right of final decision as to the acceptability of the substitution.

3. Substitutions cannot be made after the contract has been awarded without approval of the Engineer.

4. The Contractor will maintain accurate "As-Built" drawings showing the equipment or materials as actually installed.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Closeout Procedures.

B. Final Cleaning.

C. Project Record Documents.

D. Warranties.

1.02 RELATED SECTIONS

A. Division 1 - General Requirements.

B. PMP.

1.03 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for inspection by the Owner.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.04 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean interior and exterior surfaces exposed to view.

C. Clean site, sweep paved areas, rake clean landscaped surfaces.

D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.05 PROJECT RECORD DOCUMENTS

A. Maintain on-site, one set of the following record documents; record actual revisions to the Work:

1. Contract Drawings.

2. Specifications.

3. Written or verbal instructions.

4. Modifications to the Contract.

5. Reviewed shop drawings, product data, and samples.

B. Store Record Documents separate from documents used for construction.

C. Record information concurrent with construction progress.

D. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.

2. Product substitutions or alternates utilized.

3. Changes made by Addenda and Modifications.

E. Record Documents, As-Built Drawings, and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

2. Field changes of dimension and detail.

3. Details not on original Contract Drawings.

F. Submit documents to the Owner with claim for final Application for Payment.

1.07 WARRANTIES

A. Provide notarized copies.

Execute and assemble documents from Subcontractors, suppliers, and manufacturers.

C. Provide Table of Contents and assemble in a ring binder with durable plastic cover.

D. Submit prior to final Application for Payment.

E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

DIVISION 2

SITE WORK

SECTION 02005

SURVEYING

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. The work to be performed under this section shall include:

1. Project as-built surveys as required herein and elsewhere in the Technical Specification.

2. Surveys during the life of the project as directed by the Engineer, and surveys required to measure the quantities of completed work for determining the value of partial payments as described in other sections of these Specifications.

3. Pre-construction and construction topographic surveys.

B. The survey work shall be performed under the direction of a Land Surveyor registered in the State of New Mexico who shall be subcontracted by the Contractor for the life of the Contract to perform the QA survey work to be performed under this item. The Contractor's QA Surveyor shall be independent from the Contractor and approved by the Engineer. Topographic, cross-sectional, and grade verification surveys will include the development by the QA Surveyor of topographic drawings for the use by the Engineer in verifying field conditions, measurement of quantities, and adjusting the design as necessary.

1.02 RELATED SECTIONS AND REQUIREMNTS

A. CQCP.

B. Construction Plan for LASO TA-73 Airport Landfill.

1.03 SUBMITTALS

A. Prior to commencement of work under this item, the Contractor shall submit the name, address, and telephone number of the QA Surveyor that will perform this work on the Project.

B. The Contractor shall organize the placement of the components of the landfill cover systems into manageable areas of work. The Contractor shall submit to the Engineer the pre-construction surveys before commencing excavation, fill placement, or cover system work. Additional topographic surveys of the completed work shall be submitted with each payment request and shall be a condition precedent to the Engineer's approval of the Contractor's request for partial payment. Topographic surveys and as-built surveys to be developed include the following:

1. Pre-construction topographic survey plan shall depict the existing conditions within the limits of work prior to earth disturbance at both the DDA and main landfill.

2. The Contractor, at a minimum, shall also prepare construction topographic and as-built surveys for each of the following surfaces as shown on the Contract Drawings and described in the Technical Specifications.

(a) Existing topography of the main landfill, including locations and elevations of any existing structure on the landfill.

(b) Subgrade surface after removal of existing interim cover material (main landfill).

(c) Subgrade surface on east slope of landfill clearly showing the areal extent of resistant material (bedrock). To be submitted immediately upon removal of waste from the slope.

(d) The top surface of the relocated interim cover material (main landfill).

(e) The top surface of the infiltration layer (main landfill)

(f) Top surface of the aggregate base course.

(g) The final grade surface (main landfill and DDA).

(h) Horizontal alignment and top and bottom of all retaining walls.

3. The Contractor shall, at a minimum, prepare construction topographic surveys for other areas within the limit of work (but beyond the landfill surface) for each of the following surfaces as shown on the Drawings and described in the Technical Specifications:

(a) The final grades of all permanent stormwater management structures (to include all related pipe locations, sizes, and invert elevations).

4. The coordinate system requirements for deliverables are North American Datum 83 and North American Vertical Datum 088.

5. All topographic survey plans shall be prepared at a scale of 1 in. = 30 ft with a 2- ft contour interval applying National Map Standards, unless otherwise directed by the Engineer.

D. The Contractor shall compile all topographic surveys performed for work during the course of the Contract into composite plans for the respective surfaces of each area surveyed. The composite plans shall be prepared at a scale of 1 in. = 30 ft with 2-ft contour intervals (with spot elevations at all tops and toes of slopes) and shall be submitted to the Engineer no later than 15 working days after the scheduled completion date for the Construction.

E. For all work under this item, the Contractor shall submit disk copies of the topographic survey plans in AutoCAD 2004 (or latest version) format with executable files along with two (2) prints for each survey plan required.

F. The Engineer reserves the right to require the submittal of copies of any or all survey field notes from the Contractor.

G. Tolerance on construction shall be ±0.15 ft every 100 ft with no compounding of tolerance except for asphalt and concrete surface which shall have a tolerance of ±0.10 ft every 100 ft with no compounding of tolerance . All minimum and maximum slopes shall be maintained.

PART 2 MATERIALS

Not Applicable.

PART 3 EXECUTION

3.01 SURVEYING

A. The Contractor shall locate, protect, and verify survey control points established from local elevation and coordinate datum prior to starting site work and preserve these points during construction. These controls will be permanent monuments used throughout construction and post-construction for any needed topographic, radial stakeout, and benchmark elevations. The Contractor shall promptly report to the Engineer lost, relocated or destroyed control points. The Contractor shall maintain complete and accurate field notes for all control points and survey points as work progresses.

B. The Contractor shall perform and update the as-built surveys throughout the life of the Contract as necessary and at the end of the project.

C. For all survey work, survey points shall be obtained using a 50-ft grid. Additional points shall be surveyed at toe and top of slopes and as necessary to provide accurate topography in areas where slopes vary between the above noted grid points. All point elevations shall be accurate to a tenth of a foot. All pipe invert elevations shall be accurate to a hundredth of a foot.

D. Initial Staking will include angle points for fence relocation at the northeast end of the main landfill and centerline cut and fills for proposed access routes.

E. Upon completion of survey work the Contractor shall submit to the Engineer the deliverables (including plans, drawings, electronic disks, and survey notes), in accordance with subsection 1.02.

F. All deliverables under this item shall be signed and sealed by the QA Surveyor.

END OF SECTION

SECTION 02100

CLEARING AND STRIPPING

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. The work to be performed under this Section includes all requirements for the clearing and stripping of all areas within the Contract Limit of Work in accordance with the Documents.

1.02 DEFINITIONS

A. Clearing is the removal from the ground surface and disposal, within the contract limit of disturbance, of brush, shrubs, other vegetation, rubbish, and debris (natural and man-made).

B. Stripping is the removal and stockpiling, within the contract limit of disturbance or as provided for by the Engineer, of all topsoils and cover soils that are above the limits of waste including matted roots, and organic materials.

PART 2 MATERIALS

Not Applicable.

PART 3 EXECUTION

3.01 GENERAL

A. Do not start earthwork operations in areas where clearing and stripping is not complete. Comply with erosion, sediment control, and storm management measures specified in the SWPPP and Section 02930 (Erosion and Sediment Control).

3.02 CLEARING

A. Clear all items to the limits necessary to perform construction activities and shred all cleared and grubbed material for use in topsoil applications. The Contractor is responsible to dispose of cleared and grubbed materials in accordance with State and Federal guidelines.

B. Burning of any material shall not be permitted on the Site.

3.03 STRIPPING

A. Cut existing vegetation on the main landfill as close to the existing ground surface as possible. Remove material from the ground surface and use it as mulch for temporary stabilization.

B. Disk the first 6 to 8 in. of cover soils, including stubble vegetation. Thoroughly mix the soils with the vegetative matter.

C. Remove the completed disked material and stockpile as topsoil.

D. Do not over excavate the topsoil material.

E. Assure the topsoil is segregated from the waste and cover soils.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. The work to be performed under this section includes requirements for excavation; subgrade preparation; placement and compaction of structural fill and other soil or aggregate materials, including low-permeability soil; grading; items associated with the backfilling of pipe/utility trenches; filling for roads, channels, etc. as required; and performing laboratory and field testing of earthwork materials, as shown on the Drawings or as directed by the Engineer. The work shall also include completing up to 5 geotechnical test borings along the alignment of Wall No.1.

1.02 RELATED SECTIONS AND REFERENCES

A. Section 02100 – Clearing and Stripping

B. Section 02270 – Channel Protection

C. Section 02750 – Stormwater Management and Discharge

D. Section 02930 – Erosion and Sediment Control

E. SWPPP, June 2005.

F. CQCP, June 2005.

G. Construction Plan for LASO TA-73 Airport Landfill, June 2005.

H. New Mexico Department of Transportation (NMDOT) Specifications for Highway and Bridge Construction, 2000 Edition.

1.03 DEFINITIONS

A. Definitions pertinent to the earthwork requirements of this project include:

1. Existing/Relocated Interim Cover Material – on-site soil suitable for backfilling pipe trenches, associated in-line structures, [illegible]im cover, and for use in backfilling areas from which waste was removed.

2. Structural fill – suitable imported soil/aggregate used for wall backfill.

3. Common borrow – suitable soils meeting the material requirements specified herein and provided from locations within the limits of the site property. Common borrow, to the greatest extent practicable, within the limits of construction methods, engineering judgment and design and in accordance with these Specifications shall be used for site construction. [illegible] anticipated that all common borrow will be generated from existing/relocated [illegible]rim cover materials.

4. Foreign borrow – suitable material meeting the material requirements specified herein and provided from sources outside the limits of the site property. Foreign borrow will be used to supplement common borrow material as needed.

5. Infiltration layer soils – defined as foreign borrow, suitable material meeting the requirements specified herein, and infiltration layer soil for use within the main landfill cover system shall be common borrow, environmentally-clean and free of organic material, frozen material, wood, or foreign trash, or other objectionable materials which may be decomposable, compressible, or which cannot be properly compacted, shall not contain recycled materials.

6. Topsoil – suitable material meeting the material requirements specified herein; and provided from sources within or outside the limits of the site property.

7. Unsuitable material – unsuitable material not meeting the requirements set forth herein for fill materials or as otherwise determined by the Engineer to be inappropriate and/or unacceptable for use. Unsuitable material shall be disposed of by the Contractor in the main landfill.

8. Environmentally-clean – soil purchased from commercially available sources shall be certified to be free of chemical contaminants by the seller. The Engineer reserves the right to require additional chemical testing by the Contractor, at no cost to the Engineer, of proposed foreign borrow material to verify its environmental cleanliness should the borrow site history suggest the possible presence of contamination. The Engineer also reserves the right to inspect the foreign borrow site at any time prior to or during construction activities.

9. Noncalcareous – soil or aggregate that, when tested in accordance with ASTM D3042 for soils and ASTM D4373 for aggregates, possesses no more than a 5% loss of weight (dry basis) for aggregates or a maximum carbonate content of 15%.

10. Subgrade – excavation bottom or existing grade, as specified herein, prepared to receive [illegible]regate materials or infiltration layer.

1.04 QUALITY CONTROL

A. General

1. Unless otherwise indicated, all laboratory and field testing shall be performed by an independent geotechnical testing laboratory (GTL) employed by the Contractor, with test materials furnished by the Contractor under the direction of the Engineer. The GTL proposed by the Contractor shall be reviewed and approved by the Engineer. The laboratory shall, at a minimum, be in compliance with ASTM D3740 Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rocks as Used in Engineering Design and Construction.

2. The Contractor shall test materials as set forth in the applicable referenced sections and as required herein.

B. Preconstruction Material Testing Requirements

1. The Contractor shall arrange for an inspection by the Engineer of each proposed foreign and common borrow source prior to the commencement of earthwork operations. During said inspection, the Contractor shall provide any equipment necessary to excavate test pits throughout the limits of the proposed source so as to provide the Engineer with a thorough inspection of the type(s) and uniformity of material(s) throughout the proposed source. Upon the Engineer's visual inspection and preliminary acceptance of a proposed borrow source, the Contractor shall collect representative samples of the borrow soils for

subsequent geotechnical testing in accordance with Table 02200-1 and as directed by the Engineer.

2. The Contractor is required to submit representative samples of each proposed foreign and common borrow material to the GTL at the minimum frequencies specified in Table 02200-1. The physical property tests shall be completed for each sample and the material approved prior to use of the material at the site. The Contractor shall complete all testing on infiltration layer materials prior to delivery to the site at the frequency specified in Table 02200-1. Infiltration layer material must be pre-approved prior to delivery to the site. Additional quality control testing will be performed on samples of delivered material. If, during the course of construction, an alternative borrow source is used, the material must be pre-approved by the Engineer in accordance with the requirements of this Specification prior to delivery to the site.

3. When a material is approved for use as infiltration layer soil, additional testing shall be performed in accordance with Table 02200-1 to correlate acceptable in-place compactive effort and moisture content to required permeability properties. The resulting lab data shall be used to develop a window within which the degree of compaction and moisture content of the tested in-place soil should fall. By doing so, a reasonable level of assurance can be expected that permeability of the in-place soil will meet the regulatory requirements for hydraulic conductivity.

4. The results of this preconstruction testing program shall be submitted to the Engineer for approval at least two (2) weeks before use of these soils at the site. These test results may be applied toward the test frequency requirements. Physical specimens of all proposed foreign borrow materials shall also be submitted to the Engineer, if requested. The Engineer shall have the authority to reject any and all soils that are believed to be inappropriate for earthwork construction.

5. The frequency of conformance testing of each approved soil material shall be in accordance with Table 02200-1 or at anytime that a significant change in physical properties of the proposed fill materials is observed by the GTL or the Engineer. The results of this on-going conformance testing shall be reviewed and approved by the Engineer prior to use of that material for which the testing was completed.

Table 02200-1
Material Quality Control
*Minimum Preconstruction Testing Requirements

Property	Test Method	Fill Materials[3, 5] Frequency	Infiltration Layer Frequency	Topsoil Frequency
Particle Size Analysis w/Hydrometer[1]	ASTM D421/D422	10,000CY	5,000CY	5,000 CY
Atterberg Limits	ASTM D4318	10,000 CY	5,000CY	---------
Organic Content	ASTM D2974	10,000 CY	---------	5,000 CY
Moisture Content	ASTM D2216	10,000 CY	5,000CY	5,000 CY
Standard Proctor Compaction	ASTM D698	10,000 CY	5,000CY	---------
Permeability[2]	ASTM D5084	---------	5,000CY	---------
pH	ASTM D4972	---------	---------	5,000 CY
Nitrogen (TKN)	EPA 351.3	---------	---------	5,000 CY
Phosphorus, Orthophosphate (as P)	EPA 9056A	---------	---------	5,000 CY

[1]Provide USCS designations for Structural Fill/Common Borrow/Foreign Borrow and Infiltration Layer samples and USDA classification for topsoil samples.
[2]Permeability tests for infiltration layer soil shall be conducted on remolded samples compacted to 95% degree of compaction as determined from ASTM D698 within -1% to +2% of optimum moisture content. The permeability test shall be performed under a confining stress of between 0.5 and 2.0 psi, with the lowest value being preferred and a hydraulic gradient of 1.0.
[3]Fill materials include Structural Fill, Common Borrow and Foreign Borrow.
[4]Testing frequency requirements for imported materials obtained from a NMDOT certified source may be reduced by the Engineer based on review of historical records for material produced by the source.
5. [illegible]ding materials used to achieve subgrade elevations.

Preconstruction
Minimum Testing Acceptance Criteria

Property	Test Method	Fill Materials[1, 3]	Infiltration Layer	Topsoil
Particle Size Analysis w/Hydrometer	ASTM D421/D422	See 2.01.A.2.e	---------	---------
Atterberg Limits	ASTM D4318	LL ≤ 40; PI ≤ 12	---------	---------
Organic Content	ASTM D2974	≤ 6%	---------	> 5%
Standard Proctor Compaction	ASTM D698	Dry density [2] ≥ 105 pcf	---------	---------
Permeability	ASTM D5084	---------	K ≤$1x10^{-5}$ cm/s	---------
pH	ASTM D4972	---------	---------	5.5 – 7.6
USDA Classification	Via ASTM D421/D422	---------	---------	Sandy loam, loam, silty loam, sandy clay loam
Nitrogen (TKN)	EPA 351.3	---------	---------	None; used to guide amendment
Phosphorus, Orthophosphate (as P)	EPA 9056A	---------	---------	None; used to guide amendment

[1]Fill materials include Structural Fill, Common Borrow and Foreign Borrow.
[2]Maximum dry density for structural fill used behind retaining walls shall be at least 110 pcf.
3. [illegible]ding materials used to achieve subgrade elevations.

C. Field Quality Control Testing Requirements

1. The Contractor shall provide all horizontal and vertical controls necessary for all earthworks as well as associated grid layout and staking using benchmarks and monuments, if any, shown on the Drawings and required by these Specifications.

2. Placing soil material and performing earthworks will be subject to periodic QA inspection by the Engineer. The GTL shall provide continuous quality control (QC) inspection including field moisture and density tests during the compaction of each lift of soil in accordance with Table 02200-2. The Contractor shall also provide labor and equipment to prepare smooth surface spot locations as designated by the independent GTL or the Engineer on which to perform field tests.

Table 02200-2
Field Quality Control
Minimum Testing Requirements

Property	Test Method	Fill Materials[1, 2, 3] Frequency	Infiltration Layer Frequency
Field Dry Density	ASTM D2922	10,000 SF	2/Ac/Lift
Field Moisture Content	ASTM D3017	10,000 SF	2/Ac/Lift
Particle Size Analysis (Sieve only)	ASTM D421/422	---------	2500 CY
Standard Proctor	ASTM D698	---------	5000 CY

[1]Fill materials include Structural Fill, Common Borrow and Foreign Borrow.
2. ding materials used to achieve subgrade elevations
3. CN-4200-41 for reduction in testing frequency for MSE wall backfill

Field Quality Control
Minimum Testing Acceptance Criteria

Property	Test Method	Fill Materials[1, 3, 4]	Infiltration Layer
Field Dry Density	ASTM D2922	98% Standard Proctor	95% Standard Proctor[1]
Field Moisture Content	ASTM D3017	± 3% Optimum	-1 to +2% Optimum[1]
Particle Size Analysis (Sieve Only)	ASTM D421/422	---------	Range to be determined[2]

[1]Fill materials include Structural Fill, Common Borrow and Foreign Borrow.
[2]Acceptable range will be established upon completion of preconstruction testing.
3. ding materials used to achieve subgrade elevations.
4. of standard Proctor allowed for Russell's gravel aggregate used as backfill behind Walls 1 and 2.

3. Following the placement and compaction of each lift of soil, said lift shall be tested to determine the in-place compacted dry density and moisture content of the in-place soils, and to determine conformance of these data with the project specifications, before subsequent lifts are placed. The testing results from the infiltration layer shall also show that in-place density and moisture content fall within the permeability window determined for the infiltration layer soils as described in Subsection 1.04.B.3. Tests outside of the window shall be considered failing unless otherwise approved by the Engineer. Deficient areas shall be recompacted in accordance with approved techniques as stated herein.

The GTL shall perform in-place field density and moisture tests of each compacted lift in accordance with the following approved methods:

a. ASTM D2922 and D3017 (Moisture Content and Density of Soil and Soil-Aggregate in Place by Nuclear Methods). The direct transmission method shall be used unless otherwise directed by the Engineer.

4. For each placed lift, one field moisture-density test shall be performed by the GTL for each 100 lineal ft of trench backfill and narrow above-grade fills, for every 10,000 square feet (ft^2) of structural fill/common fill soil and 2 every AC of infiltration layer soil placed and compacted. The field moisture-density testing frequency shall be increased, if deemed necessary by the Engineer.

5. Any test resulting in penetration of the infiltration soil layer shall be repaired using granular or powdered bentonite.

1.05 SUBMITTALS

A. Delivery Tickets

1. Delivery tickets showing the following information with each load of foreign borrow fill material used shall be submitted to the SS:

a. Location of borrow source.

b. Name and location of supplier.

c. Type and amount of material delivered.

B. Certified Test Reports

1. The Contractor shall submit to the Engineer the source, estimated quantity, and testing results of all soil material to be used. Acceptance of the soil material from any location shall not be construed as approval of an entire location, but only insofar as the soil material continues to meet the Specification requirements.

2. The Contractor shall submit two (2) certified copies of each report of laboratory test results to the Engineer at least two (2) weeks before use of any soil materials.

3. The Contractor shall submit Certificates of Compliance in accordance with Section 01340 for soil and aggregate materials stating that the materials are environmentally-clean and satisfy all material requirements of these Specifications.

PART 2 MATERIALS

2.01 SOIL MATERIALS

A. Existing/Relocated Interim Cover Material

1. Existing/Relocated Interim Cover Material shall be approved common or foreign borrow material consisting of soil having a uniform mixture of durable natural materials. Common borrow generated by site excavation activities required to achieve design subgrade elevations shall be used as fill to the maximum extent possible.

2. Fill soil generated from site excavation activities shall be environmentally-clean, and free of frozen material, wood, trash, or other objectionable materials which may be

decomposable, compressible or which cannot be properly compacted, shall not contain any recycled materials, and shall not contain particles larger than:

- 2 in. for trench backfill.
- 1 in. for the 12-in. lift of fill soil adjacent to any geosynthetic materials.
- 4 in. for fill used in embankment or other fills.

3. Snow, ice, and frozen soil shall be strictly excluded from structural fill materials.

4. The moisture content of soils being placed as fill shall be near optimum conditions so as to provide the specified compaction and ensure a stable embankment.

5. Recycled materials shall be unacceptable for use as fill.

6. Foreign borrow may be used to augment common borrow providing the requirements specified herein are satisfied.

B. Infiltration Layer

1. Infiltration Layer soil for use within the main landfill cover system shall be foreign borrow, environmentally-clean and free of organic material, frozen material, wood, or foreign trash, or other objectionable materials which may be decomposable, compressible, or which cannot be properly compacted, shall not contain recycled materials, and shall satisfy the following:

   a. Maximum particle size of 1.5 in.

   b. Maximum permeability of 1×10^{-5} centimeters per second (cm/sec) when compacted to at least [illegible]% of its maximum dry density (ASTM D698) at a moisture content between -1% and +2% wet of its optimum moisture content under a confining stress of 2 psi, unless otherwise approved by the Engineer. (Permeability testing shall be completed under the lowest normal stress that can be reliability maintained by the laboratory test apparatus.)

C. Topsoil

1. Topsoil shall be sandy loam, silty loam, or sandy clay loam as classified by the United States Department of Agriculture (USDA). Gradation analysis (sieve and hydrometer; ASTM D421/422) shall be completed to allow proper USDA classification of the material. Topsoil shall be fertile and friable surface soil of good and uniform quality. Topsoil shall not contain subsoil materials. Topsoil shall be free of refuse, hard clods, woody vegetation, stiff clay, construction debris, boulders, stones larger than 2 in., hydrocarbons, petroleum materials or chemicals toxic to plants, other miscellaneous or otherwise unstable or undesirable materials, and other deleterious inclusions. Testing of topsoil shall be at the frequencies shown on Table 02200-1.

2. Topsoil shall have a minimum organic content of 1% by weight. The organic content of soils shall be determined by the Engineer-approved laboratory utilizing the method described in the ASTM D2974.

3. Topsoil shall have a pH value within a range of 5.5 to 7.6.

4. Apply slow release fertilizers to minimize deficiencies in topsoil, based on prequalification testing results. Organic fertilizers such as Biosol Mix, Biosol, Osmocote, composted manure or other products approved by the Engineer or his designee may be used. If composted manure is to be applied, test the nutrient content and interpret before it is used. If wood chips are used, chips shall have a relatively large surface area to volume ratio to be more easily broken down in the soil. Incorporate wood chips at low rates (0.5 ton/ AC) in order to assure the Carbon to Nitrogen ratio in soil is at favorable conditions for plant germination and growth. If higher rates are used, add nitrogen fertilizer to assure nutrient availability to plants.

2.02 BEDDING MATERIALS

A. Aggregate Bedding for gas collection pipes located within the limit of waste and below the paved surface shall meet the requirements for Aggregate Base Course.

B. Bedding for gas collection pipes located within the limit of waste but beyond the paved surface shall meet the requirements for Infiltration Layer material.

C. Aggregate Bedding for storm drain pipes and precast and cast-in-place concrete structures shall be noncalcareous aggregate meeting the requirements of NMDOT Section 304.21 for Class OGBC (open-graded base course) unless otherwise recommended by the manufacturer. Slag will not be permitted.

2.03 AGGREGATE BASE COURSE

A. Aggregate base course shall be noncalcareous aggregate meeting the requirements of NMDOT Section 304.21 for Class I Base Course or as otherwise may be required to satisfy the design requirements for the support of the MatCon™ pavement, defined in UFGS Section 02722 (attached).

2.04 STRUCTURAL FILL

A. Structural Fill used as backfill for the reinforced concrete wall (Wall No.1) and the MSE walls shall be aggregate meeting the requirements of MSE wall vendors guide specifications as per FCN-4200-010. kfill shall be used for the 10 ft immediately behind Wall 1; and interim cover material may be used beyond the 10-ft limit to the limit of the preparatory grade.

PART 3 EXECUTION

3.01 EXCAVATION

A. General

1. Excavations shall be completed to the lines and grades indicated on the Drawings and as required in these Specifications. It shall be the Contractor's responsibility to separate and protect excavated material that is suitable for reuse (i.e., common borrow) from contamination by unsuitable excavated material or other sources. Determination of suitable material shall be preliminarily based on visual observations by the Contractor with concurrence by the Engineer. Final determination of suitable material shall be based on the results of the specified testing program and/or the professional judgment of the Engineer. The Contractor shall make his own determinations relative to subsurface conditions within the vicinity of the landfill and any areas that may yield suitable common borrow materials.

2. The Contractor shall maintain all excavation and fill operations free of water by ditching, sumps, pumping, or other methods approved by the Engineer. Each layer of fill material shall be placed so that the surface is free-draining. Runoff and other water shall be conveyed in ditches and channels to the site perimeter stormwater management system as specified herein.

B. Removal and Placement of Excess and Unsuitable Soil Materials

1. Excess soil materials generated by site excavations, and materials deemed unsuitable by the Engineer which are encountered either beneath, contiguous to or within the proposed limits of excavation or fill placement, shall be removed, transported to, and placed at a stockpile area and kept separate from other soil materials. Unsuitable materials shall be placed within the landfill.

2. Excess (but otherwise suitable) soil materials shall be segregated from and not contaminated with unsuitable soil materials.

3. Excavated boulders and other inert oversized material shall be handled as specified in Section 02266.

C. Unauthorized Excavation

1. Where unauthorized excavations are made below indicated elevations under channels, footings, pipes, structures, or outside trench limits, restore the area to proper elevations with structural fill materials that are placed and compacted, as specified herein, at no additional cost to the Engineer.

D Sheeting, Shoring, And Bracing

1. Method, design and adequacy of all temporary sheeting, shoring, and bracing systems, when applicable, shall meet the requirements of OSHA 29 CFR Part 1926 and are the responsibility of the Contractor. All damage related to or caused by improperly designed or constructed retention systems shall be repaired by the Contractor. The design and method of the sheeting, shoring, and bracing shall provide means for its removal as backfill progresses, unless otherwise indicated on the Drawings or directed by the Engineer.

2. Provide sheeting and shoring or other appropriate retention measures as required to ensure safe working conditions; maintain required excavation dimensions for proper construction; and to prevent accidents, cave-ins, and damage to adjacent structures, facilities, and surfaces.

3. Sheeting, shoring, and bracing shall be placed so as not to interfere with the construction and shall be entirely independent of all footings, pipes, and structures.

4. Remove sheeting, shoring, bracing, and all forms concurrently with backfilling operations. Such removal shall be accomplished in a manner that precludes settlement of the backfill, cave-in of the excavation sides, and prevents damage to adjacent surfaces. Voids left or caused by the removal shall be promptly filled.

E. Trench Excavation

1. Excavate trenches, when required, to the width and depth dimensions indicated on the Drawings. Provide uniform, continuous support for pipe or structure on required bedding. Remove rock, when encountered, to a minimum depth of 6 in. below the pipe and to the same depth below the bell. In general, the trench bottom shall be excavated to conform to the shape and dimensions of the proposed pipe or structure. If the shape of the trench cannot be preserved or the trench varies from the shape of the structures, the space between the desired trench dimensions and the bottom of the excavation, as made, shall be filled with compacted aggregate backfill. Allowance shall be made for the placement of granular bedding, where specified. Materials at the bottom of the trench deemed unsuitable by the Engineer shall be removed and replaced with compacted aggregate backfill. Depth and width of removal shall be as directed by the Engineer. Damage caused to existing facilities by the Contractor's operations shall be repaired or replaced at no expense to the Engineer.

2. Unless otherwise specified herein or authorized by the Engineer, trench excavation shall proceed no more than 300 ft in advance of the placing of backfill. The Engineer may require backfilling and subsequent re-excavation of trenches left open for an unreasonable amount of time in advance of pipe installation. Trenches left open overnight, or during periods when the Contractor's forces are not present, shall be so protected or enclosed and appropriately marked as to cause no danger to the public or others.

3. Sides of trenches from a point 1 ft above the top of the pipe to the bottom of the trench shall be practically plumb. Bell holes, if required, shall be excavated in the bottom of the trench wherever necessary to permit the proper assembling of joints.

E. Excavation for Cast-in-Place Reinforced Concrete Wall

1. Excavation for the cast-in-place reinforced concrete wall shall be to the lines and grades shown on the Drawings. All over-burden soils, waste material and miscellaneous debris shall be removed from within the limits of the excavation. The excavation shall be extended to depths such that the bottom of the wall footing bears at least 2 feet below the surface of competent bedrock. If the excavation must be extended to greater depths to achieve 2 feet embedment into competent bedrock, the over-excavated portion of the trench shall be backfilled with lean concrete. The lean concrete shall be tied to the bedrock and to the wall footing with appropriately sized and spaced reinforcing bars.

2. Excavation into bedrock shall be stepped as necessary to achieve the minimum required embedment depth.

3. The use of hydraulic hammers may be required to complete rock excavation. Blasting is not permitted.

3.02 FILL AND BACKFILL CONSTRUCTION

A General

1. Excavations shall be backfilled with Existing/Relocated Interim Cover Material, other Common Borrow approved for use by the Engineer, or Aggregate Base Course

2. Backfill around a structure or pipe shall be brought up evenly on all sides so that no unbalanced pressure shall be imposed on the structure or pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of all pipes. Extra attention shall be paid to the compaction of fill under the haunches when entering and exiting manholes. After the bedding material has been placed and compacted, the remainder of the excavation shall be backfilled with suitable Existing/Interim Cover Material.

3. Do not place, spread, or compact fill material or backfill material while it is frozen or thawing; or place upon frozen or thawing ground; or during unfavorable weather conditions. When the Work is interrupted by rain, fill operations shall not be resumed until field tests indicate that the water content and density of the exposed fill are within the limits specified. A compacted layer that has been rained on or frozen shall be removed, reworked, or recompacted by a method approved by the Engineer before the next layer is placed thereon.

4. Thoroughly mix each lift before compaction to ensure uniform distribution of water content. Distribute particles of permissible sizes throughout the fill material.

5. Placement of soil materials on underlying geosynthetics shall not proceed at an ambient temperature below 32°F or above 104°F, unless otherwise specified or approved by the Engineer. Equipment used for placing soil shall not be driven directly on the underlying geosynthetics. A minimum thickness of 12 in. of soil material is required between tracked equipment with a maximum ground pressure of 15 pounds per square inch (psi) and the underlying geosynthetics, unless otherwise specified. A minimum thickness of 3 ft of soil material is required between rubber-tired vehicles and the underlying geosynthetics.

6. Soils used at the site shall be continuously visually inspected by the Contractor's quality control personnel during construction to check that it is consistent with the soil previously used at the site. If changes in material or source occur, the quality control personnel shall inform the Engineer immediately and reject any work performed by the Contractor using the new material until the pre-construction QA/QC procedures (as outlined in the CQCP) are executed and approved by the Engineer at the expense of the Contractor.

7. The Contractor shall be responsible to repair any desiccation or other damage to soil between testing and acceptance by wetting, drying and reworking the material.

8. The finished surface of the structural fill layer component of the liner system shall be free of debris, roots, sticks, or any other foreign matter so as to provide for an acceptable bearing surface for the overlying geosynthetics, where applicable.

B. Subgrade Preparation

1. Areas where fill material is to be placed shall have all vegetation, root matter, and topsoil removed. Following this activity, the subgrade within the limits of fill material placement shall be proofrolled on-grade using a heavy-duty roller (preferably sheepsfoot) with a minimum weight of 10 tons. A minimum of four passes of the roller shall be completed over the entire area. Proof-rolling in this manner shall be completed over the entire landfill area to provide for a stable and uniform subgrade surface, unless otherwise approved by the Engineer. Additional proof-rolling of the surface may be required within the hanger footprints as directed by the Engineer. To the extent practical, the north and east slopes of the landfill shall be compacted with construction equipment.

2. Following completion of proof-rolling, the entire area will be visually inspected by the Engineer. Should any loose or otherwise unstable zones be detected by the visual inspection, these areas shall be recompacted using a roller with as many passes as are necessary to densify these materials to the satisfaction of the Engineer. If these materials cannot be densified sufficiently by the additional proofrolling, they shall be undercut and replaced with one or more lifts of large (6 to 12-inch diameter) aggregate. The aggregate shall be pushed into the soft subgrade until the area is stabilized.

3. For undercuts, the exposed subgrade shall be proofrolled on-grade until sufficiently stable, as determined by the Engineer. (If the undercut zones are of minimal areal extent, hand-operated compaction equipment may be used to densify these areas.) Unsuitable materials undercut during subgrade preparation activities shall be transported to and placed at the stockpile area under the direction of the Engineer and disposed of in the landfill.

4. The exposed subgrade and structural fill on which the mechanically stabilized earth walls will be constructed shall be thoroughly compacted. The use of vibratory compaction equipment shall be monitored closely so as to minimize the potential for waste material to be displaced from the face of the temporary slope.

C. Material Storage

1. Deposit excess excavated material at the materials on-site stockpile areas. Stockpile(s) shall be graded in such a manner so as to prevent erosion and sedimentation.

D. Placing Fill Materials

1. Prior to placing fill material, all soils to be used for construction shall be tested by the GTL approved by the Engineer, as specified in Subsection 1.04.C. Materials must be approved by the Engineer prior to their use.

2. Where structural fill or common fill is to be placed, the surface shall be scarified before placing fill. Place fill material in uniform, horizontal lifts of not more than 12 in. in loose (uncompacted) thickness. Spread each layer uniformly and evenly. Perform compaction using equipment and methods approved by the Engineer. The Contractor shall use equipment appropriate for obtaining the compaction criteria specified herein.

3. Unless otherwise indicated in these Specifications or approved by the Engineer, the fill shall be placed in a uniform, uncompacted lift thickness not exceeding 12 in. Each lift shall be spread evenly and compacted to the specified in-place dry density.

4. Prior to commencing compaction, infiltration layer fills shall be brought to within an acceptable range of their specified optimum moisture content per ASTM D698 by either aerating the material if it is too wet or spraying the material with water if it is too dry. Acceptable moisture contents shall be as specified in Table 02200-2, unless otherwise approved by the Engineer, and shall be controlled by the Contractor in order to meet the compaction requirements specified herein. Each placed lift of infiltration layer fill used to achieve prepared subgrade elevations and in berms and embankments shall be compacted to at least 98% of the maximum dry density as determined by the Standard Proctor compaction test (ASTM D698), unless otherwise approved by the Engineer.

5. Continue all filling operations until the fill has been brought up to the finished slopes and grades shown on the Drawings, making proper allowances for thickness of topsoil, channel lining, roadway aggregate, etc.

6. Place all fill materials so that surfaces shall be sloped to drain at all times so as to prevent excessive moisture accumulation from rainwater.

7. Compaction by large rollers or heavy equipment shall not be permitted within 5 ft of structures. Accordingly, compaction in these areas shall be performed using hand-operated vibratory-plate or small walk-behind compactors. Fill materials compacted using this equipment shall be placed in maximum 6-in. loose lifts, unless otherwise specified herein.

E. Placing Infiltration Layer Soil

1. Where infiltration layer fill is to be placed, the surface shall be scarified before placing fill. Place fill material in uniform lifts of not more than 12 in. in loose (uncompacted) thickness, to achieve a compacted thickness of 6 in. per lift. Spread each layer uniformly and evenly. Perform compaction using equipment and methods approved by the Engineer. The Contractor shall use equipment appropriate for obtaining the compaction criteria specified herein.

2. Unless otherwise indicated in these Specifications or approved by the Engineer, the fill shall be placed in a uniform, uncompacted lift thickness not exceeding 12 in. Each lift shall be spread evenly and compacted to the specified in-place dry density.

3. Prior to commencing compaction, infiltration layer fills shall be brought to within an acceptable range of their specified optimum moisture content per ASTM D698 by either aerating the material if it is too wet or spraying the material with water if it is too dry. Acceptable moisture contents shall be as specified in Table 02200-2, unless otherwise approved by the Engineer, and shall be controlled by the Contractor in order to meet the compaction requirements specified herein. Each placed lift of infiltration layer fill shall be compacted to at least [illegible]% of the maximum dry density as determined by the Standard Proctor compaction test (ASTM D698), unless otherwise approved by the Engineer.

4. Following compaction, in-place moisture and density testing will be performed at a frequency as specified in Table 02200-2. The Engineer may elect to reduce the test frequency if it has been demonstrated that the required density can consistently be achieved. In no case will the test frequency be reduced to less than one test per 40,000 ft^2 per lift.

5. Equipment operation shall be as required in Subsection 3.02.A.5.

6. The surface of each lift shall be scarified prior to placement of the next lift.

F. Placing Trench Backfill

1. Unless otherwise noted or directed by the Engineer, placing trench backfill shall conform to requirements specified above for placing and compacting structural fill, except as modified below:

   a. Place and compact granular bedding in accordance with the Drawings. Place and compact granular bedding to a minimum thickness of 6 in. under precast and cast-in-place structures.

   b. For all other pipes, compact approved trench backfill materials to a minimum of 1 ft above the top of pipe with manual tampers. Place backfill in thin horizontal lifts not exceeding a loose thickness of 6 in. In lieu of this, the Contractor may elect to continue the granular bedding to 1 ft above the top of the pipe.

   c. Utilize such compaction equipment that will not damage the pipe and pipe joints. Pipe and pipe joints damaged by the Contractor's operations shall be removed and replaced at no cost to the Engineer.

   d. Trench backfill shall be placed in uniform lifts of not more than 6 in. in loose thickness. After the structure has been properly bedded, selected material from the excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along sides of the structure in layers not exceeding the specified lift thickness. The backfill shall be brought up evenly on all sides for the full height of the structure. Care shall be taken not to over-compact the backfill and cause damage to the pipe or structure.

G. Elastic Settlement

1. Elastic settlement or immediate settlement is the immediate change in shape or distortion of soil caused by the applied stress and is calculated using the theory of elasticity. For the landfill, the concern for elastic settlement is focused on the loading of the airplane hangers and parking of a plane, in addition to the loading that occurs due to the placement of new fill.
   The following calculations have been done to evaluate elastic settlement and the settlement has been accounted for in the establishment of the lines and grades for the preceding layers for the concrete pads and the Matcon pavement:

   - The settlement associated with the construction of the concrete foundation and pad for the hangers, including the weight of the hangers

   - The elastic settlement that could occur from parking a twin engine plane of the appropriate size for the area, on the Matcon for a period of time

Additionally, there will be some elastic settlement during placement and compaction of fill. This settlement will be compensated for by adding and compacting additional material as required to meet the specified lines and grades for each fill layer.

A.03 TOPSOIL

A. Topsoil shall be placed at thicknesses required on the DDA to achieve a total in-place cover soil thickness of at least 12-in. and other disturbed areas of the site as designated on the Drawings. The spreading shall be performed in such a manner that seeding can proceed with little additional soil preparation or tillage. Irregularities in the surface resulting from topsoil placement or other operations shall be corrected so as to prevent the formation of depressions where water will pond. Topsoil shall not be placed when the subgrade surface is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to the proposed seeding program. Topsoil should not be overly compacted either deliberately or inadvertently.

B. The Contractor shall provide the necessary temporary erosion and sediment control, drainage, dust control, and safety measures during construction at no additional cost.

C. Stockpiled topsoil materials shall be placed in approved areas. The stockpiled materials shall be placed and graded for proper drainage and shall not be placed near the edge of side slopes.

D. Mud, snow, ice, or frozen earth shall not be incorporated in the topsoil.

E. After topsoil placement and finish grading, no heavy equipment, trucks, etc. shall be permitted to travel on these completed areas. The Contractor shall, through mechanical raking, and hand grading with rakes and shovels, grade all areas around fences, pipes, and other structures in preparation for final seeding. Only low ground pressure equipment may be used for seeding. Seeding will be performed in accordance with Section 02932.

F. The Contractor shall pay all costs, fees, etc. to rectify any deficiencies in placement of the topsoil layer, to the acceptance of the Construction Manager, including those deficiencies resulting from weather, erosion, etc., during the time period between placement of the topsoil layer and proper development of the vegetative cover.

3.04 FINISH GRADING

A. Perform grading operations so that the fill areas are well-drained at all times. Maintain drainage ditches and keep them open and free from soil, debris, and leaves until final acceptance of the Work. Finish all grading on neat, regular lines conforming to the lines, grades, and contours shown on the Drawings, or if not shown, in accordance with the criteria set forth herein. Perform grading work in proper sequence with all other associated operations.

B. Grade all areas disturbed during the Work of the Contract. At trench locations, excavated and filled areas, and adjacent transition areas, grade so that finished surfaces are at the proposed grade or are approximately at the grades existing prior to being disturbed. Adjust as required to provide positive drainage.

C. Finished grades of all surfaces shall be constructed within the tolerances specified. As-built surveys completed by the Contractor shall document that the approved finished surface does not deviate from the design by more than the allowable tolerance.

D. As-built surveys shall be completed by the Contractor as required in Section 02005.

E. All specified minimum thicknesses and slopes shall be achieved for the respective earthen material of the landfill cover system.

3.05 INFILRATION LAYER MAINTENANCE AND REPAIR

A. Fine-grained, low-permeability soils are susceptible to desiccation and subsequent cracking in warm weather conditions. The Contractor shall be responsible for maintaining optimum moisture (or slightly above) conditions within installed protective cover soil throughout the entire construction. Should the soil crack or separate, the Contractor shall add the necessary moisture to the material in order to properly scarify, recompact, and retest what might have once been an acceptable lift of material. Prior to placement of additional lifts of soil or geosynthetics, the surface will be inspected and approved by the Engineer immediately before placement.

B. The Contractor shall repair all erosion scars on any compacted lift of soil due to excessive rainfall.

C. The Contractor shall backfill any holes within the compacted lifts during the construction with granular or powdered bentonite (i.e., moisture/density test holes, Shelby tube holes, grade stakes, etc.).

D. If a defective area is discovered in the low-permeability soil layer, the Engineer will immediately determine the extent and nature of the defect. If the defect is indicated by an unsatisfactory test result, the Engineer will determine the extent of the defective area by additional tests, observations, a review of records, or other appropriate means. If the defect is related to adverse site conditions, such as overly wet soils or surface desiccation, the Engineer shall define the limits and nature of the defect. The Contractor shall correct the deficiency to the satisfaction of the Engineer, at no cost to the Engineer. All retests, as required by the Engineer, must verify that the defect has been corrected prior to additional work in this area.

3.06 DEWATERING AND DRAINAGE

A. To preclude surface water ponding in excavations, provide and maintain dewatering systems of sufficient capacity to remove water while each excavation is performed. Sediment-laden water shall be directed to a diversion channel and/or sediment trap as described in the Contractor's SWPPP. The Contractor is responsible for compliance with all required United States Environmental Protection Agency (EPA), DOE, and NMED stipulations as stated in other section of these Specifications and the SWPPP.

B. Methods of dewatering excavations shall be at the Contractor's discretion. Continuous investigations and checks shall be made by the Contractor to ensure that the dewatering system employed is functioning properly and is not causing damage or settlement to adjacent surfaces or structures. The system shall be modified as required, and any damage caused by the system shall be the responsibility of the Contractor to repair or restore.

C. Provide necessary temporary surface drainage and keep same operating to the satisfaction of the Engineer until permanent drainage or finish grading has been completed. Do not allow damming or ponding of water in gutters or storm drains.

3.07 GEOTECHNICAL TEST BORINGS

A. The Contractor shall complete up to 5 but no less than 3 geotechnical testing borings along the proposed alignment of Wall No.1 to verify the location and competency of the bedrock. Over-burden soils shall be sampled in accordance with ASTM D1586. Each boring shall be extended a minimum depth of 10 feet into bedrock using a core barrel. The Contractor shall report blow counts, rock quality designation (RQD) and percent recovery. A boring log shall be prepared for each test boring. The location (horizontal and vertical) of each boring shall be recorded and shown on a site plan. All bore holes shall be backfilled with grout.

END OF SECTION

GS SECTION 02722 (SUPPLEMENTAL)

GRADED CRUSHED AGGREGATE BASE COURSE FOR MATCON PAVEMENT

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C 117	(2004) Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 131	(2003) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(2004) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 29/C 29M	(1997; R 2003) Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2002e1) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 1883	(1999) CBR (California Bearing Ratio) of Laboratory-Compacted Soils
ASTM D 2217	(1985;R 1998) Wet Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants
ASTM D 2922	(2004) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(2004) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(2000) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 75	(2003) Sampling Aggregates

SD-06 Test Reports

- Gradation
  Bearing ratio

Liquid limit
Plasticity index
Gradation
Smoothness
Density
Thickness

1.3 DELIVERY AND STORAGE

Inspect materials delivered to site for damage and store as to prevent segregation and contamination.

1.4 WEATHER LIMITATIONS

Do not construct base course when atmospheric temperature is below 2 degrees C 35 degrees F or when rainfall or other weather conditions detrimentally affect the quality of the finished course.
1.5 CONSTRUCTION EQUIPMENT

Equipment shall be dependable and adequate for the purpose intended. Maintain equipment in satisfactory and safe operating condition. Subject to approval, special equipment dictated by local conditions may be used. Calibrated equipment, such as scales, batching equipment, spreaders, and similar items, shall have been recalibrated by an approved calibration laboratory within 12 months of commencing work.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Aggregates

Consist of durable and sound crushed gravel, crushed stone, or crushed slag, free of lumps or balls of clay or other objectionable matter. Crushed stone and gravel shall be free from flat, elongated, soft, or disintegrated pieces. Crushed gravel retained on a No. 4 sieve shall have at least 90 percent by weight with at least two fractured faces and 100 percent by weight with at least one fractured face. Base course materials samples shall have a bearing ratio of at least 100 as determined by laboratory tests on a 4-day soaked specimen in accordance with ASTM D 1883; compact specimen in accordance with ASTM D 1557, Method D. Determine grain size in accordance with ASTM C 136 and amount of material finer than 75 micrometers 200 mesh sieve in accordance with ASTM C 117. Soil binder material, that portion of material passing the No. 40 sieve, shall be of such composition that the composite material conforms to the requirements specified herein. The base course shall be of such nature that it can be compacted readily with watering and rolling to a firm, stable base and shall conform to one of the following sizes:

Percentage by Weight Passing
Square Mesh Laboratory Sieves

Sieves	Percent passing
1 1/2 inch	100
1 inch	60-100
1/2 inch	30-65
No. 4	20-50
No. 10	15-40
No. 40	5-25
No. 200	0-10

That portion of the material passing the No. 40 sieve shall have a liquid limit of not more than 25 and a plasticity index of not more than 5 as determined by ASTM D 4318. Prepare samples in accordance with ASTM D 2217, Procedure A.

PART 3 EXECUTION

3.1 BASE COURSE

Construct the graded aggregate base course on a prepared sub-grade, as indicated. Provide line and grade stakes for control. Place grade stakes in lanes parallel to the centerline of areas to be paved and space for string lining or other control methods. The base course shall consist of aggregate processed, deposited, spread, and compacted on a prepared surface. The Contractor shall be responsible for protection of completed areas against detrimental effects. Recondition, reshape, and re-compact areas damaged by freezing, rainfall, or other weather conditions.
3.2 Reserved

3.3 MIXING OF MATERIALS

Mix aggregates in a stationary or traveling plant. Proportion aggregates by weight or volume in such quantities that specified gradation, liquid limit, and plasticity index requirements are met after the base course has been placed and compacted. Incorporate, during the mixing operation, water in quantities sufficient to provide the necessary moisture content for the specified compaction. Mixing operations shall produce satisfactory uniform blending and the method of discharging into trucks shall not produce segregation.

3.4 PLACING

Do not dump mixed materials in piles, but place on prepared sub grade or sub base in layers of uniform thickness with a spreader. When a compacted course 6 inches in thickness is required, place material in a single layer. When a compacted course in excess of 6 inches is required, place material in layers of equal thickness. Do not exceed 6 inches or have less than 3 inches in thickness for any compacted layer. Place layers so that when compacted, they will be true to grades or levels required with the least possible surface disturbance. Where the base course is constructed in more than one layer, clean previously constructed layers of loose and foreign matter. Maintain material water content during the placing period to obtain the compaction specified. Make adjustments in placing procedures or equipment to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to insure a satisfactory base course.

3.4.1 Stationary-Plant Method

Mix aggregates, binder material and water until a uniform homogeneous mixture is obtained. Do not dump materials in piles; place in layers of essentially uniform thickness, not to exceed 6 inches after compaction, by an approved spreader. Tail gate spreading will be acceptable only with permission, under conditions such as where space limitations prohibit use of the spreader.

3.4.2 Windrow Traveling-Plant Method

Place aggregates and binder materials in windrows of such cross section and proportions that, when picked up, mixed, and re-deposited in windrows, the finished mixture shall conform to the specified requirements. Do not exceed the rated capacity of the traveling plant with the size of the windrow of the combined materials. Add water, in quantity sufficient to provide the necessary moisture content for compacting, to the aggregates at the time of mixing. Mix materials uniformly by the traveling plant, deposit in windrows of uniform cross section, and spread in a layer of uniform thickness to the required contour and grades.

3.5 COMPACTING AND FINISHING

Immediately following the placing, spread the finished mixture uniformly in a layer and bring to optimum moisture content. The loose thickness and the surface of the layer shall be such that the specified density and the required thickness shall be obtained after compaction. Compact the layer with steel-faced, vibrating or pneumatic-tired rollers, or other suitable compacting equipment or combinations thereof. Continue compacting until the layer is compacted through the full depth to a field density of at least 100 percent of the maximum density at optimum moisture content tested in accordance with ASTM D 1556 or and ASTM D 3017. In areas not accessible to rollers or compactors, compact the mixture with mechanical hand tampers. If the mixture is excessively moistened by rain, aerate by blade graders, or other suitable equipment. Aerate until the moisture content of the material is that needed to obtain the required density. Finish the surface of the layer by a combination of rolling and blading. Final surface shall be smooth and free from waves, irregularities, and ruts or soft yielding spots.

3.6 PROOF ROLLING

In addition to compacting the base course to the required density, proof roll the top surface of the completed base course with a single pass of a loaded dual axle dump truck. When under the action of the proof rolling, the base course yields, pumps, or otherwise fails, remove, replace with suitable materials, and re-compact materials in the base course or in the underlying layers indicated to be unsatisfactory. The speed of the roller shall not exceed 8 kph 5 miles per hour. Obtain approval from the Engineer and the MatCon subcontractor's technical lead upon completion of the proof rolling of the base course.

3.7 FINISHING AT EDGES OF BASE COURSE

Place earth or other approved materials along the edges of the base course in such quantity that it will compact to the thickness of the course being constructed. When the course is being constructed in two or more layers, place material to the thickness of each layer. In each operation, allow at least a one foot width of the shoulder to be rolled and compacted simultaneously with the rolling and compacting of each layer.

3.8 FIELD QUALITY CONTROL

Approve materials and material sources in advance of the use of such materials in the work. Replace base where samples are removed. Take duplicate samples at the same time and in the same manner as the original.

3.8.1 Sampling

3.8.1.1 Aggregates at the Source

Prior to production and delivery of aggregates, take at least one initial sample in accordance with ASTM D 75. Collect each sample by taking three incremental samples at random from the source material to make a composite sample of not less than 50 pounds. Repeat above sampling when source of material is changed or when unacceptable deficiencies or variations from specified grading of materials are found in testing.

3.8.1.2 During Construction

Take one random sample from each 1000 tons of completed course material, but not less than one random sample per day's run. Take samples in accordance with ASTM D 75.

3.8.1.3 Sample Identification

Place each sample in a clean container, securely fastened to prevent loss of material. Tag each sample for identification and with the following information:

Contract No._____
Sample No._____ Quality _____
Date of Sample_____
Sampler_____
Source_____
Intended Use_____
For Testing_____

3.8.2 Testing

3.8.2.1 Aggregates

Test each sample of base course material without delay. Make gradation tests from each sample in accordance with ASTM C 136. Make sieve analysis on material passing the No. 200 sieve in accordance with ASTM C 117.

3.8.2.2 Smoothness Tests

Test with a 10 foot straightedge, applied parallel with and at right angles to the center line of the paved area. Correct deviations in the surface in excess of 1/2 inch by loosening, adding or removing material, reshaping, watering, and compacting. The smoothness requirements specified herein apply only to the top layer when base course is constructed in more than one layer.

3.8.2.3 Field Density Tests

ASTM D 1556 or ASTM D 3017. Take one test for each 500 square yards of each layer of base course.

3.8.2.4 Laboratory Density Tests

In accordance with ASTM D 1557, Method D.

3.8.2.5 Thickness Tests

Measure thickness of base course at intervals such that there will be a depth measurement for at least each 500 square yards of complete base course. Make depth measurements by test holes, at least 3 inches in diameter, through the base course. Where base course deficiency is more than 1/2 inch, correct by scarifying, adding mixture of proper gradation, reblading, and re-compacting. Where the measured thickness is more than 1/2 inch thicker than indicated, consider it as the indicated thickness plus 1/2 inch for determining the average. The average thickness is the average of the depth measurements and shall not under run the thickness indicated.

3.9 MAINTENANCE

After construction is completed, maintain the base course throughout, except where portion of the succeeding course is under construction thereon. Maintenance includes drainage, rolling, shaping, and watering, as necessary, to maintain the course in proper condition. Correct deficiencies in thickness, composition, construction, smoothness, and density, which develop during the maintenance, to conform to the requirements specified herein. Maintain sufficient moisture by light sprinkling with water at the surface to prevent a dusty condition.

-- End of Section -

SECTION 02260

ON-SITE WASTE EXCAVATION AND TRANSPORT

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This section includes the requirements for the on-site transport of excavated materials from one area of the airport landfill to another area of the same landfill. This section is not applicable to the DDA.

1.02 RELATED SECTIONS AND REFERENCES

A. Section 02100 – Clearing and Stripping.

B. Section 02200 – Earthwork.

C. SWPPP, June 2005.

D. CQCP, June 2005.

E. Construction Plan for LASO TA-73 Airport Landfill, June 2005.

PART 2 MATERIALS

2.01 GENERAL

A. The Contractor shall provide all materials and equipment required for the excavation, transport and handling of waste and soil materials within the boundaries of the site.

PART 3 EXECUTION

3.01 EXCAVATION

A. The Contractor shall complete excavation of site materials as shown on the Drawings.

B. Contour maps are provided to the Contractor for his use in determining the “cuts” necessary to minimize over-excavation of the waste and mixture of cover soils into the waste. It is suggested that the Contractor stake the cut excavations in the field and perform “test pitting” as necessary to verify the thickness designated on the contour maps.

C. Prior to the excavation of any waste materials, test pits shall be excavated to determine the horizontal limits of waste. Pits shall be spaced at 100 ft on center on the north, south and west sides of the landfill and the delineated edge of waste marked in the field and surveyed for inclusion on the project as-builts. All relocated waste shall be placed within these limits to ensure coverage by the final cover system.

D. Excavation for wall construction shall be limited to the minimum amount of material necessary to construct the concrete wall and the mechanically stabilized earth retaining walls. All excavations in waste required to facilitate wall construction shall be cut back to a safe working slope of between 1H:1V and 1.5H:1V or flatter if dictated by the density and composition of the materials encountered. All waste shall be excavated to a distance of between approximately 3 and 8 ft from the rear face of the concrete retaining wall to

permit installation of the wall footing(s). The waste shall be cut from the base level of Wall No. 1 at a slope of no steeper than 1.25H:1V to the base elevation of the Wall No. 2. From the base elevation of Wall No. 2 the waste slope shall be cut at an inclination of no steeper than 1.5H:1V. This slope inclination shall extend to the point at which the temporary slope intersects the 4H:1V permanent slope. These excavation requirements may be modified based on the actual conditions encountered in the field with the approval of the Engineer.

The exposed face of the excavated waste shall be closely monitored during excavation and for the period up until backfill is placed. If movement of the waste is observed or if tension cracks are observed on or near the top of the slope, measures shall be taken to stabilize the slope. These measures may include removal of additional waste material to create a flatter slope.

Excavated slope shall be protected from extreme precipitation and surface water runon by the use of temporary covers (soil or plastic), berms, ditches,etc.

E. If embedded debris is encountered while excavating waste from the slopes the Contractor shall cut off such debris flush with the final excavated slope face so as not to cause a potential collapse or instability of the slope. The Engineer may permit excavation of embedded debris based on size, location and composition of the embedded debris and surrounding materials.

3.02 TRANSPORTATION

A. The Contractor shall transport the waste materials to the fill areas shown on the Drawings. Vehicles shall be operated in a safe and controlled manner. Vehicles shall not be operated on airport roadway or taxiways without prior authorization of the airport manager.

3.03 MATERIAL PLACEMENT

A. The Contractor shall place excavated waste from the site in the fill areas as shown on the Drawings and in accordance with Section 02266 specifications.

3.04 CONTROL OF DUST, ODORS, AND SPILLS

A. The Contractor shall implement measures to strictly control dust, odors, and spills during the on-site transport of excavated materials. The gates of hauling vehicles shall be sealed tightly to prevent the release of materials during transport and vehicles will not be overloaded so that the waste material rolls off the tops of loaded vehicles. The Contractor shall use covers/tarps to prevent the release of dusts and odors from trucks, scrappers, etc., as necessary. Dust control measures shall be implemented as necessary to prevent hazardous conditions for aircraft operations.

END OF SECTION

SECTION 02266

LANDFILL WASTE PLACEMENT PROCEDURES

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Capping of the airport landfill includes the relocation of waste from the north and east slopes and from areas on top of the landfill and consolidation of this waste on the flat portion of the landfill within the limit of the landfill final cover system shown on the Drawings.

B. The toe of the east slope will be relocated approximately 10 ft westward (as defined on the Drawings) to allow the inclusion of the landfill cap (concrete wall) while maintaining a buffer zone between the edge of the cap and the canyon wall. The east slope will be backfilled with free-draining structural fill to allow this area to be tied into the native soil/bedrock/waste and to provide a stable foundation for the mechanically stabilized earth retaining walls.

C. This section includes requirements for the main landfill only.

1.02 RELATED WORK

A. Section 02200 – Earthwork.

B. Section 02930 – Erosion and Sediment Control.

C. SWPPP, June 2005.

D. CQCP, June 2005.

E. Construction Plan for LASO TA-73 Airport Landfill, June 2005.

1.03 SUBMITTALS

A. Topographic survey as described in subsection 1.04.A. Survey shall be prepared and submitted with Contractor's application for payment of waste relocation.

PART 2 MATERIALS

2.01 GENERAL

A. The Contractor shall provide all materials and equipment to place, spread, and compact the waste and soil materials within the landfill.

B. Relocated waste shall not be used as backfill against any wall or around any pipe or structure.

PART 3 EXECUTION

3.01 GENERAL

A. All relocated waste shall be placed within the limits shown on the Drawings or as otherwise defined by the Engineer based on the findings of test pit excavations.

3.02 PLACEMENT AND COMPACTION

A. The excavated material shall be spread with dozers or similar earthmoving equipment under controlled lift and compaction construction.

B. Large pieces shall be isolated and filled around with soil or other smaller wastes in order to minimize voids.

C. Large, flat pieces shall be placed flat and filled around on all sides with soil/waste. Enough horizontal space between slabs in the same lift shall be maintained for compaction equipment to operate.

D. At least 1 foot of waste/soil shall separate large, flat pieces. No direct stacking will be permitted.

E. Waste shall be compacted until they are visually observed to be dense, stable and unyielding, or as directed by the Construction Manager. The Contractor shall complete as many passes as necessary of the compaction equipment to achieve a satisfactory condition.

F. Special care shall be taken when excavating waste, or soil approximately 10 ft east of the existing storm drain (trench drain) located along the western edge of the landfill. Any damage to existing structures designated to remain in place shall be repaired by the Contractor at no additional cost to the Owner.

G. The subgrade exposed after removal of waste from the east slope on which the MSE wall (Wall No. 2) is to be constructed shall be thoroughly compacted. A relatively smooth and level subgrade shall be provided for construction of the MSE wall.

H. The Contractor shall use extreme care when compacting waste on and around the east and north slopes. Operation of equipment in static mode may be necessary to ensure stability of excavated slopes. If equipment cannot be operated in vibratory mode heavier compaction equipment may be required to sufficiently densify the waste.

3.03 CONDITION AREAS

A. Should excavated waste material that is saturated be placed within the landfill, the Contractor shall set aside an area to dry said wastes.

B. The area to dry these soils shall not be within 5 ft of the final grades for the cover system or within 50 horizontal ft of the final side slope grades.

C. The Contractor shall spread the saturated material in thin lifts and dry the material by racking, tilling, liming, mixing in dry soil, or other approved methods.

D. Areas used to dry saturated material will not be stacked upon each other for more than two consecutive loose lifts.

3.04 PREPARATORY GRADE

A. An allowance for the dimensions of the cover system shall be incorporated into the grading.

B. Landfill outslopes will be stabilized with riprap as shown on the Drawings.

END OF SECTION

SECTION 02270

CHANNEL PROTECTION

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. The work to be performed under this section includes furnishing all labor, materials, tools, and equipment necessary for providing protection for slopes, ditches, channels, and riprap outlet protection to the configuration and extents indicated in accordance with the Contract Documents.

1.02 SUBMITTALS

A. In accordance with Section 01340, submit a Certificate of Compliance before delivery of materials for the items listed below:

1. Stone.
2. Geotextiles and fasteners.
3. Erosion control blankets.
4. Erosion control mats.

PART 2 PRODUCTS

2.01 STONE FOR OUTLET AND CHANNEL PROTECTION

A. Stone shall meet the requirements of NMDOT Section 602.221.

B. Stone for riprap shall be composed of a well-graded mixture of stone size such that the material size, based on a gradation analysis, is consistent with Table 02270-1.

Riprap shall be reasonably well-graded from the smallest to the largest size specified and shall be controlled by visual inspection.

C. No broken concrete shall be used on this project.

D. Riprap shall be National Crushed Stone Association (NCSA) Class Size R3 and R5.

2.02 EROSION CONTROL MATTING

A. Channel beds and newly graded sideslope protection shall utilize synthetic erosion control mats as required.

B. Temporary grass stabilization seed mixture shall meet the requirements of Section 02932.

Table 02270-1

Riprap Gradation

Rock Size (in.)	Class, Size No. (NCSA) (percent passing)	
	R5	R3
18	100*	
9	15 – 50	
6		100*
4	0 – 15	
3		15 – 50
2		0 – 15
Nominal Placement Thickness (in.)	18	12

* Maximum allowable rock size.

2.03 RENO MATTRESSES

A. Reno mattresses shall be manufactured by Maccaferri, Terra Aqua Gabions, Inc. or Engineer-approved equal. Reno mattresses shall be a minimum thickness of 9 inches. In-fill material shall be 3 to 6 in. crushed stone or as otherwise required by the reno mattress manufacturer. Crushed stone shall have an aggregate index (AI) of 35 or less as defined by NMDOT Division 900.

PART 3 EXECUTION

3.01 RIPRAP

A. Place geotextile loosely over the prepared subgrade. Overlap the geotextile panels a minimum of 18 in. Place and shingle panels parallel to the flow and slope. Anchor panels with securing pins inserted through the geotextile, along, but not closer than 2 in. to each edge and at distances required to prevent displacement before or during construction. Stagger overlaps perpendicular to the flow a minimum of 5 ft. Geotextiles damaged or displaced before, during, or after placement shall be replaced or repaired by the Contractor at no cost to the Engineer.

B. Place riprap on subgrade or geotextile material to its full specified thickness and to the extent shown on the Drawings. Placement shall be in one operation in such a manner as to not disturb underlying material. End dumping of rock upon the geotextile shall not be permitted.

C. The larger stones shall be well distributed and compact. Hand placing or rearranging of individual stones by mechanical equipment may be required to secure the required results.

D. Riprap shall be placed starting at the toe of slope and proceeding upslope.

E. Equipment operations shall meet the requirements of 02200 Part 3.02A.5.

3.02 EROSION CONTROL MATS

A. Erosion control mats for channel protection, where indicated on the Drawings or ordered by the Engineer, shall be installed in strict accordance with the manufacturer's recommendations.

3.03 RENO MATTRESSES

A. Reno mattresses, where indicated on the Drawings or ordered by the Engineer, shall be installed in strict accordance with the manufacturer's recommendations.

END OF SECTION

SECTION 02273

MECHANICALLY STABILIZED EARTH RETAINING WALL

PART 1 GENERAL

1.01 DESCRIPTION

A. This section includes requirements for the design, construction, quality control and assurance and all related items necessary to install a mechanical stabilized earth (MSE) retaining walls on the east slope of the landfill at the locations shown on the Drawings.

B. The Retaining Wall Subcontractor (Subcontractor) shall complete a detailed design of the proposed retaining walls to determine all required wall dimensions, materials and details, and all other material components to provide for stable wall construction and long-term performance in accordance with the requirements of local building codes, the International Building Code (IBC), standard engineering design practice and this Specification. If a conflict should exist between any of the above-referenced requirements the more stringent requirements shall govern.

C. The design shall be completed under the direct supervision of a licensed Professional Engineer registered in the State of New Mexico and submitted as a shop drawing for review and approval by the Engineer.

D. The Subcontractor shall provide a construction quality assurance plan for the installation of the walls.

E. Upon approval of the shop drawing (detailed design) by the Engineer and Owner, the Subcontractor shall complete the retaining wall construction in accordance with the approved design and as specified herein.

F. The Subcontractor shall afford the Engineer the opportunity to verify and confirm the stability of the east slope of the landfill and the Subcontractor shall modify the MSE wall design as required based on the results of the analyses completed by the Engineer.

1.02 QUALITY ASSURANCE

A. Upon acceptance by the Engineer and Owner of the retaining wall design, the Subcontractor shall construct the retaining wall in accordance with the quality control and assurance requirements of this and all other applicable Specifications.

B. The Subcontractor shall provide all quality control data provided by manufacturers of all elements used in the construction of the wall to the Engineer. The Engineer reserves the right to require additional testing of any and all materials.

C. The Subcontractor shall follow the recommended handling, storage and installation guidelines and recommendations provided by the manufacturers of the wall components.

1.03 SUBMITTALS

A. Design

1. The Subcontractor shall submit a conceptual design describing the proposed wall materials including facing units, geosynthetic reinforcement and earth/rock anchors to the Engineer and Owner for approval prior to commencing detailed design.

2. The Subcontractor shall complete a detailed design that fully addresses all dimensions, construction materials (including subgrade preparation and backfilling), wall reinforcement and drainage, and installation requirements necessary to demonstrate stable wall construction and long-term performance. The design shall be such that changes in wall length and alignment can be accommodated and implemented in the field.

3. The Subcontractor shall design an anchorage system that can be installed in the event there is insufficient space to install the required length of geosynthetic reinforcement. This anchorage system shall consist of earth/rock anchors installed in pre-drilled holes and connected to the geosynthetic reinforcement via a round structural member. A typical detail of such a system is shown in Appendix A.

4. The Subcontractor shall complete any and all site and subsurface investigations it deems necessary to complete a proper wall design. All investigation activities shall be coordinated with the Owner.

5. The wall design shall be prepared under the direction of and sealed by a Professional Engineer registered in the State of New Mexico. All supporting calculations, drawings, and specifications shall be submitted for approval by the Engineer. Upon approval, the Subcontractor shall procure all materials and mobilize all labor and equipment necessary to complete the construction in accordance with the approved design and these Specifications.

B. Installation Drawings

1. Upon approval of the wall design, the Contractor shall prepare and submit detailed drawings which fully describe the construction of the retaining walls, including plan and elevation views, profiles, cross-sections, and details. Details shall include fence post installation details, termination details into the rock face, termination details into soil/armored slope, details at alignment changes, etc.

C. Materials

1. The Subcontractor shall prepare and submit for approval information and test data for all materials proposed for use in the construction of the walls. The information shall include a description of the facing units, (e.g., dimensions, color, durability, material of construction, strength, etc.). In addition, geosynthetic test data shall be provided. This data shall include, at a minimum, polymer type and test results, wide width tensile strength, elongation, creep behavior, roll dimensions, etc. If applicable, connection strength data shall be provided for the proposed geosynthetic reinforcement and the proposed facing unit.

D. Certificates of Compliance

1. The Subcontractor shall submit to the Engineer for approval Certificates of Compliance prior to delivery of materials that will be used in the construction of the retaining walls. Certificates for each material shall include job location; the Contractor's name; a copy of the manufacturer's certified test reports; types, classes, and strengths of materials (as applicable); and the manufacturer's name, address, and telephone number.

E. Certified Test Reports

1. Certified test reports within the requirements of standards and testing methods specified shall be submitted to the Engineer for approval prior to material delivery. The manufacturer and Subcontractor must satisfy the Engineer that the material that it offers to furnish and install will meet in every aspect the requirements set forth in these Specifications. The Subcontractor shall transmit to the Engineer all information supplied to him by the manufacturer or supplier prior to approval for furnishing and installing any such material.

F. Installation and Repair Recommendations

1. The Subcontractor shall submit to the Engineer the manufacturer's recommended installation and repair procedures, as applicable, for materials associated with the retaining wall construction.

2. A maintenance/inspection plan addressing long term inspection and maintenance of the retaining walls.

G. Delivery, Storage, and Handling

1. Delivery of materials shall be coordinated with installation of the materials; unloaded with proper equipment at the site and as close as possible to the final placement; and secured in place. Materials shall be stored away from work areas and traffic in a reasonable level area, well drained, away from brush, poison oak or ivy and in an area accessible for inspection. Individual pieces or bundles shall be stored

within safe walking distance between to allow for full view for inspection purposes. Excavated materials or stockpiled materials shall not be placed over or against stored materials.

1.04 DESIGN REQUIREMENTS

A. International Building Code (2003)

1. The wall shall be designed in accordance with the requirements of the International Building Code (IBC) 2003, or most recent version. These requirements include the following:
    a) Minimum factor-of-safety against overturning and sliding (static) = 1.5 (Section 1806)
    b) Minimum factor-of-safety against overturning and sliding (dynamic) = 1.1
    c) Site Class D for seismic design (Section 1615)
    d) 0.2 second spectral response acceleration (5% of critical damping) for Site Class B S_s = 0.3385g (Figure 1615(1))
    e) 1 second spectral response acceleration (5% of critical damping) for Site Class B S_1= 0.0976g (Figure 1615(2))
    f) Site coefficient F_a = 1.529 (Table 1615.1.2(1))
    g) Site coefficient F_v = 2.4 (Table 1615.1.2(2))
    h) K_H = 0.345g (or other appropriate load with approval of the Engineer)
    i) K_V = 0

2. The global slope stability of the MSE walls and slopes shall be evaluated.

3. An equipment surcharge load of appropriate magnitude and size shall be incorporated in the design.

4. The walls shall be designed with batters and to heights that facilitate the construction of 4H:1V back slopes as shown on the Drawings.

B. Standard Engineering Design Practice

1. The walls shall also be designed in accordance with accepted engineering practice for MSE wall systems. Appropriate partial and global factor-of-safety values shall be applied to the strength of the reinforcing material(s).
2. The reinforcing length shall be minimized to the greatest extent permitted by design. The length of reinforcing may be governed by global slope stability in which case the reinforcing length will be increased to satisfy global slope stability.

C. Earth/Rock Anchorage System

1. If an earth/rock anchorage system is required, the system shall be designed with adequate and appropriate factor-of-safety values. A minimum factor-of-safety of 1.5 should be applied to the calculated tension load in the anchor. The design shall include a construction quality control program, which shall include a requirement to test each anchor to confirm its load carry capacity.

PART 2 MATERIALS

2.01 GENERAL

A. The Subcontractor shall provide materials in accordance with the approved design for the construction of MSE retaining walls.

B. The Subcontractor shall provide reinforcing materials that meet the requirements of the design.

C. The facing units/façade/veneer of the MSE wall shall be concrete block, natural stone, or other material approved by the Engineer and Owner. The facing units/façade/veneer shall be durable and earth tone (natural) in color. Crushed tuff is not an acceptable facing unit.

D. Earth/rock anchorage system as required to compensate for reduced length of geosynthetic reinforcement.

PART 3 EXECUTION

3.01 GENERAL

A. The Subcontractor shall coordinate all work with the Contractor. The Subcontractor shall be responsible for the handling of all materials associated with the construction of the walls including the placement and compaction of the backfill material. The Contractor will furnish and supply backfill material to a location close to the wall but will not spread, place or compact the material. The Subcontractor shall be responsible for the installation of the wall facing units.

B. The Subcontractor shall provide all labor, equipment and materials required to complete the construction of the approved wall design.

C. The Subcontractor shall maintain the geosynthetic reinforcement in the correct alignment during backfill placement.

3.02 EXCAVATION

A. Excavation of any materials required to complete the installation of the walls shall be completed by the Contractor. The Contractor shall complete excavation activities in accordance with the Specification and Drawings and as otherwise may be required to satisfy the MSE wall design requirements except that intact bedrock will not be excavated. The Subcontractor shall schedule all work so as not to interfere with excavation activities or other site work.

3.03 SURVEYS

A. The Contractor shall provide the necessary surveying services to establish the approved wall locations (alignments) and elevations. The Subcontractor shall be responsible for maintaining the correct horizontal and vertical alignment of the walls. The Contractor shall provide as-built surveys of the completed walls. The Subcontractor shall correct any and all deficiencies identified in any survey completed by the Contractor.

3.04 RETAINING WALL INSTALLATION

A. The Subcontractor shall be responsible for constructing the retaining walls to the lines and grades shown on the Drawings, and in accordance with the approved design.

B. Wall No. 2 will not be constructed until the backfill for Wall No.1 has been placed, compacted and approved by the Engineer.

3.05 RESISTANT MATERIAL

A. If, during the excavation of the waste by the Contractor, resistant material, i.e., bedrock is encountered, the Contractor shall remove as much bedrock as is deemed practicable. That is, the Contractor shall remove weathered material. If upon removal of this weathered material there is not sufficient space to permit the installation of the required length of geosynthetic reinforcement, the Subcontractor shall install earth/rock anchors as required to provide equivalent reinforcement capacity. The Subcontractor shall be responsible for designing, furnishing and installing earth/rock anchors and associated materials. It should be assumed that rock drilling/coring will be required to permit the installation of the anchors. All anchors shall be tested. Testing protocols shall be agreed upon by the Engineer, Contractor and Subcontractor prior to the installation of any anchors. Test results shall be documented.

3.05 ALIGNMENT

A. If, during the excavation of the waste by the Contractor, resistant material, i.e., bedrock is encountered at locations which will not permit the installation of any wall at the alignment and to the extents shown on the Drawings, the Engineer will modify the wall alignment and extent accordingly to accommodate the conditions encountered. The Subcontractor shall install the wall(s) to the revised alignment and extents and shall

complete any necessary additional design calculations. Design revisions shall be submitted to the Engineer for review and approval prior to installation.

B. The front face of the Wall No. 2 shall be off-set from the rear face of Wall No. 1 a minimum distance as shown in Table 02273-1. The wall alignment shown on Drawing 2009 shall be constructed except that the setback distance shall never be less than shown in Table 02273-1.

Table 02273-1
MSE Wall Minimum Required Setback Distance

Starting Station	Required Setback from rear face to front face (ft)
3+56	4.63
3+50	5.90
3+42	8.04
3+34	9.31
3+30	10.59
3+24	12.50
3+20	13.77
3+08	16.37
3+04	17.64
3+00	18.92
2+96	21.20
2+80	22.47
2+50	23.75
2+05	22.47
2+00	20.20
1+83	19.56
1+64	18.28
1+60	17.01
1+53	15.69
1+45	15.05
1+30	13.77
1+26	10.59
1+22	9.31
1+15	8.04
1+07	5.90
1+00	4.63

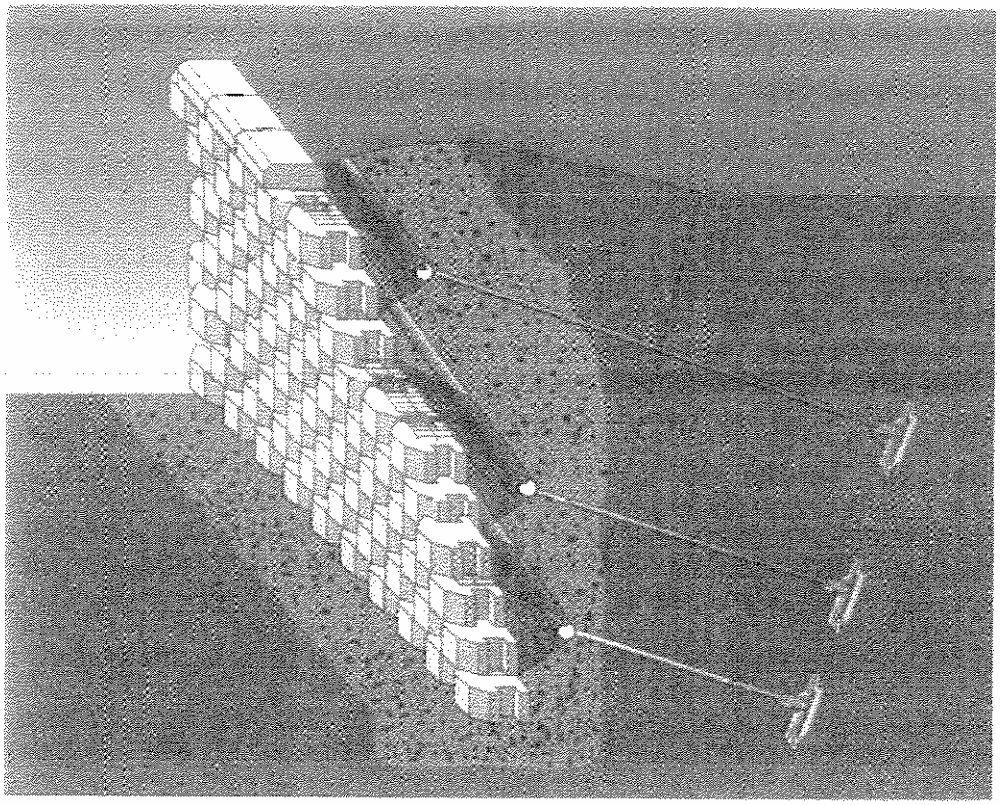
3.06 BACKFILLING

A. The Subcontractor shall place and compact all backfill materials and shall ensure that the geosynthetic reinforcement is installed in accordance with the design requirements and the manufacturer's recommendations. The Subcontractor shall ensure that all slack is removed from the geosynthetic reinforcement prior to and during backfilling operations. The Subcontractor shall confirm that the proposed backfill satisfies both the design and manufacturer's requirements.

END OF SECTION

APPENDIX A

Typical Earth/Rock Anchor System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SECTION 02511

HOT MIX ASPHALT
MODIFIED ASPHALT TECHNOLOGY FOR WASTE CONTAINMENT
MatCon™

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. The work to be performed under this section includes requirements for the design, supply, placement, and inspection of hot mix asphalt (HMA) to be installed on top of an aggregate subbase on the flat top of area of the landfill as shown on the Drawings. All aspects of the work shall be completed in conformance with the standards and procedures established by Wilder Construction Company (WCC) for the design, placement and inspection of MatCon™.

1.02 RELATED SECTIONS AND REFERENCES

A. Section 02200 – Earthwork

1.03 DEFINITIONS

A. Definitions pertinent to the earthwork requirements of this project include:

1. MatCon™ - a hot mix asphalt mix that combines a proprietary binder and strictly specified aggregates.

2. Wilder Construction Company – holder of the patent on the binder and the party responsible for designing the asphalt mix and for ensure the quality of the material and workmanship associated with the installation of MatCon™. WCC is responsible for evaluating and approving materials (aggregates) and for training and certifying asphalt manufacturing plants and installation contractors.

3. Certified Installation Contractor - a contractor certified by WCC to install MatCon™.

1.04 QUALITY CONTROL

A. General

1. WCC shall provide a quality control document that shall address inspection and testing of aggregate materials, inspection of asphalt manufacturing plants, training of installation contractors, certification of manufacturing plants and installation contractors, inspection and testing of the completed product. The quality control document shall also address repair and/or replacement procedures.

1.05 SUBMITTALS

A. Delivery Tickets

1. Delivery tickets showing the following information with each load of HMA delivered to the site shall be submitted to the SS:

a. Name and location of supplier.

b. Type and amount of material delivered.

B. Mix Design

1. Submit mix design procedure and mix design.

C. Certified Test Reports

1. Submit the results of all tests completed as part of the mix design

2. Submit the results of all tests completed on the finished pavement.

PART 2 MATERIALS

2.01 MatCon™

A. Hot Mix Asphalt

1. The HMA shall be as specified by WCC.

2. The in-place HMA shall have a permeability of no greater than 1x10 [illegible]n/sec.

PART 3 EXECUTION

3.01 SUBGRADE

A. General

1. The certified installation contractor shall inspect the subgrade on which the MatCon™ will be installed and ensure that it satisfies the requirements stipulated by WCC. If deficient areas are identified, the certified installation contractor shall notify the Contractor. The Contractor shall repair deficient areas to the satisfaction of the certified installation contractor.

3.02 MatCon™ INSTALLATION

A General

1. MatCon™ shall be installed in conformance with the requirements stipulated by WCC.

2. The interface between the MatCon™ and other materials shall be sealed by applying a slurry of hot asphalt to the joint as recommended by WCC. The slurry shall be applied in a manner that will result in neat lines. A fine sand shall be spread over the slurry after it has been applied, if so directed by the Engineer.

3. A bonding agent shall be applied to all vertical or near vertical surfaces against which MatCon™ will be placed.

A.04 TESTING AND INSPECTION

I. Testing and inspection of the completed MatCon™ shall be completed in accordance with WCC requirements or as otherwise required by the Engineer.

3.04 TOLERANCES

A. The MatCon™ shall be placed to the limits shown on the Drawings. The tolerance on the constructed surface shall be ±0.1-foot for every 100 feet with no compounding of tolerances. All minimum and maximum slopes shall be maintained.

END OF SECTION

SECTION 02720

STORM DRAIN SYSTEM

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. The work to be performed under this section includes requirements to construct a storm drain system completed in place to the limits indicated in accordance with the Contract Documents.

1.02 QUALITY CONTROL

A. Test materials as set forth in the applicable referenced Specifications and as required herein.

B. Requirements for inspection and testing of concrete inlets, culverts, manholes, and trenches, as required, are specified in Section 03400.

C. As part of the QA effort, the Engineer may inspect and test all pipe, fittings, and joint material upon delivery to the site or at the factory. The Engineer may perform, on a continual basis, plant certification and in-process inspections at no cost to the Contractor.

1.03 SUBMITTALS

A. Certificates of Compliance

1. Submit Certificates of Compliance and shop drawings before delivery of materials in accordance with Section 01340 for pipe, precast concrete (manholes, inlets, etc.), and fittings furnished by the Contractor under this section. Certificates shall include the Engineer's name; job location; the Contractor's name, types, classes, and strengths of pipe; and the pipe manufacturer's name. Certificates of Compliance for concrete and masonry materials are specified in Section 03400.

B. Invoices

1. A packing list or invoice shall accompany every shipment and shall contain the following information: Engineer's name, type and class of pipe, length, and other pertinent information.

C. Installation and Repair Recommendations

1. Submit manufacturer's recommended installation and repair methods and procedures for pipe and structures. Repairs shall be performed by the manufacture using specifically trained personnel and shall proceed only after approval of the Engineer and in his presence.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery of pipe shall be coordinated with installation or shall be unloaded with proper equipment along the line of work, outside trench limits near as practicable to point of final placement, facing in proper direction, and properly wedged secure. It shall be stored away from brush and in an accessible area for inspection.

B. Pipe and appurtenances shall be unloaded and handled with a crane or backhoe of adequate capacity equipped with appropriate slings to protect the material from damage. If damage occurs and is deemed repairable, it shall be repaired as directed by the Engineer in accordance with the manufacturer's recommendations. If damage is not repairable in the opinion of the Engineer, such pipe will be rejected and shall be removed and replaced at the Contractor's expense.

PART 2 PRODUCTS

2.01 PIPE AND FITTINGS

A. Pipe product shall conform to NMDOT Section 570.

Pipe between structures or between the structure and terminus shall be of the same size and material and shall be furnished by the same manufacturer. Each pipe length and fitting shall be clearly marked with the manufacturer's name or trademark and pipe type or strength.

2.02 JOINTING MATERIAL (CONCRETE PIPE)

A. Mortar for pipe joints shall conform to NMDOT Section 570.322.

2.03 JOINT MATERIAL (CONCRETE TRENCH)

A. Joint gasket materials shall be Concrete Sealants Inc., type CS-440, rope gasket having a diameter of 1.5 inches.

B. Concrete Adhesive shall be Concrete Sealants Inc., type CS-75.

C. Joint Sealant shall be SIKA 1A..

2.04 HIGH DENISTY POLYETHYENE (HDPE) PIPE

A. HDPE pipe shall be tested prior to shipment to the site to ensure that the physical properties are in accordance with ASTM D-3350. Only newly manufactured pipe, specifically for this project will be accepted. The pipe shall be manufactured in accordance with ASTM F-714 and ASTM D-3261.

B. The HDPE piping shall have a wall thickness classification specified on the Drawings. The pipe shall be manufactured in accordance with ASTM F-714 and ASTM D-3261. The pipe material properties shall meet or exceed the characteristics of a Type III, Class C, Category 5, Grade P34 as defined by ASTM D-1248. The material cell classification shall be 345434C as defined by ASTM D-3350.

C. Joints for HDPE pipe shall be electro-fusion butt welded, to provide a joint that, as a minimum, has the physical properties of the pipe. All welding shall be performed by a trained individual according to the pipe manufacturer's recommendations.

2.03 GRANULAR BEDDING MATERIAL

A. Granular bedding material for pipe and structures is specified in Section 02200. Detail for bedding the pipe is shown on the Drawings.

2.04 CONCRETE INLETS

A. Concrete precast units shall meet the requirements of NMDOT Section 623.

B. Concrete strengths for inlets are specified in Section 03400.

2.05 CONCRETE INLETS FRAMES, GRATES, AND COVERS

A. Frames, grates, and covers shall meet the requirements of ASTM A48-83, Gray Iron, Class 35.

B. Design wheel loading shall be HS-20 for all grating.

C. Grating will be heavy duty type and bolted down type.

D. Grating shall be an "opened type", such as Neenah Foundary Company, Type A or Type P, or an approved equal.

2.06 Manholes and Trenches

A. Concrete manholes and trenches are specified in Section 03400.

PART 3 EXECUTION

3.01 INSTALLATION OF STORM DRAIN

A. Inspection of Delivered Materials

1. Pipe, fittings, inlets, manholes, trenches delivered to the work site will be inspected prior to installation. Nonaccepted and damaged materials shall not be installed, but shall be removed or repaired, if repairable, as directed by the Engineer.

B. Handling of Pipe and Fittings

1. Pipe and appurtenances shall be handled with a crane or backhoe of proper capacity, equipped with appropriate slings to protect the exterior of the pipe.

2. Foreign matter shall be cleaned and removed from each pipe, fitting, and appurtenances before placing in the trench. Should foreign matter be observed in previously installed pipe, fittings, or appurtenances, cease work until foreign matter is removed. Open ends of pipes and fittings shall be closed with a cap or plug when work is not proceeding.

C. Excavation of Pipe and Fittings

1. Trench excavation and backfill shall be performed as specified in Section 02200. Pipe between structures or between structure and terminus shall be of the same size and material and shall be furnished by the same manufacturer. Before pipe installation, excavate sufficient trench in advance so that reasonable changes in line and grade can be made where the location of existing structures vary from that shown and then to ensure that no unforeseeable obstructions exist. Work required by failure to take such precautions shall be performed at no cost to the Engineer.

D. Bedding of Pipe and Fittings

1. Provide granular bedding in accordance with the Drawings and Section 02200. Provide encasement and/or concrete cradle where indicated. The entire length of each pipe shall be placed on firm bedding.

E. Placement of Pipe and Fittings

1. Prior to pipe installation, bring bedding material to grade along the entire length of pipe to be installed. Install pipe to a true uniform line and grade as indicated with continuous bearing of barrel on bedding material.

2. Install pipe upgrade with the bell or groove (for concrete pipe) pointing in the direction of upstream. Place each section of pipe in such a manner as to form a close concentric joint with the adjoining section and to prevent sudden offsets in the flow lines. Unless otherwise specified, opening of joints more than half the depth for concrete pipe will not be permitted.

3. Place sufficient backfill on each section of pipe as it is installed to hold it firmly in place.

3.02 JOINTS

For reinforced concrete pipe, clean joint surfaces immediately before jointing. Joints on PVC shall be gasket collar type, constructed of the same material as the pipe, and installed according to the manufacturer's recommendations.

A. Mortar Joints

1. Assemble mortar joints to ensure complete filling of the joint all around. Mortar shall be used within 1 hour after addition of water. All joints of pipe to concrete structures shall be mortared closed.

2. Joints for HDPE pipe shall be electro-fusion butt welded.

3.03 CONCRETE MANHOLES, TRENCHES, AND INLETS

A. Excavation

1. Perform excavation to the line and grade shown on the drawings and as specified in Section 02200.

2. Location and depth as shown on the Drawings, or as directed by the Engineer.

B. Installation

1. Manholes, trenches, and inlets shall be furnished and installed at the location and in accordance with the details shown on the Drawings.

2. All structures shall be set on a crushed stone base, at least 6 in. deep, in accordance with Section 02200, to proper grade and properly leveled and aligned.

3. All lifting holes shall be sealed tight with rubber plugs and cement mortar.

4. A mechanical, flexible, tight gasket shall be provided for pipe connections at manholes and inlets that meet the requirements of ASTM C923.

5. All structures shall be painted outside with a coal tar epoxy or approved equal.

6. All structures shall be free of visible leakage. Each manhole will be visually inspected and any leaks found shall be repaired in a satisfactory manner as approved by the Engineer.

3.04 FRAMES, GRATES, AND COVER

A. Install in accordance with manufacturer's recommendations.

B. All frames and grates shall be bolted down securely to prevent any movement of the grate(s).

C. Install cast iron frame and cover on each structure, as detailed on the Drawings. Adjust the frame and cover to proper grade by using precast concrete grade rings or brick masonry when the structure is in a space dedicated for public use, a traveled way, or when designated to meet existing grade. Transition shall be a minimum of 4 in. and a maximum of 18 in. high. Otherwise, the structure shall be built without transition. Frames shall be adjusted to within 0.5 ft of final graded area.

D. Provide precast concrete grade rings, 3 in. through 6 in. thick. If required to meet proper grade, one split grade ring 2 in. thick may be used provided that this does not exceed the maximum transition heights. Precast concrete grade rings shall be set in full beds of mortar not less than 0.25 in. or more than 1.25 in. thick. Horizontal circumferential and vertical mortar joints, inside and outside, shall be pointed the full width. Depth of pointing shall not exceed 0.375 in. The mortar shall be cured a minimum of 6 hours prior to the backfilling and setting of the manhole frame. Place manhole frame and cover in a bed of mortar not less than 1 in. thick.

F. Concrete sections shall be protected from damage while in storage at the plant, while in transit, and at the contract site. They shall be handled with the proper size equipment, using only appropriate lifting holes or eyes. Joint ends of the sections shall be kept clean and placed on wooden blocks, pallets, or other appropriate material, but never on the ground. If damage is evident, it shall be repaired or the section rejected, as directed by the Owner. Thoroughly clean joint surfaces, remove all debris and foreign matter, and keep joint surfaces clean during assembly.

F. For concrete trenches; concrete section shall be installed in accordance with the manufacturer's written assembly instructions.

G. Where the gasket material (CS-440- 1.5 diameter rope size) is to be placed on the end of the concrete trench, paint area CS-75 adhesive. Place the gasket material on the painted area in the center of the concrete trench on all three (3) sides. Install materials in accordance with manufactures recommendations.

H. After the alignment and grade of the trenches has been checked and joint sealer is in place, tighten the trenches together using the quick thread rods. Tighten quick thread rods until the trenches are firmly fix against the sealer. Paint inside joints with Sika 1A.

I. Install Concrete Sealant and Sika 1A products in accordance with the manufactures requirements.

3.02 BACKFILLING

A. Backfilling around pipes and structures shall be completed in accordance with Section 02200.

END OF SECTION

SECTION 02730

GAS COLLECTION SYSTEM

PART 1 GENERAL

1.01 DESCRIPTION

A. This Section includes requirements for the construction of a Gas Collection System in accordance with the Contract Documents. The Work includes furnishing all materials, tools, equipment, labor and supervision necessary to complete the work.

1.02 QUALITY CONTROL TESTING

A. Material Testing

As part of the Quality Assurance effort, the Engineer may inspect and test all pipe, fittings, and joint material upon delivery to the site. The Engineer may perform, on an intermittent or continual basis, plant certification and in-process inspections.

1.03 SUBMITTALS

A. Installation Drawings

The Contractor shall submit installation drawings for gas collection piping in accordance with Section 01300. Furnish laying schedules that specify all fittings (including sizes) and pipe lengths.

B. Certificate of Compliance

The Contractor shall submit to the Engineer for approval Certificates of Compliance before delivery of materials for pipe and fittings furnished by the Contractor under this Section. Certificates shall include a copy of the manufacturer's certified test reports; job location; the Contractor's name; types, classes, and strengths of pipe; and the pipe manufacturer's name.

C. Certified Test Reports

Certified test reports within the requirements of standards and testing methods specified herein shall be submitted to the Engineer for approval prior to pipe delivery. The pipe manufacturer and Contractor must satisfy the Engineer that the material that he offers to furnish and install will meet in every aspect the requirements set forth in these Specifications. The Contractor shall transmit to the Engineer all information supplied to him by the manufacturer or supplier prior to approval for furnishing and installing any such material.

PART 2 MATERIALS

2.01 PIPE MATERIALS

A. Gas piping shall be high density polyethylene (HDPE) with a wall thickness classification specified on the Drawings or herein. The pipe shall be manufactured in accordance with ASTM F-714 and ASTM D-3261. The pipe material properties shall meet or exceed the characteristics of a Type III, Class C, Category 5, Grade P34 as defined by ASTM D-1248. The material cell classification shall be 345434C as defined by ASTM D-3350. Joints for HDPE pipe shall be electro-fusion butt welded, to provide a joint that, as a minimum, has the physical properties of the pipe. All welding shall be performed by a trained individual according to the pipe manufacturer's recommendations.

B. Vertical gas piping shall be Schedule 80 PVC pipe. Joints shall be solvent welded.

C. Fittings shall be of similar material(s) as the pipe

PART 3 EXECUTION

3.01 GENERAL

A. Pipe and fittings delivered to the work site shall be inspected by the Contractor and the Engineer prior to installation. Nonaccepted and damaged pipe and fittings shall be marked by the Engineer and shall be removed or repaired as directed by the Engineer.

B. All pipe and fittings shall be unloaded and handled with proper equipment avoiding severe impact blows, especially during cold weather. Pipe and appurtenances shall be unloaded and handled with a crane or backhoe of proper capacity equipped with appropriate slings to protect the exterior of the pipe. Pipe will be inspected before installation. If damage occurs during handling and placement and is deemed repairable, it shall be repaired as directed by the Engineer in accordance with approved manufacturer's recommendation. If damage is not repairable in the opinion of the Engineer, such pipe shall be rejected, removed, and replaced at the Contractor's expense.

3.02 INSTALLATION OF GAS PIPE

A. Prior to pipe installation, bring the bedding material to the grade along the entire length of pipe to be installed and install geotextile. Install pipe to a true uniform line and grade as indicated, with continuous bearing of the pipe barrel on the bedding material. Lateral pipes shall be installed sloping away from the header pipe.

B. Foreign matter shall be cleaned and removed from each pipe, fitting, and other appurtenance before placing in the trench. Should foreign matter be observed in

previously placed pipe, fitting, or appurtenance, cease work until foreign matter is removed. Open ends of pipe and fittings shall be closed with a watertight cap or plug when work is not proceeding.

C. Clean joint surfaces immediately before joining, square (face) end of each pipe to be fused, then butt (weld) pipe together according to the manufacturer's recommendations. Allow welds sufficient time to cool before working with the pipe.

D. Cap closed all open ends of pipe with end caps.

3.04 FIELD TESTING

A. No field testing is required for gas piping.

3.05 BACKFILLING

A. Backfilling shall be in accordance with Section 02200.

END OF SECTION

SECTION 02750

STORMWATER MANAGEMENT AND DISCHARGE

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This section includes the requirements for the management and discharge of waters collected during and post construction activities.

1.02 RELATED SECTIONS

A. SWPPP, June 2005.

B. Section 02930 – Erosion and Sediment Control.

PART 2 MATERIALS

Not Applicable

PART 3 EXECUTION

3.01 STORMWATER MANAGEMENT

A. Controls to be used by the Contractor shall conform to the approved details stated in the Contractor's SWPPP.

END OF SECTION

SECTION 02930

EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. The work to be performed under this section includes furnishing all labor, materials, tools, and equipment needed to install, operate, and maintain erosion and sediment controls as shown on the Drawings and specified herein.

1.02 RELATED SECTIONS

A. SWPPP, June 2005.

B. Construction Plan for LASO TA-73 Airport Landfill, June 2005.

1.03 STORMWATER POLLUTION PREVENTION

A. Prior to initiating earth-moving activities, implement the soil erosion and sedimentation controls as shown on the Drawings and detailed in the Contractor's SWPPP.

B. Fines and related costs resulting from failure to provide adequate protection against soil erosion and sedimentation are the obligation of the Contractor.

1. Silt, sediment, and mud leaving the site will be construed as damage to neighboring property and evidence of negligence on the part of the Contractor.

2. Damages to any property outside of the project limits due to negligence by the Contractor shall be rectified and/or restitution shall be paid by the Contractor.

C. Erosion and sedimentation control measures employed will be subject to approval and inspection by governing agencies having jurisdiction over such work.

The temporary control provisions proposed shall be coordinated with the project schedule, sequence of construction, and temporary and permanent site facilities to assure economical, effective and continuous erosion control throughout the construction and post construction period with no violation of the federal, state, and local regulations. The drainage area to sediment traps shown on the Design Calculations shall not be exceeded.

D. The Engineer may limit the active area of earthwork operations in progress commensurate with the Contractor's capability in controlling erosion and sediment-laden runoff.

1.04 SUBMITTALS

A. Samples: Submit samples of materials being used when requested by the Engineer including names, sources, and descriptions.

1.05 QUALITY CONTROL

A. All erosion and sediment control work shall comply with applicable requirements of governing authorities having jurisdiction. The Specifications and Drawings are not comprehensive, but rather convey the intent to provide complete slope protection and erosion control for both the Engineer and adjacent property.

B. Erosion control measures shall be established at the beginning of construction and maintained during the entire period of construction. On-site areas that are subject to severe erosion, and off-site areas that are especially vulnerable to damage from erosion and/or sedimentation are to be identified and receive special attention.

C. All land-disturbing activities are to be planned and conducted to minimize the size of the area to be exposed at any one time and the length of the time of exposure.

D. Surface water runoff originating upgradient of exposed areas should be controlled to reduce erosion and sediment loss during the period of exposure.

E. All land-disturbing activities are to be planned and conducted so as to minimize off-site sedimentation damage.

PART 2 MATERIALS

2.01 STRAW BALES

A. Straw bales, if used, shall be either wire-bound or string-tied with bindings around sides rather than over and under.

2.02 CRUSHED STONE

A. Crushed stone for stabilized construction entrance(s) shall be American Association of State Highway and Transportation Officials (AASHTO) #3.

2.03 SILT FENCE

A. Prefabricated silt fence shall meet the following requirements:

1. Silt fences shall be prefabricated.

2. The geotextile for the fencing shall meet the following requirements:

Property	Test Value(1)	Test Method
Grab Tensile Strength	90 lbs	ASTM D4632
Burst Strength	190 psi	ASTM D3786
Puncture Resistance	40 lbs	ASTM D4833
Permittivity	>0.1 sec^{-1}	ASTM D4491
AOS	>30 US sieve	ASTM D4751
UV Resistance (500 hr.)	70%	ASTM D4355

[1]Minimum average roll values (MARV)

3. Posts shall be metal or hard wood.

4. The geotextile height shall be a minimum of 3 ft and shall be provided with a tensioning cord.

2.04 GEOTEXTILES

A. Filter geotextile shall meet the requirements for geotextiles contained in Section 06020.

2.06 EROSION CONTROL MATS

A. Erosion control mats shall be American Excelsior Co., type Hi-velocity Curlex Blanket; PPS Packaging Co. type Super Duty Blanket; or approved equal.

2.07 EROSION CONTROL BLANKET

A. Erosion control blanket material shall be XCELL type regular blanket (0.98 #/sy), Curlex blanket type (0.97 #/sy), or approved equal.

PART 3 EXECUTION

3.01 STRAW BALE BARRIERS

A. Excavation shall be to the width of the bale and the length of the proposed barrier to a minimum depth of 4 in.

B. Bales shall be placed in a single row, lengthwise on proposed line, with ends of adjacent bales tightly abutting one another. In swales and ditches, the barrier shall extend to such a length that the bottoms of the end bales are higher in elevation than the top of the lower middle bale.

C. Staking shall be accomplished to securely anchor bales by driving at least two stakes or rebars through each bale.

D. The gaps between bales shall be filled by wedging straw in the gaps to prevent water from escaping between the bales.

E. Any straw bales which become clogged or otherwise deteriorate shall be properly maintained or replaced as necessary at no additional cost to the Engineer.

3.02 STABILIZED CONSTRUCTION ENTRANCE

A. Specifications include:

1. Stone Size: AASHTO #3.

2. Length: As effective, but not less than 50 ft.

3. Thickness: Not less than 6 in. in dry areas and 12 in. in wet areas.

4. Width: Not less than full width at all points of ingress or egress, but not less than 20 ft.

5. Washing: When necessary, wheels shall be cleaned to remove sediment prior to entrance onto public right-of-way or landfill entrance road. When washing is required, it shall be done on any area stabilized with crushed stone which drains into an approved sediment trap or sediment basin. All sediment shall be prevented from entering any storm drain, ditch, or watercourse through use of sand bags, gravel, boards, or other approved methods.

6. Maintenance: The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto the landfill entrance road or public right-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout or any measures used to trap sediment. All sediment spilled, dropped, washed, or tracked onto the transfer station access road or public

right-of-way must be removed immediately by the Contractor at no cost to the Engineer.

3.03 SILT FENCING

A. A 6-in. by 6-in. trench shall be excavated along the alignment of the silt fence. Excavated material shall be stockpiled on the upside of the trench.

B. Fence posts shall be positioned on the downstream side of the fence and driven into the ground. Fence posts shall be spaced no more than ten (10) ft apart.

C. The fabric flap shall be laid in the trench and backfilled with material stockpiled from excavation. The backfill shall be tamped into place.

D. The Contractor shall join fence sections together as recommended by the manufacturer and as approved by the Engineer to prevent silt from escaping through the adjoining sections.

E. The Contractor shall maintain silt fences (removing and disposing of silt, repairing fence which falls down, and replacing damaged fence, etc.) throughout the duration of the Contract at no additional cost to the Engineer. Silt shall be disposed of in such a manner that it will not erode from the site and shall be placed within the stockpile.

3.04 DUST CONTROL

A. Dust generated from the Contractor's performance of work, either inside or outside the limits of work, shall be controlled by the Contractor by applying water, calcium chloride, or other matertials with the approval of the Engineer.

B. The Engineer has the right to stop construction activity, if in his opinion; the excavations are generating excessive amounts of dust.

3.05 SOIL STABILIZATION

A. Following initial soil disturbance or redisturbance, permanent or temporary stabilization shall be completed in accordance with: a) 7 calendar days as to the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, stockpiles, and all slopes greater than 2 horizontal to 1 vertical (2:1) and b) 14 days as to all other disturbed or graded areas on the project site. The in-place sediment control measures will be maintained on a continuing basis until the site is permanently stabilized and all permit requirements are met.

3.06 CHANNELS (Temporary), SLOPES (Temporary), AND STOCKPILES

A. All channels, swales, ditches, stockpiles, etc. shall be stabilized with permanent or temporary seeding, in accordance with Section 02932 immediately upon reaching an interim grade.

B. The channel beds shall be covered with an erosion control mat. The erosion control mat shall be installed as recommended by the manufacturer of the blanket.

C. Where slopes require temporary stabilization, the Contractor shall install erosion control blankets, as directed by the Engineer.

3.07 MAINTENANCE

A. Inspection

1. Erosion and sediment control will be inspected by the Contractor the next working day after rainfall events in excess of 0.5 in. and prior to forecasted storms.

2. At a minimum, the Contractor will perform inspections of the erosion and sediment control system once every 14 calendar days and following storm events of 0.5 in. to assure the integrity of the system.

B. Repair

1. All erosion swales and gullies in excess of 6 in. deep will be filled and compacted to their original condition and reseeded as required.

2. Erosion and sediment control structures (i.e., silt fencing) will be replaced as required to assure the integrity of the system.

3.08 SEDIMENT TRAPS

A. The Contractor is solely responsible to construct and maintain the proposed sediment traps and their effluent upon commencing any earth disturbance activity.

B. The Engineer reserves the right to require upgrades to existing traps or installation of additional structures should any discharge released not meet quality standards.

END OF SECTION

SECTION 02932

SEEDING, MULCHING, AND RESTORATION

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. The work to be performed under this section shall include furnishing and installing all seed, fertilizer, mulch, mulch binder, erosion mats, and initial watering of seeded areas wherever existing site surface soils will be placed as topsoil shown on the Drawings or as directed by the Engineer. This work shall also include maintaining seeded areas as shown on the Drawings until accepted by the Engineer.

B. The areas to be seeded under this item shall include all areas designated by the Engineer and as described on the Drawings. All areas outside of specified limits where the vegetative growth has been injuriously disturbed or destroyed by the Contractor shall be restored and seeded in accordance with these specifications by the Contractor at his own expense.

1.02 RELATED SECTIONS

A. LANL Master Construction Specification, Section 02936, Seeding.

1.03 SUBMITTALS

A. The Contractor shall submit the following items:

1. Catalog data, including sources of supply for amendments, mulch, tackifier, fertilizer, and erosion control blankets.

2. Certification substantiating that material complies with specified requirements. Submit certified seed bag tags and copies of seed invoices identified by project name.

3. Installation instructions, including proposed seeding schedule. Coordinate with specified maintenance periods to provide maintenance from date of final acceptance. Once schedule is accepted, revise dates only with Engineer approval after documentation of delays.

1.04 QUALITY ASSURANCE

A. Contractor Qualifications:

1. Perform work by a single firm experienced with the type and scale of work required and having equipment and personnel adequate to perform the work satisfactorily.

B. Material Quality Control:

1. Provide seed mixture in containers showing species percentages in seed mix; test information including, purity, germination and noxious and restricted weeds; net weight; date of packaging; and location of packaging.

2. Furnish seed labeled in accordance with the requirements of federal and New Mexico statutes and regulations governing seed labeling. Such resulting

requirements include but are not necessarily limited to: Federal Seed Act and Amendments, rules and regulations established by the USDA; the New Mexico Seed Law; and all resulting regulations or restrictions established by New Mexico State University or other authorized entity.

3. In addition, ensure seed mix and its application comply with the requirements of all other federal and New Mexico statutes and regulations governing seeds, plants, and weeds. These requirements include but are not necessarily limited to: the Noxious Weed Control Act and all rules, regulations, or control measures by a noxious weed control district embracing Los Alamos County, New Mexico; and the Harmful Plant Act.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver packaged materials in sealed containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery and while stored at site. Opened or wet seed shall be rejected and returned to the responsible party.

PART 2 MATERIALS

2.01 SEED

A. Obtain native grass seed from sources whose origin would ensure site adaptability. Plant sources from New Mexico or surrounding states are preferred.

B. Obtain shrub and wildflower seed from sources whose origin would ensure site adaptability. Plant sources from New Mexico or surrounding states are preferred.

C. Cover crops (e.g., annual barley, oats, winter rye, etc.) may be used only as a temporary stabilization measure and shall not be used in conjunction with a perennial seed mix.

D. Furnish certification, showing origin of seed and pure live seed (PLS) content as determined by a certified authority. Provide bags of seed that are tagged and sealed in accordance with the State Department of Agriculture or other local certification authority within the state of origin. The tag or label shall indicate analysis of seed and date of analysis, which shall not be more than 9 months prior to delivery date. Seed may be premixed by the seed dealer and appropriate data indicated on the bag label for each variety.

E. Seed mixture shall be:

Develop seed mixture from the following guidelines. Choose a minimum of five grass species from the list. Should wildflowers be included in the mix, use a ratio of 80 to 90% grasses and 10 to 20% wildflowers. Choose 3 to 5 species from the forb and wildflowers list. These species are applicable for both undeveloped and urban-interface areas.

NATIVE PERENNIAL MIX

Common Name	**Scientific Name**	**% of Mix**
Grasses		
Blue grama*	*Bouteloua gracilis*	5 – 10%
Galleta grass*	*Hilaria jamesii*	5- 10%
Mutton grass	*Poa fendleriana*	10-15%
Sideoats grama*	*Bouteloua curtipendula*	10-15%
Arizona fescue†	*Festuca arizonica*	10 – 15%
Prairie junegrass†	*Koeleria macrantha*	5 – 10%
Bottlebrush squirreltail*	*Elymus elymoides*	15 – 20%
Little bluestem†	*Schizachyrium scoparium*	10 – 15%
Indian ricegrass*	*Oryzopsis hymenoides*	10 – 15%
Mountain brome†	*Bromus marginatus*	10 – 15%
Sand dropseed*	*Sporobolus cryptandrus*	1 - 8%
Thickspike wheatgrass	*Agropyron dasystachyum*	20 – 25%
Needle and Thread grass*	*Stipa comata*	5 – 10%
New Mexico needlegrass*	*Stipa neomexicana*	10 - 15%
Sheep fescue	*Festuca ovina*	10 – 15%
Forbs/ Wildflowers		1%
Firewheel	*Gaillardia pulchella*	2%
Evening primrose	*Oenothera caespitosa*	1%
Gooseberry leaf Globemallow	*Sphaeralcea grossulariafolia*	1.5%
Scarlet gilia	*Ipomopsis aggregata*	1%
Plains aster	*Aster bigelovii*	1%
Western yarrow	*Achillea millefolium*	½%
Fringed sage	*Artemisia frigida*	1%
Forbs/Wildflowers		
Blue flax	*Linum perenne lewisii*	4%
Scarlet bugler	*Penstemon barbatus*	2%
Palmer penstemon	*Penstemon palmeri*	2%
Prairie coneflower	*Ratibida columnifera*	1%
Showy golden-eye	*Heliomeris multiflora*	1%
Purple geranium	*Geranium caespitosum*	5%

*Species particularly suited for especially dry sites.
†Species particularly suited for higher elevations (above 7000 ft).

2.02 STRAW MULCH

A. Straw shall be stalks from oats, wheat, rye, barley, or rice that are free from noxious weeds, mold, or other objectionable material. At least 65% of the herbage by weight of

each bale of straw shall be 10 in. in length or longer. Rotted, brittle, or molded straw is not acceptable. Straw from introduced grasses is acceptable if cut prior to seed formation. If possible, provide marsh grass composed of mid to tall native grasses (usually tough and wiry grass and grass-like plants found in the lowland areas within the Rocky Mountain Region).

2.03 HYDRAULIC MULCH/TACKIFIER

A. Provide mulch material consisting of 100% virgin wood fibers manufactured expressly from whole wood chips, such as Eco-Fibre, Conwed, etc. Process chips in such a manner as to contain no growth or germination inhibiting factors. Do not produce fiber from recycled material such as sawdust, paper, cardboard, or residue from pulp and paper plants. Provide materials free from contaminants such as lead paint, varnish, or other metal contaminants. Hydraulic mulch shall contain non-toxic dye to assist in visually determining even distribution. Mulch material shall meet the following specifications:

Parameter	Value
pH at 3% consistency	4.5 +/- 0.5
Ash content	0.8% +/- 0.2%
Moisture holding capacity	1250 (grams water/100 grams oven dry fiber)
Moisture content	12% +/- 3% (Wet weight basis)

B. Combine mulch with an organic plantago-based tackifier, such as M-binder, etc., that has no growth or germination inhibiting factors and is nontoxic. Apply the uniform mixture to the seeded area.

C. Bagged mulch/tackifier mix that is homogenous within the unit package may also be used. Tackifier shall adhere to the fibers during manufacturing to prevent separation during shipment and to avoid chemical agglomeration during mixing in the hydraulic mulching equipment.

2.04 EROSION CONTROL BLANKET

A. Provide erosion control blankets of a uniform web of interlocking excelsior wood fibers, weed-free straw, or a combination of straw and coir fibers.

Use an appropriate blanket chosen for the site conditions and functionality for the desired growing seasons.

1. 3:1 slopes or gentler use single netted blankets - A machine-produced erosion control blanket using 100% straw or excelsior fibers sewn into a medium weight photodegradable bottom net. Minimum weight of blanket 0.5 lbs/ square yard, such as Greenfix America WS05, etc.

2. 3:1 – 2:1 slopes use double netted blankets - A machine-produced erosion control blanket using 100% straw or excelsior fibers sewn into a medium weight photodegradable top net and a light weight photo degradable bottom net. Minimum weight of blanket 0.7 lbs/ square yard, such as Greenfix America WS072, etc.

3. 2:1 slopes and steeper and/or 2 growing seasons of protection use straw/coir blend blankets - A machine-produced straw /coir fiber erosion control blanket using 70% straw /30% coir fibers sewn into a heavy weight photodegradable top

net and a medium weight photo degradable bottom net. Minimum weight of blanket 0.7 lbs/square yard, such as Greenfix America CFS072R, etc.

B. Staples: U-shaped, 11 gauge or heavier steel wire, minimum leg length of 8 in. after bending, with a throat approximately 2 in. wide.

C. Wood Stakes: Use 2-in. x 2-in. x 12-in. pine or fir stakes, beveled at one end, in place of wire staples in tuff locations.

2.05 BONDED FIBER MATRIX

A. Provide Bonded Fiber Matrix (BFM) composed of natural color, long-strand wood fiber, produced by therm-mechanical defribration of wood chips and joined together by a high-strength non-toxic adhesive, such as Eco-Ageis, etc. The product shall be composed of 90% wood fiber, 9% blended hydrocolloid-based binder, and 1% mineral activators, all by total weight. The BFM shall be 100% biodegradable and non-toxic to fish and wildlife, and it shall not contain any synthetic fibers.

2.06 AMENDMENTS / SOIL ADDITIONS

A. Fertilizer: Apply slow-release organic fertilizers such as Biosol Mix, Biosol, Osmocote, composted manure, or approved equal to minimize deficiencies of the topsoil. If composted manure is to be applied, test the nutrient content and interpret before it is used.

B. Water: Clean, fresh, and free of substances or matter that could inhibit vigorous growth.

C. Sand: Clean, washed, and free of toxic materials.

D. Wood chips: Wood chips shall have a relatively large surface area to volume ratio to be more easily broken down in the soil. Incorporate wood chips at low rates (0.5 ton/ AC) in order to assure the carbon to nitrogen ratio in soil is at favorable conditions for plant germination and growth. If higher rates are used, add nitrogen fertilizer to assure nutrient availability to plants.

PART 3 EXECUTION

3.01 PREPARATION

A. Preparation of the Seedbed.

1. Prepare seedbed to a maximum depth of 4 in. by tilling with a disc harrow or chiseling tool. Uproot all competitive vegetation during seedbed preparation and work soil uniformly, leaving surface rough to reduce surface erosion. Remove large clods and stones, or other foreign material that would interfere with seeding equipment.

2. Do not till on ground that is already loose to a depth of 2 in. or more that has undergone regrading and fill.

4. Do not do work when moisture content of soil is unfavorable or ground is otherwise in a non-tillable condition. To minimize dust problems for adjoining areas, do not till when wind speeds exceed 10 miles per hour (mph).

5. The extent of seedbed preparation shall not exceed the area on which the entire seeding operation can be accomplished within a 24-hour period.

B. Soil Amendments/Additions

1. Uniformly apply slow-release organic fertilizer to prepared seedbed in accordance with manufacturer recommended rates.

C. Prepare seedbed again if prior to seeding, the Engineer determines that rain or some other factor has affected prepared surfaces and that it may prevent seeding to proper depth.

D. On excessively steep slopes (steeper than 2:1), hydraulic/broadcast seeding may be appropriate. If seeding in this fashion, multiply application rate of seed by a factor of 2.

E. If cover crop has been established in area to be seeded, mow cover crop early in growing season before cover crop is ready to drop seeds.

3.02 APPLICATION OF SEED

A. Do not seed during windy weather, or when topsoil is dry, saturated, or frozen.

B. Equip seed boxes used for drill and broadcast seeding with an agitator.

C. To prevent stratification of seed mix, do not run seed box agitators while seeding is not being performed.

D. If seed mix is transported to site in a seed box or other equipment that subjects mix to shaking or similar movement that has the potential to cause stratification, remix seed prior to application.

E. Calibrate seeding equipment in presence of the Construction Manager to determine that equipment setting is appropriate to distribute seed at the specified rates.

F. Unless otherwise shown on Drawings, seed areas disturbed by or denuded by construction operations or erosion.

G. Use markers to ensure that no gaps will exist between passes of seeding equipment.

H. If cover crop has been established, mow the crop and drill seed perennial seed mix into the crop stubble.

I. When drill seeding, plant seed mix at a rate of 20 to 25 PLS lb/AC. Uniformly apply prescribed mix over area to be seeded as follows:

1. Accomplish seeding operations, where practical, by drilling in a direction across slope.

2. Plant seeds approximately 1/4 in. deep.

3. Do not exceed 4 in. distance between drilled furrows. If furrow openers on drill exceed 4 in., drill area twice to obtain a 4-in. distance between furrows.

4. Seed with grass wheels, rate control attachments, seed boxes with agitators, and separate boxes for small seed.

J. When broadcast seeding, plant seed mix at a rate of 32 to 37 PLS lbs/AC.

1. Where it is not practical to accomplish seeding by drilling, mechanically broadcast seed by use of a hydraulic mulch slurry blower, rotary spreader, or a seeder box with a gear feed mechanism. If seeding is done with a slurry blower, use highest pressure and smallest nozzle opening that will accommodate the seed.

2. Immediately following seeding operation, lightly rake seedbed or loosen with a chain harrow to provide approximately 1/4 in. of soil cover over most of the seed.

3. If hydraulically applying mulch as part of the broadcast seeding process, use a two-step process. Apply seed with a tracer (200 to 300 lb/AC) amount of mulch across entire seeded area. Once seed is applied, apply full complement of mulch (to equal 2,000 lb/AC). This shall allow seed to be in good contact with soil surface and not suspended in mulch matrix.

4. Prohibit vehicles and other equipment from traveling over the seeded areas.

3.03 STRAW MULCH

A. For locations that have not been hydraulically mulched, immediately following raking/chaining operation, add straw mulch to seeded areas.

1. Apply straw mulch at a minimum rate of 1.5 tons per AC of air-dry material. Spread straw mulch uniformly over area either by hand or with a mechanical mulch spreader to achieve 80% ground cover. When spread by hand, tear bales of straw apart and fluff before spreading. Depth of applied straw mulch shall not exceed 3 in. Do not mulch when wind velocity exceeds 10 mph.

2. Wherever use of crimping equipment is practical, place mulch in manner noted above and anchor it into the soil to a minimum depth of 2 in.. Use a crimper or heavy disc such as a mulch tiller, with flat serrated discs at least ¼-in. in thickness, having dull edges, and spaced no more than 9 in. apart. Provide discs of sufficient diameter to prevent frame of equipment from dragging the mulch. Where practical, perform crimping in two (opposite) directions. Do not use Sheep's Foot Rollers, heavy equipment tracks, and standard disc cultivators for crimping.

3. If straw mulched areas cannot be anchored by crimping, use hydraulic mulch wood fibers with tackifier. Mix slurry in a tank with an agitation system and spray under pressure uniformly over the soil surface. Keep all materials in uniform suspension throughout the mixing and suspension cycle when using hydraulic

mulching equipment. Mix 100 lb of wood fiber with 150 lb of tackifier to anchor straw mulch. Apply mixture at a rate of 250 lb/AC.

4. Use both horizontal and vertical movements in the applicator to achieve an even application of the slurry material.

3.04 HYDRAULIC MULCHING/TACKIFIER

A. Immediately following raking/chaining operation, apply hydraulic mulch fibers with tackifier to seeded areas. Mix slurry in a tank with an agitation system and spray, under pressure, uniformly over soil surface. Apply mulch evenly across landscape at a rate of 2,000 lb/AC.

Use both horizontal and vertical movements in applicator to achieve an even application of slurry material. Keep all materials in uniform suspension throughout mixing and suspension cycle when using hydraulic mulching equipment.

When using plantago based tackifier as mulch, apply tackifier at a rate of 100 lb/AC. When applied alone for dust control, apply tackifier at a rate of 150 lb/AC.

Prohibit foot/vehicle traffic from hydraulically mulched areas.

3.05 EROSION CONTROL BLANKET

A. Place blankets over native grass seeding immediately following the raking/chaining operation.

B. When using single netted products for 3:1 or flatter slopes, place blanket with netting on top and the wood/ straw fibers in contact with soil over entire seeded area.

C. For slope installations, the following guidelines or manufactures recommendations shall be used:

1. Begin at top of slope and anchor its blanket in a 6 in. deep by 6-in. wide trench. Backfill trench and tamp earth firmly.

2. Unroll blanket downslope in direction of water flow.

3. Overlap edges of adjacent parallel rolls 2 to 3 in. and staple every 3 ft.

4. When blankets are spliced, place blankets end over end (shingle style) with 6-in. overlap. Staple through overlapped area, approximately 12 in. apart.

5. Lay blankets loosely and maintain direct contact with soil – do not stretch.

6. Staple blankets sufficiently to anchor blanket and maintain contact with soil. Place staples down the center and staggered with the staples placed along the edges. Moderate slopes (2:1 – 3:1) require 1 to 2 staples per square yard. Gentle slopes require 1 staple per square yard. Use a common row of staples on adjoining blankets.

D. Use wood stakes on tuff slopes, in place of wire staples. Use same installation rate as for staples. Drive stakes in perpendicular to slope and leave 2 in. exposed above soil grade.

3.06 BONDED FIBER MATRIX

A. Hydraulically apply BFM over seeded area (or apply seed with a tracer amount, 200 to 300 lb/AC) immediately following raking/chaining operations and in accordance with manufacturer's specified procedures. Hydraulically apply BFM as a viscous mixture. Upon drying, it shall form a continuous, porous, and erosion-resistant mat. Upon drying, matrix shall not inhibit germination and growth of plants in and beneath the layer. Matrix shall retain its form despite re-wetting.

B. Apply matrix uniformly across area and apply in multiple directions to ensure a 100% soil surface coverage.

C. Apply at a rate of approximately 3,500 lb/AC in a manner that achieves uniform coverage of all exposed soils.

D. Prohibit vehicle traffic on hydraulic BFM applications.

3.07 WATERING

A. Where temporary watering is required for seeded areas, provide temporary water system which may be a sprinkler system, or a water truck with a spray boom or any other method satisfactory to distribute a uniform coverage of clean water (free or oil, acid, salt, or other substances harmful to plants) to previously seeded and mulched areas.

B. If a temporary sprinkler system is used, keep all pipe connections tight to avoid leakage and loss of water, and to prevent washing or erosion of growing areas. Maintain sprinklers in proper working order during watering.

C. Do not drive trucks with spray systems on seeded areas and ensure water force does not cause movement of mulch or seed on the ground.

D. Water revegetated areas.

E. Apply water at a maximum of 0.5 in. per hour for 2 hours. Additional applications of water may be made as designated by the Engineer. Water source will be approved by the SS, prior to use.

3.08 MAINTENANCE

A. Begin maintenance immediately after planting.

B. Maintain seeded areas for not less than 60 days after final acceptance of work and longer as required to achieve final stabilization as described in Section 3.10 ACCEPTANCE.

C. Reseed void areas greater than 6 ft^2 or repetitive voids greater than 2 ft^2 amounting to more than 10% of any area that appears the growing season following installation.

D. Keep revegetated areas free of noxious weeds until acceptance by the Engineer. Contact the Engineer prior to application of any control measure.

3.09 CLEANUP AND PROTECTION

A. After completion of work, clear site of excess soil, waste material, debris, and objects that may hinder maintenance and detract from neat appearance of site.

B. Protect work and materials from damage due to seeding operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged work as directed.

3.10 ACCEPTANCE

A. Seeded areas will be reviewed for acceptance by the Engineer when final stabilization has been achieved. Final stabilization is defined as "All soil-disturbing activities at the site have been completed and a uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap or geotextiles) have been employed."

B. In the event that all other work required by the Contract is completed before final stabilization is achieved or because seasonal limitations prevent seeding, partial acceptance of the work shall be made with final acceptance delayed until satisfactory vegetative growth has been established.

END OF SECTION

SECTION 02980

CHAIN LINK FENCE

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This section shall consist of furnishing and erecting permanent and temporary construction fence in accordance with these specifications and the details, lines and grades shown on the plans or as established by the Engineer.

B. Existing fence can be relocated and reused in its entirety as construction fencing as shown on the plans, and described herein.

1.02 QUALITY ASSURANCE

A. The Airport perimeter fencing height will comply with the FAA Landing and Taxiway obstruction requirements. The final site fencing requirements will be coordinated with the Los Alamos County Airport Manager and the Owner.

B. Fencing installed on top of retaining walls will be a minimum height of 4 feet.

C. The work and material under this section shall conform to the recommended practice outlined in the following standard and as required by this specification.

1. American National Standards Institute (ANSI)/ASTM A123 – Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.

2. ANSI/ASTM F567 – Installation of Chain-Link Fence.

3. ASTM A116 – Zinc-Coated (Galvanized) Steel Woven Wire Fence Fabric.

4. ASTM A120 – Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized) Welded and Seamless, or Ordinary Uses.

5. ASTM A121 – Zinc-Coated (Galvanized) Steel Barbed Wire.

6. ASTM A153 – Zinc-Coating (Hot-Dip) on Iron and Steel Hardware.

7. ASTM A392 – Zinc-Coated Steel Chain-Link Fence Fabric.

8. ASTM A428 – Weight of Coating on Aluminum-Coated Iron or Steel Articles.

9. ASTM A491 – Aluminum-Coated Steel Chain Link Fence Fabric.

10. ASTM A569 – Steel, Carbon (0.15 Maximum Percent), Hot-Rolled Sheet and Strip Commercial Quality.

11. ASTM A585 – Aluminum Coated Steel Barbed Wire.

12. ASTM C94 – Ready-Mixed Concrete.

13. ASTM F573 – Residential Zinc-Coated Steel Chain Link Fence Fabric.

14. ASTM F668 –PVC Coated Steel Chain Link Fence Fabric.

15. Chain Link Fence Manufacturers Institute (CLFMI) – Product Manual.

16. FS RR-F-191 – Fencing, Wire and Post Metal (and Gates, Chain Link Fence Fabric, and Accessories).

1.03 SUBMITTALS

A. Submit copies of the manufacturer's latest published literature and data on fabric, posts, accessories, fittings, and hardware for chain link fence.

B. Submit shop drawings showing details of each element. Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.

C. Submit two samples of fence fabric, illustrating construction and finish for chain link fence.

D. Each roll of fabric shall carry a tag showing the kind of base metal, or plastic, the kind of coating, the gauge of the wire, the length of fencing or fabric in the roll, and the name of the manufacturer. Posts, wire, and other fittings shall be identified as to manufacturer, kind of base metal, and kind of coating.

PART 2 MATERIALS

2.01 WIRE (Fabric)

A. New fabric wire shall be of a similar height and material to the existing fence and shall have a base metal of steel with a tensile strength of 75,000 lbs per square in. and galvanized in conformance with the requirements of ASTM A392, Class II. Wire will be of 9-gauge and have a nominal diameter of 0.148 in. being woven in a 2-in. mesh. Fence for Airport perimeter to be coated to match existing fencing and fence for walls shall be galvanized.

2.02 POSTS, RAILS, GATES, AND BRACES

A. Posts, rails, gate(s), and braces shall be of galvanized steel conforming to the requirements of ASTM F1083 and shall also conform to the requirements listed in Table 02980-1. Braces shall be provided for each gate, corner, pull, and end post and shall consist of a brace extending to each adjacent line post at midheight of the fabric and a rod not less than 3/8-in. in normal diameter, or equivalent, from line post back to gate, pull or end post, with a turnbuckle or equivalent, for adjustment as shown on plans.

B. Top rails shall be lengths not less than 10 ft and shall be fitted with expansion couplings for connecting the lengths into a continuous run. Couplings shall be not less than 6 in. long, shall allow for expansion and contraction of the rail, and shall be approved by the Engineer.

TABLE 02980-1

POSTS AND RAIL SIZES AND WEIGHTS

Use and Section	O.D. In.	Weight/Lb/Ft.
Gate Posts	4.00	9.11
Corner Posts	2.875	5.79
End Posts, Pull Posts	2.875	5.79
Intermediate Posts	2.375	3.65
Top Rail and Postbrace	1.660	2.27
Gate Rails (Frame)	1.90	2.72

2.03 WIRE TIES AND TENSION WIRE

A. All wire fabric ties, wire ties, hog rings, and tension wire shall be zinc-coated steel core wire. Tension wire shall have a minimum tensile strength of 80,000 psi. Zinc coating shall be .30 oz. per square foot. Tension wire shall be 6-gauge.

2.04 MISCELLANEOUS FITTINGS AND HARDWARE

A. Miscellaneous fittings and hardware shall be zinc-coated steel, wrought iron, malleable iron, or pressed steel and shall be equal to materials specified in FS RR-F-191/4B.

2.05 GATES

A. Structural members of gates shall be fully welded on all sides and faces of joints at exposed edges. Surplus welding material shall be removed. Gates shall be swing gates or sliding gate as indicated on plans and specifications. Gates shall include all hardware and appurtenances including latches, plunger pins, etc.

B. Hinges for gate(s) shall be the pin type and shall be heavy-duty, malleable iron. Shop drawings will be required with the hinges being subject to the Engineer's approval.

2.06 CONCRETE

A. Concrete for setting posts shall have a minimum compressive strength of 3,000 psi and conform to NMDOT standards.

PART 3 EXECUTION

3.01 CLEARING FENCE LINE

A. The site of the fence shall be sufficiently cleared of obstructions, and surface irregularities shall be graded so that the fence will conform to the general contour of the ground. All holes shall be filled with common borrow or excavated material at the direction of the Engineer. When required, the Contractor shall grade the ground surface so that the fence elevation shall conform to existing or future structures. The fence line shall be cleared to a minimum width of 10 ft on each side of the centerline of the fence. This clearing shall consist of the removal of all stumps, brush, rocks, trees, or other obstructions which will interfere with proper construction of the fence. Stumps to be removed shall be grubbed or excavated. All holes remaining after the clearing and grubbing operations shall be refilled with suitable soil, gravel, or other material acceptable to the Construction Manager and shall be compacted properly with tampers.

Disturbed areas shall be seeded and mulched as directed by the Engineer and as specified in Section 02932.

3.02 CONSTRUCTION FENCE

A. Construction fence shall consist of new fence, as specified, and may be existing fence labeled as “to be removed’ or “to be relocated.” The existing fence may be reused and installed as construction fence to the lines and grades shown on the plans.

1. Line posts shall be spaced not more than 10 ft on centers in the line of fence. End or pull posts shall have a 500-ft maximum spacing.

2. End posts shall be installed in concrete foundations as shown on drawings. Line posts shall be installed in earth foundations. Concrete foundations shall extend one (1) in. above the ground at the posts, with a slope to match existing grade at the foundation’s edge. All posts shall be set vertical, true to alignment, and securely embedded in earth or concrete foundations as required.

3. After the concrete has been allowed to cure for 2 days, for the end posts, fabric, braces, and rails shall be attached. The fabric shall be attached to the posts and rails at a sufficient number of points to ensure a firm, rigid, and unyielding attachment, and shall be a maximum of two (2) in. clear of the pavement or ground surface. The fabric shall be stretched between posts so that no bends or loose places in fabric will result. Lengths of fabric shall be spliced by bringing the fabric ends close together and weaving in a picket in such a way that it engages each individual mesh of the fabric ends. Brace rails and truss rods shall be provided at all fence corners and ends.

4. The bottom of the fence shall be placed a uniform distance above the finished ground surface except where allowance is made for the irregularities in the ground contour.

3.03 GROUNDING

A. With the exception of the fence atop the retaining walls, all fence shall have at least one ground for every 500 ft of fence, at end posts, and on each side of gates. The ground shall consist of a 5/8-in. diameter copper-clad rod driven a minimum of 8 ft into the earth and attached to the fence by a copper wire and grounding clips to obtain a maximum resistance of 25 ohms and in accordance with the plans and as approved by the Engineer.

3.04 CLEANING UP

A. The Contractor shall remove from the vicinity of the completed work all tools and equipment belonging to him or used during construction. All piles of soil shall be leveled and all brush or debris of any nature shall be removed from the site.

END OF SECTION

DIVISION 3

CONCRETE

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. The work to be performed shall include the construction of Wall No. 1 and aircraft hanger slabs. The work may also include the construction of trench drains, manholes and other drainage structures if precast structures are not utilized. Mix design, sampling, testing and inspection of concrete are also included.

1.02 QUALITY ASSURANCE

A. Perform cast-in-place concrete work in accordance with ACI 301 unless specified otherwise.

B. Maintain copy of ACI 301 in field office for duration of project.

1.03 TESTS

A. Testing of concrete mix will be performed by independent testing laboratory appointed by the Contractor. The Contractor shall include costs for all testing. Copies of test results will be furnished by Contractor to the Engineer. Contractor shall submit name of testing laboratory to Engineer for approval.

B. Prior to start of concrete work:

1. Submit concrete mix design for each classification of strength, slump and air entrainment.

2. Mix sample batches of each concrete mix design specified.

3. Take three test cylinders for each sample batch for compression test at seven and twenty-eight days.

4. Cylinders will be cured and tested to determine criteria for judging quality of concrete placed during construction.

C. Sample concrete in accordance with ASTM C172.

D. Make slump test in accordance with ASTM C143 for each 100 cubic yards of delivered concrete. Furnish material and assistance required to make tests. Additional testing may be required based on observed variability in and appearance of the concrete and addition of water on site, at the discretion of the QCSM and/or the engineer.

E. Test air content in accordance with ASTM C231.

F. Test unit weight as per ASTM C138 at least daily

G. Cure test cylinders in accordance with ASTM C192.

H. Make one set of three cylinders for each classification of concrete placed in one day, and for every 100 cubic yards of concrete placed. Make and test additional cylinders when deemed necessary by the Engineer. Lab cure two of the three cylinder specimens and field

cure the remaining one. Make tests in accordance with ASTM C39.

I. Compression tests of test cylinders will be made in accordance with ASTM C31 at 28 days. Seven-day tests may be used provided that the relation between seven and 28-day strengths of the concrete has been established by earlier testing.

J. Furnish cylinder molds, materials, and assistance required for preparation of test cylinders. Single use 6 inch by 12 inch paper cylinder molds may be used if they comply with ASTM C470.

K. Do not remove forms from or apply loads to concrete structures for which strength tests have not been made and results of which have not equaled or exceeded minimum requirements.

L. In cases where average cylinder strengths are below minimum required values, the Engineer shall have the right to require conditions of temperature and/or moisture necessary to secure the required strength and may require load or core tests to be made on affected portions of the Work.

1.04 RELATED SECTIONS

A. SWPPP, June 2005

B. CQCP, June 2005

C. Construction Plan for LASO TA-73 Airport Landfill, June 2005

1.05 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete for Buildings.

B. ACI 305 – Hot Weather Concreting.

C. ACI 306 – Cold Weather Concreting.

1.06 SHOP DRAWINGS AND SUBMISSIONS

A. Submit shop drawings and product data for all products under the provisions of Section 01340.

B. Submit shop drawings of reinforcing steel.

C. Shop Drawings for reinforcement, for fabrication, bending and placement of concrete reinforcement shall comply with ACI SP-66 (04), "ACI Detailing Manual," ACI 315-99 and ACI 315R-04, showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Indicate bar sizes, spacing, locations and quantities of reinforcing steel, and wire fabric, bending and cutting schedules, and supporting and spacing devices.

D. Submit Steel producer's certificates of mill analysis, tensile tests and bend tests.

E. Submit test results.

F. Submit color samples.

G. Submit written procedures for protection of concrete construction in accordance with ACI 301, ACI 305 for Hot Weather Construction, and ACI 306 for Cold Weather Construction.

PART 2 PRODUCTS

2.01 CEMENT (ACI 301 2.1)

A. Use one brand and type of cement throughout project unless otherwise specified.

B. Cement: Air entraining-type 1A. ASTM C150.

2.02 ADMIXTURES

A. Type and dosage of admixture: conform to manufacturer's instructions for temperature conditions.

B. Air entraining admixtures: conform to ASTM C260, and contain no chlorides. Maximum air content shall be six percent, plus or minus one percent of volume of concrete when tested in accordance with ASTM C231. Allowable air for AMEC mix #18 is 3.5% to 6.5%. Use air-entraining admixtures in concrete exposed to weathering and at other concrete work at Contractor's option.

C. Water reducing admixtures: Polyheed 997 Type A; or hydroxylated carboxylic acid type conforming to ASTM C494, Type A with one exception that:

1. Maximum shrinkage: maximum 100 percent of control mix.

2. Relative durability factor: minimum 100 percent of control mix.

3. Use only as approved by Engineer.

D. Do not use calcium chloride in concrete containing aluminum items.

E. Color admixture for retaining wall shall produce an earth tone concrete subject to the approval of the Engineer.

2.03 MIX DESIGN (ACI 301 3.2)

A. Provide 28-day compressive strength as follows:

Location	Min. 28-Day Compressive Strength (psi)	Water-Cement Ratio by Weight
Retaining Wall	3,000	0.59 Air entrained
Hanger Slab	4,000	0.35 Air entrained

B. Provide over design factor for concrete mix of 1.15.

2.04 SLUMP

A. Slump for consolidation by vibration: [illegible]ches. Slump for consolidation by rodding:

- 6 inches for 4000 psi concrete, based on Amec Mix No. 44 design.
- 4 inches for 3000 psi concrete, based on Amec Mix No. 18 design.

[illegible]lerance of ± 1 inch from the specified slump will be allowed during slump testing to accommodate the precision of the test method. The intent of the variance is not to change the allowable slump specification.

2.05 PROPORTIONS (ACI 301 3.8)

A. Selection of proportions for normal weight concrete: Method 1.

2.06 REINFORCING STEEL (ACI 301 5.2)

A. Reinforcing Steel: 60 yield grade; deformed billet steel bars, ASTM A615; plain finish.

2.07 EXPANSION JOINTS (ACI 301 6.2)

A. Premolded Expansion Joint Filler: type required shown on Drawings, conforming to ASTM D1751. or ASTM D1752, Type III "Self-Expanding Cork," where indicated. The thickness and profile to match joint design.

2.08 ACCESSORIES

A. Bonding Agent: two component modified epoxy resin; Sikadur Hi-Mod manufactured by Sika Chemical Co. or Epoxtite Binder Code 2385 manufactured by W.R. Grace & Co. Polyvinyl bonding Agent shall be "Weld-Crete" manufactured by Larsen Products Corp., or approved equal.

B. Non-Shrink Grout: Grout shall be a premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing a minimum compressive strength of 2,400 PSI in two days; 7,000 PSI in 28 days.

PART 3 EXECUTION

3.01 GENERAL

A. Install concrete work in accordance with ACI 301 except as amended by this Section.

B. Notify the Engineer a minimum 24 hours prior to placement of any concrete.

C. Transport concrete from mixer to place of final deposit in a continuous manner to prevent separation or loss of material and as rapidly as practicable until the unit of operations is complete. Do not use concrete which has reached an initial set or has contained water for more than one hour.

D. Deposit concrete as nearly as practicable to final position to prevent segregation from rehandling. In walls, place concrete in horizontal layers with first batches placed at ends and progress toward the center.

E. Compact concrete immediately after placing by thoroughly agitating the mass to force out air pockets and work the mixture into corners, around reinforcement and inserts, and prevent formation of voids. Do not use vibrators to move concrete horizontally.

F. Concrete trucks will not be permitted on existing foundations.

G. Do not deposit concrete in or under water without the permission of the Engineer.

H. Fresh concrete shall not be placed on concrete which has hardened sufficiently to cause formation of cold joints or planes of weakness within the section. If a section cannot be placed continuously, construction joints shall be located at points as provided for on the Drawings or as approved by the Engineer. When work is resumed, concrete previously

placed shall be thoroughly cleansed of foreign materials and laitance, using a stiff wire brush or other tools, and a stream of water if necessary, and then slushed with grout consisting of one part Portland Cement and two parts sand.

I. Free drop of concrete for more than five feet will not be allowed. Where greater drops are required, a tremie shall be employed. Discharge of the tremie shall be controlled such that the concrete may be effectively compacted into horizontal layers not exceeding twelve inch in thickness with a minimum of lateral movement.

J. Hot weather placement of concrete shall be in strict accordance with Hot Weather Concreting, ACI 305R-91. Subgrades shall be kept moist in hot weather to prevent extraction of water from the concrete.

K. Cold weather placement of concrete shall be in strict accordance with Cold Weather Concreting, ACI 306R-88

3.02 FORMWORK (ACI 301 4.2)

A. Obtain the authorization of the Engineer for use of earth forms. When using earth forms, hand-trim sides and bottoms, and remove loose dirt prior to placing concrete.

B. Chamfer exposed edges: 3/4 in x 3/4 in unless otherwise noted on the drawings.

C. Tape or seal joints and seams to provide a smooth surface.

D. Make and erect forms so finished concrete will conform to shapes, lines, grades and dimensions shown on Drawings and to produce plumb, even, true concrete surfaces. Form all exposed concrete surfaces.

E. Tie forms together with spreader-ties. Brace and shore forms as required. Design forms to remain in correct position during and after placement of concrete and not to deflect under weight of wet concrete.

1. Make forms tight to prevent mortar leakage.

F. Rebar posts may be used to support temporary formwork. Posts may be driven into the subgrade and left in place as long as posts are not within 1 inch of structural rebar.

3.03 FORM SURFACES PREPARATION (ACI 301 4.4)

A. Apply form release agent on formwork in accordance with manufacturer's recommendations. Apply prior to placing reinforcing steel, anchoring devices and embedded parts. Do not apply form release agent where concrete surfaces will receive applied coverings which are affected by agent.

3.04 FINISHING FORMED SURFACES (ACI 301.10.4)

A. Formed Surface Finishes: Provide rough form finish at surfaces not exposed to view. Provide smooth form finish at surfaces exposed to view.

B. Finish concrete surfaces shall meet the requirements of ACI 117-90.

3.05 FINISHING HORIZONTAL SURFACES

A. Horizontal surfaces which will be exposed after completion, i.e., hanger slabs shall receive a broom finish.

3.06 REMOVAL OF FORMS (ACI 301 4.5)

A. Do not remove forms and bracing until concrete has gained sufficient strength to carry its own weight, construction loads, and design loads which are liable to be imposed upon it. Verify strength of concrete by compressive test results.

3.07 RESHORING (ACI 301 4.6)

A. Remove load supporting forms only when concrete has attained 75 percent of required 28-day compressive strength, provided construction is reshored.

3.08 WELDING (ACI 5.3)

A. Welding Reinforcing Steel is not permitted without the express approval of the Owner.

3.09 CONSTRUCTION JOINTS (ACI 301 6.1)

A. Install construction joints where shown on Drawings.

3.10 INSERTS, EMBEDDED PARTS AND OPENINGS

A. Provide formed openings where required for pipes, conduits, sleeves and other work to be embedded in and passing through concrete members.

B. Coordinate work involved in forming and setting openings, slots, recesses, sleeves, bolts, anchors or other inserts.

3.11 REPAIR OF SURFACE DEFECTS (ACI 301 9.1)

A. Allow the Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Modify or replace concrete not conforming to required lines, detail and elevations.

C. Repair or replace concrete not properly placed resulting in excessive honeycombing and other defects. Do not patch, repair or replace exposed concrete except upon express direction of the Engineer.

3.12 CURING AND PROTECTION

A. Curing shall be in accordance with recommended practice and Drawing 3003 Note 7 for curing concrete ACI 308-92. In lieu of using curing compound, cover the placed concrete with a plastic moisture barrier and allow the concrete to self-cure. On the sixth day, the plastic barrier will be removed and the concrete will be allowed to dry for 24 hours. On the seventh day after the concrete placement, the sealing compound will be applied per the specifications.

1. Apply specified curing compound to concrete surfaces as soon as final finishing operations are complete (within two hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

END OF SECTION

SECTION 03400

PRECAST CONCRETE

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This section includes requirements for providing precast concrete structures including storm drain structures, manholes, and other specified miscellaneous structures to the size, shape, and extent in accordance with the contract documents.

1.02 QUALITY CONTROL

A. Precast concrete shall be supplied by a qualified firm with a minimum of 2 years of continuous operation experience.

B. Contractor shall not place the order for precast structures until order is reviewed and approved by Owner's engineer.

C. The manufacturer or supplier shall provide the Owner, prior to delivery of precast structures for an order, a Certificate of Compliance with the Contractor's name, section sizes, footage, or number of pieces required to fill the order.

D. The Owner reserves the right to inspect and test all precast structures, fittings, and joint material after delivery to the site or at the factory. The manufacturer or supplier shall furnish materials for the tests and labor as required to assist the Owner with the tests.

E. Only approved precast concrete structures shall be shipped to the contract site.

1.03 SUBMITTALS

A. Contractor's drawings.

B. Submit the following Contractor's drawings in accordance with Section 01340:

1. Shop drawings showing complete details, pertinent calculations, design loads, materials, strengths, sizes and thicknesses, joint and connection design, and details for all precast structures.

C. Installation methods for precast sections:

1. This submittal may be waived when the manufacturer has his recommended methods on file with the Owner.

D. Test reports:

1. Submit manufacturer's certified test reports.

1.04 DELIVERY, STORAGE AND HANDLING

A. Precast structures are considered suitable for handling to transport to the contract site after the concrete has cured to minimum strength of 80% of the design strength.

B. Delivery of precast structures shall be coordinated with installation or shall be unloaded with proper equipment along the line of work, outside work limits as near as practicable to point of final placement. They shall be stored off the ground on wood blocks, pallets, or other appropriate means away from brush, poison oak or ivy, and in an accessible area for inspection. Excavated material shall not be placed over or against the stored precast structures.

C. Precast structures and appurtenances shall be unloaded and handled with a crane, backhoe, or equipment of adequate capacity, equipped with appropriate slings and lifting devices to protect the material from damage.

D. If damage occurs and is deemed repairable, it shall be repaired as directed by the Owner in accordance with approved manufacturer's recommendations. If damage is not repairable in the opinion of the Owner, such items of material will be rejected and shall be removed and replaced at the Contractor's expense.

PART 2 MATERIALS

2.01 PRECAST CONCRETE MANHOLE(S), INLETS, AND TRENCHES

A. General

1. Precast concrete shall meet requirements of ASTM C478 and be designed to withstand an HS-20 loading. In addition, the minimum compressive strength of the concrete shall be 4,000 psi and shall have a minimum compression cylinder test of 4,000 psi, any variance being in accordance with ASTM C478; and with joints meeting requirements of ASTM C443. Cement will be Portland, Type II with an Air Content of 5% to 7% as determined in accordance with ASTM C 231. Concrete shall be comprised of cementatious material, water, fine and course aggregate, and add mixtures. The cementatious material shall be Portland or blended hydraulic cement and pozzolan where appropriate.

2. Precast concrete sections shall conform to NMDOT Section 662.2. Furnish in lengths of 1-ft minimum, except not more than one 1-ft section shall be used in a manhole. Precast manhole cone section shall have bolt inserts provided. Inserts shall be embedded a minimum of 3 in., accommodate 9.75-in.-diameter bolts. Inserts shall be provided with plugs for transporting from plant to contract site.

3. Each concrete section shall be clearly marked on the inside near the top with the following information where applicable: ASTM Specification designation, manhole setting number (bases only), date of manufacture, and name or trademark of manufacturer. Markings may be engraved or stenciled with waterproof paint or ink in minimum 1-in.-high letters.

4. Precast concrete grade rings shall meet requirements of ASTM C478, except the minimum strength of the concrete shall be 5,000 psi using Type II cement. Rings shall be drilled with holes 1.5 to 2-in.-diameter to accommodate frame anchor bolts. Grade rings with cracks or fractures passing through the height of the ring and any continuous crack extending for a length of 3 in. or more will be rejected. Planes of the surfaces of the ring shall be within the limits of plus or minus 0.25-in. of horizontal and vertical.

5. Steps shall be a minimum 1-ft wide with a 1-ft center to center spacing, drop front type, and meet the requirements of ASTM C478.

6. Precast concrete materials for trench sections shall conform to NMDOT Section 662.2. Furnish in lengths to minimize number of joints. Supply a closed end on each trench. Sections to be supplied ¾" quick thread rods and steel plate.

B. Gasket Connectors

1. Each manhole precast section shall be fitted with an "O" ring type gasket that conforms to NMDOT Section 662.25.

2. Each joint of the precast trench section will be joined with a Concrete Sealants Inc., sealer type CS-440. The interior of the trench will be painted with a Sika Corporation type Sikaflex 1A material.

2.02 BITUMINOUS COATING

A. All exterior surfaces of precast structures shall be coated with bitumastic material.

B. The bituminous coating shall conform to NMDOT Section 662.26.

2.03 GRATE AND FRAME

A. Manhole covers shall conform to NMDOT Section 662.27.

B. Castings shall be suitable for AASHTO HS-2O loading.

C. Trench grate and frame will be ductile iron, 80-55-06.

PART 3 EXECUTION

3.01 A. Completion of the work shall be in accordance with Section 02720, Storm Drain System

3.02 BACKFILLING

A. Backfilling shall be completed in accordance with Section 02200, Earthwork.

END OF SECTION

DIVISION 6

GEOSYNTHETICS

SECTION 06005

VERY FLEXIBLE POLYETHYLENE GEOMEMBRANE

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. The Work includes the manufacture, supply, delivery, testing, and installation of smooth very flexible polyethylene (VFPE) geomembrane for channel lining. The work includes furnishing all materials, labor, supervision, tools, equipment that may be necessary to construct the work in accordance with the Contract Documents. The requirements of this specification have been reduced compared to a typical specification in light of the intended use and in consideration of the limited quantity of material required.

1.02 QUALITY ASSURANCE

A. Manufacturer Qualifications

1. The VFPE manufacturer(s) shall be a specialist in the manufacturing of VFPE geomembrane, and shall have produced and supplied at least 5 million ft^2 of said material that were used in successful applications.

B. Contractor's Geosynthetics Installer Qualifications

1. The Contractor's Geosynthetics Installer (Installer) shall meet the requirements of this Section. The Installer shall be responsible for the performance of the Installer and the installed geosynthetics.

2. The Installer shall be experienced in all aspects of VFPE geomembrane handling, storage, and installation. The Installer shall have successfully installed at least 5 million ft^2 of polyethylene geomembrane within the last 5 years, and be trained and approved by the manufacturer to install the geomembrane materials.

3. The Installer shall employ a field supervisor experienced in the installation of polyethylene geomembrane. This individual shall have installed or supervised the installation of a minimum of 2,000,000 ft^2 of polyethylene geomembrane on a minimum of five (5) different projects.

4. Each welder is required to have a minimum of 1 year of experience welding polyethylene geomembrane, except that the master welder shall have a minimum of three (3) years experience welding polyethylene geomembrane.

C. Geosynthetics Testing Laboratory Qualifications

1. Independent testing of the material is not required. However, the Engineer reserves the right to require testing of the material at an independent testing laboratory. The testing laboratory, if required, shall be accredited by the Geosynthetic Institute to perform the tests required in these Specifications.

D. Materials Testing

1. Material testing shall be completed by the manufacturer in accordance with its Quality Control/Quality Assurance Plan.

1.03 SUBMITTALS

A. General

1. The Contractor shall submit to the Engineer for review and approval the following information:

   a. Name of Manufacturer.

   b. Manufacturer's quality control test results – certified test results.

   c. A Certificate of Compliance along with QC test results from the manufacturer stating that the polymer (raw material) used to manufacture the geomembrane and the geomembrane to be delivered to the site meets all of the physical property requirements presented in Tables 06005-1 and 06005-3, respectively.

   d. Manufacturer's warranty for the installed geomembrane (example).

   e. Proposed installation panel layout drawings, including panel and seam identification, panel orientation, seaming details, and penetration details. Engineer or Owner approval of these drawings does not relieve the Installer of the responsibility to properly install/lay out the geomembrane. The proposed panel layout drawing is tentative and may be modified by the Engineer.

   f. Manufacturer's recommended product defect repair and construction repair procedures.

   g. Manufacturer's recommended field seaming procedures and techniques, including: methods, overlap, personnel identification, QA/QC of seaming operations, temperatures, and preparation of materials.

   h. Manufacturer's nondestructive and destructive seam testing procedures, including: type(s) of tests, a list of equipment required, frequency of tests with locations, methods, qualifications of personnel that perform the tests, and acceptance/rejection criteria for tested seams.

   i. Installer's daily quality control (QC) log and Report of Welds format to be used during geomembrane installation.

Table 06005-1

Polyethylene Polymer(s) for Geomembranes and Extrudate

Property	Test Method	Required Minimum Value	Unit
Density (compounded resin)	ASTM D1505 or D792	0.91	g/cc
Melt Flow Index	ASTM D1238 (Condition E)	<1.0	g/10 min.

Test Frequency: One per shipping container compartment.

Table 06005-2

Conformance and "Fingerprinting" Testing Requirements for Geomembrane Liners

Property	Test Method
Thickness	ASTM D5199
Tensile Properties	ASTM D638 Type IV
Tear Resistance	ASTM D1004
Puncture Resistance	ASTM D4833
Carbon Black Content	ASTM D1603
Carbon Black Dispersion	ASTM D3015 or D5596
Density	ASTM D1505
Melt Flow Index	ASTM D1238

Table 06005-3

Physical Properties of LDPE/VFPE Geomembrane Liners
(Minimum Average Roll Values)

Property	Test Method	Units	Required Minimum Value
Gauge Thickness (nominal)	ASTM D5199	mils	40
Sheet Density	ASTM D1505	g/cm^3	0.92
Tensile Properties – Tensile strength at break – Elongation at break	ASTM D638 Type IV	 lb/in %	 150 700
Dimensional Stability[a]	ASTM D1204	%	± 2
Puncture Resistance	ASTM D4833	lbs	55
Tear Resistance	ASTM D1004	lbs	22
Coefficient of Linear Thermal Expansion[a]	ASTM D696	cm/cm^oC	$\leq 2x10^{-4}$
Low Temperature Brittleness[a]	ASTM D746B	^oC	$<-70^o$
Carbon Black Content	ASTM D1603	%	2-3
Carbon Black Dispersion	ASTM D5596	score	1 or 2 or A1 or A2
Melt Flow Index	ASTM D1238 condition E	g/10 min	≤ 1
ESCR[a]	ASTM D5397	hrs	>200

[a] Certification by manufacturer is adequate.

j. Method of construction procedures for preparation of earthen subgrade and placement of earthen material above the geosynthetics including method of placement, equipment, and personnel.

k. The Installer shall provide a Certificate of Compliance from the manufacturer stating that the resin used to produce the geomembrane to be used on this project has an environmental stress crack resistance of greater than 200 hours as tested in conformance with ASTM D5397.

l. Copies of quality control certificates issued by the resin supplier used to manufacture the geomembrane to be used on this project. These certificates, at a minimum, shall include reports of tests conducted to verify the material quality, including specific gravity, and melt flow index.

m. Documentation shall be submitted to demonstrate chemical compatibility of the geomembrane with any municipal solid waste leachate. The chemical compatibility testing shall be performed using the EPA 9090 testing method with all test results submitted for approval to the Engineer.

n. The Installer shall provide a certificate from the manufacturer stating that the geomembrane to be used on this project will have been produced within one year of receipt of material at the site.

B. Certified Test Reports

1. Certified test reports within the requirements of standards and testing methods specified herein shall be submitted to the Engineer for review and approval prior to delivery. The geomembrane manufacturer and Installer must satisfy the Engineer that the material they offer to furnish and install shall meet in every aspect the requirements set forth in these Specifications. The Installer shall transmit to the Engineer all information given to them by the manufacturer or supplier prior to approval for furnishing and installing any such material.

2. If the manufacturer uses test methods other than those specified, an explanation of the alternate test method shall be provided.

C. Installer's Qualifications

1. At least three (3) weeks prior to commencement of geomembrane installation, the Installer shall submit written notification to the Engineer of the field supervisor and individual welders' work experience relative to polyethylene geomembrane installation and welding. No geomembrane welding shall begin until the Engineer has received the notifications and has approved the field supervisor and the individual welder qualifications.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered to the site only after the required submittals have been furnished and approved by the Engineer. Storage and handling of the materials shall conform to the manufacturer's recommendations and shall be done in such a manner as

to prevent damage to any part of the Work. The Installer shall provide labor and equipment to properly unload material upon arrival at the site. Storage shall be in an area reasonably free of dirt, dust, direct sunlight, extreme heat, and disturbance. The material shall be stored in a reasonably-level area that is well-drained, away from oils/fuels, brush, poison oak or ivy, in an accessible area for inspection, and on a smooth surface so that the material is well-supported and not resting on sharp objects that could damage it. Geomembrane roll goods shall be underlain by a bedding geotextile and not stacked more than three rolls high. Individual pieces or bundles shall be stored with safe walking space and clearance between them to allow full view for inspection purposes. The protective covers used to wrap each roll of geomembrane, if used by the manufacturer, shall not be removed until immediately before the material is to be installed in the field.

B. Each roll delivered shall have a tag attached that identifies the following:

1. Manufacturer.

2. Product type and thickness.

3. Manufacturer batch code.

4. Manufacturer date.

5. Roll number.

6. Physical dimensions.

PART 2 MATERIALS

2.01 RAW MATERIAL (RESIN)

A. Raw material for the VFPE geomembrane shall be tested for density and melt index. At a minimum, one sample shall be obtained from each shipping container (typically a railcar) compartment. One (1) test for each of the properties in Table 06005-1 shall be performed on each compartment sample. The material shall be accepted for production use if all test results conform to the material requirements listed in Table 06005-1 and are comparable within the various shipment compartments.

2.02 SHEET GEOMEMBRANE

A. The geomembrane shall be smooth VFPE containing no fillers or extenders.

B. The VFPE geomembrane shall be tested prior to shipment to ensure that the physical and chemical properties of the finished product are in conformance with the Specifications. The required conformance testing of geomembranes are presented in Table 06005-2, with the exception of ASTM D5321. The Contractor shall perform three tests of ASTM D5321 for each of the required interfaces prior to shipment of the geosynthetic materials to the job site. Test frequency shall be one of each test per every 50,000 ft^2 of geomembrane produced or as noted. In addition, one 50 ft^2 (minimum) coupon of geomembrane per every 100,000 ft^2 of geomembrane produced shall be retained intact by the manufacturer until construction of the lining system, for which the geomembrane is used, is complete. These coupons shall be submitted to the Engineer upon request.

2.03 EXTRUDATE RESIN (WELDING ROD)

A. Resin used for extrusion welding adjacent sheets and pipe penetrations shall be VFPE produced from the same resin as the sheet geomembrane. Physical properties of the extrudate shall be in conformance with Table 06005-1. The resin shall be supplied in black.

PART 3 EXECUTION

3.01 SUBBASE ACCEPTANCE BY THE CONTRACTOR

A. Prior to installation of the geomembrane, the Installer shall verify the conditions of the installed earthen material surface to ensure that this surface represents a smooth, stable surface reasonably free of stones, organic matter, irregularities, protrusions, loose soil, and any abrupt changes in grade. The Installer shall notify the Engineer in writing of acceptance of the prepared earthen surface prior to installation of the geomembrane. This notification shall be consistent with the requirements of the geomembrane supplier for the bedding layer surface in order to preserve the warranty for the geomembrane.

3.02 INSPECTION OF SHEET GEOMEMBRANE AT JOB SITE

A. The Installer shall be responsible for the inspection of the geomembrane rolls upon their arrival at the job site. Should rolls show damage from transit, they shall be so identified by the Installer and set aside for either return to the manufacturer or repaired in accordance with the manufacturer's recommendations.

B. During unrolling of the geomembrane, the Installer shall carry out visual inspection of the geomembrane surface. Any faulty areas shall be repaired by the Installer using the preapproved techniques. Such repairs shall be recorded on the as-built drawings and reported to the Engineer by means of a daily QC log (see Subsection 3.06). At any point in the Work, if the daily QC log has not been submitted, the Engineer has the right to stop Work at the cost of the Installer until the daily QC log is submitted.

C. During installation of the geomembrane, the Engineer has the option to perform thickness measures at locations along the edges of the geomembrane panel. Any panel deployed having insufficient thickness shall be removed from the site by the Installer at no additional cost to the Owner.

3.03 INSTALLATION

A. General

1. The limits of geomembrane installation shall be as shown on the Drawings. The geomembrane shall be laid out and installed by the approved Installer in accordance with the applicable panel installation drawings approved by the Engineer.

2. All geomembrane shall be installed in a down gradient manner to minimize the potential of surface water flowing beneath placed geomembrane.

3. The Installer shall at all times maintain a clean work area to protect the geomembrane from incidental damage. This activity shall be done on an ongoing

basis throughout the work. There shall be no smoking, glass bottles, or metal cans allowed in an area where geosynthetics are being installed.

4. When placing materials upon any geomembrane(s) or geotextile(s) the Installer shall stage his operations to minimize/eliminate any wrinkles associated with that operation. Furthermore, the Engineer shall notify the Installer when such wrinkling and associated problems are present. It shall be the responsibility of the Installer to modify his operations to minimize/eliminate this problem at no additional cost to the Owner.

B. Field Panel Placement

1. Adjacent geomembrane panels shall be overlapped a minimum of 6 inches prior to hot wedge seaming, unless the Engineer approves a lesser overlap due to limitations of the Installer's welding equipment. In no case shall an overlap of less than 3 inches be approved. The required minimum geomembrane overlap for extrusion welding shall be no less than 3 inches. If excess overlap exists, the bottom sheet shall be field cut. Areas cut to remove wrinkles or fishmouths in excess of six (6) inches shall be cut along the ridge of the wrinkle and seamed.

C. Seam Preparation

1. Prior to seaming, the seam area shall be clean and free of moisture, dust, dirt, debris of any kind, and foreign material. No seaming of the VFPE geomembrane shall be conducted when the material is exposed to moisture from either dew or precipitation. Seams shall be aligned to create the fewest possible number of wrinkles and fishmouths. All seam interfaces shall be visually examined for scratches, blemishes, flaws, and texture.

2. Trimming of seams and patches shall be accomplished using a shielded blade or hook-knife and performed such that all corners are rounded. Whenever possible, the cutting of the geomembrane shall be from the underside, in an upward motion. Any trimming of test strips or patch pieces on the geomembrane shall be performed with a scrub sheet between the geomembrane and the cutting operation. All trimming of seams shall be completed at least 50 ft ahead of seaming operations.

3. For extrusion-welded seams, a small hand-held electric rotary grinder with circular disc grit grinding paper shall be used to remove oxidation at the seam locations. The grinding plate shall be approximately 4 inches in diameter, and No. 80 or No. 100 grit paper shall be used. The depth of the grinding shall be no greater than 10% of the sheet thickness, and in general should only be approximately 5% of the sheet thickness. The grinding shall extend beneath the full width of the extrudate and no greater than 0.25 inch beyond the limit of extrudate after it is placed. Grinding shall precede welding by approximately 15 minutes, and shall be oriented perpendicular to the seam direction rather than parallel to it.

D. Seaming

1. General

a. The approved seaming techniques for the Work are hot-wedge and extrusion fillet welding.

b. Welding of VFPE shall not take place when ambient temperatures are less than 41°F (5°C) or exceed 104°F (40°C), when measured 1 ft above the geomembrane. Weather conditions shall have no precipitation, dew or fog, nor shall winds be in excess of 20 mph during welding.

2. Hot-Wedge Seaming

   a. The operator shall keep constant visual contact with the temperature controls, as well as with the completed seam coming out of the machine. Occasional adjustments of the temperature or speed may be necessary to maintain a consistent weld.

   b. If an excessive amount of squeeze-out is observed, reduce the temperature and/or pressure to correct the situation. Nip/drive roller marks shall be able to be observed visually, but just barely evident to the touch.

   c. Cleaning of the hot-wedge welder shall be performed at least daily.

   d. A smooth-insulating plate or heat-insulating fabric shall be placed beneath the hot-welding apparatus after usage.

   e. Seams exhibiting burnout due to excessive heat or roller slippage shall be repaired in accordance with Subsection 3.04 as directed by the Engineer.

3. Extrusion Fillet Seaming

   a. Grinding of the sheets shall be completed in accordance with Subsection 3.03.C.3. A hot-air welder may be used to tack weld sheets together in order to hold them in proper position for extrusion welding.

   b. The extrusion welder is to be purged of all heat-degraded extrudate in the barrel prior to beginning a seam. This shall be done every time the extruder is restarted after a 2-minute or longer downtime. The purged extrudate shall be properly disposed of.

   c. Extrudate in the form of a molten, viscous bead shall be deposited over the overlapped seam. The center of the extrudate shall be directly over the edge of the upper sheet.

   d. The extrudate thickness shall be approximately two times the specified sheet thickness measured from the top of the bottom sheet to the top or crown of the extrudate. Excessive squeeze-out (or flashing) is acceptable as long as it is equal on both sides and does not interfere with subsequent vacuum box testing. Excessive extrudate build-ups shall be removed, and a patch shall be placed in accordance with Subsection 3.04 if so directed by the Engineer.

   e. After seaming, visual inspection of the extrudate bead shall be made, particularly for straight-line alignment, height, and uniformity of surface texture. There shall be no bubbles or pockmarks in the extrudate. Grind marks shall only be visible for no more than 0.25 inch beyond the extrudate. They shall be extremely faint and shall never appear as heavy gouge marks. A patch shall be placed in accordance with Subsection 3.04 over the entire seam where the excessive grinding is observed.

f. Seam weld runs shall terminate at a panel end or tail off gradually. Where extrusion fillet welds are temporarily terminated long enough to cool, they shall be ground prior to applying new extrudate over the existing seam. This restart procedure shall be followed on patches, pipes, fittings, appurtenances, and “T” or “Y” seams.

4. Trial Seams

a. Trial seams shall be made at the beginning of each seaming period (start of day, midday and at the conclusion of the day’s seaming) for each welding apparatus and operator of said apparatus. Trial seams shall be made at least every five hours and every time the seaming equipment or operator is changed. Trial seams shall be made under the same conditions as actual seams (i.e., welding apparatus, electrical cord length, operator, and ambient temperature). The Installer shall make additional trial seams if ambient temperatures vary more than 10°F (0.5°C) from initial trial seam conditions or as directed by the Engineer.

The trial seam sample shall be at least 3 ft long by 2 ft wide (after seaming) with the seam centered lengthwise. Seam overlap shall be nominally 4 inches, with a 3-inch minimum.

b. Six adjoining coupon specimens, each 1-inch wide, shall be cut from the trial seam sample by the Installer using a die cutter to ensure precise 1-inch wide coupons. The coupons shall be tested in peel (outside and inside track) and shear using an electronic readout field tensiometer, at a strain rate of 2 in./min, and they shall not fail in the seam (i.e., Film Tear Bond (FTB), failure in the parent sheet material, is required). The specimen shall not fail at a stress less than 25% of the break strength of the parent material in peel or no less than 30% of the break strength in shear.

Ideally, samples shall be conditioned at 23± 2°C at a relative humidity of 50± 5% for two hours prior to testing. If test conditions vary from these conditions, a 1-inch wide coupon of the parent geomembrane material (no weld) shall be tested in the same manner as the seam specimens to determine the break strength at this condition.

c. If a coupon specimen fails, the entire operation shall be repeated. If the additional coupon specimen fails, the seaming apparatus and seamer shall not be accepted and shall not be used for seaming until the deficiencies are corrected and two consecutive successful trial seams are achieved. All welded seams installed by the seaming apparatus/operator between the period of time when an acceptable coupon specimen and a deficient coupon specimen were obtained shall be evaluated. The evaluation shall consist of cutting three 12-inch wide by 12-inch long samples from the suspect deficient seam. The samples shall be taken at locations directed by the Engineer. The samples shall be field tested by the Installer in shear and peel. If any of the three samples fail the shear and peel criteria, the entire length of deficient welding shall be repaired in accordance with Subsection 3.04.

d. The test weld samples shall be classified according to NSF 54 standards, marked with the date, roll/seam number, operator, ambient temperature, welding machine number, temperature and load at failure. A copy of this information shall be attached to each coupon specimen, which will be retained by the Engineer.

5. Nondestructive Seam Continuity Testing

a. The Installer shall nondestructively test all field seams over their full length using a vacuum test unit, air pressure testing, or other approved method. Continuity testing shall be carried out as the seaming work progresses in accordance with the following procedures unless otherwise recommended by the geomembrane manufacturer:

b. Vacuum Testing

i. A non-detergent soapy solution shall be applied to the surface of the geomembrane immediately prior to testing the seam.

ii. Test shall be performed with a tank pressure of approximately 5 psi (10 inches of Hg) gauge.

iii. Examine the geomembrane seam through the viewing window for 10 seconds.

iv. The next adjoining area shall overlap the previously tested area by a minimum of 3 inches (75 mm).

v. All areas indicating leaks shall be repaired in accordance with Subsection 3.04.

vi. Vacuum-tested seams shall be recorded on the daily QC log (Subsection 3.06) including location, date, test unit number, name of tester, and results of test.

c. Air Pressure Testing

i. Sustain a pressure of 24 to 30 psi of the air channel for approximately 5 minutes.

ii. If the loss of pressure exceeds 3 psi over a five minute period or does not stabilize, locate the faulty area and repair in accordance with Subsection 3.04.

iii. Verify that the length of the tested channel is unobstructed by cutting the air channel at the end opposite the pressure gauge.

iv. Seal test holes with extrudate.

v. Air pressure tested seams shall be recorded on the daily QC log (Subsection 3.06), including location, date, test unit number, name of tester, and results of test.

3.04 DEFECTS AND REPAIRS

A. Identification

1. All seams and nonseam areas of the geomembrane shall be evaluated by the Engineer for identification of defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. Because light reflected by the geomembrane aids in the detection of defects, the surface of the geomembrane shall be clean at the time of inspection. The geomembrane surface shall be broomed or washed by the Installer if the amount of dust or mud inhibits inspection.

B. Evaluation

1. Each suspect location, both in seams and in nonseam areas, shall be nondestructively tested using the methods described in Subsection 3.03.D, as appropriate. Each location that fails the nondestructive testing shall be marked by the Engineer and repaired by the Installer. Scratches, abrasions, or other imperfections in the geomembrane and welds that are deemed significant by the Engineer shall be repaired.

C. Repair Procedures

1. Repair procedures shall be agreed upon between the Installer and the Engineer prior to geomembrane installation.

2. Defective seams shall be repaired by reconstruction. Seam reconstruction for the fusion welding process shall be achieved by welding a replacement strip (cap) over the failed seam. The replacement strip shall extend at least 12 inches beyond the faulty seam at all locations and shall be extrusion welded completely around its perimeter. A reconstructed seam shall not consist of extrusion welding the outside edge (flap) of the existing weld.

3. Tears or pinholes or other imperfections shall be repaired by seaming or patching. Patches shall be round or oval in shape, made of the same material as the geomembrane, and extend a minimum of 6 inches beyond all edges of the defect.

4. Each repair shall be numbered and logged in the Installer's daily QC log.

D. Verification of Repairs

1. Each repair shall be nondestructively tested using the methods described in Subsection 3.03.D, as appropriate. Repairs that pass the nondestructive test shall be taken as an indication of an adequate repair. Repairs that fail shall be redone and retested until a passing test results. The Engineer shall observe all nondestructive testing of repairs, and record the number of each patch, date, name of patcher, and test outcome.

2. Seam reconstruction areas resulting from failures in destructive sampling shall also have one destructive test performed within the repair area in accordance with Subsection 3.03.D.6.

3.06 DAILY QUALITY CONTROL LOG

A. The Installer shall maintain a daily quality control (QC) log during all phases of geomembrane installation. This log shall document the daily progression of the geomembrane installation from delivery to final acceptance. The daily QC log shall designate those construction activities that influence the integrity of the geomembrane during installation. The log, at a minimum, shall include entries and detailed documentation of the following:

1. Weather (temperature, winds, precipitation).

2. Preparation activities, including removal of water, sediment, geomembrane cleaning, or subbase smoothing and repair.

3. Document that the roll number and sheet lot number are placed in the required panel locations.

4. Maps or sketches indicating material installed during that day, and material installed previously. Maps or sketches shall indicate the amount of material installed that day, the amount installed previously and the total amount installed to date.

5. Repairs and replacements.

6. Document seaming activities, including name of welder(s) for each seam and any leakage detected in testing of that seam.

7. Results and locations of destructive and nondestructive testing performed as part of geomembrane installation, including corrective action taken.

8. Equipment used to place the geomembrane.

9. Calibration dates for each piece of seaming equipment and seam test equipment.

10. Time periods, locations, and procedures administered when tents are used for geomembrane installation during periods of low temperature.

B. Prior to performing the work, the Installer shall submit the daily QC log format for approval by the Engineer.

END OF SECTION

SECTION 06020

GEOTEXTILES

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. The Work includes the manufacture, supply, delivery, testing, storage, and installation of woven and nonwoven geotextiles to be used for filtering and separation media within the drainage and cover systems as indicated on the Contract Drawings. The Contractor shall supply all equipment, tools, labor, supervision, materials, and quality control required to complete the Work in accordance with the Contract Documents.

1.02 QUALITY CONTROL

A. Manufacturer Qualifications

1. The geotextile manufacturer(s) shall be specialist(s) in the manufacturing of polyester, polyethylene, and/or polypropylene geotextile (as applicable), and shall have produced and manufactured a minimum of 5 million ft^2 of said geotextiles that were used in successful installations.

B. Materials Testing

1. Quality control testing of materials shall be as set forth in the applicable referenced Specifications and as required herein. Testing of the geotextiles shall be in accordance with Subsection 2.01.B.

C. Laboratory Testing

1. Unless otherwise indicated, testing shall be performed by the manufacturer.

D. Visual Inspection During Installation

1. During placement of the geotextiles, the Contractor shall carry out visual inspections of the material surface. Any faulty areas relating to material integrity, uniformity, rips or tears, sewing incompleteness, and seam overlap shall be repaired by the Contractor using pre-approved techniques and in accordance with manufacturer recommendations. Such repairs shall be reported to the Owner by means of a daily QC log. At any point in the Work, if the daily QC log has not been submitted, the Owner has the right to stop work at the expense of the Contractor until the daily QC log is submitted.

1.03 SUBMITTALS

A. Certified Test Reports

1. Certified test reports for a minimum of two (2) samples tested in accordance with the standards and testing methods specified herein shall be submitted to the Owner for approval for each geotextile proposed for this project prior to material delivery. The material manufacturer and Contractor must satisfy the Owner that the materials they offer to furnish and install shall meet every aspect of the requirements listed in Table 06020-1 and as stated in PART 2, MATERIALS. The Contractor shall transmit to the Owner all information given to them by the manufacturer or supplier prior to approval for furnishing and installing any such material.

Table 06020-1

Physical and Mechanical Properties of Geotextiles

Property	Test Method	Required Value [1]	
		Nonwoven (Drainage Composite)	Woven
Visual Inspection	--	Packaging, visible defects	Packaging, visible defects
Mass per Unit Area(2)	ASTM D5261	6 oz/yd^2	---
Puncture Strength	ASTM D4833	85 lbs	90 lbs
Apparent Opening Size	ASTM D4751	$\leq$ No. 70 Sieve	---
Grab Tensile Strength	ASTM D4632	160 lbs	200 lbs
Grab Elongation	ASTM D4632	> 50 %	15 %
Tear Strength	ASTM D4533	60 lbs	90 lbs
Permittivity	ASTM D4491	$\geq$ 1.5 sec^2	---
UV Resistance[3] (@500 Hours)	ASTM D4355	> 70 % strength retained	---

[1] MARV.
[2] For information only, not a required property.
[3] Manufacturer's certification required which states product exceeds required value for typical roll values.

2. The Contractor or manufacturer shall complete interface friction testing (direct shear) in accordance with ASTM D5321 under confining pressures of 2, 4 and 6 psi. The drainage composite shall be in direct contact with infiltration soil which is compacted to 90% DOC within 1% +/- of its optimum moisture content. The interfaces shall be wetted (soaked) prior to initiating the tests. Two series of interface friction testing shall be performed for each soil type or each combination of soil types in direct contact with the drainage composite. The physical properties of each soil type used in the testing shall be reported including USCS designation, Atterberg Limits, natural moisture content and degree of compaction.

   The minimum required interface friction angle shall be 26 degrees.

B. Installation And Repair Recommendations

1. Within three (3) weeks after award of the Contract, submit manufacturer's recommended installation procedures for the sewing of the geotextiles and procedures for repair. All sewing shall be performed by trained personnel of the Contractor or their subcontractors; the geotextile installer must be approved by the Owner. The Contractor may also be requested to submit training or experience records of the installer personnel to the Owner for approval.

C. The Contractor shall submit to the Owner for approval within three (3) weeks after award of the Contract the following information:

1. Contractor's daily QC log format to be used during geotextile installation. This log shall document the daily progression of geotextile installation from delivery to final acceptance. The daily log shall designate these construction activities that influence the integrity of the geotextile during installation. The log, at a minimum, shall include entries and detailed documentation of the following:

    a. Weather (temperature, winds, precipitation).

    b. Repairs and replacements.

    c. Document the roll number and location of each roll when placed.

    d. Quantity of material installed that day; quantity installed to date.

D. Laboratory test results shall be submitted as the Work progresses.

E. Sewing equipment information, stitch type, and density proposed for use at the project shall be submitted to the Owner for review prior to placement of geotextile in the field.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered to the site only after the required submittals have been approved by the Owner. Storage and handling of the materials shall conform to the manufacturer's recommendations and shall be done in such a manner as to prevent damage to any part of the Work. The Contractor shall provide labor and equipment to properly unload material upon arrival at the site. The material shall be stored in a reasonably level, smooth, and well-drained area that is away from sharp objects or rocks that may puncture the material, away from brush, oil, grease, or fuels, and in an accessible area for inspection. Individual rolls shall be stored with safe walking space and clearance between them to allow full view for inspection purposes. To prevent ultraviolet degradation of the material, the protective wrapper on each geotextile roll shall not be removed until the material is ready for use. Any rolls that are delivered without protective wrappers shall be rejected by the Owner at no cost to the Owner. Any rolls of geotextile that will not be installed within 21 days following delivery to the site shall be covered with tarps to protect the rolls from the elements.

PART 2 MATERIALS

2.01 GEOTEXTILES

A. Geotextiles shall be provided to meet the minimum physical and mechanical properties outlined in Table 06020-1 and as designated on the Drawings. The properties shown represent the MARV for the installed materials, unless otherwise indicated.

B. Geotextiles shall be tested by the manufacturer prior to shipment to ensure that the physical and mechanical properties of the finished product are in accordance with these Specifications. The required material properties, test methods, values, and units are presented in Table 06020-1. Test frequencies shall be one (1) of each test for every 100,000 ft^2 of geotextile produced for this project or as noted in Table 06020-1.

PART 3 EXECUTION

3.01 INSTALLATION RESPONSIBILITY

A. The Contractor shall be responsible for installing the geotextiles and all components and details associated with these materials.

3.02 GEOTEXTILE PLACEMENT

A. Geotextiles shall be placed by the Contractor at the locations and to the limits shown on the Drawings. All seams placed on slopes of 4H:1V or greater shall be overlapped a minimum of eight (12) in.. All other seams shall be overlapped a minimum of eight (8) in. Seams on slopes shall be oriented with the slope. End-of-roll seams shall be offset a minimum of 5 ft between adjacent roll ends. Cross-slope seams shall be avoided as much as possible.

B. A minimum of 12 in. of the aggregate/soil shall be placed onto the geotextiles and spread in advance of construction equipment not exceeding 10 psi contact pressure. When contact pressures exceed 10 psi, construction equipment shall be limited to operating on 36 in. of aggregate/soil above geosynthetics. The material shall be spread in the same direction as the fabric is seamed. Extreme care shall be required by the Contractor so that the equipment operator pushes the soil materials ahead without damage to the geotextile. At no time shall construction equipment be permitted to track directly on the geotextile. Any damage to the fabric or other geosynthetics shall be repaired by the Contractor (using approved methods) at no expense to the Owner.

C. During periods of high winds, sandbags, or other methods approved by the manufacturer(s) shall be used by the Contractor to temporarily secure any exposed geotextile in place.

3.04 COVERING GEOTEXTILES

A. All geotextiles shall be covered within 21 calendar days, following removal of their protective wrapping and their placement in the field, to protect them from ultraviolet (UV) degradation. The Contractor shall stage construction activities to accomplish the schedule. Any geotextile left exposed longer than the 21 calendar days shall, at the Owner's direction, be removed and replaced at no cost to the Owner.

END OF SECTION

SECTION 06030

DRAINAGE COMPOSITE

PART 1 GENERAL

1.01 DESCRIPTION

A. The Work includes the supply, delivery, testing, storage, and installation of drainage composite to be used in the construction of the cover system. The work includes furnishing all materials, labor, supervision, tools, equipment, construction machinery and quality control that may be necessary.

1.02 QUALITY CONTROL

A. Manufacturer Qualifications

1. The drainage net and drainage composite manufacturer(s) shall be specialist(s) in the manufacturing of drainage net and drainage composite and shall have produced and manufactured a minimum of 5 million ft^2 of said materials that were used in successful installations.

B. Material Testing

1. Quality control testing of materials shall be as set forth in the applicable referenced Specifications and as required herein. Testing of the drainage net and drainage composite shall be in accordance with Subsections 2.01.C and 2.02.B.

2. Samples of delivered drainage media to be used on this project shall be obtained by the Contractor for testing at the Geosynthetic Testing Laboratory at a frequency of one (1) sample (at least 6 ft by 3 ft) for every 100,000 ft^2 of material to be installed at the site. Drainage media samples shall be tested according to the methods listed in Table 06030-1. The samples selected shall have the roll and lot numbers, and manufacturer clearly marked on or attached to the sample. All samples not required for testing shall be submitted to the Engineer.

3. The manufacturer or Contractor shall retain one 50 ft^2 coupon of drainage composite for every 100,000 ft^2 produced for this project. Each sample shall have the roll, lot number and manufacturer clearly marked.

C. Laboratory Testing

1. Unless otherwise indicated, testing shall be performed by the manufacturer or an Engineer-approved independent geosynthetics testing laboratory with materials furnished by the Contractor and at the expense of the Contractor.

D. Visual Inspection During Installation

1. During placement of the drainage media, the Contractor shall carry out visual inspections of the material surface. Any faulty areas relating to net integrity, continuity, overlapping/joining technique, and panel placement/orientation shall be repaired by the Contractor using preapproved techniques. Such repairs shall be reported to the Engineer by means of a daily quality control (QC) log. At any point in the Work, if the daily QC log has not been submitted, the Engineer has the right to stop Work at the expense of the Contractor until the daily QC log is submitted.

1.03 SUBMITTALS

A. Certified Test Reports

1. Certified test reports for a minimum of two (2) samples tested in accordance with the standards and testing methods specified herein shall be submitted to the Engineer for approval prior to material delivery. Results of at least one (1) transmissivity test performed under similar conditions described in Table 06030-1 shall also be provided to the Engineer for approval prior to delivery of the first shipment of material. The material manufacturer and Contractor must satisfy the Engineer that the material they offer to furnish and install shall meet in every aspect the requirements set forth in these Specifications and the requirements of Table 06030-1 and as stated in PART 2, MATERIALS. The Contractor shall transmit to the Engineer all information given to them by the manufacturer or supplier prior to approval for furnishing and installing any such material.

B. Samples

1. The Contractor shall obtain from the drainage media suppliers and submit to the Engineer for approval, within 3 weeks after award of the contract, samples of the proposed synthetic drainage media materials.

C. Installation And Repair Recommendations

1. The Contractor shall submit to the Engineer for approval, within 3 weeks after award of the Contract, full and complete installation shop drawings showing at a minimum: layout of the synthetic drainage media system, details of joining the panels, and details for anchorage of this material. The Contractor shall also submit the manufacturer's recommended installation procedures, including placement and joining.

D. Laboratory test results shall be submitted as the Work progresses.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered to the site only after the required submittals have been approved by the Engineer. Storage and handling of the materials shall conform to the manufacturer's recommendations and shall be done in such a manner as to prevent damage to any part of the Work or the material itself. The Contractor shall provide labor and equipment to properly unload material upon arrival at site. The material shall be stored in a reasonably level, well-drained, smooth area that is away from brush, poison oak or ivy, oil, grease, or fuels, and in an accessible area for inspection. Individual pieces or bundles shall be stored with safe walking space and clearance between them to allow full view for inspection purposes. To prevent ultraviolet degradation of the drainage composite geotextile, the protective wrapper on each drainage composite roll shall not be removed until the material is ready for installation.

PART 2 MATERIALS

2.01 DRAINAGE NET

A. The drainage net component of the drainage composite shall consist of high-density polyethylene and have the minimum physical properties specified in Table 06030-1.

B. Drainage net shall be tested by the manufacturer prior to shipment to ensure that the physical and mechanical properties of the finished product are in accordance with these Specifications. Properties tested, test methods, and required values for drainage net are presented in Table 06030-1. Test frequency shall be one of each test in Table 06030-1 for every 40,000 ft^2 of drainage net produced for this project or as noted. Planar transmissivity shall be tested twice on actual material produced for this project under the conditions described in Table 06030-1 and the results submitted to the Engineer for review and approval prior to material installation. Results of each test shall include a plot of transmissivity versus confining pressure.

Table 06030-1

Physical Properties of Drainage Net[1]

Property	Test Method	Required Minimum Value	Unit
Density (with Carbon Black)	ASTM D1505	0.935	g/cc
Carbon Black Content	ASTM D1603	2.0	%
Thickness	ASTM D5199	160	mils
Melt Index	ASTM D1238	<1.0	g/10 min
Tensile Strength (Machine Direction)	ASTM D5034/5035	25	lb/in
Tensile Strength (Trans. Direction)	ASTM D5034/5035	15	lbs/in
Transmissivity (Tests as Outlined Below shall be Performed) [4]	ASTM D4716	5.08×10^{-4} (i = 0.27 @ 500, 1,000, and 2,000 psf)	m^3/sec-m
Ply Adhesion[5]	ASTM D751	1	lb

[1] Required Values are Minimum Average Roll Values.
[2] No foaming agents shall be used in the manufacturing process of the drainage nets.
[3] Drainage composites shall be composed of a geonet meeting the requirements of this Specification, and overlain and underlain by a nonwoven needlepunched geotextile. The nonwoven geotextiles will be heat-bonded to the geonet. The physical property requirements of the filtration geotextiles are provided in Section 06020.
[4] Tests to be performed for i=0.27 shall include: a single layer of drainage composite sandwiched between two layers of infiltration layer soil compacted to 95% DOC.
[5] Drainage composite only.

2.02 DRAINAGE COMPOSITE

A. The drainage composite shall be fabricated of three (3) layers, utilizing 6 oz/yd^2 nonwoven geotextile (min.) as the top and bottom layer of the drainage net. The layers shall be heat-bonded or laminated together to form one material. All edges of the drainage net shall be enveloped by the geotextiles to preclude the potential for intrusion of foreign material into the net. The drainage net shall conform to Subsection 2.01.

B. The nonwoven geotextiles used for drainage composite manufacture shall conform to Section 06020 of these Specifications. Properties tested, test methods, required values and test frequency shall be as set forth in Section 06020. The ply adhesion of the geotextiles to the drainage net shall be evaluated (both sides) in accordance with ASTM D751 at a frequency of 1 test for every 40,000 ft^2 of drainage composite produced for this project. A minimum of 1-pound per inch is required for ply adhesion of the geotextiles to the drainage net.

2.03 DRAINAGE COMPOSITE TIES

A. The drainage composite ties shall be heavy-duty, high-strength polymer (nylon) braid ties. They shall be brightly-colored (in contrasting color to the drainage media) for easy inspection.

PART 3 EXECUTION

3.01 INSTALLATION RESPONSIBILITY

A. The Contractor shall be responsible for installing the drainage media and all components and details associated with these materials.

3.02 DRAINAGE MEDIA PLACEMENT

A. The drainage media shall be laid out and installed by trained technicians in accordance with the applicable shop drawings approved by the Engineer. The Engineer's approval of the shop drawings does not relieve the Contractor of their responsibility to properly install the drainage media materials. Drainage media shall be installed by trained personnel of the Contractor or their subcontractors. The Contractor and/or their subcontractors shall be certified by the drainage media manufacturers as accepted material installers.

B. The drainage media within the cover system shall be installed to the limits shown on the Drawings after the underlying subgrade material has been installed and accepted. The drainage media shall be anchored as indicated on the Drawings and rolled down slope (machine direction parallel to slope). Rolling of drainage media across slopes shall not be permitted.

C. Adjacent panels shall be overlapped a minimum of 4 inches and securely fastened together with ties at a maximum of 10-ft intervals. Drainage composite geotextiles shall be overlapped a minimum of 6 inches and seamed. Seaming shall be by sewing, or other Engineer-approved means. Cross-slope seams or end-of-panel seams shall be overlapped a minimum of 6 inches and offset a minimum of 5 ft between adjacent roll ends and securely fastened together with ties at a maximum of 2-ft intervals.

3.03 COVER SOIL PLACEMENT

A. Infiltration layer soil shall be placed from the toe of the slope moving in a generally upward direction. Because of site restraints it may not be possible in some locations to move up slope. In such locations soil may be placed across the slope in an upwardly moving direction. Soil should not be pushed in a downward direction.

END OF SECTION

ENGINEERING
CONSTRUCTION
COMMISSIONING

TCPI

October 9, 2006

Mr. Berg Keshian, Jr., P.E.
Weston Solutions, Inc.
3840 Commons Avenue, NE
Albuquerque, NM 87109

RE: Los Alamos Site Office
TA-73 Airport Landfills
Los Alamos, NM
Retaining Wall Cold Joint Bonding
TCPI Project No. E-06130

Dear Berg;

Per our conversation today I am attaching calculations that show that by using several different approached the maximum calculated shear/bond stress that will be introduced in the footing ranging from 54 psi to 139 psi. The minimum predicted bond strength is at least 506 psi. This was arrived by using test lab data provided by Larsen Products on the latex bonding agent "Weld-Crete" and using statistical analysis to insure that the minimum predicted bond strength would have probability that 99.0% of test data is going to exceed the design value. In addition this bond capacity was reduced by an "Under-Strength" capacity factor of 0.75 times the bond strength. In addition the maximum shear capacity of the concrete is 82 psi and the maximum tension, or modulus of rupture is 410 psi both values are still below the predicted bond strength.

In summary if the footing can be cleaned and the Weld-Crete applied in accordance with the manufactures specifications then the material will have the strength capacity to adequately bond the second concrete pour to the first. This analysis also does not take into account the vertical steel dowel bars.

If you have any questions please contact me at 610-423-6234.

Sincerely,

Joseph J. Ferry

Joseph J. Ferry, P.E.
Chief Engineer
CC: Andrew Harpur, Weston Solutions.

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PROJECT NO. E-05129
CLIENT/FACILITY LOS ALAMOS RET. WALL
SUBJECT COLD JOINT
PREPARED BY WF DATE 10-6-06
CHECKED BY DATE

COLD JOINT EVALUATION

THE FOLLOWING IS AN EVALUATION OF WALL E AT THE COLD JOINT LOCATION

METHOD 'A' EVALUATION OF SHEAR (MAX) OF FOOTING AS AN IDEAL UNCRACKED REINFORCED CONCRETE BEAM.

$V_u = 139$ psi

METHOD 'B' ANALYSIS THE TOTAL TENSION FORCE IN THE HEEL TO INSURE IT COULD BE TRANSFER BY BOND ACROSS THE COLD JOINT THE ANALYSIS IN VERY CONSERVATIVE SINCE THE UPWARD PRESSURE ON THE HEEL WAS NEGLECTED.

MAX BOND FORCE = 54 psi

METHOD 'C' SAME APPROACH AS 'B' EXCEPT THE FORCE THAT IS TRANSFER BY BOND IS EQUAL TO THE FORCE NEEDED TO DEVELOP THE REBAR IN YIELDING

MAX BOND FORCE = 56 psi

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PROJECT NO. F-05129
CLIENT/FACILITY LOS ALAMOS RET. WALL
SUBJECT COLD JOINT
PREPARED BY JJF DATE 10-6-06
CHECKED BY DATE

METHOD "D" COMPARE MAX SHEAR CAPACITY OF CONCRETE TO BOND CAPACITY OF "WELD-CRETE"

$$\phi v_n = 0.75\,(2)\sqrt{3000} = 82.2 \text{ psi}$$

METHOD "E": CALCULATE THE MAXIMUM TENSION CAPACITY I.E. MAXIMUM MODULUS OF RUPTURE TO BOND CAPACITY OF "WELD-CRETE"

$$f_r = 6\sqrt{f_c'} \text{ TO } 7\sqrt{f_c'}$$

$$\text{USE } 7.5\sqrt{f_c'} = 7.5\sqrt{3000} = 410 \text{ psi}$$

WELD-CRETE BOND CAPACITY

PER THE STATISTICAL ANALYSIS GIVEN IN APPENDIX A THE MINIMUM PREDICTED BOND STRENGTH IS 506 psi

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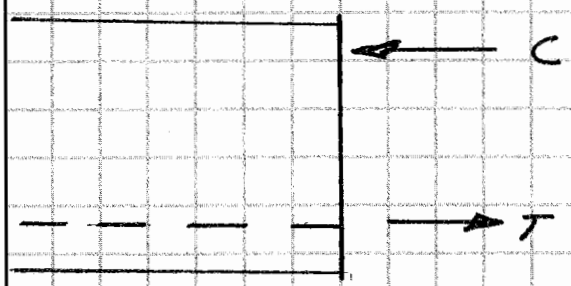
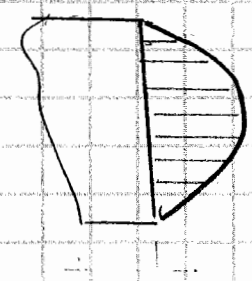
CLIENT/FACILITY
SUBJECT COLD JOINT
PREPARED BY JJF DATE 10-5-96
CHECKED BY DATE

METHOD A

EVALUATE FOOTING AS AN IDEAL UNCRACKED REINFORCED BEAM



FORCES



$$v = \frac{VQ}{Ib}$$

SHEAR STRESS DISTRIBUTION

V = MAX FACTORED SHEAR FORCE lb/LIN FOOT.

Q = STATICAL MOMENT OF INERTIA

I = MOMENT OF INERTIA

b = WIDTH (ie 12 INCH)

d = DEPTH OF REINFORCEMENT

CALCULATE LARGEST (FACTORED) SHEAR V

LOAD CASE	TOE	HEEL
NORMAL	10,800 lb	32,800 lb
COMPACTION EQUIP	14,000 lb	32,800 lb
SEISMIC	14,600 lb C	32,800 lb C

C = CONTROLS

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PREPARED BY JHF DATE 10-5-06
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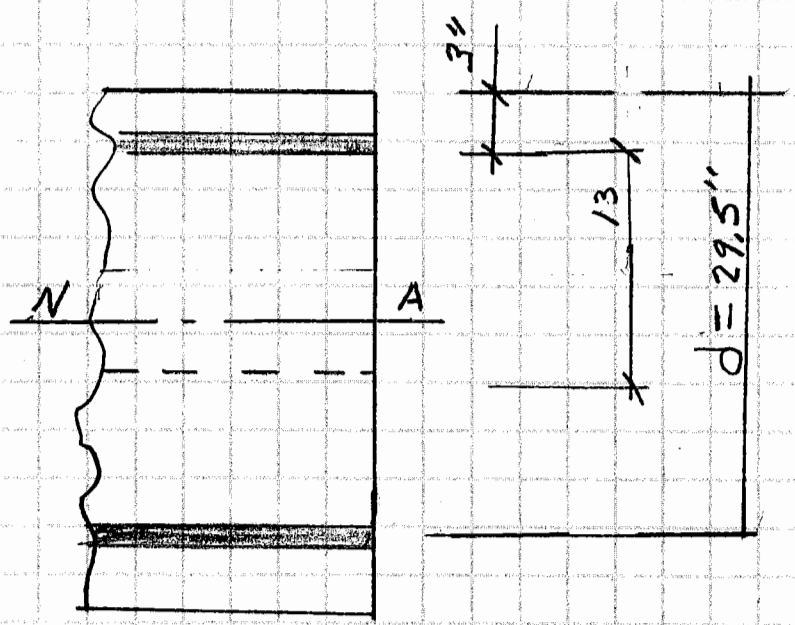
THE DEPTH TO THE COLD JOINT INTERFACE IS LISTED IN TABLE 1

SINCE V IS A FUNCTION OF Q THE AREA WITH THE DEEPES VALUE AT THE INTERFACE WITH THE STEM (IE WALL) WOULD RESULT IN THE LARGES SHEAR VALUE



$\frac{1}{2} \cdot d = 14.75''$

$3 + 13 = 16''$

SINCE INTERFACE IS AT, OR BELOW NE AXIS

$v = 1.5\, v_{AVE}$

$$v_u = \frac{1.5\, V_u}{b\, d} = \frac{1.5\,(14{,}600)}{29.5\,(12)} = 62 \text{ PSI} \quad \text{TOE}$$

$$v_{u\text{-HEEL}} = \frac{1.5\, V_u}{b\, d} = \frac{1.5\,(32800)}{29.5\,(12)} = 139 \text{ PSI} \quad \text{HEEL}$$

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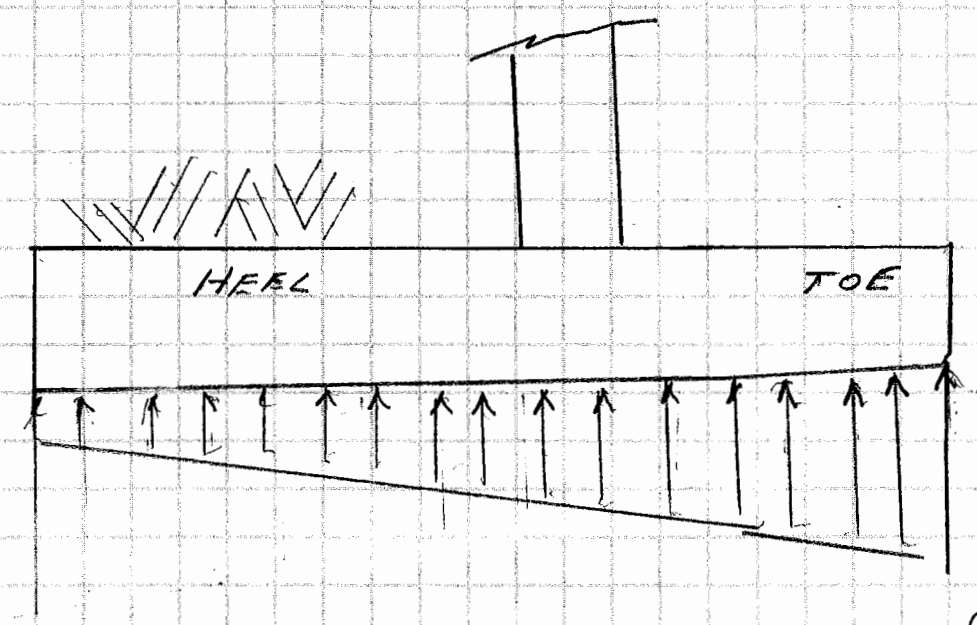
PROJECT NO. LOS ALAMOS RET. WALL
CLIENT/FACILITY
SUBJECT COLD JOINT
PREPARED BY JJF DATE 10-6-06
CHECKED BY DATE

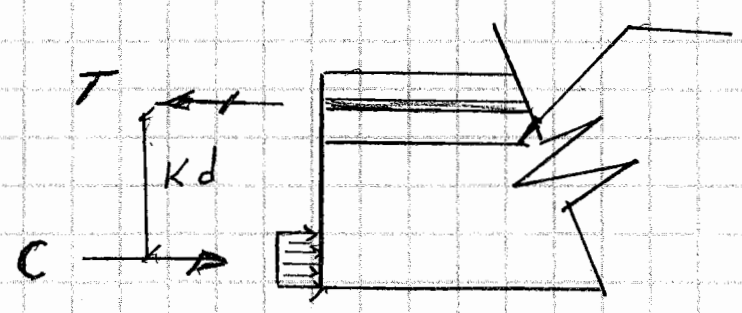
METHOD 'B'

ANALYSIS TOTAL TENSION FORCE IN HEEL, AND INSURE IT CAN BE TRANSFER ACROSS THE COLD JOINT BY BOND



M_u = 131,040 FT·lb/LIN FOOT { MAX FOR NORMAL, EQUIP, AND SEISMIC

NEGLECT UPWARD LOAD ON HEEL
THIS IS VERY CONSERVATIVE APPROACH



CALCULATE T AND SEE IF THE BOND OF THE COLD JOINT CAN TRANSFER THE FORCE ACROSS THE JOINT.

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PROJECT NO. LOS ALAMOS RET WALL
CLIENT/FACILITY
SUBJECT COLD JOINT
PREPARED BY JJF DATE 10-6-06
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$d = 33 - 3 - 1 = 29.0 \text{ in}$

$K = 0.88 \qquad Kd = 25.5 \text{ in}$

$$T_u = \frac{M_u}{Kd} = \frac{131{,}040(12)}{25.5} = 61{,}620 \text{ lbs/ft.}$$

BOND ACROSS JOINT

$$\sigma_u = \frac{61{,}620}{\underbrace{8.0\,(12)}_{\text{HEEL LENGTH}}(12)} = 54 \text{ psi}$$

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CLIENT/FACILITY
SUBJECT COLD JOINT
PREPARED BY AAF DATE 10-7-06
CHECKED BY DATE

METHOD 'C'

SAME APPROACH AS 'B' BUT CALCULATE THE BOND STRESS NEEDED TO DEVELOP THE BAR FORCE

HEEL REINFORCEMENT
#9 @ 10

$$T = \phi A_s \cdot f_y = 0.90\,(1.00)\left(\frac{12}{10}\right)(60{,}000)$$

$$= 64{,}800 \text{ lbs/FT.}$$

$$\sigma_u = \frac{64{,}800}{8.0\,(12)(12)} = 56 \text{ psi}$$

APPENDIX A

Test Lab Results

and

Statistical Analysis of Weld-Crete

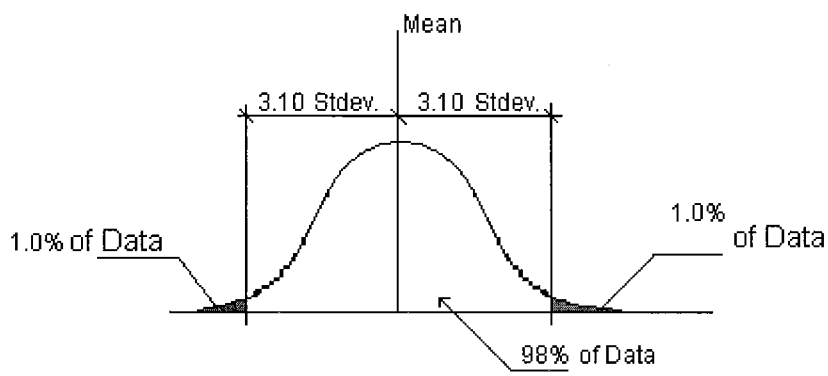
Statistical Analysis of Small Sample Sizes

The following analysis is to statistically insure the for a small sample size the the probability of the design value not being met is less that 1.0%, or at least 99.0% of test data will exceed the design value. This is in keeping with the basic philosophy of the ACI 318 Code. Where concrete mix is design to have a probability of being under-strength by a factor of 1 to 100, or less.

Since the data is from a small sample size (i.e. less that 30 samples) the analysis will use Student's t-Distribution method.

Definitions:

n = Sample Size
X mean = Mean (Arithmetic Mean) ν = Standard Deviation
D value = The design value, with 99.0% of data exceeding this value.
A = data matrix which list the coefficients that would be multiplied by the Standard Deviation to obtained a probability of failure of 1% or less.
Data = A data array of test results



t-Distribution for Small Sample Sizes

Note: The above figure is shown with a sample size (n) of 4.

Test data listed below is for Larsen Products material "Weld-Crete". The test were for Bond Strength test of Latex Systems used with Concrete by the Slant Shear method. ASTM C 1042-91.

Testing Agent CTC-GEOTEK. Job No. 957001 Data dated 6/19/95. Total of four (4) test

$$A := \begin{pmatrix} 2 & 5.19 \\ 3 & 3.64 \\ 4 & 3.10 \\ 5 & 2.84 \\ 6 & 2.68 \end{pmatrix} \qquad Data := \begin{pmatrix} 757 \\ 764 \\ 715 \\ 736 \end{pmatrix}$$

$X_{mean} := mean(Data)$ $\qquad X_{mean} = 743.0$ psi

$\nu := Stdev(Data)$ $\qquad \nu = 22.1$ psi

$D_{value} := X_{mean} - 3.10 \cdot \nu$ $\qquad D_{value} = 674.4$ psi

The usable bond capacity of the Weld-Crete material is as follows:

$\phi := 0.75$ The strength reduction factor ϕ is 0.75 for shear, per ACI 318-02 section 9.3

$\phi \cdot D_{value} = 505.8$ psi

CTC-GEOTEK

ENGINEERING TESTING INSPECTION

Job No. 957001

BOND STRENGTH OF LATEX SYSTEMS USED WITH CONCRETE BY SLANT SHEAR

ASTM C 1042-91

BONDING AGENT

Manufacture	Larsen Products
Product Name	Weld-Crete
Manufacture Code	05E95
Type	I Latices *(Redispersible)*

BASE MATERIAL

Portland Cement	Type IIIA
Coarse Aggregate	No. 7
Water/Cement Ratio	.35
Strength at 7 days	≥4500 psi

BOND STRENGTH

Average Bond Strength	740 psi
Required Bond Strength[a]	≥400 psi

TEST DATA

Sample No.	Test Date	Age (Days)	[b]Failure Mode	Void Area (%)	Bonding Area (%)	Total Load (lb)	Bond Strength (psi)
05E95-1	6/19/95	14	3	0	14.13	10,700	757
05E95-2	6/19/95	14	3	0	14.13	10,800	764
05E95-3	6/19/95	14	3	0	14.13	10,100	715
05E95-4	6/19/95	14	3	0	14.13	10,400	736

[b]Failure Mode
1 Base Material Matrix
2 Bond Material
3 Bond Matrix

NOTE

→ [a]"ASTM C 1059-91, Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete"

Blair G. Peterson, S.E.T.
Laboratory Manager

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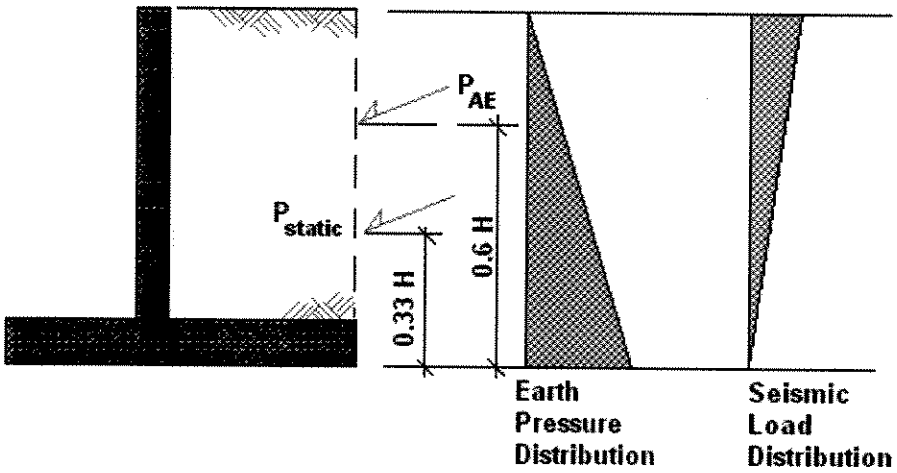
DESIGN CALCULATIONS



Revised Report July 2006

by

TCPI
436 Creamery Way
Suite 100
Exton, Pennsylvania 19341

Design Calculations Retaining Wall 1

Index

1.0 Design Criteria
2.0 Calculations

See original May 2005 calculations for appendixes.

1.0 Design Criteria

1.1 **General:** The reinforced concrete retaining wall (i.e. Wall No. 1) was design using the following documents. See Appendix 'A' of the original calculations for a list of references.

1.1.1 Retaining Wall No. 1 was design in accordance with International Building Code (IBC) 2003 Edition.

1.1.2 ACI 318-02 "Building Code Requirements for Structural Concrete".

1.2 **Wall Heights:** The retaining wall was design in height increments of 5'-0" from Grade to a maximum height of 24'-0". The following is a list of wall mark numbers and the maximum height for that wall.

Mk. No.	From	To
A	Grade	5'-0"
B	≥ 5'-1"	10-0"
C	≥ 10'-1"	15'-0"
D	≥ 15'-1"	20'-0"
E	≥ 20'-1"	24'-0"

1.3 **Design Criteria:**

1.3.1 Base of retaining wall will be founded on suitable soil, but it will not be bedrock

1.3.2 Soil weight is 125 pcf.

1.3.3 Soil friction at the interface of the base of the concrete retaining walls to the soil is assumed to be a value of 0.55.

1.3.4 The Equivalent Fluid Pressure for Passive soil pressure was revised to a value of 534 psf. Per Weston Solutions. This includes a factor of safety of 2:1 against the calculated value of 8.88 for K_p (Values used to develop this calculation include a soil internal friction angle of 40 deg., a wall to soil interface angle of 15 deg. and a soil density of 125 pcf.

1.4 **Factors of Safety:** The Factor of Safety (F.S.) for sliding for seismic and temporary loads can be reduced below 1.5.

A review of design codes shows that AASHTO Standard Specifications for Highway Bridges, 16th Edition (1996) section 5.2.2.2 permits this F.S. to be as low as 1.1 for the seismic load case. While a review of the US Army Corps of Engineers "Retaining & Flood Walls Manual", EM 1110-2-2502 (29 September 1989) lists the following variable F.S's. in section 4-3.

1.4.1	Normal Load Case:	1.5
1.4.2	Short Duration Load Case:	1.3
1.4.3	Seismic Load Case:	1.1

A short Duration load includes Equipment Surcharges during Construction.

1.5 **Load Cases:** The following three (3) load cased were evaluated for each wall height

1.5.1 Normal Load: This is the basic design load on the wall. It consisted of the following items

1.5.1.1 EFP (equivalent fluid pressure) of 51 pcf. Sheet 9 of Appendix B of the original calculations recommends an EFP of 45.5 pcf based on the average of the active (Ka) and the at-rest (Ko) lateral earth pressure coefficients. The actual lateral earth pressure condition is somewhere between the active and the at-rest cases. Selecting the active lateral earth pressure coefficient as the average of the two conditions is based on engineering judgment.

1.5.1.2 The higher, and therefore more conservative active EFP used in this analysis was calculated based on the following lateral earth pressure coefficient $K = Ka + 82\%(Ko-Ka) = 0.259 + 0.820 \times (0.441 - 0.259) = 0.408$. With an assumed in-place density of the backfill of 125 pcf, ($\gamma = 125$) this gives an EFP of 51 pcf.

1.5.1.3 Allowable soil bearing condition is 4,000 psf. There are no surcharge effects from the uphill MSE Walls. See Appendix 'C' of the original calculations for details.

1.5.1.4 Stability ratio for overturning is a minimum of 2.0 to 1.0.

1.5.1.5 Factor of Safety for sliding is a minimum of 1.50 to 1.0.

1.5.1.6 Resultant of vertical loads is within the middle 1/3 of the wall base.

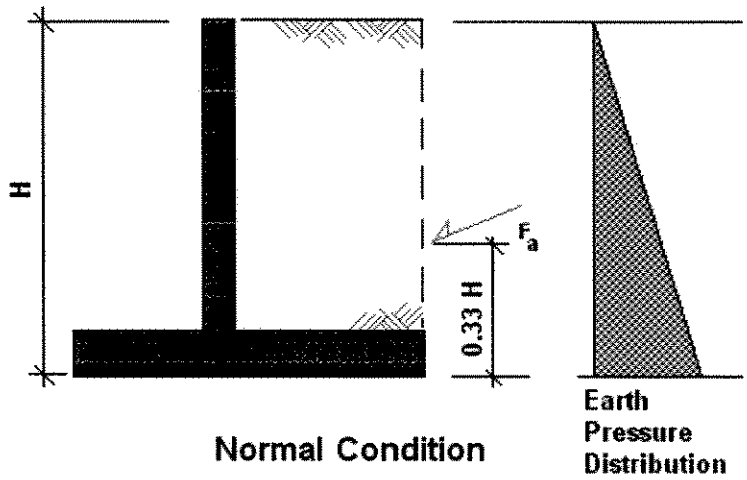


Figure 1

1.5.2 Compaction Equipment Load Case: This temporary load case consist of the following items:

1.5.2.1 EFP of 46 pcf. This value was calculated using the average of the active (Ka) and the at-rest (Ko) lateral earth pressure coefficients. The actual lateral earth pressure is somewhere between the active and the at-rest cases. Selecting the lateral earth pressure coefficient as the average of the two conditions is based on engineering judgment. (See Sheet 9 of Appendix B of the original calculations) Since this is a temporary condition a more conservative approximation of the EFP is not warranted.

1.5.2.2 A surcharge from compaction equipment was applied behind the wall. This consisted of a 2,500 pound load spread over a 10'-0" width, or 250 psf continuous along the length of the wall. See diagrams that are included with each wall design for this load case, and Figure 2.

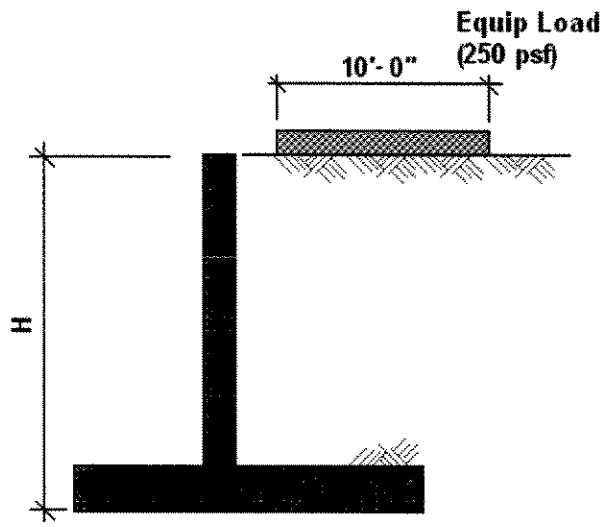
1.5.2.3 Allowable soil bearing condition is 5,000 psf.

1.5.2.4 There are no surcharge effects from the uphill MSE Walls. See appendix 'C' of the original calculations for details.

1.5.2.5 Stability ratio for overturning is a minimum of 2.0 to 1.0.

1.5.2.6 Factor of Safety for sliding is a minimum of 1.33 to 1.0.

1.5.2.7 Resultant of vertical loads is within the middle 1/3 of the wall base.



Compaction Equipment Load

Figure. 2

1.5.3 Seismic Condition This upset condition consists of an earthquake event.

1.5.3.1 K_h of 0.09 was used with an inverse triangular distribution, with increasing pressure toward the bottom of the wall. See Figure 3 and sheets 15 to 17 of Appendix 'B' for details. Also see Appendix 'D' of the original calculations for a detailed discussion of the Mononobe-Okabe equations and their application.

1.5.3.2 Allowable soil bearing condition is 5,000 psf.

1.5.3.3 There are no surcharge effects from the uphill MSE Walls. See appendix 'C' of the original calculations for details.

1.5.3.4 Stability ratio for overturning is a minimum of 1.5 to 1.0.

1.5.3.5 Factor of Safety for sliding is a minimum of 1.10 to 1.0.

1.5.3.6 Resultant of vertical loads is within the middle 1/3 of the wall base

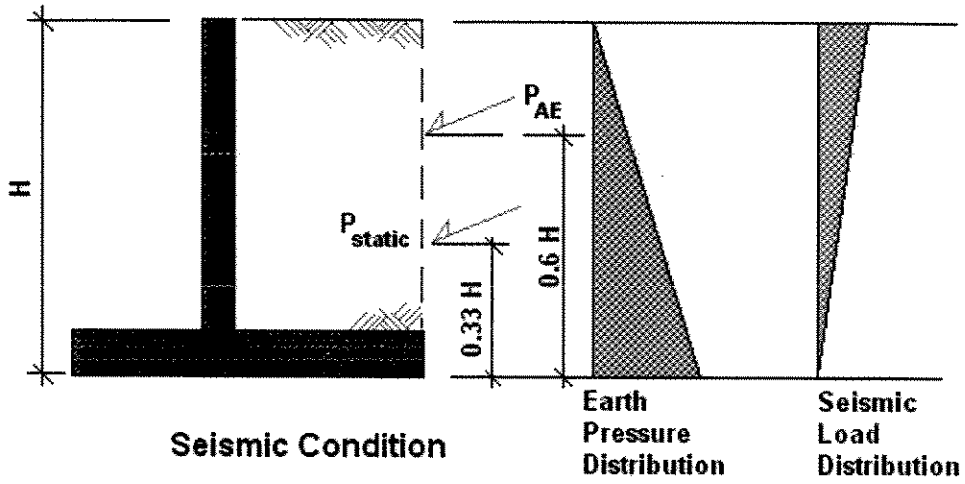

H
P_{AE}
P_{static}
0.6 H
0.33 H
Seismic Condition
Earth Pressure Distribution
Seismic Load Distribution

Figure 3

WALL MK. 'A'

Loading Case	Overturning Ratio	Sliding Ratio	Maximum Soil Bearing Pressure	Controlling Case for Strength Design	Remarks
Normal	3.0	1.9	1025		See Note 1
Compaction Equipment	2.8	1.6	3120	✓	
Seismic	2.7	1.9	2570		

Notes:

1.0 Vertical Component of Active Pressure was used in the calculation of Soil Pressure.

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'A' H = 5' Normal
Job # : E-05129 Dsgnr: JJF
Description....
Low Level Wall "A" Height H = 5'-0" Normal Loads

Page: _____
Date: MAY 23,2005

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	5.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	51.0 psf/ft
Toe Active Pressure	=	51.0 psf/ft
Passive Pressure	=	532.0 psf/ft
Soil Density	=	125.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	1.25 ft
Heel Width	=	2.75
Total Footing Width	=	4.00
Footing Thickness	=	15.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel = 0.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

*Design Summary

Wall Stability Ratios

Overturning	=	3.00	OK
Sliding	=	1.91	OK
Total Bearing Load	=	2,573 lbs	
...resultant ecc.	=	4.75 in	
Soil Pressure @ Toe	=	1,025 psf	OK
Soil Pressure @ Heel	=	261 psf	OK
Allowable	=	4,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,230 psf	
ACI Factored @ Heel	=	313 psf	
Footing Shear @ Toe	=	2.1 psi	OK
Footing Shear @ Heel	=	12.5 psi	OK
Allowable	=	93.1 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	956.3 lbs	
less 100% Passive Force	= -	415.6 lbs	
less 100% Friction Force	= -	1,415.1 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

Top Stem

Design Height Above Ftg	ft =		Stem OK 0.00
Wall Material Above "Ht"	=		Concrete
Thickness	=		10.00
Rebar Size	=		# 5
Rebar Spacing	=		12.00
Rebar Placed at	=		Edge
Design Data			
fb/FB + fa/Fa	=		**0.169**
Total Force @ Section	lbs =		1,020.0
Moment....Actual	ft-# =		1,700.0
Moment.....Allowable	=		10,037.3
Shear.....Actual	psi =		11.3
Shear.....Allowable	psi =		82.2
Wall Weight	=		125.0
Rebar Depth 'd'	in =		7.50
LAP SPLICE IF ABOVE	in =		21.36
LAP SPLICE IF BELOW	in =		
HOOK EMBED INTO FTG	in =		9.59
Masonry Data			
f'm	psi =		
Fs	psi =		
Solid Grouting	=		
Special Inspection	=		
Modular Ratio 'n'	=		
Short Term Factor	=		
Equiv. Solid Thick.	=		
Masonry Block Type = Medium Weight			
Concrete Data			
f'c	psi =		3,000.0
Fy	psi =		60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'A' H = 5' Normal
Job # : E-05129 Dsgnr: JJF
Description....
Low Level Wall "A" Height H = 5'-0" Normal Loads

Page: _____
Date: MAY 23,2005

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,230	313 psf
Mu' : Upward	=	887	0 ft-#
Mu' : Downward	=	176	0 ft-#
Mu: Design	=	711	1,700 ft-#
Actual 1-Way Shear	=	2.05	12.46 psi
Allow 1-Way Shear	=	93.11	93.11 psi
Toe Reinforcing	=	# 5 @ 18.00 in	
Heel Reinforcing	=	# 5 @ 18.00 in	
Key Reinforcing	=	None Spec'd	

Other Acceptable Sizes & Spacings
Toe: Not req'd, Mu < S * Fr
Heel: Not req'd, Mu < S * Fr
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	996.1	2.08	2,075.2
Toe Active Pressure	=	-39.8	0.42	-16.6
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	956.3	**O.T.M.** =	2,058.6

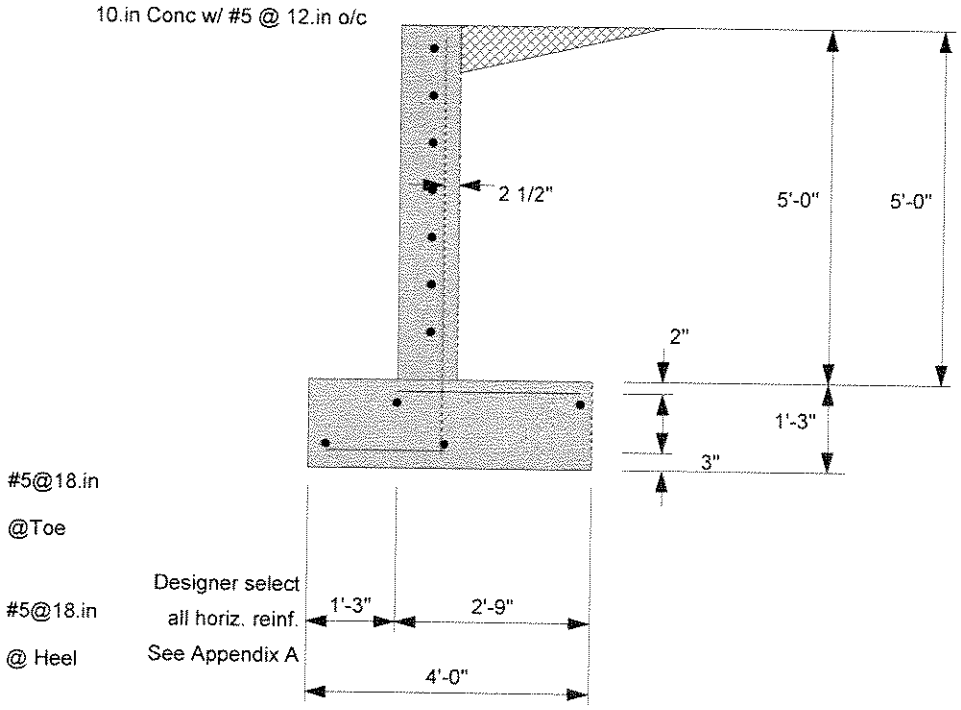
Resisting/Overturning Ratio = **3.00**

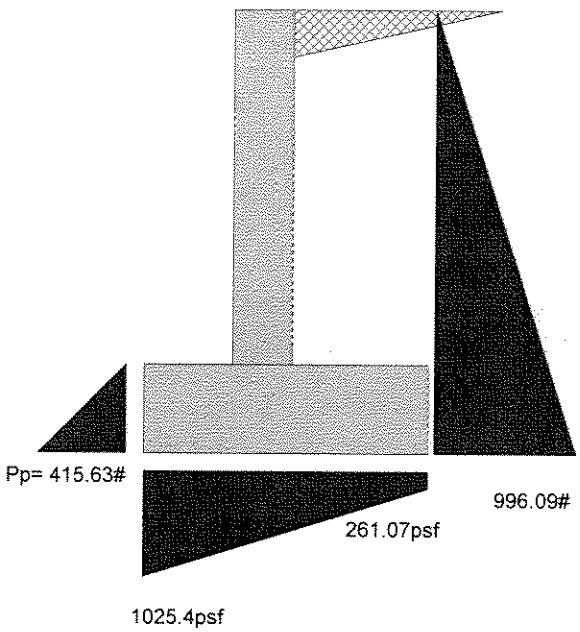
Vertical Loads used for Soil Pressure = 2,572.9 lbs

Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	1,197.9	3.04	3,643.7
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=			
Surcharge Over Toe	=			
Stem Weight(s)	=	625.0	1.67	1,041.7
Earth @ Stem Transitions	=			
Footing Weight	=	750.0	2.00	1,500.0
Key Weight	=			
Vert. Component	=			
Total =		2,572.9 lbs	**R.M.=**	6,185.3

DESIGNER NOTES:


10.in Conc w/ #5 @ 12.in o/c
2 1/2"
5'-0"
5'-0"
2"
1'-3"
3"
#5@18.in
@Toe
Designer select
all horiz. reinf.
See Appendix A
#5@18.in
@ Heel
1'-3"
2'-9"
4'-0"


Pp= 415.63#
996.09#
261.07psf
1025.4psf

Cantilevered Retaining Wall Design
Calculation Trace Listing

Beginning of Trace
Setting ACI Load Factors: DL Fact = 1.2000, LL Fact = 1.6000, ST Fact = 1.000
Noted that EFP Method being used
Back-solving internal friction angle from density and EFP, angle = 24.870 deg
Actual Heel Width (past back of stem) = 1.9167 ft
Soil Height for Stability (wall+footing+cslope) = 6.2500 ft
Calculating Overturning Values
Arm = 2.0833 ft, Moment = 2,075.20 ft-#
Active Pressure @ Toe: (0.000 + 15.000)^2 * 51.000 / 2.0= 39.844 lbs
Arm = (0.000 + 15.000) / 3 /12 = 0.417 ft, Moment = 16.602 ft-#
Toe Active Pressure Used To Resist Sliding, so ADD Soil over toe = 39.844 lbs to Total Overturning Loads
Calculating Resisting Moments
Soil Wt Over Heel = 1.9167 * 5.0000 * 125.000 = 1,197.92 lbs
Arm = 4.0000 - 1.9167 / 2.0 = 3.0417 ft, Moment = 1,197.92 * 3.0417 = 3,643.66 ft-#
Top Stem Weight = 625.000 lbs, Arm = (1.2500 + 0.833 / 2.0) = 1.6667 ft
Stem Avg. Arm = 20.000 ft, Total Moment = 12,500 ft-#
Avg. Arm = 0.000 ft, Moment = 0.000 ft-#
Footing Weight = 4.0000 * 15.000 * 150.000 = 750.000 lbs, Arm = 4.0000 / 2.0 = 2.0000 ft, Moment = 1,500.00 ft-#
Key Weight = 0.000 * 0.000 * 150.000 = 750.000 lbs, Arm = 0.000 + 0.000 / 2.0 = 0.000 ft, Moment = 0.000 ft-#
Total Resis. Wt = 2,572.92 lbs, Moment = 6,185.33 ft-#
Calculated Stem Forces for Preliminary Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 1,020.00 lbs, Moment = 1,700.00 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 1,020.00 / 7.5000 / 12.0 = 11.333 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 120,447 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
Calculate Bar Lap Lengths
Top Stem, Hooked Embed into Concrete Footing BELOW = 9.5851 in
Top Stem, Embed into Concrete ABOVE = 35.602 in
Calculating Soil Pressure
Toe Bar Depth = 15.000 - 3.0000 - 0.5 = 11.500 in, Heel Bar Depth = 15.000 - 2.0000 - 0.5 = 12.500 in
Service Load Soil Pressures.....
P = 2,572.92 lbs, Ecc = 4.753 in, Toe Pressure = 85.449 psf, Heel Pressure = 21.756 psf
Calculating Factored Load Shear in Footing=
P = 3,087.50 lbs, Ecc = 4.753 in, Toe Pressure = 85.449 psf, Heel Pressure = 21.756 psf
Shear @ Toe = (2.0544 - 1.2000 * (15.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 3.5000) / (12.0 * 11.500) = 2.0544 psi
Shear @ Heele = (2.0544 - 1,868.75 - 0.000 - 0.000 - 0.000) / (12.0 * 12.500) = 12.458 psi
Shear Distances from Edge; Toe = 15.000 in, Heel = 23.000 in
Toe Upward Moment = 886.663 ft-#
Toe Downward Moment = 1.2000 * (15.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 15.000^2 / 2.0 = 175.781 ft-#
Moment @ Toe, Upward = 10,640 ft-#, Downward = 1.2000 * (15.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 15.000^2 / 2.0 = 710.882
Design Toe Moment <= 6.5 * d^2 * SQRT(f'c) --->> No Reinforcing Used
Flag set to ignore updard pressure under heel-->> Heel Upward Moment = 0
Heel Downward Moment = 1.2000 * (15.000 * 1.0417 + 60.000 * 0.868 + 0.000 + 0.000) * 23.000^2 / 2.0 = 1,790.89 ft-#
Add moment due to vertical soil component = 1.6000 * 0.000 * 23.000 = 0.000 ft-#
Preliminary Design Moment = 21,490.625 ft-#
Note! Base Stem Moment Governs! Heel Design Moment = 20,400 ft-#
Design Heel Moment <= 6.5 * d^2 * SQRT(f'c) --->> No Reinforcing Used
Soil Height for Passive Pressure = 0.000 + 15.000 + 0.000 = 15.000 in
Sliding Resistance due to Friction = 2,572.92 * 0.550 = 1,415.10 lbs
Friction Resistance adjusted for Specified '%' = 1.000 * 1,415.10 = 1,415.10 lbs
Sliding Passive Pressure = (15.000 - 0.000) * 3.6944 * (15.000 - 0.000)/2.0)
+ (0.000 * 3.6944 * (15.000 - 0.000)) = 415.625 lbs
Passive Resistance adjusted for Specified '%' = 1.000 * 1,415.10 = 415.625 lbs
Sliding Factor of Safety = (415.625 + 1,415.10) / 956.250 = 1.9145 lbs
Calculating Footing Rebar Requirements
RHo:Balanced = 0.850 * 3,000.00 / 60,000 * 0.850 * (87000.0 / (87000.0 + 60,000)) = 0.021
Calculated Stem Forces for Fincal Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 1,020.00 lbs, Moment = 1,700.00 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 1,020.00 / 7.5000 / 12.0 = 11.333 psi

65 Determine Allowable Moments
66 Top Concrete Stem Capacity = 120,447 in-#
67 Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
68 **Calculate Bar Lap Lengths**
69 Top Stem, Hooked Embed into Concrete Footing BELOW = 9.5851 in
70 Top Stem, Embed into Concrete ABOVE = 35.602 in

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'A' H= 5' Equipient Load
Job # : E-05129 Dsgnr: JJF
Description....
Wall "A" Height (H) = 5'-0" Equipment Load with EFP =

Page: _____
Date: MAY 25,2005

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	5.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	5,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	46.0 psf/ft
Toe Active Pressure	=	46.0 psf/ft
Passive Pressure	=	532.0 psf/ft
Soil Density	=	125.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	1.25 ft
Heel Width	=	2.75
Total Footing Width	=	4.00
Footing Thickness	=	15.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	2,000.0 lbs
Footing Width	=	8.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	4.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

*Design Summary

Wall Stability Ratios

Overturning	=	2.83	OK
Sliding	=	1.60	OK
Total Bearing Load	=	3,119 lbs	
...resultant ecc.	=	3.96 in	
Soil Pressure @ Toe	=	1,165 psf	OK
Soil Pressure @ Heel	=	394 psf	OK
Allowable	=	5,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,349 psf	
ACI Factored @ Heel	=	456 psf	
Footing Shear @ Toe	=	2.3 psi	OK
Footing Shear @ Heel	=	6.2 psi	OK
Allowable	=	93.1 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	1,259.2 lbs	
less 100% Passive Force	= -	415.6 lbs	
less 100% Friction Force	= -	1,594.5 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

Top Stem

			Stem OK
Design Height Above Ftg	ft =	0.00	
Wall Material Above "Ht"	=	Concrete	
Thickness	=	10.00	
Rebar Size	=	# 5	
Rebar Spacing	=	12.00	
Rebar Placed at	=	Edge	

Design Data

fb/FB + fa/Fa	=	**0.241**
Total Force @ Section	lbs =	1,396.7
Moment....Actual	ft-# =	2,421.1
Moment.....Allowable	=	10,037.3
Shear.....Actual	psi =	15.5
Shear.....Allowable	psi =	82.2
Wall Weight	=	125.0
Rebar Depth 'd'	in =	7.50
LAP SPLICE IF ABOVE	in =	21.36
LAP SPLICE IF BELOW	in =	
HOOK EMBED INTO FTG	in =	9.59

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Special Inspection	=	
Modular Ratio 'n'	=	
Short Term Factor	=	
Equiv. Solid Thick.	=	

Masonry Block Type = Medium Weight

Concrete Data

f'c	psi =	3,000.0
Fy	psi =	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'A' H= 5' Equiplent Load
Job # : E-05129 Dsgnr: JJF
Description....
Wall "A" Height (H) = 5'-0" Equipment Load with EFP =

Page: _____
Date: MAY 25,2005

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,349	456 psf
Mu' : Upward	=	981	1,100 ft-#
Mu' : Downward	=	176	2,465 ft-#
Mu: Design	=	805	1,366 ft-#
Actual 1-Way Shear	=	2.31	6.24 psi
Allow 1-Way Shear	=	93.11	93.11 psi
Toe Reinforcing	=	# 5 @ 12.00 in	
Heel Reinforcing	=	# 5 @ 12.00 in	
Key Reinforcing	=	None Spec'd	

Other Acceptable Sizes & Spacings
Toe: Not req'd, Mu < S * Fr
Heel: Not req'd, Mu < S * Fr
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	898.4	2.08	1,871.7
Toe Active Pressure	=	-35.9	0.42	-15.0
Surcharge Over Toe	=			
Adjacent Footing Load	=	396.7	2.50	991.0
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	1,259.2	**O.T.M.** =	2,847.8

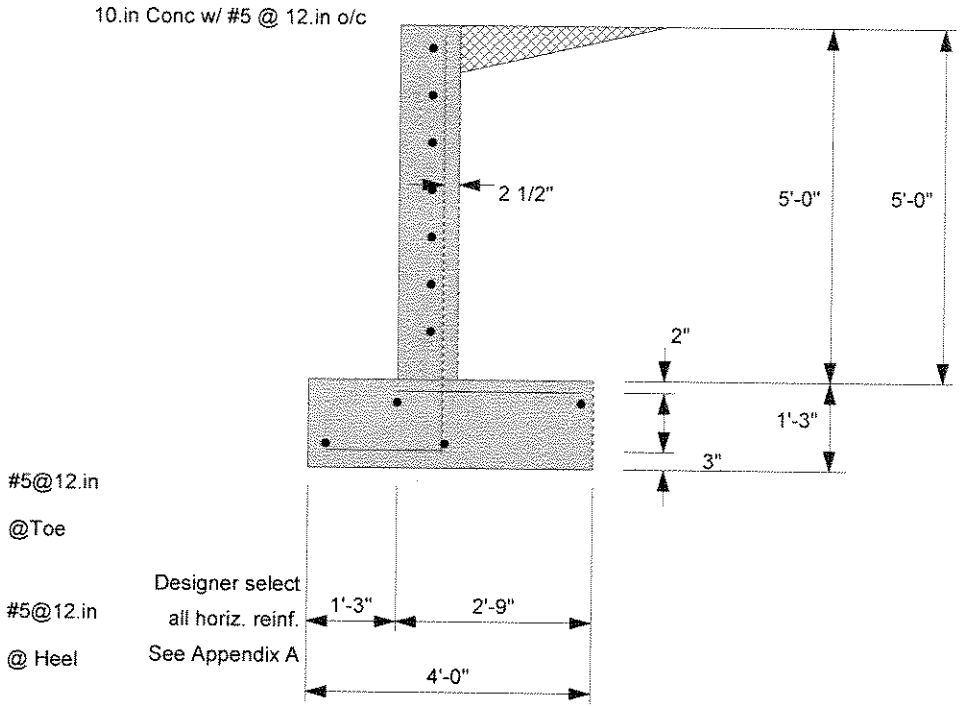
Resisting/Overturning Ratio = **2.83**

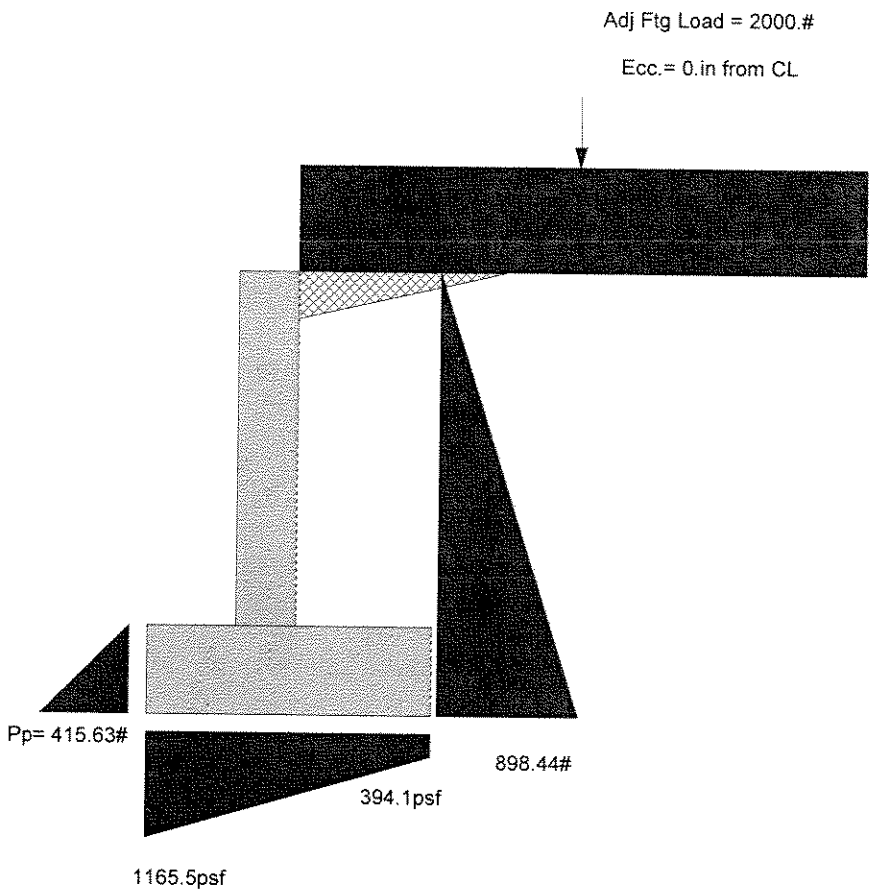
Vertical Loads used for Soil Pressure = 3,119.1 lbs

Vertical component of active pressure used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	1,197.9	3.04	3,643.7
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=	326.2	3.04	992.3
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=			
Surcharge Over Toe	=			
Stem Weight(s)	=	625.0	1.67	1,041.7
Earth @ Stem Transitions	=			
Footing Weight	=	750.0	2.00	1,500.0
Key Weight	=			
Vert. Component	=	220.0	4.00	879.9
Total =		3,119.1 lbs	**R.M.=**	8,057.5

DESIGNER NOTES:


10.in Conc w/ #5 @ 12.in o/c
2 1/2"
5'-0"
5'-0"
2"
1'-3"
3"
#5@12.in
@Toe
Designer select
all horiz. reinf.
See Appendix A
#5@12.in
@ Heel
1'-3"
2'-9"
4'-0"


Adj Ftg Load = 2000.#
Ecc.= 0.in from CL
Pp= 415.63#
898.44#
394.1psf
1165.5psf

Cantilevered Retaining Wall Design
Calculation Trace Listing

1 **Beginning of Trace**
2 Setting ACI Load Factors: DL Fact = 1.2000, LL Fact = 1.6000, ST Fact = 1.000
3 Noted that EFP Method being used
4 Back-solving internal friction angle from density and EFP, angle = 27.520 deg
5 Actual Heel Width (past back of stem) = 1.9167 ft
6 Soil Height for Stability (wall+footing+cslope) = 6.2500 ft
7 **Calculating Overturning Values**
8 Arm = 2.0833 ft, Moment = 1,871.74 ft-#
9 Active Pressure @ Toe: (0.000 + 15.000)^2 * 46.000 / 2.0= 35.938 lbs
10 Arm = (0.000 + 15.000) / 3 /12 = 0.417 ft, Moment = 14.974 ft-#
11 Adjacent Footing Lateral Force = 396.651 lbs
12 Height above Footing Base = 29.981 in, Moment = 396.651 * 2.4984 = 990.993 ft-#
13 Toe Active Pressure Used To Resist Sliding, so ADD Soil over toe = 35.938 lbs to Total Overturning Loads
14 **Calculating Resisting Moments**
15 Soil Wt Over Heel = 1.9167 * 5.0000 * 125.000 = 1,197.92 lbs
16 Arm = 4.0000 - 1.9167 / 2.0 = 3.0417 ft, Moment = 1,197.92 * 3.0417 = 3,643.66 ft-#
17 Adjacent Footing, Force = 326.241 lbs, Arm = 3.0417 ft, Moment = 992.317 ft-#
18 Top Stem Weight = 625.000 lbs, Arm = (1.2500 + 0.833 / 2.0) = 1.6667 ft
19 Stem Avg. Arm = 20.000 ft, Total Moment = 12,500 ft-#
20 Avg. Arm = 0.000 ft, Moment = 0.000 ft-#
21 Footing Weight = 4.0000 * 15.000 * 150.000 = 750.000 lbs, Arm = 4.0000 / 2.0 = 2.0000 ft, Moment = 1,500.00 ft-#
22 Key Weight = 0.000 * 0.000 * 150.000 = 750.000 lbs, Arm = 0.000 + 0.000 / 2.0 = 0.000 ft, Moment = 0.000 ft-#
23 Soil Vertical Component = 0.078 * 6.2500 * 6.2500 * 0.5 = 219.973 lbs, Arm = 4.0000 ft, Moment = 879.893 ft-#
24 Total Resis. Wt = 3,119.13 lbs, Moment = 8,057.54 ft-#
25 **Calculated Stem Forces for Preliminary Checks**
26 **Cantilevered Stem Calculations**
27 Top Stem Section: Shear = 1,396.67 lbs, Moment = 2,421.08 ft-#
28 Calcualting Actual Shear Stress
29 Concrete Unit Shear Stress = 1,396.67 / 7.5000 / 12.0 = 15.519 psi
30 Determine Allowable Moments
31 Top Concrete Stem Capacity = 120,447 in-#
32 Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
33 **Calculate Bar Lap Lengths**
34 Top Stem, Hooked Embed into Concrete Footing BELOW = 9.5851 in
35 Top Stem, Embed into Concrete ABOVE = 35.602 in
36 **Calculating Soil Pressure**
37 Toe Bar Depth = 15.000 - 3.0000 - 0.5 = 11.500 in, Heel Bar Depth = 15.000 - 2.0000 - 0.5 = 12.500 in
38 Service Load Soil Pressures.....
39 P = 3,119.13 lbs, Ecc = 3.957 in, Toe Pressure = 97.122 psf, Heel Pressure = 32.842 psf
40 **Calculating Factored Load Shear in Footing=**
41 P = 3,609.49 lbs, Ecc = 3.957 in, Toe Pressure = 97.122 psf, Heel Pressure = 32.842 psf
42 Shear @ Toe = (2.3062 - 1.2000 * (15.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 3.5000) / (12.0 * 11.500) = 2.3062 psi
43 Shear @ Heele = (2.3062 - 1,868.75 - 0.000 - 351.957 - 0.000) / (12.0 * 12.500) = 6.2447 psi
44 Shear Distances from Edge; Toe = 15.000 in, Heel = 23.000 in
45 Toe Upward Moment = 981.019 ft-#
46 Toe Downward Moment = 1.2000 * (15.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 15.000^2 / 2.0 = 175.781 ft-#
47 Moment @ Toe, Upward = 11,772 ft-#, Downward = 1.2000 * (15.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 15.000^2 / 2.0 = 805.238
48 Design Toe Moment <= 6.5 * d^2 * SQRT(f'c) --->> No Reinforcing Used
49 Heel Upward Moment = 1,099.57 ft-#
50 Heel Downward Moment = 1.2000 * (15.000 * 1.0417 + 60.000 * 0.868 + 0.000 + 0.000) * 23.000^2 / 2.0 = 1,790.89 ft-#
51 Add moment due to vertical soil component = 1.6000 * 219.973 * 23.000 = 8,095.02 ft-#
52 Preliminary Design Moment = 16,390.856 ft-#
53 Design Heel Moment <= 6.5 * d^2 * SQRT(f'c) --->> No Reinforcing Used
54 Soil Height for Passive Pressure = 0.000 + 15.000 + 0.000 = 15.000 in
55 Sliding Resistance due to Friction = 3,119.13 * 0.550 = 1,715.52 lbs
56 Vertical Component NOT used for sliding so SUBTRACT : 0.078 * 75.000^2 * 0.5 * 0.550 = 120.985 lbs
57 Friction Resistance adjusted for Specified '%' = 1.000 * 1,594.54 = 1,594.54 lbs
58 Sliding Passive Pressure = (15.000 - 0.000) * 3.6944 * (15.000 - 0.000)/2.0)
59 + (0.000 * 3.6944 * (15.000 - 0.000)) = 415.625 lbs
60 Passive Resistance adjusted for Specified '%' = 1.000 * 1,594.54 = 415.625 lbs
61 Sliding Factor of Safety = (415.625 + 1,594.54) / 1,259.15 = 1.5964 lbs
62 **Calculating Footing Rebar Requirements**
63 RHo:Balanced = 0.850 * 3,000.00 / 60,000 * 0.850 * (87000.0 / (87000.0 + 60,000)) = 0.021
64 **Calculated Stem Forces for Fincal Checks**

65 **Cantilevered Stem Calculations**
66 Top Stem Section: Shear = 1,396.67 lbs, Moment = 2,421.08 ft-#
67 Calcualting Actual Shear Stress
68 Concrete Unit Shear Stress = 1,396.67 / 7.5000 / 12.0 = 15.519 psi
69 Determine Allowable Moments
70 Top Concrete Stem Capacity = 120,447 in-#
71 Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
72 **Calculate Bar Lap Lengths**
73 Top Stem, Hooked Embed into Concrete Footing BELOW = 9.5851 in
74 Top Stem, Embed into Concrete ABOVE = 35.602 in

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'A' H = 5' Seismic
Job # : E-05129 Dsgnr: JJF
Description....
Low Wall "A" H= 5'-0" Seismic load EFP = 46 & Kv =

Page: _____
Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	5.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	5,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	46.0 psf/ft
Toe Active Pressure	=	46.0 psf/ft
Passive Pressure	=	532.0 psf/ft
Soil Density	=	125.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	1.25 ft
Heel Width	=	2.75
Total Footing Width	=	4.00
Footing Thickness	=	15.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel = 0.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Design Kh = 0.100 g

Kae for seismic earth pressure	=	0.391
Ka for static earth pressure	=	0.323
Difference: Kae - Ka	=	0.068

Added seismic base force 118.5 lbs

Using Mononobe-Okabe / Seed-Whitman procedure

*Design Summary

Wall Stability Ratios

Overturning	=	2.69	OK
Sliding	=	1.87	OK
Total Bearing Load	=	2,573 lbs	
...resultant ecc.	=	5.88 in	
Soil Pressure @ Toe	=	1,116 psf	OK
Soil Pressure @ Heel	=	170 psf	OK
Allowable	=	5,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,340 psf	
ACI Factored @ Heel	=	204 psf	
Footing Shear @ Toe	=	2.3 psi	OK
Footing Shear @ Heel	=	12.5 psi	OK
Allowable	=	93.1 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	981.0 lbs	
less 100% Passive Force	= -	415.6 lbs	
less 100% Friction Force	= -	1,415.1 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

Top Stem

Stem OK

Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Concrete
Thickness	=	10.00
Rebar Size	=	# 5
Rebar Spacing	=	12.00
Rebar Placed at	=	Edge

Design Data

fb/FB + fa/Fa	=	**0.185**
Total Force @ Section	lbs =	1,026.8
Moment....Actual	ft-# =	1,853.9
Moment.....Allowable	=	10,037.3
Shear.....Actual	psi =	10.2
Shear.....Allowable	psi =	82.2
Wall Weight	=	125.0
Rebar Depth 'd'	in =	7.50
LAP SPLICE IF ABOVE	in =	21.36
LAP SPLICE IF BELOW	in =	
HOOK EMBED INTO FTG	in =	9.59

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Special Inspection	=	
Modular Ratio 'n'	=	
Short Term Factor	=	
Equiv. Solid Thick.	=	

Masonry Block Type = Medium Weight

Concrete Data

f'c	psi =	3,000.0
Fy	psi =	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'A' H = 5' Seismic
Job # : E-05129 Dsgnr: JJF
Description....
Low Wall "A" H= 5'-0" Seismic load EFP = 46 & Kv =

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Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,340	204 psf
Mu' : Upward	=	954	0 ft-#
Mu' : Downward	=	176	1,791 ft-#
Mu: Design	=	778	1,791 ft-#
Actual 1-Way Shear	=	2.27	12.46 psi
Allow 1-Way Shear	=	93.11	93.11 psi
Toe Reinforcing	=	# 5 @ 12.00 in	
Heel Reinforcing	=	# 5 @ 12.00 in	
Key Reinforcing	=	None Spec'd	

Other Acceptable Sizes & Spacings
Toe: Not req'd, Mu < S * Fr
Heel: Not req'd, Mu < S * Fr
Key: No key defined

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	898.4	2.08	1,871.7
Toe Active Pressure	=	-35.9	0.42	-15.0
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Seismic Earth Load	=	118.5	3.75	444.5
Total	=	981.0	**O.T.M.** =	2,301.2

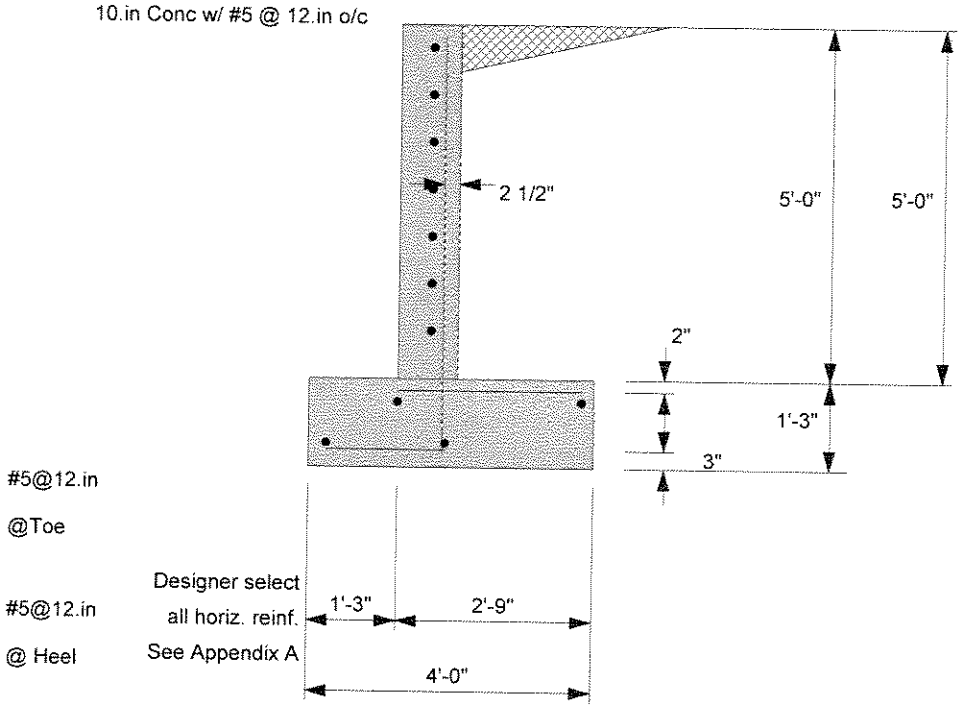
Resisting/Overturning Ratio = **2.69**

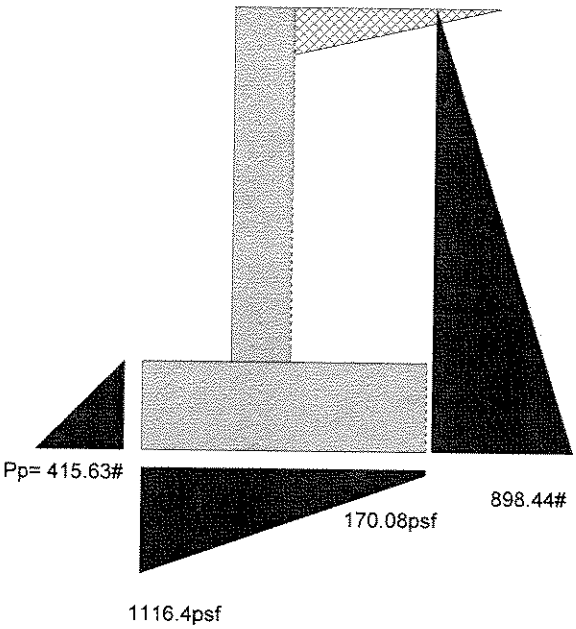
Vertical Loads used for Soil Pressure = 2,572.9 lbs

Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	1,197.9	3.04	3,643.7
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=			
Surcharge Over Toe	=			
Stem Weight(s)	=	625.0	1.67	1,041.7
Earth @ Stem Transitions	=			
Footing Weight	=	750.0	2.00	1,500.0
Key Weight	=			
Vert. Component	=			
Total =		2,572.9 lbs	**R.M.=**	6,185.3

DESIGNER NOTES:


10.in Conc w/ #5 @ 12.in o/c
2 1/2"
5'-0"
5'-0"
2"
1'-3"
3"
#5@12.in
@Toe
Designer select
all horiz. reinf.
See Appendix A
#5@12.in
@ Heel
1'-3"
2'-9"
4'-0"


Pp= 415.63#
898.44#
170.08psf
1116.4psf

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'A' H = 5' Seismic
Job # : E-05129 Dsgnr: JJF
Description....
Low Wall "A" H= 5'-0" Seismic load EFP = 46 & Kv =

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Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005, 1-November-2005, (c) 1989
Registration # : RP-1141385

Cantilevered Retaining Wall Design
Calculation Trace Listing

Beginning of Trace
Setting ACI Load Factors: DL Fact = 1.2000, LL Fact = 1.6000, ST Fact = 1.000
Noted that EFP Method being used
Back-solving internal friction angle from density and EFP, angle = 27.520 deg
Actual Heel Width (past back of stem) = 1.9167 ft
Soil Height for Stability (wall+footing+cslope) = 6.2500 ft
Calculating Overturning Values
Arm = 2.0833 ft, Moment = 1,871.74 ft-#
Seismic Lateral Force calcs....
Kae Force = 0.068 * 0.868 * 75.000^2 / 2.0 = 118.525 lbs
Ka Force = 75.000 * 0.319 * 75.000 * 0.5 = 898.438 lbs
Force Height = Retained Height * 0.6 = 75.000 * 0.600 = 45.000
Overturning Moment = 118.525 * 45.000 = 444.468 ft-#
Active Pressure @ Toe: (0.000 + 15.000)^2 * 46.000 / 2.0= 35.938 lbs
Arm = (0.000 + 15.000) / 3 /12 = 0.417 ft, Moment = 14.974 ft-#
Toe Active Pressure Used To Resist Sliding, so ADD Soil over toe = 35.938 lbs to Total Overturning Loads
Calculating Resisting Moments
Soil Wt Over Heel = 1.9167 * 5.0000 * 125.000 = 1,197.92 lbs
Arm = 4.0000 - 1.9167 / 2.0 = 3.0417 ft, Moment = 1,197.92 * 3.0417 = 3,643.66 ft-#
Top Stem Weight = 625.000 lbs, Arm = (1.2500 + 0.833 / 2.0) = 1.6667 ft
Stem Avg. Arm = 20.000 ft, Total Moment = 12,500 ft-#
Avg. Arm = 0.000 ft, Moment = 0.000 ft-#
Footing Weight = 4.0000 * 15.000 * 150.000 = 750.000 lbs, Arm = 4.0000 / 2.0 = 2.0000 ft, Moment = 1,500.00 ft-#
Key Weight = 0.000 * 0.000 * 150.000 = 750.000 lbs, Arm = 0.000 + 0.000 / 2.0 = 0.000 ft, Moment = 0.000 ft-#
Total Resis. Wt = 2,572.92 lbs, Moment = 6,185.33 ft-#
Calculated Stem Forces for Preliminary Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 1,026.84 lbs, Moment = 1,853.85 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 920.000 / 7.5000 / 12.0 = 10.222 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 120,447 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
Calculate Bar Lap Lengths
Top Stem, Hooked Embed into Concrete Footing BELOW = 9.5851 in
Top Stem, Embed into Concrete ABOVE = 35.602 in
Calculating Soil Pressure
Toe Bar Depth = 15.000 - 3.0000 - 0.5 = 11.500 in, Heel Bar Depth = 15.000 - 2.0000 - 0.5 = 12.500 in
Service Load Soil Pressures.....
P = 2,572.92 lbs, Ecc = 5.885 in, Toe Pressure = 93.032 psf, Heel Pressure = 14.173 psf
Calculating Factored Load Shear in Footing=
P = 3,087.50 lbs, Ecc = 5.885 in, Toe Pressure = 93.032 psf, Heel Pressure = 14.173 psf
Shear @ Toe = (2.2684 - 1.2000 * (15.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 3.5000) / (12.0 * 11.500) = 2.2684 psi
Shear @ Heele = (2.2684 - 1,868.75 - 0.000 - 0.000 - 0.000) / (12.0 * 12.500) = 12.458 psi
Shear Distances from Edge; Toe = 15.000 in, Heel = 23.000 in
Toe Upward Moment = 954.196 ft-#
Toe Downward Moment = 1.2000 * (15.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 15.000^2 / 2.0 = 175.781 ft-#
Moment @ Toe, Upward = 11,450 ft-#, Downward = 1.2000 * (15.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 15.000^2 / 2.0 = 778.415
Design Toe Moment <= 6.5 * d^2 * SQRT(f'c) --->> No Reinforcing Used
Flag set to ignore updard pressure under heel-->> Heel Upward Moment = 0
Heel Downward Moment = 1.2000 * (15.000 * 1.0417 + 60.000 * 0.868 + 0.000 + 0.000) * 23.000^2 / 2.0 = 1,790.89 ft-#
Add moment due to vertical soil component = 1.6000 * 0.000 * 23.000 = 0.000 ft-#
Preliminary Design Moment = 21,490.625 ft-#
Design Heel Moment <= 6.5 * d^2 * SQRT(f'c) --->> No Reinforcing Used
Soil Height for Passive Pressure = 0.000 + 15.000 + 0.000 = 15.000 in
Sliding Resistance due to Friction = 2,572.92 * 0.550 = 1,415.10 lbs
Friction Resistance adjusted for Specified '%' = 1.000 * 1,415.10 = 1,415.10 lbs
Sliding Passive Pressure = (15.000 - 0.000) * 3.6944 * (15.000 - 0.000)/2.0)
+ (0.000 * 3.6944 * (15.000 - 0.000)) = 415.625 lbs
Passive Resistance adjusted for Specified '%' = 1.000 * 1,415.10 = 415.625 lbs
Sliding Factor of Safety = (415.625 + 1,415.10) / 981.025 = 1.8661 lbs
Calculating Footing Rebar Requirements
RHo:Balanced = 0.850 * 3,000.00 / 60,000 * 0.850 * (87000.0 / (87000.0 + 60,000)) = 0.021
Calculated Stem Forces for Fincal Checks

65 **Cantilevered Stem Calculations**
66 Top Stem Section: Shear = 1,026.84 lbs, Moment = 1,853.85 ft-#
67 Calcualting Actual Shear Stress
68 Concrete Unit Shear Stress = 920.000 / 7.5000 / 12.0 = 10.222 psi
69 Determine Allowable Moments
70 Top Concrete Stem Capacity = 120,447 in-#
71 Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
72 **Calculate Bar Lap Lengths**
73 Top Stem, Hooked Embed into Concrete Footing BELOW = 9.5851 in
74 Top Stem, Embed into Concrete ABOVE = 35.602 in

WALL MK. 'B'

Loading Case	Overturning Ratio	Sliding Ratio	Maximum Soil Bearing Pressure	Controlling Case for Strength Design	Remarks
Normal	2.9	2.16	1775		See Note 1
Compaction Equipment	2.5	1.9	2360	✓	
Seismic	2.6	2.1	2150		

Notes:

1.0 Vertical Component of Active Pressure was used in the calculation of Soil Pressure.

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall "B" H = 10 Normal
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'B' Height (H) =10'-0" Normal Loads EFP = 51

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Date: MAY 24,2005

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
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Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	10.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	51.0 psf/ft
Toe Active Pressure	=	51.0 psf/ft
Passive Pressure	=	532.0 psf/ft
Soil Density	=	125.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	2.00 ft
Heel Width	=	5.25
Total Footing Width	=	7.25
Footing Thickness	=	18.00 in
Key Width	=	12.00 in
Key Depth	=	18.00 in
Key Distance from Toe	=	2.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel = 0.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

*Design Summary

Wall Stability Ratios

Overturning	=	2.90	OK
Sliding	=	2.16	OK
Total Bearing Load	=	9,412 lbs	
...resultant ecc.	=	5.32 in	
Soil Pressure @ Toe	=	1,775 psf	OK
Soil Pressure @ Heel	=	822 psf	OK
Allowable	=	4,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,962 psf	
ACI Factored @ Heel	=	908 psf	
Footing Shear @ Toe	=	7.4 psi	OK
Footing Shear @ Heel	=	40.4 psi	OK
Allowable	=	93.1 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	3,315.0 lbs
less 100% Passive Force	= -	2,394.0 lbs
less 100% Friction Force	= -	4,767.8 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Top Stem	2nd
Design Height Above Ftg	ft =	3.75	0.00
		Stem OK	Stem OK
Wall Material Above "Ht"	=	Concrete	Concrete
Thickness	=	12.00	12.00
Rebar Size	=	# 5	# 7
Rebar Spacing	=	12.00	12.00
Rebar Placed at	=	Edge	Edge
Design Data			
fb/FB + fa/Fa	=	**0.259**	**0.565**
Total Force @ Section	lbs =	1,593.8	4,080.0
Moment....Actual	ft-# =	3,320.3	13,600.0
Moment.....Allowable	ft-# =	12,827.3	24,057.0
Shear.....Actual	psi =	14.0	35.8
Shear.....Allowable	psi =	82.2	82.2
Wall Weight	psf =	150.0	150.0
Rebar Depth 'd'	in =	9.50	9.50
LAP SPLICE IF ABOVE	in =	21.36	37.38
LAP SPLICE IF BELOW	in =	21.36	
HOOK EMBED INTO FTG	in =		13.42
Masonry Data			
f'm	psi =		
Fs	psi =		
Solid Grouting	=		
Special Inspection	=		
Modular Ratio 'n'	=		
Short Term Factor	=		
Equiv. Solid Thick.	=		
Masonry Block Type = Medium Weight			
Concrete Data			
f'c	psi =	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall "B" H = 10 Normal
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'B' Height (H) =10'-0" Normal Loads EFP = 51

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Date: MAY 24,2005

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
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Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,962	908 psf
Mu' : Upward	=	3,729	0 ft-#
Mu' : Downward	=	540	0 ft-#
Mu: Design	=	3,189	13,600 ft-#
Actual 1-Way Shear	=	7.43	40.44 psi
Allow 1-Way Shear	=	93.11	93.11 psi
Toe Reinforcing	=	# 7 @ 18.00 in	
Heel Reinforcing	=	# 7 @ 21.75 in	
Key Reinforcing	=	# 5 @ 19.25 in	

Other Acceptable Sizes & Spacings

Toe: Not req'd, Mu < S * Fr
Heel: #4@ 7.25 in, #5@ 11.25 in, #6@ 16.00 in, #7@ 21.75 in, #8@ 28.50 in, #9@ 36
Key: #4@ 12.50 in, #5@ 19.25 in, #6@ 27.25 in, #7@ 37.25 in,

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	3,372.4	3.83	12,927.4
Toe Active Pressure	=	-57.4	0.50	-28.7
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	3,315.0	**O.T.M.** =	12,898.8

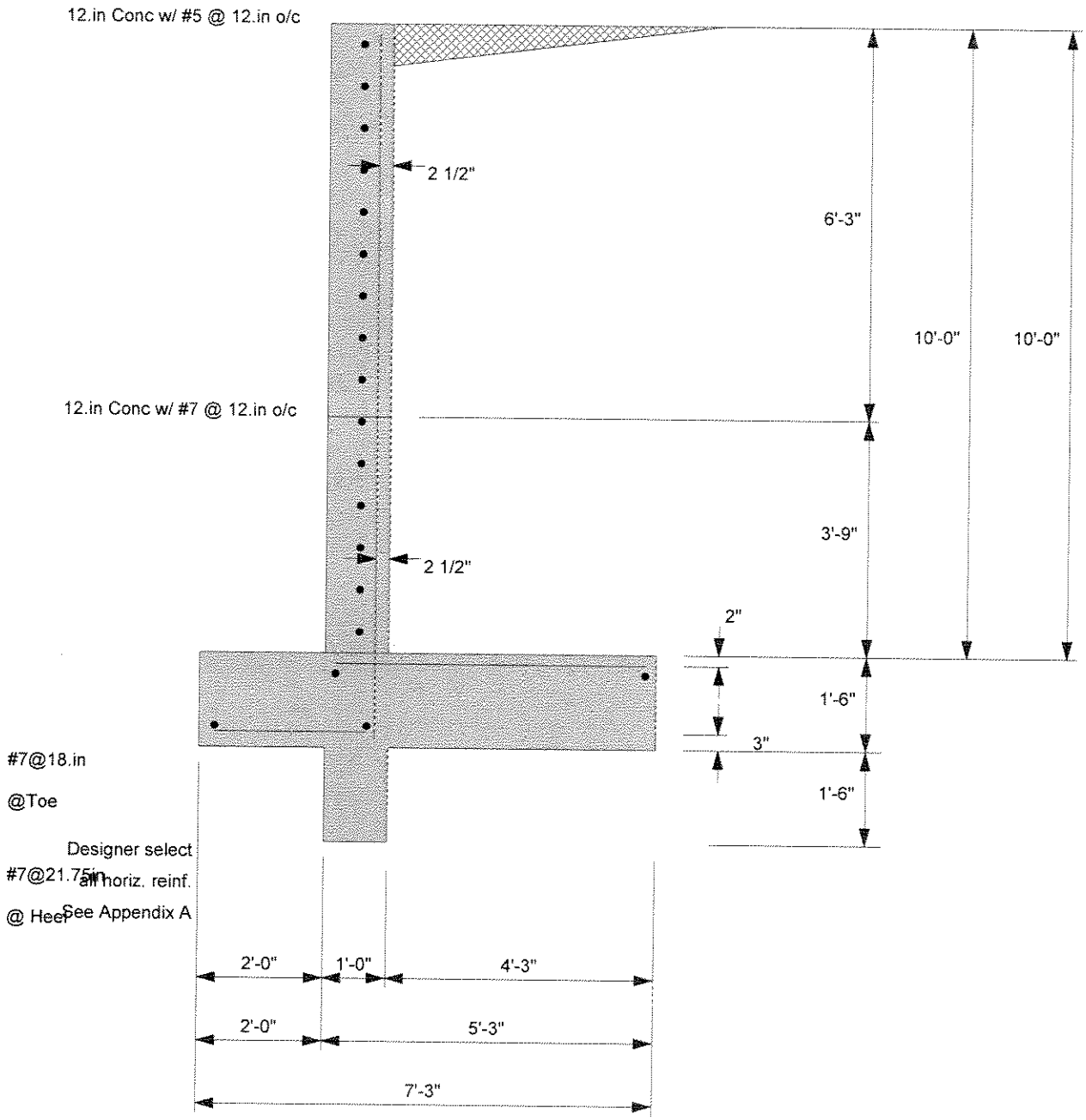
Resisting/Overturning Ratio = **2.90**

Vertical Loads used for Soil Pressure = 9,412.2 lbs

Vertical component of active pressure used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	5,312.5	5.13	27,226.6
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=			
Surcharge Over Toe	=			
Stem Weight(s)	=	1,500.0	2.50	3,750.0
Earth @ Stem Transitions	=			
Footing Weight	=	1,631.3	3.63	5,913.3
Key Weight	=	225.0	2.50	562.5
Vert. Component	=			
Total =		8,668.8 lbs	**R.M.=**	37,452.3

DESIGNER NOTES: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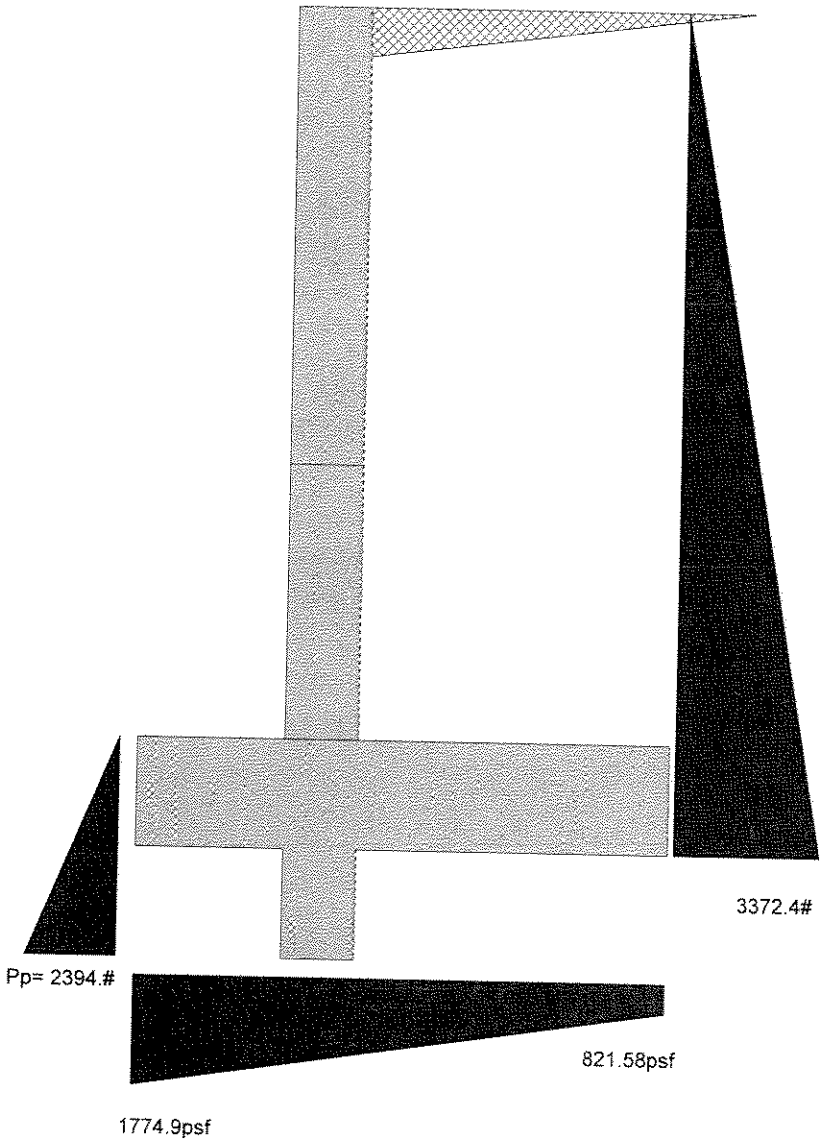
6'-3"
10'-0"
10'-0"
12.in Conc w/ #7 @ 12.in o/c
3'-9"
2 1/2"
2"
1'-6"
3"
1'-6"
#7@18.in
@Toe
Designer select
#7@21.75in
all horiz. reinf.
@ Heel
See Appendix A
2'-0"
1'-0"
4'-3"
2'-0"
5'-3"
7'-3"


3372.4#
Pp= 2394.#
821.58psf
1774.9psf

Retain Pro 2005, 1-November-2005, (c) 1989
Registration # : RP-1141385

Cantilevered Retaining Wall Design
Calculation Trace Listing

Beginning of Trace
Setting ACI Load Factors: DL Fact = 1.2000, LL Fact = 1.6000, ST Fact = 1.000
Noted that EFP Method being used
Back-solving internal friction angle from density and EFP, angle = 24.870 deg
Actual Heel Width (past back of stem) = 4.2500 ft
Soil Height for Stability (wall+footing+cslope) = 11.500 ft
Calculating Overturning Values
Arm = 3.8333 ft, Moment = 12,927 ft-#
Active Pressure @ Toe: (0.000 + 18.000)^2 * 51.000 / 2.0= 57.375 lbs
Arm = (0.000 + 18.000) / 3 /12 = 0.500 ft, Moment = 28.688 ft-#
Toe Active Pressure Used To Resist Sliding, so ADD Soil over toe = 57.375 lbs to Total Overturning Loads
Calculating Resisting Moments
Soil Wt Over Heel = 4.2500 * 10.0000 * 125.000 = 5,312.50 lbs
Arm = 7.2500 - 4.2500 / 2.0 = 5.1250 ft, Moment = 5,312.50 * 5.1250 = 27,227 ft-#
Top Stem Weight = 937.500 lbs, Arm = (2.0000 + 1.000 / 2.0) = 2.5000 ft
2nd Top Stem Weight = 562.500 lbs, Arm = (2.0000 + 1.000 / 2.0) = 2.5000 ft
Stem Avg. Arm = 30.000 ft, Total Moment = 45,000 ft-#
Avg. Arm = 0.000 ft, Moment = 0.000 ft-#
Footing Weight = 7.2500 * 18.000 * 150.000 = 1,631.25 lbs, Arm = 7.2500 / 2.0 = 3.6250 ft, Moment = 5,913.28 ft-#
Key Weight = 1.5000 * 1.000 * 150.000 = 1,631.25 lbs, Arm = 2.0000 + 1.000 / 2.0 = 2.5000 ft, Moment = 562.500 ft-#
Total Resis. Wt = 8,668.75 lbs, Moment = 37,452 ft-#
Calculated Stem Forces for Preliminary Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 1,593.75 lbs, Moment = 3,320.31 ft-#
2nd Top Stem Section: Shear = 4,080.00 lbs, Moment = 13,600 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 1,593.75 / 9.5000 / 12.0 = 13.980 psi
Concrete Unit Shear Stress = 4,080.00 / 9.5000 / 12.0 = 35.789 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 153,927 in-#
2nd Top Concrete Stem Capacity = 288,684 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
Calculate Bar Lap Lengths
Top Stem, Embed into Concrete ABOVE = 35.602 in
Top Stem, Embed into Concrete BELOW = 35.602 in
2nd Top Stem, Hooked Embed into Concrete Footing BELOW = 13.419 in
2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
Calculating Soil Pressure
Toe Bar Depth = 18.000 - 3.0000 - 0.5 = 14.500 in, Heel Bar Depth = 18.000 - 2.0000 - 0.5 = 15.500 in
Service Load Soil Pressures.....
P = 9,412.18 lbs, Ecc = 5.324 in, Toe Pressure = 147.907 psf, Heel Pressure = 68.465 psf
Calculating Factored Load Shear in Footing=
P = 10,403 lbs, Ecc = 5.324 in, Toe Pressure = 147.907 psf, Heel Pressure = 68.465 psf
Shear @ Toe = (7.4349 - 1.2000 * (18.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 9.5000) / (12.0 * 14.500) = 7.4349 psi
Shear @ Heele = (7.4349 - 7,522.50 - 0.000 - 0.000 - 0.000) / (12.0 * 15.500) = 40.444 psi
Shear Distances from Edge; Toe = 24.000 in, Heel = 51.000 in
Toe Upward Moment = 3,729.50 ft-#
Toe Downward Moment = 1.2000 * (18.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 24.000^2 / 2.0 = 540.000 ft-#
Moment @ Toe, Upward = 44,754 ft-#, Downward = 1.2000 * (18.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 24.000^2 / 2.0 = 3,189.50
Design Toe Moment <= 6.5 * d^2 * SQRT(f'c) --->> No Reinforcing Used
Flag set to ignore updard pressure under heel-->> Heel Upward Moment = 0
Heel Downward Moment = 1.2000 * (18.000 * 1.0417 + 120.000 * 0.868 + 0.000 + 0.000) * 51.000^2 / 2.0 = 15,985 ft-#
Add moment due to vertical soil component = 1.6000 * 0.000 * 51.000 = 0.000 ft-#
Preliminary Design Moment = 191,823.750 ft-#
Note! Base Stem Moment Governs! Heel Design Moment = 163,200 ft-#
Soil Height for Passive Pressure = 18.000 + 18.000 + 0.000 = 36.000 in
Sliding Resistance due to Friction = 8,668.75 * 0.550 = 4,767.81 lbs
Friction Resistance adjusted for Specified '%' = 1.000 * 4,767.81 = 4,767.81 lbs
Sliding Passive Pressure = (36.000 - 0.000) * 3.6944 * (36.000 - 0.000)/2.0)
+ (0.000 * 3.6944 * (36.000 - 0.000)) = 2,394.00 lbs
Passive Resistance adjusted for Specified '%' = 1.000 * 4,767.81 = 2,394.00 lbs
Sliding Factor of Safety = (2,394.00 + 4,767.81) / 3,315.00 = 2.1604 lbs
Calculating Footing Rebar Requirements

RHo:Balanced = 0.850 * 3,000.00 / 60,000 * 0.850 * (87000.0 / (87000.0 + 60,000)) = 0.021
Ru : Heel = ABS(163,200 / 12.0 / 15.500^2 / 0.9) = 62.897 psi
Required Steel % = 0.001%
Required Steel Area = 0.028 in2
Key : Required Steel % = 0.000%
Required Steel Area = 0.016 in2
Calculated Stem Forces for Fincal Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 1,593.75 lbs, Moment = 3,320.31 ft-#
2nd Top Stem Section: Shear = 4,080.00 lbs, Moment = 13,600 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 1,593.75 / 9.5000 / 12.0 = 13.980 psi
Concrete Unit Shear Stress = 4,080.00 / 9.5000 / 12.0 = 35.789 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 153,927 in-#
2nd Top Concrete Stem Capacity = 288,684 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
Calculate Bar Lap Lengths
Top Stem, Embed into Concrete ABOVE = 35.602 in
Top Stem, Embed into Concrete BELOW = 35.602 in
2nd Top Stem, Hooked Embed into Concrete Footing BELOW = 13.419 in
2nd Top Stem, Embed into Concrete ABOVE = 62.303 in

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'B' H= 10' Equipment Load
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'B' Height (H) = 10'-0" Equipment Load with EFP =

Page: _____
Date: MAY 25,2005

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	10.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	46.0 psf/ft
Toe Active Pressure	=	46.0 psf/ft
Passive Pressure	=	532.0 psf/ft
Soil Density	=	125.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	2.00 ft
Heel Width	=	5.25
Total Footing Width	=	7.25
Footing Thickness	=	18.00 in
Key Width	=	12.00 in
Key Depth	=	18.00 in
Key Distance from Toe	=	2.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0020
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel = 0.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	2,500.0 lbs
Footing Width	=	10.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	5.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

*Design Summary

Wall Stability Ratios

Overturning	=	2.48	OK
Sliding	=	1.93	OK
Total Bearing Load	=	9,294 lbs	
...resultant ecc.	=	12.18 in	
Soil Pressure @ Toe	=	2,359 psf	OK
Soil Pressure @ Heel	=	205 psf	OK
Allowable	=	4,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	2,894 psf	
ACI Factored @ Heel	=	251 psf	
Footing Shear @ Toe	=	11.3 psi	OK
Footing Shear @ Heel	=	17.0 psi	OK
Allowable	=	93.1 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	3,882.9 lbs	
less 100% Passive Force	= -	2,394.0 lbs	
less 100% Friction Force	= -	5,111.6 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Top Stem	2nd
Design Height Above Ftg	ft =	Stem OK 3.75	Stem OK 0.00
Wall Material Above "Ht"	=	Concrete	Concrete
Thickness	=	12.00	12.00
Rebar Size	=	# 5	# 7
Rebar Spacing	=	12.00	12.00
Rebar Placed at	=	Edge	Edge
Design Data			
fb/FB + fa/Fa	=	**0.369**	**0.742**
Total Force @ Section	lbs =	2,182.3	4,955.7
Moment....Actual	ft-# =	4,728.7	17,859.7
Moment.....Allowable	ft-# =	12,827.3	24,057.0
Shear.....Actual	psi =	19.1	43.5
Shear.....Allowable	psi =	82.2	82.2
Wall Weight	psf =	150.0	150.0
Rebar Depth 'd'	in =	9.50	9.50
LAP SPLICE IF ABOVE	in =	21.36	37.38
LAP SPLICE IF BELOW	in =	21.36	
HOOK EMBED INTO FTG	in =		13.42
Masonry Data			
f'm	psi =		
Fs	psi =		
Solid Grouting	=		
Special Inspection	=		
Modular Ratio 'n'	=		
Short Term Factor	=		
Equiv. Solid Thick.	=		
Masonry Block Type = Medium Weight			
Concrete Data			
f'c	psi =	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'B' H= 10' Equipment Load
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'B' Height (H) = 10'-0" Equipment Load with EFP =

Page: _____
Date: MAY 25,2005

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel
Factored Pressure	=	2,894	251 psf
Mu' : Upward	=	5,302	6,935 ft-#
Mu' : Downward	=	540	15,985 ft-#
Mu: Design	=	4,762	9,051 ft-#
Actual 1-Way Shear	=	11.28	17.00 psi
Allow 1-Way Shear	=	93.11	93.11 psi
Toe Reinforcing	=	# 7 @ 12.00 in	
Heel Reinforcing	=	# 7 @ 19.50 in	
Key Reinforcing	=	# 5 @ 18.00 in	

Other Acceptable Sizes & Spacings

Toe: Not req'd, Mu < S * Fr
Heel: #4@ 6.50 in, #5@ 10.25 in, #6@ 14.25 in, #7@ 19.50 in, #8@ 25.50 in, #9@ 32
Key: #4@ 11.25 in, #5@ 17.25 in, #6@ 24.50 in, #7@ 33.50 in,

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	3,041.8	3.83	11,660.0
Toe Active Pressure	=	-51.8	0.50	-25.9
Surcharge Over Toe	=			
Adjacent Footing Load	=	892.9	5.34	4,765.8
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	3,882.9	**O.T.M.** =	16,400.0

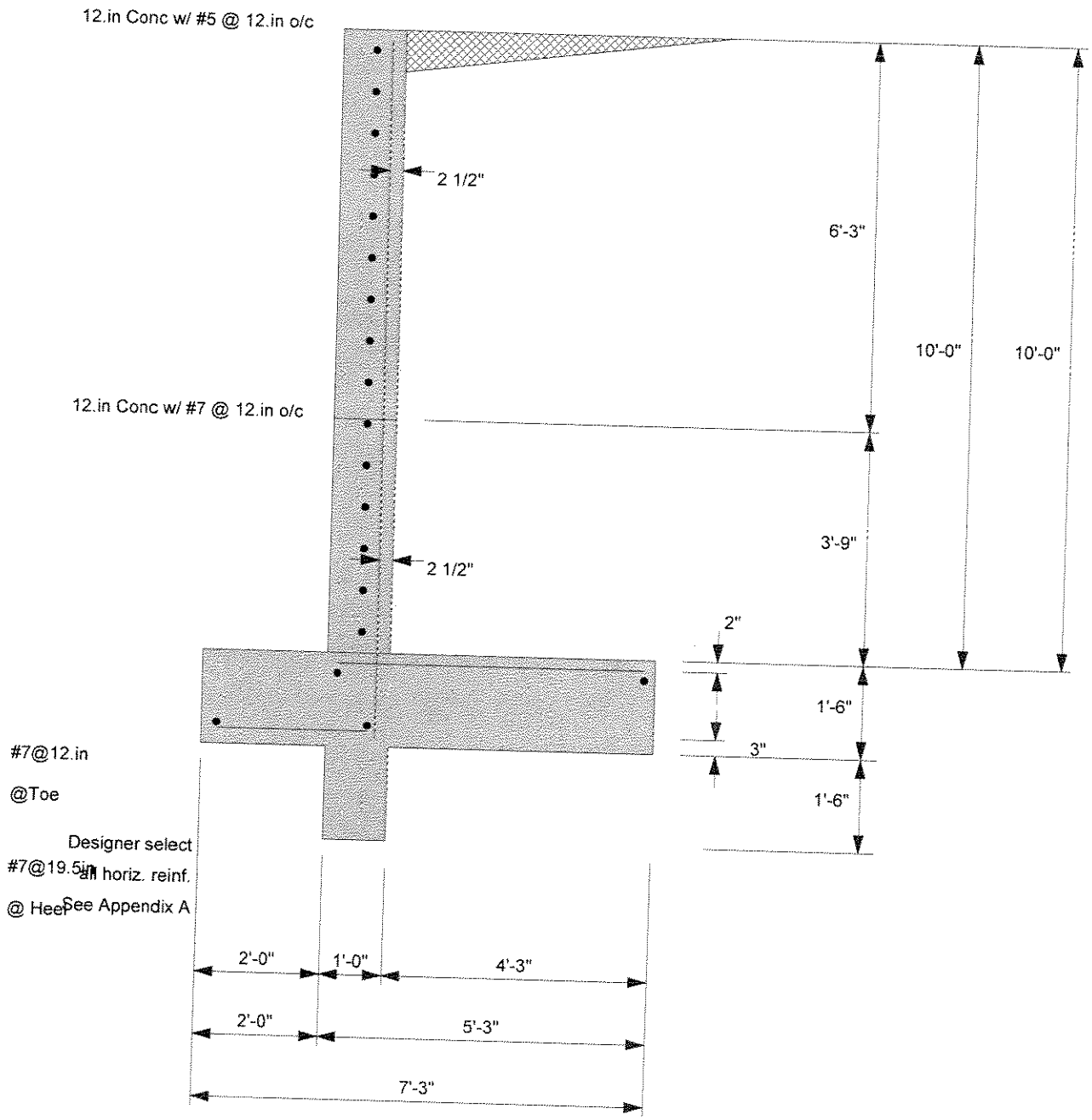
Resisting/Overturning Ratio = **2.48**

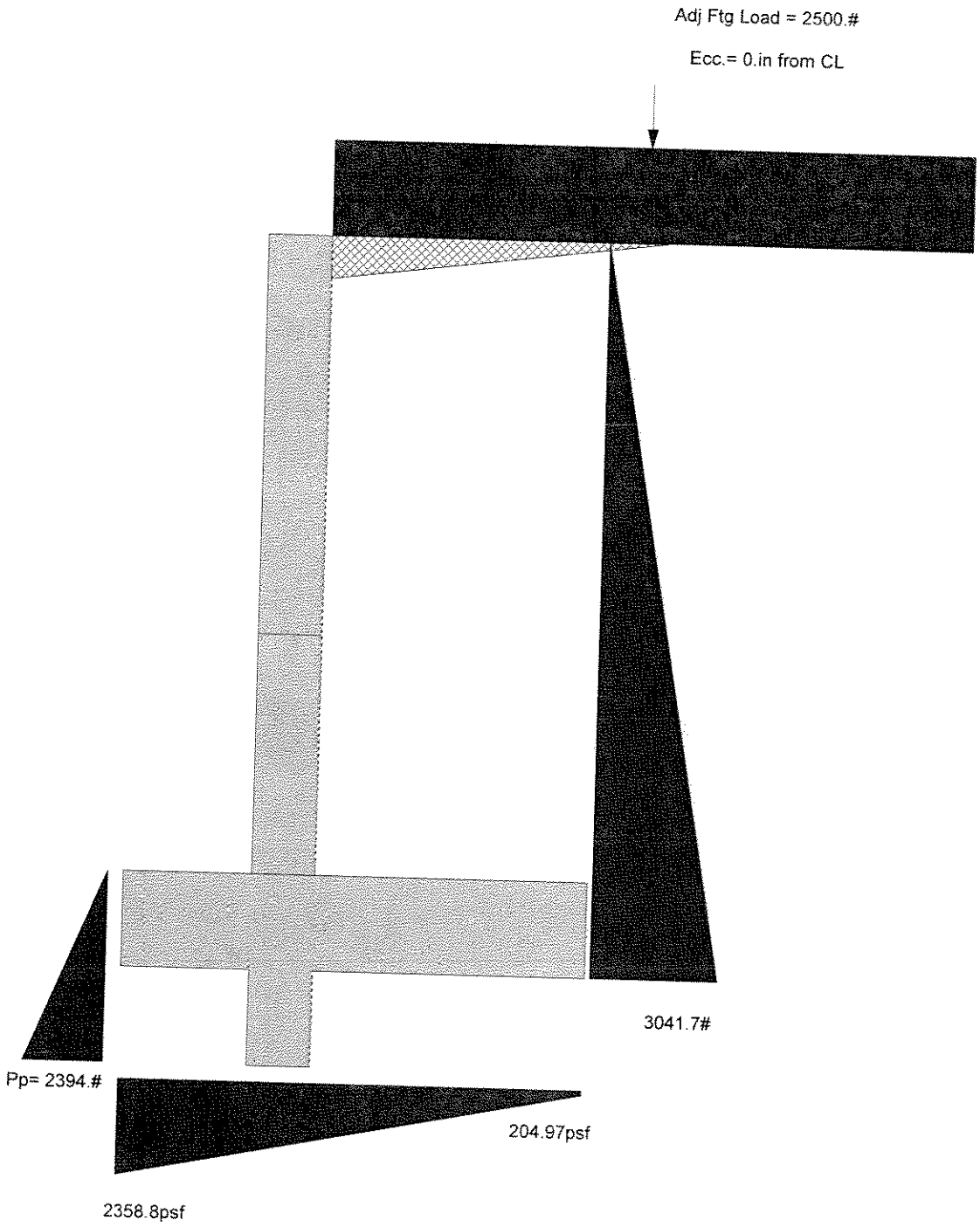
Vertical Loads used for Soil Pressure = 9,293.8 lbs

Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	5,312.5	5.13	27,226.6
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=	625.0	5.13	3,203.1
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=			
Surcharge Over Toe	=			
Stem Weight(s)	=	1,500.0	2.50	3,750.0
Earth @ Stem Transitions	=			
Footing Weight	=	1,631.3	3.63	5,913.3
Key Weight	=	225.0	2.50	562.5
Vert. Component	=			
Total =		9,293.8 lbs	**R.M.=**	40,655.5

DESIGNER NOTES:


12.in Conc w/ #5 @ 12.in o/c
2 1/2"
6'-3"
10'-0"
10'-0"
12.in Conc w/ #7 @ 12.in o/c
3'-9"
2 1/2"
2"
1'-6"
3"
1'-6"
#7@12.in
@Toe
Designer select
#7@19.5in
all horiz. reinf.
@ Hee
See Appendix A
2'-0"
1'-0"
4'-3"
2'-0"
5'-3"
7'-3"


Adj Ftg Load = 2500.#
Ecc.= 0.in from CL
3041.7#
Pp= 2394.#
204.97psf
2358.8psf

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'B' H= 10' Equipment Load
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'B' Height (H) = 10'-0" Equipment Load with EFP =

Page: _____
Date: MAY 25,2005

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005, 1-November-2005, (c) 1989
Registration # : RP-1141385

Cantilevered Retaining Wall Design
Calculation Trace Listing

1 **Beginning of Trace**
2 Setting ACI Load Factors: DL Fact = 1.2000, LL Fact = 1.6000, ST Fact = 1.000
3 Noted that EFP Method being used
4 Back-solving internal friction angle from density and EFP, angle = 27.520 deg
5 Actual Heel Width (past back of stem) = 4.2500 ft
6 Soil Height for Stability (wall+footing+cslope) = 11.500 ft
7 **Calculating Overturning Values**
8 Arm = 3.8333 ft, Moment = 11,660 ft-#
9 Active Pressure @ Toe: (0.000 + 18.000)^2 * 46.000 / 2.0= 51.750 lbs
10 Arm = (0.000 + 18.000) / 3 /12 = 0.500 ft, Moment = 25.875 ft-#
11 Adjacent Footing Lateral Force = 892.880 lbs
12 Height above Footing Base = 64.051 in, Moment = 892.880 * 5.3376 = 4,765.82 ft-#
13 Toe Active Pressure Used To Resist Sliding, so ADD Soil over toe = 51.750 lbs to Total Overturning Loads
14 **Calculating Resisting Moments**
15 Soil Wt Over Heel = 4.2500 * 10.0000 * 125.000 = 5,312.50 lbs
16 Arm = 7.2500 - 4.2500 / 2.0 = 5.1250 ft, Moment = 5,312.50 * 5.1250 = 27,227 ft-#
17 Adjacent Footing, Force = 625.000 lbs, Arm = 5.1250 ft, Moment = 3,203.13 ft-#
18 Top Stem Weight = 937.500 lbs, Arm = (2.0000 + 1.000 / 2.0) = 2.5000 ft
19 2nd Top Stem Weight = 562.500 lbs, Arm = (2.0000 + 1.000 / 2.0) = 2.5000 ft
20 Stem Avg. Arm = 30.000 ft, Total Moment = 45,000 ft-#
21 Avg. Arm = 0.000 ft, Moment = 0.000 ft-#
22 Footing Weight = 7.2500 * 18.000 * 150.000 = 1,631.25 lbs, Arm = 7.2500 / 2.0 = 3.6250 ft, Moment = 5,913.28 ft-#
23 Key Weight = 1.5000 * 1.000 * 150.000 = 1,631.25 lbs, Arm = 2.0000 + 1.000 / 2.0 = 2.5000 ft, Moment = 562.500 ft-#
24 Total Resis. Wt = 9,293.75 lbs, Moment = 40,655 ft-#
25 **Calculated Stem Forces for Preliminary Checks**
26 **Cantilevered Stem Calculations**
27 Top Stem Section: Shear = 2,182.30 lbs, Moment = 4,728.68 ft-#
28 2nd Top Stem Section: Shear = 4,955.71 lbs, Moment = 17,860 ft-#
29 Calcualting Actual Shear Stress
30 Concrete Unit Shear Stress = 2,182.30 / 9.5000 / 12.0 = 19.143 psi
31 Concrete Unit Shear Stress = 4,955.71 / 9.5000 / 12.0 = 43.471 psi
32 Determine Allowable Moments
33 Top Concrete Stem Capacity = 153,927 in-#
34 2nd Top Concrete Stem Capacity = 288,684 in-#
35 Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
36 2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
37 **Calculate Bar Lap Lengths**
38 Top Stem, Embed into Concrete ABOVE = 35.602 in
39 Top Stem, Embed into Concrete BELOW = 35.602 in
40 2nd Top Stem, Hooked Embed into Concrete Footing BELOW = 13.419 in
41 2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
42 **Calculating Soil Pressure**
43 Toe Bar Depth = 18.000 - 3.0000 - 0.5 = 14.500 in, Heel Bar Depth = 18.000 - 2.0000 - 0.5 = 15.500 in
44 Service Load Soil Pressures.....
45 P = 9,293.75 lbs, Ecc = 12.182 in, Toe Pressure = 196.569 psf, Heel Pressure = 17.081 psf
46 **Calculating Factored Load Shear in Footing=**
47 P = 11,403 lbs, Ecc = 12.182 in, Toe Pressure = 196.569 psf, Heel Pressure = 17.081 psf
48 Shear @ Toe = (11.282 - 1.2000 * (18.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 9.5000) / (12.0 * 14.500) = 11.282 psi
49 Shear @ Heele = (11.282 - 7,522.50 - 0.000 - 0.000 - 0.000) / (12.0 * 15.500) = 17.000 psi
50 Shear Distances from Edge; Toe = 24.000 in, Heel = 51.000 in
51 Toe Upward Moment = 5,302.10 ft-#
52 Toe Downward Moment = 1.2000 * (18.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 24.000^2 / 2.0 = 540.000 ft-#
53 Moment @ Toe, Upward = 63,625 ft-#, Downward = 1.2000 * (18.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 24.000^2 / 2.0 = 4,762.10
54 Design Toe Moment <= 6.5 * d^2 * SQRT(f'c) --->> No Reinforcing Used
55 Heel Upward Moment = 6,934.53 ft-#
56 Heel Downward Moment = 1.2000 * (18.000 * 1.0417 + 120.000 * 0.868 + 0.000 + 0.000) * 51.000^2 / 2.0 = 15,985 ft-#
57 Add moment due to vertical soil component = 1.6000 * 0.000 * 51.000 = 0.000 ft-#
58 Preliminary Design Moment = 108,609.355 ft-#
59 Soil Height for Passive Pressure = 18.000 + 18.000 + 0.000 = 36.000 in
60 Sliding Resistance due to Friction = 9,293.75 * 0.550 = 5,111.56 lbs
61 Friction Resistance adjusted for Specified '%' = 1.000 * 5,111.56 = 5,111.56 lbs
62 Sliding Passive Pressure = (36.000 - 0.000) * 3.6944 * (36.000 - 0.000)/2.0)
63 + (0.000 * 3.6944 * (36.000 - 0.000)) = 2,394.00 lbs
64 Passive Resistance adjusted for Specified '%' = 1.000 * 5,111.56 = 2,394.00 lbs

Cantilevered Retaining Wall Design
Calculation Trace Listing

65 Sliding Factor of Safety = (2,394.00 + 5,111.56) / 3,882.88 = 1.9330 lbs
66 **Calculating Footing Rebar Requirements**
67 RHo:Balanced = 0.850 * 3,000.00 / 60,000 * 0.850 * (87000.0 / (87000.0 + 60,000)) = 0.021
68 Ru : Heel = ABS(108,609.355 / 12.0 / 15.500^2 / 0.9) = 41.858 psi
69 Required Steel % = 0.001%
70 Required Steel Area = 0.031 in2
71 Key : Required Steel % = 0.000%
72 Required Steel Area = 0.018 in2
73 **Calculated Stem Forces for Fincal Checks**
74 **Cantilevered Stem Calculations**
75 Top Stem Section: Shear = 2,182.30 lbs, Moment = 4,728.68 ft-#
76 2nd Top Stem Section: Shear = 4,955.71 lbs, Moment = 17,860 ft-#
77 Calcualting Actual Shear Stress
78 Concrete Unit Shear Stress = 2,182.30 / 9.5000 / 12.0 = 19.143 psi
79 Concrete Unit Shear Stress = 4,955.71 / 9.5000 / 12.0 = 43.471 psi
80 Determine Allowable Moments
81 Top Concrete Stem Capacity = 153,927 in-#
82 2nd Top Concrete Stem Capacity = 288,684 in-#
83 Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
84 2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
85 **Calculate Bar Lap Lengths**
86 Top Stem, Embed into Concrete ABOVE = 35.602 in
87 Top Stem, Embed into Concrete BELOW = 35.602 in
88 2nd Top Stem, Hooked Embed into Concrete Footing BELOW = 13.419 in
89 2nd Top Stem, Embed into Concrete ABOVE = 62.303 in

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall "B" H = 10 Seismic
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'B' Height (H) =10'-0" Seismic ~~EFP = 82 pcf~~

Page: _____
Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	10.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	5,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	46.0 psf/ft
Toe Active Pressure	=	46.0 psf/ft
Passive Pressure	=	532.0 psf/ft
Soil Density	=	125.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	2.00 ft
Heel Width	=	5.25
Total Footing Width	=	7.25
Footing Thickness	=	18.00 in
Key Width	=	12.00 in
Key Depth	=	18.00 in
Key Distance from Toe	=	2.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0020
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Design Kh	=	0.100 g
Kae for seismic earth pressure	=	0.391
Ka for static earth pressure	=	0.323
Difference: Kae - Ka	=	0.068

Added seismic base force 401.3 lbs

Using Mononobe-Okabe / Seed-Whitman procedure

*Design Summary

Wall Stability Ratios

Overturning	=	2.60 OK
Sliding	=	2.11 OK
Total Bearing Load	=	8,669 lbs
...resultant ecc.	=	11.59 in
Soil Pressure @ Toe	=	2,152 psf OK
Soil Pressure @ Heel	=	240 psf OK
Allowable	=	5,000 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	2,582 psf
ACI Factored @ Heel	=	288 psf
Footing Shear @ Toe	=	9.9 psi OK
Footing Shear @ Heel	=	40.4 psi OK
Allowable	=	93.1 psi

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	3,391.3 lbs
less 100% Passive Force	=	- 2,394.0 lbs
less 100% Friction Force	=	- 4,767.8 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Top Stem	2nd
Design Height Above Ftg	ft =	Stem OK 3.75	Stem OK 0.00
Wall Material Above "Ht"	=	Concrete	Concrete
Thickness	=	12.00	12.00
Rebar Size	=	# 5	# 7
Rebar Spacing	=	12.00	12.00
Rebar Placed at	=	Edge	Edge
Design Data			
fb/FB + fa/Fa	=	**0.282**	**0.616**
Total Force @ Section	lbs =	1,604.4	4,107.4
Moment....Actual	ft-# =	3,620.8	14,830.8
Moment.....Allowable	ft-# =	12,827.3	24,057.0
Shear.....Actual	psi =	12.6	32.3
Shear.....Allowable	psi =	82.2	82.2
Wall Weight	psf =	150.0	150.0
Rebar Depth 'd'	in =	9.50	9.50
LAP SPLICE IF ABOVE	in =	21.36	37.38
LAP SPLICE IF BELOW	in =	21.36	
HOOK EMBED INTO FTG	in =		13.42

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Special Inspection	=	
Modular Ratio 'n'	=	
Short Term Factor	=	
Equiv. Solid Thick.	=	

Masonry Block Type = Medium Weight

Concrete Data

f'c	psi =	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall "B" H = 10 Seismic
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'B' Height (H) =10'-0" Seismic ~~EFP = 62 pcf~~

Page: _____
Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel
Factored Pressure	=	2,582	288 psf
Mu' : Upward	=	4,742	0 ft-#
Mu' : Downward	=	540	0 ft-#
Mu: Design	=	4,202	14,831 ft-#
Actual 1-Way Shear	=	9.95	40.44 psi
Allow 1-Way Shear	=	93.11	93.11 psi
Toe Reinforcing	=	# 7 @ 18.00 in	
Heel Reinforcing	=	# 7 @ 19.50 in	
Key Reinforcing	=	# 5 @ 18.00 in	

Other Acceptable Sizes & Spacings

Toe: Not req'd, Mu < S * Fr
Heel: #4@ 6.50 in, #5@ 10.25 in, #6@ 14.25 in, #7@ 19.50 in, #8@ 25.50 in, #9@ 32
Key: #4@ 11.25 in, #5@ 17.25 in, #6@ 24.50 in, #7@ 33.50 in,

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	3,041.8	3.83	11,660.0
Toe Active Pressure	=	-51.8	0.50	-25.9
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Seismic Earth Load	=	401.3	6.90	2,768.8
Total	=	3,391.3	**O.T.M.** =	14,403.0

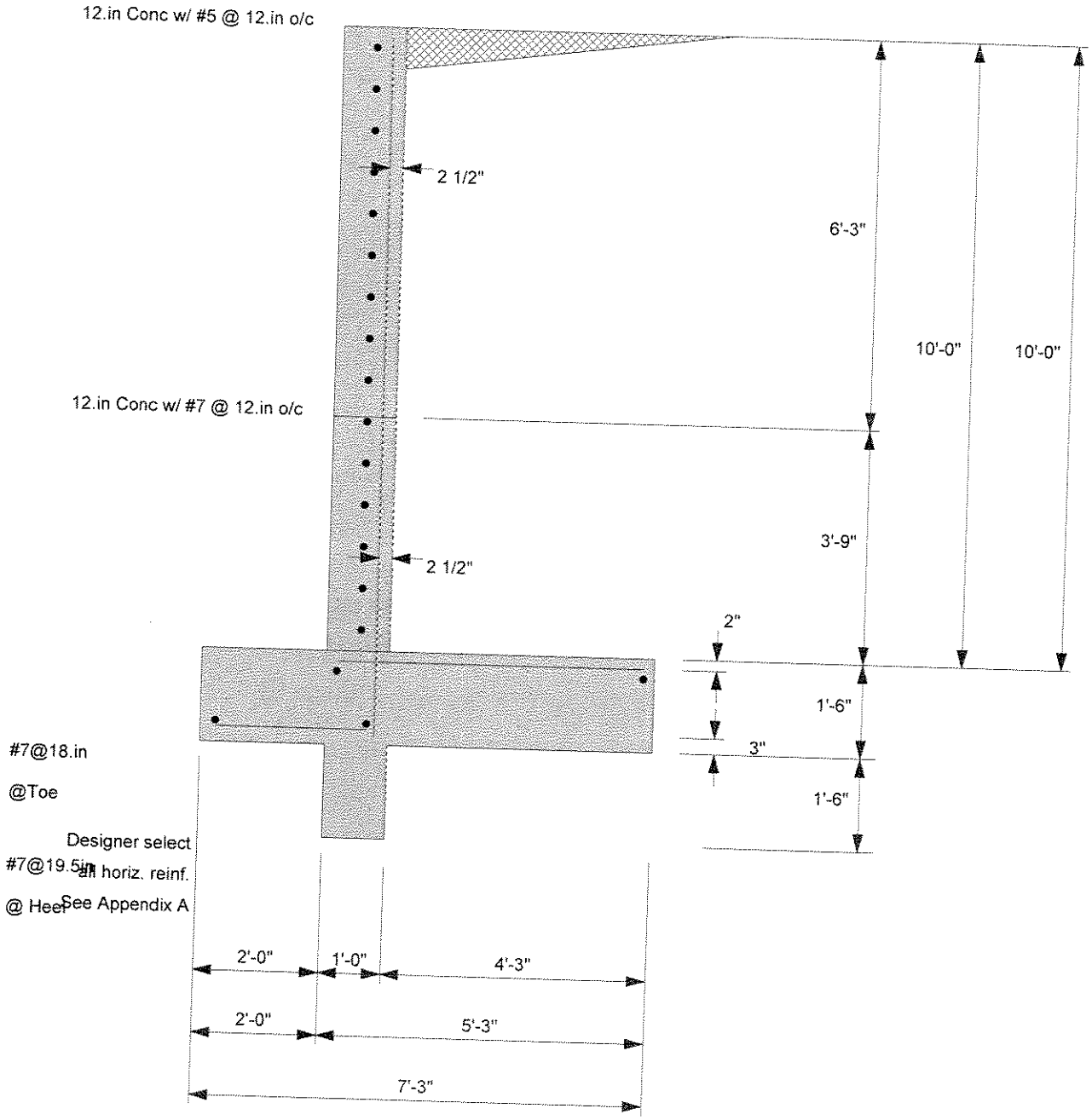
Resisting/Overturning Ratio = **2.60**

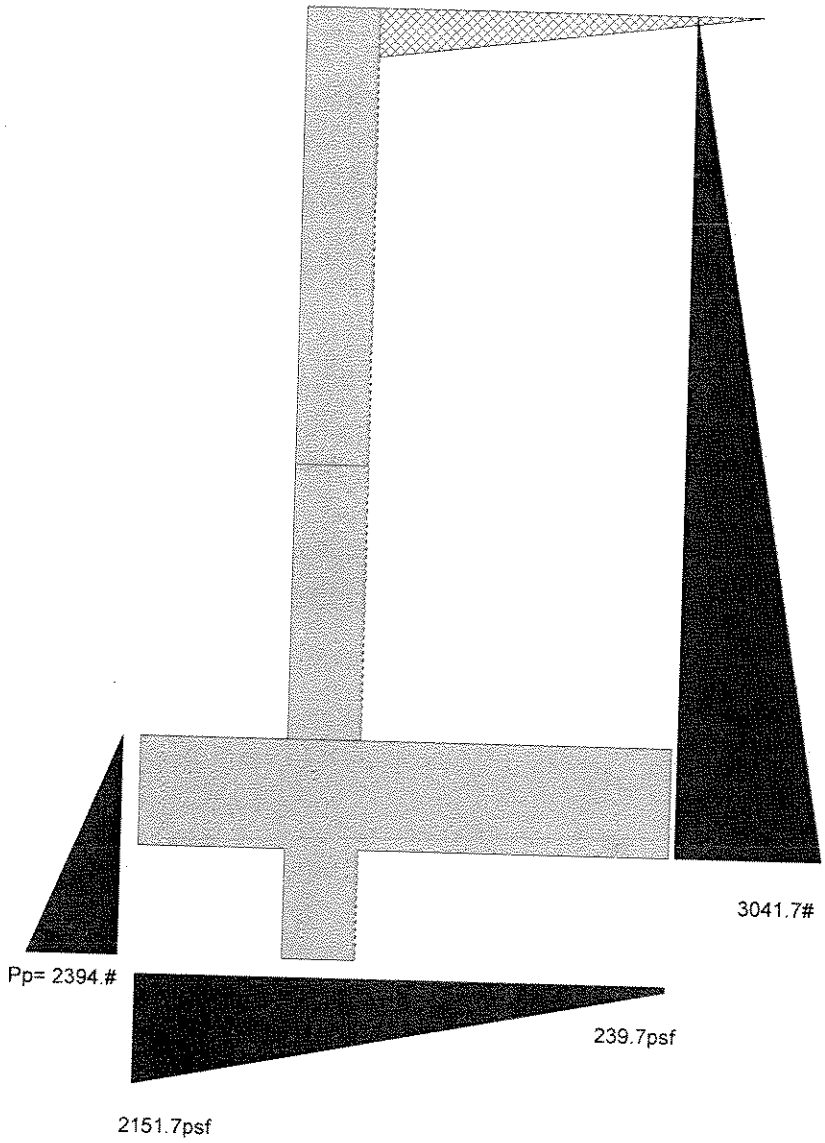
Vertical Loads used for Soil Pressure = 8,668.8 lbs

Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	5,312.5	5.13	27,226.6
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=			
Surcharge Over Toe	=			
Stem Weight(s)	=	1,500.0	2.50	3,750.0
Earth @ Stem Transitions	=			
Footing Weight	=	1,631.3	3.63	5,913.3
Key Weight	=	225.0	2.50	562.5
Vert. Component	=			
Total =		8,668.8 lbs	**R.M.=**	37,452.3

DESIGNER NOTES:


12.in Conc w/ #5 @ 12.in o/c
2 1/2"
6'-3"
10'-0"
10'-0"
12.in Conc w/ #7 @ 12.in o/c
3'-9"
2 1/2"
2"
1'-6"
3"
1'-6"
#7@18.in
@Toe
Designer select
#7@19.5in
all horiz. reinf.
@ Hee
See Appendix A
2'-0"
1'-0"
4'-3"
2'-0"
5'-3"
7'-3"


3041.7#
Pp= 2394.#
239.7psf
2151.7psf

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall "B" H = 10 Seismic
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'B' Height (H) =10'-0" Seismic E[redacted]pcf

Page: _____
Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005, 1-November-2005, (c) 1989
Registration # : RP-1141385

Cantilevered Retaining Wall Design
Calculation Trace Listing

1 **Beginning of Trace**
2 Setting ACI Load Factors: DL Fact = 1.2000, LL Fact = 1.6000, ST Fact = 1.000
3 Noted that EFP Method being used
4 Back-solving internal friction angle from density and EFP, angle = 27.520 deg
5 Actual Heel Width (past back of stem) = 4.2500 ft
6 Soil Height for Stability (wall+footing+cslope) = 11.500 ft
7 **Calculating Overturning Values**
8 Arm = 3.8333 ft, Moment = 11,660 ft-#
9 Seismic Lateral Force calcs....
10 Kae Force = 0.068 * 0.868 * 138.000^2 / 2.0 = 401.278 lbs
11 Ka Force = 138.000 * 0.319 * 138.000 * 0.5 = 3,041.75 lbs
12 Force Height = Retained Height * 0.6 = 138.000 * 0.600 = 82.800
13 Overturning Moment = 401.278 * 82.800 = 2,768.81 ft-#
14 Active Pressure @ Toe: (0.000 + 18.000)^2 * 46.000 / 2.0= 51.750 lbs
15 Arm = (0.000 + 18.000) / 3 /12 = 0.500 ft, Moment = 25.875 ft-#
16 Toe Active Pressure Used To Resist Sliding, so ADD Soil over toe = 51.750 lbs to Total Overturning Loads
17 **Calculating Resisting Moments**
18 Soil Wt Over Heel = 4.2500 * 10.0000 * 125.000 = 5,312.50 lbs
19 Arm = 7.2500 - 4.2500 / 2.0 = 5.1250 ft, Moment = 5,312.50 * 5.1250 = 27,227 ft-#
20 Top Stem Weight = 937.500 lbs, Arm = (2.0000 + 1.000 / 2.0) = 2.5000 ft
21 2nd Top Stem Weight = 562.500 lbs, Arm = (2.0000 + 1.000 / 2.0) = 2.5000 ft
22 Stem Avg. Arm = 30.000 ft, Total Moment = 45,000 ft-#
23 Avg. Arm = 0.000 ft, Moment = 0.000 ft-#
24 Footing Weight = 7.2500 * 18.000 * 150.000 = 1,631.25 lbs, Arm = 7.2500 / 2.0 = 3.6250 ft, Moment = 5,913.28 ft-#
25 Key Weight = 1.5000 * 1.000 * 150.000 = 1,631.25 lbs, Arm = 2.0000 + 1.000 / 2.0 = 2.5000 ft, Moment = 562.500 ft-#
26 Total Resis. Wt = 8,668.75 lbs, Moment = 37,452 ft-#
27 **Calculated Stem Forces for Preliminary Checks**
28 **Cantilevered Stem Calculations**
29 Top Stem Section: Shear = 1,604.44 lbs, Moment = 3,620.80 ft-#
30 2nd Top Stem Section: Shear = 4,107.36 lbs, Moment = 14,831 ft-#
31 Calcualting Actual Shear Stress
32 Concrete Unit Shear Stress = 1,437.50 / 9.5000 / 12.0 = 12.610 psi
33 Concrete Unit Shear Stress = 3,680.00 / 9.5000 / 12.0 = 32.281 psi
34 Determine Allowable Moments
35 Top Concrete Stem Capacity = 153,927 in-#
36 2nd Top Concrete Stem Capacity = 288,684 in-#
37 Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
38 2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
39 **Calculate Bar Lap Lengths**
40 Top Stem, Embed into Concrete ABOVE = 35.602 in
41 Top Stem, Embed into Concrete BELOW = 35.602 in
42 2nd Top Stem, Hooked Embed into Concrete Footing BELOW = 13.419 in
43 2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
44 **Calculating Soil Pressure**
45 Toe Bar Depth = 18.000 - 3.0000 - 0.5 = 14.500 in, Heel Bar Depth = 18.000 - 2.0000 - 0.5 = 15.500 in
46 Service Load Soil Pressures.....
47 P = 8,668.75 lbs, Ecc = 11.593 in, Toe Pressure = 179.307 psf, Heel Pressure = 19.975 psf
48 **Calculating Factored Load Shear in Footing=**
49 P = 10,403 lbs, Ecc = 11.593 in, Toe Pressure = 179.307 psf, Heel Pressure = 19.975 psf
50 Shear @ Toe = (9.9493 - 1.2000 * (18.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 9.5000) / (12.0 * 14.500) = 9.9493 psi
51 Shear @ Heele = (9.9493 - 7,522.50 - 0.000 - 0.000 - 0.000) / (12.0 * 15.500) = 40.444 psi
52 Shear Distances from Edge; Toe = 24.000 in, Heel = 51.000 in
53 Toe Upward Moment = 4,742.07 ft-#
54 Toe Downward Moment = 1.2000 * (18.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 24.000^2 / 2.0 = 540.000 ft-#
55 Moment @ Toe, Upward = 56,905 ft-#, Downward = 1.2000 * (18.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 24.000^2 / 2.0 = 4,202.07
56 Design Toe Moment <= 6.5 * d^2 * SQRT(f'c) --->> No Reinforcing Used
57 Flag set to ignore updard pressure under heel-->> Heel Upward Moment = 0
58 Heel Downward Moment = 1.2000 * (18.000 * 1.0417 + 120.000 * 0.868 + 0.000 + 0.000) * 51.000^2 / 2.0 = 15,985 ft-#
59 Add moment due to vertical soil component = 1.6000 * 0.000 * 51.000 = 0.000 ft-#
60 Preliminary Design Moment = 191,823.750 ft-#
61 Note! Base Stem Moment Governs! Heel Design Moment = 177,970 ft-#
62 Soil Height for Passive Pressure = 18.000 + 18.000 + 0.000 = 36.000 in
63 Sliding Resistance due to Friction = 8,668.75 * 0.550 = 4,767.81 lbs
64 Friction Resistance adjusted for Specified '%' = 1.000 * 4,767.81 = 4,767.81 lbs

65 Sliding Passive Pressure = (36.000 - 0.000) * 3.6944 * (36.000 - 0.000)/2.0)
66 + (0.000 * 3.6944 * (36.000 - 0.000)) = 2,394.00 lbs
67 Passive Resistance adjusted for Specified '%' = 1.000 * 4,767.81 = 2,394.00 lbs
68 Sliding Factor of Safety = (2,394.00 + 4,767.81) / 3,391.28 = 2.1118 lbs
69 **Calculating Footing Rebar Requirements**
70 RHo:Balanced = 0.850 * 3,000.00 / 60,000 * 0.850 * (87000.0 / (87000.0 + 60,000)) = 0.021
71 Ru : Heel = ABS(177,970 / 12.0 / 15.500^2 / 0.9) = 68.590 psi
72 Required Steel % = 0.001%
73 Required Steel Area = 0.031 in2
74 Key : Required Steel % = 0.000%
75 Required Steel Area = 0.018 in2
76 **Calculated Stem Forces for Fincal Checks**
77 **Cantilevered Stem Calculations**
78 Top Stem Section: Shear = 1,604.44 lbs, Moment = 3,620.80 ft-#
79 2nd Top Stem Section: Shear = 4,107.36 lbs, Moment = 14,831 ft-#
80 Calcualting Actual Shear Stress
81 Concrete Unit Shear Stress = 1,437.50 / 9.5000 / 12.0 = 12.610 psi
82 Concrete Unit Shear Stress = 3,680.00 / 9.5000 / 12.0 = 32.281 psi
83 Determine Allowable Moments
84 Top Concrete Stem Capacity = 153,927 in-#
85 2nd Top Concrete Stem Capacity = 288,684 in-#
86 Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
87 2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
88 **Calculate Bar Lap Lengths**
89 Top Stem, Embed into Concrete ABOVE = 35.602 in
90 Top Stem, Embed into Concrete BELOW = 35.602 in
91 2nd Top Stem, Hooked Embed into Concrete Footing BELOW = 13.419 in
92 2nd Top Stem, Embed into Concrete ABOVE = 62.303 in

WALL MK. 'C'

Loading Case	Overturning Ratio	Sliding Ratio	Maximum Soil Bearing Pressure	Controlling Case for Strength Design	Remarks
Normal	2.7	2.0	2700		See Note 1
Compaction Equipment	2.3	1.8	3430	✓	
Seismic	2.3	1.9	3300		

Notes:

1.0 Vertical Component of Active Pressure was used in the calculation of Soil Pressure.

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'C' H=15' Normal
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'C" H = 15'-0" Normal Loads EFP = 51 pcf

Page: ____
Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	15.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	51.0 psf/ft
Toe Active Pressure	=	51.0 psf/ft
Passive Pressure	=	532.0 psf/ft
Soil Density	=	130.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	3.00 ft
Heel Width	=	7.25
Total Footing Width	=	10.25
Footing Thickness	=	24.00 in
Key Width	=	15.00 in
Key Depth	=	18.00 in
Key Distance from Toe	=	3.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0020
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel	=	0.0 psf

NOT Used To Resist Sliding & Overturning

Surcharge Over Toe	=	0.0 psf

NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

*Design Summary

Wall Stability Ratios

Overturning	=	2.69	OK
Sliding	=	1.97	OK
Total Bearing Load	=	19,757 lbs	
...resultant ecc.	=	8.16 in	
Soil Pressure @ Toe	=	2,695 psf	OK
Soil Pressure @ Heel	=	1,160 psf	OK
Allowable	=	4,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	2,957 psf	
ACI Factored @ Heel	=	1,273 psf	
Footing Shear @ Toe	=	12.5 psi	OK
Footing Shear @ Heel	=	62.8 psi	OK
Allowable	=	93.1 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	7,210.1 lbs
less 100% Passive Force	=	- 4,256.0 lbs
less 100% Friction Force	=	- 9,935.1 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Top Stem	2nd	3rd
Design Height Above Ftg	ft =	Stem OK 10.00	Stem OK 3.75	Stem OK 0.00
Wall Material Above "Ht"	=	Concrete	Concrete	Concrete
Thickness	=	15.00	15.00	15.00
Rebar Size	=	# 7	# 7	# 9
Rebar Spacing	=	18.00	9.00	9.00
Rebar Placed at	=	Edge	Edge	Edge
Design Data				
fb/FB + fa/Fa	=	**0.081**	**0.480**	**0.716**
Total Force @ Section	lbs =	1,020.0	5,163.8	9,169.8
Moment....Actual	ft-# =	1,700.0	19,364.1	45,898.3
Moment.....Allowable	ft-# =	20,892.0	40,368.0	64,133.3
Shear.....Actual	psi =	7.1	35.9	63.7
Shear.....Allowable	psi =	82.2	82.2	82.2
Wall Weight	psf =	187.5	187.5	187.5
Rebar Depth 'd'	in =	12.00	12.00	12.00
LAP SPLICE IF ABOVE	in =	37.38	37.38	48.06
LAP SPLICE IF BELOW	in =	37.38	37.38	
HOOK EMBED INTO FTG	in =			17.25
Masonry Data				
f'm	psi =			
Fs	psi =			
Solid Grouting	=			
Special Inspection	=			
Modular Ratio 'n'	=			
Short Term Factor	=			
Equiv. Solid Thick.	=			
Masonry Block Type = Medium Weight				
Concrete Data				
f'c	psi =	3,000.0	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'C' H=15' Normal
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'C" H = 15'-0" Normal Loads EFP = 51 pcf

Page: _____
Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel
Factored Pressure	=	2,957	1,273 psf
Mu' : Upward	=	12,566	0 ft-#
Mu' : Downward	=	1,971	0 ft-#
Mu: Design	=	10,595	45,898 ft-#
Actual 1-Way Shear	=	12.53	62.79 psi
Allow 1-Way Shear	=	93.11	93.11 psi
Toe Reinforcing	=	# 9 @ 18.00 in	
Heel Reinforcing	=	# 7 @ 11.25 in	
Key Reinforcing	=	# 5 @ 13.00 in	

Other Acceptable Sizes & Spacings

Toe: Not req'd, Mu < S * Fr
Heel: #4@ 3.75 in, #5@ 6.00 in, #6@ 8.25 in, #7@ 11.25 in, #8@ 14.75 in, #9@ 18.7
Key: #4@ 8.50 in, #5@ 13.00 in, #6@ 18.50 in, #7@ 25.25 in,

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	7,369.5	5.67	41,760.5
Toe Active Pressure	=	-159.4	0.83	-132.8
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	7,210.1	**O.T.M.** =	41,627.7

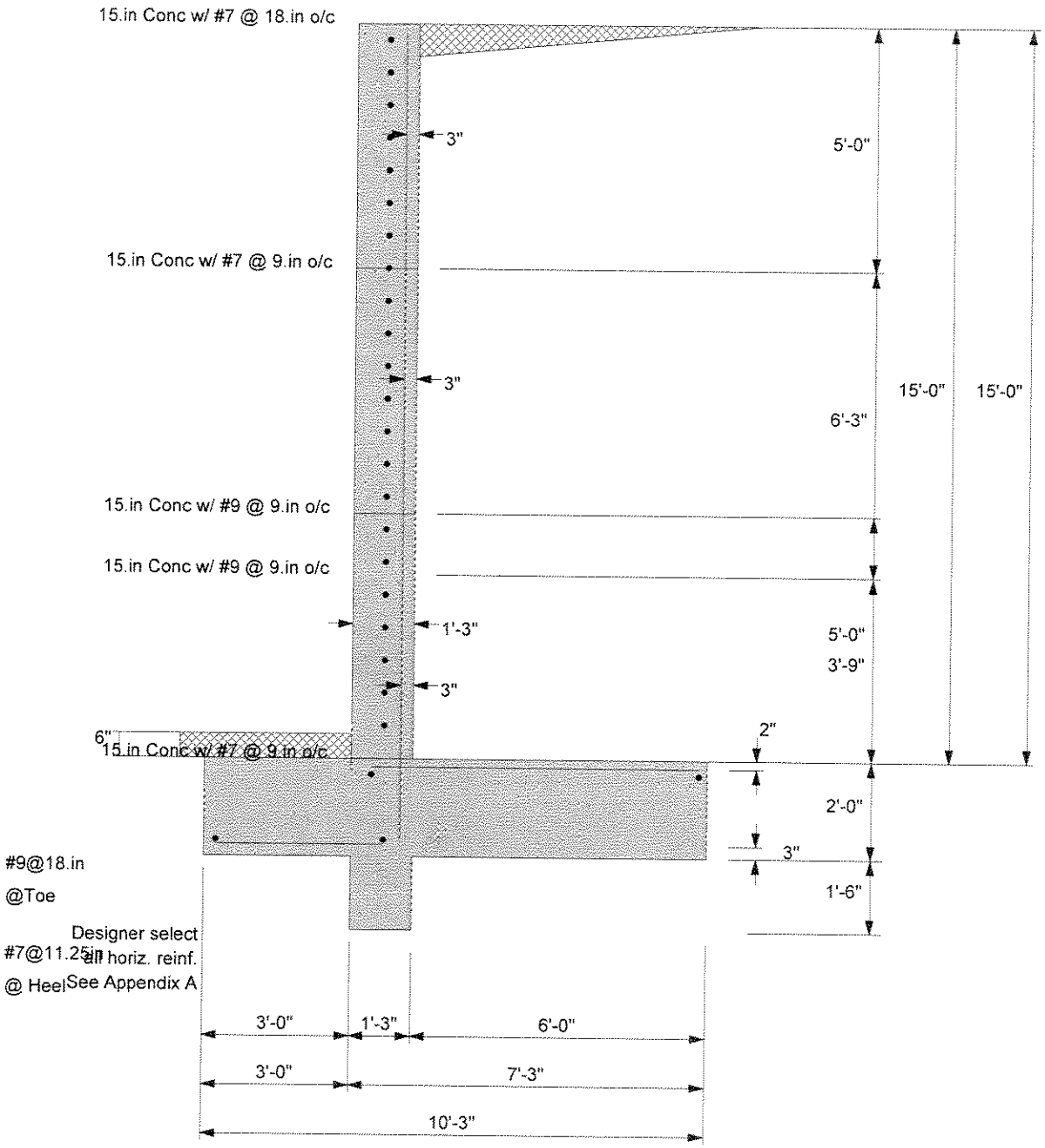
Resisting/Overturning Ratio = **2.69**

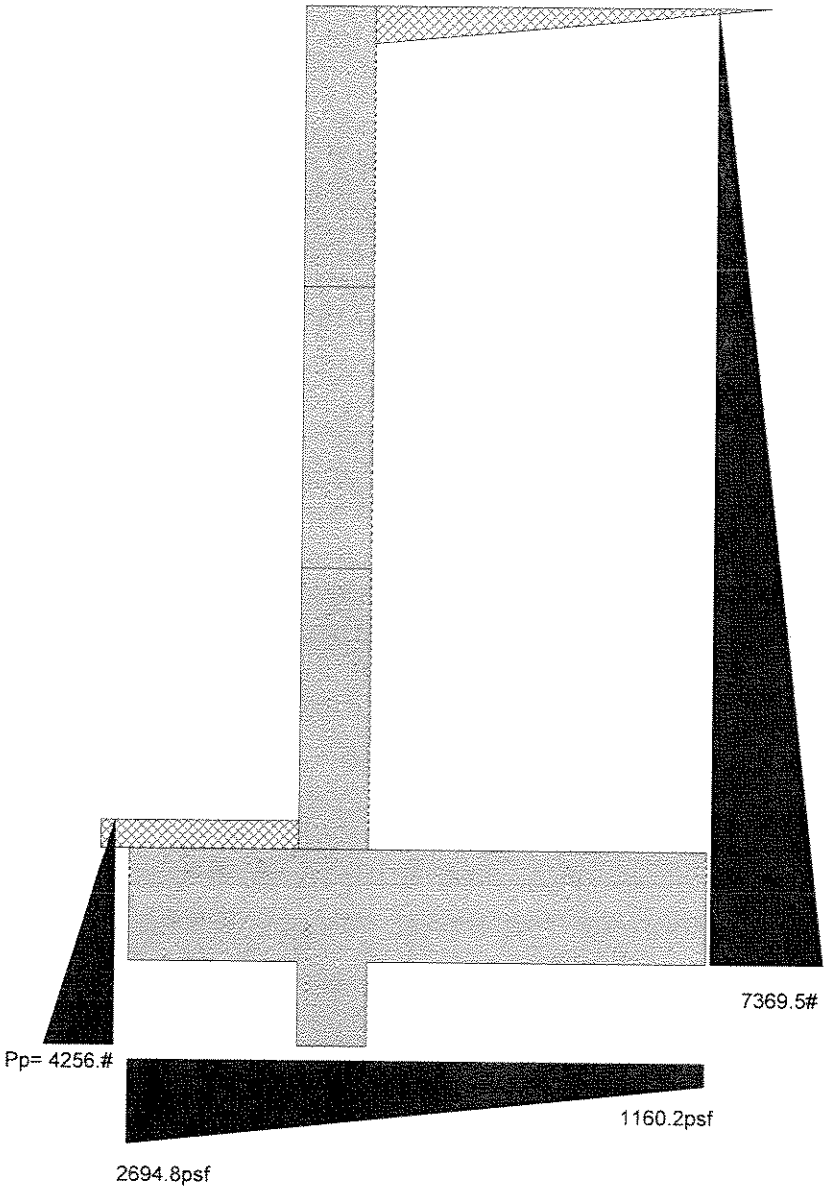
Vertical Loads used for Soil Pressure = 19,756.9 lbs

Vertical component of active pressure used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	11,700.0	7.25	84,825.0
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=	195.0	1.50	292.5
Surcharge Over Toe	=			
Stem Weight(s)	=	2,812.5	3.63	10,195.3
Earth @ Stem Transitions	=			
Footing Weight	=	3,075.0	5.13	15,759.4
Key Weight	=	281.3	3.63	1,019.5
Vert. Component	=			
Total =		18,063.8 lbs	**R.M.=**	112,091.7

DESIGNER NOTES:


15.in Conc w/ #7 @ 18.in o/c
3"
5'-0"
15.in Conc w/ #7 @ 9.in o/c
3"
15'-0"
15'-0"
6'-3"
15.in Conc w/ #9 @ 9.in o/c
15.in Conc w/ #9 @ 9.in o/c
1'-3"
5'-0"
3'-9"
3"
6"
15.in Conc w/ #7 @ 9.in o/c
2"
2'-0"
3"
1'-6"
#9@18.in
@Toe
Designer select
#7@11.25in
@ Heel
all horiz. reinf.
See Appendix A
3'-0"
1'-3"
6'-0"
3'-0"
7'-3"
10'-3"


7369.5#
Pp= 4256.#
1160.2psf
2694.8psf

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'C' H=15' Equipment
Job # : E-05129 Dsgnr: JJF
Description....
Wall "C" Height (H) = 15'-0" Equipment Load EFP = 46

Page: _____
Date: MAY 25,2005

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	15.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	5,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	46.0 psf/ft
Toe Active Pressure	=	46.0 psf/ft
Passive Pressure	=	532.0 psf/ft
Soil Density	=	125.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	3.00 ft
Heel Width	=	7.25
Total Footing Width	=	10.25
Footing Thickness	=	24.00 in
Key Width	=	15.00 in
Key Depth	=	18.00 in
Key Distance from Toe	=	3.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel = 0.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	2,500.0 lbs
Footing Width	=	10.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	6.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

*Design Summary

Wall Stability Ratios

Overturning	=	2.33 OK
Sliding	=	1.84 OK
Total Bearing Load	=	18,304 lbs
...resultant ecc.	=	18.87 in
Soil Pressure @ Toe	=	3,430 psf OK
Soil Pressure @ Heel	=	142 psf OK
Allowable	=	5,000 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	4,168 psf
ACI Factored @ Heel	=	172 psf
Footing Shear @ Toe	=	18.1 psi OK
Footing Shear @ Heel	=	60.7 psi OK
Allowable	=	93.1 psi

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	7,777.9 lbs
less 100% Passive Force	=	- 4,256.0 lbs
less 100% Friction Force	=	- 10,067.2 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Top Stem	2nd	3rd
Design Height Above Ftg	ft =	Stem OK 10.00	Stem OK 3.75	Stem OK 0.00
Wall Material Above "Ht"	=	Concrete	Concrete	Concrete
Thickness	=	15.00	15.00	15.00
Rebar Size	=	# 7	# 7	# 9
Rebar Spacing	=	18.00	9.00	9.00
Rebar Placed at	=	Edge	Edge	Edge
Design Data				
fb/FB + fa/Fa	=	**0.115**	**0.621**	**0.866**
Total Force @ Section	lbs =	1,445.5	6,209.4	10,180.6
Moment....Actual	ft-# =	2,394.5	25,070.6	55,542.0
Moment.....Allowable	ft-# =	20,892.0	40,368.0	64,133.3
Shear.....Actual	psi =	10.0	43.1	70.7
Shear.....Allowable	psi =	82.2	82.2	82.2
Wall Weight	psf =	187.5	187.5	187.5
Rebar Depth 'd'	in =	12.00	12.00	12.00
LAP SPLICE IF ABOVE	in =	37.38	37.38	48.06
LAP SPLICE IF BELOW	in =	37.38	37.38	
HOOK EMBED INTO FTG	in =			17.25

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Special Inspection	=	
Modular Ratio 'n'	=	
Short Term Factor	=	
Equiv. Solid Thick.	=	

Masonry Block Type = Medium Weight

Concrete Data

f'c	psi =	3,000.0	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'C' H=15' Equipment
Job # : E-05129 Dsgnr: JJF
Description....
Wall "C" Height (H) = 15'-0" Equipment Load EFP = 46

Page: _____
Date: MAY 25,2005

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel
Factored Pressure	=	4,168	172 psf
Mu' : Upward	=	17,001	0 ft-#
Mu' : Downward	=	1,958	46,980 ft-#
Mu: Design	=	15,044	46,980 ft-#
Actual 1-Way Shear	=	18.15	60.70 psi
Allow 1-Way Shear	=	93.11	93.11 psi

Toe Reinforcing = # 9 @ 27.25 in
Heel Reinforcing = # 7 @ 11.00 in
Key Reinforcing = # 5 @ 14.50 in

Other Acceptable Sizes & Spacings

Toe: #4@ 5.50 in, #5@ 8.50 in, #6@ 12.00 in, #7@ 16.50 in, #8@ 21.50 in, #9@ 27.
Heel: #4@ 3.75 in, #5@ 5.75 in, #6@ 8.00 in, #7@ 11.00 in, #8@ 14.50 in, #9@ 18.2
Key: #4@ 9.50 in, #5@ 14.50 in, #6@ 20.50 in, #7@ 28.00 in,

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	6,647.0	5.67	37,666.3
Toe Active Pressure	=	-143.8	0.83	-119.8
Surcharge Over Toe	=			
Adjacent Footing Load	=	1,274.7	8.87	11,306.8
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	7,777.9	**O.T.M.** =	48,853.4

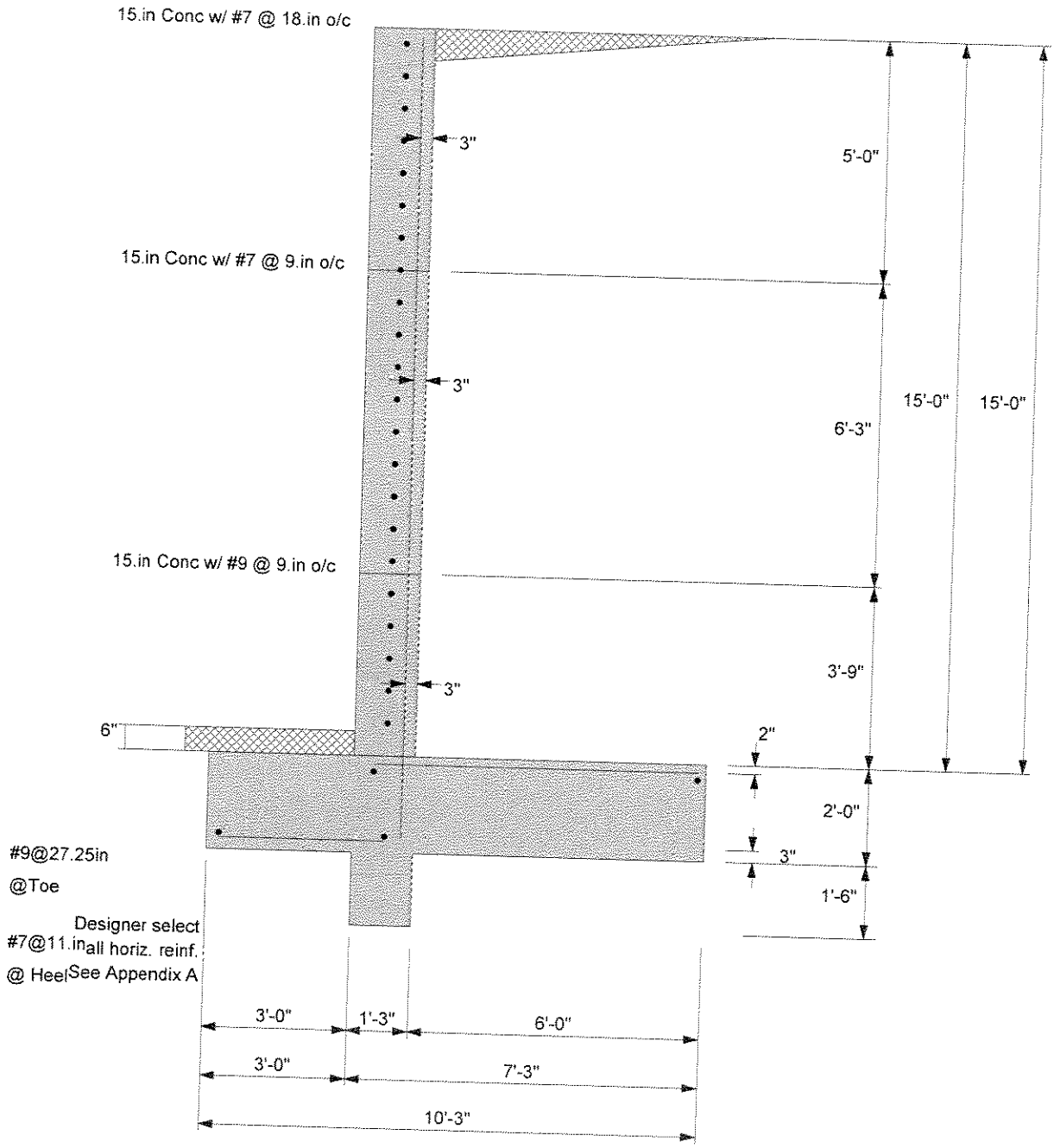
Resisting/Overturning Ratio = **2.33**

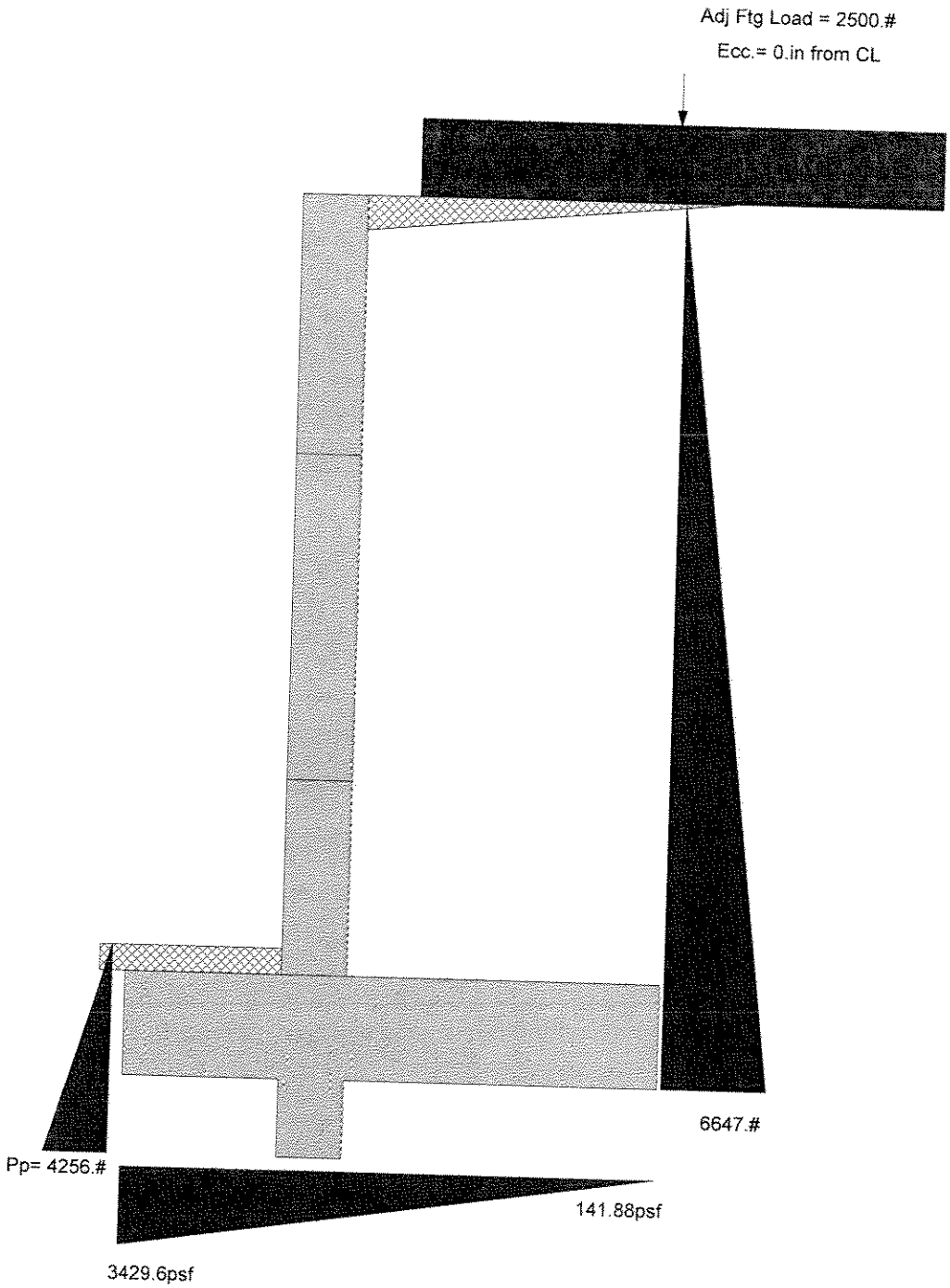
Vertical Loads used for Soil Pressure = 18,303.9 lbs

Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	11,250.0	7.25	81,562.5
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=	697.7	7.25	5,058.1
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=	187.5	1.50	281.3
Surcharge Over Toe	=			
Stem Weight(s)	=	2,812.5	3.63	10,195.3
Earth @ Stem Transitions	=			
Footing Weight	=	3,075.0	5.13	15,759.4
Key Weight	=	281.3	3.63	1,019.5
Vert. Component	=			
Total =		18,303.9 lbs	**R.M.=**	113,876.1

DESIGNER NOTES:


15.in Conc w/ #7 @ 18.in o/c
3"
5'-0"
15.in Conc w/ #7 @ 9.in o/c
3"
15'-0"
15'-0"
6'-3"
15.in Conc w/ #9 @ 9.in o/c
3'-9"
3"
6"
2"
2'-0"
3"
1'-6"
#9@27.25in
@Toe
Designer select
#7@11.in all horiz. reinf.
@ Heel See Appendix A
3'-0"
1'-3"
6'-0"
3'-0"
7'-3"
10'-3"


Adj Ftg Load = 2500.#
Ecc.= 0.in from CL
6647.#
Pp= 4256.#
141.88psf
3429.6psf

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'C' H=15' Equipment
Job # : E-05129 Dsgnr: JJF
Description....
Wall "C" Height (H) = 15'-0" Equipment Load EFP = 46

Page: _____
Date: MAY 25,2005

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005, 1-November-2005, (c) 1989
Registration # : RP-1141385

Cantilevered Retaining Wall Design
Calculation Trace Listing

1 **Beginning of Trace**
2 Setting ACI Load Factors: DL Fact = 1.2000, LL Fact = 1.6000, ST Fact = 1.000
3 Noted that EFP Method being used
4 Back-solving internal friction angle from density and EFP, angle = 27.520 deg
5 Actual Heel Width (past back of stem) = 6.0000 ft
6 Soil Height for Stability (wall+footing+cslope) = 17.000 ft
7 **Calculating Overturning Values**
8 Arm = 5.6667 ft, Moment = 37,666 ft-#
9 Active Pressure @ Toe: (6.0000 + 24.000)^2 * 46.000 / 2.0= 143.750 lbs
10 Arm = (6.0000 + 24.000) / 3 /12 = 0.833 ft, Moment = 119.792 ft-#
11 Adjacent Footing Lateral Force = 1,274.69 lbs
12 Height above Footing Base = 106.443 in, Moment = 1,274.69 * 8.8703 = 11,307 ft-#
13 Toe Active Pressure Used To Resist Sliding, so ADD Soil over toe = 143.750 lbs to Total Overturning Loads
14 **Calculating Resisting Moments**
15 Soil Wt Over Heel = 6.0000 * 15.000 * 125.000 = 11,250 lbs
16 Arm = 10.250 - 6.0000 / 2.0 = 7.2500 ft, Moment = 11,250 * 7.2500 = 81,563 ft-#
17 Soil Wt Over Toe = 3.0000 * 0.500 * 125.000 = 187.500 lbs
18 Arm = 3.0000 / 2.0 = 1.5000 ft, Moment = 187.500 * 1.5000 = 281.250 ft-#
19 Adjacent Footing, Force = 697.674 lbs, Arm = 7.2500 ft, Moment = 5,058.14 ft-#
20 Top Stem Weight = 937.500 lbs, Arm = (3.0000 + 1.2500 / 2.0) = 3.6250 ft
21 2nd Top Stem Weight = 1,171.88 lbs, Arm = (3.0000 + 1.2500 / 2.0) = 3.6250 ft
22 3rd Top Stem Weight = 703.125 lbs, Arm = (3.0000 + 1.2500 / 2.0) = 3.6250 ft
23 Stem Avg. Arm = 43.500 ft, Total Moment = 122,344 ft-#
24 Avg. Arm = 0.000 ft, Moment = 0.000 ft-#
25 Footing Weight = 10.250 * 24.000 * 150.000 = 3,075.00 lbs, Arm = 10.250 / 2.0 = 5.1250 ft, Moment = 15,759 ft-#
26 Key Weight = 1.5000 * 1.2500 * 150.000 = 3,075.00 lbs, Arm = 3.0000 + 1.2500 / 2.0 = 3.6250 ft, Moment = 1,019.53 ft-#
27 Total Resis. Wt = 18,304 lbs, Moment = 113,876 ft-#
28 **Calculated Stem Forces for Preliminary Checks**
29 **Cantilevered Stem Calculations**
30 Top Stem Section: Shear = 1,445.46 lbs, Moment = 2,394.46 ft-#
31 2nd Top Stem Section: Shear = 6,209.40 lbs, Moment = 25,071 ft-#
32 3rd Top Stem Section: Shear = 10,181 lbs, Moment = 55,542 ft-#
33 Calcualting Actual Shear Stress
34 Concrete Unit Shear Stress = 1,445.46 / 12.000 / 12.0 = 10.038 psi
35 Concrete Unit Shear Stress = 6,209.40 / 12.000 / 12.0 = 43.121 psi
36 Concrete Unit Shear Stress = 10,181 / 12.000 / 12.0 = 70.699 psi
37 Determine Allowable Moments
38 Top Concrete Stem Capacity = 250,704 in-#
39 2nd Top Concrete Stem Capacity = 484,416 in-#
40 3rd Top Concrete Stem Capacity = 769,600 in-#
41 Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
42 2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
43 3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
44 **Calculate Bar Lap Lengths**
45 Top Stem, Embed into Concrete ABOVE = 62.303 in
46 Top Stem, Embed into Concrete BELOW = 62.303 in
47 2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
48 2nd Top Stem, Embed into Concrete BELOW = 62.303 in
49 3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
50 3rd Top Stem, Embed into Concrete ABOVE = 80.104 in
51 **Calculating Soil Pressure**
52 Toe Bar Depth = 24.000 - 3.0000 - 0.5 = 20.500 in, Heel Bar Depth = 24.000 - 2.0000 - 0.5 = 21.500 in
53 Service Load Soil Pressures.....
54 P = 18,304 lbs, Ecc = 18.871 in, Toe Pressure = 285.802 psf, Heel Pressure = 11.823 psf
55 **Calculating Factored Load Shear in Footing=**
56 P = 22,244 lbs, Ecc = 18.871 in, Toe Pressure = 285.802 psf, Heel Pressure = 11.823 psf
57 Shear @ Toe = (18.147 - 1.2000 * (24.000 * 1.0417 + 6.0000 * 0.868 + 0.000) * 15.500) / (12.0 * 20.500) = 18.147 psi
58 Shear @ Heele = (18.147 - 15,660 - 0.000 - 0.000 - 0.000) / (12.0 * 21.500) = 60.698 psi
59 Shear Distances from Edge; Toe = 36.000 in, Heel = 72.000 in
60 Toe Upward Moment = 17,001 ft-#
61 Toe Downward Moment = 1.2000 * (24.000 * 1.0417 + 6.0000 * 0.868 + 0.000) * 36.000^2 / 2.0 = 1,957.50 ft-#
62 Moment @ Toe, Upward = 204,014 ft-#, Downward = 1.2000 * (24.000 * 1.0417 + 6.0000 * 0.868 + 0.000) * 36.000^2 / 2.0 = 15,04
63 Flag set to ignore updard pressure under heel-->> Heel Upward Moment = 0
64 Heel Downward Moment = 1.2000 * (24.000 * 1.0417 + 180.000 * 0.868 + 0.000 + 0.000) * 72.000^2 / 2.0 = 46,980 ft-#

Cantilevered Retaining Wall Design
Calculation Trace Listing

Add moment due to vertical soil component = 1.6000 * 0.000 * 72.000 = 0.000 ft-#
Preliminary Design Moment = 563,760.000 ft-#
Soil Height for Passive Pressure = 18.000 + 24.000 + 6.0000 = 48.000 in
Sliding Resistance due to Friction = 18,304 * 0.550 = 10,067 lbs
Friction Resistance adjusted for Specified '%' = 1.000 * 10,067 = 10,067 lbs
Sliding Passive Pressure = (48.000 - 0.000) * 3.6944 * (48.000 - 0.000)/2.0)
+ (0.000 * 3.6944 * (48.000 - 0.000)) = 4,256.00 lbs
Passive Resistance adjusted for Specified '%' = 1.000 * 10,067 = 4,256.00 lbs
Sliding Factor of Safety = (4,256.00 + 10,067) / 7,777.94 = 1.8415 lbs
Calculating Footing Rebar Requirements
RHo:Balanced = 0.850 * 3,000.00 / 60,000 * 0.850 * (87000.0 / (87000.0 + 60,000)) = 0.021
Ru : Toe = ABS(180,524 / 12.0 / 20.500^2 / 0.9) = 39.774 psi
Required Steel % = 0.001%
Required Steel Area = 0.037 in2
Ru : Heel = ABS(563,760.000 / 12.0 / 21.500^2 / 0.9) = 112.926 psi
Required Steel % = 0.002%
Required Steel Area = 0.055 in2
Key : Required Steel % = 0.000%
Required Steel Area = 0.022 in2
Calculated Stem Forces for Fincal Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 1,445.46 lbs, Moment = 2,394.46 ft-#
2nd Top Stem Section: Shear = 6,209.40 lbs, Moment = 25,071 ft-#
3rd Top Stem Section: Shear = 10,181 lbs, Moment = 55,542 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 1,445.46 / 12.000 / 12.0 = 10.038 psi
Concrete Unit Shear Stress = 6,209.40 / 12.000 / 12.0 = 43.121 psi
Concrete Unit Shear Stress = 10,181 / 12.000 / 12.0 = 70.699 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 250,704 in-#
2nd Top Concrete Stem Capacity = 484,416 in-#
3rd Top Concrete Stem Capacity = 769,600 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
Calculate Bar Lap Lengths
Top Stem, Embed into Concrete ABOVE = 62.303 in
Top Stem, Embed into Concrete BELOW = 62.303 in
2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
2nd Top Stem, Embed into Concrete BELOW = 62.303 in
3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
3rd Top Stem, Embed into Concrete ABOVE = 80.104 in

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'C' H= 15' Seismic 1
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'C' H = 15'-0" Seismic Load , EFP = 46 Kv = 0.10

Page: _____
Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	15.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	5,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	46.0 psf/ft
Toe Active Pressure	=	46.0 psf/ft
Passive Pressure	=	532.0 psf/ft
Soil Density	=	125.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	3.00 ft
Heel Width	=	7.25
Total Footing Width	=	10.25
Footing Thickness	=	24.00 in
Key Width	=	15.00 in
Key Depth	=	18.00 in
Key Distance from Toe	=	3.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel = 0.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Design Kh	=	0.100 g

Using Mononobe-Okabe / Seed-Whitman procedure

Kae for seismic earth pressure	=	0.391
Ka for static earth pressure	=	0.323
Difference: Kae - Ka	=	0.068

Added seismic base force 876.9 lbs

*Design Summary

Wall Stability Ratios

Overturning	=	2.34 OK
Sliding	=	1.89 OK
Total Bearing Load	=	17,606 lbs
...resultant ecc.	=	19.02 in
Soil Pressure @ Toe	=	3,311 psf OK
Soil Pressure @ Heel	=	124 psf OK
Allowable	=	5,000 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	3,974 psf
ACI Factored @ Heel	=	149 psf
Footing Shear @ Toe	=	17.2 psi OK
Footing Shear @ Heel	=	60.7 psi OK
Allowable	=	93.1 psi

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	7,380.1 lbs
less 100% Passive Force	=	- 4,256.0 lbs
less 100% Friction Force	=	- 9,683.4 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Top Stem	2nd	3rd
Design Height Above Ftg	ft =	Stem OK 10.00	Stem OK 3.75	Stem OK 0.00
Wall Material Above "Ht"	=	Concrete	Concrete	Concrete
Thickness	=	15.00	15.00	15.00
Rebar Size	=	# 7	# 7	# 9
Rebar Spacing	=	18.00	9.00	9.00
Rebar Placed at	=	Edge	Edge	Edge
Design Data				
fb/FB + fa/Fa	=	**0.089**	**0.523**	**0.780**
Total Force @ Section	lbs =	1,026.8	5,198.4	9,232.4
Moment....Actual	ft-# =	1,853.9	21,116.5	50,052.4
Moment.....Allowable	ft-# =	20,892.0	40,368.0	64,133.3
Shear.....Actual	psi =	6.4	32.3	57.4
Shear.....Allowable	psi =	82.2	82.2	82.2
Wall Weight	psf =	187.5	187.5	187.5
Rebar Depth 'd'	in =	12.00	12.00	12.00
LAP SPLICE IF ABOVE	in =	37.38	37.38	48.06
LAP SPLICE IF BELOW	in =	37.38	37.38	
HOOK EMBED INTO FTG	in =			17.25

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Special Inspection	=	
Modular Ratio 'n'	=	
Short Term Factor	=	
Equiv. Solid Thick.	=	

Masonry Block Type = Medium Weight

Concrete Data

f'c	psi =	3,000.0	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'C' H= 15' Seismic 1
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'C' H = 15'-0" Seismic Load , EFP = 46 Kv = 0.10

Page: _____
Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel
Factored Pressure	=	3,974	149 psf
Mu' : Upward	=	16,202	0 ft-#
Mu' : Downward	=	1,958	46,980 ft-#
Mu: Design	=	14,244	46,980 ft-#
Actual 1-Way Shear	=	17.18	60.70 psi
Allow 1-Way Shear	=	93.11	93.11 psi

Toe Reinforcing = # 9 @ 31.75 in
Heel Reinforcing = # 7 @ 11.00 in
Key Reinforcing = # 5 @ 14.50 in

Other Acceptable Sizes & Spacings

Toe: Not req'd, Mu < S * Fr
Heel: #4@ 3.75 in, #5@ 5.75 in, #6@ 8.00 in, #7@ 11.00 in, #8@ 14.50 in, #9@ 18.2
Key: #4@ 9.50 in, #5@ 14.50 in, #6@ 20.50 in, #7@ 28.00 in,

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	6,647.0	5.67	37,666.3
Toe Active Pressure	=	-143.8	0.83	-119.8
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Seismic Earth Load	=	876.9	10.20	8,944.3
Total	=	7,380.1	**O.T.M.** =	46,490.9

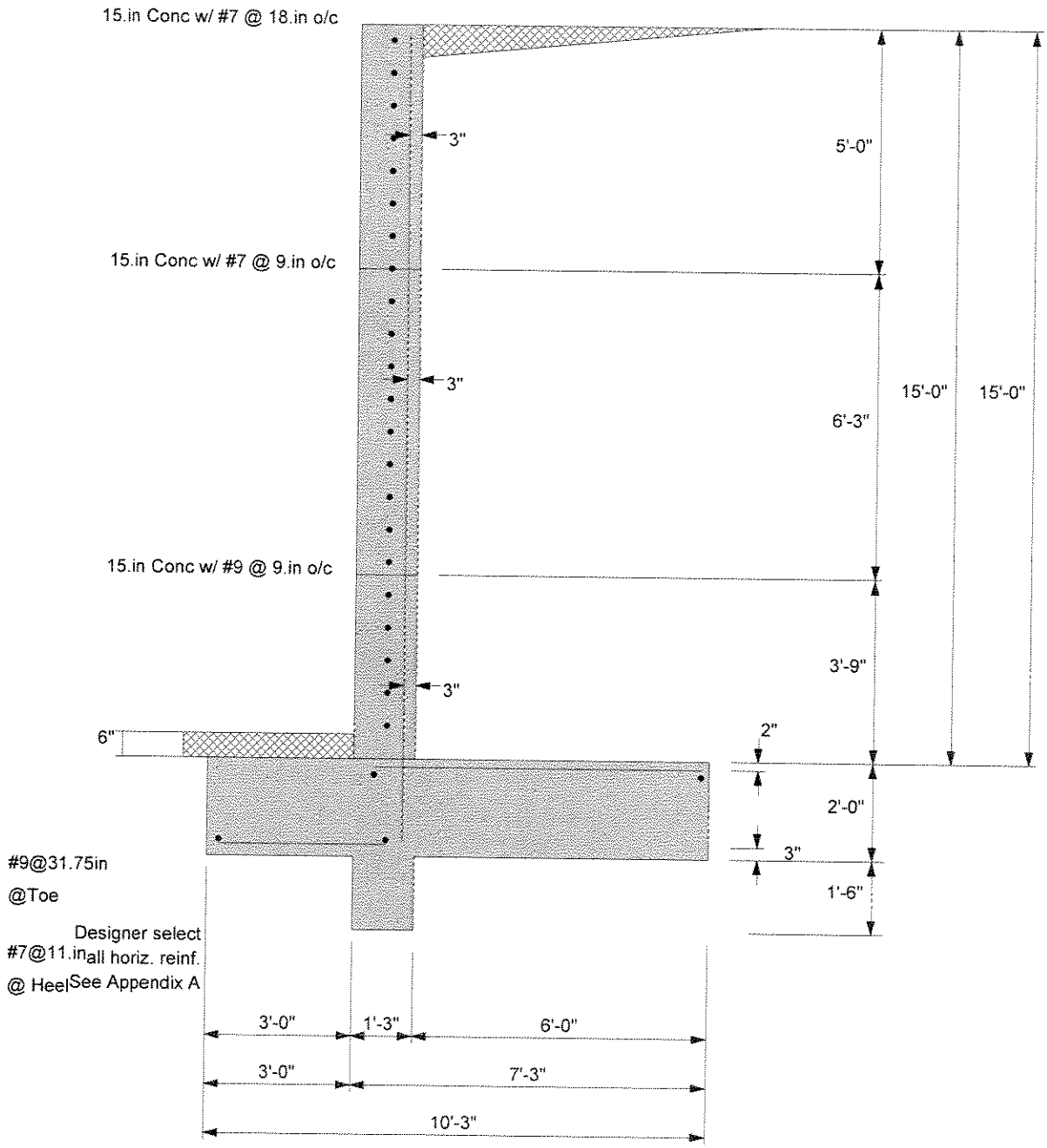
Resisting/Overturning Ratio = **2.34**

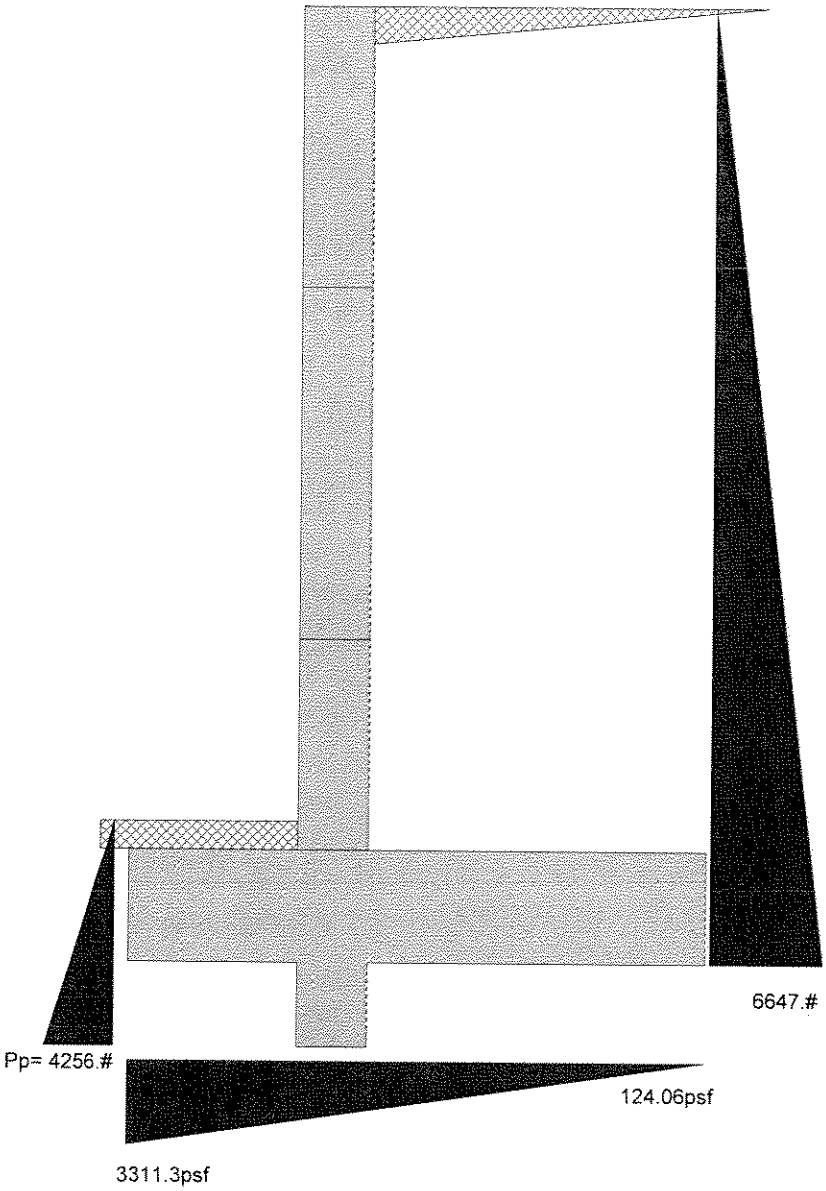
Vertical Loads used for Soil Pressure = 17,606.3 lbs

Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	11,250.0	7.25	81,562.5
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=	187.5	1.50	281.3
Surcharge Over Toe	=			
Stem Weight(s)	=	2,812.5	3.63	10,195.3
Earth @ Stem Transitions	=			
Footing Weight	=	3,075.0	5.13	15,759.4
Key Weight	=	281.3	3.63	1,019.5
Vert. Component	=			
Total =		17,606.3 lbs	**R.M.=**	108,818.0

DESIGNER NOTES:


15.in Conc w/ #7 @ 18.in o/c
3"
5'-0"
15.in Conc w/ #7 @ 9.in o/c
3"
15'-0"
15'-0"
6'-3"
15.in Conc w/ #9 @ 9.in o/c
3'-9"
3"
6"
2"
2'-0"
3"
1'-6"
#9@31.75in
@Toe
Designer select
#7@11.in all horiz. reinf.
@ Heel See Appendix A
3'-0"
1'-3"
6'-0"
3'-0"
7'-3"
10'-3"


6647.#
Pp= 4256.#
124.06psf
3311.3psf

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'C' H= 15' Seismic 1
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'C' H = 15'-0" Seismic Load , EFP = 46 Kv = 0.10

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Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005, 1-November-2005, (c) 1989
Registration # : RP-1141385

Cantilevered Retaining Wall Design
Calculation Trace Listing

Beginning of Trace
Setting ACI Load Factors: DL Fact = 1.2000, LL Fact = 1.6000, ST Fact = 1.000
Noted that EFP Method being used
Back-solving internal friction angle from density and EFP, angle = 27.520 deg
Actual Heel Width (past back of stem) = 6.0000 ft
Soil Height for Stability (wall+footing+cslope) = 17.000 ft
Calculating Overturning Values
Arm = 5.6667 ft, Moment = 37,666 ft-#
Seismic Lateral Force calcs....
Kae Force = 0.068 * 0.868 * 204.000^2 / 2.0 = 876.894 lbs
Ka Force = 204.000 * 0.319 * 204.000 * 0.5 = 6,647.00 lbs
Force Height = Retained Height * 0.6 = 204.000 * 0.600 = 122.400
Overturning Moment = 876.894 * 122.400 = 8,944.32 ft-#
Active Pressure @ Toe: (6.0000 + 24.000)^2 * 46.000 / 2.0= 143.750 lbs
Arm = (6.0000 + 24.000) / 3 /12 = 0.833 ft, Moment = 119.792 ft-#
Toe Active Pressure Used To Resist Sliding, so ADD Soil over toe = 143.750 lbs to Total Overturning Loads
Calculating Resisting Moments
Soil Wt Over Heel = 6.0000 * 15.000 * 125.000 = 11,250 lbs
Arm = 10.250 - 6.0000 / 2.0 = 7.2500 ft, Moment = 11,250 * 7.2500 = 81,563 ft-#
Soil Wt Over Toe = 3.0000 * 0.500 * 125.000 = 187.500 lbs
Arm = 3.0000 / 2.0 = 1.5000 ft, Moment = 187.500 * 1.5000 = 281.250 ft-#
Top Stem Weight = 937.500 lbs, Arm = (3.0000 + 1.2500 / 2.0) = 3.6250 ft
2nd Top Stem Weight = 1,171.88 lbs, Arm = (3.0000 + 1.2500 / 2.0) = 3.6250 ft
3rd Top Stem Weight = 703.125 lbs, Arm = (3.0000 + 1.2500 / 2.0) = 3.6250 ft
Stem Avg. Arm = 43.500 ft, Total Moment = 122,344 ft-#
Avg. Arm = 0.000 ft, Moment = 0.000 ft-#
Footing Weight = 10.250 * 24.000 * 150.000 = 3,075.00 lbs, Arm = 10.250 / 2.0 = 5.1250 ft, Moment = 15,759 ft-#
Key Weight = 1.5000 * 1.2500 * 150.000 = 3,075.00 lbs, Arm = 3.0000 + 1.2500 / 2.0 = 3.6250 ft, Moment = 1,019.53 ft-#
Total Resis. Wt = 17,606 lbs, Moment = 108,818 ft-#
Calculated Stem Forces for Preliminary Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 1,026.84 lbs, Moment = 1,853.85 ft-#
2nd Top Stem Section: Shear = 5,198.37 lbs, Moment = 21,117 ft-#
3rd Top Stem Section: Shear = 9,232.35 lbs, Moment = 50,052 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 920.000 / 12.000 / 12.0 = 6.3889 psi
Concrete Unit Shear Stress = 4,657.50 / 12.000 / 12.0 = 32.344 psi
Concrete Unit Shear Stress = 8,270.80 / 12.000 / 12.0 = 57.436 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 250,704 in-#
2nd Top Concrete Stem Capacity = 484,416 in-#
3rd Top Concrete Stem Capacity = 769,600 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
Calculate Bar Lap Lengths
Top Stem, Embed into Concrete ABOVE = 62.303 in
Top Stem, Embed into Concrete BELOW = 62.303 in
2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
2nd Top Stem, Embed into Concrete BELOW = 62.303 in
3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
3rd Top Stem, Embed into Concrete ABOVE = 80.104 in
Calculating Soil Pressure
Toe Bar Depth = 24.000 - 3.0000 - 0.5 = 20.500 in, Heel Bar Depth = 24.000 - 2.0000 - 0.5 = 21.500 in
Service Load Soil Pressures.....
P = 17,606 lbs, Ecc = 19.019 in, Toe Pressure = 275.942 psf, Heel Pressure = 10.339 psf
Calculating Factored Load Shear in Footing=
P = 21,128 lbs, Ecc = 19.019 in, Toe Pressure = 275.942 psf, Heel Pressure = 10.339 psf
Shear @ Toe = (17.183 - 1.2000 * (24.000 * 1.0417 + 6.0000 * 0.868 + 0.000) * 15.500) / (12.0 * 20.500) = 17.183 psi
Shear @ Heele = (17.183 - 15,660 - 0.000 - 0.000 - 0.000) / (12.0 * 21.500) = 60.698 psi
Shear Distances from Edge; Toe = 36.000 in, Heel = 72.000 in
Toe Upward Moment = 16,202 ft-#
Toe Downward Moment = 1.2000 * (24.000 * 1.0417 + 6.0000 * 0.868 + 0.000) * 36.000^2 / 2.0 = 1,957.50 ft-#
Moment @ Toe, Upward = 194,423 ft-#, Downward = 1.2000 * (24.000 * 1.0417 + 6.0000 * 0.868 + 0.000) * 36.000^2 / 2.0 = 14,24

Design Toe Moment <= 6.5 * d^2 * SQRT(f'c) --->> No Reinforcing Used
Flag set to ignore updard pressure under heel-->> Heel Upward Moment = 0
Heel Downward Moment = 1.2000 * (24.000 * 1.0417 + 180.000 * 0.868 + 0.000 + 0.000) * 72.000^2 / 2.0 = 46,980 ft-#
Add moment due to vertical soil component = 1.6000 * 0.000 * 72.000 = 0.000 ft-#
Preliminary Design Moment = 563,760.000 ft-#
Soil Height for Passive Pressure = 18.000 + 24.000 + 6.0000 = 48.000 in
Sliding Resistance due to Friction = 17,606 * 0.550 = 9,683.44 lbs
Friction Resistance adjusted for Specified '%' = 1.000 * 9,683.44 = 9,683.44 lbs
Sliding Passive Pressure = (48.000 - 0.000) * 3.6944 * (48.000 - 0.000)/2.0)
+ (0.000 * 3.6944 * (48.000 - 0.000)) = 4,256.00 lbs
Passive Resistance adjusted for Specified '%' = 1.000 * 9,683.44 = 4,256.00 lbs
Sliding Factor of Safety = (4,256.00 + 9,683.44) / 7,380.14 = 1.8888 lbs
Calculating Footing Rebar Requirements
RHo:Balanced = 0.850 * 3,000.00 / 60,000 * 0.850 * (87000.0 / (87000.0 + 60,000)) = 0.021
Ru : Heel = ABS(563,760.000 / 12.0 / 21.500^2 / 0.9) = 112.926 psi
Required Steel % = 0.002%
Required Steel Area = 0.055 in2
Key : Required Steel % = 0.000%
Required Steel Area = 0.022 in2
Calculated Stem Forces for Fincal Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 1,026.84 lbs, Moment = 1,853.85 ft-#
2nd Top Stem Section: Shear = 5,198.37 lbs, Moment = 21,117 ft-#
3rd Top Stem Section: Shear = 9,232.35 lbs, Moment = 50,052 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 920.000 / 12.000 / 12.0 = 6.3889 psi
Concrete Unit Shear Stress = 4,657.50 / 12.000 / 12.0 = 32.344 psi
Concrete Unit Shear Stress = 8,270.80 / 12.000 / 12.0 = 57.436 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 250,704 in-#
2nd Top Concrete Stem Capacity = 484,416 in-#
3rd Top Concrete Stem Capacity = 769,600 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
Calculate Bar Lap Lengths
Top Stem, Embed into Concrete ABOVE = 62.303 in
Top Stem, Embed into Concrete BELOW = 62.303 in
2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
2nd Top Stem, Embed into Concrete BELOW = 62.303 in
3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
3rd Top Stem, Embed into Concrete ABOVE = 80.104 in

WALL MK. 'D'

Loading Case	Overturning Ratio	Sliding Ratio	Maximum Soil Bearing Pressure	Controlling Case for Strength Design	Remarks
Normal	2.6	2.0	3620		See Note 1
Compaction Equipment	2.5	2.0	4310	✓	
Seismic	2.3	1.9	4410		

Notes:

1.0 Vertical Component of Active Pressure was used in the calculation of Soil Pressure.

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'D' H=20' Normal
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'D' H = 20'-0" Normal Loads EFP = 51pcf

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Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	20.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	51.0 psf/ft
Toe Active Pressure	=	51.0 psf/ft
Passive Pressure	=	532.0 psf/ft
Soil Density	=	125.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	4.00 ft
Heel Width	=	9.50
Total Footing Width	=	13.50
Footing Thickness	=	30.00 in
Key Width	=	24.00 in
Key Depth	=	30.00 in
Key Distance from Toe	=	4.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0020
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel = 0.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

*Design Summary

Wall Stability Ratios

Overturning	=	2.60	OK
Sliding	=	1.97	OK
Total Bearing Load	=	33,658 lbs	
...resultant ecc.	=	12.17 in	
Soil Pressure @ Toe	=	3,617 psf	OK
Soil Pressure @ Heel	=	1,370 psf	OK
Allowable	=	4,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	3,973 psf	
ACI Factored @ Heel	=	1,504 psf	
Footing Shear @ Toe	=	18.4 psi	OK
Footing Shear @ Heel	=	78.4 psi	OK
Allowable	=	93.1 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	12,679.9 lbs	
less 100% Passive Force	=	- 8,046.5 lbs	
less 100% Friction Force	=	- 6,946.9 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Top Stem	2nd	3rd
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	ft =	13.00	5.00	0.00
Wall Material Above "Ht"	=	Concrete	Concrete	Concrete
Thickness	=	24.00	24.00	24.00
Rebar Size	=	# 7	# 7	# 9
Rebar Spacing	=	15.00	7.50	7.50
Rebar Placed at	=	Edge	Edge	Edge
Design Data				
fb/FB + fa/Fa	=	**0.105**	**0.530**	**0.778**
Total Force @ Section	lbs =	1,999.2	9,180.0	16,309.8
Moment....Actual	ft-# =	4,664.8	45,900.0	108,798.3
Moment.....Allowable	ft-# =	44,340.5	86,641.9	139,872.0
Shear.....Actual	psi =	7.9	36.4	64.7
Shear.....Allowable	psi =	82.2	82.2	82.2
Wall Weight	psf =	300.0	300.0	300.0
Rebar Depth 'd'	in =	21.00	21.00	21.00
LAP SPLICE IF ABOVE	in =	37.38	37.38	48.06
LAP SPLICE IF BELOW	in =	37.38	37.38	
HOOK EMBED INTO FTG	in =			17.25
Masonry Data				
f'm	psi =			
Fs	psi =			
Solid Grouting	=			
Special Inspection	=			
Modular Ratio 'n'	=			
Short Term Factor	=			
Equiv. Solid Thick.	=			
Masonry Block Type = Medium Weight				
Concrete Data				
f'c	psi =	3,000.0	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'D' H=20' Normal
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'D' H = 20'-0" Normal Loads EFP = 51pcf

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Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel
Factored Pressure	=	3,973	1,504 psf
Mu' : Upward	=	29,836	0 ft-#
Mu' : Downward	=	4,200	97,031 ft-#
Mu: Design	=	25,636	97,031 ft-#
Actual 1-Way Shear	=	18.36	78.41 psi
Allow 1-Way Shear	=	93.11	93.11 psi

Toe Reinforcing = # 9 @ 7.50 in
Heel Reinforcing = # 9 @ 10.00 in
Key Reinforcing = # 7 @ 12.00 in

Other Acceptable Sizes & Spacings

Toe: #4@ 4.00 in, #5@ 6.00 in, #6@ 8.50 in, #7@ 11.50 in, #8@ 15.00 in, #9@ 19.0
Heel: #4@ 2.25 in, #5@ 3.50 in, #6@ 5.00 in, #7@ 6.75 in, #8@ 9.00 in, #9@ 11.25
Key: #4@ 5.00 in, #5@ 7.50 in, #6@ 10.50 in, #7@ 14.50 in, #

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	12,909.4	7.50	96,820.3
Toe Active Pressure	=	-229.5	1.00	-229.5
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	12,679.9	**O.T.M.** =	96,590.8

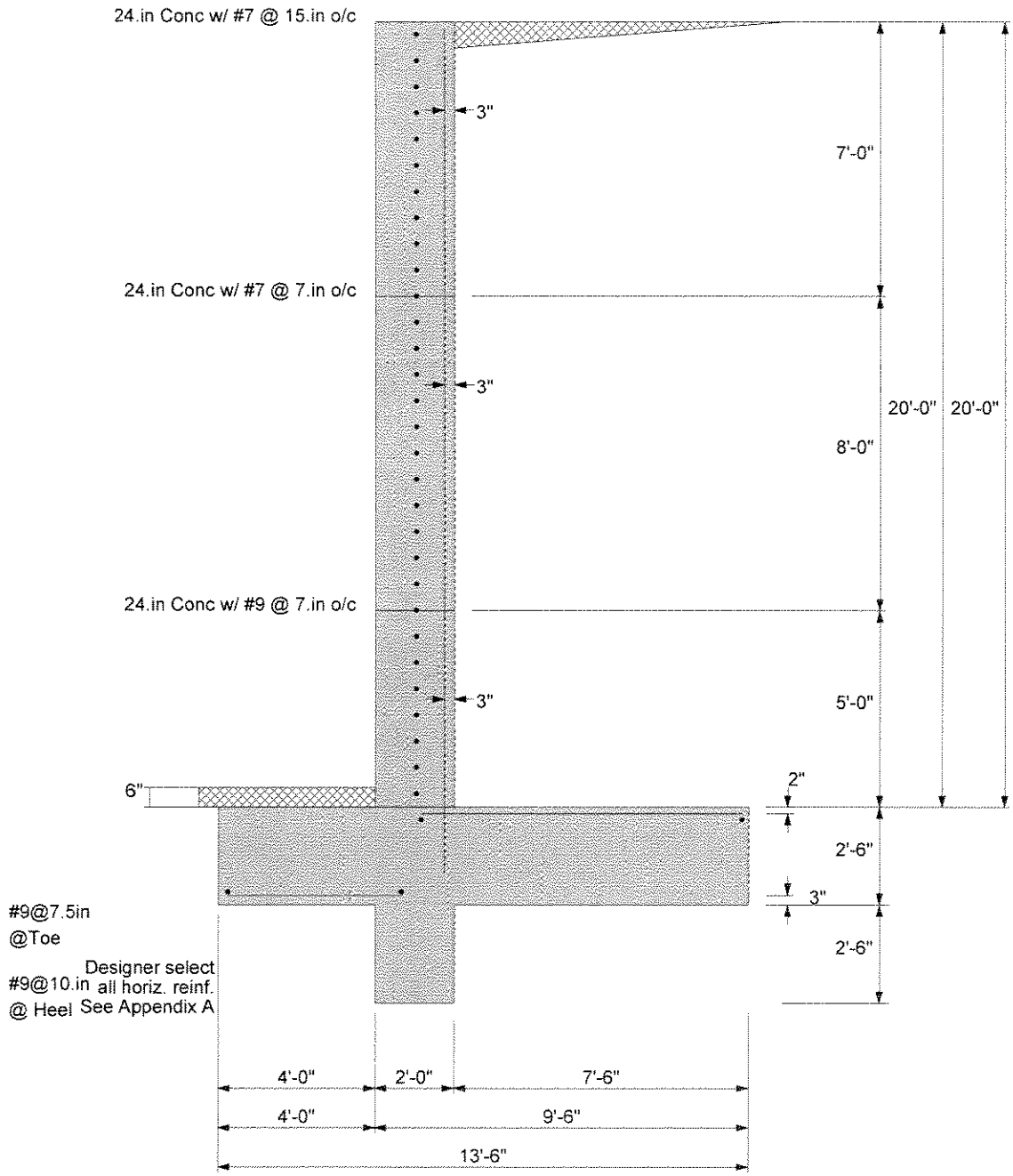
Resisting/Overturning Ratio = **2.60**

Vertical Loads used for Soil Pressure = 33,658.3 lbs

Vertical component of active pressure used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	18,750.0	9.75	182,812.5
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=	250.0	2.00	500.0
Surcharge Over Toe	=			
Stem Weight(s)	=	6,000.0	5.00	30,000.0
Earth @ Stem Transitions	=			
Footing Weight	=	5,062.5	6.75	34,171.9
Key Weight	=	750.0	5.00	3,750.0
Vert. Component	=			
Total =		30,812.5 lbs	**R.M.=**	251,234.4

DESIGNER NOTES: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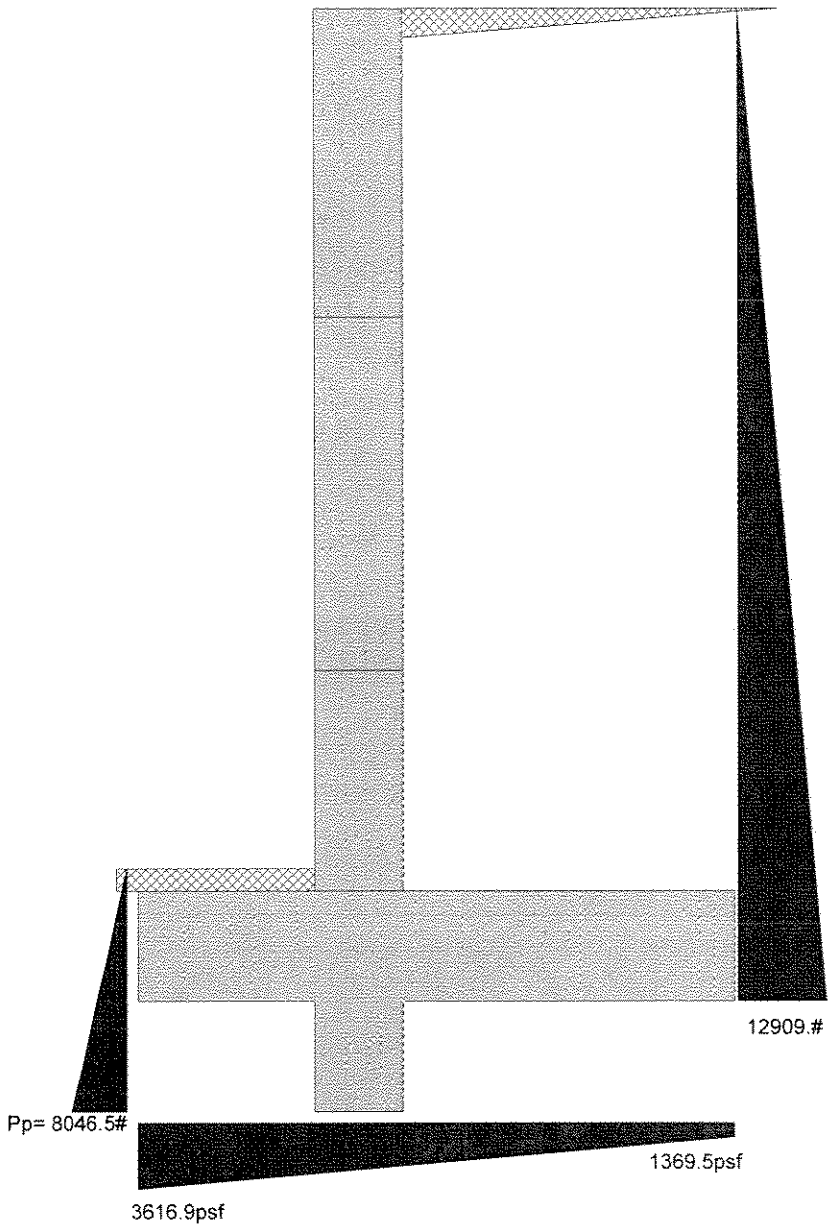
3"
7'-0"
24.in Conc w/ #7 @ 7.in o/c
3"
20'-0"
20'-0"
8'-0"
24.in Conc w/ #9 @ 7.in o/c
3"
5'-0"
6"
2"
2'-6"
3"
2'-6"
#9@7.5in
@Toe
Designer select
#9@10.in all horiz. reinf.
@ Heel See Appendix A
4'-0"
2'-0"
7'-6"
4'-0"
9'-6"
13'-6"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Pp= 8046.5#
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3616.9psf

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'D' H=20' Normal
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'D' H = 20'-0" Normal Loads EFP = 51pcf

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Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005, 1-November-2005, (c) 1989
Registration # : RP-1141385

Cantilevered Retaining Wall Design
Calculation Trace Listing

Beginning of Trace
Setting ACI Load Factors: DL Fact = 1.2000, LL Fact = 1.6000, ST Fact = 1.000
Noted that EFP Method being used
Back-solving internal friction angle from density and EFP, angle = 24.870 deg
Actual Heel Width (past back of stem) = 7.5000 ft
Soil Height for Stability (wall+footing+cslope) = 22.500 ft
Calculating Overturning Values
Arm = 7.5000 ft, Moment = 96,820 ft-#
Active Pressure @ Toe: (6.0000 + 30.000)^2 * 51.000 / 2.0= 229.500 lbs
Arm = (6.0000 + 30.000) / 3 /12 = 1.000 ft, Moment = 229.500 ft-#
Toe Active Pressure Used To Resist Sliding, so ADD Soil over toe = 229.500 lbs to Total Overturning Loads
Calculating Resisting Moments
Soil Wt Over Heel = 7.5000 * 20.000 * 125.000 = 18,750 lbs
Arm = 13.500 - 7.5000 / 2.0 = 9.7500 ft, Moment = 18,750 * 9.7500 = 182,813 ft-#
Soil Wt Over Toe = 4.0000 * 0.500 * 125.000 = 250.000 lbs
Arm = 4.0000 / 2.0 = 2.0000 ft, Moment = 250.000 * 2.0000 = 500.000 ft-#
Top Stem Weight = 2,100.00 lbs, Arm = (4.0000 + 2.0000 / 2.0) = 5.0000 ft
2nd Top Stem Weight = 2,400.00 lbs, Arm = (4.0000 + 2.0000 / 2.0) = 5.0000 ft
3rd Top Stem Weight = 1,500.00 lbs, Arm = (4.0000 + 2.0000 / 2.0) = 5.0000 ft
Stem Avg. Arm = 60.000 ft, Total Moment = 360,000 ft-#
Avg. Arm = 0.000 ft, Moment = 0.000 ft-#
Footing Weight = 13.500 * 30.000 * 150.000 = 5,062.50 lbs, Arm = 13.500 / 2.0 = 6.7500 ft, Moment = 34,172 ft-#
Key Weight = 2.5000 * 2.0000 * 150.000 = 5,062.50 lbs, Arm = 4.0000 + 2.0000 / 2.0 = 5.0000 ft, Moment = 3,750.00 ft-#
Total Resis. Wt = 30,813 lbs, Moment = 251,234 ft-#
Calculated Stem Forces for Preliminary Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 1,999.20 lbs, Moment = 4,664.80 ft-#
2nd Top Stem Section: Shear = 9,180.00 lbs, Moment = 45,900 ft-#
3rd Top Stem Section: Shear = 16,310 lbs, Moment = 108,798 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 1,999.20 / 21.000 / 12.0 = 7.9333 psi
Concrete Unit Shear Stress = 9,180.00 / 21.000 / 12.0 = 36.429 psi
Concrete Unit Shear Stress = 16,310 / 21.000 / 12.0 = 64.721 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 532,086 in-#
2nd Top Concrete Stem Capacity = 1,039,703 in-#
3rd Top Concrete Stem Capacity = 1,678,464 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
Calculate Bar Lap Lengths
Top Stem, Embed into Concrete ABOVE = 62.303 in
Top Stem, Embed into Concrete BELOW = 62.303 in
2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
2nd Top Stem, Embed into Concrete BELOW = 62.303 in
3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
3rd Top Stem, Embed into Concrete ABOVE = 80.104 in
Calculating Soil Pressure
Toe Bar Depth = 30.000 - 3.0000 - 0.5 = 26.500 in, Heel Bar Depth = 30.000 - 2.0000 - 0.5 = 27.500 in
Service Load Soil Pressures.....
P = 33,658 lbs, Ecc = 12.169 in, Toe Pressure = 301.406 psf, Heel Pressure = 114.129 psf
Calculating Factored Load Shear in Footing=
P = 36,975 lbs, Ecc = 12.169 in, Toe Pressure = 301.406 psf, Heel Pressure = 114.129 psf
Shear @ Toe = (18.364 - 1.2000 * (30.000 * 1.0417 + 6.0000 * 0.868 + 0.000) * 21.500) / (12.0 * 26.500) = 18.364 psi
Shear @ Heele = (18.364 - 25,875 - 0.000 - 0.000 - 0.000) / (12.0 * 27.500) = 78.409 psi
Shear Distances from Edge; Toe = 48.000 in, Heel = 90.000 in
Toe Upward Moment = 29,836 ft-#
Toe Downward Moment = 1.2000 * (30.000 * 1.0417 + 6.0000 * 0.868 + 0.000) * 48.000^2 / 2.0 = 4,200.00 ft-#
Moment @ Toe, Upward = 358,027 ft-#, Downward = 1.2000 * (30.000 * 1.0417 + 6.0000 * 0.868 + 0.000) * 48.000^2 / 2.0 = 25,63
Flag set to ignore updard pressure under heel-->> Heel Upward Moment = 0
Heel Downward Moment = 1.2000 * (30.000 * 1.0417 + 240.000 * 0.868 + 0.000 + 0.000) * 90.000^2 / 2.0 = 97,031 ft-#
Add moment due to vertical soil component = 1.6000 * 0.000 * 90.000 = 0.000 ft-#
Preliminary Design Moment = 1164,375.000 ft-#
Soil Height for Passive Pressure = 30.000 + 30.000 + 6.0000 = 66.000 in

Sliding Resistance due to Friction = 30,813 * 0.550 = 16,947 lbs
Friction Resistance adjusted for Specified '%' = 1.000 * 16,947 = 16,947 lbs
Sliding Passive Pressure = (66.000 - 0.000) * 3.6944 * (66.000 - 0.000)/2.0)
+ (0.000 * 3.6944 * (66.000 - 0.000)) = 8,046.50 lbs
Passive Resistance adjusted for Specified '%' = 1.000 * 16,947 = 8,046.50 lbs
Sliding Factor of Safety = (8,046.50 + 16,947) / 12,680 = 1.9711 lbs
Calculating Footing Rebar Requirements
RHo:Balanced = 0.850 * 3,000.00 / 60,000 * 0.850 * (87000.0 / (87000.0 + 60,000)) = 0.021
Ru : Toe = ABS(307,627 / 12.0 / 26.500^2 / 0.9) = 40.561 psi
Required Steel % = 0.001%
Required Steel Area = 0.053 in2
Ru : Heel = ABS(1164,375.000 / 12.0 / 27.500^2 / 0.9) = 142.562 psi
Required Steel % = 0.002%
Required Steel Area = 0.089 in2
Key : Required Steel % = 0.000%
Required Steel Area = 0.042 in2
Calculated Stem Forces for Fincal Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 1,999.20 lbs, Moment = 4,664.80 ft-#
2nd Top Stem Section: Shear = 9,180.00 lbs, Moment = 45,900 ft-#
3rd Top Stem Section: Shear = 16,310 lbs, Moment = 108,798 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 1,999.20 / 21.000 / 12.0 = 7.9333 psi
Concrete Unit Shear Stress = 9,180.00 / 21.000 / 12.0 = 36.429 psi
Concrete Unit Shear Stress = 16,310 / 21.000 / 12.0 = 64.721 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 532,086 in-#
2nd Top Concrete Stem Capacity = 1,039,703 in-#
3rd Top Concrete Stem Capacity = 1,678,464 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
Calculate Bar Lap Lengths
Top Stem, Embed into Concrete ABOVE = 62.303 in
Top Stem, Embed into Concrete BELOW = 62.303 in
2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
2nd Top Stem, Embed into Concrete BELOW = 62.303 in
3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
3rd Top Stem, Embed into Concrete ABOVE = 80.104 in

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'D' H= 20' Equipment Load
Job # : E-05129 Dsgnr: JJF
Description....
Wall "D" H= 20'-0" withe Equipment Loads Surcharge =

Page: _____
Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	20.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	5,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	46.0 psf/ft
Toe Active Pressure	=	46.0 psf/ft
Passive Pressure	=	532.0 psf/ft
Soil Density	=	130.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	4.00 ft
Heel Width	=	9.50
Total Footing Width	=	13.50
Footing Thickness	=	30.00 in
Key Width	=	24.00 in
Key Depth	=	30.00 in
Key Distance from Toe	=	4.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0020
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel = 0.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	2,500.0 lbs
Footing Width	=	10.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	6.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

*Design Summary

Wall Stability Ratios

Overturning	=	2.51	OK
Sliding	=	2.01	OK
Total Bearing Load	=	32,323 lbs	
...resultant ecc.	=	21.59 in	
Soil Pressure @ Toe	=	4,309 psf	OK
Soil Pressure @ Heel	=	480 psf	OK
Allowable	=	5,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	5,210 psf	
ACI Factored @ Heel	=	580 psf	
Footing Shear @ Toe	=	24.5 psi	OK
Footing Shear @ Heel	=	81.1 psi	OK
Allowable	=	93.1 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	12,850.8 lbs	
less 100% Passive Force	=	- 8,046.5 lbs	
less 100% Friction Force	=	- 7,777.4 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Top Stem	2nd	3rd
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	ft =	14.50	5.00	0.00
Wall Material Above "Ht"	=	Concrete	Concrete	Concrete
Thickness	=	24.00	24.00	24.00
Rebar Size	=	# 7	# 7	# 9
Rebar Spacing	=	15.00	7.50	7.50
Rebar Placed at	=	Edge	Edge	Edge
Design Data				
fb/FB + fa/Fa	=	**0.072**	**0.641**	**0.876**
Total Force @ Section	lbs =	1,733.3	10,189.8	16,890.9
Moment....Actual	ft-# =	3,187.4	55,543.5	122,554.5
Moment.....Allowable	ft-# =	44,340.5	86,641.9	139,872.0
Shear.....Actual	psi =	6.9	40.4	67.0
Shear.....Allowable	psi =	82.2	82.2	82.2
Wall Weight	psf =	300.0	300.0	300.0
Rebar Depth 'd'	in =	21.00	21.00	21.00
LAP SPLICE IF ABOVE	in =	37.38	37.38	48.06
LAP SPLICE IF BELOW	in =	37.38	37.38	
HOOK EMBED INTO FTG	in =			17.25
Masonry Data				
f'm	psi =			
Fs	psi =			
Solid Grouting	=			
Special Inspection	=			
Modular Ratio 'n'	=			
Short Term Factor	=			
Equiv. Solid Thick.	=			
Masonry Block Type = Medium Weight				
Concrete Data				
f'c	psi =	3,000.0	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'D' H= 20' Equipment Load
Job # : E-05129 Dsgnr: JJF Date: JUL 18,2006
Page: _____
Description....
Wall "D" H= 20'-0" withe Equipment Loads Surcharge =

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel	
Factored Pressure	=	5,210	580	psf
Mu' : Upward	=	38,025	0	ft-#
Mu' : Downward	=	4,224	100,406	ft-#
Mu: Design	=	33,801	100,406	ft-#
Actual 1-Way Shear	=	24.50	81.14	psi
Allow 1-Way Shear	=	93.11	93.11	psi

Toe Reinforcing = # 9 @ 7.50 in
Heel Reinforcing = # 9 @ 11.00 in
Key Reinforcing = # 5 @ 8.25 in

Other Acceptable Sizes & Spacings

Toe: #4@ 4.00 in, #5@ 6.00 in, #6@ 8.50 in, #7@ 11.50 in, #8@ 15.00 in, #9@ 19.0
Heel: #4@ 2.25 in, #5@ 3.50 in, #6@ 5.00 in, #7@ 6.75 in, #8@ 8.75 in, #9@ 11.00
Key: #4@ 5.00 in, #5@ 7.50 in, #6@ 10.50 in, #7@ 14.50 in, #

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	11,643.8	7.50	87,328.1
Toe Active Pressure	=	-207.0	1.00	-207.0
Surcharge Over Toe	=			
Adjacent Footing Load	=	1,414.1	13.25	18,733.7
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	12,850.8	**O.T.M.** =	105,854.8

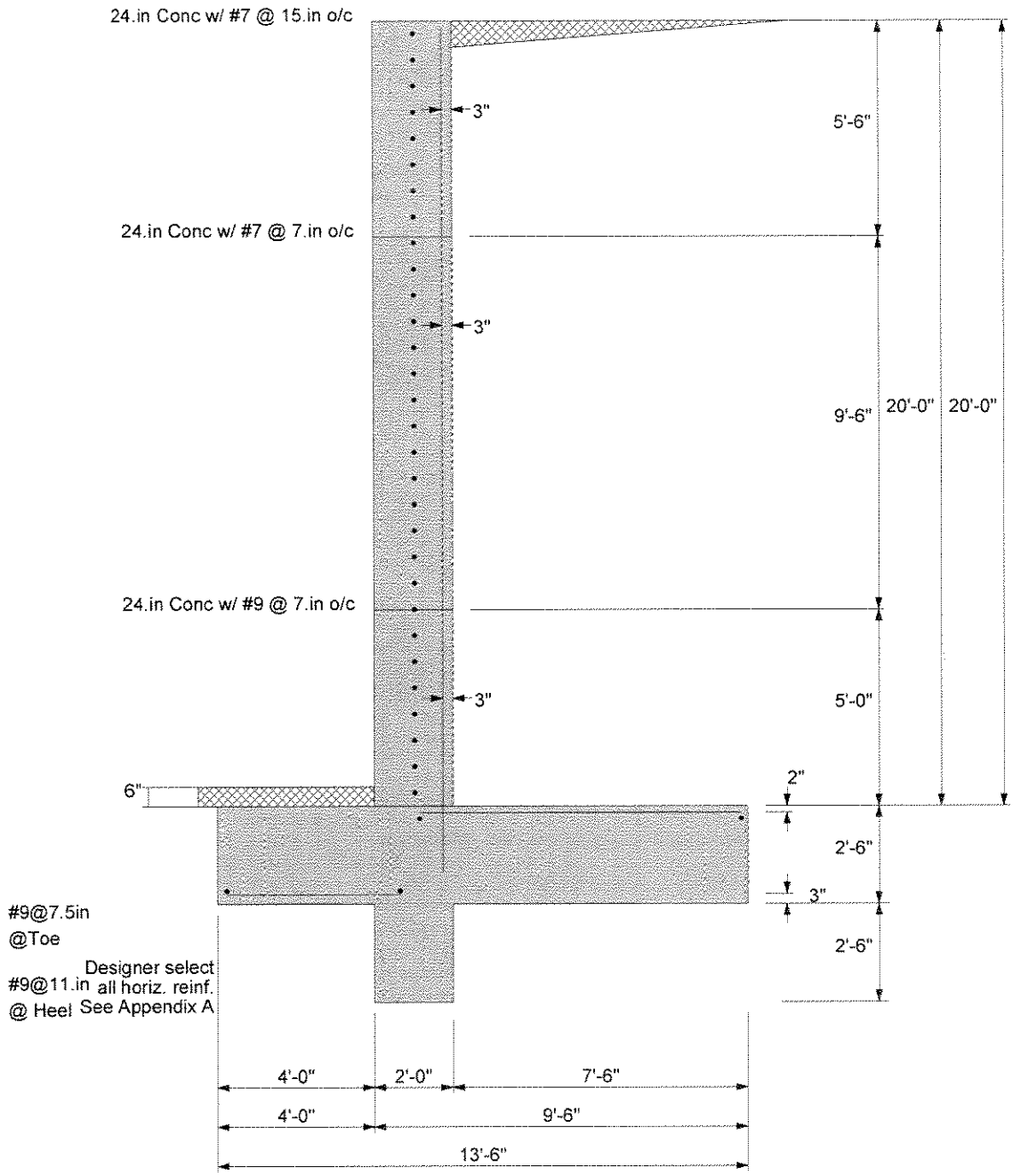
Resisting/Overturning Ratio = **2.51**

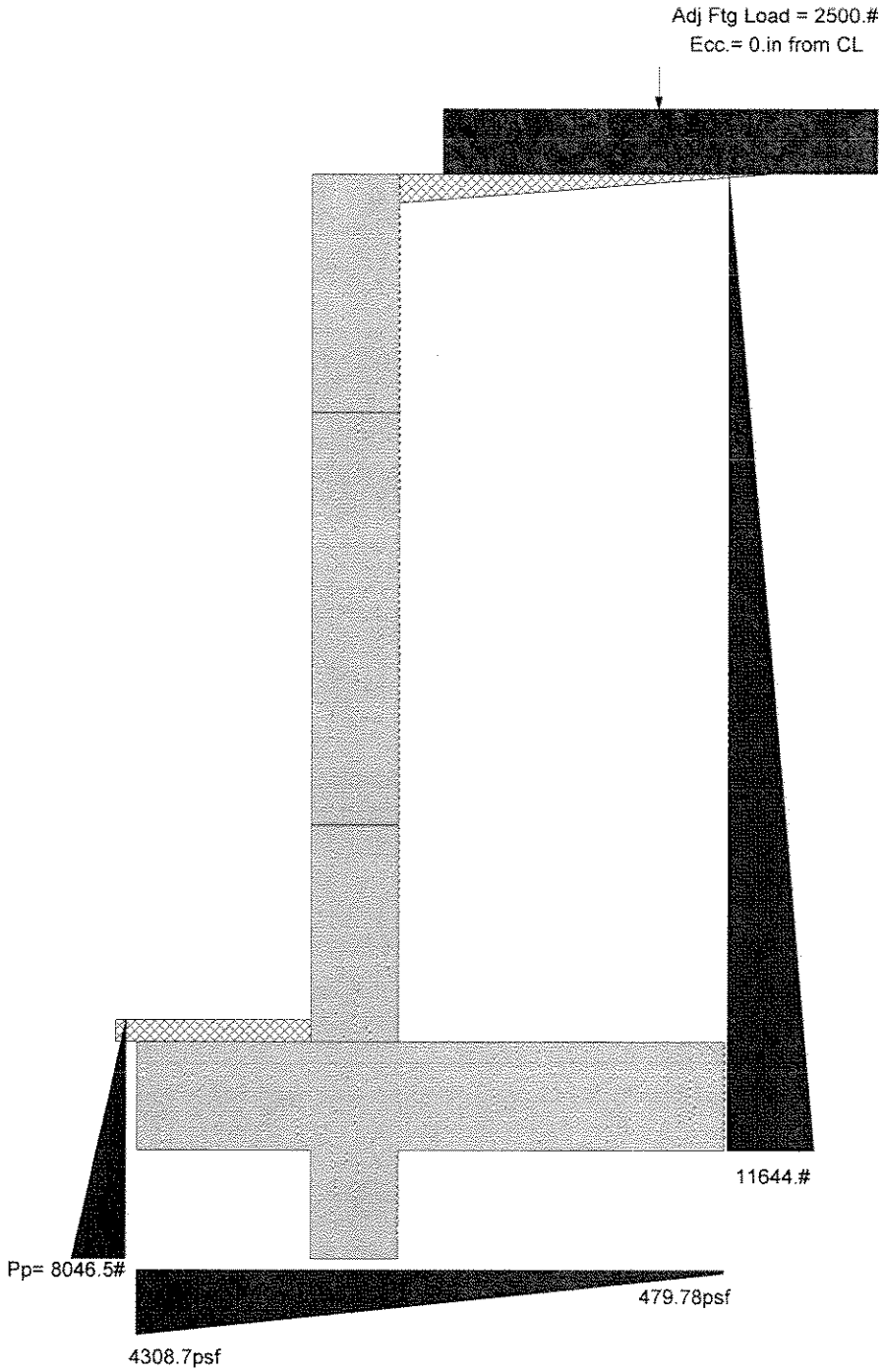
Vertical Loads used for Soil Pressure = 32,322.5 lbs

Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	19,500.0	9.75	190,125.0
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=	750.0	9.75	7,312.5
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=	260.0	2.00	520.0
Surcharge Over Toe	=			
Stem Weight(s)	=	6,000.0	5.00	30,000.0
Earth @ Stem Transitions	=			
Footing Weight	=	5,062.5	6.75	34,171.9
Key Weight	=	750.0	5.00	3,750.0
Vert. Component	=			
Total =		32,322.5 lbs	**R.M.=**	265,879.4

DESIGNER NOTES:


24.in Conc w/ #7 @ 15.in o/c
3"
5'-6"
24.in Conc w/ #7 @ 7.in o/c
3"
9'-6"
20'-0"
20'-0"
24.in Conc w/ #9 @ 7.in o/c
3"
5'-0"
6"
2"
2'-6"
3"
2'-6"
#9@7.5in
@Toe
#9@11.in
@ Heel
Designer select
all horiz. reinf.
See Appendix A
4'-0"
2'-0"
7'-6"
4'-0"
9'-6"
13'-6"


Adj Ftg Load = 2500.#
Ecc.= 0.in from CL
11644.#
Pp= 8046.5#
479.78psf
4308.7psf

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'D' H= 20' Equipment Load
Job # : E-05129 Dsgnr: JJF
Description....
Wall "D" H= 20'-0" withe Equipment Loads Surcharge =

Page: _____
Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	20.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	5,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	46.0 psf/ft
Toe Active Pressure	=	46.0 psf/ft
Passive Pressure	=	532.0 psf/ft
Soil Density	=	130.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	4.00 ft
Heel Width	=	9.50
Total Footing Width	=	13.50
Footing Thickness	=	30.00 in
Key Width	=	24.00 in
Key Depth	=	30.00 in
Key Distance from Toe	=	4.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0020
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel = 0.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	2,500.0 lbs
Footing Width	=	10.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	6.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

*Design Summary

Wall Stability Ratios

Overturning	=	2.51	OK
Sliding	=	2.01	OK
Total Bearing Load	=	32,323 lbs	
...resultant ecc.	=	21.59 in	
Soil Pressure @ Toe	=	4,309 psf	OK
Soil Pressure @ Heel	=	480 psf	OK
Allowable	=	5,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	5,210 psf	
ACI Factored @ Heel	=	580 psf	
Footing Shear @ Toe	=	24.5 psi	OK
Footing Shear @ Heel	=	81.1 psi	OK
Allowable	=	93.1 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	12,850.8 lbs	
less 100% Passive Force	=	- 8,046.5 lbs	
less 100% Friction Force	=	- 7,777.4 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Top Stem	2nd	3rd
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	ft =	14.50	5.00	0.00
Wall Material Above "Ht"	=	Concrete	Concrete	Concrete
Thickness	=	24.00	24.00	24.00
Rebar Size	=	# 7	# 7	# 9
Rebar Spacing	=	15.00	7.50	7.50
Rebar Placed at	=	Edge	Edge	Edge
Design Data				
fb/FB + fa/Fa	=	**0.072**	**0.641**	**0.876**
Total Force @ Section	lbs =	1,733.3	10,189.8	16,890.9
Moment....Actual	ft-# =	3,187.4	55,543.5	122,554.5
Moment.....Allowable	ft-# =	44,340.5	86,641.9	139,872.0
Shear.....Actual	psi =	6.9	40.4	67.0
Shear.....Allowable	psi =	82.2	82.2	82.2
Wall Weight	psf =	300.0	300.0	300.0
Rebar Depth 'd'	in =	21.00	21.00	21.00
LAP SPLICE IF ABOVE	in =	37.38	37.38	48.06
LAP SPLICE IF BELOW	in =	37.38	37.38	
HOOK EMBED INTO FTG	in =			17.25
Masonry Data				
f'm	psi =			
Fs	psi =			
Solid Grouting	=			
Special Inspection	=			
Modular Ratio 'n'	=			
Short Term Factor	=			
Equiv. Solid Thick.	=			
Masonry Block Type = Medium Weight				
Concrete Data				
f'c	psi =	3,000.0	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'D' H= 20' Equipment Load Page: _____
Job # : E-05129 Dsgnr: JJF Date: JUL 18,2006
Description....
Wall "D" H= 20'-0" withe Equipment Loads Surcharge =

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel
Factored Pressure	=	5,210	580 psf
Mu' : Upward	=	38,025	0 ft-#
Mu' : Downward	=	4,224	100,406 ft-#
Mu: Design	=	33,801	100,406 ft-#
Actual 1-Way Shear	=	24.50	81.14 psi
Allow 1-Way Shear	=	93.11	93.11 psi

Toe Reinforcing	=	# 9 @ 7.50 in
Heel Reinforcing	=	# 9 @ 11.00 in
Key Reinforcing	=	# 5 @ 8.25 in

Other Acceptable Sizes & Spacings

Toe: #4@ 4.00 in, #5@ 6.00 in, #6@ 8.50 in, #7@ 11.50 in, #8@ 15.00 in, #9@ 19.0
Heel: #4@ 2.25 in, #5@ 3.50 in, #6@ 5.00 in, #7@ 6.75 in, #8@ 8.75 in, #9@ 11.00
Key: #4@ 5.00 in, #5@ 7.50 in, #6@ 10.50 in, #7@ 14.50 in, #

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	11,643.8	7.50	87,328.1
Toe Active Pressure	=	-207.0	1.00	-207.0
Surcharge Over Toe	=			
Adjacent Footing Load	=	1,414.1	13.25	18,733.7
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	12,850.8	**O.T.M.** =	105,854.8

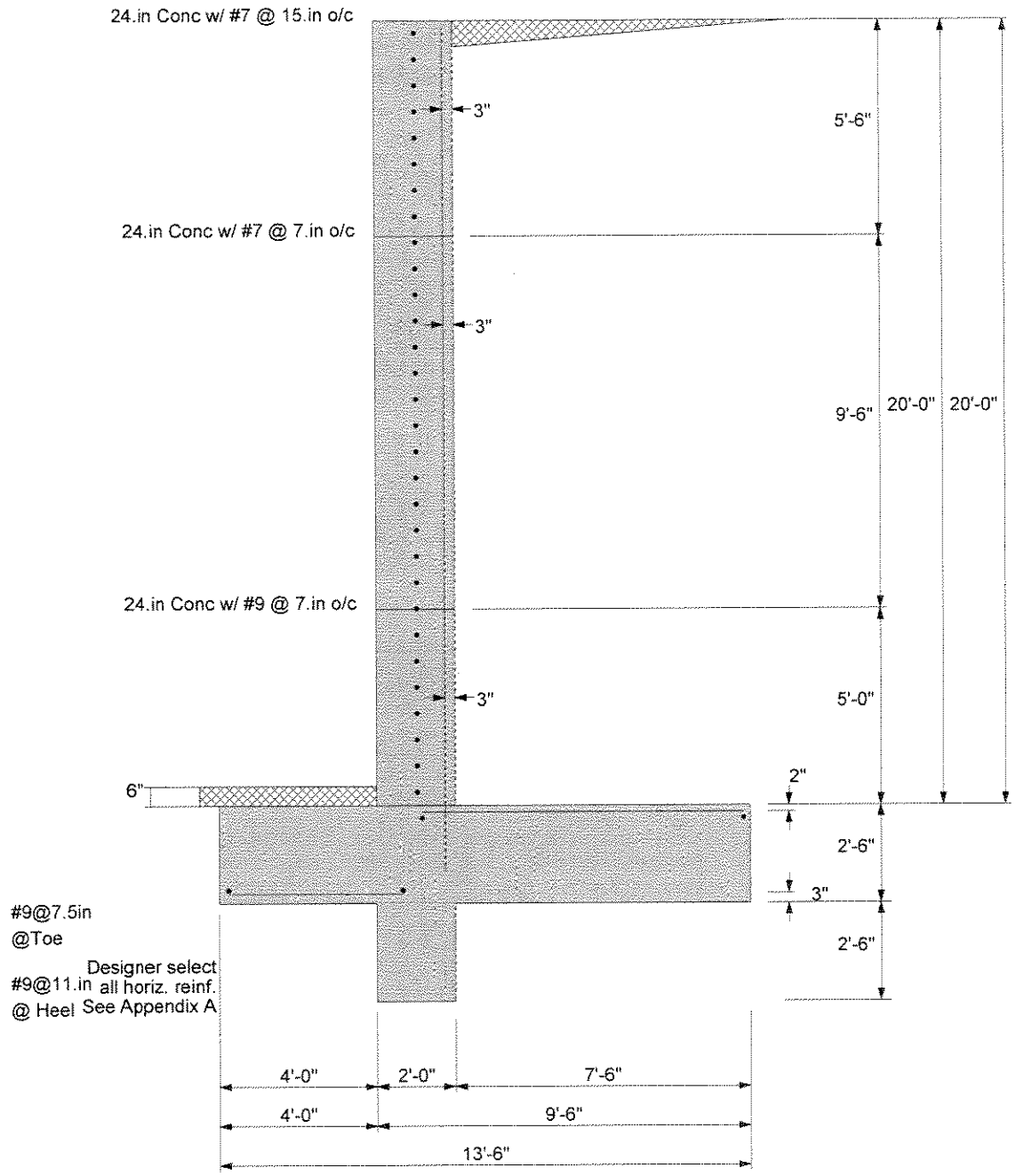
Resisting/Overturning Ratio = **2.51**

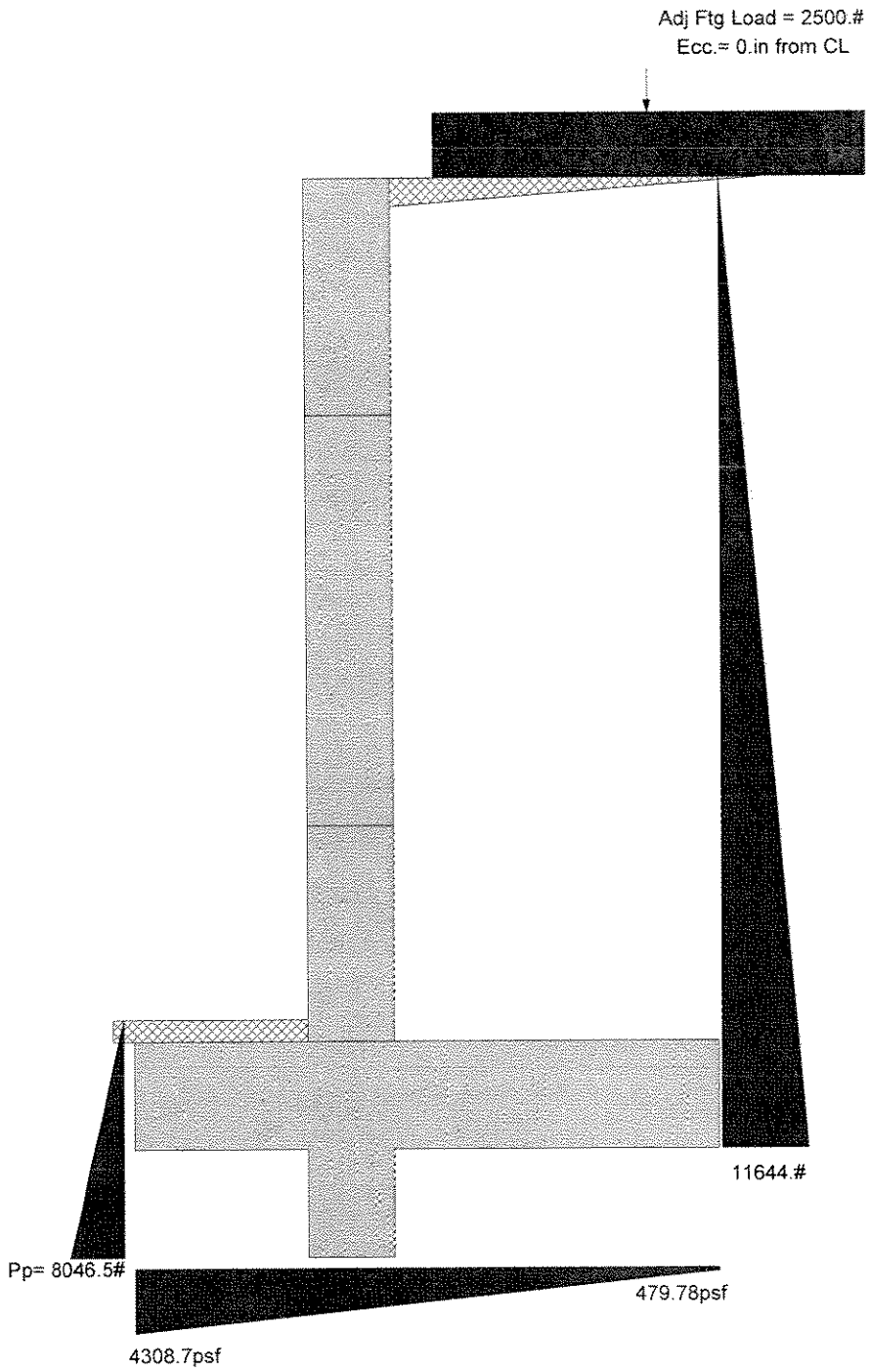
Vertical Loads used for Soil Pressure = 32,322.5 lbs

Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	19,500.0	9.75	190,125.0
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=	750.0	9.75	7,312.5
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=	260.0	2.00	520.0
Surcharge Over Toe	=			
Stem Weight(s)	=	6,000.0	5.00	30,000.0
Earth @ Stem Transitions	=			
Footing Weight	=	5,062.5	6.75	34,171.9
Key Weight	=	750.0	5.00	3,750.0
Vert. Component	=			
Total =		32,322.5 lbs	**R.M.=**	265,879.4

DESIGNER NOTES:


24.in Conc w/ #7 @ 15.in o/c
3"
5'-6"
24.in Conc w/ #7 @ 7.in o/c
3"
9'-6"
20'-0"
20'-0"
24.in Conc w/ #9 @ 7.in o/c
3"
5'-0"
6"
2"
2'-6"
3"
2'-6"
#9@7.5in
@Toe
Designer select
#9@11.in all horiz. reinf.
@ Heel See Appendix A
4'-0"
2'-0"
7'-6"
4'-0"
9'-6"
13'-6"


Adj Ftg Load = 2500.#
Ecc.= 0.in from CL
11644.#
Pp= 8046.5#
479.78psf
4308.7psf

Cantilevered Retaining Wall Design
Calculation Trace Listing

Beginning of Trace
Setting ACI Load Factors: DL Fact = 1.2000, LL Fact = 1.6000, ST Fact = 1.000
Noted that EFP Method being used
Back-solving internal friction angle from density and EFP, angle = 28.510 deg
Actual Heel Width (past back of stem) = 7.5000 ft
Soil Height for Stability (wall+footing+cslope) = 22.500 ft
Calculating Overturning Values
Arm = 7.5000 ft, Moment = 87,328 ft-#
Active Pressure @ Toe: (6.0000 + 30.000)^2 * 46.000 / 2.0= 207.000 lbs
Arm = (6.0000 + 30.000) / 3 /12 = 1.000 ft, Moment = 207.000 ft-#
Adjacent Footing Lateral Force = 1,414.07 lbs
Height above Footing Base = 158.977 in, Moment = 1,414.07 * 13.248 = 18,734 ft-#
Toe Active Pressure Used To Resist Sliding, so ADD Soil over toe = 207.000 lbs to Total Overturning Loads
Calculating Resisting Moments
Soil Wt Over Heel = 7.5000 * 20.000 * 130.000 = 19,500 lbs
Arm = 13.500 - 7.5000 / 2.0 = 9.7500 ft, Moment = 19,500 * 9.7500 = 190,125 ft-#
Soil Wt Over Toe = 4.0000 * 0.500 * 130.000 = 260.000 lbs
Arm = 4.0000 / 2.0 = 2.0000 ft, Moment = 260.000 * 2.0000 = 520.000 ft-#
Adjacent Footing, Force = 750.000 lbs, Arm = 9.7500 ft, Moment = 7,312.50 ft-#
Top Stem Weight = 1,650.00 lbs, Arm = (4.0000 + 2.0000 / 2.0) = 5.0000 ft
2nd Top Stem Weight = 2,850.00 lbs, Arm = (4.0000 + 2.0000 / 2.0) = 5.0000 ft
3rd Top Stem Weight = 1,500.00 lbs, Arm = (4.0000 + 2.0000 / 2.0) = 5.0000 ft
Stem Avg. Arm = 60.000 ft, Total Moment = 360,000 ft-#
Avg. Arm = 0.000 ft, Moment = 0.000 ft-#
Footing Weight = 13.500 * 30.000 * 150.000 = 5,062.50 lbs, Arm = 13.500 / 2.0 = 6.7500 ft, Moment = 34,172 ft-#
Key Weight = 2.5000 * 2.0000 * 150.000 = 5,062.50 lbs, Arm = 4.0000 + 2.0000 / 2.0 = 5.0000 ft, Moment = 3,750.00 ft-#
Total Resis. Wt = 32,323 lbs, Moment = 265,879 ft-#
Calculated Stem Forces for Preliminary Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 1,733.25 lbs, Moment = 3,187.43 ft-#
2nd Top Stem Section: Shear = 10,190 lbs, Moment = 55,544 ft-#
3rd Top Stem Section: Shear = 16,891 lbs, Moment = 122,554 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 1,733.25 / 21.000 / 12.0 = 6.8780 psi
Concrete Unit Shear Stress = 10,190 / 21.000 / 12.0 = 40.436 psi
Concrete Unit Shear Stress = 16,891 / 21.000 / 12.0 = 67.027 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 532,086 in-#
2nd Top Concrete Stem Capacity = 1,039,703 in-#
3rd Top Concrete Stem Capacity = 1,678,464 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
Calculate Bar Lap Lengths
Top Stem, Embed into Concrete ABOVE = 62.303 in
Top Stem, Embed into Concrete BELOW = 62.303 in
2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
2nd Top Stem, Embed into Concrete BELOW = 62.303 in
3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
3rd Top Stem, Embed into Concrete ABOVE = 80.104 in
Calculating Soil Pressure
Toe Bar Depth = 30.000 - 3.0000 - 0.5 = 26.500 in, Heel Bar Depth = 30.000 - 2.0000 - 0.5 = 27.500 in
Service Load Soil Pressures.....
P = 32,323 lbs, Ecc = 21.590 in, Toe Pressure = 359.061 psf, Heel Pressure = 39.982 psf
Calculating Factored Load Shear in Footing=
P = 39,087 lbs, Ecc = 21.590 in, Toe Pressure = 359.061 psf, Heel Pressure = 39.982 psf
Shear @ Toe = (24.504 - 1.2000 * (30.000 * 1.0417 + 6.0000 * 0.903 + 0.000) * 21.500) / (12.0 * 26.500) = 24.504 psi
Shear @ Heele = (24.504 - 26,775 - 0.000 - 0.000 - 0.000) / (12.0 * 27.500) = 81.136 psi
Shear Distances from Edge; Toe = 48.000 in, Heel = 90.000 in
Toe Upward Moment = 38,025 ft-#
Toe Downward Moment = 1.2000 * (30.000 * 1.0417 + 6.0000 * 0.903 + 0.000) * 48.000^2 / 2.0 = 4,224.00 ft-#
Moment @ Toe, Upward = 456,304 ft-#, Downward = 1.2000 * (30.000 * 1.0417 + 6.0000 * 0.903 + 0.000) * 48.000^2 / 2.0 = 33,80
Flag set to ignore updard pressure under heel-->> Heel Upward Moment = 0
Heel Downward Moment = 1.2000 * (30.000 * 1.0417 + 240.000 * 0.903 + 0.000 + 0.000) * 90.000^2 / 2.0 = 100,406 ft-#

65 Add moment due to vertical soil component = 1.6000 * 0.000 * 90.000 = 0.000 ft-#
66 Preliminary Design Moment = 1204,875.000 ft-#
67 Soil Height for Passive Pressure = 30.000 + 30.000 + 6.0000 = 66.000 in
68 Sliding Resistance due to Friction = 32,323 * 0.550 = 17,777 lbs
69 Friction Resistance adjusted for Specified '%' = 1.000 * 17,777 = 17,777 lbs
70 Sliding Passive Pressure = (66.000 - 0.000) * 3.6944 * (66.000 - 0.000)/2.0)
71 + (0.000 * 3.6944 * (66.000 - 0.000)) = 8,046.50 lbs
72 Passive Resistance adjusted for Specified '%' = 1.000 * 17,777 = 8,046.50 lbs
73 Sliding Factor of Safety = (8,046.50 + 17,777) / 12,851 = 2.0095 lbs
74 **Calculating Footing Rebar Requirements**
75 RHo:Balanced = 0.850 * 3,000.00 / 60,000 * 0.850 * (87000.0 / (87000.0 + 60,000)) = 0.021
76 Ru : Toe = ABS(405,616 / 12.0 / 26.500^2 / 0.9) = 53.481 psi
77 Required Steel % = 0.001%
78 Required Steel Area = 0.053 in2
79 Ru : Heel = ABS(1204,875.000 / 12.0 / 27.500^2 / 0.9) = 147.521 psi
80 Required Steel % = 0.003%
81 Required Steel Area = 0.092 in2
82 Key : Required Steel % = 0.000%
83 Required Steel Area = 0.042 in2
84 **Calculated Stem Forces for Fincal Checks**
85 **Cantilevered Stem Calculations**
86 Top Stem Section: Shear = 1,733.25 lbs, Moment = 3,187.43 ft-#
87 2nd Top Stem Section: Shear = 10,190 lbs, Moment = 55,544 ft-#
88 3rd Top Stem Section: Shear = 16,891 lbs, Moment = 122,554 ft-#
89 Calcualting Actual Shear Stress
90 Concrete Unit Shear Stress = 1,733.25 / 21.000 / 12.0 = 6.8780 psi
91 Concrete Unit Shear Stress = 10,190 / 21.000 / 12.0 = 40.436 psi
92 Concrete Unit Shear Stress = 16,891 / 21.000 / 12.0 = 67.027 psi
93 Determine Allowable Moments
94 Top Concrete Stem Capacity = 532,086 in-#
95 2nd Top Concrete Stem Capacity = 1,039,703 in-#
96 3rd Top Concrete Stem Capacity = 1,678,464 in-#
97 Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
98 2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
99 3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
100 **Calculate Bar Lap Lengths**
101 Top Stem, Embed into Concrete ABOVE = 62.303 in
102 Top Stem, Embed into Concrete BELOW = 62.303 in
103 2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
104 2nd Top Stem, Embed into Concrete BELOW = 62.303 in
105 3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
106 3rd Top Stem, Embed into Concrete ABOVE = 80.104 in

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : **Wall "D" H= 20' Seismic** Page: _____
Job # : **E-05129** Dsgnr: **JJF** Date: **JUL 18,2006**
Description....
Wall 'D' H = 20'-0" Seismic Loads EFP = 46 & Kv = 0.10

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	20.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	5,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	46.0 psf/ft
Toe Active Pressure	=	46.0 psf/ft
Passive Pressure	=	532.0 psf/ft
Soil Density	=	125.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	4.00 ft
Heel Width	=	9.50
Total Footing Width	=	13.50
Footing Thickness	=	30.00 in
Key Width	=	24.00 in
Key Depth	=	30.00 in
Key Distance from Toe	=	4.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel = 0.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Design Kh = 0.100 g

Using Mononobe-Okabe / Seed-Whitman procedure

Kae for seismic earth pressure	=	0.391
Ka for static earth pressure	=	0.323
Difference: Kae - Ka	=	0.068

Added seismic base force 1,536.1 lbs

*Design Summary

Wall Stability Ratios

Overturning	=	2.33	OK
Sliding	=	1.93	OK
Total Bearing Load	=	30,813 lbs	
...resultant ecc.	=	25.16 in	
Soil Pressure @ Toe	=	4,409 psf	OK
Soil Pressure @ Heel	=	155 psf	OK
Allowable	=	5,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	5,291 psf	
ACI Factored @ Heel	=	186 psf	
Footing Shear @ Toe	=	24.8 psi	OK
Footing Shear @ Heel	=	78.4 psi	OK
Allowable	=	93.1 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	12,972.8 lbs	
less 100% Passive Force	=	- 8,046.5 lbs	
less 100% Friction Force	=	- 6,946.9 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Top Stem	2nd	3rd
Design Height Above Ftg	ft =	13.00	5.00	0.00
		Stem OK	Stem OK	Stem OK
Wall Material Above "Ht"	=	Concrete	Concrete	Concrete
Thickness	=	24.00	24.00	24.00
Rebar Size	=	# 7	# 7	# 9
Rebar Spacing	=	15.00	7.50	7.50
Rebar Placed at	=	Edge	Edge	Edge
Design Data				
fb/FB + fa/Fa	=	**0.115**	**0.578**	**0.848**
Total Force @ Section	lbs =	2,012.6	9,241.6	16,420.2
Moment....Actual	ft-# =	5,087.0	50,054.0	118,644.9
Moment.....Allowable	ft-# =	44,340.5	86,641.9	139,872.0
Shear.....Actual	psi =	7.2	32.9	58.4
Shear.....Allowable	psi =	82.2	82.2	82.2
Wall Weight	psf =	300.0	300.0	300.0
Rebar Depth 'd'	in =	21.00	21.00	21.00
LAP SPLICE IF ABOVE	in =	37.38	37.38	48.06
LAP SPLICE IF BELOW	in =	37.38	37.38	
HOOK EMBED INTO FTG	in =			17.25
Masonry Data				
f'm	psi =			
Fs	psi =			
Solid Grouting	=			
Special Inspection	=			
Modular Ratio 'n'	=			
Short Term Factor	=			
Equiv. Solid Thick.	=			
Masonry Block Type = Medium Weight				
Concrete Data				
f'c	psi =	3,000.0	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall "D" H= 20' Seismic
Job # : E-05129 Dsgnr: JJF
Description....
Wall 'D' H = 20'-0" Seismic Loads EFP = 46 & Kv = 0.10

Page: _____
Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel	
Factored Pressure	=	5,291	186	psf
Mu' : Upward	=	38,297	0	ft-#
Mu' : Downward	=	4,200	97,031	ft-#
Mu: Design	=	34,097	97,031	ft-#
Actual 1-Way Shear	=	24.80	78.41	psi
Allow 1-Way Shear	=	93.11	93.11	psi

Toe Reinforcing	=	# 9 @ 21.00 in
Heel Reinforcing	=	# 9 @ 11.25 in
Key Reinforcing	=	None Spec'd

Other Acceptable Sizes & Spacings

Toe: #4@ 4.25 in, #5@ 6.50 in, #6@ 9.25 in, #7@ 12.75 in, #8@ 16.75 in, #9@ 21.0
Heel: #4@ 2.25 in, #5@ 3.50 in, #6@ 5.00 in, #7@ 6.75 in, #8@ 9.00 in, #9@ 11.25
Key: #4@ 5.50 in, #5@ 8.25 in, #6@ 11.75 in, #7@ 16.00 in, #

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	11,643.8	7.50	87,328.1
Toe Active Pressure	=	-207.0	1.00	-207.0
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Seismic Earth Load	=	1,536.1	13.50	20,737.1
Total	=	12,972.8	**O.T.M.** =	107,858.2

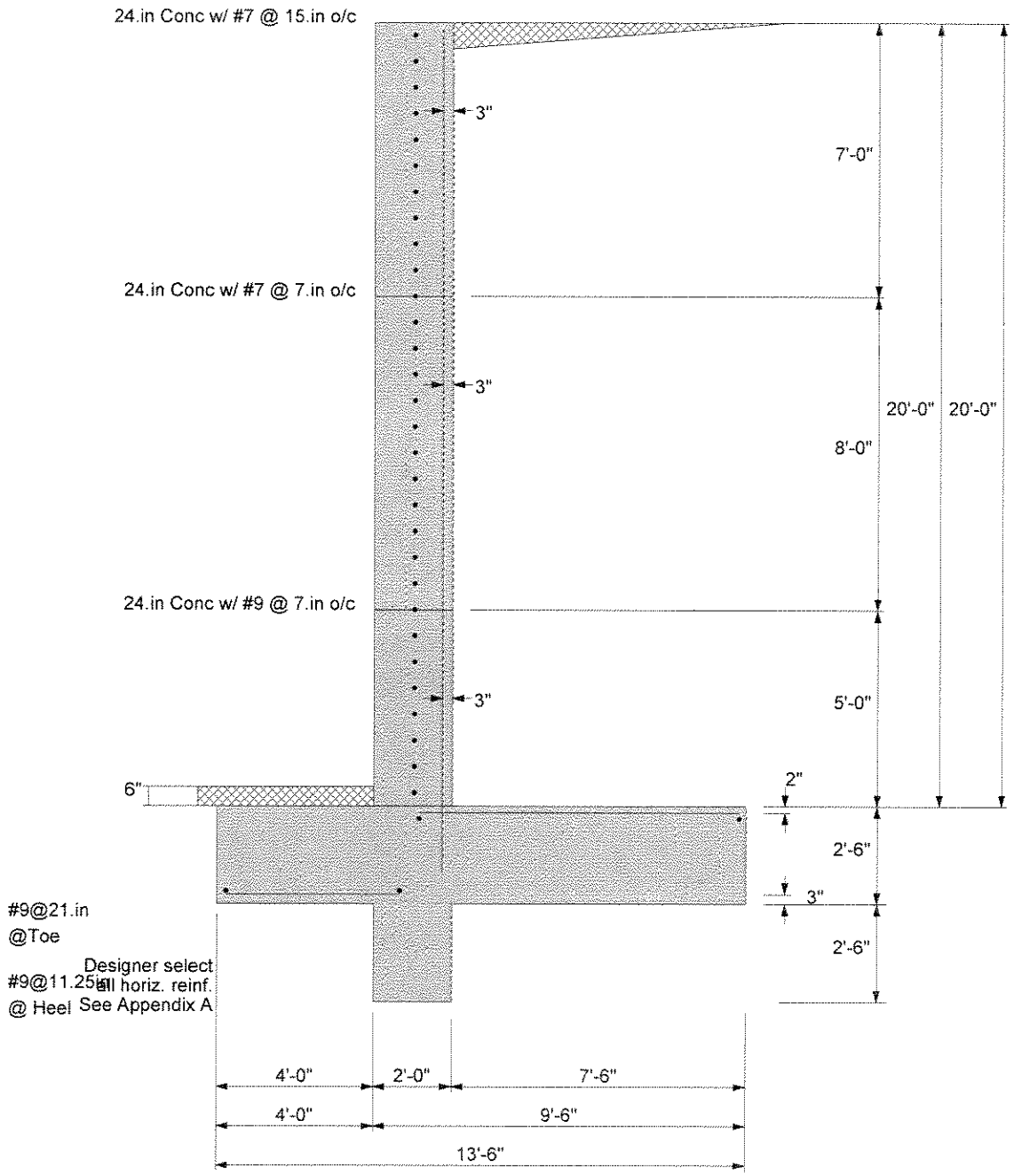
Resisting/Overturning Ratio = **2.33**

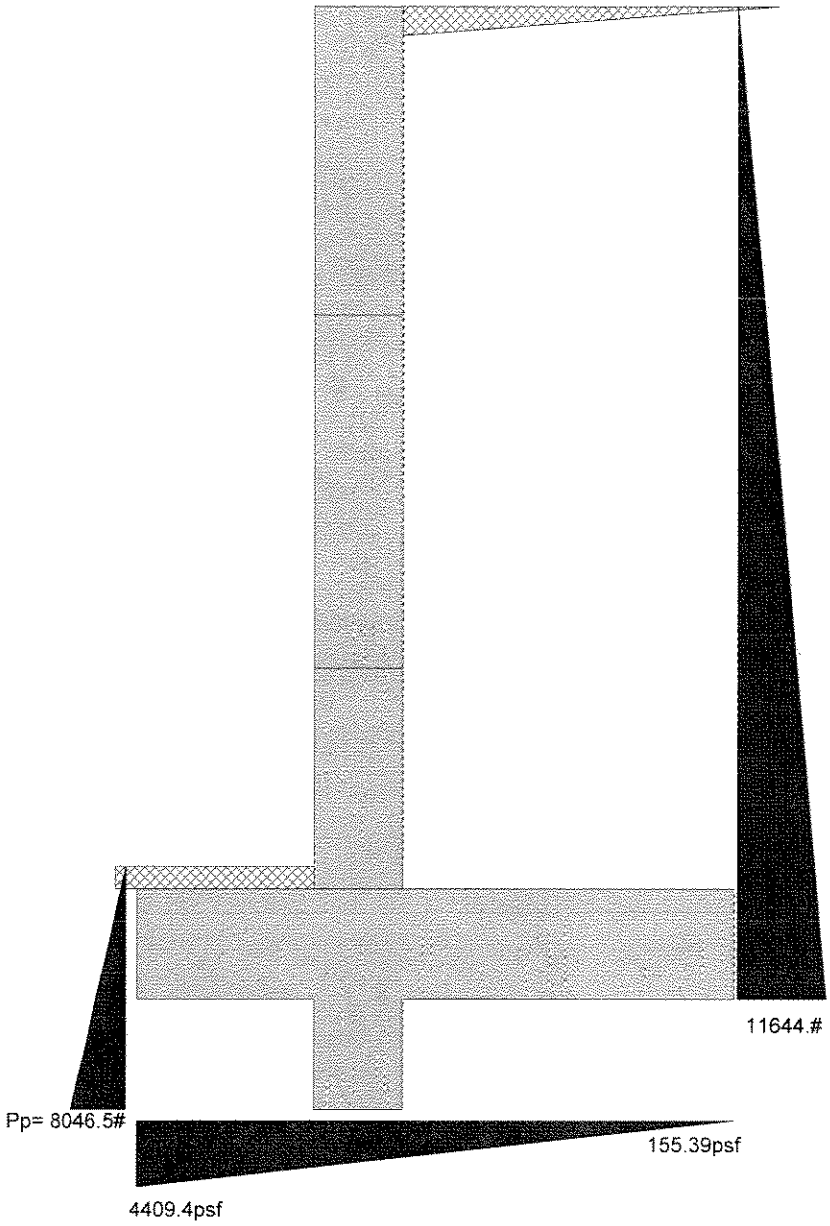
Vertical Loads used for Soil Pressure = 30,812.5 lbs

Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	18,750.0	9.75	182,812.5
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=	250.0	2.00	500.0
Surcharge Over Toe	=			
Stem Weight(s)	=	6,000.0	5.00	30,000.0
Earth @ Stem Transitions	=			
Footing Weight	=	5,062.5	6.75	34,171.9
Key Weight	=	750.0	5.00	3,750.0
Vert. Component	=			
Total =		30,812.5 lbs	**R.M.=**	251,234.4

DESIGNER NOTES:


24.in Conc w/ #7 @ 15.in o/c
3"
7'-0"
24.in Conc w/ #7 @ 7.in o/c
3"
20'-0"
20'-0"
8'-0"
24.in Conc w/ #9 @ 7.in o/c
3"
5'-0"
6"
2"
2'-6"
3"
2'-6"
#9@21.in
@Toe
Designer select
#9@11.25in
all horiz. reinf.
@ Heel
See Appendix A
4'-0"
2'-0"
7'-6"
4'-0"
9'-6"
13'-6"


11644.#
Pp= 8046.5#
155.39psf
4409.4psf

Cantilevered Retaining Wall Design
Calculation Trace Listing

Beginning of Trace
Setting ACI Load Factors: DL Fact = 1.2000, LL Fact = 1.6000, ST Fact = 1.000
Noted that EFP Method being used
Back-solving internal friction angle from density and EFP, angle = 27.520 deg
Actual Heel Width (past back of stem) = 7.5000 ft
Soil Height for Stability (wall+footing+cslope) = 22.500 ft
Calculating Overturning Values
Arm = 7.5000 ft, Moment = 87,328 ft-#
Seismic Lateral Force calcs....
Kae Force = 0.068 * 0.868 * 270.000^2 / 2.0 = 1,536.08 lbs
Ka Force = 270.000 * 0.319 * 270.000 * 0.5 = 11,644 lbs
Force Height = Retained Height * 0.6 = 270.000 * 0.600 = 162.000
Overturning Moment = 1,536.08 * 162.000 = 20,737 ft-#
Active Pressure @ Toe: (6.0000 + 30.000)^2 * 46.000 / 2.0= 207.000 lbs
Arm = (6.0000 + 30.000) / 3 /12 = 1.000 ft, Moment = 207.000 ft-#
Toe Active Pressure Used To Resist Sliding, so ADD Soil over toe = 207.000 lbs to Total Overturning Loads
Calculating Resisting Moments
Soil Wt Over Heel = 7.5000 * 20.000 * 125.000 = 18,750 lbs
Arm = 13.500 - 7.5000 / 2.0 = 9.7500 ft, Moment = 18,750 * 9.7500 = 182,813 ft-#
Soil Wt Over Toe = 4.0000 * 0.500 * 125.000 = 250.000 lbs
Arm = 4.0000 / 2.0 = 2.0000 ft, Moment = 250.000 * 2.0000 = 500.000 ft-#
Top Stem Weight = 2,100.00 lbs, Arm = (4.0000 + 2.0000 / 2.0) = 5.0000 ft
2nd Top Stem Weight = 2,400.00 lbs, Arm = (4.0000 + 2.0000 / 2.0) = 5.0000 ft
3rd Top Stem Weight = 1,500.00 lbs, Arm = (4.0000 + 2.0000 / 2.0) = 5.0000 ft
Stem Avg. Arm = 60.000 ft, Total Moment = 360,000 ft-#
Avg. Arm = 0.000 ft, Moment = 0.000 ft-#
Footing Weight = 13.500 * 30.000 * 150.000 = 5,062.50 lbs, Arm = 13.500 / 2.0 = 6.7500 ft, Moment = 34,172 ft-#
Key Weight = 2.5000 * 2.0000 * 150.000 = 5,062.50 lbs, Arm = 4.0000 + 2.0000 / 2.0 = 5.0000 ft, Moment = 3,750.00 ft-#
Total Resis. Wt = 30,813 lbs, Moment = 251,234 ft-#
Calculated Stem Forces for Preliminary Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 2,012.60 lbs, Moment = 5,086.97 ft-#
2nd Top Stem Section: Shear = 9,241.55 lbs, Moment = 50,054 ft-#
3rd Top Stem Section: Shear = 16,420 lbs, Moment = 118,645 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 1,803.20 / 21.000 / 12.0 = 7.1556 psi
Concrete Unit Shear Stress = 8,280.00 / 21.000 / 12.0 = 32.857 psi
Concrete Unit Shear Stress = 14,711 / 21.000 / 12.0 = 58.376 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 532,086 in-#
2nd Top Concrete Stem Capacity = 1,039,703 in-#
3rd Top Concrete Stem Capacity = 1,678,464 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
Calculate Bar Lap Lengths
Top Stem, Embed into Concrete ABOVE = 62.303 in
Top Stem, Embed into Concrete BELOW = 62.303 in
2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
2nd Top Stem, Embed into Concrete BELOW = 62.303 in
3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
3rd Top Stem, Embed into Concrete ABOVE = 80.104 in
Calculating Soil Pressure
Toe Bar Depth = 30.000 - 3.0000 - 0.5 = 26.500 in, Heel Bar Depth = 30.000 - 2.0000 - 0.5 = 27.500 in
Service Load Soil Pressures.....
P = 30,813 lbs, Ecc = 25.162 in, Toe Pressure = 367.452 psf, Heel Pressure = 12.949 psf
Calculating Factored Load Shear in Footing=
P = 36,975 lbs, Ecc = 25.162 in, Toe Pressure = 367.452 psf, Heel Pressure = 12.949 psf
Shear @ Toe = (24.805 - 1.2000 * (30.000 * 1.0417 + 6.0000 * 0.868 + 0.000) * 21.500) / (12.0 * 26.500) = 24.805 psi
Shear @ Heele = (24.805 - 25,875 - 0.000 - 0.000 - 0.000) / (12.0 * 27.500) = 78.409 psi
Shear Distances from Edge; Toe = 48.000 in, Heel = 90.000 in
Toe Upward Moment = 38,297 ft-#
Toe Downward Moment = 1.2000 * (30.000 * 1.0417 + 6.0000 * 0.868 + 0.000) * 48.000^2 / 2.0 = 4,200.00 ft-#
Moment @ Toe, Upward = 459,564 ft-#, Downward = 1.2000 * (30.000 * 1.0417 + 6.0000 * 0.868 + 0.000) * 48.000^2 / 2.0 = 34,097

Flag set to ignore updard pressure under heel-->> Heel Upward Moment = 0
Heel Downward Moment = 1.2000 * (30.000 * 1.0417 + 240.000 * 0.868 + 0.000 + 0.000) * 90.000^2 / 2.0 = 97,031 ft-#
Add moment due to vertical soil component = 1.6000 * 0.000 * 90.000 = 0.000 ft-#
Preliminary Design Moment = 1164,375.000 ft-#
Soil Height for Passive Pressure = 30.000 + 30.000 + 6.0000 = 66.000 in
Sliding Resistance due to Friction = 30,813 * 0.550 = 16,947 lbs
Friction Resistance adjusted for Specified '%' = 1.000 * 16,947 = 16,947 lbs
Sliding Passive Pressure = (66.000 - 0.000) * 3.6944 * (66.000 - 0.000)/2.0)
+ (0.000 * 3.6944 * (66.000 - 0.000)) = 8,046.50 lbs
Passive Resistance adjusted for Specified '%' = 1.000 * 16,947 = 8,046.50 lbs
Sliding Factor of Safety = (8,046.50 + 16,947) / 12,973 = 1.9266 lbs
Calculating Footing Rebar Requirements
RHo:Balanced = 0.850 * 3,000.00 / 60,000 * 0.850 * (87000.0 / (87000.0 + 60,000)) = 0.021
Ru : Toe = ABS(409,164 / 12.0 / 26.500^2 / 0.9) = 53.949 psi
Required Steel % = 0.001%
Required Steel Area = 0.048 in2
Ru : Heel = ABS(1164,375.000 / 12.0 / 27.500^2 / 0.9) = 142.562 psi
Required Steel % = 0.002%
Required Steel Area = 0.089 in2
Key : Required Steel % = 0.000%
Required Steel Area = 0.038 in2
Calculated Stem Forces for Fincal Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 2,012.60 lbs, Moment = 5,086.97 ft-#
2nd Top Stem Section: Shear = 9,241.55 lbs, Moment = 50,054 ft-#
3rd Top Stem Section: Shear = 16,420 lbs, Moment = 118,645 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 1,803.20 / 21.000 / 12.0 = 7.1556 psi
Concrete Unit Shear Stress = 8,280.00 / 21.000 / 12.0 = 32.857 psi
Concrete Unit Shear Stress = 14,711 / 21.000 / 12.0 = 58.376 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 532,086 in-#
2nd Top Concrete Stem Capacity = 1,039,703 in-#
3rd Top Concrete Stem Capacity = 1,678,464 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
Calculate Bar Lap Lengths
Top Stem, Embed into Concrete ABOVE = 62.303 in
Top Stem, Embed into Concrete BELOW = 62.303 in
2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
2nd Top Stem, Embed into Concrete BELOW = 62.303 in
3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
3rd Top Stem, Embed into Concrete ABOVE = 80.104 in

WALL MK. 'E'

Loading Case	Overturning Ratio	Sliding Ratio	Maximum Soil Bearing Pressure	Controlling Case for Strength Design	Remarks
Normal	2.5	1.7	3900		See Note 1
Compaction Equipment	2.4	1.8	4600	.76	
Seismic	2.2	1.7		✓	

Notes:

1.0 Vertical Component of Active Pressure was used in the calculation of Soil Pressure.

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : **Wall "E" H = 24' Normal** Page: _____
Job # : **E-05129** Dsgnr: **JJF** Date: **JUL 18,2006**
Description....
Wall "E" Height 'H' = 24'-0" Normal loads EFP = 51 psf

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
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Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	24.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	51.0 psf/ft
Toe Active Pressure	=	0.0 psf/ft
Passive Pressure	=	534.0 psf/ft
Soil Density	=	125.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	5.50 ft
Heel Width	=	10.50
Total Footing Width	=	16.00
Footing Thickness	=	33.00 in
Key Width	=	30.00 in
Key Depth	=	36.00 in
Key Distance from Toe	=	5.50 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0020
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

*Design Summary

Wall Stability Ratios

Overturning	=	2.51	OK
Sliding	=	1.71	OK
Total Bearing Load	=	44,747 lbs	
...resultant ecc.	=	12.65 in	
Soil Pressure @ Toe	=	3,902 psf	OK
Soil Pressure @ Heel	=	1,691 psf	OK
Allowable	=	4,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	4,262 psf	
ACI Factored @ Heel	=	1,847 psf	
Footing Shear @ Toe	=	30.4 psi	OK
Footing Shear @ Heel	=	89.5 psi	OK
Allowable	=	93.1 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	18,246.8 lbs	
less 100% Passive Force	=	- 8,827.7 lbs	
less 100% Friction Force	=	- 2,398.8 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Top Stem	2nd	3rd
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	ft =	13.00	5.00	0.00
Wall Material Above "Ht"	=	Concrete	Concrete	Concrete
Thickness	=	30.00	30.00	30.00
Rebar Size	=	# 7	# 7	# 9
Rebar Spacing	=	10.00	5.00	5.00
Rebar Placed at	=	Edge	Edge	Edge
Design Data				
fb/FB + fa/Fa	=	**0.212**	**0.563**	**0.706**
Total Force @ Section	lbs =	4,936.8	14,728.8	23,500.8
Moment....Actual	ft-# =	18,101.6	93,282.4	188,006.4
Moment.....Allowable	ft-# =	85,186.1	165,784.3	266,112.0
Shear.....Actual	psi =	15.2	45.5	72.5
Shear.....Allowable	psi =	82.2	82.2	82.2
Wall Weight	psf =	375.0	375.0	375.0
Rebar Depth 'd'	in =	27.00	27.00	27.00
LAP SPLICE IF ABOVE	in =	37.38	37.38	48.06
LAP SPLICE IF BELOW	in =	37.38	37.38	
HOOK EMBED INTO FTG	in =			17.25
Masonry Data				
f'm	psi =			
Fs	psi =			
Solid Grouting	=			
Special Inspection	=			
Modular Ratio 'n'	=			
Short Term Factor	=			
Equiv. Solid Thick.	=			
Masonry Block Type = Medium Weight				
Concrete Data				
f'c	psi =	3,000.0	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : **Wall "E" H = 24' Normal** Page: _____
Job # : **E-05129** Dsgnr: **JJF** Date: **JUL 18,2006**
Description....
Wall "E" Height 'H' = 24'-0" Normal loads EFP = 51 psf

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
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Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel	
Factored Pressure	=	4,262	1,847	psf
Mu' : Upward	=	60,277	0	ft-#
Mu' : Downward	=	7,487	131,040	ft-#
Mu: Design	=	52,790	131,040	ft-#
Actual 1-Way Shear	=	30.39	89.51	psi
Allow 1-Way Shear	=	93.11	93.11	psi

Toe Reinforcing = # 9 @ 5.00 in
Heel Reinforcing = # 9 @ 10.00 in
Key Reinforcing = # 7 @ 12.00 in

Other Acceptable Sizes & Spacings

Toe: #4@ 3.50 in, #5@ 5.50 in, #6@ 7.50 in, #7@ 10.25 in, #8@ 13.50 in, #9@ 17.0
Heel: #4@ 2.00 in, #5@ 3.25 in, #6@ 4.50 in, #7@ 6.00 in, #8@ 8.00 in, #9@ 10.00
Key: #4@ 3.75 in, #5@ 5.75 in, #6@ 8.25 in, #7@ 11.25 in, #8

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	18,246.8	8.92	162,701.0
Toe Active Pressure	=		0.92	
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	18,246.8	**O.T.M.** =	162,701.0

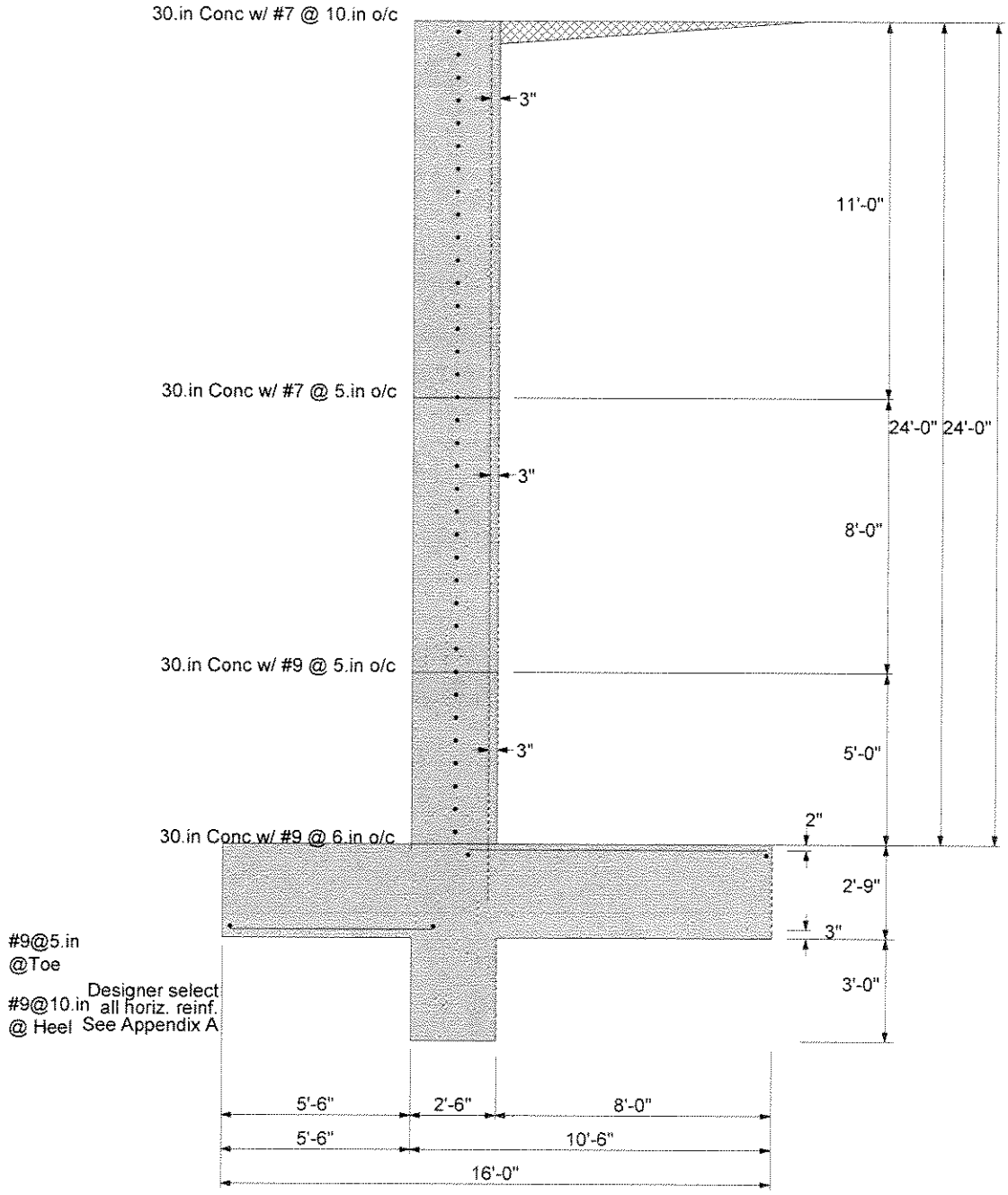
Resisting/Overturning Ratio = **2.51**

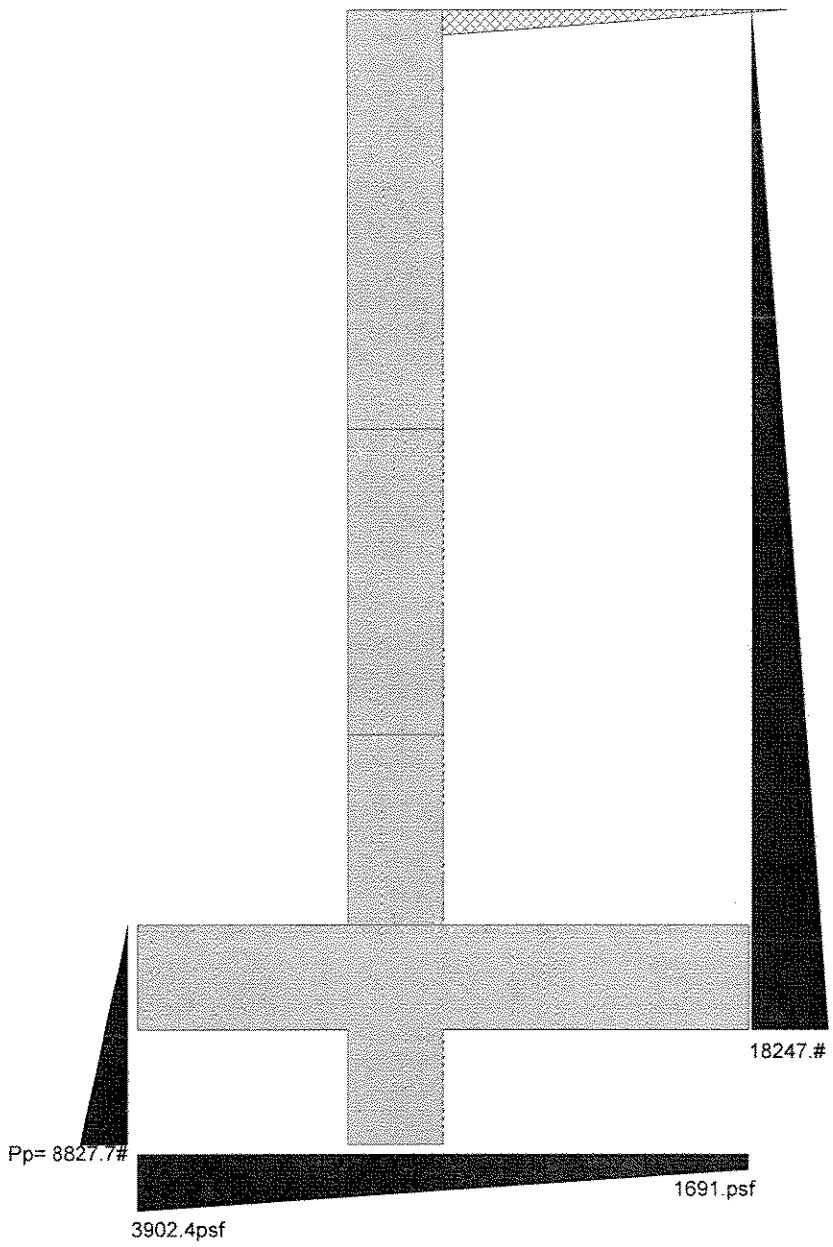
Vertical Loads used for Soil Pressure = 44,747.5 lbs

Vertical component of active pressure used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	24,000.0	12.00	288,000.0
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=			
Surcharge Over Toe	=			
Stem Weight(s)	=	9,000.0	6.75	60,750.0
Earth @ Stem Transitions	=			
Footing Weight	=	6,600.0	8.00	52,800.0
Key Weight	=	1,125.0	6.75	7,593.8
Vert. Component	=			
Total =		40,725.0 lbs	**R.M.=**	409,143.8

DESIGNER NOTES:


30.in Conc w/ #7 @ 10.in o/c
3"
11'-0"
30.in Conc w/ #7 @ 5.in o/c
24'-0"
24'-0"
3"
8'-0"
30.in Conc w/ #9 @ 5.in o/c
3"
5'-0"
2"
30.in Conc w/ #9 @ 6.in o/c
2'-9"
3"
#9@5.in
@Toe
3'-0"
Designer select
#9@10.in all horiz. reinf.
@ Heel See Appendix A
5'-6"
2'-6"
8'-0"
5'-6"
10'-6"
16'-0"


18247.#
Pp= 8827.7#
1691.psf
3902.4psf

Cantilevered Retaining Wall Design
Calculation Trace Listing

1 **Beginning of Trace**
2 Setting ACI Load Factors: DL Fact = 1.2000, LL Fact = 1.6000, ST Fact = 1.000
3 Noted that EFP Method being used
4 Back-solving internal friction angle from density and EFP, angle = 24.870 deg
5 Actual Heel Width (past back of stem) = 8.0000 ft
6 Soil Height for Stability (wall+footing+cslope) = 26.750 ft
7 **Calculating Overturning Values**
8 Arm = 8.9167 ft, Moment = 162,701 ft-#
9 Active Pressure @ Toe: (0.000 + 33.000)^2 * 0.000 / 2.0= 0.000 lbs
10 Arm = (0.000 + 33.000) / 3 /12 = 0.917 ft, Moment = 0.000 ft-#
11 Toe Active Pressure Used To Resist Sliding, so ADD Soil over toe = 0.000 lbs to Total Overturning Loads
12 **Calculating Resisting Moments**
13 Soil Wt Over Heel = 8.0000 * 24.000 * 125.000 = 24,000 lbs
14 Arm = 16.000 - 8.0000 / 2.0 = 12.000 ft, Moment = 24,000 * 12.000 = 288,000 ft-#
15 Top Stem Weight = 4,125.00 lbs, Arm = (5.5000 + 2.5000 / 2.0) = 6.7500 ft
16 2nd Top Stem Weight = 3,000.00 lbs, Arm = (5.5000 + 2.5000 / 2.0) = 6.7500 ft
17 3rd Top Stem Weight = 1,875.00 lbs, Arm = (5.5000 + 2.5000 / 2.0) = 6.7500 ft
18 Stem Avg. Arm = 81.000 ft, Total Moment = 729,000 ft-#
19 Avg. Arm = 0.000 ft, Moment = 0.000 ft-#
20 Footing Weight = 16.000 * 33.000 * 150.000 = 6,600.00 lbs, Arm = 16.000 / 2.0 = 8.0000 ft, Moment = 52,800 ft-#
21 Key Weight = 3.0000 * 2.5000 * 150.000 = 6,600.00 lbs, Arm = 5.5000 + 2.5000 / 2.0 = 6.7500 ft, Moment = 7,593.75 ft-#
22 Total Resis. Wt = 40,725 lbs, Moment = 409,144 ft-#
23 **Calculated Stem Forces for Preliminary Checks**
24 **Cantilevered Stem Calculations**
25 Top Stem Section: Shear = 4,936.80 lbs, Moment = 18,102 ft-#
26 2nd Top Stem Section: Shear = 14,729 lbs, Moment = 93,282 ft-#
27 3rd Top Stem Section: Shear = 23,501 lbs, Moment = 188,006 ft-#
28 Calcualting Actual Shear Stress
29 Concrete Unit Shear Stress = 4,936.80 / 27.000 / 12.0 = 15.237 psi
30 Concrete Unit Shear Stress = 14,729 / 27.000 / 12.0 = 45.459 psi
31 Concrete Unit Shear Stress = 23,501 / 27.000 / 12.0 = 72.533 psi
32 Determine Allowable Moments
33 Top Concrete Stem Capacity = 1,022,233 in-#
34 2nd Top Concrete Stem Capacity = 1,989,412 in-#
35 3rd Top Concrete Stem Capacity = 3,193,344 in-#
36 Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
37 2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
38 3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
39 **Calculate Bar Lap Lengths**
40 Top Stem, Embed into Concrete ABOVE = 62.303 in
41 Top Stem, Embed into Concrete BELOW = 62.303 in
42 2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
43 2nd Top Stem, Embed into Concrete BELOW = 62.303 in
44 3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
45 3rd Top Stem, Embed into Concrete ABOVE = 80.104 in
46 **Calculating Soil Pressure**
47 Toe Bar Depth = 33.000 - 3.0000 - 0.5 = 29.500 in, Heel Bar Depth = 33.000 - 2.0000 - 0.5 = 30.500 in
48 Service Load Soil Pressures.....
49 P = 44,747 lbs, Ecc = 12.652 in, Toe Pressure = 325.203 psf, Heel Pressure = 140.916 psf
50 **Calculating Factored Load Shear in Footing=**
51 P = 48,870 lbs, Ecc = 12.652 in, Toe Pressure = 325.203 psf, Heel Pressure = 140.916 psf
52 Shear @ Toe = (30.394 - 1.2000 * (33.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 36.500) / (12.0 * 29.500) = 30.394 psi
53 Shear @ Heele = (30.394 - 32,760 - 0.000 - 0.000 - 0.000) / (12.0 * 30.500) = 89.508 psi
54 Shear Distances from Edge; Toe = 66.000 in, Heel = 96.000 in
55 Toe Upward Moment = 60,277 ft-#
56 Toe Downward Moment = 1.2000 * (33.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 66.000^2 / 2.0 = 7,486.88 ft-#
57 Moment @ Toe, Upward = 723,318 ft-#, Downward = 1.2000 * (33.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 66.000^2 / 2.0 = 52,790
58 Flag set to ignore updard pressure under heel-->> Heel Upward Moment = 0
59 Heel Downward Moment = 1.2000 * (33.000 * 1.0417 + 288.000 * 0.868 + 0.000 + 0.000) * 96.000^2 / 2.0 = 131,040 ft-#
60 Add moment due to vertical soil component = 1.6000 * 0.000 * 96.000 = 0.000 ft-#
61 Preliminary Design Moment = 1572,480.000 ft-#
62 Soil Height for Passive Pressure = 36.000 + 33.000 + 0.000 = 69.000 in
63 Sliding Resistance due to Friction = 40,725 * 0.550 = 22,399 lbs
64 Friction Resistance adjusted for Specified '%' = 1.000 * 22,399 = 22,399 lbs

Sliding Passive Pressure = (69.000 - 0.000) * 3.7083 * (69.000 - 0.000)/2.0)
+ (0.000 * 3.7083 * (69.000 - 0.000)) = 8,827.69 lbs
Passive Resistance adjusted for Specified '%' = 1.000 * 22,399 = 8,827.69 lbs
Sliding Factor of Safety = (8,827.69 + 22,399) / 18,247 = 1.7113 lbs

Calculating Footing Rebar Requirements

RHo:Balanced = 0.850 * 3,000.00 / 60,000 * 0.850 * (87000.0 / (87000.0 + 60,000)) = 0.021
Ru : Toe = ABS(633,476 / 12.0 / 29.500^2 / 0.9) = 67.400 psi
Required Steel % = 0.001%
Required Steel Area = 0.059 in2
Ru : Heel = ABS(1572,480.000 / 12.0 / 30.500^2 / 0.9) = 156.517 psi
Required Steel % = 0.003%
Required Steel Area = 0.102 in2
Key : Required Steel % = 0.000%
Required Steel Area = 0.054 in2

Calculated Stem Forces for Fincal Checks

Cantilevered Stem Calculations

Top Stem Section: Shear = 4,936.80 lbs, Moment = 18,102 ft-#
2nd Top Stem Section: Shear = 14,729 lbs, Moment = 93,282 ft-#
3rd Top Stem Section: Shear = 23,501 lbs, Moment = 188,006 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 4,936.80 / 27.000 / 12.0 = 15.237 psi
Concrete Unit Shear Stress = 14,729 / 27.000 / 12.0 = 45.459 psi
Concrete Unit Shear Stress = 23,501 / 27.000 / 12.0 = 72.533 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 1,022,233 in-#
2nd Top Concrete Stem Capacity = 1,989,412 in-#
3rd Top Concrete Stem Capacity = 3,193,344 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi

Calculate Bar Lap Lengths

Top Stem, Embed into Concrete ABOVE = 62.303 in
Top Stem, Embed into Concrete BELOW = 62.303 in
2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
2nd Top Stem, Embed into Concrete BELOW = 62.303 in
3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
3rd Top Stem, Embed into Concrete ABOVE = 80.104 in

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'E' H=24' Equipment
Job # : E-05129 Dsgnr: JJF
Description....
Wall "E" H = 24'-0" Equipment Load EFP = 46 pcf and

Page: _____
Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
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Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	24.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	5,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	46.0 psf/ft
Toe Active Pressure	=	46.0 psf/ft
Passive Pressure	=	534.0 psf/ft
Soil Density	=	125.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	5.50 ft
Heel Width	=	10.50
Total Footing Width	=	16.00
Footing Thickness	=	33.00 in
Key Width	=	30.00 in
Key Depth	=	36.00 in
Key Distance from Toe	=	5.50 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0020
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel = 0.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	2,500.0 lbs
Footing Width	=	10.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	6.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

*Design Summary

Wall Stability Ratios

Overturning	=	2.44 OK
Sliding	=	1.78 OK
Total Bearing Load	=	41,427 lbs
...resultant ecc.	=	24.71 in
Soil Pressure @ Toe	=	4,589 psf OK
Soil Pressure @ Heel	=	590 psf OK
Allowable	=	5,000 psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	5,537 psf
ACI Factored @ Heel	=	712 psf
Footing Shear @ Toe	=	39.4 psi OK
Footing Shear @ Heel	=	89.5 psi OK
Allowable	=	93.1 psi

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	17,756.3 lbs
less 100% Passive Force	=	- 8,827.7 lbs
less 100% Friction Force	=	- 12,784.7 lbs
Added Force Req'd	=	0.0 lbs OK
....for 1.5 : 1 Stability	=	0.0 lbs OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Top Stem	2nd	3rd
Design Height Above Ftg	ft =	Stem OK 13.00	Stem OK 5.00	Stem OK 0.00
Wall Material Above "Ht"	=	Concrete	Concrete	Concrete
Thickness	=	30.00	30.00	30.00
Rebar Size	=	# 7	# 7	# 9
Rebar Spacing	=	10.00	5.00	5.00
Rebar Placed at	=	Edge	Edge	Edge
Design Data				
fb/FB + fa/Fa	=	**0.276**	**0.642**	**0.763**
Total Force @ Section	lbs =	5,974.0	15,424.1	23,497.9
Moment....Actual	ft-# =	23,546.4	106,405.7	202,968.5
Moment.....Allowable	ft-# =	85,186.1	165,784.3	266,112.0
Shear.....Actual	psi =	18.4	47.6	72.5
Shear.....Allowable	psi =	82.2	82.2	82.2
Wall Weight	psf =	375.0	375.0	375.0
Rebar Depth 'd'	in =	27.00	27.00	27.00
LAP SPLICE IF ABOVE	in =	37.38	37.38	48.06
LAP SPLICE IF BELOW	in =	37.38	37.38	
HOOK EMBED INTO FTG	in =			17.25

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Special Inspection	=	
Modular Ratio 'n'	=	
Short Term Factor	=	
Equiv. Solid Thick.	=	

Masonry Block Type = Medium Weight

Concrete Data

f'c	psi =	3,000.0	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : **Wall 'E' H=24' Equipment** Page: _____
Job # : **E-05129** Dsgnr: **JJF** Date: **JUL 18,2006**
Description....
Wall "E" H = 24'-0" Equipment Load EFP = 46 pcf and

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
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Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel	
Factored Pressure	=	5,537	712	psf
Mu' : Upward	=	75,389	0	ft-#
Mu' : Downward	=	7,487	131,040	ft-#
Mu: Design	=	67,902	131,040	ft-#
Actual 1-Way Shear	=	39.38	89.51	psi
Allow 1-Way Shear	=	93.11	93.11	psi

Toe Reinforcing	=	# 9 @ 5.00 in
Heel Reinforcing	=	# 9 @ 10.00 in
Key Reinforcing	=	# 7 @ 12.00 in

Other Acceptable Sizes & Spacings

Toe: #4@ 3.50 in, #5@ 5.50 in, #6@ 7.50 in, #7@ 10.25 in, #8@ 13.50 in, #9@ 17.0
Heel: #4@ 2.00 in, #5@ 3.25 in, #6@ 4.50 in, #7@ 6.00 in, #8@ 8.00 in, #9@ 10.00
Key: #4@ 3.75 in, #5@ 5.75 in, #6@ 8.25 in, #7@ 11.25 in, #8

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	16,457.9	8.92	146,749.9
Toe Active Pressure	=	-173.9	0.92	-159.4
Surcharge Over Toe	=			
Adjacent Footing Load	=	1,472.3	16.89	24,866.5
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Total	=	17,756.3	**O.T.M.** =	171,457.0

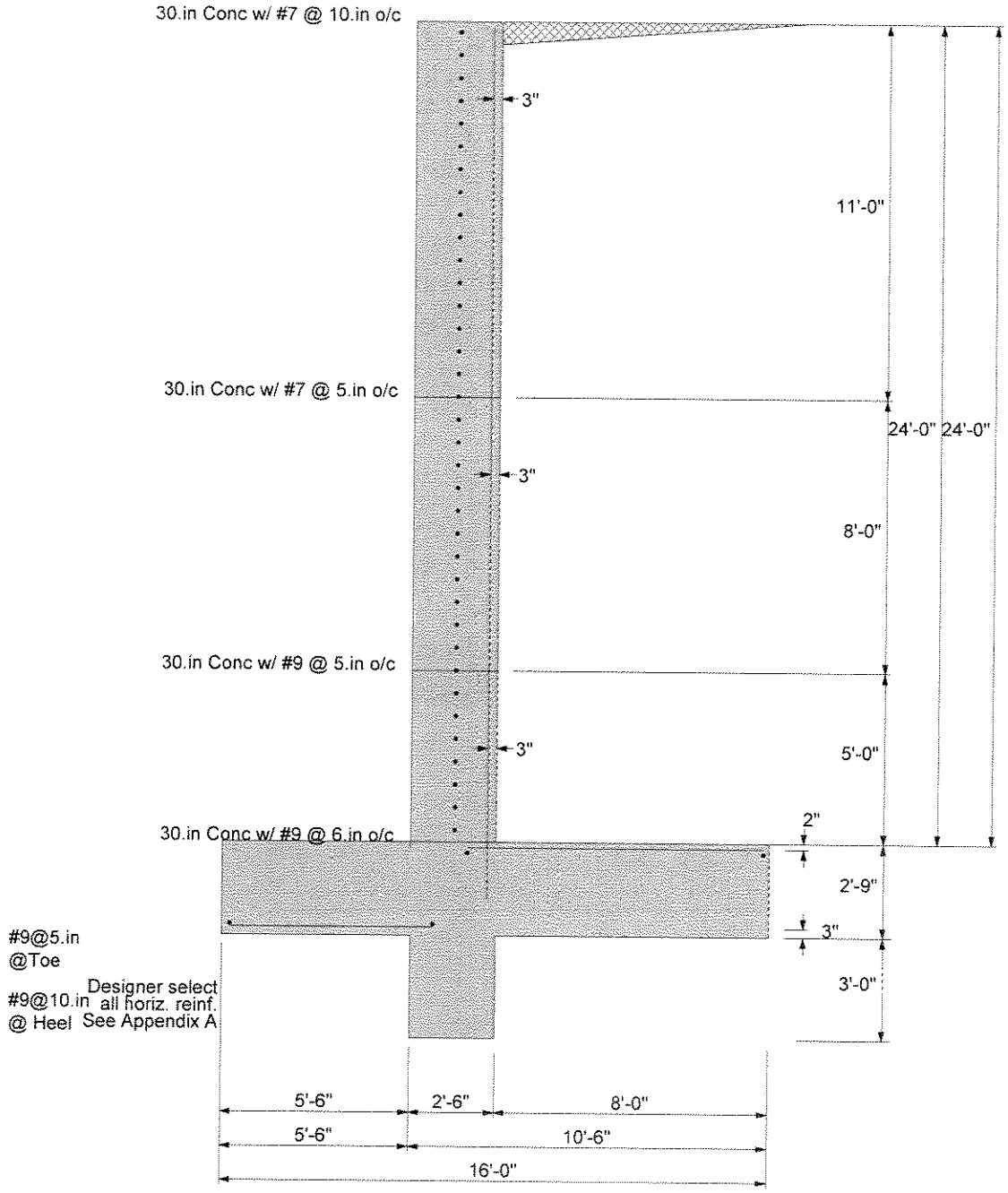
Resisting/Overturning Ratio = **2.44**

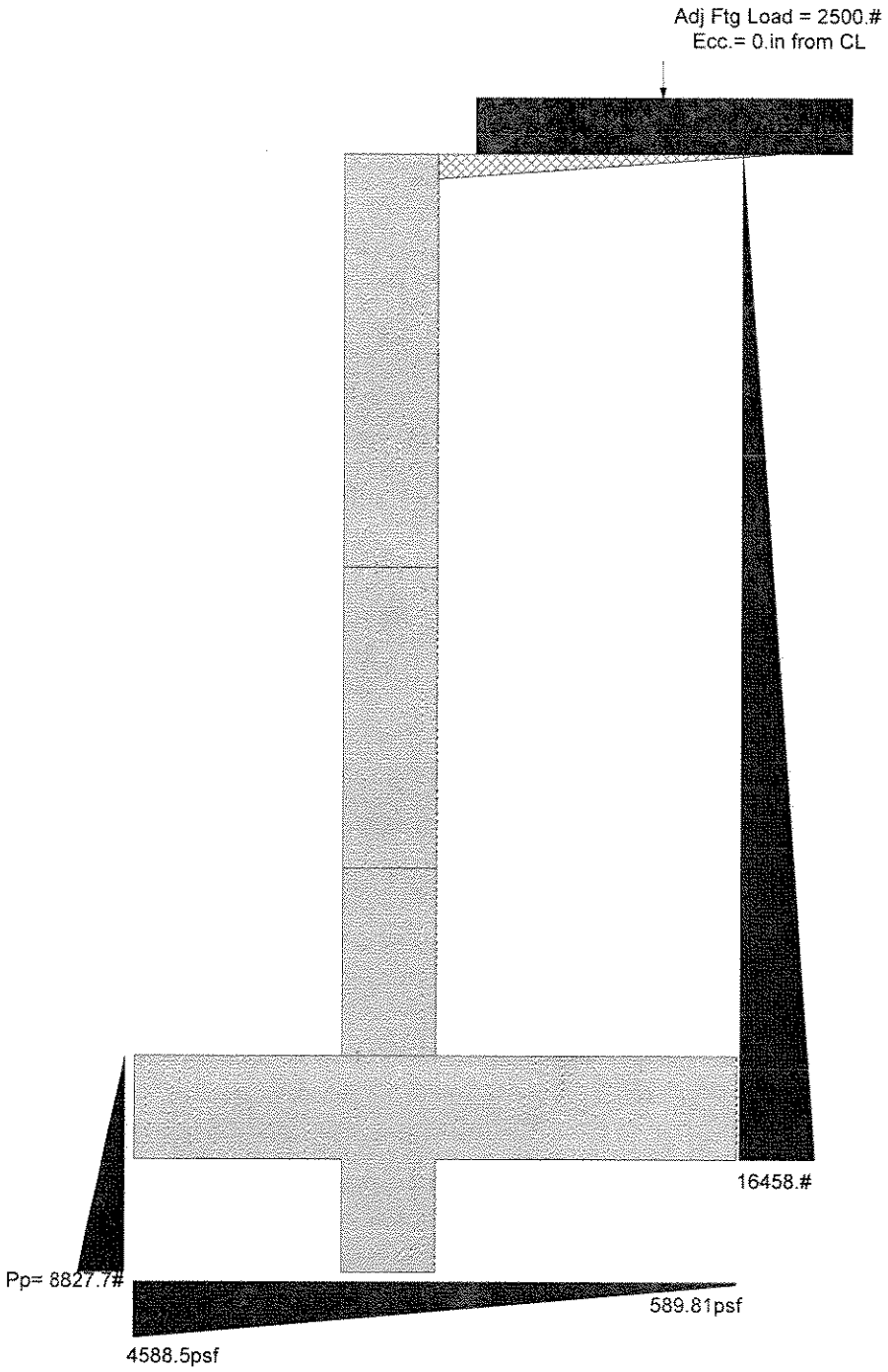
Vertical Loads used for Soil Pressure = 41,426.8 lbs

Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	24,000.0	12.00	288,000.0
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=	701.8	12.00	8,421.1
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=			
Surcharge Over Toe	=			
Stem Weight(s)	=	9,000.0	6.75	60,750.0
Earth @ Stem Transitions	=			
Footing Weight	=	6,600.0	8.00	52,800.0
Key Weight	=	1,125.0	6.75	7,593.8
Vert. Component	=			
Total =		41,426.8 lbs	**R.M.=**	417,564.8

DESIGNER NOTES:


30.in Conc w/ #7 @ 10.in o/c
3"
11'-0"
30.in Conc w/ #7 @ 5.in o/c
24'-0"
24'-0"
3"
8'-0"
30.in Conc w/ #9 @ 5.in o/c
3"
5'-0"
2"
30.in Conc w/ #9 @ 6.in o/c
2'-9"
3"
#9@5.in
@Toe
3'-0"
Designer select
#9@10.in all horiz. reinf.
@ Heel See Appendix A
5'-6"
2'-6"
8'-0"
5'-6"
10'-6"
16'-0"


Adj Ftg Load = 2500.#
Ecc.= 0.in from CL
16458.#
Pp= 8827.7#
589.81psf
4588.5psf

Cantilevered Retaining Wall Design
Calculation Trace Listing

Beginning of Trace
Setting ACI Load Factors: DL Fact = 1.2000, LL Fact = 1.6000, ST Fact = 1.000
Noted that EFP Method being used
Back-solving internal friction angle from density and EFP, angle = 27.520 deg
Actual Heel Width (past back of stem) = 8.0000 ft
Soil Height for Stability (wall+footing+cslope) = 26.750 ft
Calculating Overturning Values
Arm = 8.9167 ft, Moment = 146,750 ft-#
Active Pressure @ Toe: (0.000 + 33.000)^2 * 46.000 / 2.0= 173.938 lbs
Arm = (0.000 + 33.000) / 3 /12 = 0.917 ft, Moment = 159.443 ft-#
Adjacent Footing Lateral Force = 1,472.29 lbs
Height above Footing Base = 202.676 in, Moment = 1,472.29 * 16.890 = 24,866 ft-#
Toe Active Pressure Used To Resist Sliding, so ADD Soil over toe = 173.938 lbs to Total Overturning Loads
Calculating Resisting Moments
Soil Wt Over Heel = 8.0000 * 24.000 * 125.000 = 24,000 lbs
Arm = 16.000 - 8.0000 / 2.0 = 12.000 ft, Moment = 24,000 * 12.000 = 288,000 ft-#
Adjacent Footing, Force = 701.754 lbs, Arm = 12.000 ft, Moment = 8,421.05 ft-#
Top Stem Weight = 4,125.00 lbs, Arm = (5.5000 + 2.5000 / 2.0) = 6.7500 ft
2nd Top Stem Weight = 3,000.00 lbs, Arm = (5.5000 + 2.5000 / 2.0) = 6.7500 ft
3rd Top Stem Weight = 1,875.00 lbs, Arm = (5.5000 + 2.5000 / 2.0) = 6.7500 ft
Stem Avg. Arm = 81.000 ft, Total Moment = 729,000 ft-#
Avg. Arm = 0.000 ft, Moment = 0.000 ft-#
Footing Weight = 16.000 * 33.000 * 150.000 = 6,600.00 lbs, Arm = 16.000 / 2.0 = 8.0000 ft, Moment = 52,800 ft-#
Key Weight = 3.0000 * 2.5000 * 150.000 = 6,600.00 lbs, Arm = 5.5000 + 2.5000 / 2.0 = 6.7500 ft, Moment = 7,593.75 ft-#
Total Resis. Wt = 41,427 lbs, Moment = 417,565 ft-#
Calculated Stem Forces for Preliminary Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 5,974.03 lbs, Moment = 23,546 ft-#
2nd Top Stem Section: Shear = 15,424 lbs, Moment = 106,406 ft-#
3rd Top Stem Section: Shear = 23,498 lbs, Moment = 202,968 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 5,974.03 / 27.000 / 12.0 = 18.438 psi
Concrete Unit Shear Stress = 15,424 / 27.000 / 12.0 = 47.605 psi
Concrete Unit Shear Stress = 23,498 / 27.000 / 12.0 = 72.524 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 1,022,233 in-#
2nd Top Concrete Stem Capacity = 1,989,412 in-#
3rd Top Concrete Stem Capacity = 3,193,344 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
Calculate Bar Lap Lengths
Top Stem, Embed into Concrete ABOVE = 62.303 in
Top Stem, Embed into Concrete BELOW = 62.303 in
2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
2nd Top Stem, Embed into Concrete BELOW = 62.303 in
3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
3rd Top Stem, Embed into Concrete ABOVE = 80.104 in
Calculating Soil Pressure
Toe Bar Depth = 33.000 - 3.0000 - 0.5 = 29.500 in, Heel Bar Depth = 33.000 - 2.0000 - 0.5 = 30.500 in
Service Load Soil Pressures.....
P = 41,427 lbs, Ecc = 24.710 in, Toe Pressure = 382.378 psf, Heel Pressure = 49.151 psf
Calculating Factored Load Shear in Footing=
P = 49,993 lbs, Ecc = 24.710 in, Toe Pressure = 382.378 psf, Heel Pressure = 49.151 psf
Shear @ Toe = (39.384 - 1.2000 * (33.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 36.500) / (12.0 * 29.500) = 39.384 psi
Shear @ Heele = (39.384 - 32,760 - 0.000 - 0.000 - 0.000) / (12.0 * 30.500) = 89.508 psi
Shear Distances from Edge; Toe = 66.000 in, Heel = 96.000 in
Toe Upward Moment = 75,389 ft-#
Toe Downward Moment = 1.2000 * (33.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 66.000^2 / 2.0 = 7,486.88 ft-#
Moment @ Toe, Upward = 904,670 ft-#, Downward = 1.2000 * (33.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 66.000^2 / 2.0 = 67,902
Flag set to ignore updard pressure under heel-->> Heel Upward Moment = 0
Heel Downward Moment = 1.2000 * (33.000 * 1.0417 + 288.000 * 0.868 + 0.000 + 0.000) * 96.000^2 / 2.0 = 131,040 ft-#
Add moment due to vertical soil component = 1.6000 * 0.000 * 96.000 = 0.000 ft-#
Preliminary Design Moment = 1572,480.000 ft-#

65 Soil Height for Passive Pressure = 36.000 + 33.000 + 0.000 = 69.000 in
66 Sliding Resistance due to Friction = 41,427 * 0.550 = 22,785 lbs
67 Friction Resistance adjusted for Specified '%' = 1.000 * 22,785 = 22,785 lbs
68 Sliding Passive Pressure = (69.000 - 0.000) * 3.7083 * (69.000 - 0.000)/2.0)
69 + (0.000 * 3.7083 * (69.000 - 0.000)) = 8,827.69 lbs
70 Passive Resistance adjusted for Specified '%' = 1.000 * 22,785 = 8,827.69 lbs
71 Sliding Factor of Safety = (8,827.69 + 22,785) / 17,756 = 1.7803 lbs
72 **Calculating Footing Rebar Requirements**
73 RHo:Balanced = 0.850 * 3,000.00 / 60,000 * 0.850 * (87000.0 / (87000.0 + 60,000)) = 0.021
74 Ru : Toe = ABS(814,827 / 12.0 / 29.500^2 / 0.9) = 86.696 psi
75 Required Steel % = 0.001%
76 Required Steel Area = 0.059 in2
77 Ru : Heel = ABS(1572,480.000 / 12.0 / 30.500^2 / 0.9) = 156.517 psi
78 Required Steel % = 0.003%
79 Required Steel Area = 0.102 in2
80 Key : Required Steel % = 0.000%
81 Required Steel Area = 0.054 in2
82 **Calculated Stem Forces for Fincal Checks**
83 **Cantilevered Stem Calculations**
84 Top Stem Section: Shear = 5,974.03 lbs, Moment = 23,546 ft-#
85 2nd Top Stem Section: Shear = 15,424 lbs, Moment = 106,406 ft-#
86 3rd Top Stem Section: Shear = 23,498 lbs, Moment = 202,968 ft-#
87 Calcualting Actual Shear Stress
88 Concrete Unit Shear Stress = 5,974.03 / 27.000 / 12.0 = 18.438 psi
89 Concrete Unit Shear Stress = 15,424 / 27.000 / 12.0 = 47.605 psi
90 Concrete Unit Shear Stress = 23,498 / 27.000 / 12.0 = 72.524 psi
91 Determine Allowable Moments
92 Top Concrete Stem Capacity = 1,022,233 in-#
93 2nd Top Concrete Stem Capacity = 1,989,412 in-#
94 3rd Top Concrete Stem Capacity = 3,193,344 in-#
95 Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
96 2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
97 3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
98 **Calculate Bar Lap Lengths**
99 Top Stem, Embed into Concrete ABOVE = 62.303 in
100 Top Stem, Embed into Concrete BELOW = 62.303 in
101 2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
102 2nd Top Stem, Embed into Concrete BELOW = 62.303 in
103 3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
104 3rd Top Stem, Embed into Concrete ABOVE = 80.104 in

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'E' H= 24 Seismic 1
Job # : E-05129 Dsgnr: JJF
Description....
Wall "E" H= 24'-0" Seismic EFP = 46 & Kv = 0.10

Page: _____
Date: JUL 18,2006

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Criteria

Retained Height	=	24.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00 : 1
Height of Soil over Toe	=	0.00 in
Water height over heel	=	0.0 ft
Wind on Stem	=	0.0 psf

Soil Data

Allow Soil Bearing	=	5,000.0 psf
Equivalent Fluid Pressure Method		
Heel Active Pressure	=	46.0 psf/ft
Toe Active Pressure	=	46.0 psf/ft
Passive Pressure	=	534.0 psf/ft
Soil Density	=	125.00 pcf
Footing||Soil Friction	=	0.550
Soil height to ignore for passive pressure	=	0.00 in

Footing Dimensions & Strengths

Toe Width	=	5.50 ft
Heel Width	=	10.50
Total Footing Width	=	16.00
Footing Thickness	=	33.00 in
Key Width	=	30.00 in
Key Depth	=	36.00 in
Key Distance from Toe	=	5.50 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0020
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Surcharge Loads

Surcharge Over Heel = 0.0 psf
NOT Used To Resist Sliding & Overturning
Surcharge Over Toe = 0.0 psf
NOT Used for Sliding & Overturning

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Design Kh	=	0.100 g
Kae for seismic earth pressure	=	0.391
Ka for static earth pressure	=	0.323
Difference: Kae - Ka	=	0.068

Added seismic base force 2,171.2 lbs

Using Mononobe-Okabe / Seed-Whitman procedure

*Design Summary

Wall Stability Ratios

Overturning	=	2.26	OK
Sliding	=	1.69	OK
Total Bearing Load	=	40,725 lbs	
...resultant ecc.	=	28.90 in	
Soil Pressure @ Toe	=	4,844 psf	OK
Soil Pressure @ Heel	=	246 psf	OK
Allowable	=	5,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	5,813 psf	
ACI Factored @ Heel	=	295 psf	
Footing Shear @ Toe	=	41.2 psi	OK
Footing Shear @ Heel	=	89.5 psi	OK
Allowable	=	93.1 psi	

Sliding Calcs (Vertical Component NOT Used)

Lateral Sliding Force	=	18,455.2 lbs	
less 100% Passive Force	=	- 8,827.7 lbs	
less 100% Friction Force	=	- 22,398.8 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 : 1 Stability	=	0.0 lbs	OK

Load Factors

Building Code	IBC 2003
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Top Stem	2nd	3rd
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	ft =	13.00	5.00	0.00
Wall Material Above "Ht"	=	Concrete	Concrete	Concrete
Thickness	=	30.00	30.00	30.00
Rebar Size	=	# 7	# 7	# 9
Rebar Spacing	=	10.00	5.00	5.00
Rebar Placed at	=	Edge	Edge	Edge
Design Data				
fb/FB + fa/Fa	=	**0.232**	**0.614**	**0.770**
Total Force @ Section	lbs =	4,969.9	14,827.6	23,658.4
Moment....Actual	ft-# =	19,739.8	101,724.5	205,021.1
Moment.....Allowable	ft-# =	85,186.1	165,784.3	266,112.0
Shear.....Actual	psi =	13.7	41.0	65.4
Shear.....Allowable	psi =	82.2	82.2	82.2
Wall Weight	psf =	375.0	375.0	375.0
Rebar Depth 'd'	in =	27.00	27.00	27.00
LAP SPLICE IF ABOVE	in =	37.38	37.38	48.06
LAP SPLICE IF BELOW	in =	37.38	37.38	
HOOK EMBED INTO FTG	in =			17.25
Masonry Data				
f'm	psi =			
Fs	psi =			
Solid Grouting	=			
Special Inspection	=			
Modular Ratio 'n'	=			
Short Term Factor	=			
Equiv. Solid Thick.	=			
Masonry Block Type = Medium Weight				
Concrete Data				
f'c	psi =	3,000.0	3,000.0	3,000.0
Fy	psi =	60,000.0	60,000.0	60,000.0

To specify your own special title block here, use the "Settings" screen and enter your title block information.

Title : Wall 'E' H= 24 Seismic 1 Page: _____
Job # : E-05129 Dsgnr: JJF Date: JUL 18,2006
Description....
Wall "E" H= 24'-0" Seismic EFP = 46 & Kv = 0.10

This Wall in File: C:\Program Files\RP2005\LOS ALAMOS R

Retain Pro 2005 , 1-November-2005, (c) 1989-2005
www.retainpro.com/support for latest release
Registration # : RP-1141385 2005002

Cantilevered Retaining Wall Design

Code: IBC 2003

Footing Design Results

		Toe	Heel	
Factored Pressure	=	5,813	295	psf
Mu' : Upward	=	78,363	0	ft-#
Mu' : Downward	=	7,487	131,040	ft-#
Mu: Design	=	70,876	131,040	ft-#
Actual 1-Way Shear	=	41.19	89.51	psi
Allow 1-Way Shear	=	93.11	93.11	psi

Toe Reinforcing = # 9 @ 5.00 in
Heel Reinforcing = # 9 @ 10.00 in
Key Reinforcing = # 7 @ 12.00 in

Other Acceptable Sizes & Spacings

Toe: #4@ 3.50 in, #5@ 5.25 in, #6@ 7.50 in, #7@ 10.00 in, #8@ 13.25 in, #9@ 16.7
Heel: #4@ 2.00 in, #5@ 3.25 in, #6@ 4.50 in, #7@ 6.00 in, #8@ 8.00 in, #9@ 10.00
Key: #4@ 3.75 in, #5@ 5.75 in, #6@ 8.25 in, #7@ 11.25 in, #8

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
Heel Active Pressure	=	16,457.9	8.92	146,749.9
Toe Active Pressure	=	-173.9	0.92	-159.4
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
Seismic Earth Load	=	2,171.2	16.05	34,847.5
Total	=	18,455.2	**O.T.M.** =	181,438.0

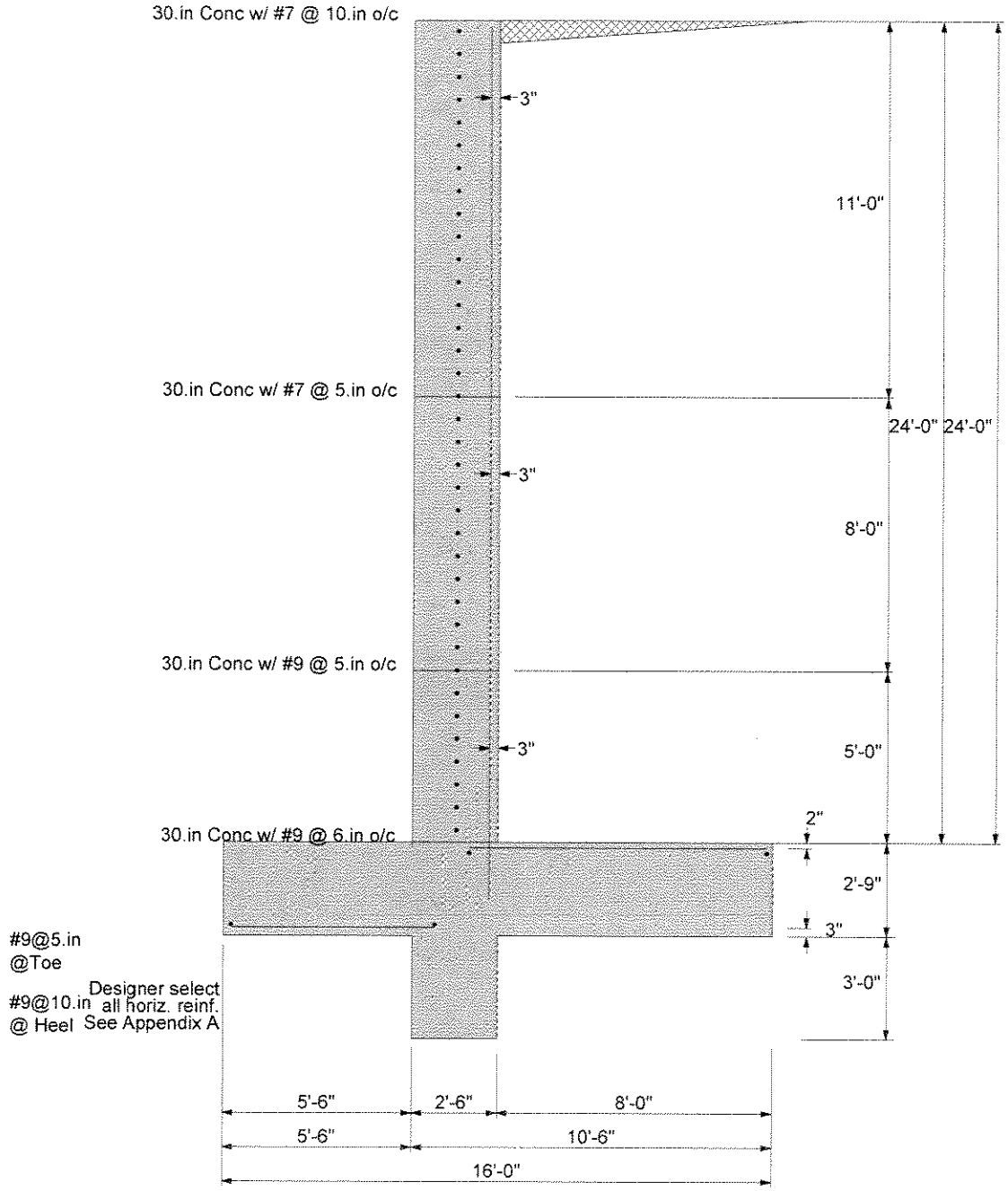
Resisting/Overturning Ratio = **2.26**

Vertical Loads used for Soil Pressure = 40,725.0 lbs

Vertical component of active pressure NOT used for soil pressure

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over Heel	=	24,000.0	12.00	288,000.0
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=		0.00	
Soil Over Toe	=			
Surcharge Over Toe	=			
Stem Weight(s)	=	9,000.0	6.75	60,750.0
Earth @ Stem Transitions	=			
Footing Weight	=	6,600.0	8.00	52,800.0
Key Weight	=	1,125.0	6.75	7,593.8
Vert. Component	=			
Total =		40,725.0 lbs	**R.M.=**	409,143.8

DESIGNER NOTES: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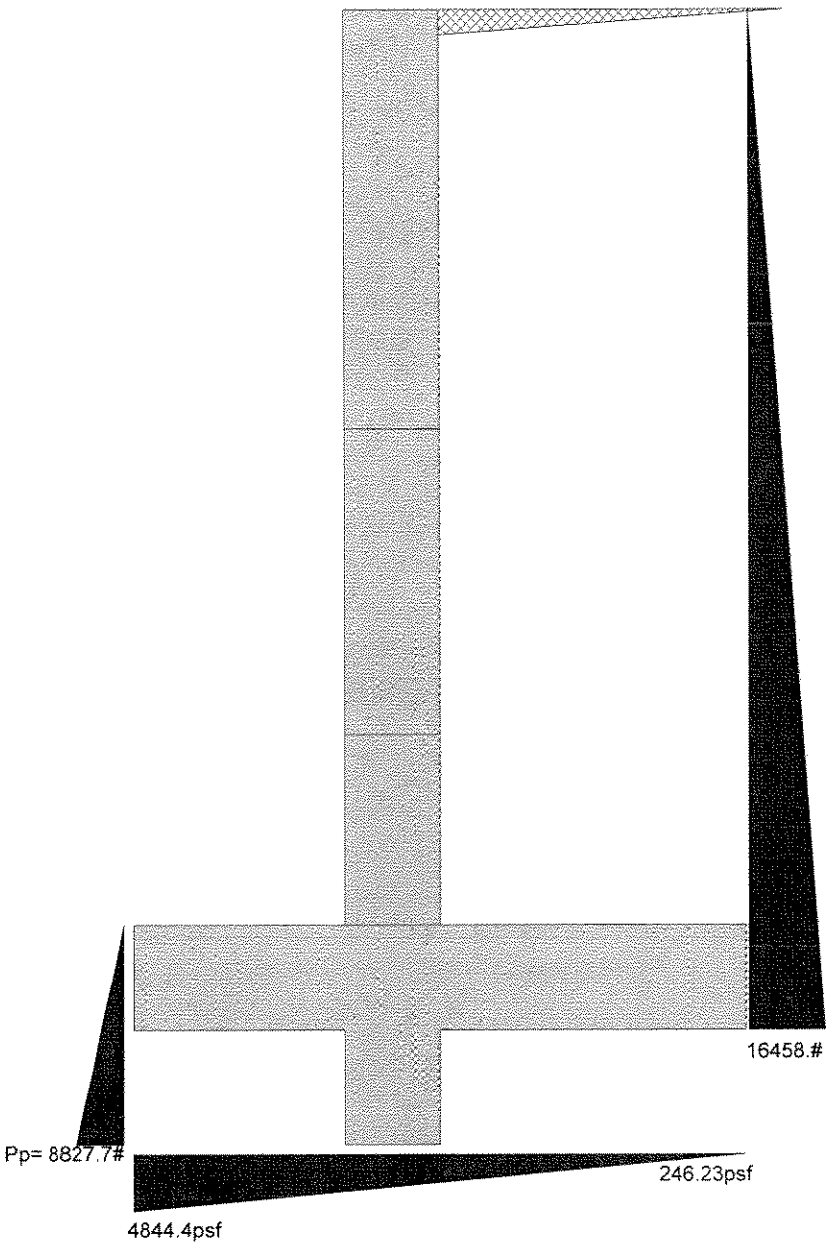
11'-0"
30.in Conc w/ #7 @ 5.in o/c
24'-0"
24'-0"
3"
8'-0"
30.in Conc w/ #9 @ 5.in o/c
3"
5'-0"
2"
30.in Conc w/ #9 @ 6.in o/c
2'-9"
3"
#9@5.in
@Toe
3'-0"
#9@10.in
@ Heel
Designer select
all horiz. reinf.
See Appendix A
5'-6"
2'-6"
8'-0"
5'-6"
10'-6"
16'-0"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Retain Pro 2005, 1-November-2005, (c) 1989
Registration # : RP-1141385

Cantilevered Retaining Wall Design
Calculation Trace Listing

Beginning of Trace
Setting ACI Load Factors: DL Fact = 1.2000, LL Fact = 1.6000, ST Fact = 1.000
Noted that EFP Method being used
Back-solving internal friction angle from density and EFP, angle = 27.520 deg
Actual Heel Width (past back of stem) = 8.0000 ft
Soil Height for Stability (wall+footing+cslope) = 26.750 ft
Calculating Overturning Values
Arm = 8.9167 ft, Moment = 146,750 ft-#
Seismic Lateral Force calcs....
Kae Force = 0.068 * 0.868 * 321.000^2 / 2.0 = 2,171.18 lbs
Ka Force = 321.000 * 0.319 * 321.000 * 0.5 = 16,458 lbs
Force Height = Retained Height * 0.6 = 321.000 * 0.600 = 192.600
Overturning Moment = 2,171.18 * 192.600 = 34,848 ft-#
Active Pressure @ Toe: (0.000 + 33.000)^2 * 46.000 / 2.0= 173.938 lbs
Arm = (0.000 + 33.000) / 3 /12 = 0.917 ft, Moment = 159.443 ft-#
Toe Active Pressure Used To Resist Sliding, so ADD Soil over toe = 173.938 lbs to Total Overturning Loads
Calculating Resisting Moments
Soil Wt Over Heel = 8.0000 * 24.000 * 125.000 = 24,000 lbs
Arm = 16.000 - 8.0000 / 2.0 = 12.000 ft, Moment = 24,000 * 12.000 = 288,000 ft-#
Top Stem Weight = 4,125.00 lbs, Arm = (5.5000 + 2.5000 / 2.0) = 6.7500 ft
2nd Top Stem Weight = 3,000.00 lbs, Arm = (5.5000 + 2.5000 / 2.0) = 6.7500 ft
3rd Top Stem Weight = 1,875.00 lbs, Arm = (5.5000 + 2.5000 / 2.0) = 6.7500 ft
Stem Avg. Arm = 81.000 ft, Total Moment = 729,000 ft-#
Avg. Arm = 0.000 ft, Moment = 0.000 ft-#
Footing Weight = 16.000 * 33.000 * 150.000 = 6,600.00 lbs, Arm = 16.000 / 2.0 = 8.0000 ft, Moment = 52,800 ft-#
Key Weight = 3.0000 * 2.5000 * 150.000 = 6,600.00 lbs, Arm = 5.5000 + 2.5000 / 2.0 = 6.7500 ft, Moment = 7,593.75 ft-#
Total Resis. Wt = 40,725 lbs, Moment = 409,144 ft-#
Calculated Stem Forces for Preliminary Checks
Cantilevered Stem Calculations
Top Stem Section: Shear = 4,969.90 lbs, Moment = 19,740 ft-#
2nd Top Stem Section: Shear = 14,828 lbs, Moment = 101,725 ft-#
3rd Top Stem Section: Shear = 23,658 lbs, Moment = 205,021 ft-#
Calcualting Actual Shear Stress
Concrete Unit Shear Stress = 4,452.80 / 27.000 / 12.0 = 13.743 psi
Concrete Unit Shear Stress = 13,285 / 27.000 / 12.0 = 41.002 psi
Concrete Unit Shear Stress = 21,197 / 27.000 / 12.0 = 65.422 psi
Determine Allowable Moments
Top Concrete Stem Capacity = 1,022,233 in-#
2nd Top Concrete Stem Capacity = 1,989,412 in-#
3rd Top Concrete Stem Capacity = 3,193,344 in-#
Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
Calculate Bar Lap Lengths
Top Stem, Embed into Concrete ABOVE = 62.303 in
Top Stem, Embed into Concrete BELOW = 62.303 in
2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
2nd Top Stem, Embed into Concrete BELOW = 62.303 in
3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
3rd Top Stem, Embed into Concrete ABOVE = 80.104 in
Calculating Soil Pressure
Toe Bar Depth = 33.000 - 3.0000 - 0.5 = 29.500 in, Heel Bar Depth = 33.000 - 2.0000 - 0.5 = 30.500 in
Service Load Soil Pressures.....
P = 40,725 lbs, Ecc = 28.904 in, Toe Pressure = 403.700 psf, Heel Pressure = 20.519 psf
Calculating Factored Load Shear in Footing=
P = 48,870 lbs, Ecc = 28.904 in, Toe Pressure = 403.700 psf, Heel Pressure = 20.519 psf
Shear @ Toe = (41.190 - 1.2000 * (33.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 36.500) / (12.0 * 29.500) = 41.190 psi
Shear @ Heele = (41.190 - 32,760 - 0.000 - 0.000 - 0.000) / (12.0 * 30.500) = 89.508 psi
Shear Distances from Edge; Toe = 66.000 in, Heel = 96.000 in
Toe Upward Moment = 78,363 ft-#
Toe Downward Moment = 1.2000 * (33.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 66.000^2 / 2.0 = 7,486.88 ft-#
Moment @ Toe, Upward = 940,357 ft-#, Downward = 1.2000 * (33.000 * 1.0417 + 0.000 * 0.868 + 0.000) * 66.000^2 / 2.0 = 70,876
Flag set to ignore updard pressure under heel-->> Heel Upward Moment = 0
Heel Downward Moment = 1.2000 * (33.000 * 1.0417 + 288.000 * 0.868 + 0.000 + 0.000) * 96.000^2 / 2.0 = 131,040 ft-#

65 Add moment due to vertical soil component = 1.6000 * 0.000 * 96.000 = 0.000 ft-#
66 Preliminary Design Moment = 1572,480.000 ft-#
67 Soil Height for Passive Pressure = 36.000 + 33.000 + 0.000 = 69.000 in
68 Sliding Resistance due to Friction = 40,725 * 0.550 = 22,399 lbs
69 Friction Resistance adjusted for Specified '%' = 1.000 * 22,399 = 22,399 lbs
70 Sliding Passive Pressure = (69.000 - 0.000) * 3.7083 * (69.000 - 0.000)/2.0)
71 + (0.000 * 3.7083 * (69.000 - 0.000)) = 8,827.69 lbs
72 Passive Resistance adjusted for Specified '%' = 1.000 * 22,399 = 8,827.69 lbs
73 Sliding Factor of Safety = (8,827.69 + 22,399) / 18,455 = 1.6920 lbs
74 **Calculating Footing Rebar Requirements**
75 RHo:Balanced = 0.850 * 3,000.00 / 60,000 * 0.850 * (87000.0 / (87000.0 + 60,000)) = 0.021
76 Ru : Toe = ABS(850,514 / 12.0 / 29.500^2 / 0.9) = 90.493 psi
77 Required Steel % = 0.002%
78 Required Steel Area = 0.060 in2
79 Ru : Heel = ABS(1572,480.000 / 12.0 / 30.500^2 / 0.9) = 156.517 psi
80 Required Steel % = 0.003%
81 Required Steel Area = 0.102 in2
82 Key : Required Steel % = 0.000%
83 Required Steel Area = 0.054 in2
84 **Calculated Stem Forces for Fincal Checks**
85 **Cantilevered Stem Calculations**
86 Top Stem Section: Shear = 4,969.90 lbs, Moment = 19,740 ft-#
87 2nd Top Stem Section: Shear = 14,828 lbs, Moment = 101,725 ft-#
88 3rd Top Stem Section: Shear = 23,658 lbs, Moment = 205,021 ft-#
89 Calcualting Actual Shear Stress
90 Concrete Unit Shear Stress = 4,452.80 / 27.000 / 12.0 = 13.743 psi
91 Concrete Unit Shear Stress = 13,285 / 27.000 / 12.0 = 41.002 psi
92 Concrete Unit Shear Stress = 21,197 / 27.000 / 12.0 = 65.422 psi
93 Determine Allowable Moments
94 Top Concrete Stem Capacity = 1,022,233 in-#
95 2nd Top Concrete Stem Capacity = 1,989,412 in-#
96 3rd Top Concrete Stem Capacity = 3,193,344 in-#
97 Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
98 2nd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
99 3rd Top Concrete Stem Shear Capacity = 0.75 * 2.0 * sqrt(3,000.00) = 82.158 psi
100 **Calculate Bar Lap Lengths**
101 Top Stem, Embed into Concrete ABOVE = 62.303 in
102 Top Stem, Embed into Concrete BELOW = 62.303 in
103 2nd Top Stem, Embed into Concrete ABOVE = 62.303 in
104 2nd Top Stem, Embed into Concrete BELOW = 62.303 in
105 3rd Top Stem, Hooked Embed into Concrete Footing BELOW = 17.253 in
106 3rd Top Stem, Embed into Concrete ABOVE = 80.104 in

TENSAR Earth Technologies, Inc.

5883 Glenridge Drive
Suite 200
Atlanta, Georgia 30328
Tel: 404-250-1290
Fax: 404-250-9185

DESIGN CALCULATIONS

Prepared for

Los Alamos Site Office TA-73 Airport Landfills

(Revision 2)

W.O. NO. 13104.002.001.7000

Los Alamos County, New Mexico

TET#D06602

January 8, 2007

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DESIGN CALCULATIONS	5

CALCULATED BY: CANDANCE CAMPBELL
CHECKED BY: LUIS VELEZ

DESIGN ASSUMPTIONS

Project Name:	LASO TA-73 Airport Landfills Los Alamos County, NM	**Date:**	1/8/07
Project Number	D06602	**Engineer:**	CLC

THE FOLLOWING ASSUMPTIONS HAVE BEEN ADOPTED BY TET FOR THE PURPOSE OF DEVELOPING A FINAL DESIGN. ALL ASSUMPTIONS MUST BE VERIFIED BY OTHERS PRIOR TO CONSTRUCTION.

1. Design Methodology

In general accordance with AASHTO Standard Specifications for Highway Bridges 2002

2. Soil Properties

Soils	*Unit Weight γ, PCF*	*Friction Angle ϕ', degrees*	*Cohesion PSF*
Reinforced Soil	130	32	0
Retained Soil	100	35.5	0
Foundation Soil	130	32	4000

NOTE: ALL SOIL PROPERTIES MUST BE VERIFIED BY A GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION.

3. Geometry

- General Information
  - Two Mechanically Stabilized Earth (MSE) walls with the following geometry:

Walls	*Length, ft*	*Maximum Design Height, ft*	*Top & Toe slope*
Wall 2A	71.0	13.5	3H:1V Top Slope Level Toe slope
Wall 2B	110.0	21.5	3H:1V Top Slope Level Toe slope

4. Facing

SierraScape galvanized baskets with stone facing and a setback of 1.5" to achieve 1H:12V face batter.

5. Loading

Traffic Loading	= 250 psf
Design Seismic Acceleration	= 0.262 g

6. Geogrid Reinforcement

Type	*Creep Limited Strength, Lbs/ft*	*Reduction Factor* RF_{ID}/RF_D	*Working Strength, Lbs/ft*
UX1400MSE	2170	1.10/1.0	1973
UX1500MSE	3255	1.10/1.0	2959

Soil-geogrid interaction coefficient	= 0.8
Percent coverage of geogrid	= 94 %
Design life	= 75 years

7. Stability Analysis

	Static	**Static**
Internal Stability		
Minimum factor of safety for geogrid pullout	= 1.5	= 1.1
Minimum factor of safety for geogrid strength	= 1.5	= 1.1
Minimum factor of safety for connection	= 1.5	= 1.1
External Stability	**Static**	
Minimum factor of safety for direct sliding	= 1.5	= 1.1
Maximum eccentricity, e/L	= 1/6	= 1/3

NOTE: Global stability is beyond the scope of this design.

8. Maximum Applied Bearing Pressure

= 4701 psf (Static)

= 7612 psf (Seismic)

9. Hydraulic Conditions

Groundwater/phreatic surfaces were not considered in this design. Water surfaces assumed to be sufficiently below the base of the MSE walls as not influence the internal and external stability of the MSE walls.

10. Notes

A. The design presented herein is based on the information provided to Tensar Earth Technologies, Inc. Tensar Earth Technologies, Inc. accepts no liability for the information or verification of information.

B. The owner or owner's representative is responsible to review and verify the design parameters prior to construction.

C. Tensar Earth Technologies, Inc. assumes no liability for interpretation of subsurface conditions, suitability of soil design parameters, and subsurface groundwater conditions.

D. Evaluation of foundation bearing capacity and global stability are the responsibility of the owner or owner's representative. Tensar Earth Technologies, Inc., accepts no responsibility or liability for the evaluation of global stability and foundation bearing capacity.

E. Total and differential settlement and their effects on this system are the responsibility of the owner or owner's representative. Tensar Earth Technologies, Inc. accepts no responsibility or liability for the evaluation of settlements.

F. Flood conditions and rapid drawdown have not been considered in the design.

11. References

For references see Section 9.0 on sheet 2 of 8, Construction Requirements, of the construction drawings.

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RETAINING WALL SYSTEMS

AASHTO DESIGN METHOD
LANL Airport Landfill

PROJECT IDENTIFICATION

Title:	LANL Airport Landfill
Project Number:	D06602
Client:	Slaton Bros SW
Designer:	CLC
Station Number:	2A_1+00.0-1+40.2 & 2B_1+75.5-2+10.0

Description:

Wall 2A and Wall 2B_DH=10.5'_EXTERNAL

Company's information:

Name: Tensar Earth Technologies, Inc.
Street: 5883 Glenridge Drive
Suite 200
Atlanta, GA 30328
Telephone #: (404) 250-1290
Fax #: (404) 250-9185
E-Mail: ccampbell@tensarcorp.com

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Original date and time of creating this file: January 4, 2007

PROGRAM MODE: ANALYSIS
of a SIMPLE STRUCTURE
using GEOGRID as reinforcing material.

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SOIL DATA

REINFORCED SOIL

Unit weight, γ	130.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	32.0 °

RETAINED SOIL

Unit weight, γ	100.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	35.5 °

FOUNDATION SOIL (Considered as an equivalent uniform soil)

Equivalent unit weight, $\gamma_{equiv.}$	130.0 lb/ft ^{3}
Equivalent internal angle of friction, $\phi_{equiv.}$	32.0 °
Equivalent cohesion, $c_{equiv.}$	4000.0 lb/ft ^{2}

Water table does not affect bearing capacity

LATERAL EARTH PRESSURE COEFFICIENTS

Ka (internal stability) = 0.3073 (if batter is less than 10°, Ka is calculated from eq. 15. Otherwise, eq. 38 is utilized)
Inclination of internal slip plane, ψ = 61.00° (see Fig. 28 in DEMO 82).
Ka (external stability) = 0.3050 (if batter is less than 10°, Ka is calculated from eq. 16. Otherwise, eq. 17 is utilized)

BEARING CAPACITY

Bearing capacity coefficients (calculated by MSEW): Nc = 35.49 N γ = 30.21

SEISMICITY

Maximum ground acceleration coefficient, α_o = 0.131
Kae (α_o> 0) = 0.5134 Kae (α_o= 0) = 0.3050 Δ Kae = 0.2084 (see eq. 37 in DEMO 82)
Seismic soil-geogrid friction coefficient, F* is 80.0% of its specified static value.

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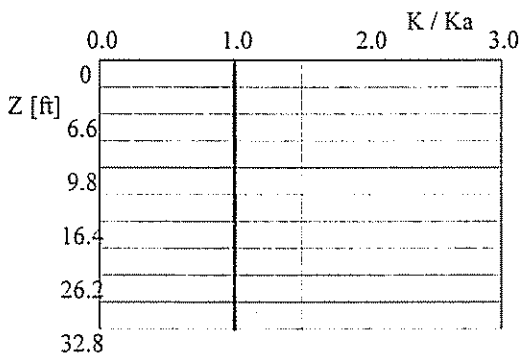
INPUT DATA: Geogrids
(Analysis)

D A T A	Geogrid type #1	Geogrid type #2	Geogrid type #3	Geogrid type #4	Geogrid type #5
Tult [lb/ft]	3974.1	4796.3	7811.2	9866.7	11990.8
Durability reduction factor, RFd	1.00	1.00	1.00	1.00	1.00
Installation-damage reduction factor, RFid	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	2.34	2.21	2.40	2.29	2.22
Fs-overall for strength	N/A	N/A	N/A	N/A	N/A
Coverage ratio, Rc	0.940	0.940	0.940	0.940	0.940
Friction angle along geogrid-soil interface, ρ	26.56	26.56	26.56	26.56	26.56
Pullout resistance factor, F*	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$
Scale-effect correction factor, α	1.0	1.0	1.0	1.0	1.0

Variation of Lateral Earth Pressure Coefficient With Depth

Z	K / Ka
0 ft	1.00
3.3 ft	1.00
6.6 ft	1.00
9.8 ft	1.00
13.1 ft	1.00
16.4 ft	1.00
19.7 ft	1.00



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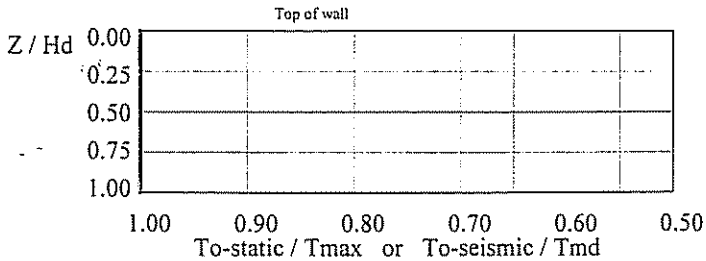
INPUT DATA: Facia and Connection (according to revised Demo 82) (Analysis)

FACIA type: Facing enabling frictional connection of reinforcement (e.g., modular concrete blocks, gabions)
Depth/height of block is 1.48/1.48 ft. Horizontal distance to Center of Gravity of block is 0.74 ft.
Average unit weight of block is γ_f = 114.58 lb/ft ^{3}

Z / Hd	To-static / Tmax or To-seismic / Tmd
0.00	1.00
0.25	1.00
0.50	1.00
0.75	1.00
1.00	1.00



Geogrid Type #1		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ (1)	CRult (2)	σ	CRult	σ	CRult	σ	CRult	σ	CRult
0.0	1.00	0.0	1.00	0.0	1.00	0.0	0.38	0.0	0.38
						1200.9	0.44	1200.9	0.44
						2999.0	0.53	3600.5	0.56
						6000.1	0.68	7198.9	0.74

Geogrid Type #1 3)		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr
0.0	0.15	0.0	0.15	0.0	0.15	0.0	0.38	0.0	0.38
480.3	0.20	480.3	0.20	599.4	0.21	1200.9	0.44	1200.9	0.44
1200.9	0.27	1200.9	0.27	1800.3	0.33	2999.0	0.53	3600.5	0.56
2399.6	0.39	2399.6	0.39	3600.5	0.51	6000.1	0.68	7198.9	0.74

(1) σ = Confining stress in between stacked blocks [lb/ft ^{2}]
(2) CRult = Tc-ult / Tult
(3) CRcr = Tcre / Tult

In seismic analysis, long term strength is reduced to 100% of its static value.

D A T A (for connection only)	Type #1	Type #2	Type #3	Type #4	Type #5
Product Name	UX1100MSE..	UX1400MSE..	UX1500MSE..	UX1600MSE..	UX1700MSE..
Connection strength reduction factor, RFd	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	N/A	N/A	N/A	N/A	N/A

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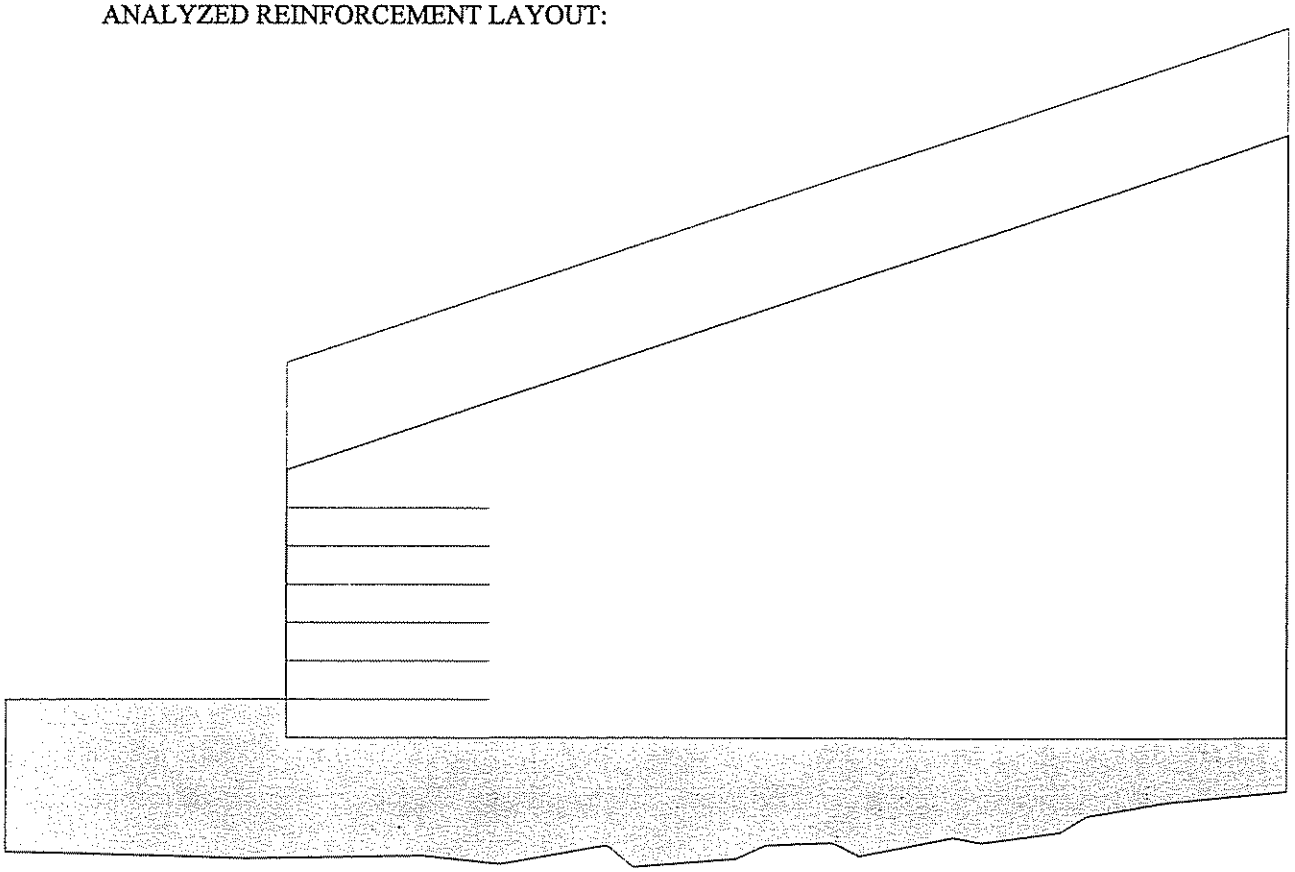
INPUT DATA: Geometry and Surcharge loads (of a SIMPLE STRUCTURE)

Design height, Hd	10.50	[ft]	{ Embedded depth is E = 1.50 ft, and height above top of finished bottom grade is H = 9.00 ft }
Batter, ω	0.0	[deg]	
Backslope, β	18.4	[deg]	
Backslope rise	80.0	[ft]	Broken back equivalent angle, I = 18.43° (see Fig. 25 in DEMO 82)

UNIFORM SURCHARGE

Uniformly distributed dead load is 0.0 [lb/ft ²], and live load is 250.0 [lb/ft ²]

ANALYZED REINFORCEMENT LAYOUT:



SCALE:

0 2 4 6 [ft]

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ANALYSIS: CALCULATED FACTORS (Static conditions)

Bearing capacity, Fs = 66.15, Meyerhof stress = 2342 lb/ft².

Foundation Interface: Direct sliding, Fs = 2.430, Eccentricity, e/L = 0.1004, Fs-overturning = 3.49

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	8.00	3	4.54	6.99	6.995	29.085	1.974	0.1004	UX1500MSE-SS
2	1.50	8.00	3	2.32	3.82	3.821	12.596	2.107	0.0747	UX1500MSE-SS
3	3.00	8.00	2	1.52	2.91	2.907	11.054	2.259	0.0501	UX1400MSE-SS
4	4.50	8.00	2	1.65	3.38	3.384	9.504	2.427	0.0263	UX1400MSE-SS
5	6.00	8.00	2	1.82	4.05	4.047	7.957	2.609	0.0020	UX1400MSE-SS
6	7.50	8.00	2	2.07	5.03	5.035	6.405	2.784	-0.0254	UX1400MSE-SS
7	9.00	8.00	2	1.79	4.83	4.830	3.507	2.875	-0.0642	UX1400MSE-SS

ANALYSIS: CALCULATED FACTORS (Seismic conditions)

Bearing capacity, Fs = 45.38, Meyerhof stress = 3332 lb/ft².

Foundation Interface: Direct sliding, Fs = 1.458, Eccentricity, e/L = 0.2333, Fs-overturning = 1.90

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	8.00	3	4.06	5.91	5.912	16.164	1.184	0.2333	UX1500MSE-SS
2	1.50	8.00	3	2.20	3.51	3.507	8.293	1.313	0.1727	UX1500MSE-SS
3	3.00	8.00	2	1.45	2.65	2.647	7.266	1.474	0.1183	UX1400MSE-SS
4	4.50	8.00	2	1.57	3.08	3.078	6.235	1.679	0.0699	UX1400MSE-SS
5	6.00	8.00	2	1.74	3.68	3.677	5.206	1.944	0.0263	UX1400MSE-SS
6	7.50	8.00	2	1.98	4.56	4.564	4.173	2.281	-0.0148	UX1400MSE-SS
7	9.00	8.00	2	1.74	4.48	4.482	2.396	2.644	-0.0617	UX1400MSE-SS

N/A (see internal)

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AASHTO DESIGN METHOD
LANL Airport Landfill

PROJECT IDENTIFICATION

Title: LANL Airport Landfill
Project Number: D06602
Client: Slaton Bros SW
Designer: CLC
Station Number: 2A_1+00.0-1+40.2 & 2B_1+75.5-2+10.0

Description:

Wall 2A and Wall 2B_DH=10.5'_EXTERNAL

Company's information:

Name: Tensar Earth Technologies, Inc.
Street: 5883 Glenridge Drive
Suite 200
Atlanta, GA 30328
Telephone #: (404) 250-1290
Fax #: (404) 250-9185
E-Mail: ccampbell@tensarcorp.com

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PROGRAM MODE: ANALYSIS
of a SIMPLE STRUCTURE
using GEOGRID as reinforcing material.

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License number MSEW-301064

SOIL DATA

REINFORCED SOIL

Unit weight,	γ	130.0 lb/ft ^{3}
Design value of internal angle of friction,	ϕ	32.0 °

RETAINED SOIL

Unit weight,	γ	100.0 lb/ft ^{3}
Design value of internal angle of friction,	ϕ	35.5 °

FOUNDATION SOIL (Considered as an equivalent uniform soil)

Equivalent unit weight,	$\gamma_{equiv.}$	130.0 lb/ft ^{3}
Equivalent internal angle of friction,	$\phi_{equiv.}$	32.0 °
Equivalent cohesion,	$c_{equiv.}$	4000.0 lb/ft ^{2}

Water table does not affect bearing capacity

LATERAL EARTH PRESSURE COEFFICIENTS

Ka (internal stability) = 0.3073 (if batter is less than 10°, Ka is calculated from eq. 15. Otherwise, eq. 38 is utilized)
Inclination of internal slip plane, ψ= 61.00° (see Fig. 28 in DEMO 82).
Ka (external stability) = 0.3050 (if batter is less than 10°, Ka is calculated from eq. 16. Otherwise, eq. 17 is utilized)

BEARING CAPACITY

Bearing capacity coefficients (calculated by MSEW): Nc = 35.49 N γ= 30.21

SEISMICITY

Note: specified α_o combined with I and δ produced a square root of -0.00 in eq. 37a.
MSEW set this square root to ZERO so that the Kae could be calculated. Be aware that the end results are likely erroneous and ARE PROVIDED FOR INFORMATION ONLY

Maximum ground acceleration coefficient, α_o = 0.262
Kae (α_o> 0) = 1.1640 Kae (α_o= 0) = 0.3050 Δ Kae = 0.8590 (see eq. 37 in DEMO 82)
Seismic soil-geogrid friction coefficient, F* is 80.0% of its specified static value.

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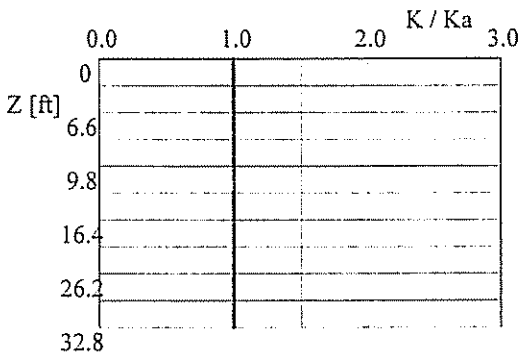
INPUT DATA: Geogrids
(Analysis)

D A T A	Geogrid type #1	Geogrid type #2	Geogrid type #3	Geogrid type #4	Geogrid type #5
Tult [lb/ft]	3974.1	4796.3	7811.2	9866.7	11990.8
Durability reduction factor, RFd	1.00	1.00	1.00	1.00	1.00
Installation-damage reduction factor, RFid	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	2.34	2.21	2.40	2.29	2.22
Fs-overall for strength	N/A	N/A	N/A	N/A	N/A
Coverage ratio, Rc	0.940	0.940	0.940	0.940	0.940
Friction angle along geogrid-soil interface, ρ	26.56	26.56	26.56	26.56	26.56
Pullout resistance factor, F*	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$
Scale-effect correction factor, α	1.0	1.0	1.0	1.0	1.0

Variation of Lateral Earth Pressure Coefficient With Depth

Z	K / Ka
0 ft	1.00
3.3 ft	1.00
6.6 ft	1.00
9.8 ft	1.00
13.1 ft	1.00
16.4 ft	1.00
19.7 ft	1.00



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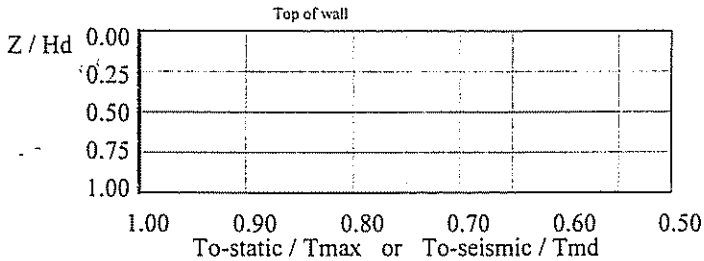
INPUT DATA: Facia and Connection (according to revised Demo 82) (Analysis)

FACIA type: Facing enabling frictional connection of reinforcement (e.g., modular concrete blocks, gabions)
Depth/height of block is 1.48/1.48 ft. Horizontal distance to Center of Gravity of block is 0.74 ft.
Average unit weight of block is $\gamma_f = 114.58$ lb/ft³

Z / Hd	To-static / Tmax or To-seismic / Tmd
0.00	1.00
0.25	1.00
0.50	1.00
0.75	1.00
1.00	1.00



Geogrid Type #1		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ (1)	CRult (2)	σ	CRult	σ	CRult	σ	CRult	σ	CRult
0.0	1.00	0.0	1.00	0.0	1.00	0.0	0.38	0.0	0.38
						1200.9	0.44	1200.9	0.44
						2999.0	0.53	3600.5	0.56
						6000.1	0.68	7198.9	0.74

Geogrid Type #1(3)		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr
0.0	0.15	0.0	0.15	0.0	0.15	0.0	0.38	0.0	0.38
480.3	0.20	480.3	0.20	599.4	0.21	1200.9	0.44	1200.9	0.44
1200.9	0.27	1200.9	0.27	1800.3	0.33	2999.0	0.53	3600.5	0.56
2399.6	0.39	2399.6	0.39	3600.5	0.51	6000.1	0.68	7198.9	0.74

(1) σ = Confining stress in between stacked blocks [lb/ft²]
(2) CRult = Tc-ult / Tult
(3) CRcr = Tcre / Tult

In seismic analysis, long term strength is reduced to 100% of its static value.

D A T A (for connection only)	Type #1	Type #2	Type #3	Type #4	Type #5
Product Name	UX1100MSE..	UX1400MSE..	UX1500MSE..	UX1600MSE..	UX1700MSE..
Connection strength reduction factor, RFd	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	N/A	N/A	N/A	N/A	N/A

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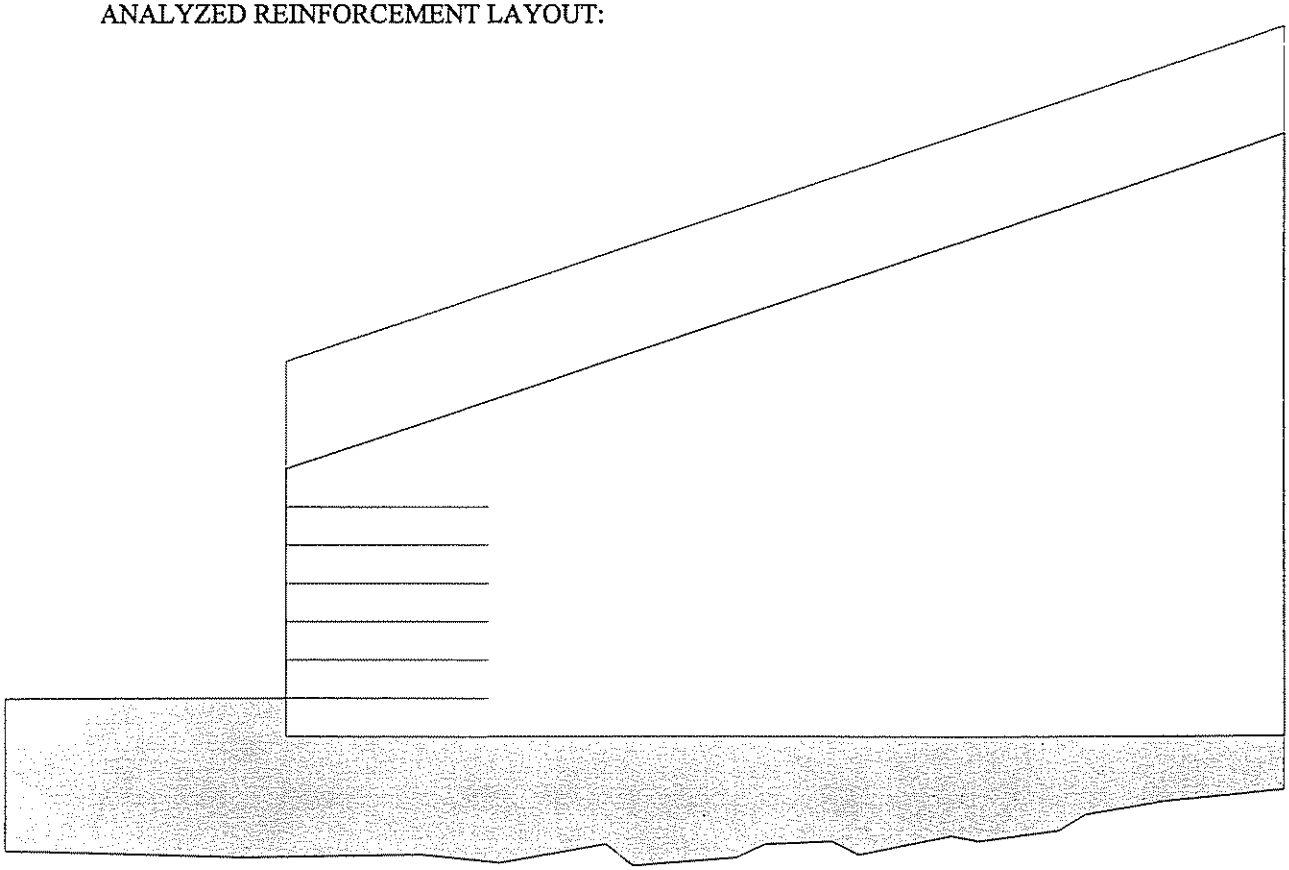
INPUT DATA: Geometry and Surcharge loads (of a SIMPLE STRUCTURE)

Design height, Hd	10.50	[ft]	{ Embedded depth is E = 1.50 ft, and height above top of finished bottom grade is H = 9.00 ft }
Batter, ω	0.0	[deg]	
Backslope, β	18.4	[deg]	
Backslope rise	80.0	[ft]	Broken back equivalent angle, I = 18.43° (see Fig. 25 in DEMO 82)

U N I F O R M S U R C H A R G E

Uniformly distributed dead load is 0.0 [lb/ft ²], and live load is 250.0 [lb/ft ²]

ANALYZED REINFORCEMENT LAYOUT:



SCALE:

0 2 4 6 [ft]

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ANALYSIS: CALCULATED FACTORS (Static conditions)

Bearing capacity, Fs = 66.15, Meyerhof stress = 2342 lb/ft².

Foundation Interface: Direct sliding, Fs = 2.430, Eccentricity, e/L = 0.1004, Fs-overturning = 3.49

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	8.00	3	4.54	6.99	6.995	29.085	1.974	0.1004	UX1500MSE-SS
2	1.50	8.00	3	2.32	3.82	3.821	12.596	2.107	0.0747	UX1500MSE-SS
3	3.00	8.00	2	1.52	2.91	2.907	11.054	2.259	0.0501	UX1400MSE-SS
4	4.50	8.00	2	1.65	3.38	3.384	9.504	2.427	0.0263	UX1400MSE-SS
5	6.00	8.00	2	1.82	4.05	4.047	7.957	2.609	0.0020	UX1400MSE-SS
6	7.50	8.00	2	2.07	5.03	5.035	6.405	2.784	-0.0254	UX1400MSE-SS
7	9.00	8.00	2	1.79	4.83	4.830	3.507	2.875	-0.0642	UX1400MSE-SS

ANALYSIS: CALCULATED FACTORS (Seismic conditions)

N/A N/A

Bearing capacity, Fs = 16.53, Meyerhof stress = 8810 lb/ft².

Foundation Interface: Direct sliding, Fs = 0.942, Eccentricity, e/L = 0.4285, Fs-overturning = 1.14 N/A

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	8.00	3	3.74	5.26	5.260	12.987	0.765	0.4285	UX1500MSE-SS
2	1.50	8.00	3	2.11	3.29	3.290	7.262	0.861	0.3207	UX1500MSE-SS
3	3.00	8.00	2	1.39	2.47	2.470	6.358	0.988	0.2246	UX1400MSE-SS
4	4.50	8.00	2	1.51	2.87	2.870	5.449	1.163	0.1405	UX1400MSE-SS
5	6.00	8.00	2	1.68	3.43	3.425	4.542	1.415	0.0678	UX1400MSE-SS
6	7.50	8.00	2	1.92	4.25	4.246	3.633	1.798	0.0048	UX1400MSE-SS
7	9.00	8.00	2	1.70	4.24	4.238	2.144	2.357	-0.0563	UX1400MSE-SS

N/A (see external)

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SIERRASCAPE®
RETAINING WALL SYSTEMS

AASHTO DESIGN METHOD
LANL Airport Landfill

PROJECT IDENTIFICATION

Title: LANL Airport Landfill
Project Number: D06602
Client: Slaton Bros SW
Designer: CLC
Station Number: 1+40.2-1+71.0

Description:

Wall 2A_DH=15.0'_EXTERNAL

Company's information:

Name: Tensar Earth Technologies, Inc.
Street: 5883 Glenridge Drive
Suite 200
Atlanta, GA 30328
Telephone #: (404) 250-1290
Fax #: (404) 250-9185
E-Mail: ccampbell@tensarcorp.com

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Original date and time of creating this file: January 4, 2007

PROGRAM MODE: ANALYSIS
of a SIMPLE STRUCTURE
using GEOGRID as reinforcing material.

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SOIL DATA

REINFORCED SOIL

Unit weight, γ	130.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	32.0 °

RETAINED SOIL

Unit weight, γ	100.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	35.5 °

FOUNDATION SOIL (Considered as an equivalent uniform soil)

Equivalent unit weight, $\gamma_{equiv.}$	130.0 lb/ft ^{3}
Equivalent internal angle of friction, $\phi_{equiv.}$	32.0 °
Equivalent cohesion, $c_{equiv.}$	4000.0 lb/ft ^{2}

Water table does not affect bearing capacity

LATERAL EARTH PRESSURE COEFFICIENTS

Ka (internal stability) = 0.3073 (if batter is less than 10°, Ka is calculated from eq. 15. Otherwise, eq. 38 is utilized)
Inclination of internal slip plane, ψ = 61.00° (see Fig. 28 in DEMO 82).
Ka (external stability) = 0.3050 (if batter is less than 10°, Ka is calculated from eq. 16. Otherwise, eq. 17 is utilized)

BEARING CAPACITY

Bearing capacity coefficients (calculated by MSEW): Nc = 35.49 N γ = 30.21

SEISMICITY

Maximum ground acceleration coefficient, α_o = 0.131
Kae (α_o> 0) = 0.5134 Kae (α_o= 0) = 0.3050 Δ Kae = 0.2084 (see eq. 37 in DEMO 82)
Seismic soil-geogrid friction coefficient, F* is 80.0% of its specified static value.

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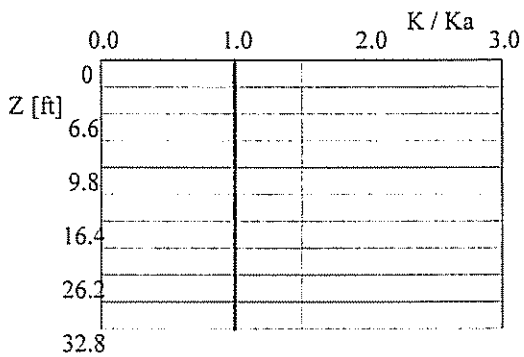
INPUT DATA: Geogrids
(Analysis)

D A T A	Geogrid type #1	Geogrid type #2	Geogrid type #3	Geogrid type #4	Geogrid type #5
Tult [lb/ft]	3974.1	4796.3	7811.2	9866.7	11990.8
Durability reduction factor, RFd	1.00	1.00	1.00	1.00	1.00
Installation-damage reduction factor, RFid	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	2.34	2.21	2.40	2.29	2.22
Fs-overall for strength	N/A	N/A	N/A	N/A	N/A
Coverage ratio, Rc	0.940	0.940	0.940	0.940	0.940
Friction angle along geogrid-soil interface, ρ	26.56	26.56	26.56	26.56	26.56
Pullout resistance factor, F*	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$
Scale-effect correction factor, α	1.0	1.0	1.0	1.0	1.0

Variation of Lateral Earth Pressure Coefficient With Depth

Z	K / Ka
0 ft	1.00
3.3 ft	1.00
6.6 ft	1.00
9.8 ft	1.00
13.1 ft	1.00
16.4 ft	1.00
19.7 ft	1.00



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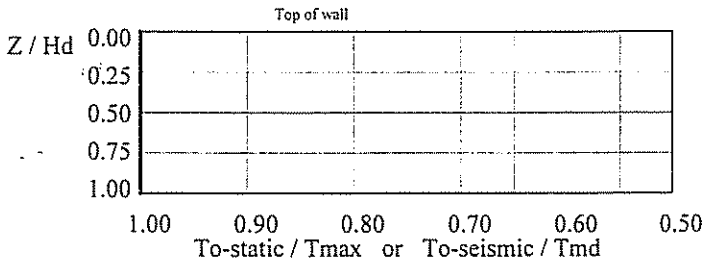
INPUT DATA: Facia and Connection (according to revised Demo 82) (Analysis)

FACIA type: Facing enabling frictional connection of reinforcement (e.g., modular concrete blocks, gabions)
Depth/height of block is 1.48/1.48 ft. Horizontal distance to Center of Gravity of block is 0.74 ft.
Average unit weight of block is $\gamma_r = 114.58$ lb/ft³

Z / Hd	To-static / Tmax or To-seismic / Tmd
0.00	1.00
0.25	1.00
0.50	1.00
0.75	1.00
1.00	1.00



Geogrid Type #1		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ (1)	CRult (2)	σ	CRult	σ	CRult	σ	CRult	σ	CRult
0.0	1.00	0.0	1.00	0.0	1.00	0.0	0.38	0.0	0.38
						1200.9	0.44	1200.9	0.44
						2999.0	0.53	3600.5	0.56
						6000.1	0.68	7198.9	0.74

Geogrid Type #1(3)		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr
0.0	0.15	0.0	0.15	0.0	0.15	0.0	0.38	0.0	0.38
480.3	0.20	480.3	0.20	599.4	0.21	1200.9	0.44	1200.9	0.44
1200.9	0.27	1200.9	0.27	1800.3	0.33	2999.0	0.53	3600.5	0.56
2399.6	0.39	2399.6	0.39	3600.5	0.51	6000.1	0.68	7198.9	0.74

(1) σ = Confining stress in between stacked blocks [lb/ft²]
(2) CRult = Tc-ult / Tult
(3) CRcr = Tcre / Tult

In seismic analysis, long term strength is reduced to 100% of its static value.

D A T A (for connection only)	Type #1	Type #2	Type #3	Type #4	Type #5
Product Name	UX1100MSE..	UX1400MSE..	UX1500MSE..	UX1600MSE..	UX1700MSE..
Connection strength reduction factor, RFd	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	N/A	N/A	N/A	N/A	N/A

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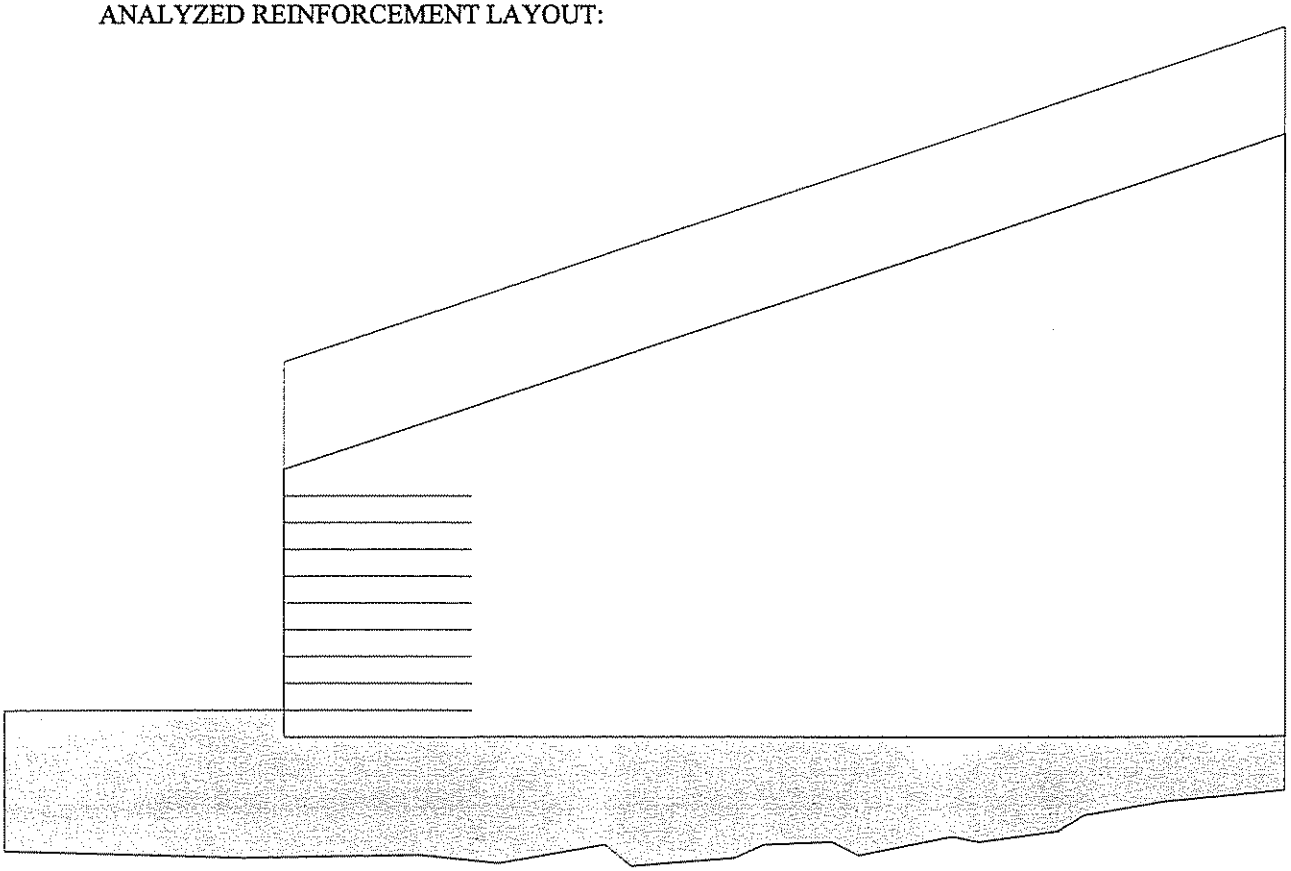
INPUT DATA: Geometry and Surcharge loads (of a SIMPLE STRUCTURE)

Design height, Hd	15.00	[ft]	{ Embedded depth is E = 1.50 ft, and height above top of finished bottom grade is H = 13.50 ft }
Batter, ω	0.0	[deg]	
Backslope, β	18.4	[deg]	
Backslope rise	80.0	[ft]	Broken back equivalent angle, I = 18.43° (see Fig. 25 in DEMO 82)

UNIFORM SURCHARGE

Uniformly distributed dead load is 0.0 [lb/ft ²], and live load is 250.0 [lb/ft ²]

ANALYZED REINFORCEMENT LAYOUT:



SCALE:

0 2 4 6 8 10 [ft]

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ANALYSIS: CALCULATED FACTORS (Static conditions)

Bearing capacity, Fs = 48.82, Meyerhof stress = 3249 lb/ft².

Foundation Interface: Direct sliding, Fs = 2.480, Eccentricity, e/L = 0.1058, Fs-overturning = 3.41

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	10.50	3	3.92	5.07	5.074	39.198	2.014	0.1058	UX1500MSE-SS
2	1.50	10.50	3	1.98	2.70	2.703	17.661	2.121	0.0863	UX1500MSE-SS
3	3.00	10.50	3	2.04	2.96	2.962	16.125	2.241	0.0677	UX1500MSE-SS
4	4.50	10.50	3	2.12	3.28	3.275	14.580	2.374	0.0498	UX1500MSE-SS
5	6.00	10.50	3	2.23	3.66	3.663	13.044	2.522	0.0324	UX1500MSE-SS
6	7.50	10.50	3	2.35	4.15	4.155	11.508	2.685	0.0153	UX1500MSE-SS
7	9.00	10.50	2	1.56	3.20	3.200	9.963	2.863	-0.0023	UX1400MSE-SS
8	10.50	10.50	2	1.70	3.79	3.788	8.426	3.046	-0.0214	UX1400MSE-SS
9	12.00	10.50	2	1.90	4.64	4.639	6.880	3.211	-0.0448	UX1400MSE-SS
10	13.50	10.50	2	1.60	4.30	4.301	3.840	3.281	-0.0802	UX1400MSE-SS

ANALYSIS: CALCULATED FACTORS (Seismic conditions)

Bearing capacity, Fs = 29.61, Meyerhof stress = 5156 lb/ft².

Foundation Interface: Direct sliding, Fs = 1.419, Eccentricity, e/L = 0.2638, Fs-overturning = 1.72

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	10.50	3	3.39	4.22	4.218	21.089	1.152	0.2638	UX1500MSE-SS
2	1.50	10.50	3	1.84	2.46	2.458	11.404	1.243	0.2148	UX1500MSE-SS
3	3.00	10.50	3	1.91	2.69	2.693	10.410	1.350	0.1695	UX1500MSE-SS
4	4.50	10.50	3	2.00	2.98	2.978	9.409	1.479	0.1279	UX1500MSE-SS
5	6.00	10.50	3	2.10	3.33	3.330	8.414	1.635	0.0898	UX1500MSE-SS
6	7.50	10.50	3	2.23	3.78	3.776	7.419	1.826	0.0551	UX1500MSE-SS
7	9.00	10.50	2	1.48	2.88	2.885	6.418	2.066	0.0231	UX1400MSE-SS
8	10.50	10.50	2	1.62	3.41	3.412	5.423	2.364	-0.0073	UX1400MSE-SS
9	12.00	10.50	2	1.82	4.18	4.177	4.422	2.724	-0.0387	UX1400MSE-SS
10	13.50	10.50	2	1.55	3.98	3.981	2.608	3.075	-0.0787	UX1400MSE-SS

N/A (see internal)

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SIERRASCAPE®
RETAINING WALL SYSTEMS

AASHTO DESIGN METHOD
LANL Airport Landfill

PROJECT IDENTIFICATION

Title: LANL Airport Landfill
Project Number: D06602
Client: Slaton Bros SW
Designer: CLC
Station Number: 1+40.2-1+71.0

Description:

Wall 2A_DH=15.0'_INTERNAL

Company's information:

Name: Tensar Earth Technologies, Inc.
Street: 5883 Glenridge Drive
Suite 200
Atlanta, GA 30328
Telephone #: (404) 250-1290
Fax #: (404) 250-9185
E-Mail: ccampbell@tensarcorp.com

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Original date and time of creating this file: January 4, 2007

PROGRAM MODE: ANALYSIS
of a SIMPLE STRUCTURE
using GEOGRID as reinforcing material.

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SOIL DATA

REINFORCED SOIL

Unit weight, γ	130.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	32.0 °

RETAINED SOIL

Unit weight, γ	100.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	35.5 °

FOUNDATION SOIL (Considered as an equivalent uniform soil)

Equivalent unit weight, $\gamma_{equiv.}$	130.0 lb/ft ^{3}
Equivalent internal angle of friction, $\phi_{equiv.}$	32.0 °
Equivalent cohesion, $c_{equiv.}$	4000.0 lb/ft ^{2}

Water table does not affect bearing capacity

LATERAL EARTH PRESSURE COEFFICIENTS

Ka (internal stability) = 0.3073 (if batter is less than 10°, Ka is calculated from eq. 15. Otherwise, eq. 38 is utilized)
Inclination of internal slip plane, ψ= 61.00° (see Fig. 28 in DEMO 82).
Ka (external stability) = 0.3050 (if batter is less than 10°, Ka is calculated from eq. 16. Otherwise, eq. 17 is utilized)

BEARING CAPACITY

Bearing capacity coefficients (calculated by MSEW): Nc = 35.49 N γ= 30.21

SEISMICITY

Note: specified $\alpha_o$ombined with I and δroduced a square root of -0.00 in eq. 37a.
MSEW set this square root to ZERO so that the Kae could be calculated. Be aware that the end results are likely erroneous and ARE PROVIDED FOR INFORMATION ONLY

Maximum ground acceleration coefficient, α_o = 0.262
Kae (α_o> 0) = 1.1640 Kae (α_o= 0) = 0.3050 Δ Kae = 0.8590 (see eq. 37 in DEMO 82)
Seismic soil-geogrid friction coefficient, F* is 80.0% of its specified static value.

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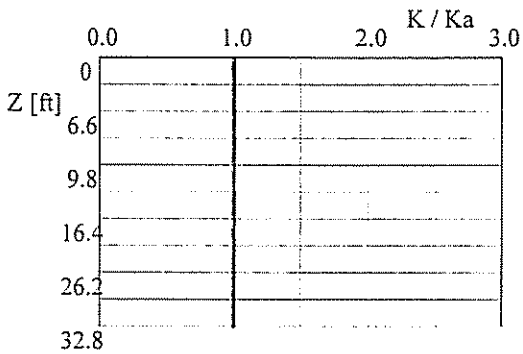
INPUT DATA: Geogrids
(Analysis)

D A T A	Geogrid type #1	Geogrid type #2	Geogrid type #3	Geogrid type #4	Geogrid type #5
Tult [lb/ft]	3974.1	4796.3	7811.2	9866.7	11990.8
Durability reduction factor, RFd	1.00	1.00	1.00	1.00	1.00
Installation-damage reduction factor, RFid	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	2.34	2.21	2.40	2.29	2.22
Fs-overall for strength	N/A	N/A	N/A	N/A	N/A
Coverage ratio, Rc	0.940	0.940	0.940	0.940	0.940
Friction angle along geogrid-soil interface, ρ	26.56	26.56	26.56	26.56	26.56
Pullout resistance factor, F*	0.80·tanϕ	0.80·tanϕ	0.80·tanϕ	0.80·tanϕ	0.80·tanϕ
Scale-effect correction factor, α	1.0	1.0	1.0	1.0	1.0

Variation of Lateral Earth Pressure Coefficient With Depth

Z	K / Ka
0 ft	1.00
3.3 ft	1.00
6.6 ft	1.00
9.8 ft	1.00
13.1 ft	1.00
16.4 ft	1.00
19.7 ft	1.00



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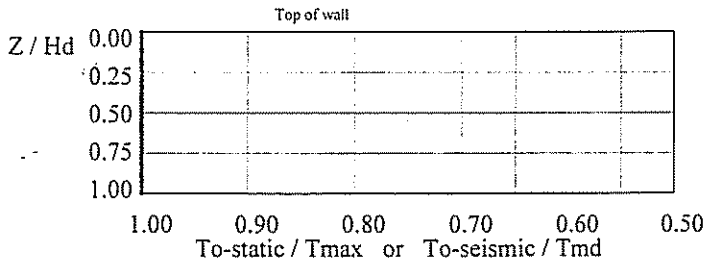
INPUT DATA: Facia and Connection (according to revised Demo 82) (Analysis)

FACIA type: Facing enabling frictional connection of reinforcement (e.g., modular concrete blocks, gabions)
Depth/height of block is 1.48/1.48 ft. Horizontal distance to Center of Gravity of block is 0.74 ft.
Average unit weight of block is $\gamma_f = 114.58$ lb/ft^3

Z / Hd	To-static / Tmax or To-seismic / Tmd
0.00	1.00
0.25	1.00
0.50	1.00
0.75	1.00
1.00	1.00



Geogrid Type #1		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ (1)	CRult (2)	σ	CRult	σ	CRult	σ	CRult	σ	CRult
0.0	1.00	0.0	1.00	0.0	1.00	0.0	0.38	0.0	0.38
						1200.9	0.44	1200.9	0.44
						2999.0	0.53	3600.5	0.56
						6000.1	0.68	7198.9	0.74

Geogrid Type #1 3)		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr
0.0	0.15	0.0	0.15	0.0	0.15	0.0	0.38	0.0	0.38
480.3	0.20	480.3	0.20	599.4	0.21	1200.9	0.44	1200.9	0.44
1200.9	0.27	1200.9	0.27	1800.3	0.33	2999.0	0.53	3600.5	0.56
2399.6	0.39	2399.6	0.39	3600.5	0.51	6000.1	0.68	7198.9	0.74

(1) σ = Confining stress in between stacked blocks [lb/ft^2]
(2) CRult = Tc-ult / Tult
(3) CRcr = Tcre / Tult

In seismic analysis, long term strength is reduced to 100% of its static value.

D A T A (for connection only)	Type #1	Type #2	Type #3	Type #4	Type #5
Product Name	UX1100MSE..	UX1400MSE..	UX1500MSE..	UX1600MSE..	UX1700MSE..
Connection strength reduction factor, RFd	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	N/A	N/A	N/A	N/A	N/A

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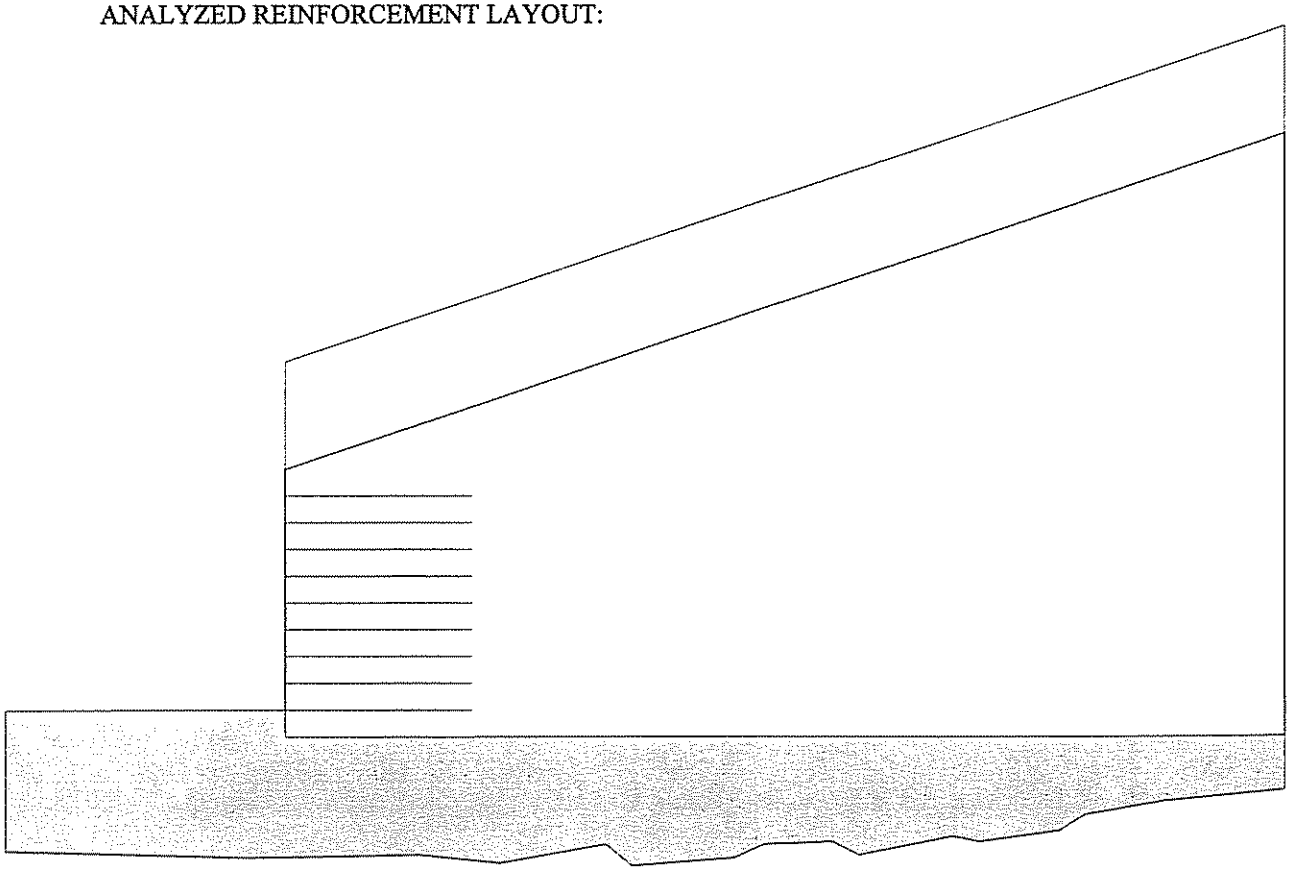
INPUT DATA: Geometry and Surcharge loads (of a SIMPLE STRUCTURE)

Design height, Hd	15.00	[ft]	{ Embedded depth is E = 1.50 ft, and height above top of finished bottom grade is H = 13.50 ft }
Batter, ω	0.0	[deg]	
Backslope, β	18.4	[deg]	
Backslope rise	80.0	[ft]	Broken back equivalent angle, I = 18.43° (see Fig. 25 in DEMO 82)

UNIFORM SURCHARGE

Uniformly distributed dead load is 0.0 [lb/ft ²], and live load is 250.0 [lb/ft ²]

ANALYZED REINFORCEMENT LAYOUT:



SCALE:

0 2 4 6 8 10 [ft]

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ANALYSIS: CALCULATED FACTORS (Static conditions)

Bearing capacity, Fs = 48.82, Meyerhof stress = 3249 lb/ft².

Foundation Interface: Direct sliding, Fs = 2.480, Eccentricity, e/L = 0.1058, Fs-overturning = 3.41

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	10.50	3	3.92	5.07	5.074	39.198	2.014	0.1058	UX1500MSE-SS
2	1.50	10.50	3	1.98	2.70	2.703	17.661	2.121	0.0863	UX1500MSE-SS
3	3.00	10.50	3	2.04	2.96	2.962	16.125	2.241	0.0677	UX1500MSE-SS
4	4.50	10.50	3	2.12	3.28	3.275	14.580	2.374	0.0498	UX1500MSE-SS
5	6.00	10.50	3	2.23	3.66	3.663	13.044	2.522	0.0324	UX1500MSE-SS
6	7.50	10.50	3	2.35	4.15	4.155	11.508	2.685	0.0153	UX1500MSE-SS
7	9.00	10.50	2	1.56	3.20	3.200	9.963	2.863	-0.0023	UX1400MSE-SS
8	10.50	10.50	2	1.70	3.79	3.788	8.426	3.046	-0.0214	UX1400MSE-SS
9	12.00	10.50	2	1.90	4.64	4.639	6.880	3.211	-0.0448	UX1400MSE-SS
10	13.50	10.50	2	1.60	4.30	4.301	3.840	3.281	-0.0802	UX1400MSE-SS

ANALYSIS: CALCULATED FACTORS (Seismic conditions)

N/A N/A

Bearing capacity, Fs = 4.69, Meyerhof stress = 30647 lb/ft².

Foundation Interface: Direct sliding, Fs = 0.898, Eccentricity, e/L = 0.4926, Fs-overturning = 1.01 N/A

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	10.50	3	3.06	3.72	3.716	16.705	0.729	0.4926	UX1500MSE-SS
2	1.50	10.50	3	1.75	2.29	2.292	9.878	0.792	0.4044	UX1500MSE-SS
3	3.00	10.50	3	1.82	2.51	2.511	9.015	0.870	0.3230	UX1500MSE-SS
4	4.50	10.50	3	1.90	2.78	2.776	8.147	0.966	0.2484	UX1500MSE-SS
5	6.00	10.50	3	2.01	3.10	3.103	7.284	1.088	0.1808	UX1500MSE-SS
6	7.50	10.50	3	2.13	3.52	3.519	6.421	1.249	0.1202	UX1500MSE-SS
7	9.00	10.50	2	1.42	2.67	2.673	5.552	1.467	0.0662	UX1400MSE-SS
8	10.50	10.50	2	1.56	3.16	3.161	4.689	1.774	0.0180	UX1400MSE-SS
9	12.00	10.50	2	1.76	3.87	3.868	3.820	2.218	-0.0268	UX1400MSE-SS
10	13.50	10.50	2	1.51	3.76	3.757	2.326	2.807	-0.0734	UX1400MSE-SS

N/A (see external)

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SIERRASCAPE®
RETAINING WALL SYSTEMS

AASHTO DESIGN METHOD
LANL Airport Landfill

PROJECT IDENTIFICATION

Title:	LANL Airport Landfill
Project Number:	D06602
Client:	Slaton Bros SW
Designer:	CLC
Station Number:	1+00.0-1+38.1

Description:

Wall 2B_DH=23.0'_EXTERNAL

Company's information:

Name: Tensar Earth Technologies, Inc.
Street: 5883 Glenridge Drive
Suite 200
Atlanta, GA 30328
Telephone #: (404) 250-1290
Fax #: (404) 250-9185
E-Mail: ccampbell@tensarcorp.com

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Original date and time of creating this file: January 4, 2007

PROGRAM MODE: ANALYSIS
of a SIMPLE STRUCTURE
using GEOGRID as reinforcing material.

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SOIL DATA

REINFORCED SOIL

Unit weight, γ	130.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	32.0 °

RETAINED SOIL

Unit weight, γ	100.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	35.5 °

FOUNDATION SOIL (Considered as an equivalent uniform soil)

Equivalent unit weight, $\gamma_{equiv.}$	130.0 lb/ft ^{3}
Equivalent internal angle of friction, $\phi_{equiv.}$	32.0 °
Equivalent cohesion, $c_{equiv.}$	4000.0 lb/ft ^{2}

Water table does not affect bearing capacity

LATERAL EARTH PRESSURE COEFFICIENTS

Ka (internal stability) = 0.3073 (if batter is less than 10°, Ka is calculated from eq. 15. Otherwise, eq. 38 is utilized)
Inclination of internal slip plane, ψ= 61.00° (see Fig. 28 in DEMO 82).
Ka (external stability) = 0.3050 (if batter is less than 10°, Ka is calculated from eq. 16. Otherwise, eq. 17 is utilized)

BEARING CAPACITY

Bearing capacity coefficients (calculated by MSEW): Nc = 35.49 N γ= 30.21

SEISMICITY

Maximum ground acceleration coefficient, α_o = 0.131
Kae (α_o> 0) = 0.5134 Kae (α_o= 0) = 0.3050 Δ Kae = 0.2084 (see eq. 37 in DEMO 82)
Seismic soil-geogrid friction coefficient, F* is 80.0% of its specified static value.

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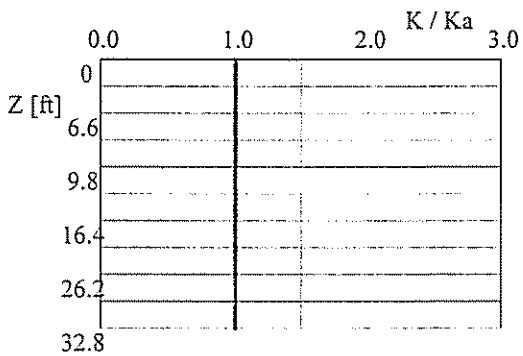
INPUT DATA: Geogrids
(Analysis)

D A T A	Geogrid type #1	Geogrid type #2	Geogrid type #3	Geogrid type #4	Geogrid type #5
Tult [lb/ft]	3974.1	4796.3	7811.2	9866.7	11990.8
Durability reduction factor, RFd	1.00	1.00	1.00	1.00	1.00
Installation-damage reduction factor, RFid	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	2.34	2.21	2.40	2.29	2.22
Fs-overall for strength	N/A	N/A	N/A	N/A	N/A
Coverage ratio, Rc	0.940	0.940	0.940	0.940	0.940
Friction angle along geogrid-soil interface, ρ	26.56	26.56	26.56	26.56	26.56
Pullout resistance factor, F*	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$
Scale-effect correction factor, α	1.0	1.0	1.0	1.0	1.0

Variation of Lateral Earth Pressure Coefficient With Depth

Z	K / Ka
0 ft	1.00
3.3 ft	1.00
6.6 ft	1.00
9.8 ft	1.00
13.1 ft	1.00
16.4 ft	1.00
19.7 ft	1.00



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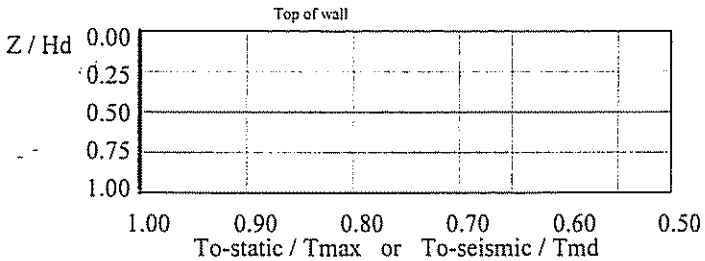
INPUT DATA: Facia and Connection (according to revised Demo 82) (Analysis)

FACIA type: Facing enabling frictional connection of reinforcement (e.g., modular concrete blocks, gabions)
Depth/height of block is 1.48/1.48 ft. Horizontal distance to Center of Gravity of block is 0.74 ft.
Average unit weight of block is $\gamma_f = 114.58$ lb/ft ^{3}

Z / Hd	To-static / Tmax or To-seismic / Tmd
0.00	1.00
0.25	1.00
0.50	1.00
0.75	1.00
1.00	1.00



Geogrid Type #1		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ (1)	CRult (2)	σ	CRult	σ	CRult	σ	CRult	σ	CRult
0.0	1.00	0.0	1.00	0.0	1.00	0.0	0.38	0.0	0.38
						1200.9	0.44	1200.9	0.44
						2999.0	0.53	3600.5	0.56
						6000.1	0.68	7198.9	0.74

Geogrid Type #1(3)		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr
0.0	0.15	0.0	0.15	0.0	0.15	0.0	0.38	0.0	0.38
480.3	0.20	480.3	0.20	599.4	0.21	1200.9	0.44	1200.9	0.44
1200.9	0.27	1200.9	0.27	1800.3	0.33	2999.0	0.53	3600.5	0.56
2399.6	0.39	2399.6	0.39	3600.5	0.51	6000.1	0.68	7198.9	0.74

(1) σ = Confining stress in between stacked blocks [lb/ft ^{2}]
(2) CRult = Tc-ult / Tult
(3) CRcr = Tcre / Tult

In seismic analysis, long term strength is reduced to 100% of its static value.

D A T A (for connection only)	Type #1	Type #2	Type #3	Type #4	Type #5
Product Name	UX1100MSE..	UX1400MSE..	UX1500MSE..	UX1600MSE..	UX1700MSE..
Connection strength reduction factor, RFd	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	N/A	N/A	N/A	N/A	N/A

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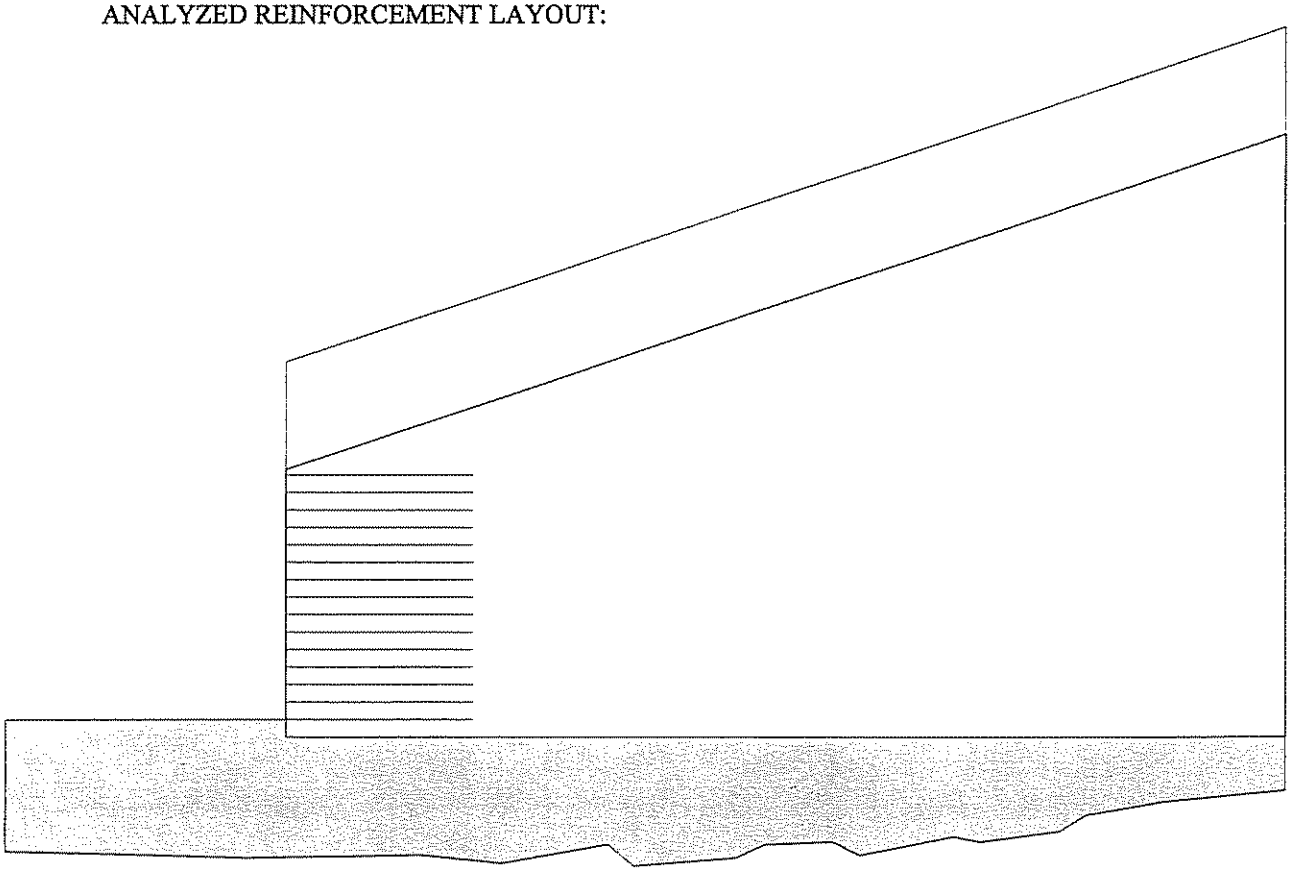
INPUT DATA: Geometry and Surcharge loads (of a SIMPLE STRUCTURE)

Design height, Hd	23.00	[ft]	{ Embedded depth is E = 1.50 ft, and height above top of finished bottom grade is H = 21.50 ft }
Batter, ω	0.0	[deg]	
Backslope, β	18.4	[deg]	
Backslope rise	55.0	[ft]	Broken back equivalent angle, I = 18.43° (see Fig. 25 in DEMO 82)

UNIFORM SURCHARGE

Uniformly distributed dead load is 0.0 [lb/ft ²], and live load is 250.0 [lb/ft ²]

ANALYZED REINFORCEMENT LAYOUT:



SCALE:

0 2 4 6 8 10[ft]

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ANALYSIS: CALCULATED FACTORS (Static conditions)

Bearing capacity, Fs = 35.70, Meyerhof stress = 4701 lb/ft².

Foundation Interface: Direct sliding, Fs = 2.650, Eccentricity, e/L = 0.0944, Fs-overturning = 3.71

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	16.00	3	3.38	3.41	3.409	61.500	2.152	0.0944	UX1500MSE-SS
2	1.50	16.00	3	1.69	1.78	1.778	28.790	2.233	0.0821	UX1500MSE-SS
3	3.00	16.00	3	1.72	1.89	1.887	27.249	2.321	0.0703	UX1500MSE-SS
4	4.50	16.00	3	1.75	2.01	2.009	25.722	2.416	0.0588	UX1500MSE-SS
5	6.00	16.00	3	1.78	2.15	2.148	24.181	2.519	0.0476	UX1500MSE-SS
6	7.50	16.00	3	1.82	2.31	2.309	22.640	2.632	0.0368	UX1500MSE-SS
7	9.00	16.00	3	1.86	2.49	2.495	21.100	2.754	0.0261	UX1500MSE-SS
8	10.50	16.00	3	1.91	2.71	2.714	19.576	2.886	0.0156	UX1500MSE-SS
9	12.00	16.00	3	1.97	2.97	2.975	18.037	3.030	0.0050	UX1500MSE-SS
10	13.50	16.00	3	2.04	3.29	3.291	16.499	3.186	-0.0057	UX1500MSE-SS
11	15.00	16.00	3	2.14	3.68	3.682	14.978	3.352	-0.0170	UX1500MSE-SS
12	16.50	16.00	3	2.25	4.18	4.180	13.443	3.526	-0.0294	UX1500MSE-SS
13	18.00	16.00	3	2.40	4.83	4.833	11.912	3.699	-0.0438	UX1500MSE-SS
14	19.50	16.00	2	1.62	3.82	3.819	10.400	3.851	-0.0622	UX1400MSE-SS
15	21.00	16.00	2	1.80	4.69	4.686	8.880	3.933	-0.0889	UX1400MSE-SS
16	22.50	16.00	2	2.45	7.10	7.101	8.638	3.825	-0.1364	UX1400MSE-SS

ANALYSIS: CALCULATED FACTORS (Seismic conditions)

Bearing capacity, Fs = 20.79, Meyerhof stress = 7612 lb/ft².

Foundation Interface: Direct sliding, Fs = 1.464, Eccentricity, e/L = 0.2556, Fs-overturning = 1.77

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	16.00	3	2.80	2.81	2.815	32.644	1.189	0.2556	UX1500MSE-SS
2	1.50	16.00	3	1.54	1.61	1.610	18.415	1.251	0.2234	UX1500MSE-SS
3	3.00	16.00	3	1.57	1.71	1.708	17.419	1.321	0.1928	UX1500MSE-SS
4	4.50	16.00	3	1.60	1.82	1.818	16.433	1.400	0.1638	UX1500MSE-SS
5	6.00	16.00	3	1.64	1.94	1.943	15.437	1.489	0.1365	UX1500MSE-SS
6	7.50	16.00	3	1.68	2.09	2.088	14.441	1.591	0.1107	UX1500MSE-SS
7	9.00	16.00	3	1.72	2.25	2.255	13.446	1.709	0.0865	UX1500MSE-SS
8	10.50	16.00	3	1.78	2.45	2.451	12.460	1.845	0.0637	UX1500MSE-SS
9	12.00	16.00	3	1.84	2.69	2.685	11.466	2.004	0.0422	UX1500MSE-SS
10	13.50	16.00	3	1.92	2.97	2.969	10.471	2.192	0.0219	UX1500MSE-SS
11	15.00	16.00	3	2.01	3.32	3.319	9.486	2.415	0.0025	UX1500MSE-SS
12	16.50	16.00	3	2.13	3.76	3.762	8.493	2.681	-0.0166	UX1500MSE-SS
13	18.00	16.00	3	2.28	4.34	4.343	7.500	2.995	-0.0364	UX1500MSE-SS
14	19.50	16.00	2	1.54	3.39	3.394	6.519	3.350	-0.0586	UX1400MSE-SS
15	21.00	16.00	2	1.72	4.15	4.151	5.529	3.690	-0.0878	UX1400MSE-SS
16	22.50	16.00	2	2.32	6.13	6.132	5.122	3.802	-0.1363	UX1400MSE-SS

N/A (see internal)

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SIERRASCAPE®
RETAINING WALL SYSTEMS

AASHTO DESIGN METHOD
LANL Airport Landfill

PROJECT IDENTIFICATION

Title: LANL Airport Landfill
Project Number: D06602
Client: Slaton Bros SW
Designer: CLC
Station Number: 1+00.0-1+38.1

Description:

Wall 2B_DH=23.0'_INTERNAL

Company's information:

Name: Tensar Earth Technologies, Inc.
Street: 5883 Glenridge Drive
Suite 200
Atlanta, GA 30328
Telephone #: (404) 250-1290
Fax #: (404) 250-9185
E-Mail: ccampbell@tensarcorp.com

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Original date and time of creating this file: January 4, 2007

PROGRAM MODE: ANALYSIS
of a SIMPLE STRUCTURE
using GEOGRID as reinforcing material.

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SOIL DATA

REINFORCED SOIL

Unit weight, γ	130.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	32.0 °

RETAINED SOIL

Unit weight, γ	100.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	35.5 °

FOUNDATION SOIL (Considered as an equivalent uniform soil)

Equivalent unit weight, $\gamma_{equiv.}$	130.0 lb/ft ^{3}
Equivalent internal angle of friction, $\phi_{equiv.}$	32.0 °
Equivalent cohesion, $c_{equiv.}$	4000.0 lb/ft ^{2}

Water table does not affect bearing capacity

LATERAL EARTH PRESSURE COEFFICIENTS

Ka (internal stability) = 0.3073 (if batter is less than 10°, Ka is calculated from eq. 15. Otherwise, eq. 38 is utilized)
Inclination of internal slip plane, ψ = 61.00° (see Fig. 28 in DEMO 82).
Ka (external stability) = 0.3050 (if batter is less than 10°, Ka is calculated from eq. 16. Otherwise, eq. 17 is utilized)

BEARING CAPACITY

Bearing capacity coefficients (calculated by MSEW): Nc = 35.49 N γ = 30.21

SEISMICITY

Note: specified $\alpha_o$ombined with I and δroduced a square root of -0.00 in eq. 37a.
MSEW set this square root to ZERO so that the Kae could be calculated. Be aware that the end results are likely erroneous and ARE PROVIDED FOR INFORMATION ONLY

Maximum ground acceleration coefficient, α_o = 0.262
Kae (α_o> 0) = 1.1640 Kae (α_o= 0) = 0.3050 Δ Kae = 0.8590 (see eq. 37 in DEMO 82)
Seismic soil-geogrid friction coefficient, F* is 80.0% of its specified static value.

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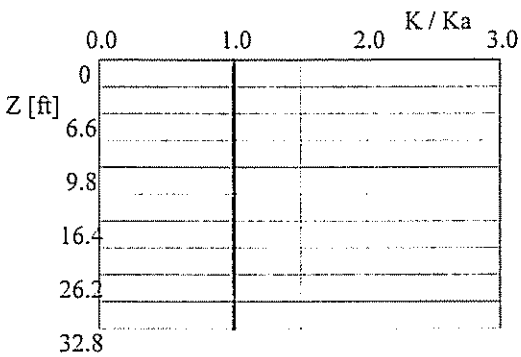
INPUT DATA: Geogrids
(Analysis)

D A T A	Geogrid type #1	Geogrid type #2	Geogrid type #3	Geogrid type #4	Geogrid type #5
Tult [lb/ft]	3974.1	4796.3	7811.2	9866.7	11990.8
Durability reduction factor, RFd	1.00	1.00	1.00	1.00	1.00
Installation-damage reduction factor, RFid	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	2.34	2.21	2.40	2.29	2.22
Fs-overall for strength	N/A	N/A	N/A	N/A	N/A
Coverage ratio, Rc	0.940	0.940	0.940	0.940	0.940
Friction angle along geogrid-soil interface, ρ	26.56	26.56	26.56	26.56	26.56
Pullout resistance factor, F*	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$
Scale-effect correction factor, α	1.0	1.0	1.0	1.0	1.0

Variation of Lateral Earth Pressure Coefficient With Depth

Z	K / Ka
0 ft	1.00
3.3 ft	1.00
6.6 ft	1.00
9.8 ft	1.00
13.1 ft	1.00
16.4 ft	1.00
19.7 ft	1.00



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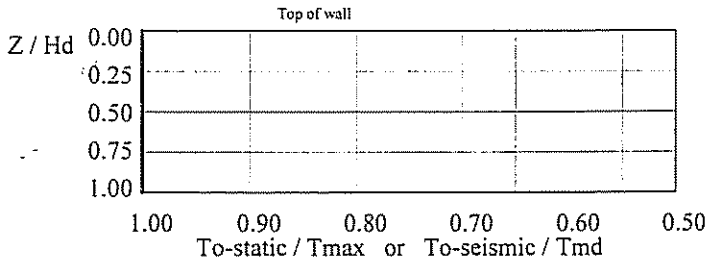
INPUT DATA: Facia and Connection (according to revised Demo 82) (Analysis)

FACIA type: Facing enabling frictional connection of reinforcement (e.g., modular concrete blocks, gabions)
Depth/height of block is 1.48/1.48 ft. Horizontal distance to Center of Gravity of block is 0.74 ft.
Average unit weight of block is $\gamma_f = 114.58$ lb/ft^3

Z / Hd	To-static / Tmax or To-seismic / Tmd
0.00	1.00
0.25	1.00
0.50	1.00
0.75	1.00
1.00	1.00



Geogrid Type #1		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ [1]	CRult [2]	σ	CRult	σ	CRult	σ	CRult	σ	CRult
0.0	1.00	0.0	1.00	0.0	1.00	0.0	0.38	0.0	0.38
						1200.9	0.44	1200.9	0.44
						2999.0	0.53	3600.5	0.56
						6000.1	0.68	7198.9	0.74

Geogrid Type #1[3]		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr
0.0	0.15	0.0	0.15	0.0	0.15	0.0	0.38	0.0	0.38
480.3	0.20	480.3	0.20	599.4	0.21	1200.9	0.44	1200.9	0.44
1200.9	0.27	1200.9	0.27	1800.3	0.33	2999.0	0.53	3600.5	0.56
2399.6	0.39	2399.6	0.39	3600.5	0.51	6000.1	0.68	7198.9	0.74

[1] σ = Confining stress in between stacked blocks [lb/ft^2]
[2] CRult = Tc-ult / Tult
[3] CRcr = Tcre / Tult

In seismic analysis, long term strength is reduced to 100% of its static value.

D A T A (for connection only)	Type #1	Type #2	Type #3	Type #4	Type #5
Product Name	UX1100MSE..	UX1400MSE..	UX1500MSE..	UX1600MSE..	UX1700MSE..
Connection strength reduction factor, RFd	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	N/A	N/A	N/A	N/A	N/A

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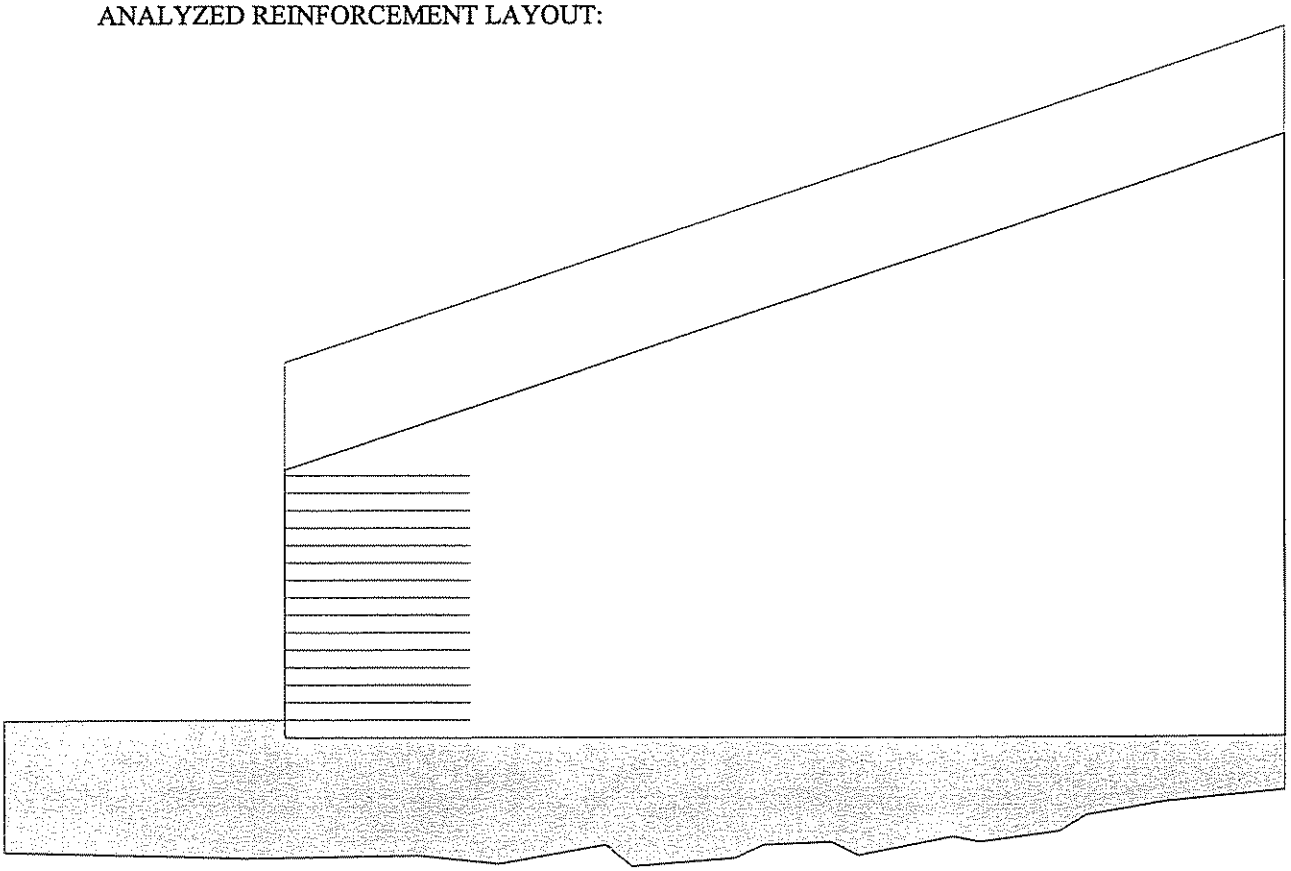
INPUT DATA: Geometry and Surcharge loads (of a SIMPLE STRUCTURE)

Design height, Hd	23.00	[ft]	{ Embedded depth is E = 1.50 ft, and height above top of finished bottom grade is H = 21.50 ft }
Batter, ω	0.0	[deg]	
Backslope, β	18.4	[deg]	
Backslope rise	55.0	[ft]	Broken back equivalent angle, I = 18.43° (see Fig. 25 in DEMO 82)

UNIFORM SURCHARGE

Uniformly distributed dead load is 0.0 [lb/ft ²], and live load is 250.0 [lb/ft ²]

ANALYZED REINFORCEMENT LAYOUT:



SCALE:

0 2 4 6 8 10 [ft]

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ANALYSIS: CALCULATED FACTORS (Static conditions)

Bearing capacity, Fs = 35.70, Meyerhof stress = 4701 lb/ft².
Foundation Interface: Direct sliding, Fs = 2.650, Eccentricity, e/L = 0.0944, Fs-overturning = 3.71

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	16.00	3	3.38	3.41	3.409	61.500	2.152	0.0944	UX1500MSE-SS
2	1.50	16.00	3	1.69	1.78	1.778	28.790	2.233	0.0821	UX1500MSE-SS
3	3.00	16.00	3	1.72	1.89	1.887	27.249	2.321	0.0703	UX1500MSE-SS
4	4.50	16.00	3	1.75	2.01	2.009	25.722	2.416	0.0588	UX1500MSE-SS
5	6.00	16.00	3	1.78	2.15	2.148	24.181	2.519	0.0476	UX1500MSE-SS
6	7.50	16.00	3	1.82	2.31	2.309	22.640	2.632	0.0368	UX1500MSE-SS
7	9.00	16.00	3	1.86	2.49	2.495	21.100	2.754	0.0261	UX1500MSE-SS
8	10.50	16.00	3	1.91	2.71	2.714	19.576	2.886	0.0156	UX1500MSE-SS
9	12.00	16.00	3	1.97	2.97	2.975	18.037	3.030	0.0050	UX1500MSE-SS
10	13.50	16.00	3	2.04	3.29	3.291	16.499	3.186	-0.0057	UX1500MSE-SS
11	15.00	16.00	3	2.14	3.68	3.682	14.978	3.352	-0.0170	UX1500MSE-SS
12	16.50	16.00	3	2.25	4.18	4.180	13.443	3.526	-0.0294	UX1500MSE-SS
13	18.00	16.00	3	2.40	4.83	4.833	11.912	3.699	-0.0438	UX1500MSE-SS
14	19.50	16.00	2	1.62	3.82	3.819	10.400	3.851	-0.0622	UX1400MSE-SS
15	21.00	16.00	2	1.80	4.69	4.686	8.880	3.933	-0.0889	UX1400MSE-SS
16	22.50	16.00	2	2.45	7.10	7.101	8.638	3.825	-0.1364	UX1400MSE-SS

ANALYSIS: CALCULATED FACTORS (Seismic conditions)

N/A N/A Bearing capacity, Fs = 2.45, Meyerhof stress = 58809 lb/ft².
Foundation Interface: Direct sliding, Fs = 0.911, Eccentricity, e/L = 0.4889, Fs-overturning = 1.02 N/A

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	16.00	3	2.46	2.47	2.469	25.711	0.739	0.4889	UX1500MSE-SS
2	1.50	16.00	3	1.43	1.50	1.496	15.866	0.781	0.4304	UX1500MSE-SS
3	3.00	16.00	3	1.47	1.59	1.587	15.003	0.829	0.3747	UX1500MSE-SS
4	4.50	16.00	3	1.50	1.69	1.689	14.149	0.883	0.3220	UX1500MSE-SS
5	6.00	16.00	3	1.54	1.81	1.805	13.286	0.946	0.2723	UX1500MSE-SS
6	7.50	16.00	3	1.58	1.94	1.939	12.424	1.020	0.2255	UX1500MSE-SS
7	9.00	16.00	3	1.63	2.09	2.094	11.561	1.108	0.1818	UX1500MSE-SS
8	10.50	16.00	3	1.68	2.28	2.275	10.707	1.214	0.1412	UX1500MSE-SS
9	12.00	16.00	3	1.75	2.49	2.491	9.845	1.343	0.1035	UX1500MSE-SS
10	13.50	16.00	3	1.82	2.75	2.753	8.983	1.504	0.0687	UX1500MSE-SS
11	15.00	16.00	3	1.92	3.08	3.075	8.129	1.709	0.0365	UX1500MSE-SS
12	16.50	16.00	3	2.03	3.48	3.483	7.268	1.976	0.0065	UX1500MSE-SS
13	18.00	16.00	3	2.18	4.02	4.017	6.407	2.329	-0.0222	UX1500MSE-SS
14	19.50	16.00	2	1.48	3.12	3.117	5.555	2.798	-0.0513	UX1400MSE-SS
15	21.00	16.00	2	1.65	3.80	3.803	4.695	3.371	-0.0832	UX1400MSE-SS
16	22.50	16.00	2	2.23	5.53	5.528	4.242	3.768	-0.1361	UX1400MSE-SS

N/A (see external)

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RETAINING WALL SYSTEMS

AASHTO DESIGN METHOD
LANL Airport Landfill

PROJECT IDENTIFICATION

Title: LANL Airport Landfill
Project Number: D06602
Client: Slaton Bros SW
Designer: CLC
Station Number: 1+38.1-1+75.5

Description:

Wall 2B_DH=16.5'_EXTERNAL

Company's information:

Name: Tensar Earth Technologies, Inc.
Street: 5883 Glenridge Drive
Suite 200
Atlanta, GA 30328
Telephone #: (404) 250-1290
Fax #: (404) 250-9185
E-Mail: ccampbell@tensarcorp.com

Original file path and name: k:_d\D06602\Final\Design\Walls 2A and 2B\Rev2_1.4.07\W.....
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Original date and time of creating this file: January 4, 2007

PROGRAM MODE: ANALYSIS
of a SIMPLE STRUCTURE
using GEOGRID as reinforcing material.

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SOIL DATA

REINFORCED SOIL

Unit weight, γ	130.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	32.0 °

RETAINED SOIL

Unit weight, γ	100.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	35.5 °

FOUNDATION SOIL (Considered as an equivalent uniform soil)

Equivalent unit weight, $\gamma_{equiv.}$	130.0 lb/ft ^{3}
Equivalent internal angle of friction, $\phi_{equiv.}$	32.0 °
Equivalent cohesion, $c_{equiv.}$	4000.0 lb/ft ^{2}

Water table does not affect bearing capacity

LATERAL EARTH PRESSURE COEFFICIENTS

Ka (internal stability) = 0.3073 (if batter is less than 10°, Ka is calculated from eq. 15. Otherwise, eq. 38 is utilized)
Inclination of internal slip plane, ψ= 61.00° (see Fig. 28 in DEMO 82).
Ka (external stability) = 0.3050 (if batter is less than 10°, Ka is calculated from eq. 16. Otherwise, eq. 17 is utilized)

BEARING CAPACITY

Bearing capacity coefficients (calculated by MSEW): Nc = 35.49 N γ= 30.21

SEISMICITY

Maximum ground acceleration coefficient, α_o = 0.131
Kae (α_o> 0) = 0.5134 Kae (α_o= 0) = 0.3050 Δ Kae = 0.2084 (see eq. 37 in DEMO 82)
Seismic soil-geogrid friction coefficient, F* is 80.0% of its specified static value.

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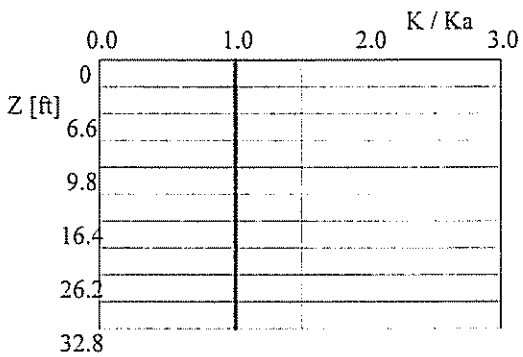
INPUT DATA: Geogrids
(Analysis)

D A T A	Geogrid type #1	Geogrid type #2	Geogrid type #3	Geogrid type #4	Geogrid type #5
Tult [lb/ft]	3974.1	4796.3	7811.2	9866.7	11990.8
Durability reduction factor, RFd	1.00	1.00	1.00	1.00	1.00
Installation-damage reduction factor, RFid	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	2.34	2.21	2.40	2.29	2.22
Fs-overall for strength	N/A	N/A	N/A	N/A	N/A
Coverage ratio, Rc	0.940	0.940	0.940	0.940	0.940
Friction angle along geogrid-soil interface, ρ	26.56	26.56	26.56	26.56	26.56
Pullout resistance factor, F*	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$
Scale-effect correction factor, α	1.0	1.0	1.0	1.0	1.0

Variation of Lateral Earth Pressure Coefficient With Depth

Z	K / Ka
0 ft	1.00
3.3 ft	1.00
6.6 ft	1.00
9.8 ft	1.00
13.1 ft	1.00
16.4 ft	1.00
19.7 ft	1.00



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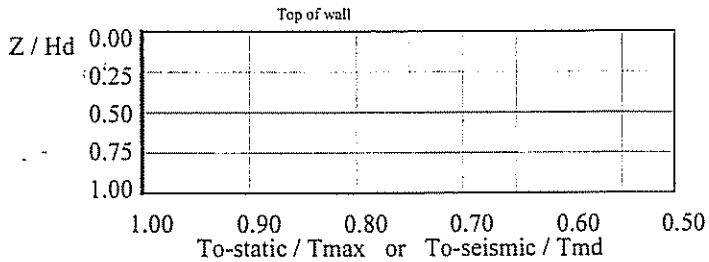
INPUT DATA: Facia and Connection (according to revised Demo 82) (Analysis)

FACIA type: Facing enabling frictional connection of reinforcement (e.g., modular concrete blocks, gabions)
Depth/height of block is 1.48/1.48 ft. Horizontal distance to Center of Gravity of block is 0.74 ft.
Average unit weight of block is $\gamma_f = 114.58$ lb/ft ^{3}

Z / Hd	To-static / Tmax or To-seismic / Tmd
0.00	1.00
0.25	1.00
0.50	1.00
0.75	1.00
1.00	1.00



Geogrid Type #1		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ (1)	CRult (2)	σ	CRult	σ	CRult	σ	CRult	σ	CRult
0.0	1.00	0.0	1.00	0.0	1.00	0.0	0.38	0.0	0.38
						1200.9	0.44	1200.9	0.44
						2999.0	0.53	3600.5	0.56
						6000.1	0.68	7198.9	0.74

Geogrid Type #1 3)		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr
0.0	0.15	0.0	0.15	0.0	0.15	0.0	0.38	0.0	0.38
480.3	0.20	480.3	0.20	599.4	0.21	1200.9	0.44	1200.9	0.44
1200.9	0.27	1200.9	0.27	1800.3	0.33	2999.0	0.53	3600.5	0.56
2399.6	0.39	2399.6	0.39	3600.5	0.51	6000.1	0.68	7198.9	0.74

(1) σ = Confining stress in between stacked blocks [lb/ft ^{2}]
(2) CRult = Tc-ult / Tult
(3) CRcr = Tcre / Tult

In seismic analysis, long term strength is reduced to 100% of its static value.

D A T A (for connection only)	Type #1	Type #2	Type #3	Type #4	Type #5
Product Name	UX1100MSE..	UX1400MSE..	UX1500MSE..	UX1600MSE..	UX1700MSE..
Connection strength reduction factor, RFd	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	N/A	N/A	N/A	N/A	N/A

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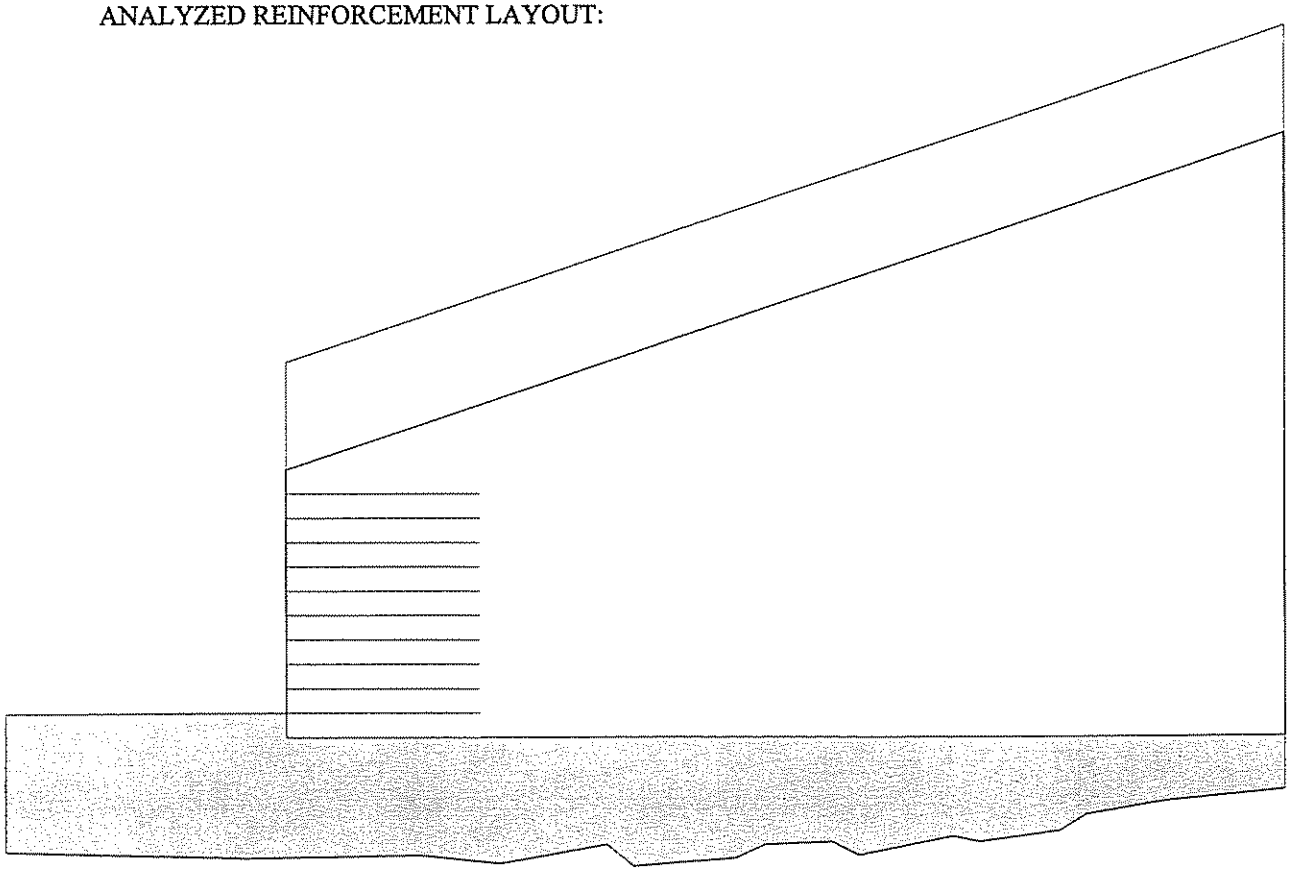
INPUT DATA: Geometry and Surcharge loads (of a SIMPLE STRUCTURE)

Design height, Hd	16.50	[ft]	{ Embedded depth is E = 1.50 ft, and height above top of finished bottom grade is H = 15.00 ft }
Batter, ω	0.0	[deg]	
Backslope, β	18.4	[deg]	
Backslope rise	55.0	[ft]	Broken back equivalent angle, I = 18.43° (see Fig. 25 in DEMO 82)

UNIFORM SURCHARGE

Uniformly distributed dead load is 0.0 [lb/ft ²], and live load is 250.0 [lb/ft ²]

ANALYZED REINFORCEMENT LAYOUT:



SCALE:

0 2 4 6 8 10 [ft]

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ANALYSIS: CALCULATED FACTORS (Static conditions)

Bearing capacity, Fs = 46.70, Meyerhof stress = 3458 lb/ft².

Foundation Interface: Direct sliding, Fs = 2.593, Eccentricity, e/L = 0.0940, Fs-overturning = 3.69

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	12.00	3	3.78	4.65	4.648	45.323	2.105	0.0940	UX1500MSE-SS
2	1.50	12.00	3	1.90	2.46	2.463	20.708	2.209	0.0775	UX1500MSE-SS
3	3.00	12.00	3	1.96	2.68	2.676	19.161	2.323	0.0616	UX1500MSE-SS
4	4.50	12.00	3	2.02	2.93	2.929	17.626	2.449	0.0464	UX1500MSE-SS
5	6.00	12.00	3	2.10	3.24	3.235	16.090	2.588	0.0315	UX1500MSE-SS
6	7.50	12.00	3	2.20	3.61	3.613	14.554	2.741	0.0169	UX1500MSE-SS
7	9.00	12.00	3	2.32	4.09	4.091	13.008	2.908	0.0021	UX1500MSE-SS
8	10.50	12.00	2	1.53	3.14	3.143	11.472	3.087	-0.0135	UX1400MSE-SS
9	12.00	12.00	2	1.67	3.71	3.708	9.937	3.268	-0.0310	UX1400MSE-SS
10	13.50	12.00	2	1.86	4.52	4.520	8.391	3.426	-0.0533	UX1400MSE-SS
11	15.00	12.00	2	1.54	4.15	4.150	4.916	3.485	-0.0873	UX1400MSE-SS

ANALYSIS: CALCULATED FACTORS (Seismic conditions)

Bearing capacity, Fs = 29.57, Meyerhof stress = 5244 lb/ft².

Foundation Interface: Direct sliding, Fs = 1.478, Eccentricity, e/L = 0.2410, Fs-overturning = 1.85

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	12.00	3	3.25	3.87	3.869	24.445	1.200	0.2410	UX1500MSE-SS
2	1.50	12.00	3	1.77	2.24	2.240	13.378	1.287	0.1994	UX1500MSE-SS
3	3.00	12.00	3	1.82	2.43	2.433	12.366	1.387	0.1606	UX1500MSE-SS
4	4.50	12.00	3	1.89	2.66	2.662	11.360	1.506	0.1247	UX1500MSE-SS
5	6.00	12.00	3	1.97	2.94	2.938	10.354	1.647	0.0915	UX1500MSE-SS
6	7.50	12.00	3	2.07	3.28	3.278	9.348	1.816	0.0609	UX1500MSE-SS
7	9.00	12.00	3	2.19	3.71	3.707	8.335	2.023	0.0326	UX1500MSE-SS
8	10.50	12.00	2	1.45	2.82	2.821	7.328	2.278	0.0059	UX1400MSE-SS
9	12.00	12.00	2	1.58	3.32	3.321	6.321	2.590	-0.0203	UX1400MSE-SS
10	13.50	12.00	2	1.77	4.04	4.036	5.305	2.955	-0.0486	UX1400MSE-SS
11	15.00	12.00	2	1.49	3.81	3.808	3.281	3.294	-0.0862	UX1400MSE-SS

N/A (see internal) N/A

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AASHTO DESIGN METHOD
LANL Airport Landfill

PROJECT IDENTIFICATION

Title: LANL Airport Landfill
Project Number: D06602
Client: Slaton Bros SW
Designer: CLC
Station Number: 1+38.1-1+75.5

Description:

Wall 2B_DH=16.5'_INTERNAL

Company's information:

Name: Tensar Earth Technologies, Inc.
Street: 5883 Glenridge Drive
Suite 200
Atlanta, GA 30328
Telephone #: (404) 250-1290
Fax #: (404) 250-9185
E-Mail: ccampbell@tensarcorp.com

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Original date and time of creating this file: January 4, 2007

PROGRAM MODE: ANALYSIS
of a SIMPLE STRUCTURE
using GEOGRID as reinforcing material.

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SOIL DATA

REINFORCED SOIL

Unit weight, γ	130.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	32.0 °

RETAINED SOIL

Unit weight, γ	100.0 lb/ft ^{3}
Design value of internal angle of friction, ϕ	35.5 °

FOUNDATION SOIL (Considered as an equivalent uniform soil)

Equivalent unit weight, $\gamma_{equiv.}$	130.0 lb/ft ^{3}
Equivalent internal angle of friction, $\phi_{equiv.}$	32.0 °
Equivalent cohesion, $c_{equiv.}$	4000.0 lb/ft ^{2}

Water table does not affect bearing capacity

LATERAL EARTH PRESSURE COEFFICIENTS

Ka (internal stability) = 0.3073 (if batter is less than 10°, Ka is calculated from eq. 15. Otherwise, eq. 38 is utilized)
Inclination of internal slip plane, ψ= 61.00° (see Fig. 28 in DEMO 82).
Ka (external stability) = 0.3050 (if batter is less than 10°, Ka is calculated from eq. 16. Otherwise, eq. 17 is utilized)

BEARING CAPACITY

Bearing capacity coefficients (calculated by MSEW): Nc = 35.49 N γ= 30.21

SEISMICITY

Note: specified $\alpha_o$ombined with I and δroduced a square root of -0.00 in eq. 37a.
MSEW set this square root to ZERO so that the Kae could be calculated. Be aware that the end results are likely erroneous and ARE PROVIDED FOR INFORMATION ONLY

Maximum ground acceleration coefficient, α_o = 0.262
Kae (α_o> 0) = 1.1640 Kae (α_o= 0) = 0.3050 Δ Kae = 0.8590 (see eq. 37 in DEMO 82)
Seismic soil-geogrid friction coefficient, F* is 80.0% of its specified static value.

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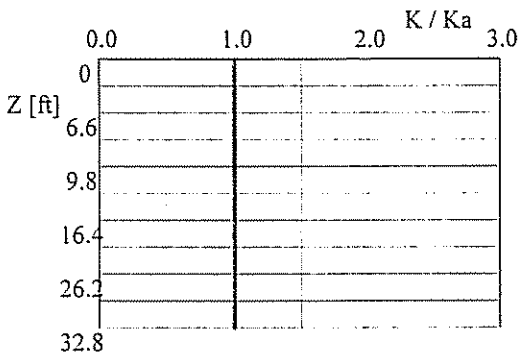
INPUT DATA: Geogrids
(Analysis)

D A T A	Geogrid type #1	Geogrid type #2	Geogrid type #3	Geogrid type #4	Geogrid type #5
Tult [lb/ft]	3974.1	4796.3	7811.2	9866.7	11990.8
Durability reduction factor, RFd	1.00	1.00	1.00	1.00	1.00
Installation-damage reduction factor, RFid	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	2.34	2.21	2.40	2.29	2.22
Fs-overall for strength	N/A	N/A	N/A	N/A	N/A
Coverage ratio, Rc	0.940	0.940	0.940	0.940	0.940
Friction angle along geogrid-soil interface, ρ	26.56	26.56	26.56	26.56	26.56
Pullout resistance factor, F*	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$	$0.80 \cdot \tan\phi$
Scale-effect correction factor, α	1.0	1.0	1.0	1.0	1.0

Variation of Lateral Earth Pressure Coefficient With Depth

Z	K / Ka
0 ft	1.00
3.3 ft	1.00
6.6 ft	1.00
9.8 ft	1.00
13.1 ft	1.00
16.4 ft	1.00
19.7 ft	1.00



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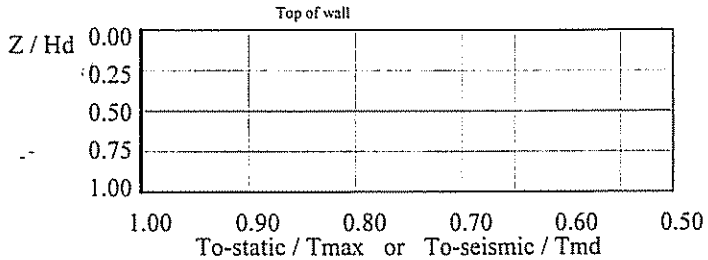
INPUT DATA: Facia and Connection (according to revised Demo 82) (Analysis)

FACIA type: Facing enabling frictional connection of reinforcement (e.g., modular concrete blocks, gabions)
Depth/height of block is 1.48/1.48 ft. Horizontal distance to Center of Gravity of block is 0.74 ft.
Average unit weight of block is $\gamma_f = 114.58$ lb/ft³

Z / Hd	To-static / Tmax or To-seismic / Tmd
0.00	1.00
0.25	1.00
0.50	1.00
0.75	1.00
1.00	1.00



Geogrid Type #1		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ (1)	CRult (2)	σ	CRult	σ	CRult	σ	CRult	σ	CRult
0.0	1.00	0.0	1.00	0.0	1.00	0.0	0.38	0.0	0.38
						1200.9	0.44	1200.9	0.44
						2999.0	0.53	3600.5	0.56
						6000.1	0.68	7198.9	0.74

Geogrid Type #1(3)		Geogrid Type #2		Geogrid Type #3		Geogrid Type #4		Geogrid Type #5	
σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr	σ	CRcr
0.0	0.15	0.0	0.15	0.0	0.15	0.0	0.38	0.0	0.38
480.3	0.20	480.3	0.20	599.4	0.21	1200.9	0.44	1200.9	0.44
1200.9	0.27	1200.9	0.27	1800.3	0.33	2999.0	0.53	3600.5	0.56
2399.6	0.39	2399.6	0.39	3600.5	0.51	6000.1	0.68	7198.9	0.74

(1) σ = Confining stress in between stacked blocks [lb/ft²]
(2) CRult = Tc-ult / Tult
(3) CRcr = Tcre / Tult

In seismic analysis, long term strength is reduced to 100% of its static value.

D A T A (for connection only)	Type #1	Type #2	Type #3	Type #4	Type #5
Product Name	UX1100MSE..	UX1400MSE..	UX1500MSE..	UX1600MSE..	UX1700MSE..
Connection strength reduction factor, RFd	1.10	1.10	1.10	1.10	1.10
Creep reduction factor, RFc	N/A	N/A	N/A	N/A	N/A

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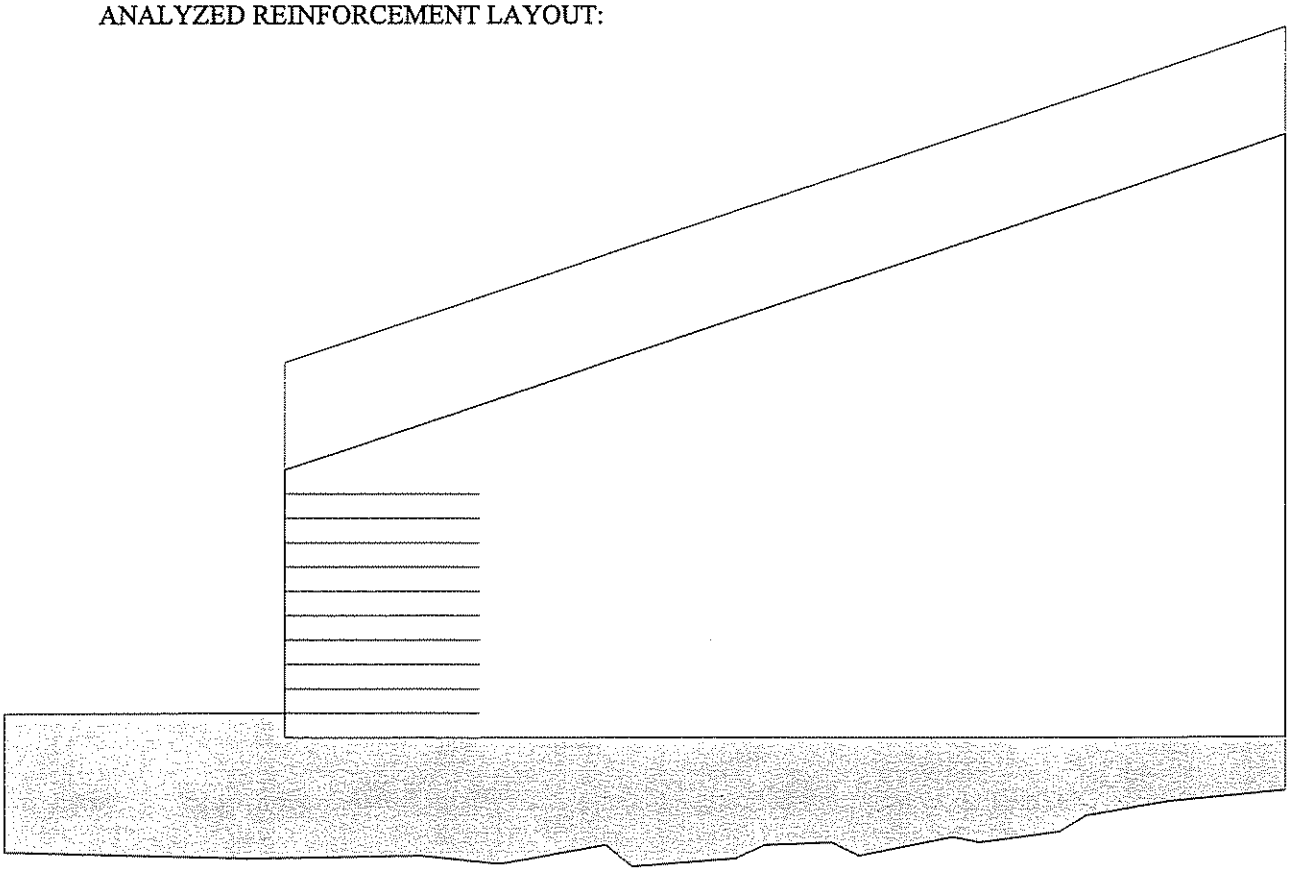
INPUT DATA: Geometry and Surcharge loads (of a SIMPLE STRUCTURE)

Design height, Hd	16.50	[ft]	{ Embedded depth is E = 1.50 ft, and height above top of finished bottom grade is H = 15.00 ft }
Batter, ω	0.0	[deg]	
Backslope, β	18.4	[deg]	
Backslope rise	55.0	[ft]	Broken back equivalent angle, I = 18.43° (see Fig. 25 in DEMO 82)

UNIFORM SURCHARGE

Uniformly distributed dead load is 0.0 [lb/ft ²], and live load is 250.0 [lb/ft ²]

ANALYZED REINFORCEMENT LAYOUT:



SCALE:

0 2 4 6 8 10 [ft]

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ANALYSIS: CALCULATED FACTORS (Static conditions)

Bearing capacity, Fs = 46.70, Meyerhof stress = 3458 lb/ft².

Foundation Interface: Direct sliding, Fs = 2.593, Eccentricity, e/L = 0.0940, Fs-overturning = 3.69

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	12.00	3	3.78	4.65	4.648	45.323	2.105	0.0940	UX1500MSE-SS
2	1.50	12.00	3	1.90	2.46	2.463	20.708	2.209	0.0775	UX1500MSE-SS
3	3.00	12.00	3	1.96	2.68	2.676	19.161	2.323	0.0616	UX1500MSE-SS
4	4.50	12.00	3	2.02	2.93	2.929	17.626	2.449	0.0464	UX1500MSE-SS
5	6.00	12.00	3	2.10	3.24	3.235	16.090	2.588	0.0315	UX1500MSE-SS
6	7.50	12.00	3	2.20	3.61	3.613	14.554	2.741	0.0169	UX1500MSE-SS
7	9.00	12.00	3	2.32	4.09	4.091	13.008	2.908	0.0021	UX1500MSE-SS
8	10.50	12.00	2	1.53	3.14	3.143	11.472	3.087	-0.0135	UX1400MSE-SS
9	12.00	12.00	2	1.67	3.71	3.708	9.937	3.268	-0.0310	UX1400MSE-SS
10	13.50	12.00	2	1.86	4.52	4.520	8.391	3.426	-0.0533	UX1400MSE-SS
11	15.00	12.00	2	1.54	4.15	4.150	4.916	3.485	-0.0873	UX1400MSE-SS

ANALYSIS: CALCULATED FACTORS (Seismic conditions)

N/A N/A Bearing capacity, Fs = 7.17, Meyerhof stress = 20301 lb/ft².

Foundation Interface: Direct sliding, Fs = 0.932, Eccentricity, e/L = 0.4554, Fs-overturning = 1.08 N/A

GEOGRID #	Elevation [ft]	Length [ft]	Type #	CONNECTION Fs-overall [connection strength]	Fs-overall [geogrid strength]	Geogrid strength Fs	Pullout resistance Fs	Direct sliding Fs	Eccentricity e/L	Product name
1	0.00	12.00	3	2.92	3.41	3.411	19.383	0.757	0.4554	UX1500MSE-SS
2	1.50	12.00	3	1.67	2.09	2.089	11.590	0.817	0.3803	UX1500MSE-SS
3	3.00	12.00	3	1.73	2.27	2.268	10.707	0.889	0.3103	UX1500MSE-SS
4	4.50	12.00	3	1.80	2.48	2.480	9.829	0.976	0.2457	UX1500MSE-SS
5	6.00	12.00	3	1.88	2.74	2.736	8.951	1.084	0.1863	UX1500MSE-SS
6	7.50	12.00	3	1.97	3.05	3.051	8.073	1.232	0.1324	UX1500MSE-SS
7	9.00	12.00	3	2.10	3.45	3.448	7.188	1.401	0.0836	UX1500MSE-SS
8	10.50	12.00	2	1.39	2.61	2.607	6.309	1.642	0.0396	UX1400MSE-SS
9	12.00	12.00	2	1.52	3.06	3.064	5.429	1.977	-0.0005	UX1400MSE-SS
10	13.50	12.00	2	1.70	3.72	3.717	4.542	2.447	-0.0392	UX1400MSE-SS
11	15.00	12.00	2	1.45	3.57	3.571	2.896	3.040	-0.0836	UX1400MSE-SS

N/A (see external)

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CONSTRUCTION DRAWINGS
Prepared For

SIERRASCAPE®
RETAINING WALL SYSTEMS

LASO TA-73 AIRPORT LANDFILL

W.O. NO. 13104.002.001.7000

LOS ALAMOS COUNTY, NEW MEXICO

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5.	Elevation View – Wall 2B
6.	Typical Cross-Section
7.	Typical Details
8.	Typical Details

PHILIP D. EGAN
NEW MEXICO
9132
REGISTERED PROFESSIONAL ENGINEER

THIS DESIGN IS BASED UPON SPECIFIC PROPERTIES OF TENSAR PRODUCTS (GEOGRIDS, DRAINAGE COMPOSITES AND EROSION MEDIA), WHICH ARE PROPRIETARY TO THE TENSAR CORPORATION 1210 CITIZENS PARKWAY, MORROW, GA, 30260. ANY SUBSTITUTION OF THE SPECIFIED PRODUCTS WILL INVALIDATE THIS DESIGN. THIS DRAWING IS BEING FURNISHED FOR USE ON THIS SPECIFIC PROJECT ONLY. ANY PARTY ACCEPTING THIS DOCUMENT DOES SO IN CONFIDENCE AND AGREES THAT IT SHALL NOT BE DUPLICATED WHOLE OR IN PART, NOR DISCLOSED TO OTHERS, WITHOUT THE CONSENT OF TENSAR EARTH TECHNOLOGIES, INC.

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RETAINING WALL SYSTEMS

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LASO TA-73 AIRPORT LANDFILL
W.O. NO. 13104.002.001.7000
LOS ALAMOS COUNTY, NEW MEXICO

TITLE SHEET

Sheet Number
1 OF 8

CONSTRUCTION REQUIREMENTS FOR PLACEMENT OF TENSAR GEOGRIDS AND BACKFILL SOILS FOR TENSAR SIERRASCAPE REINFORCED RETAINING WALLS

1.0 MATERIAL

1.1 BACKFILL SOILS

1.1.1 REINFORCED BACKFILL MATERIAL SPECIFIED BELOW SHALL BE ON-SITE SOILS OR SELECT FREE DRAINING BACKFILL. REINFORCED BACKFILL MATERIALS SHALL BE APPROVED BY OWNER OR OWNER'S REPRESENTATIVE AND SHALL MEET THE STRENGTH REQUIREMENTS AS DEFINED IN SECTION 7.0. THE REINFORCED BACKFILL MATERIAL SHALL MEET THE FOLLOWING GRADATION:

SIEVE SIZE	PERCENT PASSING
2"	100
No. 4	100-20
No. 40	0 - 60
No. 200	0 - 15

THE PORTION OF THE REINFORCED BACKFILL MATERIAL PASSING THE No. 40 SIEVE SHALL HAVE A LIQUID LIMIT LESS THAN 40 AND A PLASTICITY INDEX LESS THAN 6. REINFORCED BACKFILL MATERIAL SHALL BE CLASSIFIED PER THE UNIFIED SOIL CLASSIFICATION SYSTEM AS LOW PLASTICITY OR NON-PLASTIC SOILS.

1.1.2 REINFORCED BACKFILL AND RETAINED SOIL/FILL MATERIALS SHALL BE FREE OF EXCESS MOISTURE, ROOTS, MUCK, SOD, SNOW, FROZEN LUMPS, ORGANIC MATTER OR OTHER DELETERIOUS MATERIALS. ALL ROCK PARTICLES AND HARD EARTH CLODS SHALL BE LESS THAN THREE INCHES IN THE LONGEST DIMENSION. REINFORCED BACKFILL MATERIALS WHICH DO NOT MEET THIS CRITERIA SHALL BE CONSIDERED UNSUITABLE AND SHALL BE REMOVED.

1.2 GEOGRID REINFORCEMENT SHALL BE TENSAR UNIAXIAL GEOGRIDS MANUFACTURED BY THE TENSAR CORPORATION, MORROW, GEORGIA.

1.3 GEOTEXTILE FABRIC SHALL BE AASHTO M288 CLASS 3 GEOTEXTILE.

1.4 THE WALL FACING SHALL BE GALVANIZED 1.80"X12.67" (0.192"ϕ x 0.243"ϕ) WELDED WIRE FORMS. WIRE FORM GEOMETRY SHALL BE AS DETAILED IN THE CONSTRUCTION DRAWINGS.

2.0 TECHNICAL REQUIREMENTS

2.1 THE OWNER OR OWNER'S REPRESENTATIVE SHALL VERIFY THAT REINFORCED BACKFILL MATERIAL MEETS THE GRADATION AND OTHER REQUIREMENTS OF SECTION 1.1 PRIOR TO PROCEEDING WITH CONSTRUCTION.

2.2 PRIOR TO CONSTRUCTION OF THE TENSAR REINFORCED WALL, THE CONTRACTOR SHALL CLEAR AND GRUB THE REINFORCED BACKFILL ZONE AREA, REMOVING TOPSOIL, BRUSH, SOD OR OTHER ORGANIC OR DELETERIOUS MATERIAL. ANY UNSUITABLE SOILS SHALL BE OVER-EXCAVATED, REPLACED AND COMPACTED WITH BACKFILL MATERIAL TO PROJECT SPECIFICATIONS OR AS OTHERWISE DIRECTED BY THE OWNER OR OWNER'S REPRESENTATIVE.

2.3 FOUNDATION SHALL BE PREPARED AS PER PROJECT SPECIFICATIONS. THE OWNER OR OWNER'S REPRESENTATIVE SHALL CONFIRM THAT THE SITE HAS BEEN PROPERLY PREPARED AND THE DESIGN PARAMETERS IN SECTION 7.0 ARE APPROPRIATE PRIOR TO FILL PLACEMENT.

2.4 FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING 10 INCHES IN UNCOMPACTED THICKNESS FOR HEAVY COMPACTION EQUIPMENT. FOR ZONES WHERE COMPACTION IS ACCOMPLISHED WITH HAND-OPERATED EQUIPMENT, FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT EXCEEDING 8 INCHES IN UNCOMPACTED THICKNESS. ONLY HAND-OPERATED EQUIPMENT SHALL BE ALLOWED WITHIN THREE FEET OF THE BACK FACE OF WALL.

2.5 FILL MATERIALS SHALL BE PLACED FROM THE BACK OF THE WELDED WIRE FORMS TOWARDS THE ENDS OF THE GEOGRID TO ENSURE FURTHER TENSIONING.

2.6 FILL SHALL BE COMPACTED AS SPECIFIED BY PROJECT SPECIFICATIONS OR TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED IN ACCORDANCE WITH AASHTO T-99 (STANDARD PROCTOR), AT A MOISTURE CONTENT NO GREATER THAN 2 PERCENTAGE POINTS WET AND NO LESS THAN 1 PERCENTAGE POINT DRY OF OPTIMUM.

2.7 TESTING METHODS AND FREQUENCY, AND VERIFICATION OF MATERIAL SPECIFICATIONS SHALL BE THE RESPONSIBILITY OF THE OWNER OR OWNER'S REPRESENTATIVE.

2.8 WELDED WIRE FACING SHALL BE ERECTED AND MAINTAINED DURING CONSTRUCTION TO THE BATTER AS SHOWN ON THE DRAWINGS. INDIVIDUAL WIRE FORM DEFORMATIONS SHALL BE LIMITED TO 2.5 INCHES AT THE TOP AND A BULGE OF 2 INCHES, MEASURED FROM THE BASE OF THE WIRE FORM. THE CONTRACTOR SHALL PROVIDE ALIGNMENT CONTROL FOR EACH COURSE OF WELDED WIRE FORMS AND MAKE ALIGNMENT CORRECTIONS AS NECESSARY.

2.9 IF EXCESSIVE DEFORMATION OCCURS AS DEFINED BY SECTION 2.8 COMPACTION PROCEDURES SHOULD BE MODIFIED TO PROVIDE MAXIMUM ALLOWABLE COMPACTION AT THE WALL FACE. ALSO, ADDITIONAL STRUTS MAY BE REQUIRED TO STIFFEN THE WIRE FACE.

2.10 WELDED WIRE FORMS SHALL BE INSTALLED USING THE CORRECT ANGLE SHOWN ON THE DRAWINGS. THE ENDS OF THE WIRE FORMS SHALL BE OVERLAPPED 2.4 INCHES AND THE WIRE FORM JOINTS SHALL BE STAGGERED VERTICALLY. ANY PROTRUDING WIRES SHALL BE BENT OR CUT OFF.

2.11 A COMPLETE SET OF APPROVED CONSTRUCTION DRAWINGS AND CONTRACT SPECIFICATIONS SHALL BE ON-SITE AT ALL TIMES DURING CONSTRUCTION OF THE TENSAR REINFORCED RETAINING WALL.

3.0 TENSAR GEOGRID PLACEMENT

3.1 TENSAR GEOGRID SHALL BE PLACED AT THE LOCATIONS AND ELEVATIONS SHOWN ON THE DRAWINGS.

3.2 TENSAR GEOGRID LENGTHS SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS. TENSAR GEOGRID LENGTHS ARE MEASURED FROM THE CONNECTION LOOP, EXTENDING TO THE TAIL OF THE GEOGRIDS. REINFORCED FILL ZONE LENGTH (BASE WIDTH) IS MEASURED FROM THE FRONT FACE OF THE WALL, EXTENDING TO THE TAIL OF THE GEOGRIDS.

3.2.1 TENSAR GEOGRID REINFORCEMENT SHALL BE CONTINUOUS THROUGHOUT THEIR EMBEDMENT LENGTH(S).

3.3 TRACKED CONSTRUCTION EQUIPMENT SHALL NOT BE OPERATED DIRECTLY ON THE GEOGRID. A MINIMUM BACKFILL THICKNESS OF 6 INCHES IS REQUIRED FOR OPERATION OF TRACKED VEHICLES OVER THE GEOGRID. TURNING OF TRACKED VEHICLES SHOULD KEPT TO A MINIMUM TO PREVENT TRACKS FROM DISPLACING THE FILL AND/OR THE GEOGRID.

3.4 RUBBER-TIRED VEHICLES MAY PASS OVER THE GEOGRID REINFORCEMENT AT SLOW SPEEDS, LESS THAN 10 MPH. SUDDEN BRAKING AND SHARP TURNING SHALL BE AVOIDED.

3.5 TENSAR UNIAXIAL GEOGRIDS SHALL BE CUT NEXT TO THE CROSS-MACHINE DIRECTION BAR. THE GEOGRID SHALL BE PLACED SUCH THAT THE CONNECTION LOOPS PASS THROUGH THE LONG AXIS OF THE APERTURES (MACHINE DIRECTION) WITH THE CONNECTION ROD THREADED THROUGH THE CONNECTION LOOPS AND OVER THE LONG AXIS OF THE APERTURES. TENSAR UNIAXIAL GEOGRID SHALL BE ROLLED OUT WITH THE MACHINE DIRECTION PERPENDICULAR TO THE WALL FACE.

3.6 A MINIMUM OF 3 INCHES OF FILL MATERIAL SHALL BE REQUIRED BETWEEN LAYERS OF UNIAXIAL GEOGRIDS, UNLESS OTHERWISE SHOWN.

4.0 CHANGES TO GEOGRID LAYOUT OR PLACEMENT

4.1 NO CHANGES TO THE TENSAR GEOGRID LAYOUT, INCLUDING, BUT NOT LIMITED TO, LENGTH, GEOGRID TYPE, OR ELEVATION, SHALL BE MADE WITHOUT THE EXPRESS, WRITTEN CONSENT OF TENSAR EARTH TECHNOLOGIES, INC.

5.0 DRAINAGE

5.1 AT THE END OF EACH WORKDAY, BACKFILL SURFACE SHALL BE GRADED AWAY FROM THE WALL FACE A MINIMUM OF 2 PERCENT SLOPE AND A TEMPORARY SOIL BERM SHALL BE CONSTRUCTED NEAR THE WALL CREST TO PREVENT SURFACE WATER RUNOFF FROM OVERTOPPING THE WALL.

5.2 AT THE END OF EACH WORKDAY, BACKFILL SURFACE SHALL BE COMPACTED WITH A SMOOTH WHEEL ROLLER TO MINIMIZE PONDING OF WATER AND SATURATION OF THE BACKFILL.

5.3 THE ENGINEERING, DESIGN, ANALYSIS, DETAILING, AND MITIGATION OF BOTH SURFACE DRAINAGE AND SEEPAGE OF GROUNDWATER SHALL BE THE RESPONSIBILITY OF THE OWNER OR OWNER'S REPRESENTATIVE.

5.4 PERMANENT SURFACE WATER DIVERSION SHALL BE REQUIRED AND PROVIDED BY THE OWNER OR OWNER'S REPRESENTATIVE.

5.5 THE TENSAR REINFORCED WALL HAS BEEN DESIGNED ON THE ASSUMPTION THAT THE REINFORCED BACKFILL MATERIAL SHALL BE FREE OF SUBSURFACE DRAINAGE OF WATER (SEEPAGE). PERMANENT SUBSURFACE WATER (SEEPAGE) COLLECTION AND DIVERSION SHALL BE THE RESPONSIBILITY OF THE OWNER OR OWNER'S REPRESENTATIVE.

5.6 CARE SHALL BE TAKEN NOT TO CONTAMINATE THE GEOTEXTILE FABRIC WITH FINE-GRAINED SOILS OR OTHER DELETERIOUS MATERIALS.

6.0 METHOD OF PAYMENT

SEE CONTRACT DOCUMENTS

7.0 DESIGN PARAMETERS

7.1 DESIGN OF THE REINFORCED SOIL STRUCTURE IS BASED ON THE FOLLOWING PARAMETERS:

-	EFFECTIVE FRICTION ANGLE	EFFECTIVE COHESION	MOIST UNIT WEIGHT
REINFORCED BACKFILL	32°	0 psf	130 pcf
RETAINED SOIL	35.5°	0 psf	100 pcf
FOUNDATION SOIL	32°	4000 psf	130 pcf

7.2 FACTORS OF SAFETY:

7.2.1 INTERNAL STABILITY

-	STATIC	SEISMIC
MINIMUM FACTOR OF SAFETY FOR GEOGRID STRENGTH	= 1.5	= 1.1
MINIMUM FACTOR OF SAFETY FOR GEOGRID PULLOUT	= 1.5	= 1.1
MINIMUM FACTOR OF SAFETY FOR CONNECTION	= 1.5	= 1.1
SOIL-GEOGRID INTERACTION COEFFICIENT	= 0.8	
PERCENT COVERAGE OF GEOGRID	= 94 %	
DESIGN LIFE	= 75 YEARS	

7.2.2 EXTERNAL STABILITY

MINIMUM FACTOR OF SAFETY FOR DIRECT SLIDING	= 1.5	= 1.1
MAXIMUM FACTOR OF SAFETY FOR ECCENTRICITY, e/L	= 1/6	= 1/3

7.2.3 GLOBAL STABILITY:
GLOBAL STABILITY AND FOUNDATION BEARING CAPACITY ARE THE RESPONSIBILITY OF THE OWNER OR OWNER'S REPRESENTATIVE. TENSAR EARTH TECHNOLOGIES, INC. ACCEPTS NO LIABILITY OR RESPONSIBILITY FOR GLOBAL STABILITY OR FOUNDATION BEARING CAPACITY.

7.3 LOADINGS:
7.3.1 TRAFFIC SURCHARGE = 250 psf
7.3.2 SEISMIC ACCELERATION COEFFICIENT = 0.262 g

7.4 HYDROSTATIC DESIGN:
GROUNDWATER/PHREATIC ARE SURFACES NOT CONSIDERED IN THE WALL DESIGN. WATER SURFACE IS ASSUMED TO BE SUFFICIENTLY BELOW BOTTOM OF WALL AS NOT TO INFLUENCE INTERNAL AND EXTERNAL STABILITY.

7.5 MAXIMUM APPLIED BEARING PRESSURE (STATIC) = 4701 psf
(SEISMIC) = 7612 psf
2

8.0 SPECIAL PROVISIONS

8.1 THE DESIGN PRESENTED HEREIN IS BASED ON SOIL PARAMETERS, FOUNDATION CONDITIONS, GROUNDWATER CONDITIONS, AND LOADINGS STATED IN SECTION 7.0.

8.2 WALL ELEVATION VIEWS AND LOCATIONS, AND GEOMETRY OF EXISTING STRUCTURES MUST BE VERIFIED BY THE OWNER OR OWNER'S REPRESENTATIVE PRIOR TO CONSTRUCTION.

8.3 TENSAR EARTH TECHNOLOGIES, INC. ASSUMES NO LIABILITY FOR INTERPRETATION OR VERIFICATION OF SUBSURFACE CONDITIONS, FOR SUITABILITY OF SOIL DESIGN PARAMETERS OR FOR INTERPRETATION OF SUBSURFACE GROUNDWATER CONDITIONS.

8.4 THE OWNER OR OWNER'S REPRESENTATIVE IS RESPONSIBLE FOR REVIEWING AND VERIFYING THAT THE ACTUAL SITE CONDITIONS AND PARAMETERS ARE AS DESCRIBED HEREIN PRIOR TO AND DURING CONSTRUCTION. THE OWNER OR OWNER'S REPRESENTATIVE SHALL BE ON-SITE TO ASSURE CONSTRUCTION IS IN ACCORDANCE WITH THESE NOTES AND DRAWINGS AND THE CONTRACT PLANS AND SPECIFICATIONS. THE CONTRACTOR SHALL FOLLOW THE INSTRUCTIONS PROVIDED IN THE WELDED WIRE FORM ERECTION GUIDE PROVIDED BY TENSAR EARTH TECHNOLOGIES, INC.

8.5 THE SOIL DESIGN PARAMETERS STATED IN SECTION 7.0 SHALL BE VERIFIED BY THE OWNER OR OWNER'S REPRESENTATIVE. IF ACTUAL CONDITIONS ARE FOUND TO BE OTHER THAN AS SET FORTH IN THESE PARAMETERS, THEN CONSTRUCTION SHALL NOT PROCEED AND THE RELEVANT DATA SHALL BE PROVIDED TO TENSAR EARTH TECHNOLOGIES, INC. FOR PURPOSES OF MODIFYING THE DESIGN.

8.6 PROCEEDING WITH CONSTRUCTION WITHOUT FIRST VERIFYING CONDITIONS AND PARAMETERS DISCUSSED IN SECTIONS 1.1 AND 7.0 SHALL ABSOLVE TENSAR EARTH TECHNOLOGIES, INC. FROM ALL LIABILITY FOR THE DESIGN AND CONSTRUCTION OF THIS STRUCTURE AND THE CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS TENSAR EARTH TECHNOLOGIES, INC. FROM ALL RESULTING CLAIMS, DAMAGES, LOSSES AND EXPENSES.

8.7 IF ANY ROCK FORMATIONS AND/OR GROUNDWATER ARE ENCOUNTERED DURING CONSTRUCTION, IMMEDIATELY CONTACT TENSAR EARTH TECHNOLOGIES, INC. AT 404-250-1290 AND THE OWNER'S REPRESENTATIVE.

8.8 ANY REVISIONS TO DESIGN PARAMETERS STATED IN SECTION 7.0 OR STRUCTURE GEOMETRY SHALL REQUIRE DESIGN MODIFICATIONS PRIOR TO PROCEEDING WITH CONSTRUCTION.

8.9 THIS DESIGN IS ONLY VALID FOR THE PROPOSED TENSAR RETAINING WALL(S) AS SHOWN HEREIN.

8.10 TOTAL SETTLEMENT AND DIFFERENTIAL SETTLEMENT IN EXCESS OF 1/100 SHALL BE THE RESPONSIBILITY OF THE OWNER OR OWNER'S REPRESENTATIVE. TENSAR EARTH TECHNOLOGIES ACCEPTS NO LIABILITY OR RESPONSIBILITY FOR THE EVALUATION OF SETTLEMENTS.

8.11 ON-SITE SITE ASSISTANCE WILL BE PROVIDED BY TENSAR EARTH TECHNOLOGIES, INC. AT THE REQUEST OF THE CONTRACTOR OR AS PROVIDED IN THE CONTRACT SPECIFICATIONS. TENSAR EARTH TECHNOLOGIES IS NOT RESPONSIBLE FOR HAVING PERSONNEL ON-SITE UNLESS SPECIFICALLY PROVIDED FOR IN A WRITTEN CONTRACT SIGNED BY TENSAR EARTH TECHNOLOGIES, INC. THE TENSAR REPRESENTATIVE WILL NOT HAVE THE AUTHORITY TO STOP OR START CONSTRUCTION OF THE RETAINING WALL.

9.0 REFERENCE DOCUMENTS:

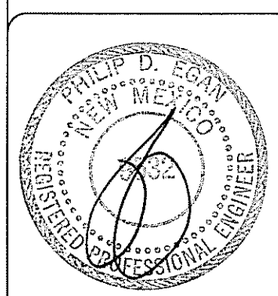
THE DESIGN CALCULATIONS AND CONSTRUCTION DRAWINGS PREPARED BY TENSAR EARTH TECHNOLOGIES, INC. ARE BASED UPON THE FOLLOWING DOCUMENTS:

9.1 CONSTRUCTION PLAN PREPARED BY NORTH WIND, INC. FOR "THE LOS ALAMOS SITE OFFICE TA-73 AIRPORT LANDFILL," REVISION 2, PAGES 9 AND 10, DATED JUNE 2005.

9.2 CONTRACT PLANS FOR U.S. DEPARTMENT OF ENERGY FOR "LOS ALAMOS SITE OFFICE TA-73 AIRPORT LANDFILLS FINAL CLOSURE DESIGN, REV. 1," W.O. NO. 13104.002.001.7000, PREPARED BY NORTH WIND AND WESTON SOLUTIONS TEAM, LAST DATED 6/22/05.

9.3 CONSTRUCTION SPECIFICATION FOR "LASO TA-73 AIRPORT LANDFILL," SECTION 02273, MECHANICALLY STABILIZED EARTH RETAINING WALL, DATED JUNE 2005.

9.4 CONTRACT PLANS PREPARED BY WESTON SOLUTIONS TEAM FOR "LOS ALAMOS SITE OFFICE, TA-73 AIRPORT LANDFILLS," WALL NO. 2 REDESIGN, DATED 11/1/06.



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Designed by: CLC
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Checked by:

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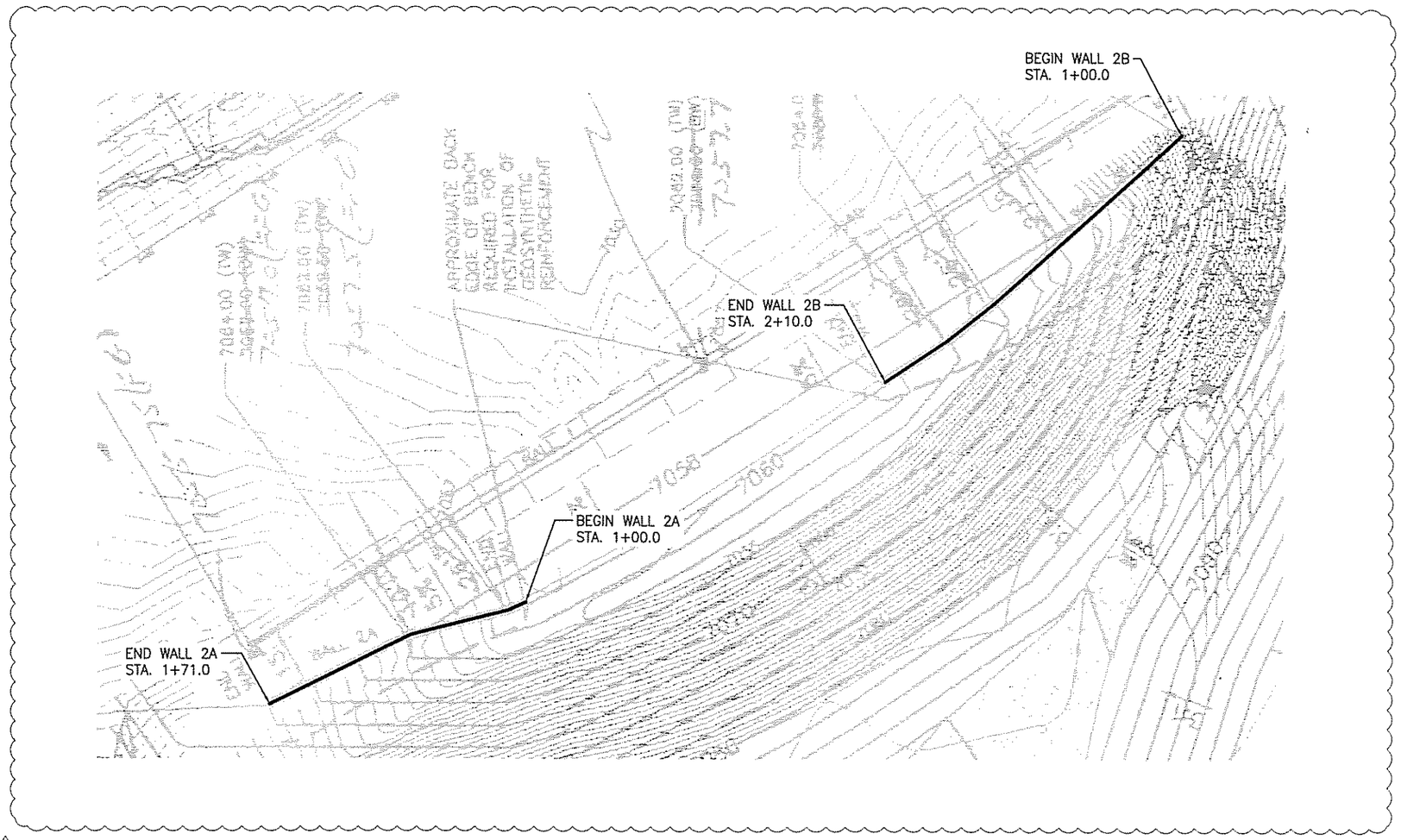
W.O. NO. 13104.002.001.7000
LOS ALAMOS COUNTY, NEW MEXICO

CONSTRUCTION REQUIREMENTS

Sheet Number 2 OF 8

N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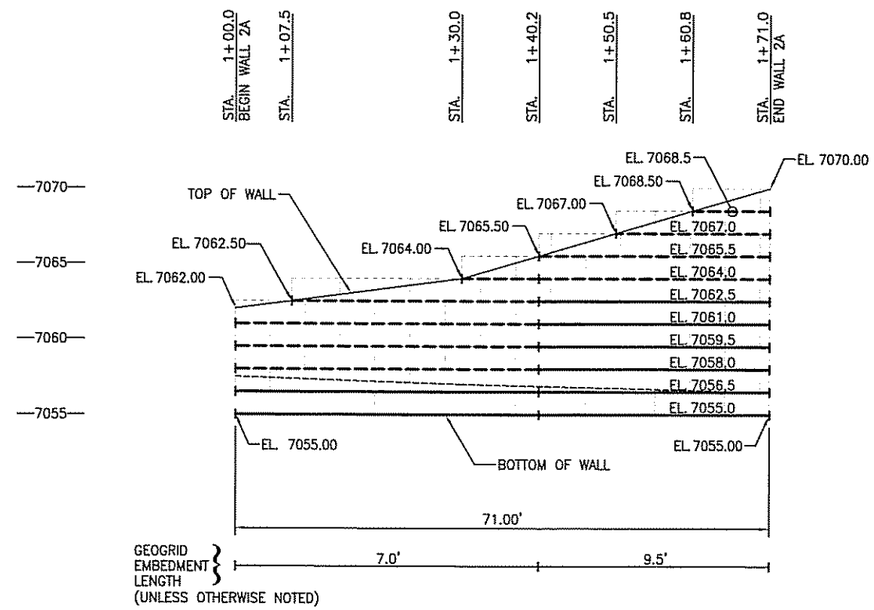

FRONT FACE ELEVATION VIEW – WALL 2A

LEGEND

- SIERRASCAPE WIRE FORM (TYP.) (SEE CONSTRUCTION REQUIREMENTS FOR SPECIFICATIONS)
- PROPOSED GRADE
- CHANGE IN EMBEDMENT LENGTH OR GEOGRID TERMINATION
- TENSAR UX1400MSE GEOGRID
- TENSAR UX1500MSE GEOGRID
- EL. XXX.X APPROX. GEOGRID ELEVATION

VERTICAL SCALE (FEET): 10, 5, 0, 5

HORIZONTAL SCALE (FEET): 10, 5, 0, 10, 20

PHILIP D. EGAN
NEW MEXICO
4432
REGISTERED PROFESSIONAL ENGINEER

THIS DESIGN IS BASED UPON SPECIFIC PROPERTIES OF TENSAR PRODUCTS (GEOGRIDS, DRAINAGE COMPOSITES AND EROSION MEDIA), WHICH ARE PROPRIETARY TO THE TENSAR CORPORATION 1210 CITIZENS PARKWAY, MORROW, GA. 30260. ANY SUBSTITUTION OF THE SPECIFIED PRODUCTS WILL INVALIDATE THIS DESIGN. THIS DRAWING IS BEING FURNISHED FOR USE ON THIS SPECIFIC PROJECT ONLY. ANY PARTY ACCEPTING THIS DOCUMENT DOES SO IN CONFIDENCE AND AGREES THAT IT SHALL NOT BE DUPLICATED WHOLE OR IN PART, NOR DISCLOSED TO OTHERS, WITHOUT THE CONSENT OF TENSAR EARTH TECHNOLOGIES, INC.

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SIERRASCAPE®
RETAINING WALL SYSTEMS

Tensar
Tensar Earth Technologies, Inc.
5883 Glenridge Drive, Suite 200
Atlanta, Georgia 30328
(404) 250-1290

REVISIONS \ ISSUE

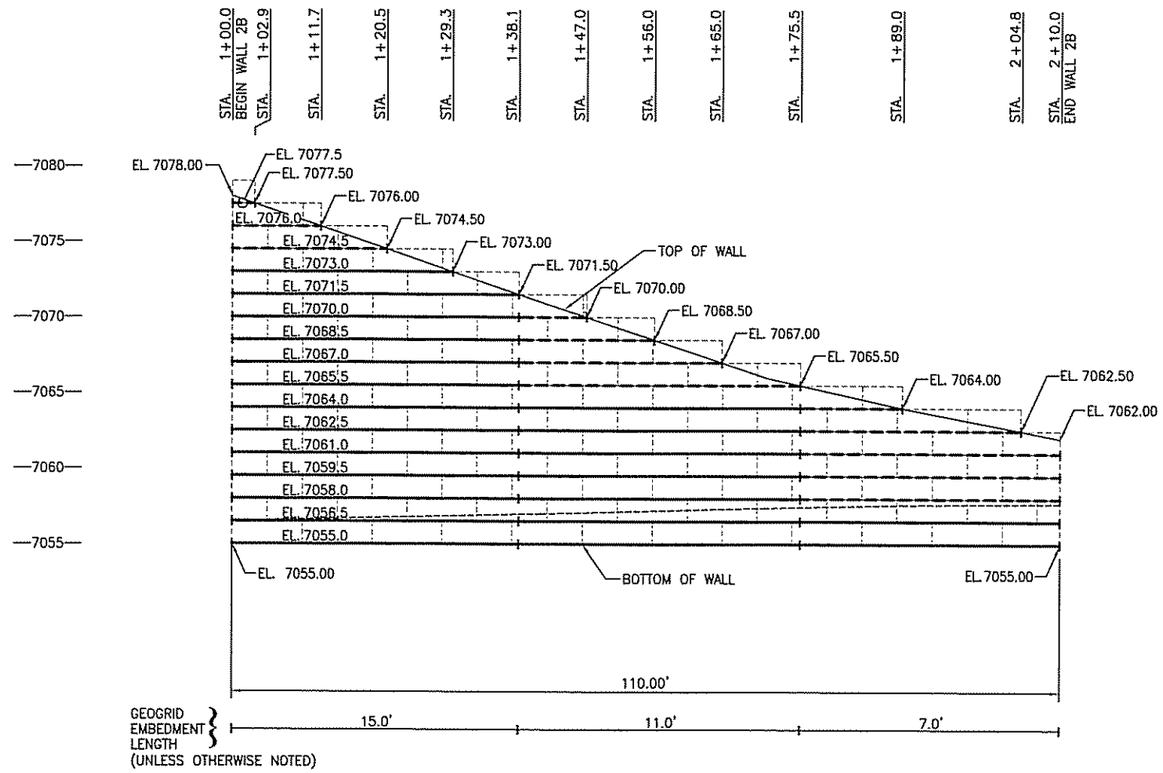
0	5/24/06	ISSUED FOR REVIEW	
1	12/1/06	REVISED PER REVIEWER'S COMMENTS	
2	1/8/07	REVISED GEOMETRY PER REVIEWER'S COMMENTS	

Project Number	D06602
File Name	D0660204.DWG
Date Drawn	5/24/06
Scale	AS SHOWN
Designed by	CLC
Drawn by	JAR
Checked by	

LASO TA-73 AIRPORT LANDFILL
W.O. NO. 13104.002.001.7000
LOS ALAMOS COUNTY, NEW MEXICO

ELEVATION VIEW
WALL 2A

Sheet Number
4 OF 8



FRONT FACE ELEVATION VIEW – WALL 2B

2

LEGEND

- SIERRASCAPE WIRE FORM (TYP.) (SEE CONSTRUCTION REQUIREMENTS FOR SPECIFICATIONS)
- PROPOSED GRADE
- CHANGE IN EMBEDMENT LENGTH OR GEOGRID TERMINATION
- TENSAR UX1400MSE GEOGRID
- TENSAR UX1500MSE GEOGRID
- EL. XXX.X — APPROX. GEOGRID ELEVATION

VERTICAL SCALE (FEET): 10, 5, 0, 5

HORIZONTAL SCALE (FEET): 10, 5, 0, 10, 20

PHILIP D. EGAN
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER

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REVISIONS \ ISSUE

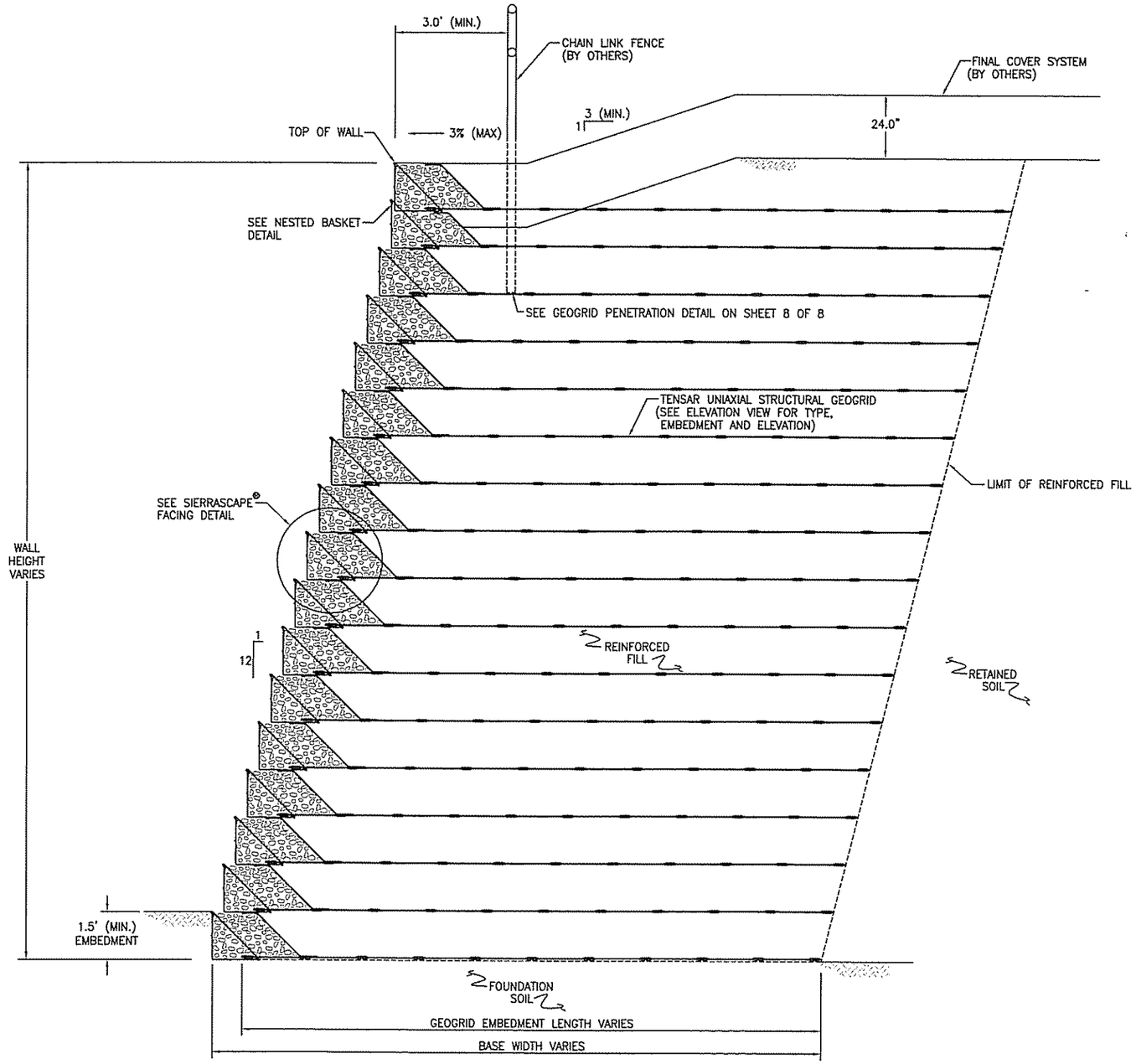
0	5/24/06	ISSUED FOR REVIEW	
1	12/1/06	REVISED PER REVIEWER'S COMMENTS	
2	1/8/07	REVISED GEOMETRY PER REVIEWER'S COMMENTS	

Project Number	D06602
File Name	D0660205.DWG
Date Drawn	5/24/06
Scale	AS SHOWN
Designed by	CLC
Drawn by	JAR
Checked by	

LASO TA-73 AIRPORT LANDFILL
W.O. NO. 13104.002.001.7000
LOS ALAMOS COUNTY, NEW MEXICO

ELEVATION VIEW
WALL 2B

Sheet Number
5 OF 8



TYPICAL CROSS-SECTION

SCALE
2 1 0 2 4 FEET

PHILIP D. EGAN
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER

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REVISIONS \ ISSUE

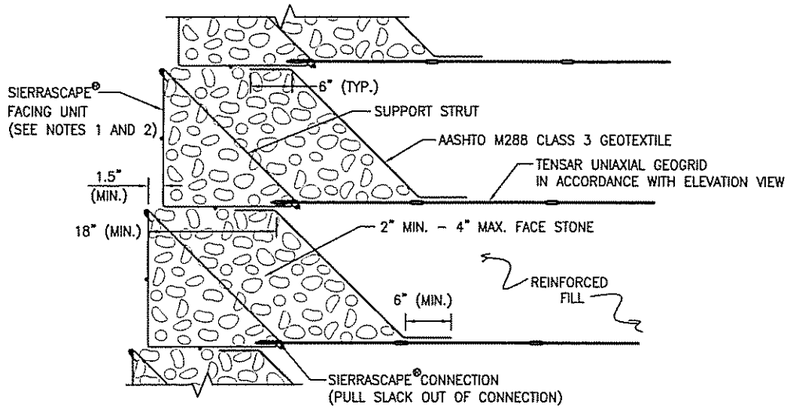
0	5/24/06	ISSUED FOR REVIEW	
1	12/1/06	REVISED PER REVIEWER'S COMMENTS	
2	1/8/07	NO CHANGE	

Project Number	D06602
File Name	D0660206.DWG
Date Drawn	5/24/06
Scale	AS SHOWN
Designed by	CLC
Drawn by	JAR
Checked by	

LASO TA-73 AIRPORT LANDFILL
W.O. NO. 13104.002.001.7000
LOS ALAMOS COUNTY, NEW MEXICO

TYPICAL CROSS-SECTON

Sheet Number
6 OF 8

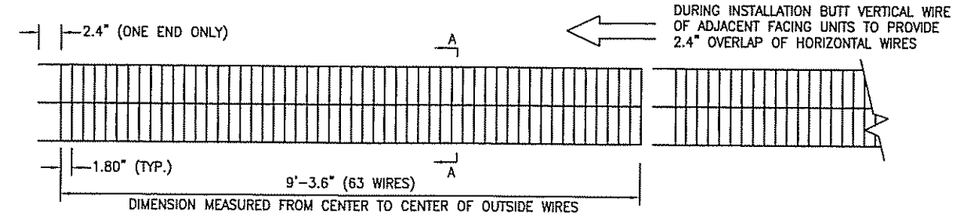


NOTES:

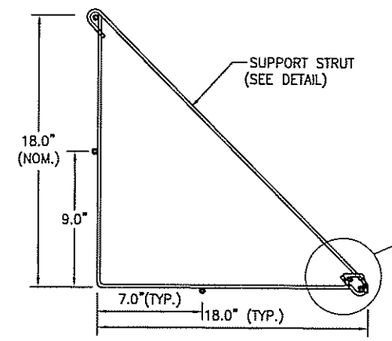
1. SEE SIERRASCAPE® FACING UNIT DETAIL FOR FACING MATERIAL AND DIMENSIONS.
2. ALL FACING UNITS SHALL BE GALVANIZED PER ASTM A123 AFTER FABRICATION.
3. OPTIONAL – A THIN LAYER (2" MIN.) OF FINER STONE (1/4"–1") MAY BE PLACED AT THE TOP OF EACH UNIT TO PROVIDE A LEVEL SURFACE FOR THE UNIT ABOVE.

SIERRASCAPE® FACING DETAIL

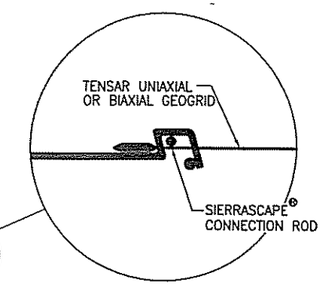
NOT TO SCALE



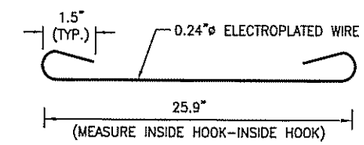
ELEVATION VIEW



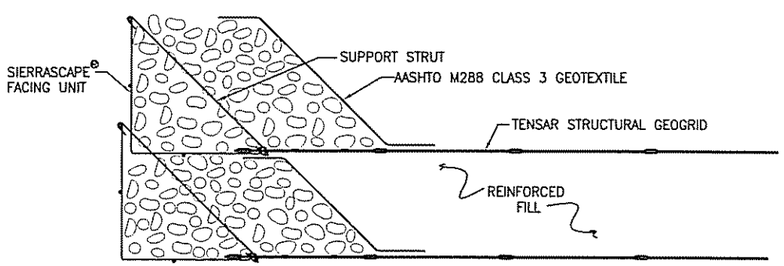
SECTION A–A



CONNECTION LOOP DETAIL



SUPPORT STRUT DETAIL

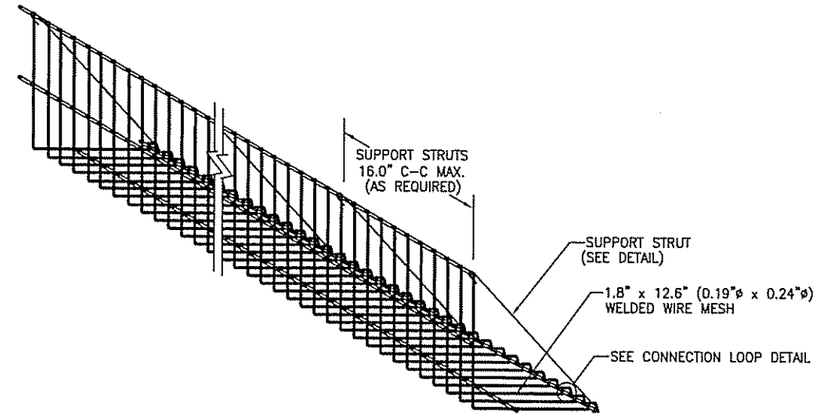


NOTES:

1. SET TOPMOST SIERRASCAPE FACING UNIT INSIDE FACING UNIT BELOW TO FOLLOW GRADE.
2. HORIZONTAL WIRES OF TOPMOST FACING UNIT MAY BE CUT TO ALLOW INSTALLATION OF STRUTS ON FACING UNIT BELOW.

NESTED BASKET DETAIL

NOT TO SCALE

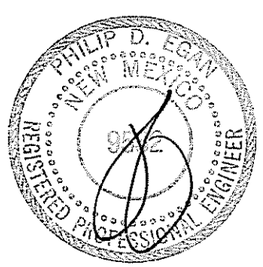


NOTE:

UNLESS OTHERWISE SPECIFIED IN THE SIERRASCAPE® FACING DETAIL ALL FACING UNITS SHALL BE GALVANIZED PER ASTM A123 AFTER BENDING.

SIERRASCAPE® FACING UNIT

NOT TO SCALE



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SIERRASCAPE
RETAINING WALL SYSTEMS

Tensar
Tensar Earth Technologies, Inc.
5883 Glenridge Drive, Suite 200
Atlanta, Georgia 30328
(404) 250–1290

REVISIONS \ ISSUE

0	5/24/06	ISSUED FOR REVIEW	
1	12/1/06	REVISED PER REVIEWER'S COMMENTS	
2	1/8/07	NO CHANGE	

Project Number	D06602
File Name	D0660207.DWG
Date Drawn	5/24/06
Scale	AS SHOWN
Designed by	CLC
Drawn by	JAR
Checked by	

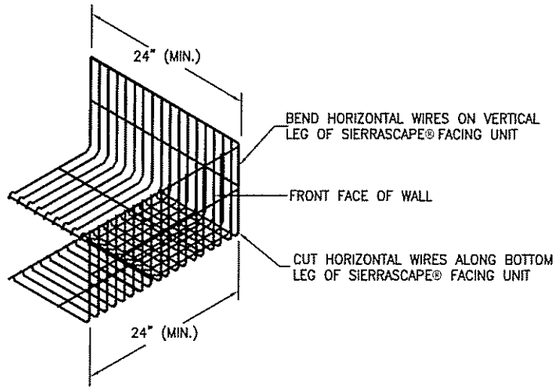
LASO TA-73 AIRPORT LANDFILL

W.O. NO. 13104.002.001.7000

LOS ALAMOS COUNTY, NEW MEXICO

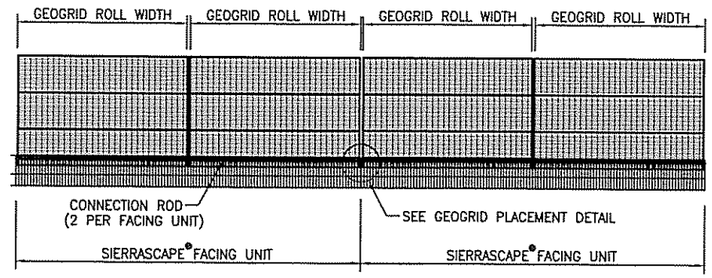
TYPICAL DETAILS

Sheet Number 7 OF 8

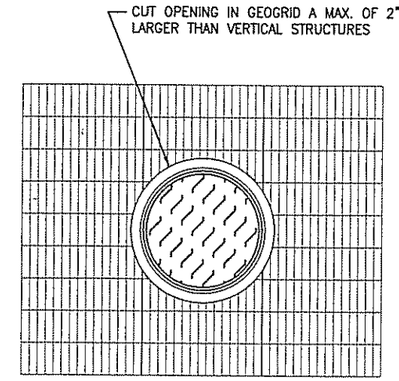


SIERRASCAPE® OUTSIDE CORNER UNIT

NOT TO SCALE

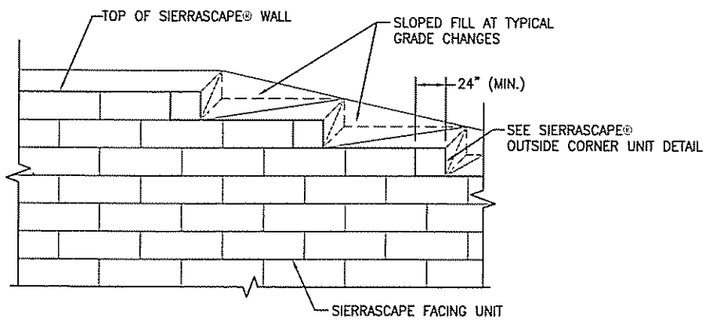


PLAN VIEW



GEOGRID PENETRATION

NOT TO SCALE

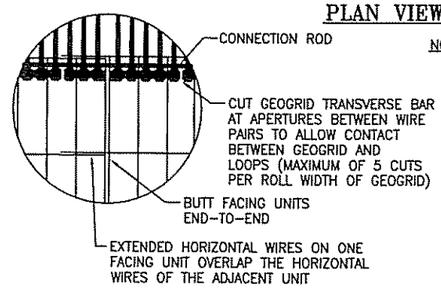


NOTES:

1. SEE SIERRASCAPE® FACING UNIT DETAIL FOR FACING MATERIALS AND DIMENSIONS.
2. USE SIERRASCAPE® FACING UNIT TO FABRICATE CONTINUOUS CORNER. PROVIDE 24" (MIN.) OF SIERRASCAPE® FACING UNIT IN BOTH DIRECTIONS AS MEASURED FROM THE CORNER BEND.
3. INSTALL ADJACENT SIERRASCAPE® FACING UNITS TO PROVIDE 4" OVERLAP OF HORIZONTAL WIRES.

TOP OF SIERRASCAPE® WALL, FINISHING DETAIL

NOT TO SCALE

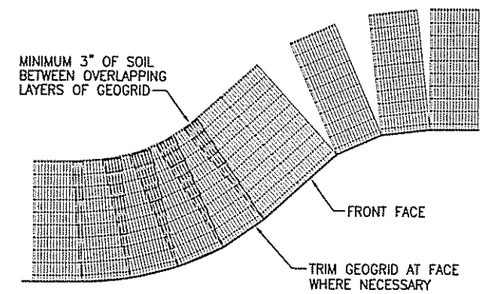


NOTES:

1. SEE SIERRASCAPE FACING UNIT DETAIL FOR FACING MATERIALS AND DIMENSIONS.
2. TWO ROLLS OF UNIAXIAL GEOGRID SHALL BE PLACED ON EACH SIERRASCAPE FACING UNIT WITH TWO GEOGRID RIBS BETWEEN EACH PAIR OF WIRE CONNECTION LOOPS.
3. DURING INSTALLATION BUTT VERTICAL WIRE OF ADJACENT FACING UNITS TO PROVIDE 2.4" OVERLAP OF HORIZONTAL WIRES.

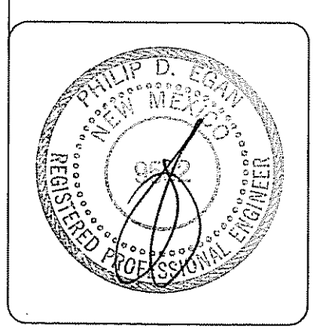
TYPICAL SIERRASCAPE® GEOGRID COVERAGE

NOT TO SCALE



GEOGRID PLACEMENT ON CURVES

NOT TO SCALE



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RETAINING WALL SYSTEMS

Tensar
Tensar Earth Technologies, Inc.
5883 Glenridge Drive, Suite 200
Atlanta, Georgia 30328
(404) 250-1290

REVISIONS \ ISSUE

0	5/24/06	ISSUED FOR REVIEW	
1	12/1/06	NO CHANGE	
2	1/8/07	NO CHANGE	

Project Number	D06602
File Name	D0660208.DWG
Date Drawn	5/24/06
Scale	AS SHOWN
Designed by	CLC
Drawn by	JAR
Checked by	

LASO TA-73 AIRPORT LANDFILL

W.O. NO. 13104.002.001.7000

LOS ALAMOS COUNTY, NEW MEXICO

TYPICAL DETAILS

Sheet Number 8 OF 8

6. RESULTS OF MONITORING, SAMPLING AND ANALYSIS

Monitoring, sampling and analysis performed for each feature of work are described in this section. Results are provided in Appendix A. The electronic laboratory reports from Kleinfelder, Inc. provided on CD are coded as shown in the example below:

71610.2 - ALB06TD013_08-21-06_A_C_S.pdf: Example report number from Appendix A

71610.2 - ALB06TD013: Report number generated by Kleinfelder, Inc.

08-21-06: date of report

A_C_S: Material types tested; C = concrete; A = aggregate; S = soil; M = MatCon

6.1 Main landfill cover

Monitoring, sampling and analysis results for the main landfill cover include on-site health and safety monitoring. Results are provided in Appendix A.

6.1.1 Aggregate subgrade

Sampling and analysis for the aggregate subgrade for both the hangar pads and the MatCon cover included prequalification testing of aggregates and acceptance testing of the compacted subgrade, as per Specification 02200. Results are provided in Appendix A. Those reports containing results for aggregates include an “A” in the filename.

6.1.2 Hangar pads

Sampling and analysis for the hangar pads include prequalification mix design and testing, and acceptance testing of concrete as received, as per Specification 03300. Results are provided in Appendix A. Those reports containing results for concrete include a “C” in the filename.

6.1.3 MatCon cover

Sampling and analysis for the MatCon cover included prequalification mix design and testing, acceptance testing as per MatCon specifications provided with the RDWP, and coring the completed cover and testing cores for saturated hydraulic conductivity. Results are provided in Appendix A. Those on-site test reports that contain results for MatCon testing include an “M” in the filename.

The completed MatCon surface was cored at 12 locations as shown in the photos provided in Appendix D Cored locations were backfilled with MatCon hot mix. Six of the cores were archived as duplicates while six were submitted to Kleinfelder’s geotechnical laboratory in Pleasanton, California, for testing for saturated hydraulic conductivity using ASTM D5084 Method C. Results for the first six cores ranged from 1.5E-07 to 3.2E-09 cm/sec. Sidewall leakage was believed responsible for the variability, as evidenced by very low final water content values indicating little or no effective porosity. These low porosity measurements corroborated the very low field void content estimates based on correlation to field densities measured with a nuclear gauge.

Sidewall leakage in permeameter testing of very low permeability asphalt concrete specimens has been previously reported. Bowders et al. (2002) (available at http://www.missouri.edu/~geotech/html/Asphalt%20Barrier%20Papers/ASTM%20GTJ%20Sidewall%20Leakage.pdf) studied sidewall leakage during this type of testing and recommended modifications to ASTM D5084 including coating the sides of the asphalt concrete test cylinders with silicone vacuum

grease and increasing the confining pressure. These modifications were used for testing the next six MatCon test cylinders. The sides of the cylinders were coated with silicone vacuum grease and the confining pressure was increased from 3 psi to 10 psi. The tops and bottoms of the cylinders were not coated. The result was no measurable flow through any of the cylinders after 10 days of testing.

Lengths of the four untrimmed test cylinders ranged from 3.5 to 4.1 inches, with an average of 3.8 inches. The hydraulic conductivity of the MatCon cores was apparently below the limits of the ASTM D5084 procedure as performed by the testing laboratory, which has previously measured permeabilities below 1E-09 cm/sec for earthen materials using this method. The requirement that the test pad cores have a saturated hydraulic conductivity less than the value of 1E-08 cm/sec used in numerical modeling to establish RCRA Subtitle C cover equivalence, as described in the RDWP (NWI 2006), was therefore met. The laboratory test report and photos of the test cylinders are provided in Appendix A, “MatCon Ksat testing”.

6.2 North and East slope covers

6.2.1 Infiltration layer

Sampling and analysis for the north and east slope covers included prequalification testing of infiltration layer soils and topsoil, acceptance testing as per Specification 02200, and constructing and coring a test pad for the infiltration layer soils and testing the cores for saturated hydraulic conductivity. Results are provided on a disk labeled "Kleinfelder Test Results" in the last section of Appendix A. The test pad results were reported to NMED on 8/31/06 and are discussed below.

6.2.1.1 Background

Portions of the final closure cover for the DOE-LASO TA-73 Airport Landfill include low-permeability soil layers (also called infiltration layer), as shown in RDWP Revision 2 Drawing 2005 and others. In response to comments by NMED in the “Notice of Disapproval for the Remedy Design Work Plan for the Las Alamos Site Office TA-73 Airport Landfill, Revision 1” (NMED 2006), DOE-LASO stated that as-built permeability for the low-permeability soil courses would be determined in a certified geotechnical laboratory on cores collected from test pads and verified against the design requirements. The materials and procedures used to construct the test pad to obtain the required permeability would then be used to construct the infiltration layer material. The design requirement for saturated hydraulic conductivity of the low-permeability soils was 1E-05 cm/sec, based on the value used in numerical modeling described in the RDWP, to demonstrate RCRA Subtitle C Minimum Technology Guidance (MTG) closure cover equivalence.

An infiltration layer soil borrow source was identified and sampled. Standard Proctor curves were determined as reported in Appendix A, Kleinfelder report no. 71610.2 - ALB06TD001_5-26-06_A_S.pdf. Compaction required to achieve the desired permeability was determined as reported in Appendix A, Kleinfelder report no. 71610.2_ALB06TD010_7-31-06_S_A.pdf. 100% of the maximum dry density using Standard Proctor compaction was needed to achieve the required permeability. Maximum dry density is 108.8 pcf and the optimum moisture content is 14.2%.

6.2.1.2 Construction and Testing

An 18-inch thick low-permeability soil test pad was constructed in three lifts on 08/03/06, and core samples were collected and tested to meet the NMED request. Construction and sampling of the test pad were witnessed by Philip Meehan, P.E. (Quality Control System Manager, North Wind, Inc) and

Berg Keshian, P.E. (Engineer of Record, Weston Solutions, Inc.). The test pad was constructed and sampled as follows:

1. A 6-in minimum layer of interim cover material was placed and wetted. The surface of the interim cover material was compacted with a smooth drum vibratory compactor and then scarified by dozer tracking prior to placing infiltration material.

2. The infiltration layer soil stockpile was wetted. An 8 inch loose lift of infiltration material was placed and wetted. The lift was rolled with four passes of the sheep's foot compactor, followed by two additional passes with the smooth drum vibratory compactor.

3. The lift was tested for moisture content and density using a nuclear gauge. Results are reported in Table 1 and compared to maximum dry density and optimum moisture content

4. The next two lifts were placed, compacted and field tested as described for the first.

5. A core sample was obtained from each lift from the completed pad as per ASTM D 2937 "Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method". The overlying material was excavated to access the top surface of the lift, at different locations on the test pad for the 6-11 inch sample and for the 11-16 inch sample. The 1-6 inch sample was obtained from the completed test pad surface, also at a separate location on the test pad.

6. Samples were packaged and transported as per the specification. Samples were tested as per ASTM D 5084 "Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter:"

6.2.1.3 Results and Discussion

Results for each sample are reported in Table 6-1 and the complete laboratory report is provided in Appendix A "Infiltration layer test pad results". Saturated hydraulic conductivity (Ksat) values reported ranged from 3.1E-07 cm/sec to 4.4 E-08 cm/sec. All of these values are at least one order of magnitude below the required value of 1.0E-05 cm/sec.

Note that the 1 to 6 inch sample was reported as remolded by the lab, due to additional handling during preparation required to hold the sample together. This sample showed the highest Ksat of the three samples, at 3.1E-07 cm/sec. These results indicate that compaction of the infiltration layer material to a dry density greater than 109 pcf will ensure Ksat values well below the design criterion.

Table 6-1. Results for infiltration layer soil field density and moisture testing, and laboratory Ksat.

Lift	Field density		Field moisture, %	Ksat, cm/sec
	Density, pcf	Percent of optimum		
1-6 inches	119.4	109.7	11.8	3.1E-07
6-11 inches	111.0	102.0	14.2	6.8E-08
11-16 inches	109.0	100.2	15.3	4.4E-08

6.2.2 Topsoil

Sampling and analysis for topsoil included prequalification and acceptance testing as per Specification 02200. Results are provided in Appendix A. Those reports containing results for soil including topsoil include an “S” in the filename.

6.3 Retaining walls

Sampling and testing for the retaining walls included drilling and coring along the alignment of Wall 1 prior to construction, and prequalification and acceptance testing during construction, as discussed below.

6.3.1 Concrete wall

Borings were drilled along the alignment of Wall 1 to determine the depth, competency and bearing strength of the underlying strata. Boring logs, location maps and rock unit descriptions are provided in Appendix A. The borings indicated approximately 10 to 15 feet of waste overlying about 10 feet of soft nonwelded tuff, overlying dense welded tuff. Standard penetration tests and rock quality index were measured and visual observations recorded.

Sampling and analysis for the concrete wall included prequalification testing of the concrete mix design and acceptance testing of concrete received, as per Specification 03300; and prequalification and acceptance of the aggregate subgrade material as per Specification 02200. Results are provided in Appendix A. Those on-site test reports that contain results for concrete testing include a “C” in the filename. Those on-site test reports that contain results for Russells gravel aggregate used for MSE wall subgrade and backfill include an “A” in the filename.

6.3.2 MSE walls

Sampling and analysis for the MSE wall included prequalification and acceptance testing of aggregate, as per Specification 02200. Results are provided in Appendix A. Those on-site test reports that contain results for Russells gravel aggregate used for MSE wall subgrade and backfill include an “A” in the filename.

6.4 DDA cover

Sampling and analysis for the DDA cover included prequalification and acceptance testing of topsoil, as per Specification 02200. Results are provided in Appendix A. Those on-site test reports that contain results for topsoil and other soils include an “S” in the filename.

7. REFERENCES

NMED 2005, "Compliance Order on Consent in the Matter of the United States Department of Energy and the Regents of the University of California, Los Alamos National Laboratory, Los Alamos County, NM, Respondents, Proceeding Under the New Mexico Hazardous Waste Act § 74-4-10 and the New Mexico Solid Waste Act § 74-9-36(D)", March 1, 2005.

"Notice of Disapproval for the Remedy Design Work Plan for the Las Alamos Site Office TA-73 Airport Landfill", NM0890010515, HWB-LANL-05-015, January 4, 2006

NWI 2006, "Remedy Design Work Plan for the Los Alamos Site Office TA-73 Airport Landfill", NW-ID-2004-031, Revision 2, April 2006.

LANL 1998, "RFI Report for Potential Release Sites 73-001 (a, b, c, d), 73-004(d), Airport Landfill Areas", LA-UR-98-3824, Los Alamos National Laboratory, November 1998.

LANL 2002, "Voluntary Corrective Measure Plan for Potential Release Sites 73-001(a)-99 and 73-001 (b)-99", LA-UR-02-4433, Los Alamos National Laboratory, October 2002.

Bowders, John J., Deepak Neupane and J. Erik Loehr, "Sidewall Leakage in Hydraulic Conductivity Testing of Asphalt Concrete Specimens" ASTM *Geotechnical Testing Journal*, June 2002.

Explanation of codes	
B	*Analyte Detected in Method Blank*
E	*Result is Estimated*
H	*Analyzed Out of Hold Time*
N	*Tentatively Identified Compound*
S	*Subcontracted*
1-9	*See Footnote*

LOS ALAMOS COUNTY
attn: **CHRIS ROSACKER**
P.O. DRAWER 1030
LOS ALAMOS NM 87544

STANDARD

Assaigai Analytical Laboratories, Inc.

Certificate of Analysis

All samples are reported on an "as received" basis, unless otherwise noted (i.e. - Dry Weight).

Client: **LOS ALAMOS COUNTY**
Project: **COMPOST 2006**
Order: **0606303 LOSC1** Receipt: **06-13-06**

William P. Biava: President of Assaigai Analytical Laboratories, Inc.

Sample: ***COMPOST 2006*** Collected: *06-13-06 11:10:00* By:
Matrix: ***C*** *SR2144*

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
0606303-0001A		**ASTM D2216**					By:	MJN		
MOIST-06-027	WC.2006.1474.8		Percent Solids	86.6	%	1	0.1		06-15-06	06-16-06
0606303-0001A		**SM9221 C,E - Dry Weight**					By:	MDE		
SMPN06002	BT.2006.356.3		MPN Fecal Coliform	ND	org/G	10	2		06-13-06	06-15-06

Unless otherwise noted, all samples were received in acceptable condition and all sampling was performed by client or client representative. Sample result of ND indicates Not Detected, ie result is less than the sample specific Detection Limit. Sample specific Detection Limit is determined by multiplying the sample Dilution Factor by the listed Reporting Detection Limit. All results relate only to the items tested. Any miscellaneous workorder information or foonotes will appear below.

Analytical results are not corrected for method blank or field blank contamination.

Report Date: 6/16/2006 4:22:49 PM

Explanation of codes	
B	*Analyte Detected in Method Blank*
E	*Result is Estimated*
H	*Analyzed Out of Hold Time*
N	*Tentatively Identified Compound*
S	*Subcontracted*
1-9	*See Footnote*

LOS ALAMOS COUNTY
attn: **L.A. BUSTAMANTE**
P.O. DRAWER 1030
LOS ALAMOS NM 87544

STANDARD

Assaigai Analytical Laboratories, Inc.

Certificate of Analysis

All samples are reported on an "as received" basis, unless otherwise noted (i.e. - Dry Weight).

Client: **LOS ALAMOS COUNTY**
Project: **COMPOST 2006/SLUDGE 2005**
Order: **0603634** **LOSC1** Receipt: **03-24-06**

William P. Biava: President of Assaigai Analytical Laboratories, Inc.

Sample: ***BAYO SLUDGE*** Collected: *03-23-06 13:46:00* By: *CR*
Matrix: ***C***

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
0603634-0001A		**SW846 3050B/6010B ICP - Dry Weight Basis**					By:	TGA		
M06337	MT.2006.620.22	7440-38-2	Arsenic	12.4	mg/kg	2	0.25		03-30-06	03-30-06
M06337	MT.2006.620.22	7440-43-9	Cadmium	1.60	mg/kg	2	0.25		03-30-06	03-30-06
M06337	MT.2006.620.31	7440-47-3	Chromium	ND	mg/kg	15	0.1		03-30-06	03-30-06
M06337	MT.2006.700.20	7440-50-8	Copper	270	mg/kg	154	1		03-30-06	04-17-06
M06337	MT.2006.620.31	7439-92-1	Lead	ND	mg/kg	15	0.25		03-30-06	03-30-06
M06337	MT.2006.620.22	7439-98-7	Molybdenum	6.81	mg/kg	2	0.05		03-30-06	03-30-06
M06337	MT.2006.620.22	7440-02-0	Nickel	11.2	mg/kg	2	0.1		03-30-06	03-30-06
M06337	MT.2006.620.22	7782-49-2	Selenium	ND	mg/kg	2	0.5		03-30-06	03-30-06
M06337	MT.2006.700.21	7440-66-6	Zinc	806	mg/kg	308	0.5		03-30-06	04-17-06
0603634-0001A		**ASTM D2216**					By:	MJN		
MOIST-06-015	WC.2006.819.4		Percent Solids	65.5	%	1	0.1		03-31-06	04-03-06
0603634-0001A		**SW846 7471B CVAA-Dry Weight Basis**					By:	BAS		
M06340	MT.2006.608.34	7439-97-6	Mercury	3053	ug / Kg	15	20		03-31-06	03-31-06
0603634-0001B		**SW846 3550B/8082 PCBs by GC/ECD - Dry Weight Basis**					By:	SDW		
S06175	XG.2006.408.29	12674-11-2	Aroclor 1016	ND	mg / Kg	76	0.05		04-05-06	04-07-06
S06175	XG.2006.408.29	11104-28-2	Aroclor 1221	ND	mg / Kg	76	0.05		04-05-06	04-07-06
S06175	XG.2006.408.29	11141-16-5	Aroclor 1232	ND	mg / Kg	76	0.05		04-05-06	04-07-06
S06175	XG.2006.408.29	53469-21-9	Aroclor 1242	ND	mg / Kg	76	0.05		04-05-06	04-07-06
S06175	XG.2006.408.29	12672-29-6	Aroclor 1248	ND	mg / Kg	76	0.05		04-05-06	04-07-06
S06175	XG.2006.408.29	11097-69-1	Aroclor 1254	ND	mg / Kg	76	0.05		04-05-06	04-07-06
S06175	XG.2006.408.29	11096-82-5	Aroclor 1260	ND	mg / Kg	76	0.05		04-05-06	04-07-06

Assaigai Analytical Laboratories, Inc.

Certificate of Analysis

All samples are reported on an "as received" basis, unless otherwise noted (i.e. - Dry Weight).

Client: **LOS ALAMOS COUNTY**
Project: **COMPOST 2006/SLUDGE 2005**
Order: **0603634** **LOSC1** Receipt: **03-24-06**

Sample: ***BAYO SLUDGE*** Collected: *03-23-06 13:46:00* By: *CR*
Matrix: ***C***

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
0603634-0001C		**EPA 900.0**					By:	TS		
ARS10600669	SB.2006.144.1		Gross Alpha	6.3342+/- 1.4822	pCi/g	1	1.5627	S	04-11-06	04-11-06
ARS10600669	SB.2006.144.1		Gross Beta	11.7182+/- 1.1467	pCi/g	1	1.493	S	04-11-06	04-11-06
0603634-0001E		**SW846 1311/3010A/6010B ICP TCLP**					By:	TGA		
M06362	MT.2006.632.29	7440-38-2	Arsenic	ND	mg/L	25	0.005		04-06-06	04-07-06
M06362	MT.2006.632.29	7440-39-3	Barium	0.404	mg/L	25	0.003		04-06-06	04-07-06
M06362	MT.2006.632.29	7440-43-9	Cadmium	ND	mg/L	25	0.005		04-06-06	04-07-06
M06362	MT.2006.632.29	7440-47-3	Chromium	ND	mg/L	25	0.002		04-06-06	04-07-06
M06362	MT.2006.632.29	7439-92-1	Lead	ND	mg/L	25	0.005		04-06-06	04-07-06
M06362	MT.2006.632.29	7782-49-2	Selenium	ND	mg/L	25	0.01		04-06-06	04-07-06
0603634-0001E		**SW846 1311/3010A/7000 series AA-FL TCLP**					By:	Dpa		
M06362	MT.2006.655.26	7440-22-4	Silver	ND	mg/L	1	0.01		04-06-06	04-11-06
0603634-0001E		**SW846 1311/7470A CVAA TCLP**					By:	BAS		
M06366	MT.2006.635.25	7439-97-6	Mercury	ND	mg/L	1	0.0002		04-07-06	04-07-06
0603634-0001E		**SW846 1311/3510B/8081A Pesticides by GC/ECD TCLP**					By:	SDW		
S06180	XG.2006.399.7	57-74-9	Chlordane	ND	mg/L	2	0.0025		04-06-06	04-06-06
S06180	XG.2006.399.7	72-20-8	Endrin	ND	mg/L	2	0.001		04-06-06	04-06-06
S06180	XG.2006.399.7	76-44-8	Heptachlor	ND	mg/L	2	0.001		04-06-06	04-06-06
S06180	XG.2006.399.7	1024-57-3	Heptachlor Epoxide	ND	mg/L	2	0.001		04-06-06	04-06-06
S06180	XG.2006.399.7	58-89-9	Lindane	ND	mg/L	2	0.001		04-06-06	04-06-06
S06180	XG.2006.399.7	72-43-5	Methoxychlor	ND	mg/L	2	0.001		04-06-06	04-06-06
S06180	XG.2006.399.7	8001-35-2	Toxaphene	ND	mg/L	2	0.0025		04-06-06	04-06-06
0603634-0001E		**SW846 1311/3510B/8270C SVOCs by GC/MS TCLP**					By:	DS		
S06179	XG.2006.394.12	106-46-7	1,4-Dichlorobenzene	ND	mg/L	2	0.005		04-06-06	04-06-06
S06179	XG.2006.394.12	95-95-4	2,4,5-Trichlorophenol	ND	mg/L	2	0.05		04-06-06	04-06-06
S06179	XG.2006.394.12	88-06-2	2,4,6-Trichlorophenol	ND	mg/L	2	0.05		04-06-06	04-06-06
S06179	XG.2006.394.12	121-14-2	2,4-Dinitrotoluene	ND	mg/L	2	0.05		04-06-06	04-06-06
S06179	XG.2006.394.12	118-74-1	Hexachlorobenzene	ND	mg/L	2	0.005		04-06-06	04-06-06
S06179	XG.2006.394.12	87-68-3	Hexachlorobutadiene	ND	mg/L	2	0.005		04-06-06	04-06-06
S06179	XG.2006.394.12	67-72-1	Hexachloroethane	ND	mg/L	2	0.005		04-06-06	04-06-06
S06179	XG.2006.394.12	108-39-4/106-44	m-Cresol & p-Cresol	ND	mg/L	2	0.005		04-06-06	04-06-06
S06179	XG.2006.394.12	98-95-3	Nitrobenzene	ND	mg/L	2	0.005		04-06-06	04-06-06
S06179	XG.2006.394.12	95-48-7	o-Cresol	ND	mg/L	2	0.005		04-06-06	04-06-06
S06179	XG.2006.394.12	87-86-5	Pentachlorophenol	ND	mg/L	2	0.05		04-06-06	04-06-06
S06179	XG.2006.394.12	110-86-1	Pyridine	ND	mg/L	2	0.05		04-06-06	04-06-06
0603634-0001E		**SW846 1311/3510B/SM 6640 Herbicides by GC/ECD TCLP**					By:	SDW		
S06176	XG.2006.402.10	93-72-1	2,4,5-TP (Silvex)	ND	mg/L	4	0.001		04-05-06	04-07-06
S06176	XG.2006.402.18	94-75-7	2,4-D	ND	mg/L	8	0.1		04-05-06	04-07-06

Assaigai Analytical Laboratories, Inc.

Certificate of Analysis

All samples are reported on an "as received" basis, unless otherwise noted (i.e. - Dry Weight).

Client: **LOS ALAMOS COUNTY**
Project: **COMPOST 2006/SLUDGE 2005**
Order: **0603634** **LOSC1** Receipt: **03-24-06**

Sample: ***BAYO SLUDGE*** Collected: *03-23-06 13:46:00* By: *CR*
Matrix: ***C***

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
0603634-0001G		**SW846 1311/8260B Purgeable VOCs by GC/MS TCLP**					By:	TRS		
V06162	XG.2006.392.14	75-35-4	1,1 Dichloroethylene	ND	mg/L	5	0.001		04-05-06	04-05-06
V06162	XG.2006.392.14	107-06-2	1,2-Dichloroethane (EDC)	ND	mg/L	5	0.002		04-05-06	04-05-06
V06162	XG.2006.392.14	71-43-2	Benzene	ND	mg/L	5	0.001		04-05-06	04-05-06
V06162	XG.2006.392.14	56-23-5	Carbon tetrachloride	ND	mg/L	5	0.001		04-05-06	04-05-06
V06162	XG.2006.392.14	108-90-7	Chlorobenzene	ND	mg/L	5	0.001		04-05-06	04-05-06
V06162	XG.2006.392.14	67-66-3	Chloroform	ND	mg/L	5	0.001		04-05-06	04-05-06
V06162	XG.2006.392.14	78-93-3	Methyl ethyl ketone	ND	mg/L	5	0.005		04-05-06	04-05-06
V06162	XG.2006.392.14	127-18-4	Tetrachloroethylene	ND	mg/L	5	0.002		04-05-06	04-05-06
V06162	XG.2006.392.14	79-01-6	Trichloroethylene	ND	mg/L	5	0.001		04-05-06	04-05-06
V06162	XG.2006.392.14	75-01-4	Vinyl chloride	ND	mg/L	5	0.005		04-05-06	04-05-06

Sample: ***WHITE ROCK SLUDGE*** Collected: *03-23-06 13:10:00* By: *CR*
Matrix: ***C***

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
0603634-0002A		**SW846 3050B/6010B ICP - Dry Weight Basis**					By:	TGA		
M06337	MT.2006.620.33	7440-38-2	Arsenic	15.2	mg/kg	17	0.25		03-30-06	03-30-06
M06337	MT.2006.620.32	7440-43-9	Cadmium	2.96	mg/kg	2	0.25		03-30-06	03-30-06
M06337	MT.2006.620.33	7440-47-3	Chromium	66.2	mg/kg	17	0.1		03-30-06	03-30-06
M06337	MT.2006.710.20	7440-50-8	Copper	785	mg/kg	172	1		03-30-06	04-18-06
M06337	MT.2006.620.33	7439-92-1	Lead	37.2	mg/kg	17	0.25		03-30-06	03-30-06
M06337	MT.2006.620.32	7439-98-7	Molybdenum	2.95	mg/kg	2	0.05		03-30-06	03-30-06
M06337	MT.2006.620.33	7440-02-0	Nickel	18.7	mg/kg	17	0.1		03-30-06	03-30-06
M06337	MT.2006.620.32	7782-49-2	Selenium	12.4	mg/kg	2	0.5		03-30-06	03-30-06
M06337	MT.2006.710.20	7440-66-6	Zinc	1270	mg/kg	172	0.5		03-30-06	04-18-06
0603634-0002A		**ASTM D2216**					By:	MJN		
MOIST-06-015	WC.2006.819.2		Percent Solids	58.6	%	1	0.1		03-31-06	04-03-06
0603634-0002A		**SW846 7471B CVAA- Dry Weight Basis**					By:	BAS		
M06340	MT.2006.608.39	7439-97-6	Mercury	3003	ug / Kg	8	20		03-31-06	03-31-06
0603634-0002B		**SW846 3550B/8082 PCBs by GC/ECD - Dry Weight Basis**					By:	SDW		
S06175	XG.2006.408.24	12674-11-2	Aroclor 1016	ND	mg / Kg	34	0.05		04-05-06	04-07-06
S06175	XG.2006.408.24	11104-28-2	Aroclor 1221	ND	mg / Kg	34	0.05		04-05-06	04-07-06
S06175	XG.2006.408.24	11141-16-5	Aroclor 1232	ND	mg / Kg	34	0.05		04-05-06	04-07-06
S06175	XG.2006.408.24	53469-21-9	Aroclor 1242	ND	mg / Kg	34	0.05		04-05-06	04-07-06
S06175	XG.2006.408.24	12672-29-6	Aroclor 1248	ND	mg / Kg	34	0.05		04-05-06	04-07-06
S06175	XG.2006.408.24	11097-69-1	Aroclor 1254	ND	mg / Kg	34	0.05		04-05-06	04-07-06
S06175	XG.2006.408.24	11096-82-5	Aroclor 1260	ND	mg / Kg	34	0.05		04-05-06	04-07-06
0603634-0002C		**EPA 900.0**					By:	TS		
ARS10600669	SB.2006.144.2		Gross Alpha	4.7176+/- 0.9650	pCi/g	1	0.9469	S	04-11-06	04-11-06

Assaigai Analytical Laboratories, Inc.

Certificate of Analysis

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Client: **LOS ALAMOS COUNTY**

Project: **COMPOST 2006/SLUDGE 2005**

Order: **0603634** **LOSC1** Receipt: **03-24-06**

Sample: ***WHITE ROCK SLUDGE*** Collected: *03-23-06 13:10:00* By: *CR*

Matrix: ***C***

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
0603634-0002C		**EPA 900.0**					By:	TS		
ARS10600669	SB.2006.144.2		Gross Beta	6.5979+/- 0.9132	pCi/g	1	1.2544	S	04-11-06	04-11-06
0603634-0002E		**SW846 1311/3010A/6010B ICP TCLP**					By:	TGA		
M06362	MT.2006.632.32	7440-38-2	Arsenic	ND	mg/L	25	0.005		04-06-06	04-07-06
M06362	MT.2006.632.32	7440-39-3	Barium	0.106	mg/L	25	0.003		04-06-06	04-07-06
M06362	MT.2006.632.32	7440-43-9	Cadmium	ND	mg/L	25	0.005		04-06-06	04-07-06
M06362	MT.2006.632.32	7440-47-3	Chromium	ND	mg/L	25	0.002		04-06-06	04-07-06
M06362	MT.2006.632.32	7439-92-1	Lead	ND	mg/L	25	0.005		04-06-06	04-07-06
M06362	MT.2006.632.32	7782-49-2	Selenium	ND	mg/L	25	0.01		04-06-06	04-07-06
0603634-0002E		**SW846 1311/3010A/7000 series AA-FL TCLP**					By:	Dpa		
M06362	MT.2006.655.27	7440-22-4	Silver	ND	mg/L	1	0.01		04-06-06	04-11-06
0603634-0002E		**SW846 1311/7470A CVAA TCLP**					By:	BAS		
M06366	MT.2006.635.26	7439-97-6	Mercury	ND	mg/L	1	0.0002		04-07-06	04-07-06
0603634-0002E		**SW846 1311/3510B/8081A Pesticides by GC/ECD TCLP**					By:	SDW		
S06180	XG.2006.399.10	57-74-9	Chlordane	ND	mg/L	2	0.0025		04-06-06	04-06-06
S06180	XG.2006.399.10	72-20-8	Endrin	ND	mg/L	2	0.001		04-06-06	04-06-06
S06180	XG.2006.399.10	76-44-8	Heptachlor	ND	mg/L	2	0.001		04-06-06	04-06-06
S06180	XG.2006.399.10	1024-57-3	Heptachlor Epoxide	ND	mg/L	2	0.001		04-06-06	04-06-06
S06180	XG.2006.399.10	58-89-9	Lindane	ND	mg/L	2	0.001		04-06-06	04-06-06
S06180	XG.2006.399.10	72-43-5	Methoxychlor	ND	mg/L	2	0.001		04-06-06	04-06-06
S06180	XG.2006.399.10	8001-35-2	Toxaphene	ND	mg/L	2	0.0025		04-06-06	04-06-06
0603634-0002E		**SW846 1311/3510B/8270C SVOCs by GC/MS TCLP**					By:	DS		
S06179	XG.2006.394.15	106-46-7	1,4-Dichlorobenzene	ND	mg/L	2	0.005		04-06-06	04-06-06
S06179	XG.2006.394.15	95-95-4	2,4,5-Trichlorophenol	ND	mg/L	2	0.05		04-06-06	04-06-06
S06179	XG.2006.394.15	88-06-2	2,4,6-Trichlorophenol	ND	mg/L	2	0.05		04-06-06	04-06-06
S06179	XG.2006.394.15	121-14-2	2,4-Dinitrotoluene	ND	mg/L	2	0.05		04-06-06	04-06-06
S06179	XG.2006.394.15	118-74-1	Hexachlorobenzene	ND	mg/L	2	0.005		04-06-06	04-06-06
S06179	XG.2006.394.15	87-68-3	Hexachlorobutadiene	ND	mg/L	2	0.005		04-06-06	04-06-06
S06179	XG.2006.394.15	67-72-1	Hexachloroethane	ND	mg/L	2	0.005		04-06-06	04-06-06
S06179	XG.2006.394.15	108-39-4/106-44	m-Cresol & p-Cresol	ND	mg/L	2	0.005		04-06-06	04-06-06
S06179	XG.2006.394.15	98-95-3	Nitrobenzene	ND	mg/L	2	0.005		04-06-06	04-06-06
S06179	XG.2006.394.15	95-48-7	o-Cresol	ND	mg/L	2	0.005		04-06-06	04-06-06
S06179	XG.2006.394.15	87-86-5	Pentachlorophenol	ND	mg/L	2	0.05		04-06-06	04-06-06
S06179	XG.2006.394.15	110-86-1	Pyridine	ND	mg/L	2	0.05		04-06-06	04-06-06
0603634-0002E		**SW846 1311/3510B/SM 6640 Herbicides by GC/ECD TCLP**					By:	SDW		
S06176	XG.2006.402.11	93-72-1	2,4,5-TP (Silvex)	ND	mg/L	4	0.001		04-05-06	04-07-06
S06176	XG.2006.402.19	94-75-7	2,4-D	ND	mg/L	8	0.1		04-05-06	04-07-06
0603634-0002G		**SW846 1311/8260B Purgeable VOCs by GC/MS TCLP**					By:	TRS		
V06162	XG.2006.392.12	75-35-4	1,1 Dichloroethylene	ND	mg/L	1	0.001		04-05-06	04-05-06
V06162	XG.2006.392.12	107-06-2	1,2-Dichloroethane (EDC)	ND	mg/L	1	0.002		04-05-06	04-05-06

Assaigai Analytical Laboratories, Inc.

Certificate of Analysis

All samples are reported on an "as received" basis, unless otherwise noted (i.e. - Dry Weight).

Client: **LOS ALAMOS COUNTY**

Project: **COMPOST 2006/SLUDGE 2005**

Order: **0603634** **LOSC1** Receipt: **03-24-06**

Sample: ***WHITE ROCK SLUDGE*** Collected: *03-23-06 13:10:00* By: *CR*

Matrix: ***C***

QC Group	Run Sequence	CAS #	Analyte	Result	Units	Dilution Factor	Detection Limit	Code	Prep Date	Run Date
0603634-0002G		**SW846 1311/8260B Purgeable VOCs by GC/MS TCLP**						By: TRS		
V06162	XG.2006.392.12	71-43-2	Benzene	ND	mg/L	1	0.001		04-05-06	04-05-06
V06162	XG.2006.392.12	56-23-5	Carbon tetrachloride	ND	mg/L	1	0.001		04-05-06	04-05-06
V06162	XG.2006.392.12	108-90-7	Chlorobenzene	ND	mg/L	1	0.001		04-05-06	04-05-06
V06162	XG.2006.392.12	67-66-3	Chloroform	ND	mg/L	1	0.001		04-05-06	04-05-06
V06162	XG.2006.392.12	78-93-3	Methyl ethyl ketone	ND	mg/L	1	0.005		04-05-06	04-05-06
V06162	XG.2006.392.12	127-18-4	Tetrachloroethylene	ND	mg/L	1	0.002		04-05-06	04-05-06
V06162	XG.2006.392.12	79-01-6	Trichloroethylene	ND	mg/L	1	0.001		04-05-06	04-05-06
V06162	XG.2006.392.12	75-01-4	Vinyl chloride	ND	mg/L	1	0.005		04-05-06	04-05-06

Unless otherwise noted, all samples were received in acceptable condition and all sampling was performed by client or client representative. Sample result of ND indicates Not Detected, ie result is less than the sample specific Detection Limit. Sample specific Detection Limit is determined by multiplying the sample Dilution Factor by the listed Reporting Detection Limit. All results relate only to the items tested. Any miscellaneous workorder information or foonotes will appear below.

Analytical results are not corrected for method blank or field blank contamination.

MEMO: The analysis for gross alpha and gross beta was subcontracted to American Radiation Services.

#18

amec

May 2, 2005
AMEC Project No. 4-519-003279

Los Alamos Transit Mix Co.
P.O.Box 747
Los Alamos NM-87544

Attn: Ignacio Lucero/Lonnie Trujillo

Re: **Exterior Site Concrete with compressive strength, f'_c: 3000 psi @ 28-days for 2005 Commercial Air-Entrained Concrete Mix Designs for Los Alamos Transit Mix**

In accordance with your request, AMEC has performed laboratory trial mixes on October 23, 2004 to establish a basis for recommended proportions for an exterior concrete mix with 28-day minimum specified compressive strength of 3,000 psi.

The trials were performed following the requirements and methods of Chapters 4 and 5 of the American Concrete Institute's Building Code requirements for Structural Concrete, ACI 318-02 and ACI 211.1-91, Standard Practice for Selecting Proportions for Normal Heavyweight, and Mass Concrete. Strength data at varying water/cementitious ratios is shown for the individual trial mixes and collectively on the attached graph in Appendix A. The final recommended mix has been established from the laboratory data using the Absolute Volume Method of ACI 211.1-91. The strength adequacy of the proposed mix is based upon a 1,200 psi over-design above the minimum specified strength in accordance with Chapter 5 of ACI 318-02. The durability adequacy is based on the requirements for moderate exposure conditions per Section 4.2.1 of ACI 318-02.

Proportions and properties for the recommended mix design follow this letter. Data for the aggregates, cement, fly ash and admixtures is contained in Appendix B.

Thank you for this opportunity to serve you. If there should be any questions, please feel free to call at (505) 821-1801.

Respectfully submitted,
AMEC Earth & Environmental Inc.

J. Vishal

#19

Vishal Jakkaraju
Engineer-in-Training
Attachments

Reviewed by,

KENNETH W. WYLIE NEW MEXICO 7733 REGISTERED PROFESSIONAL ENGINEER

Kenneth W. Wylie, P.E.
Manager of Materials Engineering

AMEC Earth & Environmental, Inc.
8519 Jefferson NE
Albuquerque, NM 87113

Received 5/26 from J.B. Henderson

amec

March 15, 2006
AMEC Project No. 6-519-003898

Los Alamos Transit Mix Co.
P.O.Box 747
Los Alamos NM-87544

Attn: Ignacio Lucero/Lonnie Trujillo

Re: 2006 Compressive Strength Data for Commercial Air-Entrained Concrete Mix Designs for Los Alamos Transit Mix (LATM) Espanola Transit Mix (ETM)

In accordance with your request, AMEC has performed field testing (slump, air content, unit weight and concrete temperature) on March 01, 2006 and also fabricated compressive strength cylinders for:

LATM Mix Code	Mix Use
Mix#18	Exterior Concrete: 3000 psi @ 28-days with 1200 psi over-design
Mix#19	Exterior Concrete: 4000 psi @ 28-days with 1200 psi over-design
Mix#20	Interior Concrete: 3000 psi @ 28-days with 1200 psi over-design
Mix#21	Interior Concrete: 4000 psi @ 28-days with 1200 psi over-design

Attached please find the reports on compressive test results for the referenced mix designs. Based on these results, the strength performance of these mixes is much better than the anticipated strength performance of the original mix designs that were established based on actual laboratory trial mixtures performed in October 2004.

If there should be any questions, please feel free to call at (505) 821-1801.

Respectfully submitted,
AMEC Earth & Environmental Inc.

Vishal Jakkaraju
EIT
Attachments

Reviewed by,

David A. Kondziolka, P.E.
Vice President

DAVID A KONDZIOLKA NEW MEXICO 7544 Registered Professional Engineer

3-15-06

AMEC Earth & Environmental, Inc.
8519 Jefferson NE
Albuquerque, NM 87113
Tel (505) 821-1801
Fax (505) 821-7371

Los Alamos Transit Mix
2005
Commercial Air-Entrained
CONCRETE MIX DESIGN PROPORTIONS
3000 psi Exterior Site Concrete

English Units

AMEC Earth & Environmental, Inc.
8519 Jefferson NE
Albuquerque, NM 87113
Tel (505) 821-1801
Fax (505) 821-7371
www.amec.com

Concrete Mix Design
Proportions - English Units

#118

amec

Project: 2005 Commercial Concrete Mixes

Job No: 4-519-003279
Date: 11/23/2004
Amend Date: 05/02/2005

Supplier: Los Alamos Transit Mix

Mix Code:

Mix Description: Exterior Concrete:3000psi @ 28 -days with 1200 psi over-design.

Mix Proportions per Cubic Yard

Material	Weight	Specific Gravity	Volume
GCC Rio Grande, Tijeras Type I-II Cement	538 lbs.	3.15	2.74 cf
Salt River Materials, 4-Corners Class F, Fly Ash	134 lbs.	2.16	0.99 cf
Water	283 lbs.	1	4.54 cf
	34.0 gal.		
EL Guique, Washed Concrete Sand (SSD)	1226 lbs.	2.631	7.47 cf
EL Guique, Sz#67 Coarse Aggregate (SSD)	1650 lbs.	2.666	9.92 cf
Water Reducer, MB Polyheed 997	26.6 oz. (1)	-	-
MB Micro Air, Air Entraining Agent	6.4 oz. (2)		-
Air	5.0 %		1.35 cf
Totals	3831 lbs.		27.00 cf

Anticipated Plastic Properties

		Specification(4)
Slump (ASTM C 143)	3.50 in.	4.0 in. max
Unit Weight (ASTM C 138)	141.9 pcf	
Air Content (ASTM C 231)	5.0 %	3.5%-6.5%

Mix Characteristics

Cement Content @ Air Content of 5.0%	538 lbs.
Total Cementitious Content	672 lbs.
Fly-Ash/Cementitious Content	19.9 %
Water/Cementitious Ratio	0.42
Fine-to-Total Aggregate	42.6 %

Anticipated Compressive Strength
(ASTM C 31 & C 39)

@ 3 days	2632 psi(3)	
@ 7 days	3168 psi(3)	
@ 14 days	3801 psi(3)	f'c= 3000 psi
@ 28 days	4237 psi(3)	f'cr= 4200 psi

(1) Temperature and slump variations may require adjustments in dosage within the range of 20.1 fl oz/cy to 46.9 fl oz/cy
(2) Temperature and slump variations may require adjustments in dosage within the range of 0.8 fl oz/cy to 10.1 fl oz/cy
(3) From lab trial batch confroming to ACI 318-99 5.3.3.2.
(4) Section 4.2.1 of ACI 318-02

APPENDIX A

TRIAL MIX DATA

AMEC Earth & Environmental, Inc.
8519 Jefferson NE
Albuquerque, NM 87113
Tel (505) 821-1801
Fax (505) 821-7371
www.amec.com

Report of Compression Test Results

amec

Client: Espanola Mercantile Company
P.O. Box 38
Espanola, NM 87532-

Attn: Ignacio Lucero

Report Date: March 30, 2006
Project #: 6-519-003898

Project Name: 2006 Concrete Mix Design for LATM/ ETM

Architect:
Engineer:

Project Manager: Vishal Jakkaraju
Specimen Type: Concrete ASTM-C39

Mix and Field Data

CastDate: 03/01/2006

Contractor:

Type of Placement: Batch Plant Testing

Location: Los Alamos Batch Plant: 3000 exterior, Set #3

Strength: Required (f'c) : 3000 psi @ 28 Days

Inspector: Abran Sandoval

Mix #: Mix#18;3000 exterior
Supplier: Los Alamos Transit
Load: 1 of 1
Truck #: 10486
Ticket #: 096558
Plant #:
Batch Size (cy): 2
Water Added (gal): 0
Admixture:

	Actual	Specs
Slump (in) ASTM C-143:	4.00	
Air Content (%) ASTM C231:	4.3	
Unit Weight (pcf) ASTM C-138:	142.7	
Sample Temperature (°F) ASTM C-1064:	60	
Ambient Temperature (°F):	58	

Clouds Condition: Clear
Precipitation: Dry
Wind Condition: Calm (0-4mph)

Time

Batch Time: 11:37
Sampled Time: 11:50
Finish Time:

Remarks: Air adjusted to 4.5 oz/yd

Test Result

Lab Id	Spec Id	Date Received	Test Date	Age (Days)	Nominal Specimen Size	Actual Area (in²)	Compressive (lbs)	Strength (psi)	Break Type	Field Cure	Type of Cap	Percent of Req.
226274	A	03/02/2006	03/04/2006	3	6x12	28.27	102100	3610	CSh	☐	Gr	120%
	B	03/02/2006	03/04/2006	3	6x12	28.27	103130	3650	Ch	☐	Gr	122%
	C	03/02/2006	03/08/2006	7	6x12	28.27	135200	4780	CSh	☐	Gr	159%
	D	03/02/2006	03/08/2006	7	6x12	28.27	133600	4730	Ch	☐	Gr	158%
	E	03/02/2006	03/08/2006	7	6x12	28.27	133790	4730	Sh		Gr	158%
	F	03/02/2006	03/15/2006	14	6x12	28.27	165530	5860	CSh	☐	Gr	195%
	G	03/02/2006	03/15/2006	14	6x12	28.27	155420	5500	Ch	☐	Gr	183%
	H	03/02/2006	03/15/2006	14	6x12	28.27	166470	5890	CSh	☐	Gr	196%
	I	03/02/2006	03/29/2006	28	6x12	28.27	193440	6840	Ch	☐	Gr	228%
	J	03/02/2006	03/29/2006	28	6x12	28.27	196130	6940	Sh	☐	Gr	231%

Reviewed By: J. Vishal

Concrete Laboratory Trial Batches
Compressive Strength Data Summary

Project: 2005 Commercial Concrete Mixes
Client: Los Alamos Transit Mix
Job No: 4-519-003279
Lab No: 4-1607

Date: 10/26/04
Amended: 05/02/2005
By: Vishal

3000 psi Exterior Lab Trials

Trial Mix ID:	Trl-1	Trl-2	Trl-3a	
Title:	w/c= 0.54	w/c= 0.45	w/c=0.33	
Batch Date:	10/23/2004	10/23/2004	10/23/2004	
3 Day Compressive Strength Data				
Test Date	10/26/2004	10/26/2004	10/26/2004	
Specimen 1, psi	1890	2734	3331	
Specimen 2, psi	1871	2690	3284	
Specimen 3, psi	1831	2762	3277	
Average, psi	1864	2729	3297	
7 Day Compressive Strength Data				
Test Date	10/30/2004	10/30/2004	10/30/2004	
Specimen 1, psi	2483	3384	3869	
Specimen 2, psi	2416	3175	3728	
Specimen 3, psi	2405	3047	3846	
Average, psi	2435	3202	3814	
14 Day Compressive Strength Data				
Test Date	11/06/2004	11/06/2004	11/06/2004	
Specimen 1, psi	2999	4041	4238	
Specimen 2, psi	2934	3887	4524	
Specimen 3, psi	2920	4045	4445	
Average, psi	2951	3991	4402	
28 Day Compressive Strength Data				
Test Date	11/20/2004	11/20/2004	11/20/2004	
Specimen 1, psi	3170	4550	4910	
Specimen 2, psi	3320	4650	4800	
Specimen 3, psi	3260	4530	4790	
Average, psi	3250	4577	4833	

Concrete Mix Design
Laboratory Trial Batches Summary

amec

Project: 2005 Commercial Concrete Mixes
Client: Los Alamos Transit Mix
Job No: 4-519-003279

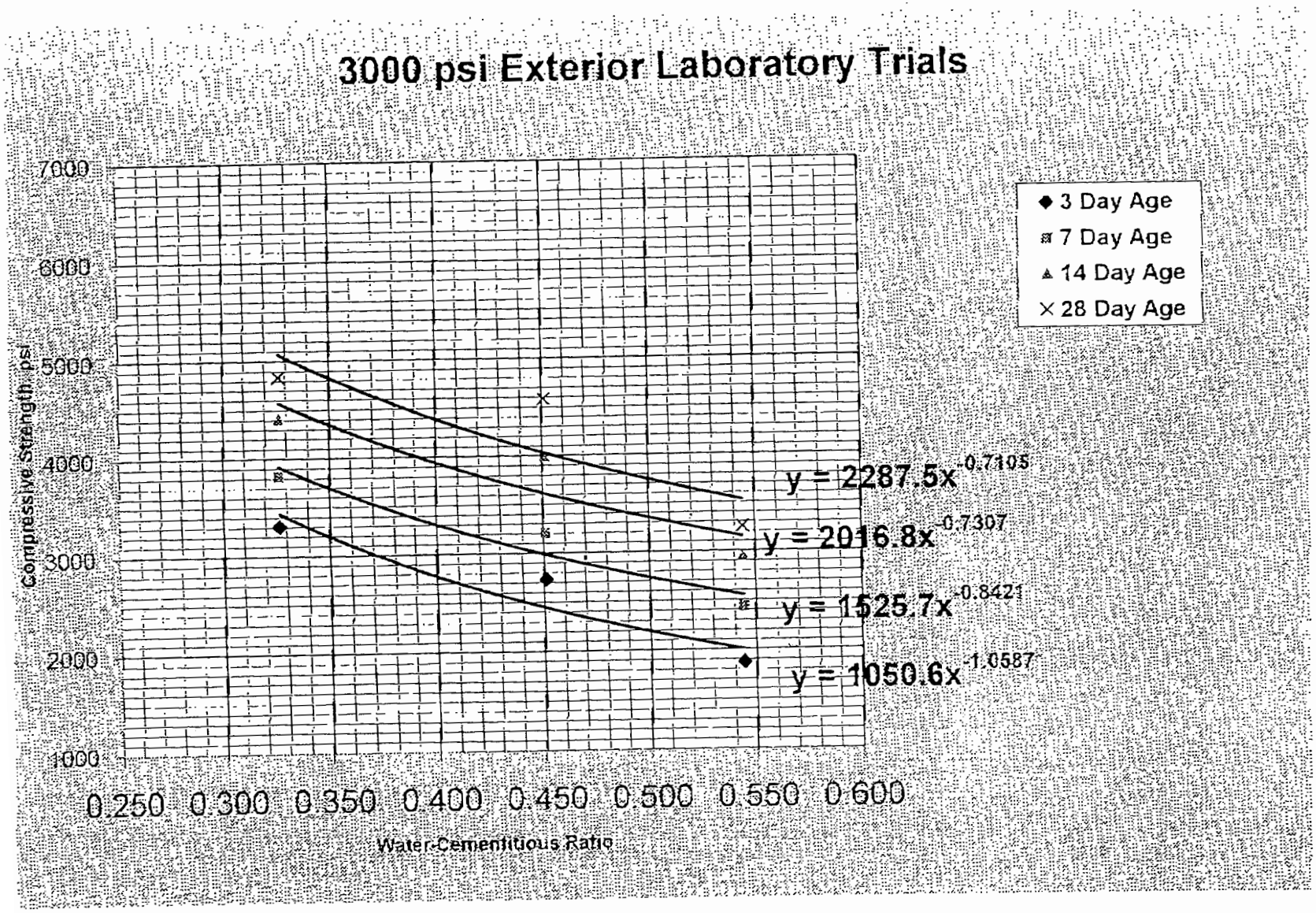
Lab Id: 4-1607
Date: 10/26/04
Amended: 05/02/05
By: Vishal

3000 psi Exterior Lab Trials	Trial Mix ID: / Title: / Batch Date:	Tri-1 w/c= 0.54 10/23/2004		Tri-2 w/c= 0.45 10/23/2004		Tri-3a w/c=0.33 10/23/2004	
Material Proportions per CY	Specific Gravity	Weight lbs (1)(2)	Volume cf	Weight lbs. (1)(2)	Volume cf	Weight lbs. (1)(2)	Volume cf.
Rio Grande Type I-II Cement, lbs.	3.15	407	2.0706	501	2.55	711	3.62
4 Corners Class F Fly Ash, lbs.	2.16	102	0.76	124	0.92	177	1.31
Water	1	277	4.44	282	4.52	290	4.65
EL-Guique Pit, WCS (SSD)	2.631	1328	8.09	1212	7.38	937	5.71
EL-Guique Pit, Sz#67 CA (SSD)	2.666	1649	9.91	1647	9.90	1661	9.98
Water Reducer, MB Polyheed-997, oz.	-	20.2		25.2		35.4	
Air-Entraining Agent, MB Micro-Air, oz.		5.3		6.0		9.0	
Air Content, % (5)	-	6.4	1.73	6.4	1.73	6.4	1.73
			27.00		27.00		27.00
Plastic Properties							
Slump, in. (4)		4.00		4.25		4.50	
Ambient Temperature, deg. F (4)		55		55		54	
Concrete Temperature, deg. F (4)		65		66		68	
Cementitious Content, pcy		509		625		888	
Fly Ash-to-Total Cementitious, % (3)		20.0		19.8		19.9	
Water/Cementitious Ratio (3)		0.544		0.45		0.33	
Fine-to-Total Aggregate, %(wt.) (3)		44.6		42.4		36.1	
Measured Air Content,% (4)		6.4		6.4		6.4	
Measured Unit Weight, pcf (4)		140.4		140.9		138.2	
Theoretical Unit Weight, pcf (2)(3)		139.4		139.5		139.9	
Target Air Content, %		6.0		6.0		6.0	
Chemical Analysis Results							
Total Sulfate Content(ppm)		64.8		24.2		29.3	
Total Soluble Chloride Ion Content(ppm)		14.8		9.6		14.1	
Compressive Strength, psi							
Standard Cured Specimens							
@ 3 days (6)(8)		1864		2729		3297	
@ 7 days (6)(8)		2435		3202		3814	
@ 14 days (6)(8)		2951		3991		4402	
@ 28 days (6)(8)		3250		4577		4833	

Notes: (1) units in lbs. unless stated otherwise (2) proportions based on measured air content
(3) as calculated (4) as measured (5) average of 2 specimens
(6) average of 3 specimens (7) 4X8 Cylinders (8) 6X12 Cylinders

2005 Commercial Concrete Mix Designs

Compressive Strength Curve



Los Alamos Transit Mix
AMEC Proj. 4-519-003279

amec

APPENDIX B

MATERIALS INFORMATION

AMEC Earth & Environmental, Inc.
8519 Jefferson NE
Albuquerque, NM 87113
Tel (505) 821-1801

REPORT of AGGREGATE PHYSICAL PROPERTIES

amec

Project: 2005 Commercial Concrete Mix Designs
Client: Los Alamos Transit Mix Co.
Material Tested: Size #67 Aggregate (3/4" Crushed)
Source: EL Guique
Product Code:
Specifications: ASTM C33, Size #67

Project No: 4-519-003279
Lab No.: 4-1548
Sample Date: 10/16/2004
Report Date: 10/28/2004 Amended: 04/18/2005
Reviewed by: J. Vishal

SIEVE ANALYSIS

ASTM C136 AASHTO T27

Sieve Size	Accum. % Passing	Specifications
300 mm (12")		
250 mm (10")		
225 mm (9")		
200 mm (8")		
150 mm (6")		
125 mm (5")		
100 mm (4")		
75.0 mm (3")		
63.0 mm (2-1/2")		
50.0 mm (2")		
37.5 mm (1-1/2")		
31.5 mm (1-1/4")		
25.0 mm (1")	100	100
19.0 mm (3/4")	100	90-100
12.5 mm (1/2")	55	
9.5 mm (3/8")	24	20-55
6.3 mm (1/4")		
4.75mm (No. 4)	3	0-10
2.36 mm (No. 8)	2	0-5
2.00 mm (No. 10)	2	
1.18mm (No.16)	2	
0.600 mm (No.30)	1	
0.425mm (No. 40)	1	
0.300mm (No. 50)	0	
0.180mm (No. 80)		
0.150mm (No.100)	1	
0.075mm (No. 200)	0.7	1.0 Max
ASTM C117 / AASHTO T11		
Soil Classification		
Moisture Content, %		
ASTM C566 AASHTO T255		
Fract. 1 Face, %	78.7	
Fract. 2 Face, %	70.0	
Fineness Modulus		
ASTM C136 AASHTO T27		

TEST RESULTS

Standard	PHYSICAL PROPERTIES		Results	Specification
ASTM C 29 AASHTO T 19	Unit Weight & Voids	Unit Weight lbs /cu ft=	102.3	
		Voids, %=	37.8	
		☐ Jigged ☐ Loose ☑ Rodded		
ASTM C 127 AASHTO T 85	Coarse Specific Gravity & Absorption	Bulk Specific Gravity (dry)=	2.641	
		Bulk Specific Gravity, SSD=	2.666	
		Apparent Specific Gravity=	2.709	
		Absorption, %=	1.0	
ASTM C 128 AASHTO T 84	Fine Specific Gravity & Absorption	Bulk Specific Gravity (dry)=		
		Bulk Specific Gravity, SSD=		
		Apparent Specific Gravity=		
		Absorption, %=		
ASTM D 2419 AASHTO T 176	Sand Equivalent	Sand Equivalent, %=		
ASTM D 4791	Flat & Elongated	Flat & Elongated, %=	7.7	
		Ratio=	3:1	
ASTM C 131 AASHTO T 96	L. A. Abrasion	Small Coarse Loss, %=	20.2	50 Max
		Grading/ Revs =	B/500	
ASTM C 535	L. A. Abrasion	Large Coarse Loss, %=		
		Grading/ Revs.=		
ASTM C 88 AASHTO T 104	Soundness	Coarse Soundness Loss, %=	1.4	18 Max
		Magnesium No. of Cycles=	5	
		Fine Soundness Loss, %=		
		Magnesium No. of Cycles=		
ASTM C 142 AASHTO T 112	Clay/Friable Particles	Coarse Aggregate, %=	0.2	3.0 Max
		Fine Aggregate, %=		
ASTM 2974 AASHTO T267	Organic Matter	Organic Matter % =		
		Ash Content % =:		
ASTM C 123 AASHTO T 113	Lightweight Pieces	Coarse Aggregate, %=	0.0	0.5 Max
		Fine Aggregate, %=		
ASTM C 1252 AASHTO T 304	Fine Aggregate Angularity	Uncompacted Voids, %=		
		Method C (as received material)		
ASTM D1557 AASHTO T180	Compaction Modified Efforts	Optimum Moisture, %=		
		Max. Density, lbs./cu.ft =		
ASTM D 4318 AASHTO T 89/90	Liquid Limit, Plastic Limit & Plasticity Index	Liquid Limit=		
		Plastic Limit=		
		Plasticity Index=		

REPORT of AGGREGATE PHYSICAL PROPERTIES

amec

Project: 2005 Commercial Concrete Mix Designs
Client: Los Alamos Transit Mix Co.
Material Tested: Washed Concrete Sand
Source: EL Guique
Product Code:
Specifications: ASTM C33, Fine Aggregate

Project No: 4-519-003279
Lab No.: 4-1549
Sample Date: 10/16/2004
Report Date: 10/28/2004 Amended: 04/18/2005
Reviewed by: J. Vishal

SIEVE ANALYSIS

ASTM C136 AASHTO T27

Sieve Size	Accum. % Passing	Specifications
300 mm (12")		
250 mm (10")		
225 mm (9")		
200 mm (8")		
150 mm (6")		
125 mm (5")		
100 mm (4")		
75.0 mm (3")		
63.0 mm (2-1/2")		
50.0 mm (2")		
37.5 mm (1-1/2")		
31.5 mm (1-1/4")		
25.0 mm (1")		
19.0 mm (3/4")		
12.5 mm (1/2")		
9.5 mm (3/8")	100	100
6.3 mm (1/4")		
4.75mm (No. 4)	96	95-100
2.36 mm (No. 8)	81	80-100
2.00 mm (No. 10)	78	
1.18mm (No 16)	68	50-85
0.600 mm (No.30)	52	25-60
0.425mm (No. 40)	40	
0.300mm (No. 50)	24	5-30
0.180mm (No. 80)		
0.150mm (No.100)	6	0-10
0.075mm (No. 200)	2.6	0-3.0
ASTM C117 / AASHTO T11		
Soil Classification		
Moisture Content, %		
ASTM C566 AASHTO T255		
Fract. 1 Face, %		
Fract. 2 Face, %		
Fineness Modulus	2.72	2.3-3.1
ASTM C136 AASHTO T27		

TEST RESULTS

Standard	PHYSICAL PROPERTIES		Results	Specification
ASTM C 29	Unit Weight	Unit Weight, lbs./cu ft=		
AASHTO T 19	& Voids	Voids, %=		
		☐ Jigged ☐ Loose ☐ Rodded		
	Coarse	Bulk Specific Gravity (dry)=		
ASTM C 127	Specific	Bulk Specific Gravity, SSD=		
AASHTO T 85	Gravity &	Apparent Specific Gravity=		
	Absorption	Absorption, %=		
	Fine	Bulk Specific Gravity (dry)=	2.604	
ASTM C 128	Specific	Bulk Specific Gravity, SSD=	2.631	
AASHTO T 84	Gravity &	Apparent Specific Gravity=	2.675	
	Absorption	Absorption, %=	1.0	
ASTM D 2419	Sand	Sand Equivalent, %=	83	
AASHTO T 176	Equivalent			
ASTM D 4791	Flat &	Flat & Elongated, %=		
	Elongated	Ratio=		
ASTM C 131	L. A.	Small Coarse Loss, %=		
AASHTO T 96	Abrasion	Grading/ Revs.=		
ASTM C 535	L. A.	Large Coarse Loss, %=		
	Abrasion	Grading/ Revs.=		
	Soundness	Coarse Soundness Loss, %=		
ASTM C 88		Magnesium No. of Cycles=		
AASHTO T 104	Soundness	Fine Soundness Loss, %=	3.2	15 Max
		Magnesium No. of Cycles=	5	
ASTM C 142	Clay/Friable	Coarse Aggregate, %=		
AASHTO T 112	Particles	Fine Aggregate, %=	0.1	3.0 Max
ASTM C40	Organic	Organic Impurities =	LTS	LTS
AASHTO T21	Impurities			
ASTM C 123	Lightweight	Coarse Aggregate, %=		
AASHTO T 113	Pieces	Fine Aggregate, %=	0.1	0.5 Max
ASTM C 1252	Fine Aggregate	Uncompacted Voids,%=		
AASHTO T 304	Angularity	Method C (as received material)		
ASTM D1557	Compaction	Optimum Moisture, %=		
AASHTO T180	Modified Efforts	Max. Density, lbs./cu ft =		
ASTM D 4318	Liquid Limit,	Liquid Limit=	NV	
AASHTO T 89/90	Plastic Limit &	Plastic Limit=	NV	
	Plasticity Index	Plasticity Index=	NP	

GCC
Rio Grande

November 8, 2004

Los Alamos Transit Mix
P. O. Box 38
Española, NM 87532

COMPLIANCE AFFIDAVIT

Portland Cement, Type I-II LA, as manufactured by GCC RIO GRANDE, at Tijeras, New Mexico is warranted to conform at the time of shipment to current ASTM Specification C-150.

No other warranty is made or to be implied.

Sincerely,

Lydia Plant
Administrative Operations

GCC
Rio Grande

SILO TEST CERTIFICATE

AVERAGE OF TEST RESULTS

TIJERAS PLANT TIJERAS, NEW MEXICO, U.S.A.

CONSIGNEE:

MILL TEST NO: AVG

DATE: 18-Oct-04

A S T M DESIGNATION: C150-04

PORTLAND CEMENT--TYPE: HI LOW ALKALI
AVERAGE 9/01/2004 TO 9/30/2004

CHEMICAL COMPOSITION:	SILICON DIOXIDE (SIO2)		21.1
	ALUMINUM OXIDE (AL2O3)		4.0
	FERRIC OXIDE (FE2O3)		2.9
	CALCIUM OXIDE (CAO)		63.3
	MAGNESIUM OXIDE (MGO)		3.1
	SULFUR TRIOXIDE (SO3)		3.0
	SODIUM OXIDE (NA2O)		0.20
	POTASSIUM OXIDE (K2O)		0.52
	LOSS ON IGNITION		1.97
	INSOLUBLE RESIDUE		0.23
	TRICALCIUM SILICATE (C3S)		58
	DICALCIUM SILICATE (C2S)		17
	TRICALCIUM ALUMINATE (C3A)		5.6
	TETRACALCIUM ALUMINOFERRITE (C4AF)		9
	ALKALIES (NA2O EQUIVALENT)		0.54
SPECIFIC SURFACE:	BLAINE, SQ M PER KILOGRAM		355
	-325 MESH FINENESS		94.1
SOUNDNESS:	AUTOCLAVE EXPANSION		0.02
TIME OF SETTING:	VICAT, INITIAL SET	125 MIN	
	VICAT, FINAL SET	252 MIN	
LIMESTONE ADDITION	% CO2		0.62
	% LIMESTONE		1.26
	% CaCO3 In LIMESTONE		95.4

COMPRESSIVE STRENGTH TESTS:	1 DAY	1698	P.S.I.	11.71	MPa
	3 DAY	3312	P.S.I.	22.84	MPa
	7 DAY	4232	P.S.I.	29.18	MPa

AIR CONTENT: PERCENT BY VOLUME 7.7

RIO GRANDE PORTLAND CEMENT IS WARRANTED TO CONFORM AT THE TIME OF SHIPMENT WITH THE SPECIFICATION DESIGNATED ABOVE. NO OTHER WARRANTY IS MADE OR IMPLIED. HAVING NO CONTROL OVER THE USE OF ITS CEMENTS, RIO GRANDE PORTLAND DOES NOT GUARANTEE FINISHED WORK.

TIJERAS PLANT

BY R. Chavez

QUALITY CONTROL SUPERINTENDANT

SRMG
Salt River Materials Group

PHOENIX CEMENT

Phoenix Cement Company
8800 E Chapparral Rd
Scottsdale Az 85250

Corporate Headquarters
8800 E Chaparral Rd, Ste 155
Scottsdale, AZ 85250
Phone: 480-850-3757
Fax: 480-850-3758

Cement Manufacturing
3000 W Cement Plant Rd
Clarkdale, AZ 86324
Phone: 928-634-2261
Fax: 928-634-3543

Phoenix Transfer Facility
1941 W Lower Buckeye Rd
Phoenix, AZ 85009
Phone: 602-258-7798
Fax: 602-525-3362

21st Avenue Facility
1325 N 21st Avenue
Phoenix, AZ 85009
Phone: 602-254-3824
Fax: 602-254-3825

Mesa Community Storage
Dobson & McKellips
Mesa, AZ 85211
Phone: 480-990-7847

Cholla Fly Ash Facility
P O Box 380
Joseph City, AZ 86032
Phone: 928-288-1661
Fax: 928-288-1663

Four Corners Fly Ash Facility
P O Box 1007
Fruitland, NM 87416
Phone: 505-598-8657
Fax: 505-598-8633

San Juan Fly Ash Facility
San Juan Generating Station
Waterflow, NM 87421
Phone: 505-598-7546
Fax: 505-598-7547

Escalante Fly Ash Facility
CR19 / P O Box 620
Prewitt, NM 87405
Phone: 505-285-4590
Fax: 505-285-4667

Gallup Fly Ash Facility
900 1/4 N 9th St
Gallup, NM 87305

Product: Class F Fly Ash, Four Corners Fly Ash
ASTM C 618-01

9-09-04

FLY ASH TEST REPORT

Cert: 21071

Lot: 5622	Results	Specifications
Chemical Analysis		
Silicon Dioxide, SiO_2	61.73 %	—
Aluminum Oxide, Al_2O_3	25.96 %	—
Ferric Oxide, Fe_2O_3	4.42 %	—
$SiO_2+Al_2O_3+Fe_2O_3$	92.11 %	70.00 Min
Calcium Oxide, CaO	1.88 %	—
Magnesium Oxide, MgO	1.02 %	—
Sulfur Trioxide, SO_3	0.20 %	5.00 Max
Moisture Content	0.06 %	3.00 Max
Loss on Ignition	0.38 %	5.00 Max
Available Alkalis as Na_2O	0.41 %	1.50 Max
Sodium Oxide, Na_2O	1.17 %	—
Potassium Oxide, K_2O	1.14 %	—
R Factor	-0.71 %	—
Physical Analysis		
Fineness, amount retained on #325 sieve, %	17.20	34.00 Max
variation, points from average	2.59	5.00 Max
Density, g/cm³	2.16	—
Variation from average, %	0.10	5.00 Max
Strength Activity Index with Portland Cement		
at 7 days, % of cement control	82.81	—
at 28 days, % of cement control	90.39	75.00 Min
Water Requirement % of cement control	95.87	105.00 Max
Soundness, autoclave expansion or contraction, %	-0.04	0.80 Max

All tests have been made in strict accordance with the current standards of the American Society for Testing and Materials covering the type of material specified.

Lee Gorby, Quality Assurance Manager
18 OCT 2004

SRMG
Salt River Materials Group
Phoenix Cement Company • Salt River Sand & Rock
Aggregates • Construction • Fly Ash • Phoenix Cement™

October 18, 2004

Peter Cantrup
Los Alamos Transit Mix
PO Box 38
Espanola NM 87532

RE: Class F Fly Ash from the Four Corners Power Plant in Fruitland, New Mexico

This letter serves as certification that all Four Corners Fly Ash (pozzolan) sold by Phoenix Cement Company to Los Alamos Transit Mix at the above referenced Project meets the requirements of the latest revision of ASTM Specification C618 for Class F Fly Ash (pozzolan).

We appreciate your interest in our product. If we can provide additional information or technical assistance, please contact us.

Respectfully,

Lee Gorby

Lee Gorby
Quality Assurance Manager

degussa.

Construction Chemicals

Master Builders, Inc.
23700 Chagrin Boulevard
Cleveland, OH 44122-5554

Phone 216-839-7500

October 19, 2004

Certificate of Conformance
PolyHeed 997
Master Builders Admixture for Concrete

TO WHOM IT MAY CONCERN:

I, Alice McFarland, Manager, Quality Assurance for Degussa Construction Chemicals and Degussa Admixtures, Inc., Cleveland, Ohio, certify:

That no calcium chloride or chloride based ingredient is used in the manufacture of PolyHeed 997; and

That PolyHeed 997, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.00012 percent (1.2 ppm) chloride ions by weight of the cement when used at the rate of 65 ml per 100 kg (1 fluid ounce per 100 pounds) of cement; and

That PolyHeed 997 meets the requirements for a Type A, Water-Reducing Admixture specified in ASTM C 494-99, Corps of Engineers' CRD-C 87-93, and AASHTO M194-00, the Standard Specifications for Chemical Admixtures for Concrete.

Alice McFarland

Alice McFarland

Manager, Quality Assurance
Degussa Construction Chemicals

degussa.
Construction Chemicals

POLYHEED® 997

Superior pumping/finishing admixture

Applications

Recommended for use in:

- Conventionally placed concrete mixes containing a wide range of cements, granulated slags, Class C and F fly ashes, silica fume and aggregates
- Reinforced, precast, prestressed, lightweight or normal weight concrete and pumped concrete
- Residential/commercial flatwork and formed surfaces

Description

PolyHeed 997 is a patented multi-component, non-chloride, mid-range water-reducing admixture. PolyHeed 997 admixture meets ASTM C 494 requirements for Type A, water-reducing, and Type F, high-range water-reducing admixtures.

Features

- True mid-range water reduction (5-15%) and excellent performance across a wide concrete slump range, especially the difficult slump range of 5-8 inches (125-200 mm)
- Superior workability, pumpability and finishability qualities even in concrete mixes containing low amounts of cementitious materials
- Compressive and flexural strength performance increased at all ages
- Strength performance comparable to chloride-bearing, water-reducing admixtures at all ages
- Improved concrete durability to damage from freezing and thawing
- Superior finishing characteristics for residential/commercial flatwork and formed surfaces

Benefits

- Significantly reduced placement and finishing time resulting in lower in-place concrete costs
- Increased service life of concrete structures

Performance Characteristics

MIXTURE DATA

500 lb of Type I cement per cubic yard (295 kg/m³); slump, 6-7 inches (150-180 mm); 5-6% air; concrete temperature 70 °F (21 °C); ambient temperature, 70 °F (21 ° C).

SETTING TIME PERFORMANCE[1]

INITIAL SET MIXTURE	h:min	DIFFERENCE h:min
PLAIN	6:01	—
PolyHeed 997		
5 fl oz/cwt (325 mL/100 kg)	6:22	+0:21
10 fl oz/cwt (650 mL/100 kg)	6:57	+0:56
15 fl oz/cwt (980 mL/100 kg)	7:31	+1:30

COMPRESSIVE STRENGTH PERFORMANCE

MIXTURE	7 DAY psi	7 DAY MPa	7 DAY %	28 DAY psi	28 DAY MPa	28 DAY %
PLAIN	2360	16.3	100	3320	22.9	100
PolyHeed 997						
5 fl oz/cwt (325 mL/100 kg)	3060	21.1	129	3930	27.1	118
10 fl oz/cwt (650 mL/100 kg)	3740	25.8	158	4610	31.8	136
15 fl oz/cwt (980 mL/100 kg)	4620	31.9	196	5460	37.7	165

[1]Note: The data shown are based on controlled laboratory tests. Reasonable variations from the results shown here may be experienced as a result of differences in concrete making materials and jobsite conditions.

Guidelines for Use

DOSAGE

PolyHeed 997 admixture has a recommended dosage range of 3-15 fl oz /100 lb (195-975 mL/100 kg) of cementitious material for most concrete mixes.

As the dosage of PolyHeed 997 admixture increases to 15 fl oz/100 lb (975 mL/100 kg) of cementitious materials, normal concrete setting time characteristics are maintained and early and ultimate compressive strengths increase.

Master Builders does not recommend the use of dosages outside the recommended range without trial testing. Consult your local Master Builders sales representative for assistance in determining the dosage for optimum performance.

Recommendations

CORROSIVITY

NON-CHLORIDE, NON-CORROSIVE

PolyHeed® 997 admixture will neither initiate nor promote corrosion of reinforcing steel in concrete. PolyHeed 997 admixture does not contain intentionally added calcium chloride or chloride-based ingredients.

COMPATIBILITY

PolyHeed 997 admixture may be used in combination with any Master Builders admixtures and may be used in all colored and architectural concrete. When used in conjunction with other admixtures, each admixture must be dispensed separately into the mix.

TEMPERATURE

If PolyHeed 997 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation.

Do not use pressurized air for agitation.

SHELF LIFE

PolyHeed 997 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your Master Builders representative regarding suitability for use and dosage recommendations if the shelf life of PolyHeed 997 admixture has been exceeded.

Packaging

PolyHeed 997 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Material Data Safety Sheet — PolyHeed 997

Additional Information

For additional information on PolyHeed 997 admixture or on its use in developing a concrete mixture with special performance characteristics, contact your Master Builders representative.

MASTER BUILDERS, INC.

United States
23700 Chagrin Boulevard
Cleveland, Ohio 44122-5554
Phone 800.MBT.9990
Fax 216.839.8821

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Fax 905.792.0651

www.masterbuilders.com

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degussa.

Construction Chemicals

Master Builders, Inc.
23700 Chagrin Boulevard
Cleveland, OH 44122-5554

Phone 216·839·7500

October 19, 2004

Certificate of Conformance
Micro-Air
Master Builders Air-Entraining Admixture for Concrete

TO WHOM IT MAY CONCERN:

I, Alice McFarland, Manager, Quality Assurance for Degussa Construction Chemicals and Degussa Admixtures, Inc., Cleveland, Ohio, certify:

That Micro-Air is Master Builders air-entraining admixture for concrete; and

That no calcium chloride or chloride based ingredient is used in the manufacture of Micro-Air; and

That Micro-Air, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.0001 percent (1.0 ppm) chloride ions by weight of the cement when used at the rate of 65 ml per 100 kg (1 fluid ounce per 100 pounds) of cement; and

That Micro-Air meets the requirements of ASTM C 260-01, Corps of Engineers CRD-C 13-97, and AASHTO M154-00, the Standard Specifications for Air-Entraining Admixtures for Concrete.

Alice McFarland

Alice McFarland

Manager, Quality Assurance
Degussa Construction Chemicals

degussa.
Construction Chemicals

MICRO AIR®

Superior admixture for freeze/thaw durability

Applications

Recommended for use in:

- Concrete exposed to freeze/thaw cycles
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Description

Micro Air air-entraining admixture provides concrete with extra protection by creating ultrastable air bubbles that are strong, small and closely spaced — a characteristic especially useful in the types of concrete known for their difficulty to entrain and maintain the air content desired.

Even when used at a lower dosage rate than standard air-entraining admixtures, Micro Air meets the requirements of ASTM C 260, AASHTO M 154, CRD-C 13 and other Federal and State specifications.

Features

- Ready-to-use — in the proper concentration for rapid, accurate dispensing
- Greatly improved stability of air-entrainment
- Ultra-stable air bubbles

Benefits

- Increased resistance to damage from freezing and thawing
- Increased resistance to scaling from deicing salts
- Improved plasticity and workability
- Improved air-void system in hardened concrete
- Improved ability to entrain and retain air in low-slump concrete; concrete containing high-carbon content fly ash, concrete using large amounts of fine materials; concrete using high-alkali cements; high-temperature concrete; and concrete with extended mixing times
- Reduced permeability — increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freeze/thaw cycles and deicing salts results from: proper air content in the hardened concrete; a suitable air-void system in terms of bubble size and spacing and adequate concrete strength, assuming the use of sound aggregates and proper mixing, placing, handling and curing techniques.

When unusually low or high amounts of an air-entraining admixture are required to achieve normal ranges of air content or if the required amount of air-entraining admixture necessary to achieve required levels of air content is observed to change significantly under given conditions, the reason should be investigated. In such cases, it is especially important to determine: (a) that a proper amount of air is contained in the fresh concrete at the point of placement and (b) that a suitable air-void system (spacing factor) is being obtained in the hardened concrete.

AIR CONTENT DETERMINATION

The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, "Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method" or ASTM C 173, "Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method." The air content of lightweight concrete should only be determined using the Volumetric Method.

The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138, "Unit Weight, Yield, and Air Content (Gravimetric) of Concrete." If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1½%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

Guidelines for Use

DOSAGE

There is no standard dosage rate for Micro Air® admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete is not predictable because of differences in concrete making materials. Typical factors which might influence the amount of air entrained are: temperature, cement, sand grading, mix proportions, slump, means of conveying and placement, use of extra fine materials such as fly ash, etc.

The amount of Micro Air admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mix, use 1/8-1 1/2 fl oz/cwt (8-98 mL/100 kg) of cement. In mixes containing water-reducing, set-controlling admixtures, the amount of Micro Air admixture needed is somewhat less than the amount required in plain concrete. In mixes requiring a higher or lower dosage to obtain the desired air content, consult your local Master Builders representative.

MIXING

Add Micro Air admixture to the concrete mix using a dispenser designed for air-entraining admixtures; or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

Measure the air content of the trial mix and either increase or decrease the quantity of Micro Air admixture to obtain the desired air content in the production mix. Check the air content of the first batch and make further adjustments if needed. Due to possible changes in the factors that affect the dosage rate of Micro Air admixture, frequent checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air in the mix at the point of placement.

APPLYING

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate or with the initial batch water. When using lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Recommendations

CORROSIVITY

NON-CHLORIDE, NON-CORROSIVE

Micro Air admixture will not initiate or promote corrosion of reinforcing steel embedded in concrete, prestressed concrete or concrete placed on galvanized steel floor and roof systems. Calcium chloride is not an added ingredient in the manufacture of this admixture.

COMPATIBILITY

Micro Air admixture may be used in combination with any Master Builders admixtures. When used in conjunction with other admixtures, each admixture must be dispensed separately into the mix.

TEMPERATURE

Micro Air admixture should be stored and dispensed at 35 °F (2 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If it freezes, thaw and reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

SHELF LIFE

Micro Air admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your Master Builders representative regarding suitability for use and dosage recommendations if the shelf life of Micro Air admixture has been exceeded.

SAFETY

Micro Air admixture is a caustic solution. Chemical goggles and gloves are recommended if transferring or handling large quantities of material. (See MSDS and/or product label for complete information.)

Packaging

Micro Air admixture is supplied in 55 gal (208 L) drums, 275 gal (1018 L) totes and bulk delivery.

Related Documents

Material Safety Data Sheet — Micro Air admixture

Additional Information

For suggested specification information or for additional product data on Micro Air admixture, contact your Master Builders representative.

MASTER BUILDERS, INC.

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www.masterbuilders.com

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Guidelines for Use

DOSAGE

There is no standard dosage rate for Micro Air® admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete is not predictable because of differences in concrete making materials. Typical factors which might influence the amount of air entrained are: temperature, cement, sand grading, mix proportions, slump, means of conveying and placement, use of extra fine materials such as fly ash, etc.

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Add Micro Air admixture to the concrete mix using a dispenser designed for air-entraining admixtures; or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

Measure the air content of the trial mix and either increase or decrease the quantity of Micro Air admixture to obtain the desired air content in the production mix. Check the air content of the first batch and make further adjustments if needed. Due to possible changes in the factors that affect the dosage rate of Micro Air admixture, frequent checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air in the mix at the point of placement.

APPLYING

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate or with the initial batch water. When using lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Recommendations

CORROSIVITY

NON-CHLORIDE, NON-CORROSIVE

Micro Air admixture will not initiate or promote corrosion of reinforcing steel embedded in concrete, prestressed concrete or concrete placed on galvanized steel floor and roof systems. Calcium chloride is not an added ingredient in the manufacture of this admixture.

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Related Documents

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Additional Information

For suggested specification information or for additional product data on Micro Air admixture, contact your Master Builders representative.

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amec

October 10, 2005
AMEC Project No. 4-519-003279

Los Alamos Transit Mix Co.
P.O.Box 747
Los Alamos NM-87544

Attn: Ignacio Lucero/Lonnie Trujillo

Re: Exterior Site Concrete with compressive strength, f'_c: 4000 psi @ 28-days for 2005 Commercial Air-Entrained Concrete Mix Designs for
Espanola Transit Mix
Los Alamos Transit Mix
Cuba Redi Mix
Mix ID:44

In accordance with your request, AMEC has performed laboratory trial mixes from October 23, 2004 through November 24, 2004 to establish a basis for recommended proportions for an exterior concrete mix with 28-day minimum specified compressive strength of 4,000 psi.

The trials were performed following the requirements and methods of Chapters 4 and 5 of the American Concrete Institute's Building Code requirements for Structural Concrete, ACI 318-02 and ACI 211.1-91, Standard Practice for Selecting Proportions for Normal Heavyweight, and Mass Concrete. Strength data at varying water/cementitious ratios is shown for the individual trial mixes and collectively on the attached graph in Appendix A. The final recommended mix has been established from the laboratory data using the Absolute Volume Method of ACI 211.1-91.

The laboratory trials were based on a slump requirement of 4 inches that correlate to a dosage of 5 oz/cwt of Master Builders' Polyheed 997 Water Reducing Admixture. However, based on technical advice from Master Builders, in order to achieve a slump of 6 inches, the target dosage of Polyheed 997 should be increased to 7 oz/cwt. This is based on the general experience that for every 2 oz/cwt increase in the dosage of Polyheed 997 there is a slump gain of approximately 2 inches. Temperature and slump variations may require adjustment in the final required dosage of Polyheed 997 to attain the required slump. Also, the increase in dosage of Polyheed 997 does not adversely affect any of the key characteristics of the concrete mix. Hence there is no need for additional trials.

The strength adequacy of the proposed mix is based upon a 1,200 psi over-design above the minimum specified strength in accordance with Chapter 5 of ACI 318-02. The durability adequacy is based on the requirements for moderate exposure conditions per Section 4.2.1 of ACI 318-02 and for concrete intended to have low permeability when exposed to water per Section 4.2.2 of ACI 318-02.

AMEC Earth & Environmental, Inc.
8519 Jefferson NE
Albuquerque, NM 87113

2005 Commercial Concrete Mixes
AMEC Proj. 4-519-003279

amec

Proportions and properties for the recommended mix design follow this letter. Data for the aggregates, cement, fly ash and admixtures is contained in Appendix B.

Thank you for this opportunity to serve you. If there should be any questions, please feel free to call at (505) 821-1801.

Respectfully submitted,
AMEC Earth & Environmental Inc.

J. Vishal

Vishal Jakkaraju
EIT
Attachments

Reviewed by,

KENNETH W. WYLIE NEW MEXICO 10/10/05 REGISTERED PROFESSIONAL ENGINEER

Kenneth W. Wylie, P.E.
Manager of Materials Engineering

AMEC Earth & Environmental, Inc.
8519 Jefferson NE
Albuquerque, NM 87113

2005 Commercial Concrete Mixes
AMEC Proj. 4-519-003279

2005
Commercial Air-Entrained
CONCRETE MIX DESIGN PROPORTIONS
4000 psi Exterior Site Concrete

English Units

AMEC Earth & Environmental, Inc.
8519 Jefferson NE
Albuquerque, NM 87113

Concrete Mix Design
Proportions - English Units

amec

Project: 2005 Commercial Concrete Mixes

Job No: 4-519-003279

Date: 12/07/2004

Supplier: Los Alamos Transit Mix

Amend Date: 10/10/2005

Mix Code: 44

Mix Description: Exterior Concrete:4000psi @ 28 -days with 1200 psi over-design.

Mix Proportions per Cubic Yard

Material	Weight	Specific Gravity	Volume
GCC Rio Grande, Tijeras Type I-II Cement	656 lbs.	3.15	3.34 cf
Salt River Materials, 4-Corners Class F, Fly Ash	164 lbs.	2.16	1.22 cf
Water	295 lbs.	1	4.73 cf
	35 gal.		
EL Guique, Washed Concrete Sand (SSD)	1079 lbs.	2.631	6.57 cf
EL Guique, Sz#67 Coarse Aggregate (SSD)	1630 lbs.	2.666	9.80 cf
Water Reducer, MB Polyheed 997	57.4 oz. (1)	-	-
MB Micro Air, Air Entraining Agent	8.2 oz. (2)		-
Air	5.0 %		1.35 cf
Totals	3824 lbs.		27.00 cf

Anticipated Plastic Properties

		Specification(4)
Slump (ASTM C 143)	6.00 in.	6.0 in. max
Unit Weight (ASTM C 138)	141.6 pcf	
Air Content (ASTM C 231)	5.0 %	4%-7%

Mix Characteristics

Cement Content @ Air Content of 5.0%	656 lbs.	
Total Cementitious Content	820 lbs.	
Fly-Ash/Cementitious Content	20.0 %	
Water/Cementitious Ratio	0.36	0.5 max
Fine-to-Total Aggregate	39.8 %	

Anticipated Compressive Strength
(ASTM C 31 & C 39)

@ 3 days	3352 psi(3)		
@ 7 days	4033 psi(3)		
@ 14 days	4739 psi(3)	f'c=	4000 psi
@ 28 days	5471 psi(3)	f'cr=	5200 psi

(1) Temperature and slump variations may require adjustments in dosage within the range of 24.6 fl oz/cy to 57.4 fl oz/cy

(2) Temperature and slump variations may require adjustments in dosage within the range of 1.025 fl oz/cy to 12.3 fl oz/cy

(3) From lab trial batch data confroming to ACI 318-99 5.3.3.2.

APPENDIX A

TRIAL MIX DATA

Concrete Mix Design
Laboratory Trial Batches Summary

amec

Project: 2005 Commercial Concrete Mixes
Client: Los Alamos Transit Mix
Job No: 4-519-003279

Lab Id: 4-1607
Date: 10/26/04
Amended: 04/18/05
By: Vishal

	Trial Mix ID:	Trl-1		Trl-2		Trl-3a		Trl-3c	
	Title:	w/c=0.54		w/c=0.45		w/c=0.33		w/c=0.32	
	Batch Date:	10/23/2004		10/23/2004		10/23/2004		11/24/2004	
Material Proportions per CY	Specific Gravity	Weight lbs. (1) (2)	Volume cf.	Weight lbs. (1) (2)	Volume cf.	Weight lbs. (1) (2)	Volume cf.	Weight lbs. (1) (2)	Volume cf.
Rio Grande Type I-II Cement, lbs.	3.15	407	2.0706	501	2.55	711	3.62	736	3.74
4 Corners Class F Fly Ash, lbs.	2.16	102	0.76	124	0.92	177	1.31	184	1.37
Water	1	277	4.44	282	4.52	290	4.65	293	4.70
EL-Guique Pit, WCS (SSD)	2.631	1328	8.09	1212	7.38	937	5.71	959	5.84
EL-Guique Pit, Sz#67 CA (SSD)	2.666	1649	9.91	1647	9.90	1661	9.98	1631	9.80
Water Reducer, MB Polyheed-997, oz.	-	20.2		25.2		35.4		50.0	
Air-Entraining Agent, MB Micro-Air, oz.		5.3		6.0		9.0		10.0	
Air Content, % (5)	-	6.4	1.73	6.4	1.73	6.4	1.73	5.7	1.54
			27.00		27.00		27.00		26.99
Plastic Properties									
Slump, in. (4)		4.00		4.25		4.50		3.50	
Ambient Temperature, deg. F (4)		55		55		54		59	
Concrete Temperature, deg. F (4)		65		66		68		66	
Cementitious Content, pcy		509		625		888		920	
Fly Ash-to-Total Cementitious, % (3)		20.0		19.8		19.9		20.0	
Water/Cementitious Ratio (3)		0.544		0.45		0.33		0.32	
Fine-to-Total Aggregate, %(wt.) (3)		44.6		42.4		36.1		37.0	
Measured Air Content,% (4)		6.4		6.4		6.4		5.7	
Measured Unit Weight, pcf (4)		140.4		146.9		138.2		141.2	
Theoretical Unit Weight, pcf (2) (3)		139.4		139.5		139.9		140.9	
Target Air Content, %		6.0		6.0		6.0		6.0	
Chemical Analysis Results									
Total Sulfate Content(ppm)		64.8		24.2		29.3		21.6	
Total Soluble Chloride Ion Content(ppm)		14.8		9.6		14		16	
Compressive Strength, psi									
Standard Cured Specimens									
@ 3 days (5)(6)		1864		2729		3297		3810	
@ 7 days (5)(6)		2435		3202		3814		4600	
@ 14 days (5)(6)		2951		3991		4402		5267	
@ 28 days (5)(6)		3250		4577		4833		6120	

Notes: (1) units in lbs. unless stated otherwise (2) proportions based on measured air content
(3) as calculated (4) as measured (5) average of 2 specimens
(6) average of 3 specimens (7) 4X8 Cylinders (8) 6X12 Cylinders

Concrete Laboratory Trial Batches
Compressive Strength Data Summary

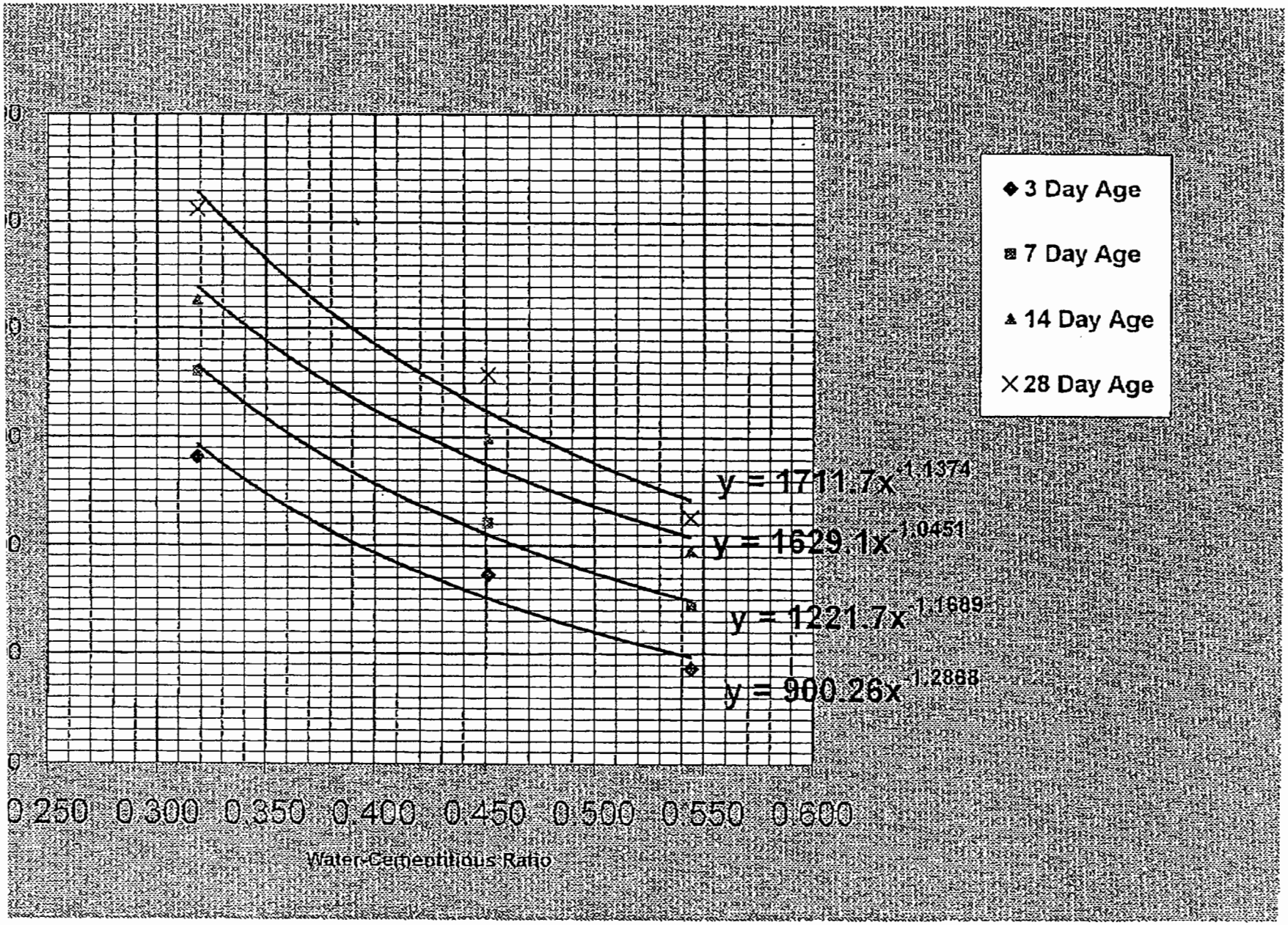
Project: 2005 Commercial Concrete Mixes
Client: Los Alamos Transit Mix
Job No: 4-519-003279
Lab No: 4-1607

Date: 10/26/04
Amended: 04/18/2005
By: Vishal

Trial Mix ID:	Trl-1	Trl-2	Trl-3a	Trl-3c
Title:	w/c= 0.54	w/c= 0.45	w/c=0.33	w/c=0.32
Batch Date:	10/23/2004	10/23/2004	10/23/2004	11/24/2004
3 Day Compressive Strength Data				
Test Date	10/26/2004	10/26/2004	10/26/2004	11/27/2004
Specimen 1, psi	1890	2734	3331	3840
Specimen 2, psi	1871	2690	3284	3800
Specimen 3, psi	1831	2762	3277	3790
Average, psi	1864	2729	3297	3810
7 Day Compressive Strength Data				
Test Date	10/30/2004	10/30/2004	10/30/2004	12/01/2004
Specimen 1, psi	2483	3384	3869	4560
Specimen 2, psi	2416	3175	3728	4680
Specimen 3, psi	2405	3047	3846	4560
Average, psi	2435	3202	3814	4600
14 Day Compressive Strength Data				
Test Date	11/06/2004	11/06/2004	11/06/2004	12/08/2004
Specimen 1, psi	2999	4041	4238	5370
Specimen 2, psi	2934	3887	4524	5280
Specimen 3, psi	2920	4045	4445	5150
Average, psi	2951	3991	4402	5267
28 Day Compressive Strength Data				
Test Date	11/20/2004	11/20/2004	11/20/2004	12/22/2004
Specimen 1, psi	3170	4550	4910	6020
Specimen 2, psi	3320	4650	4800	6080
Specimen 3, psi	3260	4530	4790	6260
Average, psi	3250	4577	4833	6120

pressive Strength Curve

2005 Commercial Concrete Mix Designs



APPENDIX B

MATERIALS INFORMATION

REPORT of AGGREGATE PHYSICAL PROPERTIES

amec

Project: 2005 Commercial Concrete Mix Designs
Client: Los Alamos Transit Mix Co.
Material Tested: Size #67 Aggregate (3/4" Crushed)
Source: EL Guique
Product Code:
Specifications: ASTM C33, Size #67

Project No: 4-519-003279
Lab No.: 4-1548
Sample Date: 10/16/2004
Report Date: 10/28/2004 **Amended:** 04/18/2005
Reviewed by: J. Vishel

SIEVE ANALYSIS

ASTM C136 AASHTO T27

Sieve Size	Accum. % Passing	Specifications
300 mm (12")		
250 mm (10")		
225 mm (9")		
200 mm (8")		
150 mm (6")		
125 mm (5")		
100 mm (4")		
75.0 mm (3")		
63.0 mm (2-1/2")		
50.0 mm (2")		
37.5 mm (1-1/2")		
31.5 mm (1-1/4")		
25.0 mm (1")	100	100
19.0 mm (3/4")	100	90-100
12.5 mm (1/2")	55	
9.5 mm (3/8")	24	20-55
6.3 mm (1/4")		
4.75mm (No. 4)	3	0-10
2.36 mm (No. 8)	2	0-5
2.00 mm (No. 10)	2	
1.18mm (No.16)	2	
0.600 mm (No.30)	1	
0.425mm (No. 40)	1	
0.300mm (No. 50)	3	
0.180mm (No. 80)		
0.150mm (No.100)	1	
0.075mm (No. 200)	0.7	1.0 Max
ASTM C117 / AASHTO T11		
Soil Classification		
Moisture Content, %		
ASTM C566 AASHTO T255		
Fract. 1 Face, %	78.7	
Fract. 2 Face, %	70.8	
Fineness Modulus		
ASTM C136 AASHTO T27		

TEST RESULTS

Standard	PHYSICAL PROPERTIES		Results	Specification
ASTM C 29	Unit Weight	Unit Weight, lbs./cu.ft=	102.3	
AASHTO T 19	& Voids	Voids, %=	37.8	
		☐ Jigged ☐ Loose ☑ Rodded		
	Coarse	Bulk Specific Gravity (dry)=	2.641	
ASTM C 127	Specific	Bulk Specific Gravity, SSD=	2.666	
AASHTO T 85	Gravity &	Apparent Specific Gravity=	2.709	
	Absorption	Absorption, %=	1.0	
	Fine	Bulk Specific Gravity (dry)=		
ASTM C 128	Specific	Bulk Specific Gravity, SSD=		
AASHTO T 84	Gravity &	Apparent Specific Gravity=		
	Absorption	Absorption, %=		
ASTM D 2419	Sand	Sand Equivalent, %=		
AASHTO T 176	Equivalent			
ASTM D 4791	Flat &	Flat & Elongated, %=	7.7	
	Elongated	Ratio=	3:1	
ASTM C 131	L. A.	Small Coarse Loss, %=	20.2	50 Max
AASHTO T 96	Abrasion	Grading/ Revs.=	B/500	
ASTM C 535	L. A.	Large Coarse Loss, %=		
	Abrasion	Grading/ Revs.=		
	Soundness	Coarse Soundness Loss, %=	1.4	18 Max
ASTM C 88		Magnesium No. of Cycles=	5	
AASHTO T 104	Soundness	Fine Soundness Loss, %=		
		Magnesium No. of Cycles=		
ASTM C 142	Clay/Friable	Coarse Aggregate, %=	0.2	3.0 Max
AASHTO T 112	Particles	Fine Aggregate, %=		
ASTM 2974	Organic	Organic Matter % =		
AASHTO T267	Matter	Ash Content % =		
ASTM C 123	Lightweight	Coarse Aggregate, %=	0.0	0.5 Max
AASHTO T 113	Pieces	Fine Aggregate, %=		
ASTM C 1252	Fine Aggregate	Uncompacted Voids, %=		
AASHTO T 304	Angularity	Method C (as received material)		
ASTM D1557	Compaction	Optimum Moisture, %=		
AASHTO T180	Modified Efforts	Max. Density, lbs./cu.ft.=		
ASTM D 4318	Liquid Limit,	Liquid Limit=		
AASHTO T 89/90	Plastic Limit &	Plastic Limit=		
	Plasticity Index	Plasticity Index=		

REPORT of AGGREGATE PHYSICAL PROPERTIES

amec

Project: 2005 Commercial Concrete Mix Designs
Client: Los Alamos Transit Mix Co.
Material Tested: Washed Concrete Sand
Source: EL Guique
Product Code:
Specifications: ASTM C33, Fine Aggregate

Project No: 4-519-003279
Lab No.: 4-1549
Sample Date: 10/16/2004
Report Date: 10/28/2004 Amended: 04/18/2005
Reviewed by: J. Vishal

SIEVE ANALYSIS

ASTM C136	AASHTO T27	
Sieve Size	Accum. % Passing	Specifications
300 mm (12")		
250 mm (10")		
225 mm (9")		
200 mm (8")		
150 mm (6")		
125 mm (5")		
100 mm (4")		
75.0 mm (3")		
63.0 mm (2-1/2")		
50.0 mm (2")		
37.5 mm (1-1/2")		
31.5 mm (1-1/4")		
25.0 mm (1")		
19.0 mm (3/4")		
12.5 mm (1/2")		
9.5 mm (3/8")	100	100
6.3 mm (1/4")		
4.75mm (No. 4)	96	95-100
2.36 mm (No. 8)	81	80-100
2.00 mm (No. 10)	78	
1.18mm (No.16)	68	50-85
0.600 mm (No.30)	52	25-60
0.425mm (No. 40)	40	
0.300mm (No. 50)	24	5-30
0.180mm (No. 80)		
0.150mm (No.100)	6	0-10
0.075mm (No. 200)	2.6	0-3.0
ASTM C117 / AASHTO T11		
Soil Classification		
Moisture Content, %		
ASTM C566 AASHTO T255		
Fract. 1 Face, %		
Fract. 2 Face, %		
Fineness Modulus	2.72	2.3-3.1
ASTM C136 AASHTO T27		

TEST RESULTS

Standard	PHYSICAL PROPERTIES		Results	Specification
ASTM C 29	Unit Weight	Unit Weight, lbs./cu.ft.=		
AASHTO T 19	& Voids	Voids, %=		
		☐ Jigged ☐ Loose ☐ Rodded		
	Coarse	Bulk Specific Gravity (dry)=		
ASTM C 127	Specific	Bulk Specific Gravity, SSD=		
AASHTO T 85	Gravity &	Apparent Specific Gravity=		
	Absorption	Absorption, %=		
	Fine	Bulk Specific Gravity (dry)=	2.604	
ASTM C 128	Specific	Bulk Specific Gravity, SSD=	2.631	
AASHTO T 84	Gravity &	Apparent Specific Gravity=	2.675	
	Absorption	Absorption, %=	1.0	
ASTM D 2419	Sand	Sand Equivalent, %=	83	
AASHTO T 176	Equivalent			
ASTM D 4791	Flat &	Flat & Elongated, %=		
	Elongated	Ratio=		
ASTM C 131	L. A.	Small Coarse Loss, %=		
AASHTO T 96	Abrasion	Grading/ Revs.=		
ASTM C 535	L. A.	Large Coarse Loss, %=		
	Abrasion	Grading/ Revs.=		
	Soundness	Coarse Soundness Loss, %=		
ASTM C 88		Magnesium No. of Cycles=		
AASHTO T 104	Soundness	Fine Soundness Loss, %=	3.2	15 Max
		Magnesium No. of Cycles=	5	
ASTM C 142	Clay/Friable	Coarse Aggregate, %=		
AASHTO T 112	Particles	Fine Aggregate, %=	0.1	3.0 Max
ASTM C40	Organic	Organic Impurities =	LTS	LTS
AASHTO T21	Impurites			
ASTM C 123	Lightweight	Coarse Aggregate, %=		
AASHTO T 113	Pieces	Fine Aggregate, %=	0.1	0.5 Max
ASTM C 1252	Fine Aggregate	Uncompacted Voids, %=		
AASHTO T 304	Angularity	Method C (as received material)		
ASTM D1557	Compaction	Optimum Moisture, %=		
AASHTO T180	Modified Efforts	Max. Density, lbs./cu.ft.=		
ASTM D 4318	Liquid Limit,	Liquid Limit=	NV	
AASHTO T 89/90	Plastic Limit &	Plastic Limit=	NV	
	Plasticity Index	Plasticity Index=	NP	

GCC
Rio Grande

November 8, 2004

Los Alamos Transit Mix
P. O. Box 38
Española, NM 87532

COMPLIANCE AFFIDAVIT

Portland Cement, Type I-II LA, as manufactured by GCC RIO GRANDE, at Tijeras, New Mexico is warranted to conform at the time of shipment to current ASTM Specification C-150.

No other warranty is made or to be implied.

Sincerely,

Lydia Plant
Administrative Operations

GCC
Rio Grande

SILO TEST CERTIFICATE

AVERAGE OF TEST RESULTS

TIJERAS PLANT TIJERAS, NEW MEXICO, U.S.A.

MILL TEST NO: AVG

CONSIGNEE:

DATE: 18-Oct-04

A S T M DESIGNATION: C150-04

PORTLAND CEMENT–TYPE: HI LOW ALKALI
AVERAGE 9/01/2004 TO 9/30/2004

CHEMICAL COMPOSITION:	SILICON DIOXIDE (SIO2)			21.1
	ALUMINUM OXIDE (AL2O3)			4.0
	FERRIC OXIDE (FE2O3)			2.9
	CALCIUM OXIDE (CAO)			63.3
	MAGNESIUM OXIDE (MGO)			3.1
	SULFUR TRIOXIDE (SO3)			3.0
	SODIUM OXIDE (NA2O)			0.20
	POTASSIUM OXIDE (K2O)			0.52
	LOSS ON IGNITION			1.97
	INSOLUBLE RESIDUE			0.23
	TRICALCIUM SILICATE (C3S)			58
	DICALCIUM SILICATE (C2S)			17
	TRICALCIUM ALUMINATE (C3A)			5.6
	TETRACALCIUM ALUMINOFERRITE (C4AF)			9
	ALKALIES (NA2O EQUIVALENT)			0.54
SPECIFIC SURFACE:	BLAINE, SQ M PER KILOGRAM			355
	-325 MESH FINENESS			94.1
SOUNDNESS:	AUTOCLAVE EXPANSION			0.02
TIME OF SETTING:	VICAT, INITIAL SET		125 MIN	
	VICAT, FINAL SET		252 MIN	
LIMESTONE ADDITION	% CO2			0.62
	% LIMESTONE			1.26
	% CaCO3 In LIMESTONE			95.4

COMPRESSIVE STRENGTH TESTS:	1 DAY	1698	P.S.I.	11.71	MPa
	3 DAY	3312	P.S.I.	22.84	MPa
	7 DAY	4232	P.S.I.	29.18	MPa

AIR CONTENT: PERCENT BY VOLUME 7.7

RIO GRANDE PORTLAND CEMENT IS WARRANTED TO CONFORM AT THE TIME OF SHIPMENT WITH THE SPECIFICATION DESIGNATED ABOVE. NO OTHER WARRANTY IS MADE OR IMPLIED. HAVING NO CONTROL OVER THE USE OF ITS CEMENTS, RIO GRANDE PORTLAND DOES NOT GUARANTEE FINISHED WORK.

TIJERAS PLANT

BY R. Vigil

QUALITY CONTROL SUPERINTENDANT

SRMG
Salt River Materials Group

PHOENIX CEMENT

Phoenix Cement Company
8800 E Chapparral Rd
Scottsdale Az 85250

Corporate Headquarters
8800 E Chapparral Rd, Ste 155
Scottsdale, AZ 85250
Phone: 480-850-5757
Fax: 480-850-5758

Cement Manufacturing
3000 W Cement Plant Rd
Clarkdale, AZ 86324
Phone: 928-634-2261
Fax: 928-634-3543

Phoenix Transfer Facility
1941 W Lower Buckeye Rd
Phoenix, AZ 85009
Phone: 602-258-7798
Fax: 602-525-3362

21st Avenue Facility
1325 N 21st Avenue
Phoenix, AZ 85009
Phone: 602-254-3824
Fax: 602-254-3825

Mesa Community Storage
Dobson & McKellips
Mesa, AZ 85211
Phone: 480-990-7847

Cholla Fly Ash Facility
P O Box 380
Joseph City, AZ 86032
Phone: 928-288-1661
Fax: 928-288-1663

Four Corners Fly Ash Facility
P O Box 1007
Fruitland, NM 87416
Phone: 505-598-8657
Fax: 505-598-8633

San Juan Fly Ash Facility
San Juan Generating Station
Waterflow, NM 87421
Phone: 505-598-7546
Fax: 505-598-7547

Escalante Fly Ash Facility
CR19 / P O Box 620
Prewitt, NM 87405
Phone: 505-285-4590
Fax: 505-285-4667

Gallup Fly Ash Facility
900 1/4 N 9th St
Gallup, NM 87305

Product: Class F Fly Ash, Four Corners Fly Ash
ASTM C 618-01

FLY ASH TEST REPORT

9-09-04 CH#: 21871

Lot: 5622	Results	Specifications
Chemical Analysis		
Silicon Dioxide, SiO_2	61.73 %	—
Aluminum Oxide, Al_2O_3	25.96 %	—
Ferric Oxide, Fe_2O_3	4.42 %	—
$SiO_2+Al_2O_3+Fe_2O_3$	92.11 %	70.00 Min
Calcium Oxide, CaO	1.88 %	—
Magnesium Oxide, MgO	1.02 %	—
Sulfur Trioxide, SO_3	0.20 %	5.00 Max
Moisture Content	0.06 %	3.00 Max
Loss on Ignition	0.38 %	5.00 Max
Available Alkalis as Na_2O	0.41 %	1.50 Max
Sodium Oxide, Na_2O	1.17 %	—
Potassium Oxide, K_2O	1.14 %	—
R Factor	-0.71 %	—
Physical Analysis		
Fineness, amount retained on #325 sieve, %	17.20	34.00 Max
variation, points from average	2.59	5.00 Max
Density, g/cm³	2.16	—
Variation from average, %	0.10	5.00 Max
Strength Activity Index with Portland Cement at 7 days, % of cement control	82.81	—
at 28 days, % of cement control	90.39	75.00 Min
Water Requirement % of cement control	95.87	105.00 Max
Soundness, autoclave expansion or contraction, %	-0.04	0.80 Max

All tests have been made in strict accordance with the current standards of the American Society for Testing and Materials covering the type of material specified.

Lee Gorby
Manager

SRMG

Salt River Materials Group

Phoenix Cement Company • Salt River Sand & Rock

Aggregates • Construction • Fly Ash • Phoenix Cement™

October 18, 2004

Peter Cantrup
Los Alamos Transit Mix
PO Box 38
Espanola NM 87532

RE: Class F Fly Ash from the Four Corners Power Plant in Fruitland, New Mexico

This letter serves as certification that all Four Corners Fly Ash (pozzolan) sold by Phoenix Cement Company to Los Alamos Transit Mix at the above referenced Project meets the requirements of the latest revision of ASTM Specification C618 for Class F Fly Ash (pozzolan).

We appreciate your interest in our product. If we can provide additional information or technical assistance, please contact us.

Respectfully,

Lee Gorby

Lee Gorby
Quality Assurance Manager

degussa.

Construction Chemicals

Master Builders, Inc.
23700 Chagrin Boulevard
Cleveland, OH 44122-5554

Phone 216-839-7500

October 19, 2004

Certificate of Conformance
PolyHeed 997
Master Builders Admixture for Concrete

TO WHOM IT MAY CONCERN:

I, Alice McFarland, Manager, Quality Assurance for Degussa Construction Chemicals and Degussa Admixtures, Inc., Cleveland, Ohio, certify:

That no calcium chloride or chloride based ingredient is used in the manufacture of PolyHeed 997; and

That PolyHeed 997, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.00012 percent (1.2 ppm) chloride ions by weight of the cement when used at the rate of 65 ml per 100 kg (1 fluid ounce per 100 pounds) of cement; and

That PolyHeed 997 meets the requirements for a Type A, Water-Reducing Admixture specified in ASTM C 494-99, Corps of Engineers' CRD-C 87-93, and AASHTO M194-00, the Standard Specifications for Chemical Admixtures for Concrete.

Alice McFarland

Alice McFarland

Manager, Quality Assurance
Degussa Construction Chemicals

degussa.

Construction Chemicals

MASTER BUILDERS MID-RANGE WATER-REDUCING ADMIXTURES

POLYHEED® 997

Superior pumping/finishing admixture

Applications

Recommended for use in:

- Conventionally placed concrete mixes containing a wide range of cements, granulated slags, Class C and F fly ashes, silica fume and aggregates
- Reinforced, precast, prestressed, lightweight or normal weight concrete and pumped concrete
- Residential/commercial flatwork and formed surfaces

Description

PolyHeed 997 is a patented multi-component, non-chloride, mid-range water-reducing admixture.

PolyHeed 997 admixture meets ASTM C 494 requirements for Type A, water-reducing, and Type F, high-range water-reducing admixtures.

Features

- True mid-range water reduction (5-15%) and excellent performance across a wide concrete slump range, especially the difficult slump range of 5-8 inches (125-200 mm)
- Superior workability, pumpability and finishability qualities even in concrete mixes containing low amounts of cementitious materials
- Compressive and flexural strength performance increased at all ages
- Strength performance comparable to chloride-bearing, water-reducing admixtures at all ages
- Improved concrete durability to damage from freezing and thawing
- Superior finishing characteristics for residential/commercial flatwork and formed surfaces

Benefits

- Significantly reduced placement and finishing time resulting in lower in-place concrete costs
- Increased service life of concrete structures

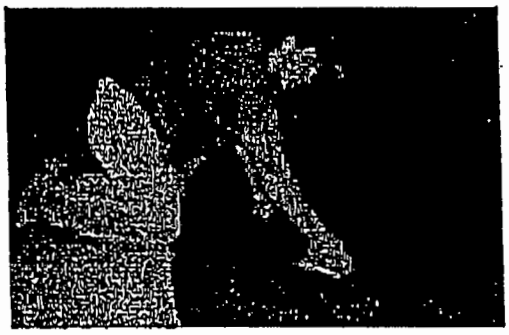
Performance Characteristics

MIXTURE DATA

500 lb of Type I cement per cubic yard (295 kg/m³); slump, 6-7 inches (150-180 mm); 5-6% air; concrete temperature 70 °F (21 °C); ambient temperature, 70 °F (21 °C).

SETTING TIME PERFORMANCE[1]

INITIAL SET MIXTURE	DIFFERENCE h:min	h:min
PLAIN	6:01	–
PolyHeed 997		
5 fl oz/cwt (325 mL/100 kg)	6:22	+0:21



COMPRESSIVE STRENGTH PERFORMANCE

MIXTURE	7 DAY psi	7 DAY MPa	7 DAY %	28 DAY psi	28 DAY MPa	28 DAY %
PLAIN	2360	16.3	100	3320	22.9	100
PolyHeed 997						
5 fl oz/cwt (325 mL/100 kg)	3060	21.1	129	3930	27.1	118
10 fl oz/cwt (650 mL/100 kg)	3740	25.8	158	4610	31.8	136
15 fl oz/cwt (980 mL/100 kg)	4620	31.9	196	5460	37.7	165

[1]Note: The data shown are based on controlled laboratory tests. Reasonable variations from the results shown here may be experienced as a result of differences in concrete making materials and jobsite conditions.

Guidelines for Use

DOSAGE

PolyHeed 997 admixture has a recommended dosage range of 3-15 fl oz /100 lb (195-975 mL/100 kg) of cementitious material for most concrete mixes.

As the dosage of PolyHeed 997 admixture increases to 15 fl oz/100 lb (975 mL/100 kg) of cementitious materials, normal concrete setting time characteristics are maintained and early and ultimate compressive strengths increase.

Master Builders does not recommend the use of dosages outside the recommended range without trial testing. Consult your local Master Builders sales representative for assistance in determining the dosage for optimum performance.

Recommendations

CORROSIVITY

NON-CHLORIDE, NON-CORROSIVE

PolyHeed® 997 admixture will neither initiate nor promote corrosion of reinforcing steel in concrete. PolyHeed 997 admixture does not contain intentionally added calcium chloride or chloride-based ingredients.

COMPATIBILITY

PolyHeed 997 admixture may be used in combination with any Master Builders admixtures and may be used in all colored and architectural concrete. When used in conjunction with other admixtures, each admixture must be dispensed separately into the mix.

TEMPERATURE

If PolyHeed 997 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation.

Do not use pressurized air for agitation.

SHELF LIFE

PolyHeed 997 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your Master Builders representative regarding suitability for use and dosage recommendations if the shelf life of PolyHeed 997 admixture has been exceeded.

Packaging

PolyHeed 997 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Material Data Safety Sheet — PolyHeed 997

Additional Information

For additional information on PolyHeed 997 admixture or on its use in developing a concrete mixture with special performance characteristics, contact your Master Builders representative.

MASTER BUILDERS, INC.

United States
23700 Chagrin Boulevard
Cleveland, Ohio 44122-5554
Phone 800.MBT.9990
Fax 216.839.8821

Canada
1800 Clark Blvd
Brampton, Ontario L6T 4M7
Phone 800.387.5862

degussa.

Construction Chemicals

Master Builders, Inc.
23700 Chagrin Boulevard
Cleveland, OH 44122-5554

Phone 216-839-7500

October 19, 2004

Certificate of Conformance
Micro-Air
Master Builders Air-Entraining Admixture for Concrete

TO WHOM IT MAY CONCERN:

I, Alice McFarland, Manager, Quality Assurance for Degussa Construction Chemicals and Degussa Admixtures, Inc., Cleveland, Ohio, certify:

That Micro-Air is Master Builders air-entraining admixture for concrete; and

That no calcium chloride or chloride based ingredient is used in the manufacture of Micro-Air; and

That Micro-Air, based on the chlorides originating from all the ingredients used in its manufacture, contributes less than 0.0001 percent (1.0 ppm) chloride ions by weight of the cement when used at the rate of 65 ml per 100 kg (1 fluid ounce per 100 pounds) of cement; and

That Micro-Air meets the requirements of ASTM C 260-01, Corps of Engineers CRD-C 13-97, and AASHTO M154-00, the Standard Specifications for Air-Entraining Admixtures for Concrete.

Alice McFarland

Alice McFarland

Manager, Quality Assurance
Degussa Construction Chemicals

degussa.
Construction Chemicals

MASTER BUILDERS AIR ENTRAINING ADMIXTURES

MICRO AIR®

Superior admixture for freeze/thaw durability

Applications

Recommended for use in:

- Concrete exposed to freeze/thaw cycles
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Description

Micro Air air-entraining admixture provides concrete with extra protection by creating ultrastable air bubbles that are strong, small and closely spaced — a characteristic especially useful in the types of concrete known for their difficulty to entrain and maintain the air content desired.

Even when used at a lower dosage rate than standard air-entraining admixtures, Micro Air meets the requirements of ASTM C 260, AASHTO M 154, CRD-C 13 and other Federal and State specifications.

Features

- Ready-to-use — in the proper concentration for rapid, accurate dispensing
- Greatly improved stability of air-entrainment
- Ultra-stable air bubbles

Benefits

- Increased resistance to damage from freezing and thawing
- Increased resistance to scaling from deicing salts
- Improved plasticity and workability
- Improved air-void system in hardened concrete
- Improved ability to entrain and retain air in low-slump concrete; concrete containing high-carbon content fly ash, concrete using large amounts of fine materials; concrete using high-alkali cements; high-temperature concrete; and concrete with extended mixing times
- Reduced permeability — increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freeze/thaw cycles and deicing salts results from: proper air content in the hardened concrete; a suitable air-void system in terms of bubble size and spacing and adequate concrete strength, assuming the use of sound aggregates and proper mixing, placing, handling and curing techniques.

When unusually low or high amounts of an air-entraining admixture are required to achieve normal ranges of air content or if the required amount of air-entraining admixture necessary to achieve required levels of air content is observed to change significantly under given conditions, the reason should be investigated. In such cases, it is especially important to determine: (a) that a proper amount of air is contained in the fresh concrete at the point of placement and (b) that a suitable air-void system (spacing factor) is being obtained in the hardened concrete.

AIR CONTENT DETERMINATION

The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, "Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method" or ASTM C 173, "Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method." The air content of lightweight concrete should only be determined using the Volumetric Method.

The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138, "Unit Weight, Yield, and Air Content (Gravimetric) of Concrete." If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1½%, the cause should be determined and corrected through equipment calibration or by whateve process is deemed necessary.

BOREHOLE LOG

KLEINFELDER

Boring # W1
Sheet 1 of 2
DCN #
Revision:

Project Name: TA-73 LANL Airport Landfill	Started: 6/3/2006	Groundwater: None	Total Depth (ft.):35.0
Project Number: 71610	Completed: 6/3/2006	Drilling Co.: Geomechanics SW	Surface Elevation: 7049.2
Location: TA-73 (See "Site Location Map")	Backfilled: 6/4/2006	Rig Type: CME75HD	Northing: 1775765
Logged by: C. Vallejo	Backfill Type: Grout	Driller: G. Sanders	Easting: 1635042

Depth, feet	Elevation, feet	Description	Graphic Log	Drilling Method	Sample/Run No.	Sample Type	% Recovery	Geomechanical Properties: RQD	Fracture Inclination	Weathering	Fracturing	Stratification	Hardness	Welding	Laboratory Tests Assigned	Remarks
0	7049	SILTY SAND (SM) - Light brown to light gray, dry, fine grained (FILL WITH REFUSE).														Upper 5 ft of borehole logged based on auger cuttings. Upper 16.5 ft of borehole drilled wih 8" OD/ 4.25" ID hollow-stem auger. Switched to HQ geobarrel air rotary at 16.5 ft bgs.
	7048															
	7047															
	7046															
	7045															
5	7044	With wood fragment at 5 ft bgs.		HSA	S1	SS 11-11-11		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	7043															
	7042															
	7041															
	7040															
10	7039	With cobbles, boulders, and tuff at 10 ft bgs.		HSA	S2	SS 50/6"		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	7038															
	7037															
	7036															
	7035															
15	7034	(FILL WITH REFUSE) 15.5 El. 7033.7'														
	7033	TSHIREGE, UNIT 3 LOWER ($Qbt3_L$) - Light gray, with red to pink reworked tuff at 15.5 ft bgs.		HSA	S3	SS 21-24-34	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	7032															
	7031			AR	R1	HQ	33	0		MW-VW	N/A	TKB	S	PW		
	7030															
20																

Checked by: _____ Date: _____

Reviewed by: _____ Date: _____

Approved by: _____ Date: _____

DRAFT CORE LOG 71610.GPJ CMRR.GDT 2/1/07

BOREHOLE LOG

KLEINFELDER

Boring # W1
Sheet 2 of 2
DCN #
Revision:

Project Name: TA-73 LANL Airport Landfill	Started: 6/3/2006	Groundwater: None	Total Depth (ft.): 35.0
Project Number: 71610	Completed: 6/3/2006	Drilling Co.: Geomechanics SW	Surface Elevation: 7049.2
Location: TA-73 (See "Site Location Map")	Backfilled: 6/4/2006	Rig Type: CME75HD	Northing: 1775765
Logged by: C. Vallejo	Backfill Type: Grout	Driller: G. Sanders	Easting: 1635042

Depth, feet	Elevation, feet	Description	Drilling Method	Sample/Run No.	Sample Type	% Recovery	RQD	Fracture Inclination	Weathering	Fracturing	Stratification	Hardness	Welding	Laboratory Tests Assigned	Remarks
20	7029	TSHIREGE, UNIT 3 LOWER ($Qbt3_L$) - Light gray, with red to pink reworked tuff at 15.5 ft bgs.	AR	S4	SS 25-26-38	78	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	7028														
	7027	22.5 El. 7026.7'													
	7026	TSHIREGE, UNIT 2 (Qbt2) - Light gray, clay infilled fractures from 22.5 to 25 ft bgs, slighty weathered fracture surfaces from 30 ft bgs.	AR	R2	HQ	100	33		MW	VF-MF	TKB	MH	MW		
	7025														
25	7024		AR	S5	SS 50/2"		N/A		N/A	N/A	N/A	N/A	N/A		
	7023														
	7022		AR	R3	HQ	100	98		F-SW	MF	TKB	MH	MW-SW		
	7021														
	7020														
30	7019														
	7018														
	7017		AR	R4	HQ	100	94		SW	MF	TKB	MH	MW-SW		
	7016														
	7015														
35	7014	35.0 El. 7014.2' Bottom of Borehole at 35.0 feet.													
	7013														
	7012														
	7011														
	7010														
40															

Checked By, Reviewed By, and Approved By Signatures and Dates are presented on Sheet Number 1 of this Borehole Log.

BOREHOLE LOG

KLEINFELDER

Boring # W2
Sheet 1 of 2
DCN #
Revision:

Project Name: TA-73 LANL Airport Landfill	Started: 6/3/2006	Groundwater: None	Total Depth (ft.):30.0
Project Number: 71610	Completed: 6/3/2006	Drilling Co.: Geomechanics SW	Surface Elevation: 7044.6
Location: TA-73 (See "Site Location Map")	Backfilled: 6/4/2006	Rig Type: CME75HD	Northing: 1775808
Logged by: C. Vallejo	Backfill Type: Grout	Driller: G. Sanders	Easting: 1635013

Depth, feet	Elevation, feet	Description	Graphic Log	Drilling Method	Sample/Run No.	Sample Type	% Recovery	Geomechanical Properties: RQD	Fracture Inclination	Weathering	Fracturing	Stratification	Hardness	Welding	Laboratory Tests Assigned	Remarks
0	7044	SILTY SAND (SM) - Light brown to light gray, dry, fine grained (FILL WITH REFUSE).														Upper 15 ft of borehole logged based on auger cuttings. Upper 20.75 ft of borehole drilled wih 8" OD/ 4.25" ID hollow-stem auger. Switched to HQ geobarrel air rotary at of 20.75 ft bgs.
	7043															
	7042															
	7041															
	7040															
5	7039															
	7038															
	7037															
	7036															
	7035															
10	7034															
	7033															
	7032															
	7031															
	7030	(FILL WITH REFUSE)														
15		15.0 El. 7029.6'														
	7029	TSHIREGE, UNIT 3 LOWER ($Qbt3_L$) - Light gray, with wood fragments and unidentified conglomorate (likely fall-in material from upper layer) at 15 ft bgs.		HSA	S1	SS 38-50/6"		N/A	N/A	MW-VW	N/A	N/A	S	PW		
	7028															
	7027															
	7026															
	7025															
20																

Checked by: _____ Date: _____

Reviewed by: _____ Date: _____

Approved by: _____ Date: _____

BOREHOLE LOG

KLEINFELDER

Boring # W2
Sheet 2 of 2
DCN #
Revision:

Project Name: TA-73 LANL Airport Landfill	Started: 6/3/2006	Groundwater: None	Total Depth (ft.):30.0
Project Number: 71610	Completed: 6/3/2006	Drilling Co.: Geomechanics SW	Surface Elevation: 7044.6
Location: TA-73 (See "Site Location Map")	Backfilled: 6/4/2006	Rig Type: CME75HD	Northing: 1775808
Logged by: C. Vallejo	Backfill Type: Grout	Driller: G. Sanders	Easting: 1635013

Depth, feet	Elevation, feet	Description	Graphic Log	Drilling Method	Sample/Run No.	Sample Type	% Recovery	RQD	Fracture Inclination	Weathering	Fracturing	Stratification	Hardness	Welding	Laboratory Tests Assigned	Remarks
								Geomechanical Properties								
20	7024	20.5 El. 7024.1' TSHIREGE, UNIT 2 (Qbt2) - Gray, fractures with clay and organic infilling at 20.5 ft bgs.	Q	HSA	S2	SS 15-50/3"		N/A	N/A	MW-VW	N/A	N/A	S	PW		
	7023															
	7022			AR	R1	HQ	100	83		SW-MW	MF-VF	TKB	MH-H	MW-SW		
	7021															
	7020															
25																5' stick of core recovered, broken to fit in core box.
	7019															
	7018															
	7017			AR	R2	HQ	100	100		F-SW	S	TKB	MH-H	SW		
	7016															
	7015															
30	7014	30.0 El. 7014.6' Bottom of Borehole at 30.0 feet.														
	7013															
	7012															
	7011															
	7010															
35	7009															
	7008															
	7007															
	7006															
	7005															
40																

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BOREHOLE LOG

KLEINFELDER

Boring # W3
Sheet 1 of 2
DCN #
Revision:

Project Name: TA-73 LANL Airport Landfill	Started: 6/4/2006	Groundwater: None	Total Depth (ft.): 24.0
Project Number: 71610	Completed: 6/4/2006	Drilling Co.: Geomechanics SW	Surface Elevation: 7041.0
Location: TA-73 (See "Site Location Map")	Backfilled: 6/4/2006	Rig Type: CME75HD	Northing: 1775855
Logged by: C. Vallejo	Backfill Type: Grout	Driller: G. Sanders	Easting: 1634990

Depth, feet	Elevation, feet	Description	Graphic Log	Drilling Method	Sample/Run No.	Sample Type	% Recovery	Geomechanical Properties: RQD	Fracture Inclination	Weathering	Fracturing	Stratification	Hardness	Welding	Laboratory Tests Assigned	Remarks
0	7040	SILTY SAND (SM) - Light brown to light gray, dry, fine grained (FILL WITH REFUSE).														Upper 5 ft of borehole logged based on auger cuttings. Upper 15.2 ft of borehole drilled wih 8" OD/ 4.25" ID hollow-stem auger. Switched to HQ geobarrel air rotary at 15.2 ft bgs.
	7039															
	7038															
	7037															
5	7036															
	7035			HSA	S1	SS 4-3-4		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	7034	With fragments of moderately-welded to poorly-welded tuff at 6.3 ft bgs.														
	7033															
	7032															
10	7031															
				HSA	S2	SS 50/6"	NR	N/A	N/A	N/A	N/A	N/A	N/A	N/A		No sample in spoon, possibly due to refuse material.
	7030															
	7029	(FILL WITH REFUSE)														
	7028	13.0 El. 7028.0'														
		TSHIREGE, UNIT 3 LOWER ($Qbt3_L$) - Light gray to light brown, with high silt content.														Driller encounters increased resistance at 13 ft bgs.
	7027															
15	7026	15.0 El. 7026.0'														
		TSHIREGE, UNIT 2 (Qbt2) - Gray.		HSA	S3	SS 50/2"		N/A	N/A	MW-VW	N/A	N/A	S	PW		
	7025															
	7024			AR	R1	HQ	100	100		F-SW	SF	TKB	MH-H	SW		
		Fracture with clay and organic infilling at 17.3 ft bgs.														
	7023															
	7022															
				AR	R2	HQ	97	97		F-SW	S	TKB	MH-H	SW		
20	7021															

Checked by: _____ Date: _____

Reviewed by: _____ Date: _____

Approved by: _____ Date: _____

BOREHOLE LOG

KLEINFELDER

Boring # W3
Sheet 2 of 2
DCN #
Revision:

Project Name: TA-73 LANL Airport Landfill	Started: 6/4/2006	Groundwater: None	Total Depth (ft.): 24.0
Project Number: 71610	Completed: 6/4/2006	Drilling Co.: Geomechanics SW	Surface Elevation: 7041.0
Location: TA-73 (See "Site Location Map")	Backfilled: 6/4/2006	Rig Type: CME75HD	Northing: 1775855
Logged by: C. Vallejo	Backfill Type: Grout	Driller: G. Sanders	Easting: 1634990

Depth, feet	Elevation, feet	Description	Graphic Log	Drilling Method	Sample/Run No.	Sample Type	% Recovery	Geomechanical Properties: RQD	Fracture Inclination	Weathering	Fracturing	Stratification	Hardness	Welding	Laboratory Tests Assigned	Remarks
20	7020	TSHIREGE, UNIT 2 (Qbt2) - Gray.														
	7019			AR	R2	HQ	97	97		F-SW	S	TKB	MH-H	SW		
	7018															
	7017	24.0 EL 7017.0'														
		Bottom of Borehole at 24.0 feet.														
25	7016															
	7015															
	7014															
	7013															
	7012															
30	7011															
	7010															
	7009															
	7008															
	7007															
35	7006															
	7005															
	7004															
	7003															
	7002															
40	7001															

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BOREHOLE LOG

KLEINFELDER

Boring # W4
Sheet 1 of 2
DCN #
Revision:

Project Name: TA-73 LANL Airport Landfill	Started: 6/4/2006	Groundwater: None	Total Depth (ft.): 25.0
Project Number: 71610	Completed: 6/4/2006	Drilling Co.: Geomechanics SW	Surface Elevation: 7045.4
Location: TA-73 (See "Site Location Map")	Backfilled: 6/4/2006	Rig Type: CME75HD	Northing: 1775905
Logged by: C. Vallejo	Backfill Type: Grout	Driller: G. Sanders	Easting: 1634967

Depth, feet	Elevation, feet	Description	Graphic Log	Drilling Method	Sample/Run No.	Sample Type	% Recovery	Geomechanical Properties: RQD	Fracture Inclination	Weathering	Fracturing	Stratification	Hardness	Welding	Laboratory Tests Assigned	Remarks
0	7045	SILTY SAND Light brown to light gray, dry, fine grained (FILL WITH REFUSE).														Upper 5 ft of borehole logged based on auger cuttings.
	7044															Upper 15.5 ft of borehole drilled wih 8" OD/ 4.25" ID hollow-stem auger. Switched to HQ geobarrel air rotary at 15.5 ft bgs.
	7043															
	7042															
	7041															
5	7040			HSA	S1	SS 3-3-4		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	7039															
	7038															
	7037															
	7036															
10	7035	With clay material at 10 ft bgs.		HSA	S2	SS 8-6-12		N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	7034															
	7033															
	7032	(FILL WITH REFUSE)														
		14.0 El. 7031.4'														
	7031	TSHIREGE, UNIT 3 LOWER ($Qbt3_L$) - Light gray, with pieces of moderately-welded tuff and stone cobble.														Increased drilling resistance at 14 ft bgs.
15	7030			HSA	S3	SS 50/6"		N/A	N/A	MW-VW	N/A	N/A	S-MH	PW		
	7029															Increased drilling resistance at 16 ft bgs.
	7028	17.4 El. 7028.0'														
	7027	TSHIREGE, UNIT 2 (Qbt2) - Gray, fracture with clay and organic infilling at 17.8 ft bgs.		AR	R1	HQ	89	89	/	SW	SF	TKB	MH-H	SW		
	7026															
20																

Checked by: _____ Date: _____

Reviewed by: _____ Date: _____

Approved by: _____ Date: _____

BOREHOLE LOG

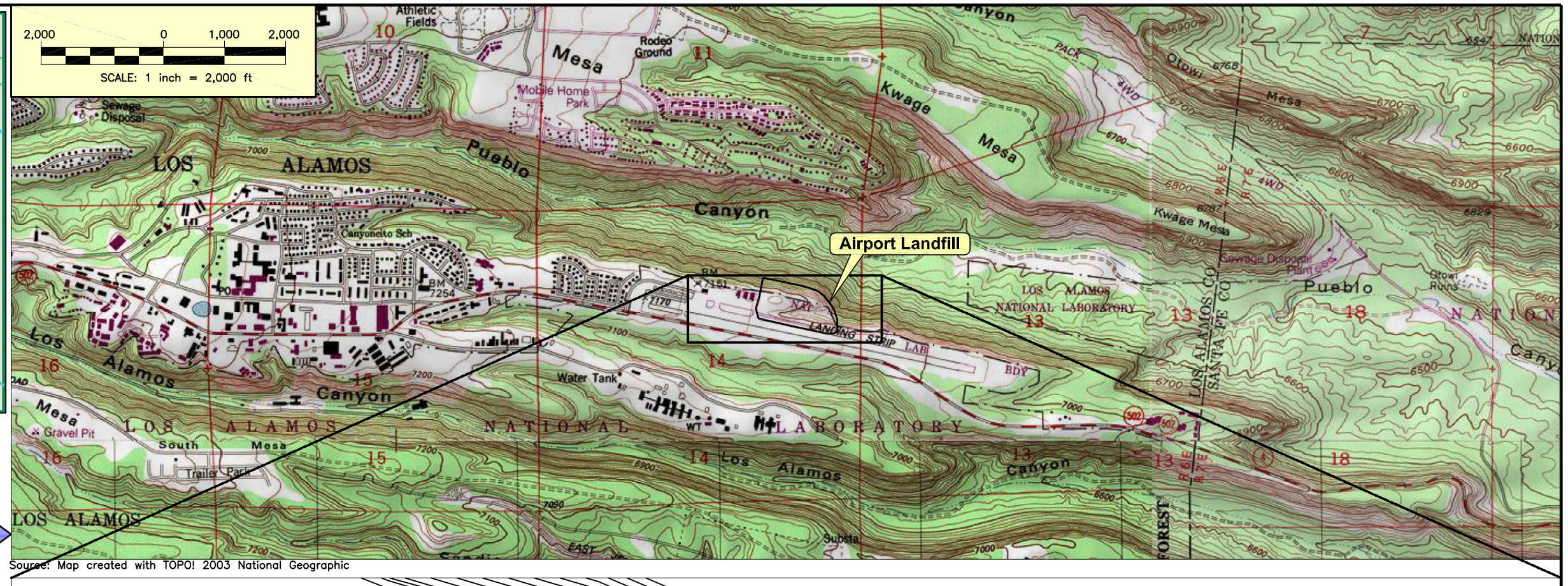
KLEINFELDER

Boring # W4
Sheet 2 of 2
DCN #
Revision:

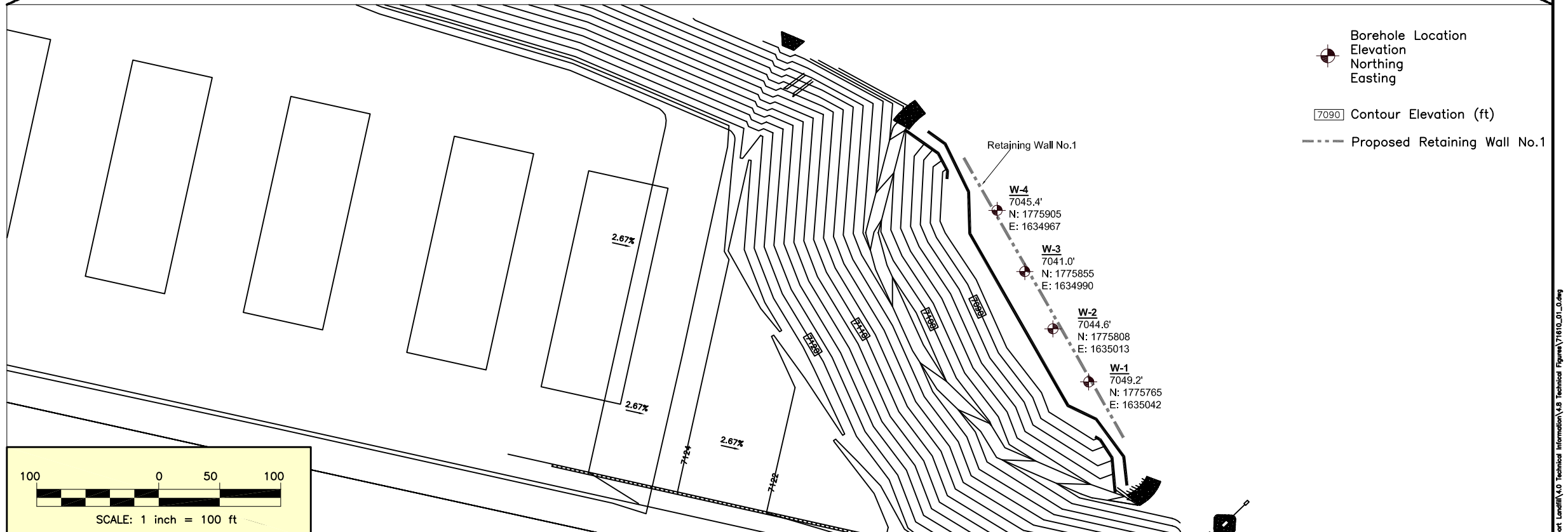
Project Name: TA-73 LANL Airport Landfill	Started: 6/4/2006	Groundwater: None	Total Depth (ft.): 25.0
Project Number: 71610	Completed: 6/4/2006	Drilling Co.: Geomechanics SW	Surface Elevation: 7045.4
Location: TA-73 (See "Site Location Map")	Backfilled: 6/4/2006	Rig Type: CME75HD	Northing: 1775905
Logged by: C. Vallejo	Backfill Type: Grout	Driller: G. Sanders	Easting: 1634967

Depth, feet	Elevation, feet	Description	Graphic Log	Drilling Method	Sample/Run No.	Sample Type	% Recovery	Geomechanical Properties: RQD	Fracture Inclination	Weathering	Fracturing	Stratification	Hardness	Welding	Laboratory Tests Assigned	Remarks
20	7025	TSHIREGE, UNIT 2 (Qbt2) - Gray, fracture with clay and organic infilling at 17.8 ft bgs.														
	7024															
	7023			AR	R2	HQ	100	100		F-SW	SF	TKB	MH-H	SW		
	7022	Fracture with clay and organic infilling at 23 ft bgs.														
	7021															
25		25.0 El. 7020.4'														
	7020	Bottom of Borehole at 25.0 feet.														
	7019															
	7018															
	7017															
	7016															
30	7015															
	7014															
	7013															
	7012															
	7011															
35	7010															
	7009															
	7008															
	7007															
	7006															
40																

Checked By, Reviewed By, and Approved By Signatures and Dates are presented on Sheet Number 1 of this Borehole Log.



Source: Map created with TOPO! 2003 National Geographic



Source: Northwind survey map – June 05, 2006

KLEINFELDER		SITE LOCATION MAP TA-73 LANL Airport Landfill Los Alamos, New Mexico	FIGURE 1
Drawn By: C. Vallejo	Date: February 2007		
Project No.: 71610	Filename: 71610_01_0.dwg		
Scale: reference scale above	Revision: 0		

G:\Geotech\Projects\71610 TA-73 Airport Landfill\4.0 Technical Information\4.6 Technical Figures\71610_01_0.dwg

STRATIGRAPHIC UNIT DESIGNATIONS USED ON BORING LOGS AND CROSS SECTIONS

Geologic Units

Fill =

Bandelier Tuff, Unit 4 (Qbt4) =

Bandelier Tuff, Unit 3 Upper (Qbt3 u) =

Bandelier Tuff, Unit 3 Lower (Qbt3 l) =

Bandelier Tuff, Unit 2 (Qbt2) =

Bandelier Tuff, Unit 1v (Qbt1 v) =

Bandelier Tuff, Unit 1g (Qbt1 g) =

Tsankawi Pumice (Qbt TP) =

Cerro Toledo (Qct) =

Otowi Member (Qbo) =

Alluvial Sediments =

Dacite =

TYPICAL DESCRIPTIONS

Fill - soil or broken tuff material used to raise or restore ground surface

Mechanical fractures - fractures or breaks in the tuff due to the mechanical process of collecting the samples; i.e., not naturally occurring fractures

N/R - no recovery

N/A - not applicable

Organics - vegetable matter, including roots

Qbo - Otowi, orange brown, with dacite fragments and pumice from 375 to 390 feet

Qbt4 - Unit 4 of the Tshirege member of the Bandelier tuff of Quaternary age, moderately to slightly weathered, soft to moderately hard, poorly to moderately welded, pale red, fractures to 1mm wide, with clay infilling

Qbt3u - Unit 3 of the Tshirege member of the Bandelier tuff of Quaternary age, moderately to slightly weathered, moderately hard, moderately welded, pale red, fractures to 1 to 4mm wide, fracture zone infilled with clay

Qbt3L - Unit 3 of the Tshirege member of the Bandelier tuff of Quaternary age, soft, poorly welded, pale red to light gray

Qbt2 - Unit 2 of the Tshirege member of the Bandelier tuff of Quaternary age, slightly weathered, moderately hard to very hard, moderately to strongly welded, pale red, fractures 1 to 4mm wide, fracture zone infilled with clay

Qbt1v - Unit 1v of the Tshirege member of the Bandelier tuff of Quaternary age, light grayish pink to light brown, vapor phase from 265 to 270 feet

Qbt1g - Unit 1g of the Tshirege member of the Bandelier tuff of Quaternary age, grayish pink to light gray

Qbt TP - white to very light gray

Qct - Cerro Toledo, light gray to pale red brown, silty sand with pumice and trace clay layers

Recovery (Rec) - Recovery percentage of sampled length. Given by total length recovered divided by total length sampled and reported as a percentage.

RQD - Rock Quality Designation. A means of characterizing rock mass quality of tuff core, expressed as the ratio (percentage) of the sum of the lengths of all pieces of sound rock core greater than 4 inches divided by the total length of the run. In calculating the sum of pieces to be counted, only natural geologic fractures are considered; mechanical breaks caused by drilling or handling are disregarded. Estimation of RQD was done in general accordance with ASTM 6032-02. However, exceptions were made to take into account the friable nature of the tuff and the HQ core size. Specifically, tuff that was intact but not "sound" per section 3.2.5 of D 6032-02 was counted as "sound" for purposes of calculating RQD, and HQ (larger than the optimal NX/NQ size) was used to improve core recovery. Therefore, the RQD values are useful primarily for comparison of relative rock quality within the Bandelier Tuff units.

Tuff - indurated pyroclastic ash consisting of grains generally finer than 4 mm. In this study, the term tuff is used to include the ashey matrix, as well as the pumice, lithic fragments, and phenocrysts

Weathering - chemical or mechanical degradation of tuff and constituent minerals over time. Descriptive terms are fresh (FR), slightly (SL), moderately (MOD), and very highly (H) weathered

Welding - process that promotes the union or cohesion of glassy fragments by thermal fusion and/or vapor-phase mineralization after deposition and subsequent cooling of tuff

TERMINOLOGY RELATED TO DELETERIOUS MATERIAL

The following terminology is used to denote size ranges of deleterious materials (man-made impurities) within fill deposits.

Descriptive Fill Term	*Size Range*	*Comparative Soil Term*
Specks	<No. 200 Sieve	Silt
Particles	No. 200 to No. 10	Sand
Fragments	1/8-inch to 4-inches	Gravel
Pieces	4 to 12-inches	Cobbles
Blocks	>12-inches	Boulders

OTHER DESCRIPTIVE TERMS

Geologic Classification - Granular Fill, Glacial Till Deposits, etc.
For soil samples on which laboratory grain size analyses are performed, the soils are also classified by the criteria of the Unified Soil Classification System (USCS), with the appropriate group symbol indicated in parentheses for each soil description (fill materials are not classified in accordance with USCS criteria)

COLOR

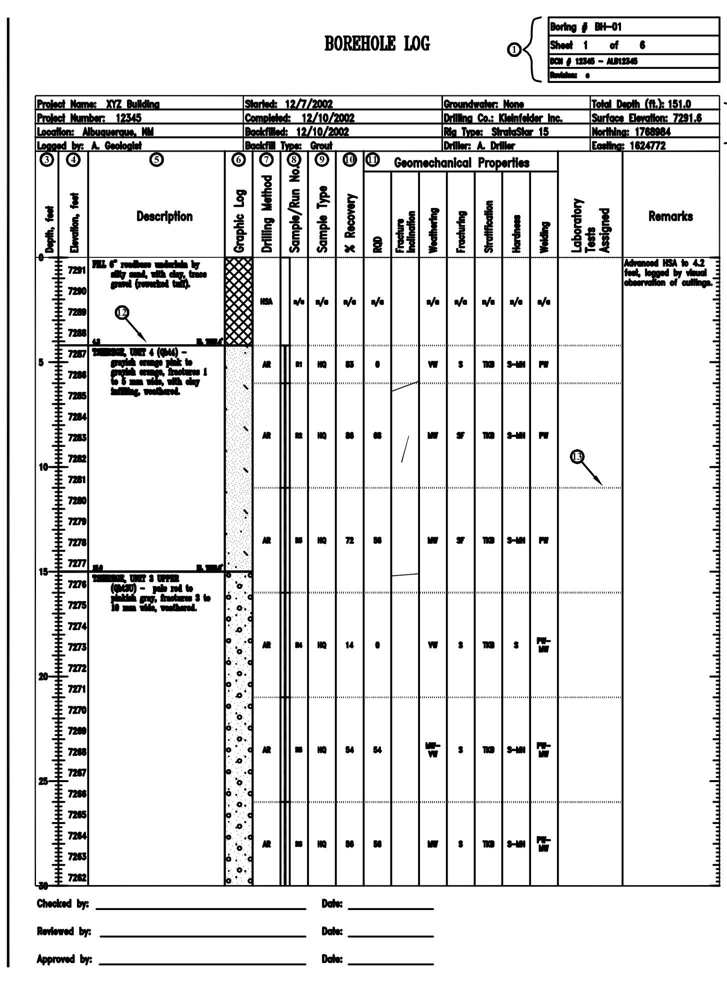
white, brown, yellow, red, gray, blue, black, yellow-brown, blue-gray, etc.

COMPONENT DEFINITION BY GRADATION

Material	*Definition*	*Fraction*	*Sieve Limit Upper*	*Sieve Limit Lower*
Boulder	Material too large to pass through an opening 12-inch square			
Cobbles	Material passing through a 12-inch square opening and retained on a 4-inch sieve			4-inch
Gravel	Material passing the 4-inch sieve and retained on the No. 10 sieve	Coarse Fine	4-inch 1-inch	1-inch No. 10
Sand	Material passing the No. 10 sieve and retained on the No. 200 sieve	Coarse Fine	No. 10 No. 40	No. 40 No. 200
Silt	Material passing the No. 200 sieve which is usually non-plastic in character and exhibits little or no strength when air dried		No. 200	
Clay	Material passing the No. 200 sieve which can also be made to exhibit plasticity within a certain range of moisture contents and which exhibits considerable strength when air dried		No. 200	

ROCK CLASSIFICATION SYSTEM (From LANL Engineering Manual and Broxton and Reneau (1995))

General Property	*Descriptive Term*	*Visual or Physical Properties*
Weathering	Very weathered (VW)	Abundant fractures coated with oxides, carbonates, sulfates, mud, etc., thorough discoloration, rock disintegration, mineral decomposition
	Moderately weathered (MW)	Some fracture coating, moderate or localized discoloration, little to no effect on cementation, slight mineral decomposition
	Slightly weathered (SW)	A few stained fractures, slight discoloration, little to no effect on cementation, no mineral decomposition
	Fresh (F)	Unaffected by weathering agents, no appreciable change with depth
Fracturing	Intensely fractured (IF)	Less than 1-inch spacing
	Very fractured (VF)	1 to 6-inch spacing
	Moderately fractured (MF)	6 to 12-inch spacing
	Slightly fractured (SF)	12 to 36-inch spacing
	Solid (S)	36-inch spacing or greater
Stratification	Thinly laminated (TL)	Less than 1/10-inch spacing
	Laminated (L)	1/10 to 1/2-inch
	Very thinly bedded (VTB)	1/2 to 2-inch spacing
	Thinly bedded (TB)	2-inches to 2 feet
	Thickly bedded (TKB)	Greater than 2 feet
Hardness (Hrd)	Soft (S)	Can be dug by hand and crushed by fingers
	Moderately hard (MH)	Friable, can be gouged deeply with knife and will crumble readily under light hammer blows
	Hard (H)	Knife scratch leaves dust trace, will withstand a few hammer blows before breaking
	Very hard (VH)	Scratched with knife with difficulty, difficult to break with hammer blows
Welding (Wld)	Poorly welded tuffs (PW) (nonwelded to partially welded tuffs in some literature)	Poorly to nonindurated and easily crumbles into flour-like. Some zones display some strength and may produce intact core with short lengths. Some core produces thin wafers that are friable and easily broken by hand. The core is lightweight and very low density. The pumices have significant void space within the pumice structures. Pumices that survive the drilling are open, not elongated. Pumice aspect ratios are roughly equant to 2:1.
	Moderately welded tuffs (MW)	Appear to be moderately indurated and break readily with light hammer blows. Pumices are elongated with some appearance of structure. Approximate pumice aspect ratios are 2:1 to 6:1. Generally, the core remains intact for lengths of several inches to feet.
	Strongly welded tuffs (SW)	Strongly indurated and have pumice aspect ratios of roughly >6:1. Generally, the core remains intact, solid, and dense with flattening of pumices such that little evidence of the pumices may remain. Strongly welded tuffs are not often encountered and require hammers to break apart core and also require air-rotary drilling to obtain sample.



NUMBERED KEY TO BOREHOLE LOG TERMINOLOGY AND SYMBOLS

1. Borehole designation and document control number.
2. Total Borehole Depth, Surface Elevation, Northing, and Easting
   Based on survey information.
3. Depth
   Depth measurement along boring relative to the existing ground surface at time of drilling.
4. Elevation
   Based on project datum.
5. Description
   Geologic nomenclature based on applicable system, with the inclusion of subunits to identify significant changes in lithology or rock properties.
6. Graphic Log
   Graphical representation of lithologic changes. See *Geologic Units*.
7. Drilling Method
   AR - Air rotary
   HSA - Hollow stem auger
   MR - Mud rotary
8. Sample/ Run No.
   Sequential number assigned to sample collected at specified interval.
   S# - Soil sample number
   R# - Core run number
9. Symbol Sampler Type
   CT - Continuous tube sample
   DTW - Denison sampler
   HQ - Rock coring, HQ core barrel (3.8-inch hole diameter) or Geobarrel
   PTW - Pitcher sampler
   S - SPT Split spoon sampler
   U - 2.5-inch California ring sampler
10. % Recovery
    Recovery percentage of sampled length. See *Typical Descriptions*
11. Geomechanical Properties
    a RQD
    Rock Quality Designation. See *Typical Descriptions*
    b Fracture Inclination
    Approximate vertical location and orientation (dip) of fractures present in sample.
    c Weathering
    Weathering description according to *Rock Classification System.*
    d Fracturing
    Fracturing description according to *Rock Classification System.*
    e Stratification
    Stratification description according to *Rock Classification System.*
    f Hardness
    Hardness description according to *Rock Classification System.*
    g Welding
    Welding description according to *Rock Classification System.*
12. Approximate stratification line differentiating geologic units.
13. Approximate boundary line between sampling intervals.

GENERAL NOTES

Logs of subsurface explorations depict subsurface soil, rock and water conditions only at the specific locations and on the dates indicated. Soil and rock conditions and water levels at other locations may differ from conditions and levels occurring at the subsurface exploration locations. Also, the passage of time may result in a change in the conditions and water levels at the subsurface exploration locations.

KLEINFELDER		General Legend and Notes for Boring Logs	Figure 2
Drawn By: C. Vallejo	Date: February 2007	TA-73 LANL Airport Landfill Los Alamos, New Mexico	
Project No:71610	Filename: 71610_02_0		
Scale: not to scale	Revision: 0		

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KLEINFELDER
An employee owned company

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION						Pages:	4
1	Steve Matier smatier@northwind-inc.com	2		3			

Transmittal Date: 08/25/06	**Transmittal DCN: 71610.2 – ALB06TS016**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD016 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Hydraulic Test Pad Results	8/14/06	71610HC 003/004/005

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

08/25/06
Date

RECEIPT AND READ ACKNOWLEDGEMENT PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature

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Print Name

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HYDRAULIC CONDUCTIVITY TEST REPORT
ASTM D5084

Project Name	TA 73 Los Alamos Landfill	*Project No.*	71610
Client Name	Kleinfelder	*Date Received*	8/8/2006 12:30
Client Address	Albuquerque, New Mexico	*Date Tested*	8/14/2006 16:40
		Date Issued	8/17/2006 9:45
Boring No.	Infiltration Test Pad		
Sample Type	Remolded Sample		
Sample Depth	1"-6"		
Sample Description	Lean Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	14.9	18.4	%
Dry Unit Weight, Dd	106.9	107.2	pcf
Height, L	2.81	2.41	Inches
Diameter, d	2.82	2.82	Inches
Degree of Saturation, Sr	69.7	86.9	%

Chamber Pressure:	60.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	55.0	psi
Consolidation Pressure:	3	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	20.7	0	15.80	21.80	3.30E-07	3.2E-07	19.98
	Finish	20.7	7980	18.00	19.70			
2	Start	20.7	7980	18.00	19.70	3.12E-07	3.1E-07	19.47
	Finish	20.7	15060	19.80	18.00			
3	Start	20.7	15060	19.80	18.00	3.11E-07	3.1E-07	19.19
	Finish	20.5	19200	20.80	17.00			
4	Start	20.5	19200	20 80	17.00	2.99E-07	2.9E-07	18.86
	Finish	20.4	24120	21.95	15.90			

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp 3.1E-07

Average Hydraulic Conductivity "k" (cm/sec) @ 20° C 3.1E-07

Assumed Specific Gravity SG 2.7

Area of Tube (cm^2), a (pipette) 0 9721

Permeant : Dealred Tap Water

Formulas:

Permeability (Falling Head-Rising Tailwater Test)

$k = [(a*L/(2*A*t)] \ln(ho/h1)$

k = Hydraulic Conductivity (cm/sec)

a = Area of Tube (cm^2)

L = Height or Length of Sample (cm)

A = Area of Sample (cm^2)

t = Time of Test Interval (sec)

h_o = Height of Head at Start of Test Interval (cm)

h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation

$Sr = w*SG/e$ $Dd = (SG/1+e)Dw$

Therefore:

$Sr = (w*SG)/((SG*Dw/Dd)-1)$

Sr = Degree of Saturation (%)

w = Moisture Content (%)

SG = Specific Gravity

e = Void Ratio

Dd =Dry Unit Weight (pcf)

Dw = Unit Weight of Water (62 4 pcf)

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KLEINFELDER

AUG-21-2006 MON 11:27 AM FAX NO. P. 02

HYDRAULIC CONDUCTIVITY TEST REPORT

ASTM D5084

Project Name	TA 73 Los Alamos Landfill	*Project No.*	71610
Client Name	Kleinfelder	*Date Received*	8/08/2006 12:30
Client Address	Albuquerque, New Mexico	*Date Tested*	8/14/2006 16:40
		Date Issued	8/17/2006 9:45
Boring No.	Infiltration Test Pond		
Sample Type	Drive Cylinder		
Sample Depth	6"-11"		
Sample Description	Lean to Fat Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	15.5	17.0	%
Dry Unit Weight, Dd	108.4	110.5	pcf
Height, L	1.76	1.73	inches
Diameter, d	2.78	2.77	inches
Degree of Saturation, Sr	75.5	87.4	%

Chamber Pressure:	60.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	55.0	psi
Consolidation Pressure:	3	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	20.6	0	9.00	23.40			
	Finish	21.3	53340	14.70	18.20	7.82E-08	7.6E-08	32.24
2	Start	21.3	53340	14.70	18.20			
	Finish	20.8	56340	15.00	17.95	7.30E-08	7.1E-08	32.11
3	Start	20.8	56340	15.00	17.95			
	Finish	20.7	61920	15.45	17.50	6.45E-08	6.3E-08	31.90
4	Start	20.7	61920	15.45	17.50			
	Finish	20.7	69900	16.10	16.90	6.32E-08	6.2E-08	31.62

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp. 7.0E-08

Average Hydraulic Conductivity "k" (cm/sec) @ 20° C 6.8E-08

Assumed Specific Gravity, SG 2.7

Area of Tube (cm^2), a (pipette) 0.9721

Permeant : Desired Tap Water

Formulas:

Permeability (Falling Head-Rising Tailwater Test)

$k = [(a*L/(2*A*t)] \ln(ho/h1)$

k = Hydraulic Conductivity (cm/sec)

a = Area of Tube (cm^2)

L = Height or Length of Sample (cm)

A = Area of Sample (cm^2)

t = Time of Test Interval (sec)

h_0 = Height of Head at Start of Test Interval (cm)

h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation

Sr = w*SG/e Dd = (SG/1+e)Dw

Therefore:

Sr = (w*SG)/((SG*Dw/Dd)-1)

Sr = Degree of Saturation (%)

w = Moisture Content (%)

SG = Specific Gravity

e = Void Ratio

Dd =Dry Unit Weight (pcf)

Dw = Unit Weight of Water (62.4 pcf)

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AUG-21-2006 MON 11:27 AM FAX NO. P. 03

HYDRAULIC CONDUCTIVITY TEST REPORT
ASTM D5084

Project Name	TA 73 Los Alamos Landfill	*Project No.*	71610
Client Name	Kleinfelder	*Date Received*	8/08/2006 12:30
Client Address	Albuquerque, New Mexico	*Date Tested*	8/16/2006 16:40
		Date Issued	8/21/2006 15:10
Boring No.	Infiltration Test Pond		
Sample Type	Drive Cylinder		
Sample Depth	11"-16"		
Sample Description	Lean to Fat Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	12.1	16.9	%
Dry Unit Weight, Dd	107.8	110.2	pcf
Height, L	1.69	1.65	inches
Diameter, d	2.78	2.76	inches
Degree of Saturation, Sr	57.9	86.4	%

Chamber Pressure:	60.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	55.0	psi
Consolidation Pressure:	3	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	21.4	0	9.35	16.95			
	Finish	21.5	2940	9.55	16.75	5.02E-08	4.8E-08	34.44
2	Start	21.5	2940	9.55	16.75			
	Finish	21.1	5880	9.70	16.60	3.77E-08	3.6E-08	34.37
3	Start	21.1	5880	9.70	16.60			
	Finish	20.8	10680	10.00	16.30	4.64E-08	4.5E-08	34.22
4	Start	20.8	10680	10.00	16.30			
	Finish	20.8	16380	10.40	15.95	4.90E-08	4.8E-08	34.04

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp 4.6E-08

Average Hydraulic Conductivity "k" (cm/sec) @ 20° C **4.4E-08**

Assumed Specific Gravity, SG 2.7
Area of Tube (cm^2), a (pipette) 0.9721
Permeant : Dealred Tap Water
Formulas:
Permeability (Falling Head-Rising Tailwater Test)
k = [(a*L/(2*A*t)] ln(ho/h1)
k = Hydraulic Conductivity (cm/sec)
a = Area of Tube (cm^2)
L = Height or Length of Sample (cm)
A = Area of Sample (cm^2)
t = Time of Test Interval (sec)
h_0 = Height of Head at Start of Test Interval (cm)
h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation
Sr = w*SG/e Dd = (SG/1+e)Dw
Therefore:
Sr = (w*SG)/((SG*Dw/Dd)-1)
Sr = Degree of Saturation (%)
w = Moisture Content (%)
SG = Specific Gravity
e = Void Ratio
Dd =Dry Unit Weight (pcf)
Dw = Unit Weight of Water (62.4 pcf)

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AUG-22-2006 TUE 09:45 AM FAX NO. P. 02

Job Mix Formula for Impermeable MatCon® Modified Asphalt Cap
Los Alamos National Laboratory Airport Landfill

Prepared For

Wilder Construction Company
1525 East Marine Drive
Everett, WA 98201-1927

Attn: Mr. Jerry Thayer
MatCon® Program Manager

Prepared By

Gaylon L. Baumgardner
Executive Vice President
Paragon Technical Services, Inc.
gaylon.baumgardner@ptsilab.com
Phone 601-933-3217

5 June 2006

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Job Mix Formula for Impermeable MatCon® Modified Asphalt Cap
Los Alamos National Laboratory Airport Landfill
5 June 2006

Mix Design Parameters for MatCon® Impermeable Asphalt

Table 1

Mineral Aggregate - Combination / Blend Ratio	
Aggregate Type	**Wt % in Blend**
-1/2" Crushed Intermediate Agg - Waldo Pit	30
Crushed Fine Aggregate - Waldo Pit	48.5
Natural Fine Aggregate - Waldo Pit	20
Hydrated Lime - Type N - Chem Lime	1.5

Table 2

Job Mix Formula, Aggregate Blend Gradation Comparison			
	MATCON® Guide Specification Range	JMF as per Table 1 Wt % Passing	
Sieve Size, mm (No.)	Wt % Passing	Target	Project Limits
12.5 mm (1/2")	100	100	100
9.5 mm (3/8")	85-100	97	92 - 100
4.75 mm (No. 4)	60-80	67	63 - 71
2.36 mm (No. 8)	40-60	47	43 - 51
1.18 mm (No. 16)	25-40	33	29 - 37
0.600 mm (No. 30)	15-25	24	20 - 28
0.300 mm (No. 50)	11-20	16	13 - 19
0.150 mm (No.100)	7-15	10	7 - 13
0.075 mm (No.200)	5-10	7	5 - 9

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Job Mix Formula for Impermeable MatCon® Modified Asphalt Cap
Los Alamos National Laboratory Airport Landfill
5 June 2006

Table 3

Asphalt Content	
Type	**Wt %,** by weight of total Mixture
MATCON® Proprietary Binder	8.2%
JMF Aggregate Blend, Dry	91.8%
Anti-strip	Not Required

Table 4

Performance Properties of Specimens Prepared using Asphalt Institute Marshall Method (50 Blow), Mix Design @ 8.0% MATCON® Binder		
Test Property	**MATCON® Requirements**	**Results**
Binder Content, %	6% to 9%	8.2%
Hydraulic Conductivity (k, cm/sec, ASTM 5084)	<1.0 x 10-8	Pass
Tensile Strength Ratio ((TSR), %, AASHTO T-283))	>80	85%
Volumetric Analysis in Accordance with Asphalt Institute Manual Series No. 2 (MS-2)		
Maximum Specific Gravity, Gmm	-	2.327
Bulk Specific Gravity, Gsb	-	2.280
Air Voids, %	3% max	2.0%
Voids in Mineral Aggregate, VMA, %	-	17.0
Voids Filled with Asphalt, VFA, %	-	89.0

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Job Mix Formula for Impermeable MatCon® Modified Asphalt Cap
Los Alamos National Laboratory Airport Landfill
5 June 2006

Table 5

Aggregate Properties						
Property	**ASTM Test Method**	**MATCON® Property**	Results			
			-1/2" Crushed Intermediate	Crushed Fine Aggregate	Natural Fine Aggregate	Hydrated Lime
Type			Granite	Granite	Nat Sand	
Quarry			Waldo	Waldo	Waldo	Chem Lime
Unit Weight, lbs/ft³	C29	Loose	77.7	97.9	na	na
		Rodded	90.3	110.0	na	na
Soundness, Sodium Sulfate	C88	<9%	3.8	3.8	na	na
Hardness, LA Abraision	C131	<40%	15	na	na	na
Fractured Faces	D5821		100	100	na	na
Sand Equivalency	D2419		na	62	59	na
Bulk Specific Gravity	C127/128		2.599	2.495	2.519	2.309
Absorption, %			1.7	2.2	1.74	na
Sieve Analysis, % Passing						
Sieve Size, mm (No.)						
12.5 mm (1/2")	C136	Not Applicable for Stockpile Aggregates	100	100	100	100
9.5 mm (3/8")			90.8	99.9	100	100
4.75 mm (No. 4)			11.4	90.3	90.7	100
2.36 mm (No. 8)			1.6	63.8	79.4	100
1.18 mm (No. 16)			0.9	43.6	68.1	100
0.600 mm (No. 30)			0.8	30.1	53.3	100
0.300 mm (No. 50)			0.8	19.7	28.0	99.9
0.150 mm (No.100)			0.7	12.2	10.3	99.5
0.075 mm (No.200)			0.5	7.5	6.0	99.4

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Job Mix Formula for Impermeable MatCon® Modified Asphalt Cap
Los Alamos National Laboratory Airport Landfill
5 June 2006

Table 6

Hydraulic Conductivity vs Density @ Optimum AC Content		
Gmm, %	**Air Voids, %**	Hydraulic Conductivity (k, cm/sec, ASTM 5084)
91.5	8.5	1.24×10^{-4}
95.5	4.5	6.42×10^{-4}
97.0	3.0	6.40×10^{-10}
97.4	2.6	8.04×10^{-10}

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January 17, 2007

John Keck
North Wind, Inc.
1425 Higham Street
Idaho Falls, Id 83402

Subject: Hydraulic Conductivity Tests (MatCon)

Dear John:

I am forwarding 4 pages of documentation as it relates to the above noted testing as provided by Kleinfelder.

The documentation consists of a letter from Cindy Pimental addressed to myself. I trust this letter summarizes the test procedure and there is no need for me to reiterate this information here. The second page is a table of results and the final two pages are graph results of the four samples, which provided tangible results.

The CD of photographs has also been included. Please note that this documentation is also being sent via e-mail and photographs have not been attached the electronic file.

Sincerely,

Perry Hampel
CMT Manager

Seth Olsen
Staff Professional

Attachments Letter (Cindy Pimentel) 4-pages.
Photograph CD

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ATTACHMENTS

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January 5, 2007
Project No.: 71610
Lab No.: 06G260
Project : Los Alamos Airport

Mr. Perry Hampel,

This letter presents the results of twelve (12) Hydraulic Conductivity tests requested for the Los Alamos project on October 31, 2006.

Samples 1 through 6 were received from Kleinfelder Albuequeque on October 31, 2006. Samples 7 through 12 were received late in November. These samples were cored to a diameter 2.75 inches with varying lengths. One end appeared to be the surface. It was rough but even and was labeled. The other end was jagged. The samples were tested in general accordance with ASTM D 5084. Photographs were taken of samples 7 through 12 after they had been trimmed, but before placing into the cells.

For Samples 1 through 4, sand was used on the uneven end in an effort to reduce air pockets. The confining pressure used was 3 PSI. The sand and/or low confining pressure may have caused sidewall leakage.

For Samples 5 through 12, the uneven ends were trimmed using a circular saw. The ends were scored as required in ASTM D5084. Samples 5 and 6 showed initial flow through the samples, however the initial results could not be duplicated and eventually the flow stopped completely. Vacuum grease was used on the sides of samples 7 through 12 and confining pressure was increased to 10 PSI. The samples remained in the cells between 8 and 11 days. There was no apparent flow through the samples 7 through 12. The lowest measured Hydraulic Conductivity we have been able to measure is in the 10^{-9} cm/s^2 range.

If you have any questions regarding this report or if we can be of further assistance, please feel free to contact our office at (925) 484-1700, ext. 426.

Sincerely,

Cindy Pimentel
Laboratory Supervisor
Geotechnical Department

Attachments: Table of Results
Photograph CD

KLEINFELDER 7133 Koll Center Parkway, Suite 100, Pleasanton, CA 94566-3101 (925) 484-1700 (925) 484-5838 fax

KLEINFELDER

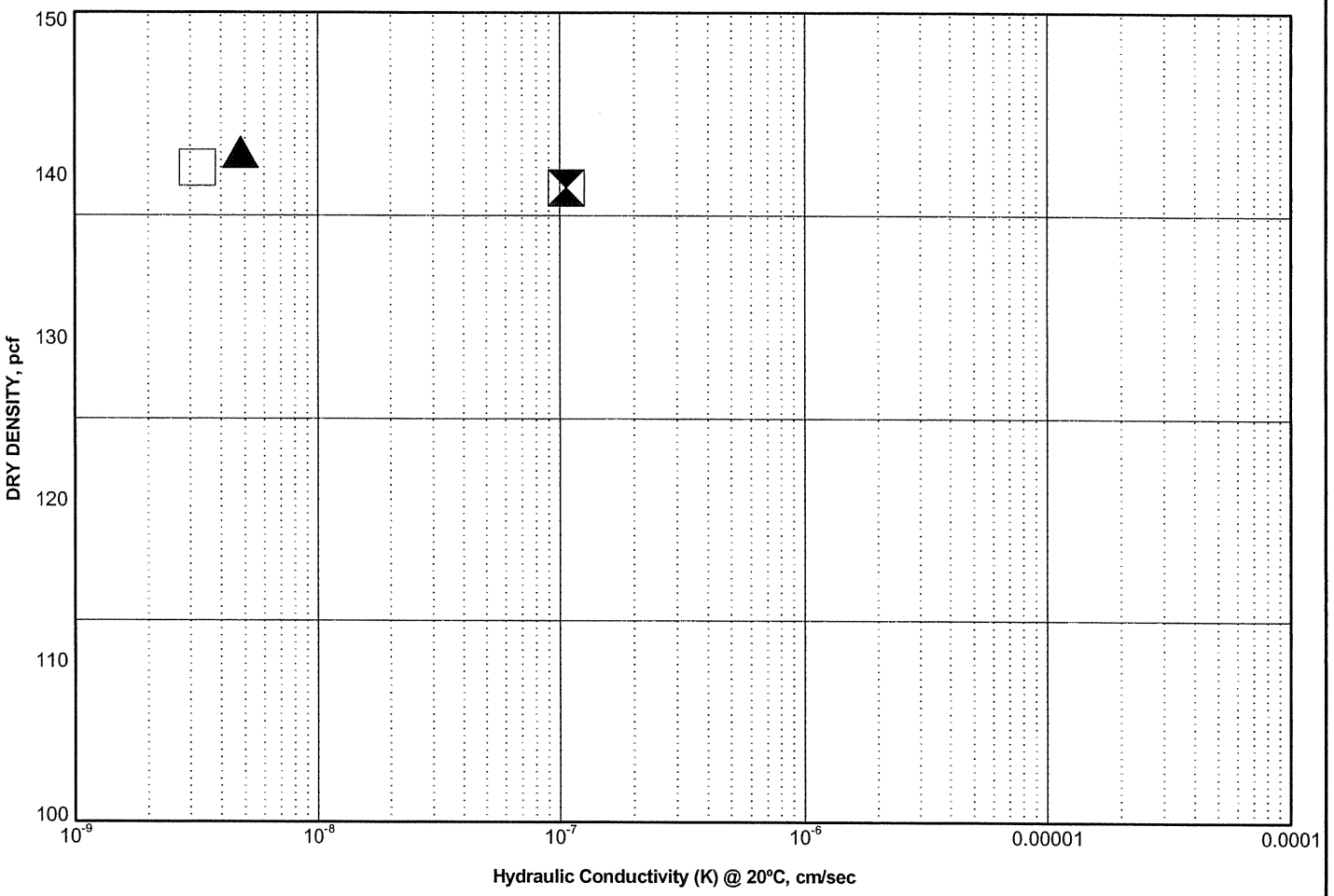
Project:	Los Alamos Airport	Dated Received:	10/31/2006
Project No.:	71610	Date Completed:	12/29/2006
Description:	Asphalt Cores	Lab No.:	06G260

Sample Identification	Hydraulic Conductivity	Confining Pressure	Sand Used on Uneven End	Days in Cells
1	3.2 E -09	3 PSI	yes	11
2	1.1 E -07	3 PSI	yes	2
3	4.8 E -09	3 PSI	yes	7
4	1.5 E -07	3 PSI	yes	3
5	incalculable *	3 PSI	no	24
6	incalculable *	3 PSI	no	24
7	incalculable **	10 PSI	no	8
8	incalculable **	10 PSI	no	8
9	incalculable **	10 PSI	no	8
10	incalculable **	10 PSI	no	10
11	incalculable **	10 PSI	no	11
12	incalculable **	10 PSI	no	11

* Vacuum grease was not used. There was no apparent flow through the samples.

** Samples were placed in the cells with vacuum grease around the sides and confining pressure of 10 psi. The samples remained in the cells between 8 and14 days, there was no apparent flow through the samples.

Note: Samples tested in general accordance with ASTM D 5084. Samples 5 through 12 were trimmed using a circular saw to cut off the uneven edge and reduce the size. Sand was used on the uneven edge for Samples 1 - 4. The ends were scored as required in ASTM D 5084.



Test Type: FALLING HEAD, RISING TAILWATER *Saturation Method: BACKPRESSURE*

	Symbol	□	⧗	▲
INITIAL	Diameter, mm	69.60	69.72	69.60
	Height, mm	105.31	103.48	88.72
	Moisture Content, %	0.0	0.5	0.1
	Dry Density, pcf	140	139	141
	Void Ratio			
	Saturation, %			
FINAL	Consol. Pressure, psi	3.00	3.00	3.00
	Water Content, %	0.0	1.1	0.7
	Dry Density, pcf	140	138	140
	Void Ratio			
	Saturation, %			
Hydraulic Conductivity, cm/sec		3.2E-09	1.1E-07	4.8E-09
Sample Source		1 @ 0.0'	2 @ 0.0'	3 @ 0.0'
Sample Description				
Note				

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 5084 (METHOD C)

KLEINFELDER

PROJECT NO. 71610

HYDRAULIC CONDUCTIVITY*

LOS ALAMOS AIRPORT

PLATE

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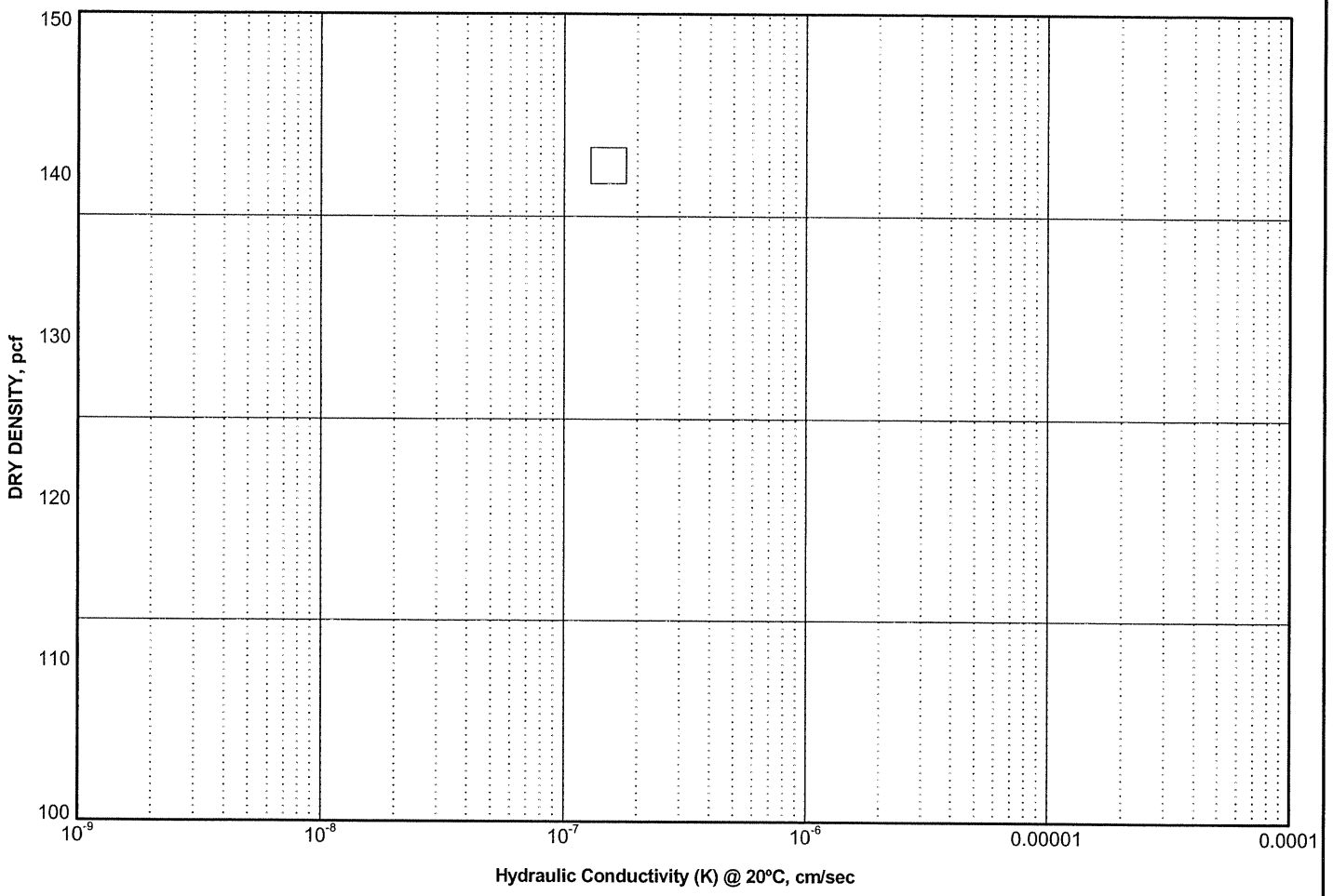
12/12/2006 10:39:29



Test Type: FALLING HEAD, RISING TAILWATER *Saturation Method: BACKPRESSURE*

Symbol		□		
INITIAL	**Diameter, mm**	69.80		
	Height, mm	89.61		
	Moisture Content, %	0.1		
	Dry Density, pcf	141		
	Void Ratio			
	Saturation, %			
FINAL	**Consol. Pressure, psi**	3.00		
	Water Content, %	1.2		
	Dry Density, pcf	139		
	Void Ratio			
	Saturation, %			
Hydraulic Conductivity, cm/sec		1.5E-07		
Sample Source		4 @ 0.0'		
Sample Description				
Note				

*PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 5084 (METHOD C)

KLEINFELDER

PROJECT NO. *71610*

HYDRAULIC CONDUCTIVITY*

LOS ALAMOS AIRPORT

PLATE

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12/12/2006 10:39:30

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DOCUMENT TRANSMITTAL FORM

TO:	John Keck North Wind, Inc. 1425 Higham Street Idaho Falls, ID 83402	**PAGE**	1	**OF**	3
		TRANSMITTAL DATE:	01/17/07		
		TRANSMITTAL DCN:	71610.3 – ALB07TS001		
RETURN RESPONSES/COMMENTS TO:	Perry Hampel				
RETURN RESPONSES/COMMENTS BY:					

PROJECT NO.:	71610	**PROJECT NAME:**	**TA-73 Airport Landfill Project**
ACTIVITY/DESCRIPTION:	**Letter Re: Hydraulic Conductivity Tests (MatCon)**		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
Letter RE: Hydraulic Conductivity Tests + CD w/ Photos of Sample	0	6	1/17/07	71610.3-ALB07TS001

INSTRUCTIONS/REMARKS

PLEASE VERIFY RECEIPT OF THIS DELIVERABLE BY REPLYING TO THIS E-MAIL. YOUR REPLY WILL SERVE AS VERIFICATION OF SUCCESSFUL RECEIPT OF THE ATTACHED DOCUMENT.

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CLIENT RECEIPT	PRINT NAME	SIGNATURE	DATE
Complete & Return this page via Fax/Mail/Email	Adrian DeHerrera for Perry Hampel	for: Perry Hampel	1/17/07

KLEINFELDER RECEIPT	PRINT NAME	SIGNATURE	DATE
Complete this section upon receipt from client			

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ASTM Geotechnical Testing Jour

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Before H

Wet Sample W

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Sidewall Leakage in Hydraulic Conductivity Testing of Asphalt Concrete Specimens

5 3:20PM

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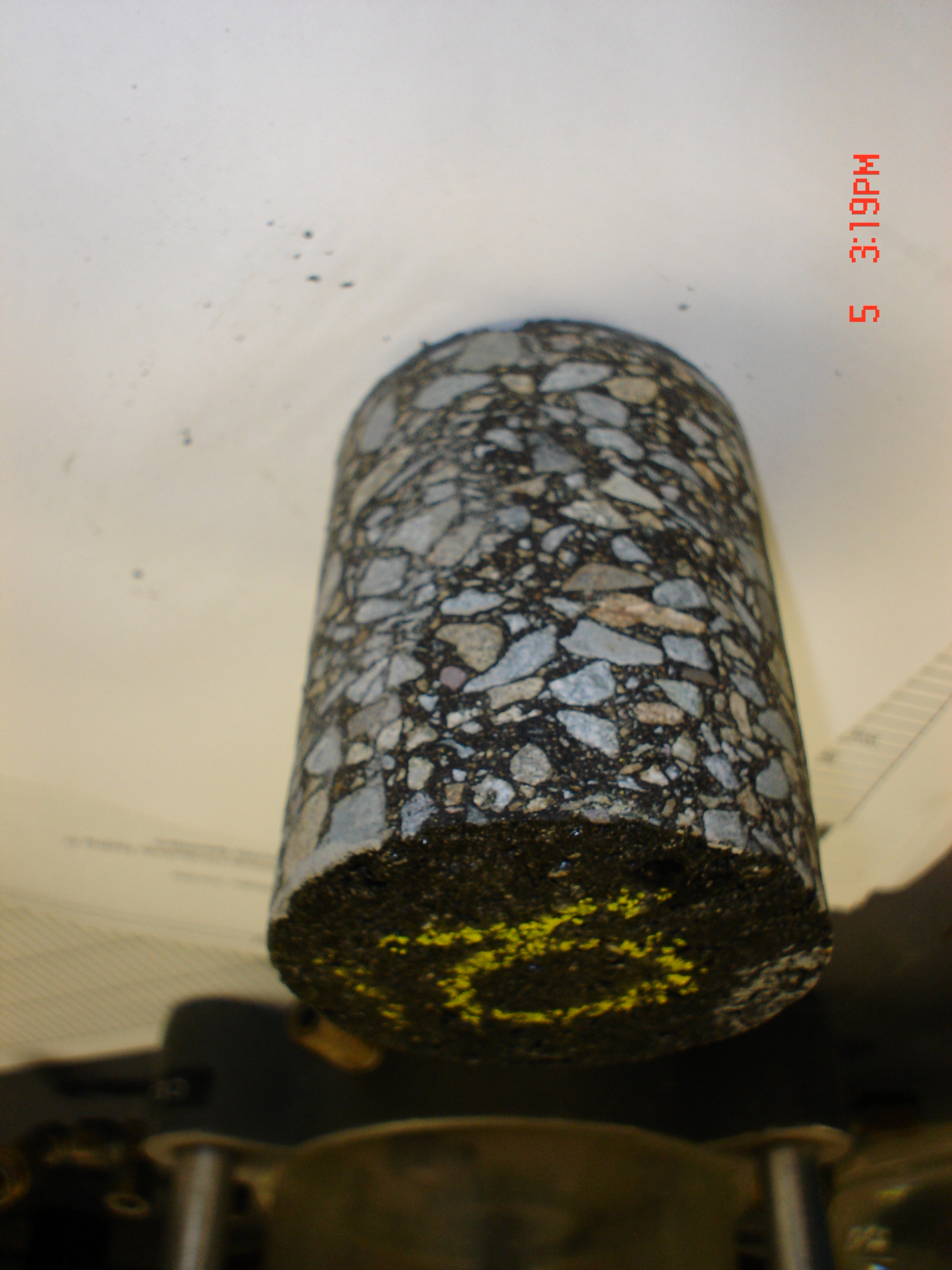
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Wet Sample
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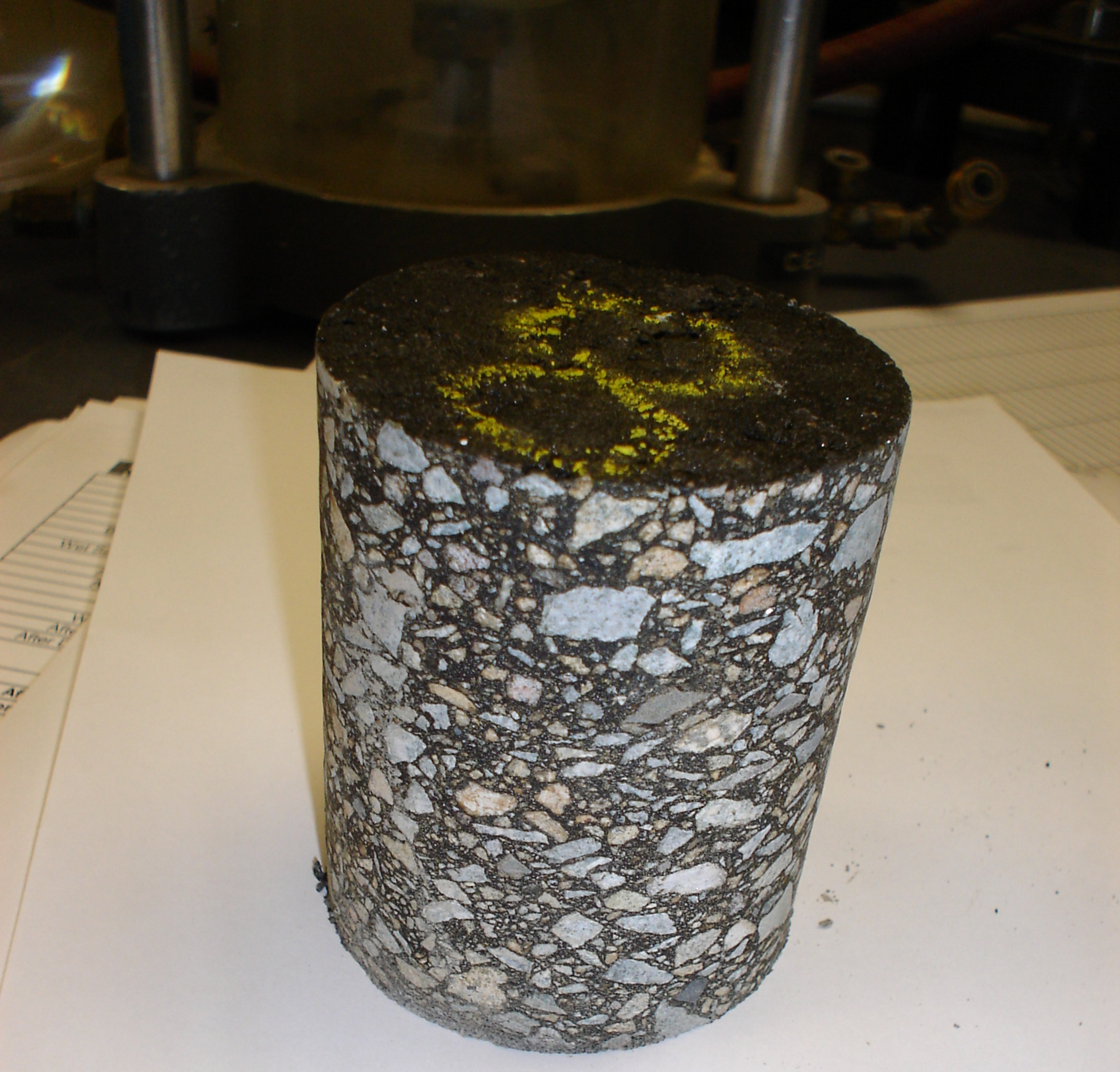

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Page 1
Cindy Pimentel - ASTM%20GTJ%20Sidewall%20Leakage
ASTM Geotechnical Testing Jc
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LARGE SCALE INTERNAL DIRECT SHEAR TEST DATA

ASTM D 3080 - 12" x 12" Box

Client:	Kleinfelder	Date:	09/19/2006
Project No:	2304-74	Test Date:	09-18&19-06
Project:	Los Alamos Landfill Gravel Pit, #71610	Technician:	SR
Interface:	Sample #06-106	Shear Rate:	0.04"/min
Special conditions:	Inundated, 95% of 133.5 MDD, 7.2% Moisture Content	Test Series:	DS-2

Displacement (inches)	Normal Force 504 psf Shear Stress (psf)	Normal Force 1512 psf Shear Stress (psf)	Normal Force 3024 psf Shear Stress (psf)
0	0	0	0
0.029	549	693	815
0.092	941	1571	1740
0.159	994	1913	2228
0.224	996	1988	2537
0.293	1012	2034	2738
0.361	1001	2094	2879
0.425	992	2135	2990
0.493	986	2169	3081
0.563	986	2208	3169
0.628	976	2230	3232
0.695	974	2273	3309
0.76	961	2296	3372
0.827	956	2281	3417
0.894	969	2260	3460
0.957	976	2243	3506
1.022	979	2222	3513
1.091	974	2187	3556
1.155	984	2155	3563
1.22	987	2114	3584
1.285	1002	2077	3601
1.35	1007	2071	3599
1.417	1007	2046	3579
1.481	1007	2041	3591
1.543	1011	2016	3596
1.608	1019	1979	3596
1.673	1032	1956	3568
1.735	1034	1953	3559
1.8	1044	1956	3563
1.866	1049	1931	3578
1.928	1057	1914	3569
1.992	1060	1875	3549
2.055	1075	1885	3508
2.119	1090	1905	3495

Data Entered By: SR Date: 09/19/2006

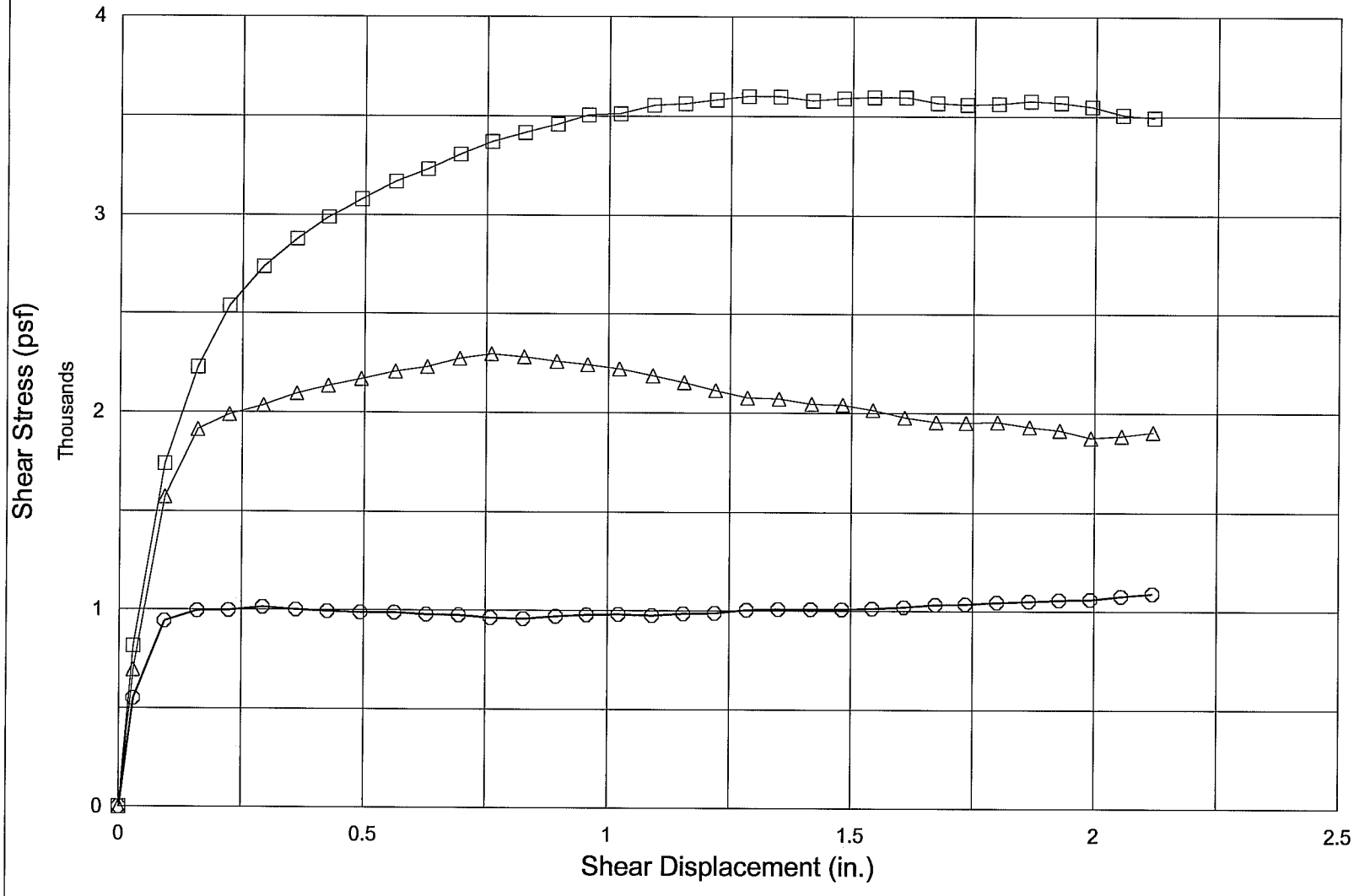
Data Checked By: CJ Date: 09/19/06

File Name: KIDSNATI

Advanced Terra Testing, Inc.

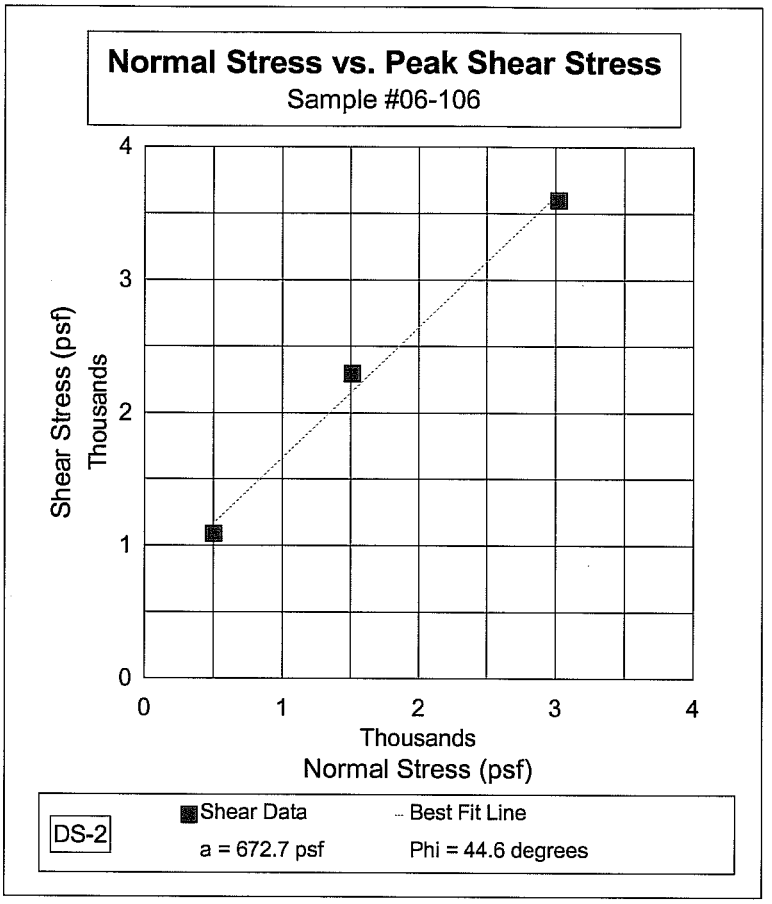
Shear Stress vs. Displacement

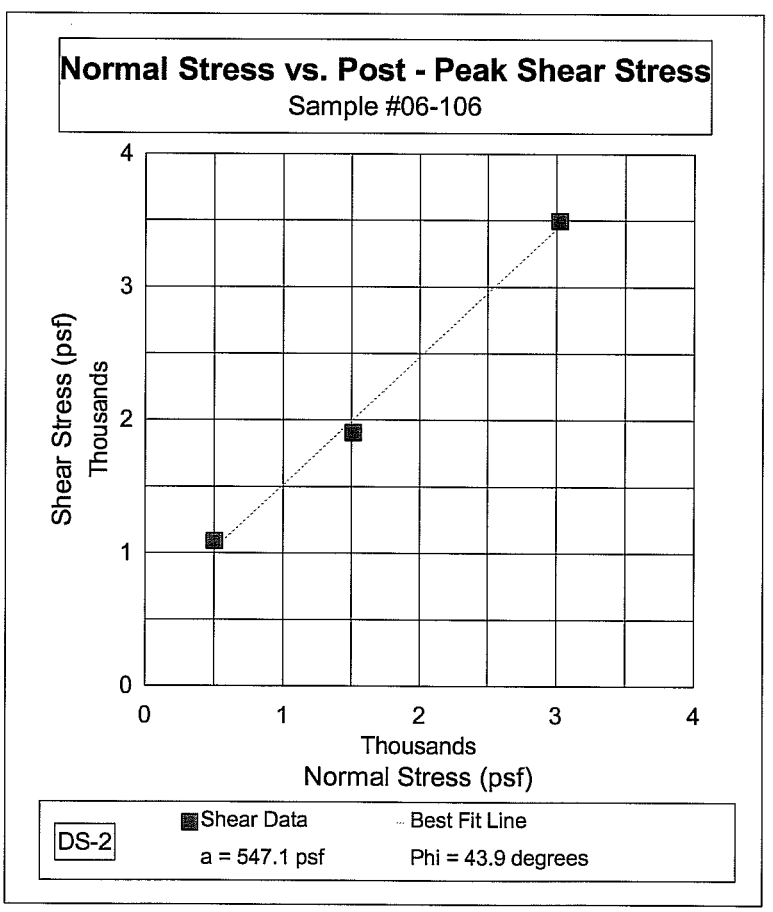
Sample #06-106



DS-2

⊖ Normal Force 504 psf ⊿ Normal Force 1512 psf ⊟ Normal Force 3024 psf





ADVANCED TERRA TESTING, Inc.

KLEINFELDER

DOCUMENT TRANSMITTAL FORM

TO:	See Distribution List	PAGE 1 OF 9
		TRANSMITTAL DATE: 12/20/06
		TRANSMITTAL DCN: 71610.2 – ALB06TS043

RETURN RESPONSES/COMMENTS TO:	Perry Hampel
RETURN RESPONSES/COMMENTS BY:	48 hrs from date of transmission

PROJECT NO.:	71610	PROJECT NAME:	TA-73 Los Alamos Land Fill
ACTIVITY/DESCRIPTION:	CMT Lab Reports		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
ASTM D 2974 Method C Organic Content	0	1	12/18/06	71610MC 001
Concrete Cylinder Test Report	0	1	12/13/06	6414C 50
Concrete Cylinder Test Report	0	1	12/13/06	6415C 51
Concrete Cylinder Test Report	0	1	12/13/06	6416C 52
Concrete Cylinder Test Report	0	1	12/12/06	6392C 53
Concrete Cylinder Test Report	0	1	12/12/06	6393C 54
Concrete Cylinder Test Report	0	1	12/18/06	6459C 57

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Complete this section upon receipt from client			

CMT LAB REPORT DISTRIBUTION

1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3	Steve Edwards sedwards@northwind-inc.com

ASTM D2974 Method C Organic Content

Job Name	TA-73	Tested by	MT	Date Tested	12/14/2006	Checked by / Date	SPO	12/18/2006
Job #	71610-1A							
Lab #	06-415							
Dish # & tare	#1 / 444.2							
Sample Location	Bucket On site							
Wet Weight (As Received)	422.8							
Dry Weight (As Received)	278.80							
A:Dry Weight 110c	58.08							
B:Dry Weight 440c	40.48							
C:A-B	17.60							
D:Percent Ash	43.5							
Percent Organic Matter	56.5							
Moisture Content =	51.6							

Percent Ash = (CX100)/A

Percent Organic Matter = 100-D

Sample #	06-415					
Dry Wt. after 16 hr.	58.08					
Dry Wt. after 1 additional hr.	58.08					
Dry Wt. 440c	40.48					
Dry Wt 440c 1 Additional hr.	40.48					

Seth Olsen

Seth Olsen Kleinfelder, Inc.

Kleinfelder Inc.
8300 Jefferson NE Suite B
Albuquerque, NM 87113

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KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: December 13, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No 3000 ¾"
Design Strength: 3000 PSI

Agg # 16440
Sand # 13120 @ 6.00%
Fly Ash # 1330
Cement # 5375
Water # 1973

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Section E retaining wall, south end

			Measured
Truck No.	10466	Slump (in.):	3.25"
Date Sampled:	November 15, 2006	Slump w/plasticizer (in.)	"
Date Received:	November 16, 2006	Air Temperature (°F):	31°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	58°
Batch Size:	10.0 cy	Air Content (%):	4.7% uncorrected
Time Batched:	7:09 a.m.	Unit Weight (pcf):	141.1
Time Placed:		Water Added (gal):	0
Time Sampled:	7:36 a.m.	Ticket No.:	99487
Yield Relative:	1.00	W/C Ratio	0.412

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
50A	11/22/06	7	4.00 x	8.00	12.57	45605	3630*****	NA
50B	11/22/06	7FC	4.00 x	8.00	12.57	44440	3530*****	NA
50C	12/13/06	28	4.00 x	8.00	12.57	73200	5820*****	C
50D	12/13/06	28	4.00 x	8.00	12.57	72690	5780*****	C

Lab # 6414 Curing: Lab/Water tanks Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: December 13, 2006
Page 1 of 1
Project No 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No 3000 ¾"
Design Strength: 3000 PSI

Agg # 16580
Sand # 12900 @ 6.00%
Fly Ash # 1380
Cement # 5340
Water # 1980

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 402^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Section E retaining wall, south end

			Measured
Truck No.	10466	Slump (in.):	4.5"
Date Sampled:	November 15, 2006	Slump w/plasticizer (in.)	"
Date Received:	November 16, 2006	Air Temperature (°F):	40°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	58°
Batch Size:	10.0 cy	Air Content (%):	5.4% uncorrected
Time Batched:	10:53 a.m.	Unit Weight (pcf):	140.4
Time Placed:		Water Added (gal):	0
Time Sampled:	11:20 a.m.	Ticket No.:	99501
Yield Relative:	1.00	W/C Ratio	0.41

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
51A	11/22/06	7	4.00 x	8.00	12.57	50430	4010**	NA
51B	11/22/06	7FC	4.00 x	8.00	12.57	46415	3690**	NA
51C	12/13/06	28	4.00 x	8.00	12.57	71755	5710**	C
51D	12/13/06	28	4.00 x	8.00	12.57	70540	5610**	C

Lab # 6415 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: December 13, 2006
Page 1 of 1
Project No 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16340
Sand # 12920 @ 6.00%
Fly Ash # 1330
Cement # 5335
Water # 1974

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Section E retaining wall, south end

			Measured
Truck No.	10556	Slump (in.):	4.5"
Date Sampled:	November 15, 2006	Slump w/plasticizer (in.)	"
Date Received:	November 16, 2006	Air Temperature (°F):	48°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	68°
Batch Size:	10.0 cy	Air Content (%):	5.1% uncorrected
Time Batched:	2:24 p.m.	Unit Weight (pcf):	140.6
Time Placed:		Water Added (gal):	0
Time Sampled:	2:50 p.m.	Ticket No.:	99514
Yield Relative:	1.00	W/C Ratio	0.41

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
52A	11/22/06	7	4.01 x	8.00	12.63	45805	3630*****	NA
52B	11/22/06	7FC	4.00 x	8.00	12.57	45965	3660*****	NA
52C	12/13/06	28	4.00 x	8.00	12.57	71045	5650**	C
52D	12/13/06	28	4.00 x	8.00	12.57	73990	5890**	C

Lab # 6416 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: Perry Hampel
Kleinfelder, Inc

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: December 12, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16460
Sand # 12980 @ 6.25%
Fly Ash # 1335
Cement # 5335
Water # 1947

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 398^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Footings B, C, and D south ends.

			Measured
Truck No.	10556	Slump (in.):	4.0"
Date Sampled:	November 14, 2006	Slump w/plasticizer (in.)	"
Date Received:	November 15, 2006	Air Temperature (°F):	52°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	63°
Batch Size:	10.0 cy	Air Content (%):	5.0% uncorrected
Time Batched:	9:36 a.m.	Unit Weight (pcf):	140.9
Time Placed:		Water Added (gal):	0
Time Sampled:	10:10 a.m.	Ticket No.:	99475
Yield Relative:	1.00	W/C Ratio	0.41

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
53A	11/21/06	7	4.00 x	8.00	12.57	63355	5040**	NA
53B	11/21/06	7FC	4.00 x	8.00	12.57	59320	4720**	NA
53C	12/12/06	28	4.00 x	8.00	12.57	74395	5920**	C
53D	12/12/06	28	4.00 x	8.00	12.57	84225	6700**	C

Lab # 6392 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: December 12, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16460
Sand # 12900 @ 6.25%
Fly Ash # 1330
Cement # 5365
Water # 1944

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Footings B, C, and D south ends.

			Measured
Truck No.	10556	Slump (in.):	4.25"
Date Sampled:	November 14, 2006	Slump w/plasticizer (in.)	"
Date Received:	November 15, 2006	Air Temperature (°F):	44°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	68°
Batch Size:	10.0 cy	Air Content (%):	5.1% uncorrected
Time Batched:	11:59 a.m.	Unit Weight (pcf):	140.5
Time Placed:		Water Added (gal):	10
Time Sampled:	12:35 p.m.	Ticket No.:	99483
Yield Relative:	1.00	W/C Ratio	0.41

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
54A	11/21/06	7	4.00 x	8.00	12.57	61885	4920**	NA
54B	11/21/06	7FC	4.00 x	8.00	12.57	62235	4950**	NA
54C	12/12/06	28	4.00 x	8.00	12.57	78250	6220**	C
54D	12/12/06	28	4.00 x	8.00	12.57	75755	6030**	C

Lab # 6393 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: December 18, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16520
Sand # 12780 @ 5.25%
Fly Ash # 1370
Cement # 5360
Water # +

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 398^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Retaining wall footing sections B, C, and D.

			Measured
Truck No.	10546	Slump (in.):	3.5"
Date Sampled:	December 6 2006	Slump w/plasticizer (in.)	"
Date Received:	December 13, 2006	Air Temperature (°F):	37°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	62°
Batch Size:	10.0 cy	Air Content (%):	4.3% uncorrected
Time Batched:	9:51 a.m.	Unit Weight (pcf):	141.1
Time Placed:		Water Added (gal):	0
Time Sampled:	10:30 a.m.	Ticket No.:	99650
Yield Relative:	+	W/C Ratio	+

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
57A	12/13/06	7	4.00 x	8.00	12.57	51355	4090*****	NA
57B	12/13/06	7FC	4.00 x	8.00	12.57	52290	4160*****	NA
57C	1/3/06	28	4.00 x	8.00	12.57			
57D	1/3/06	28	4.00 x	8.00	12.57			

Lab # 6459 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hanpel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION						Pages:	5
1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com Steve Edwards sedwards@northwind-inc.com	3	Abatech Consulting Goeffery Rowe growe@abatech.com		

Transmittal Date: 10/23/06	**Transmittal DCN: 71610.7 – ALB06TS001**	
Project No.: 71610	**Task No.: 7**	**File Index No.: 4.9**

SUBJECT: 71610.7 – ALB06TD001 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
MatCon Daily Density Summery Report	10/17/06	71610.7MAT 001
MatCon Daily Density Summery Report	10/18/06	71610 7MAT 002
MatCon Daily Density Summery Report	10/19/06	71610.7MAT 003
MatCon Daily Density Summery Report	10/20/06	71610 7MAT 004

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc at the address referenced at the top of this form

RECEIPT AND READ ACKNOWLEDGEMENT
PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

NOTES

Recipient Signature _____ Date _____

Print Name _____

Perry Hampel
Project Manager

10/23/06
Date

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/17/06
Job: 71610-1A TA-73 Test Pad

	Time	Test Pad #	Station Location	Test Location	Test Results: Lab Density	Lab Density	% Air Voids	Comments
1	11:00A	Test Pad	Core #1	1 min	139.7 140.9			
2	11:00A	Test Pad	Core #1	15 sec	139.0 142.4			
3	11:00A	Test Pad	Core #2	1 min	141.1 140.5			
4	11:00A	Test Pad	Core #2	15 sec	143.4 144.2			
5	11:00A	Test Pad	Core #3	1 min	139.1 140.7			
6	11:00A	Test Pad	Core #3	15 sec	138.5 142.5			
7	11:00A	Test Pad	Core #4	1 min	138.3 139.7			
8	11:00A	Test Pad	Core #4	15 sec	139.8 142.1			
9	11:00A	Test Pad	Core #5	1 min	138.5 139.2			
10	11:00A	Test Pad	Core #5	15 sec	137.8 139.3			
11	11:00A	Test Pad	Core #6	1 min	142.6 140.9			
12	11:00A	Test Pad	Core #6	15 sec	144.0 144.1			
13	11:00A	Test Pad	Core #7	1 min	145.0 142.5			
14	11:00A	Test Pad	Core #7	15 sec	142.4 144.4			
15	11:00A	Test Pad	Core #8	1 min	140.6 140.5			
16	11:00A	Test Pad	Core #8	15 sec	141.8 143.2			
17	11:00A	Test Pad	Core #9	1 min	140.1 141.9			
18	11:00A	Test Pad	Core #9	15 sec	144.6 141.6			
19	11:00A	Test Pad	Core #10	1 min	139.5 139.2			
20	11:00A	Test Pad	Core #10	15 sec	138.9 139.3			
21								
22								
23								
24								
25								
				Average				

QC

General Notes / Comments:

QC Technician: Mark Torrez (Print Name) Signature: [signature] Date: 10/17/06

Firm: n/a Wilder Representative: N/A

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/18/06
Job: 71610-14

	Time	Pass/Trial	Station Location	Test Location	Test Results: Dry Density	% Air Voids	Comments
1	4:05p	#1	Header #1	NE edge of Panel	144.0	99.4	
2	4:22p	#1	Header #1	center of Panel	143.1	99.2	
3	4:30p	#1	Header #1	nw edge of panel	143.6	99.6	
4	5:10p	#2	Adjacent/wside of Pad #1	North corner/Pad #1	144.3	100.1	
5	5:25p	#2	Adjacent/wside of Pad #1	center/Pad #1	142.9	99.1	
6	5:30p	#2	Adjacent/wside of Pad #1	South corner/Pad #1	143.8	99.7	
7	5:40p	#3	30' w of Pad #1	North end of Panel	144.5	100.2	
8	6:00p	#3	30' w of Pad #1	center of panel	142.0	98.5	
9	6:15p	#3	30' w of Pad #1	south end of Pad	142.6	98.9	
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
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22							
23							
24							
25							
				Average			

2.311 144.2

General Notes / Comments:

* Rice weights used is the average of the two Rices from the test pad

QC Technician: Mark Torrez
Print Name

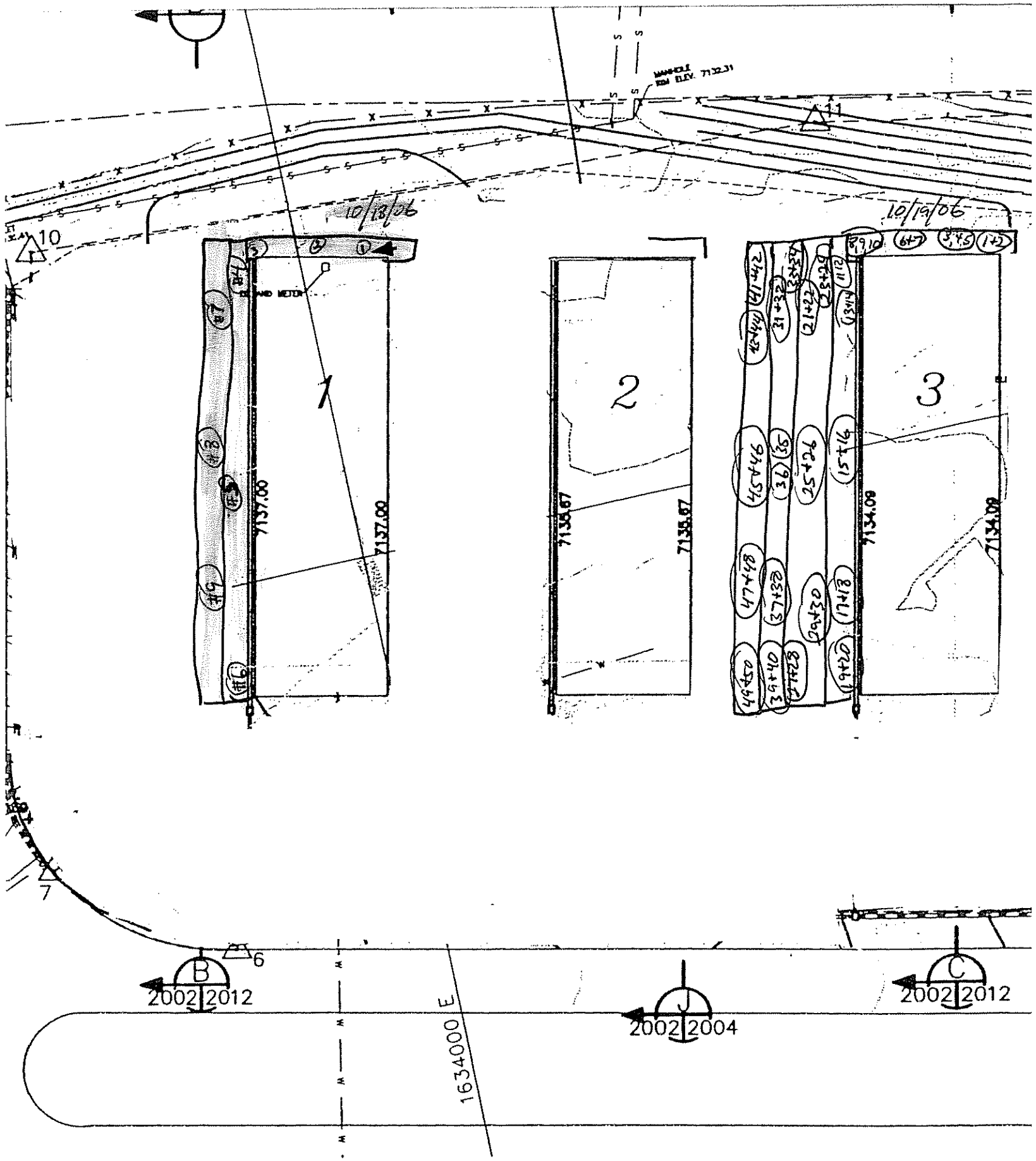
Signature

Date: 10/18/06

Firm: Klinfelder

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design


10/18/06
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MatCon Panel Placement and Compaction
MatCon Construction Quality Control

Panel Placement and Compaction	Job: 71610-17A		Date: 10/18/06	
Activity	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**
Verify panel is within specifications (*Note 1)	10/20/06 9:20A / Panel #3 / 12 FT / 5"	10/20/06 9:20A / Panel #3 / 12 FT / 4.5"	10/20/06 9:20A / Panel #3 / 12 FT / 5.25"	10/20/06 9:20A / Panel #3 / 12 FT / 5.25"
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Verify uniform and thorough compaction (*Note 2)	2:30p / Compliant	3:45 / Compliant	5:30p / Compliant	
	Panel/Time/Density	**Panel/Time/Density**	**Panel/Time/Density**	**Panel/Time/Density**
Field density of compacted panel (*Note 3)	#1 / 4:22p / 148.1	#2 / 5:10p / 144.3	#3 / 6:15p / 142.6	
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Inspect cold joints (if any) (*Note 4)	N/A	N/A	N/A	

***Note 1:** Unless otherwise directed by WILDER or specified in the plans, the nominal compacted depth of dense or open graded MatCon shall be four (4) inches The panel width shall be as specified in the plans or approved by Wilder
***Note 2:** The compacted course shall be smooth, in conformance with the line, grade, and cross-section shown in the plans or as directed by Wilder, and free of irregularities Roller compaction shall prevent thinning near panel edges
***Note 3:** The field density of the compacted MatCon shall be measured using a nuclear gage in accordance with ASTM D2950. The nuclear density shall be within specifications as directed by Wilder Air void percentage shall be three (3) percent or less, or as approved by Wilder.
***Note 4:** Cold joints are to be avoided by keeping paving panels short enough so that the start of a new panel is placed against a joint that is still hot and not yet compacted. At the end of a work shift or when a break in paving activity is anticipated. the cold joint shall be configured. constructedand finished as directed by Wilder or as specified in the plans. All cold joints shall be located on the site lay-out plan with coordinates identified for future identification Cold joint cross-section sketch shall be provided below.

Inspector Notes:

See attached sketch of paving.

QC Technician: Mark Torrez (Print Name) [signature] (Signature) Date: 10/18/06

Firm: Klenfelder Wilder Representative: n/a Date n/a

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/19/06
Job: TA-73 - 71610-1A

	Time	Test Panel	Station Location	Test Location	Lab Cal	% Density	% Air Voids	Comments
1	11:52	#1	north side Pad #3	NE corner Pad #3	143.9	99.8		
2	11:55	#1	northside Pad #3	↓	142.6	98.9		
3	12:07p	#1	northside Pad #3	NE corner Pad #3	140.7	97.6		
4	12:10	#1	↓	↓	141.3	98.0		
5	12:12	#1	↓	↓	142.9	99.1		
6	12:16	#1	↓	Center of Pad #3	141.1	97.9		
7	12:20	#1	↓	↓	143.0	99.2		
8	12:24	#1	↓	NW corner Pad #3	143.6	99.6		
9	12:26	#1	↓	↓	144.1	99.9		
10	12:30p	#1	↓	↓	142.8	99.0		
11	1:35p	#2	Adjacent to Pad #3 west side	N end of Panel	144.9	100.5		
12	1:38p	#2	↓	↓	143.6	99.6		
13	1:40p	#2	↓	↓	145.2	100.7		
14	1:42p	#2	↓	↓	142.6	98.9		
15	1:43p	#2	↓	Center of Panel	143.1	99.2		
16	1:45p	#2	↓	↓	141.8	98.3		
17	1:47p	#2	↓	South end of Panel	142.2	98.6		
18	1:48p	#2	↓	↓	144.4	100.1		
19	1:49p	#2	↓	↓	142.9	99.1		
20	1:49p	#2	↓	↓	144.0	99.9		
21	1:50p	#3	West of Panel #2	north end of Panel	141.6	100.3		
22	1:50p	#3	↓	↓	142.3	98.7		
23	1:50p	#3	↓	↓	143.8	99.7		
24	1:51p	#3	↓	↓	143.1	99.2		
25	1:51p	#3	↓	center of Panel	144.0	99.9		
				Average				

General Notes / Comments:

2.311 144.2

Rice weight used is average weight from test pad samples

QC Technician: Mark Tanez (Print Name) Signature Date: 10/19/06

Firm: Kleinfelder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/19/06
Job: TA-73 71610-1A

	Time	Test Panel	Station Location	Test Location	Test Results: Lbs/Cf	Test Results: % Density	Test Results: % Air Voids	Comments
1	1:52p	#3	west of Panel #2	Center of Panel	142.6	98.9		
2	1:53p	#3		south end of Panel	144.4	100.1		
3	1:53p	#3			141.8	98.3		
4	1:54p	#3			143.9	99.8		
5	1:54p	#3			143.6	99.6		
6	2:59	#4	west of Panel #3	north end of Panel	144.1	99.9		
7	3:01	#4			141.9	98.4		
8	3:01	#4			142.6	98.9		
9	3:04	#4			143.3	99.4		
10	3:15	#4		center of Panel	144.6	100.3		
11	3:17	#4			144.0	99.9		
12	3:17	#4		south end of Panel	144.0	99.9		
13	3:22	#4			142.8	99.0		
14	3:22	#4			143.3	99.4		
15	3:22	#4			143.1	99.2		CV
16	4:00p	#5	west of Panel #4	north end of Panel	141.9	98.4		
17	4:01p	#5			142.6	98.9		
18	4:01	#5			142.8	99.0		
19	4:05	#5			144.3	100.1		
20	4:05	#5		center of Panel	141.5	98.1		
21	4:15	#5			142.9	99.1		
22	4:15	#5		South end of Panel	143.6	99.6		
23	4:15	#5			144.5	100.2		
24	4:26	#5			141.9	98.4		
25	4:26	#5			143.1	99.2		
				Average				

General Notes / Comments:

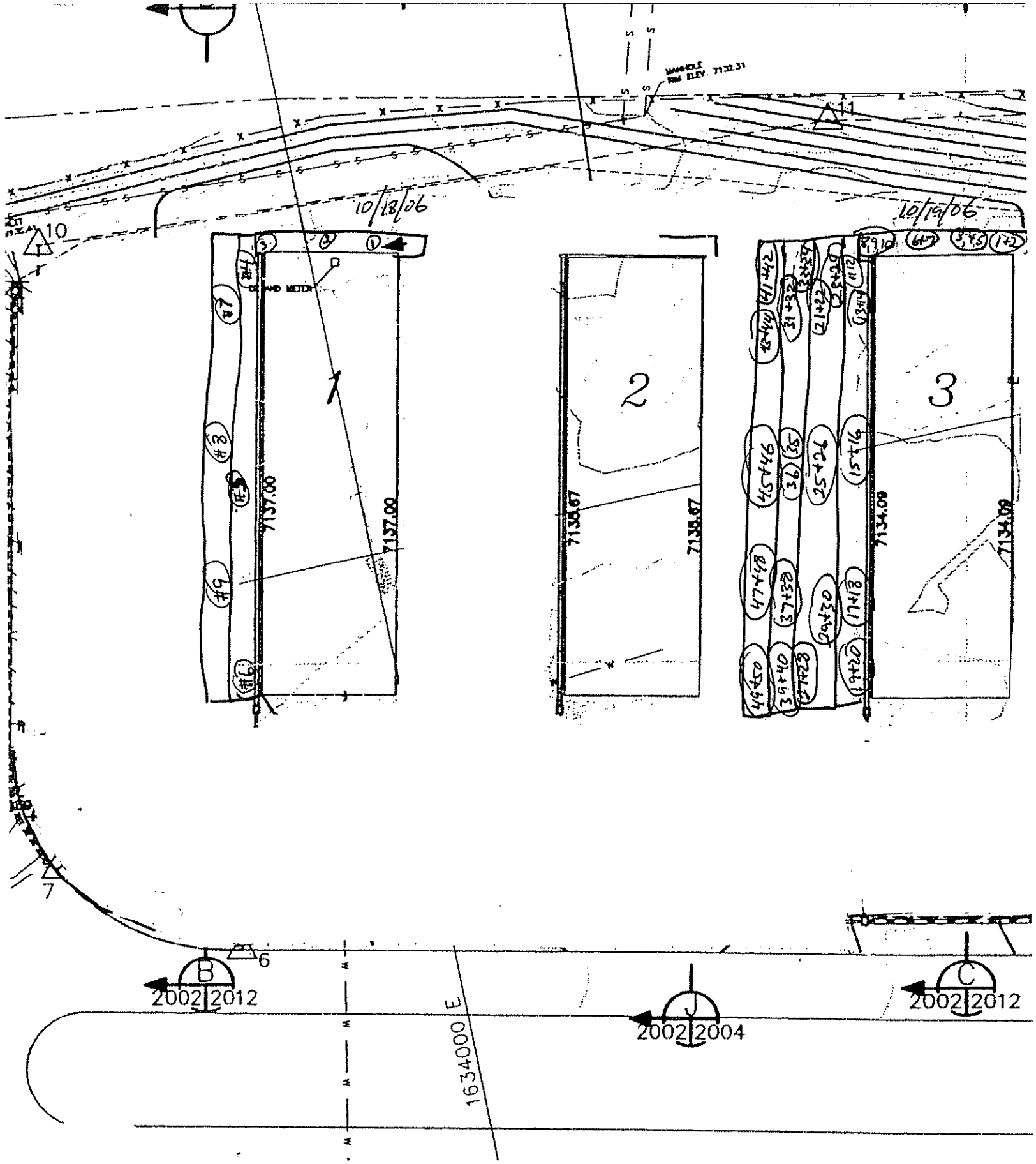
2.311 144.2

Rice weight used is Average weight from test pad samples

QC Technician: Mark Torez (Print Name) Signature: [signature] Date: 10/19/06

Firm: Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design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MatCon Panel Placement and Compaction
MatCon Construction Quality Control

Panel Placement and Compaction	Job: 71610-1A		Date: 10/19/06	
Activity	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**
Verify panel is within specifications (*Note 1)	10/20/06 9:15A / 12' width / 5.5" Thick / Panel #5	10/20/06 9:15A / Panel #5 / 12'	10/20/06 9:15A / Panel #5 / 12' / 5.5"	10/20/06 9:15A / Panel #5 / 12' / 6.5" (~70' N of SW corner of pad #3)
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Verify uniform and thorough compaction (*Note 2)	12:30p / Compliant	2:00p / Compliant	3:30p / Compliant	4:00p / Compliant
	Panel/Time/Density	**Panel/Time/Density**	**Panel/Time/Density**	**Panel/Time/Density**
Field density of compacted panel (*Note 3)	1 / 11:55 / 142.6	2 / 1:43 / 143.1	3 / 1:51 / 144.0	5 / 4:05 / 141.5
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Inspect cold joints (if any) (*Note 4)	Compliant	Compliant	Compliant	Compliant

***Note 1:** Unless otherwise directed by WILDER or specified in the plans, the nominal compacted depth of dense or open graded MatCon shall be four (4) inches. The panel width shall be as specified in the plans or approved by Wilder
***Note 2:** The compacted course shall be smooth. in conformance with the line, grade, and cross-section shown in the plans or as directed by Wilder, and free of irregularities Roller compaction shall prevent thinning near panel edges
***Note 3:** The field density of the compacted MatCon shall be measured using a nuclear gage in accordance with ASTM D2950. The nuclear density shall be within specifications as directed by Wilder. Air void percentage shall be three (3) percent or less, or as approved by Wilder.
***Note 4:** Cold joints are to be avoided by keeping paving panels short enough so that the start of a new panel is placed against a joint that is still hot and not yet compacted. At the end of a work shift or when a break in paving activity is anticipated, the cold joint shall be configured. constructedand finished as directed by Wilder or as specified in the plans All cold joints shall be located on the site lay-out plan with coordinates identified for future identification. Cold joint cross-section sketch shall be provided below.

Inspector Notes: Joint between Panel #2 and Panel # 3 was between 265° F and 275° F at north end when Panel #3 was placed (Between Panel #2 + #3)

Temperature	Feet ahead of laydown machine
206° F	15' S of NW corner of Pad #3
225° F	30' S of NW corner of Pad #3
219° F	45' S of NW corner of Pad #3
242° F	60' S of NW corner of Pad #3
231° F	100' S of NW corner of Pad #3
220° F	125' S of NW corner of Pad #3
243° F	150' S of NW corner of Pad #3
249° F	175' S of NW corner of Pad #3

QC Technician: Mark Tonez (Print Name) M Tonez (Signature) Date: 10/19/06

Firm: KleinGilder Wilder Representative: n/a Date n/a

4 84

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/20/06
Job: TA-73 71610-1A

	Time	Test Panel #	Station Location	Test Location	Dry Density	% Dry Density	% Air Voids	Comments
1	10:45	Header-1	center of Header	center	143.9	99.8		
2	10:45	Header-1	SW corner of Header	SW corner	141.6	98.2		
3	11:30	Pad #2	NE corner of Pad #2	NE corner	142.5	98.8		
4	11:30	Pad #2	center of Pad #2	center	142.1	98.5		
5	11:35	Pad #3	NW corner of Pad #3	NW corner	143.6	99.6		
6	11:35	Pad #3	SE corner of pad #3	SE corner	143.6	99.2		
7	1:20P	Pad #4	center of Pad #4	center	142.1	98.5		
8	1:20P	Pad #4	SW corner of Pad #4	SW corner	144.0	99.9		
9	2:15P	Pad #5	NE corner of Pad #5	NE corner	141.8	99.3		
10	2:17P	Pad #5	SW corner of Pad #5	SW corner	140.9	97.7		
11	3:20P	Pad #6	west of Pad #5	center of pad	142.9	99.1		
12	3:22P	Pad #6	west of Pad #5	SE corner of Pad	143.6	99.6		
13	4:40P	Pad #7	west of Pad #6	NW corner of Pad	141.7	98.3		
14	4:23P	Pad #7	west of Pad #6	SW corner of Pad	142.5	98.8		
15	5:30P	Pad #8	south of Pad #3	SW corner of Pad #8	141.6	98.2		
16	5:30P	Pad #8	south of Pad #3	NE corner of pad #8	142.9	99.1		
17	3:30P	#1+#2 Joint	cold Joint/#1+#2	southend	142.1	98.5		
18	3:32P	#2+#3 Joint	cold Joint/#2+#3	northend	141.4	98.1		
19	3:50P	#3+#4 Joint	cold Joint/#3+#4	southend	140.7	97.6		
20	3:55P	#4 and #5	cold Joint/#4+#5	northend	141.9	98.4		
21								
22								
23								
24								
25								
				Average				

General Notes / Comments:
Rice weight used is Average from Samples taken on test Pad.
2.311 (144.2)

QC Technician: Mark Tonez
Print Name
Signature
Date: 10/20/06

Firm: Kleinfelder
Wilder Representative:

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

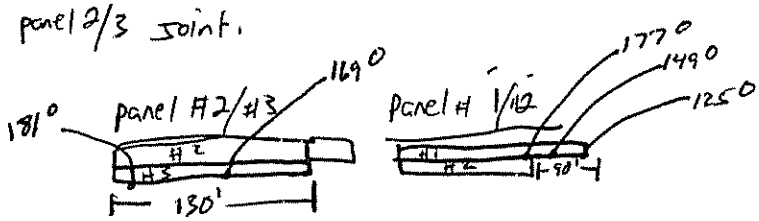
MatCon Panel Placement and Compaction
MatCon Construction Quality Control

Panel Placement and Compaction	Job: 7160-14		Date: 10/20/06	
Activity	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**
Verify panel is within specifications (*Note 1)	#2 11:30A / 12' / 4.75"	#5 2:15P / 12' / 5.25"	#6 4:00P / 12' / 4.75"	#6 4:15P / 12' / 4.25"
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Verify uniform and thorough compaction (*Note 2)	11:30A / compliant	2:15P / compliant	4:00P / compliant	4:30P / compliant
	Panel/Time/Density	**Panel/Time/Density**	**Panel/Time/Density**	**Panel/Time/Density**
Field density of compacted panel (*Note 3)	Heater #1 / 10:45 / 143.9	#2 / 11:35A / 142.1	#4 / 1:20P / 144.0	#6 / 3:20P / 148.6
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Inspect cold joints (if any) (*Note 4)	12:50P / non compliant	12:50P / non-compliant	2:45P / non-compliant	4:15 / compliant — panel 6+7 joint

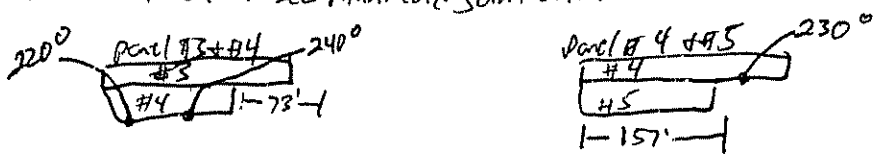
***Note 1:** Unless otherwise directed by WILDER or specified in the plans, the nominal compacted depth of dense or open graded MatCon shall be four (4) inches. The panel width shall be as specified in the plans or approved by Wilder.
***Note 2:** The compacted course shall be smooth, in conformance with the line. grade, and cross-section shown in the plans or as directed by Wilder, and free of irregularities. Roller compaction shall prevent thinning near panel edges
***Note 3:** The field density of the compacted MatCon shall be measured using a nuclear gage in accordance with ASTM D2950 The nuclear density shall be within specifications as directed by Wilder Air void percentage shall be three (3) percent or less, or as approved by Wilder
***Note 4:** Cold joints are to be avoided by keeping paving panels short enough so that the start of a new panel is placed against a joint that is still hot and not yet compacted. At the end of a work shift or when a break in paving activity is anticipated. the cold joint shall be configured, constructedand finished as directed by Wilder or as specified in the plans All cold joints shall be located on the site lay-out plan with coordinates identified for future identification. Cold joint cross-section sketch shall be provided below.

Inspector Notes:
Measurements of non-compliant cold joint between south half of panel 1/2 joint and panel 2/3 joint.

Temperatures taken at time of joint placement



measurements of non compliant cold joint between south half of panel 3+4 and panel 4+5



QC Technician: Mark Torrez (Print Name) Signature Date: 10/20/06

Firm: Kleinfelder Wilder Representative: n/a Date n/a

KLEINFELDER

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION						Pages:	5
1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3	Steve Edwards sedwards@northwind-inc.com		

Transmittal Date: 09/28/06	**Transmittal DCN: 71610.5 – ALB06TS001**	
Project No.: 71610	**Task No.: 5**	**File Index No.: 4.9**

SUBJECT: 71610.5 – ALB06TD001 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Sieve Analysis Test Report	8/24/06	71610.5SV.001
Sieve Analysis Test Report	8/24/06	71610.5SV.002
Sieve Analysis Test Report	8/24/06	71610.5SV.003
Sieve Analysis Test Report	8/24/06	71610.5SV.004

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

09/29/06
Date

RECEIPT AND READ ACKNOWLEDGEMENT PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

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8300 Jefferson, NE, Suite B, Albuquerque, NM 87114, (505)344-7373 FAX (505)344-1711

SIEVE ANALYSIS TEST
ASTM D1140 ASTM C136

Client: North Wind Inc.
Project: TA-73 Airport Landfill
Contractor: North Wind Inc.
Sample Location: San Pedro Gravel Pit
Material Use: R-3 Rip Rap
Tested By: Mark Torrez

Project No. 71610-5
Sheet: 1 of 1
Sample No. Field Sample #1
Date Sampled: 8/24/2006
Date Received: 8/24/2006
Sample By: Mark Torrez
Checked By: Perry Hampel

K=1/W

SIEVE OR SCREEN SIZE	WEIGHT RETAINED ON SIEVE OR SCREEN	% RETAINED	PERCENT PASSING		SCALE # 66229-650	
			% PASSING	SPEC. LIMIT	SIEVE #	**
6"	0.0	0.0	100	100%	taped	C
3"	0.0	0.0	100	15 - 50%	3	NC
2"	74.1	17.6	82	0 - 15%	2	NC
1"						
3/4"						
1/2"						
3/8"						
No. 4						
No. 8						
No. 10						
No. 16						
No. 30						
No. 40						
No. 50						
No. 100						
No. 200						
Pan (E)						
Total (W)						
FINENESS MODULUS (c125) (SUM OF *)/100						

WASHING ON NO. 200 SIEVE TEST

WET WT. BEFORE WASHING	421.0		
(A) DRY WT. BEFORE WASHING			
(B) DRY WT. AFTER WASHING			
TARE #			
TARE WT			
WET TOTAL WT. SAMPLE, PAN			
DRY TOTAL WT. SAMPLE, PAN			
DRY WEIGHT AFTER WASH TOTAL SAMPLE, PAN			

MOISTURE CONTENT

WT. OF WET MATERIAL (F)	
WT. OF DRY MATERIAL (G)	
WY . OF WATER (F-G=H)	
PERCENT MOISTURE (H/G*100)	
** CONDITION, C=COMPLY	NC=NONCOMPLY
	OVEN #
	n/a

COMMENTS:
Failure appears due to particle flatness and elongation

KLEINFELDER, INC.

8300 Jefferson, NE, Suite B, Albuquerque, NM 87114, (505)344-7373 FAX (505)344-1711

SIEVE ANALYSIS TEST
ASTM D1140 ASTM C136

Client: North Wind Inc.
Project: TA-73 Airport Landfill
Contractor: North Wind Inc.
Sample Location: San Pedro Gravel Pit
Material Us(R-3 Rip Rap
Tested By: Mark Torrez

Project No. 71610-5
Sheet: 1 of 1
Sample No. Field Sample #2
Date Sampled: 8/24/2006
Date Received: 8/24/2006
Sample By: Mark Torrez
Checked By: Perry Hampel

K=1/W

SIEVE OR SCREEN SIZE	WEIGHT RETAINED ON SIEVE OR SCREEN	% RETAINED	PERCENT PASSING		SCALE # 66229-650	
			% PASSING	SPEC. LIMIT	SIEVE #	**
6"	0.0	0.0	100	100%	taped	C
3"	12.6	2.8	97	15 - 50%	3	NC
2"	103.8	22.9	77	0 - 15%	2	NC
1"						
3/4"						
1/2"						
3/8"						
No. 4						
No. 8						
No. 10						
No. 16						
No. 30						
No. 40						
No. 50						
No. 100						
No. 200						
Pan (E)						
Total (W)						
FINENESS MODULUS (c125) (SUM OF *)/100						

WASHING ON NO. 200 SIEVE TEST

WET WT. BEFORE WASHING	453.8			WT. OF WET MATERIAL (F)	
(A) DRY WT. BEFORE WASHING				WT. OF DRY MATERIAL (G)	
(B) DRY WT. AFTER WASHING				WY . OF WATER (F-G=H)	
TARE #				PERCENT MOISTURE (H/G*100)	
TARE WT				** CONDITION, C=COMPLY	NC=NONCOMPLY
WET TOTAL WT. SAMPLE, PAN					
DRY TOTAL WT. SAMPLE, PAN					OVEN #
DRY WEIGHT AFTER WASH TOTAL SAMPLE, PAN					n/a

COMMENTS:
Failure appears due to particle flatness and elongation

KLEINFELDER, INC.

8300 Jefferson, NE, Suite B, Albuquerque, NM 87114, (505)344-7373 FAX (505)344-1711

SIEVE ANALYSIS TEST
ASTM D1140 ASTM C136

Client: North Wind Inc.
Project: TA-73 Airport Landfill
Contractor: North Wind Inc.
Sample Location: San Pedro Gravel Pit
Material Us: R-5 Rip Rap
Tested By: Mark Torrez

Project No. 71610-5
Sheet: 1 of 1
Sample No. Field Sample #3
Date Sampled: 8/24/2006
Date Received: 8/24/2006
Sample By: Mark Torrez
Checked By: Perry Hampel

K=1/W

SIEVE OR SCREEN SIZE	WEIGHT RETAINED ON SIEVE OR SCREEN	% RETAINED	PERCENT PASSING		SCALE # 66229-650	
			% PASSING	SPEC. LIMIT	SIEVE #	**
18"	0 0	0 0	100	100%	taped	C
9"	125.7	36 0	64	15 - 50%	taped	NC
4"	251 0	72 0	28	0 - 15%	4	NC
1"						
3/4"						
1/2"						
3/8"						
No. 4						
No. 8						
No. 10						
No. 16						
No. 30						
No. 40						
No. 50						
No. 100						
No. 200						
Pan (E)						
Total (W)						
FINENESS MODULUS (c125) (SUM OF *)/100						

WASHING ON NO. 200 SIEVE TEST

WET WT. BEFORE WASHING	351.05		
(A) DRY WT. BEFORE WASHING			
(B) DRY WT. AFTER WASHING			
TARE #			
TARE WT			
WET TOTAL WT. SAMPLE, PAN			
DRY TOTAL WT. SAMPLE, PAN			
DRY WEIGHT AFTER WASH TOTAL SAMPLE, PAN			

MOISTURE CONTENT

WT. OF WET MATERIAL (F)	
WT. OF DRY MATERIAL (G)	
WY . OF WATER (F-G=H)	
PERCENT MOISTURE (H/G*100)	
** CONDITION, C=COMPLY	NC=NONCOMPLY
	OVEN #
	n/a

COMMENTS:
Failure appears due to particle flatness and elongation

KLEINFELDER, INC.

8300 Jefferson, NE, Suite B, Albuquerque, NM 87114, (505)344-7373 FAX (505)344-1711

SIEVE ANALYSIS TEST
ASTM D1140 ASTM C136

Client: North Wind Inc.
Project: TA-73 Airport Landfill
Contractor: North Wind Inc.
Sample Location: San Pedro Gravel Pit
Material Us: R-5 Rip Rap
Tested By: Mark Torrez

Project No. 71610-5
Sheet: 1 of 1
Sample No. Field Sample #4
Date Sampled: 8/24/2006
Date Received: 8/24/2006
Sample By: Mark Torrez
Checked By: Perry Hampel

K=1/W

SIEVE OR SCREEN SIZE	WEIGHT RETAINED ON SIEVE OR SCREEN	% RETAINED	PERCENT PASSING		SCALE # 66229-650	
			% PASSING	SPEC. LIMIT	SIEVE #	**
18"	0 0	0 0	100	100%	taped	C
9"	166 2	39 0	61	15 - 50%	taped	NC
4"	294 0	69 0	31	0 - 15%	4	NC
1"						
3/4"						
1/2"						
3/8"						
No. 4						
No. 8						
No. 10						
No. 16						
No. 30						
No. 40						
No. 50						
No. 100						
No. 200						
Pan (E)						
Total (W)						
FINENESS MODULUS (c125) (SUM OF *)/100						

WASHING ON NO. 200 SIEVE TEST

WET WT. BEFORE WASHING	436.1		
(A) DRY WT. BEFORE WASHING			
(B) DRY WT. AFTER WASHING			
TARE #			
TARE WT			
WET TOTAL WT. SAMPLE, PAN			
DRY TOTAL WT. SAMPLE, PAN			
DRY WEIGHT AFTER WASH TOTAL SAMPLE, PAN			

MOISTURE CONTENT

WT. OF WET MATERIAL (F)	
WT. OF DRY MATERIAL (G)	
WY . OF WATER (F-G=H)	
PERCENT MOISTURE (H/G*100)	
** CONDITION, C=COMPLY	NC=NONCOMPLY
	OVEN #
	n/a

COMMENTS:
Failure appears due to particle flatness and elongation

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CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION					Pages:	4
1	Steve Matier smatier@northwind-inc.com	2	Philip Meehan pmeehan@northwind-inc.com	3		

Transmittal Date: 07/25/06	**Transmittal DCN: 71610.2 – ALB06TS008**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD008 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	7/20/06	5832C.7
Concrete Cylinder Test Report	7/20/06	5833C.8
Concrete Cylinder Test Report	7/20/06	5834C.9

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

07/25/06
Date

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ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: July 20, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16220
Sand # 11220 @ 5.23%
Fly Ash # 1630
Cement # 6590
Water # 2017

Max. Size Agg. (in.): 1"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Slab on Grade, 7' W & 15' N of the NE corner of pad 2. Set #1 Measured

Truck No. 10526
Date Sampled: July 13, 2006
Date Received: June 14, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 1:12 a.m
Time Placed:
Time Sampled: 1:45 a.m.
Yield Relative: 1.00

Slump (in.): 6.5"
Slump w/plasticizer (in.):
Air Temperature (°F): 72°
Mix Temp (°F): 80°
Air Content (%): 5.5% uncorrected
Unit Weight (pcf): 140.2
Water Added (gal): 0
Ticket No.: 97694
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
7A	7/20/06	7	4.00 x	8.00	12.57	68422	5440**	NA
7B	7/20/06	7FC	4.00 x	8.00	12.57	60809	4840***	NA
7C	8/10/06	28	4.00 x	8.00	12.57			
7D	8/10/06	28	4.00 x	8.00	12.57			

Lab # 5832 Curing: Lab/Water tanks Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: July 20, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16360
Sand # 11400 @ 5.84%
Fly Ash # 1675
Cement # 6530
Water # 1947

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Slab on Grade, 30' E & 4' S of the SE corner of pad 2. Set #2 Measured

Truck No 10556
Date Sampled: July 13, 2006
Date Received: June 14, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 2:58 a.m.
Time Placed:
Time Sampled: 3:30 a.m.
Yield Relative: 1.00

Slump (in.): 7.25"
Slump w/plasticizer (in.):
Air Temperature (°F): 68°
Mix Temp (°F): 75°
Air Content (%): 4.7% uncorrected
Unit Weight (pcf): 141.0
Water Added (gal): 0
Ticket No.: 97703
W/C Ratio 0.31

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
8A	7/20/06	7	4.00 x	8.00	12.57	66939	5330**	NA
8B	7/20/06	7FC	4.00 x	8.00	12.57	53729	4270**	NA
8C	8/10/06	28	4.00 x	8.00	12.57			
8D	8/10/06	28	4.00 x	8.00	12.57			

Lab # 5833 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: July 20, 2006
Page 1 of 1
Project No 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No 44
Design Strength: 4000 PSI

Agg # 16300
Sand # 11285 @ 4.59%
Fly Ash # 1640
Cement # 6560
Water # 2088

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Slab on Grade, 5' E & 5' N of the NW corner of pad 2. Set #3 Measured

Truck No. 10466
Date Sampled: July 13, 2006
Date Received: June 14, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 4:28 a.m
Time Placed:
Time Sampled: 5:00 a.m.
Yield Relative: 0.99

Slump (in.): 7.5"
Slump w/plasticizer (in.):
Air Temperature (°F): 61°
Mix Temp (°F): 78°
Air Content (%): 4.0% uncorrected
Unit Weight (pcf): 141.8
Water Added (gal): 0
Ticket No.: 97712
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
9A	7/20/06	7	4.00 x	8.00	12.57	65555	5220**	NA
9B	7/20/06	7FC	4.00 x	8.00	12.57	52998	4220**	NA
9C	8/10/06	28	4.00 x	8.00	12.57			
9D	8/10/06	28	4.00 x	8.00	12.57			

Lab # 5834 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CMT LAB REPORT DISTRIBUTION					Pages:	3
1	Steve Matier smatier@northwind-inc.com	2		3		

Transmittal Date: 06/22/06	**Transmittal DCN: 71610.2 – ALB06TS004**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD004 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	6/19/06	5727C.1
Concrete Cylinder Test Report	6/19/06	5728C.2

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel — Project Manager
6/22/06 — Date

RECEIPT AND READ ACKNOWLEDGEMENT PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

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8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature _____ Date _____

Print Name _____

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KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: June 19, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 18
Design Strength: 3000 PSI

Agg # 3260
Sand # 2480 2.13%
Fly Ash # 385
Cement # 1075
Water # 531

Max. Size Agg. (in.): 1"
Admixtures: P997 = 64oz
Air = 9oz

SAMPLE DATA

Location: Wall Panel, Test Placement. Mock up by construction trailers. Measured

Truck No. 10456
Date Sampled: June 12, 2006
Date Received: June 13, 2006
Sampled By: P. German
Batch Size: 2.0 cy
Time Batched: 1:57 p.m.
Time Placed:
Time Sampled: 2:40 p.m.
Yield Relative: +

Slump (in.): 7.25"
Slump w/plasticizer (in.):
Air Temperature (°F): 93°
Mix Temp (°F): 82°
Air Content (%): 4.0 uncorrected
Unit Weight (pcf): +
Water Added (gal): 0
Ticket No.: 97389
W/C Ratio 0.40

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
1A	6/19/06	7	4.00 x	8.00	12.57	38245	3040**	NA
1B	6/26/06	14	4.00 x	8.00	12.57			
1C	6/26/06	14	4.00 x	8.00	12.57			
1D	6/26/06	14FC	4.00 x	8.00	12.57			

Lab # 5727 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, +=unit weight not provided. FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: June 19, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 18
Design Strength: 3000 PSI

Agg # 3300
Sand # 2220 2.27%
Fly Ash # 330
Cement # 1330
Water # 499

Max. Size Agg. (in.): 1"
Admixtures: P997 = 116^{oz}
Air = 13^{oz}

SAMPLE DATA

Location: Wall Panel, Test Placement. Mock up by construction trailers. Measured

Truck No. 10486
Date Sampled: June 12, 2006
Date Received: June 13, 2006
Sampled By: P. German
Batch Size: 2.0 cy
Time Batched: 2:04 p.m.
Time Placed:
Time Sampled: 2:45 p.m.
Yield Relative: 0.99

Slump (in.): 3.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 93°
Mix Temp (°F): 85°
Air Content (%): 3.75 uncorrected
Unit Weight (pcf): 144.1
Water Added (gal): 0
Ticket No.: 97390
W/C Ratio 0.33

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
2A	6/19/06	7	4.00 x	8.00	12.57	63716	5070*****	NA
2B	6/26/06	14	4.00 x	8.00	12.57			
2C	6/26/06	14	4.00 x	8.00	12.57			
2D	6/26/06	14FC	4.00 x	8.00	12.57			

Lab # 5728 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, +=unit weight not provided. FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

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KLEINFELDER
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8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

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CMT LAB REPORT DISTRIBUTION					Pages:	7
1	Steve Matier smatier@northwind-inc.com	2	Philip Meehan pmeehan@northwind-inc.com	3		

Transmittal Date: 07/31/06	**Transmittal DCN: 71610.2 – ALB06TS010**

Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD010 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Hydraulic Conductivity Test Report	7/24/06	71610HC.001
Hydraulic Conductivity Test Report	7/26/06	71610HC.002
Moisture Density Test Report	6/26/06	71610MD.003
Moisture Density Test Report	6/28/06	71610MD.004

INSTRUCTIONS/REMARKS

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NOTES

Perry Hampel — Project Manager
07/31/06 — Date

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ALBUQUERQUE, NM 87113

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Print Name _____

HYDRAULIC CONDUCTIVITY TEST REPORT
ASTM D5084

Project Name	TA 73 Los Alamos Landfill	***Project No.***	71610
Client Name	Kleinfelder	***Date Received***	7/18/2006 10:30
Client Address	Albuquerque, New Mexico	***Date Tested***	7/24/2006 16:40
		Date Issued	7/28/2006 9:45
Boring No.	Borrow Pit, #06-190		
Sample Type	Remolded - 98.3% Compaction		
Sample Depth	NA		
Sample Description	Lean Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	14.9	20.5	%
Dry Unit Weight, Dd	106.9	106.6	pcf
Height, L	2.81	2.80	inches
Diameter, d	2.82	2.82	inches
Degree of Saturation, Sr	69.7	95.3	%

Chamber Pressure:	58.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	57.0	psi
Consolidation Pressure:	1	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	21.8	0	7.90	20.85			
	Finish	21.8	1020	9.05	19.70	1.65E-05	1.6E-05	1.54
2	Start	21.8	1020	9.05	19.70			
	Finish	21.7	1980	9.95	18.80	1.66E-05	1.6E-05	1.28
3	Start	21.7	1980	9.95	18.80			
	Finish	21.7	3300	10.95	17.80	1.67E-05	1.6E-05	0.99
4	Start	21.7	3300	10.95	17.80			
	Finish	21.7	4320	11.55	17.20	1.63E-05	1.6E-05	0.82

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp.	1.7E-05	
Average Hydraulic Conductivity "k" (cm/sec) @ 20° C		**1.6E-05**

Assumed Specific Gravity, SG 2.7
Area of Tube (cm^2). a (pipette) 0 9721
Permeant : Deaired Tap Water
Formulas:
Permeability (Falling Head-Rising Tailwater Test)
k = [(a*L/(2*A*t)] ln(ho/h1)
k = Hydraulic Conductivity (cm/sec)
a = Area of Tube (cm^2)
L = Height or Length of Sample (cm)
A = Area of Sample (cm^2)
t = Time of Test Interval (sec)
h_o = Height of Head at Start of Test Interval (cm)
h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation
Sr = w*SG/e Dd = (SG/1+e)Dw
Therefore:
Sr = (w*SG)/((SG*Dw/Dd)-1)
Sr = Degree of Saturation (%)
w = Moisture Content (%)
SG = Specific Gravity
e = Void Ratio
Dd =Dry Unit Weight (pcf)
Dw = Unit Weight of Water (62 4 pcf)

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KLEINFELDER

HYDRAULIC CONDUCTIVITY TEST RESULTS (ASTM D5084)

Project Name	TA 73 Los Alamos Landfill	***Job No.***	71610
Client Name	Kleinfelder	***Date Received***	7/18/2006 10:30
Client Address	Albuquerque, New Mexico	***Date Tested***	7/24/2006 16:40
		Date Issued	7/28/2006 9:45
Boring No.	Borrow Pit, #06-190		
Sample Type	Remolded - 98.3% Compaction		
Sample Depth	NA		
Sample Description	Lean Clay with Fine Sand, Brown		

0.0

	Deviation from Average	Change in Influent(ml)	Change in Effluent (ml)	Ratio Effluent/Influent Change
Test1	1.00	1.12	-1.12	1.00
Test 2	1.01	0.87	-0.87	1.00
Test 3	1.01	0.97	-0.97	1.00
Test 4	0.98	0.58	-0.58	1.00
	ok if within 0.75-1.25			**ok if within 0.75-1.25**

1.0231881

0.022923341

HYDRAULIC CONDUCTIVITY TEST REPORT

ASTM D5084

Project Name	TA 73 Los Alamos Landfill	***Project No.***	71610
Client Name	Kleinfelder	***Date Received***	7/18/2006 10:30
Client Address	Albuquerque, New Mexico	***Date Tested***	7/26/2006 16:00
		Date Issued	7/31/2006 8:50
Boring No.	Borrow Pit, #06-190		
Sample Type	Remolded - 100.1% Compaction		
Sample Depth	NA		
Sample Description	Lean Clay with Fine Sand, Brown		

	Before	***After***	***Units***
Moisture Content, w	14.9	19.6	%
Dry Unit Weight, Dd	106.9	109.2	pcf
Height, L	2.63	2.62	inches
Diameter, d	2.82	2.82	inches
Degree of Saturation, Sr	69.7	97.3	%

Chamber Pressure:	58.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	57.0	psi
Consolidation Pressure:	1	psi

Test Number		***Temp. Deg. C***	***Time (sec)***	***Influent Reading***	***Effluent Reading***	***Hydraulic Conductivity (cm/sec) @ Test Temp.***	***Hydraulic Conductivity (cm/sec) @ 20° C***	***Hydraulic Gradient h/L***
1	Start	21.6	0	6.50	17.25			
	Finish	21.6	1320	6.95	16.80	5.36E-06	5.2E-06	1.51
2	Start	21.6	1320	6.95	16.80			
	Finish	21.6	2460	7.25	16.50	4.46E-06	4.3E-06	1.42
3	Start	21.6	2460	7.25	16.50			
	Finish	21.5	3960	7.65	16.10	4.88E-06	4.7E-06	1.30
4	Start	21.5	3960	7.65	16.10			
	Finish	21.6	7320	8.35	15.35	4.53E-06	4.4E-06	1.08

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp.	4.8E-06	
Average Hydraulic Conductivity "k" (cm/sec) @ 20° C		**4.6E-06**

Assumed Specific Gravity, SG 2.7
Area of Tube (cm^2), a (pipette) 0 9721
Permeant : Dealred Tap Water
Formulas:
Permeability (Falling Head-Rising Tailwater Test)
k = [(a*L/(2*A*t)] ln(ho/h1)
k = Hydraulic Conductivity (cm/sec)
a = Area of Tube (cm^2)
L = Height or Length of Sample (cm)
A = Area of Sample (cm^2)
t = Time of Test Interval (sec)
h_o = Height of Head at Start of Test Interval (cm)
h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation
Sr = w*SG/e Dd = (SG/1+e)Dw
Therefore:
Sr = (w*SG)/((SG*Dw/Dd)-1)
Sr = Degree of Saturation (%)
w = Moisture Content (%)
SG = Specific Gravity
e = Void Ratio
Dd =Dry Unit Weight (pcf)
Dw = Unit Weight of Water (62.4 pcf)

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KLEINFELDER

HYDRAULIC CONDUCTIVITY TEST RESULTS (ASTM D5084)

Project Name	TA 73 Los Alamos Landfill	***Job No.***	71610
Client Name	Kleinfelder	***Date Received***	7/18/2006 10:30
Client Address	Albuquerque, New Mexico	***Date Tested***	7/26/2006 16:00
		Date Issued	7/31/2006 8:50
Boring No.	Borrow Pit, #06-190		
Sample Type	Remolded - 100.1% Compaction		
Sample Depth	NA		
Sample Description	Lean Clay with Fine Sand, Brown		

0.0

	Deviation from Average	Change in Influent(ml)	Change in Effluent (ml)	Ratio Effluent/Influent Change
Test1	1.11	0.44	-0.44	1.00
Test 2	0.93	0.29	-0.29	1.00
Test 3	1.01	0.39	-0.39	1.00
Test 4	0.94	0.68	-0.73	1.07
	ok if within 0.75-1.25			**ok if within 0.75-1.25**

1.0231881

0.022923341

KLEINFELDER

IN-PLACE DENSITY-MOISTURE

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report	☐ Yes ☑ No		Page 1 of 1
File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos	Technician/Engineer: P. German
Date: 6/26/2006	Client: Northrhwind	Contractor/Representative: Northwind	Time Arrived: 9:00 AM
Daily Field Report No.	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Cool, windy	Time Departed: 10:05 AM
Reviewed By: P. German	Location of Fill: Base course Hanger Pad #3	Gauge Number: 6682 / Make/Model: 3411 Troxler	Travel Time (hours): 3.0
Date Reviewed: 6/26/2006	Specified Compaction Requirements: Density 95 % to 100%; Moisture % + 3%	Standardization Counts: Density 1613 / Moisture 578	Total Time (hours) (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
6	A.5 - 18.5	BS	FG	142.1	6.5	138.6	135.5	4.8	97.8	P	ML
7	B.5 - 18.5	BS	FG	145.5	6.0	138.6	139.5	4.3	100.6	P	ML

Any unresolved test (date/number):

Observations/Remarks:

Not used for certification of Pad,

used for verification of compaction effort needed to meet

compaction req.

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-115	ML		138.6	7.5	ASTM D 1557

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

☐ Continued on next page

KLEINFELDER

IN-PLACE DENSITY-MOISTURE

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☐ Yes ☐ No

File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Bet	Technician/Engineer: P. German
Date: 6/28/2006	Client: Nortrhwind	Contractor/Representative:	Time Arrived: 9:35 AM
Daily Field Report No.	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Cool, clear	Time Departed: 10:50 AM
Reviewed By: P. German	Location of Fill: Base course for Hanger pad	Gauge Number: 6682 / Make/Model: 3411 Troxler	Travel Time (hours): 3.0
Date Reviewed: 7/6/2006	Specified Compaction Requirements: Density 95 % to 100%; Moisture N/A % + 3%	Standardization Counts: Density 1618 / Moisture 574	Total Time (hours): (May not include minimum)

Test No.	Test Location	Probe Depth (Inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max Dry Density	Comments: Pass/Fail	Comments: Material Classification
10	A-5	BS	FG	140.1	6.1	138.6	134.0	4.5	96.7	P	ML
11	B.5 - 9	BS	FG	145.1	5.6	138.6	139.4	4.0	100.6	P	ML

Any unresolved test (date/number):

Observations/Remarks:

Test where done for pad certification

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-115	ML		138.6	7.5	ASTM D 1557

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

☐ Continued on next page.

KLEINFELDER

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		TRANSMITTAL DCN: 71610.2 – ALB07TS001

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RETURN RESPONSES/COMMENTS BY:	48 hrs from date of transmission

PROJECT NO.:	71610	PROJECT NAME:	TA-73 Los Alamos Land Fill
ACTIVITY/DESCRIPTION:	CMT Lab Reports		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
Concrete Cylinder Test Report	0	1	12/29/06	6437C 56

INSTRUCTIONS/REMARKS

PLEASE VERIFY RECEIPT OF THIS DELIVERABLE BY REPLYING TO THIS E-MAIL. YOUR REPLY WILL SERVE AS VERIFICATION OF SUCCESSFUL RECEIPT OF THE ATTACHED DOCUMENT.

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KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: December 29, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16340
Sand # 13040 @ 6.75%
Fly Ash # 1330
Cement # 5370
Water # 1894

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Retaining wall footing.

			Measured
Truck No.	10546	Slump (in.):	4.25"
Date Sampled:	December 1 2006	Slump w/plasticizer (in.)	"
Date Received:	December 2, 2006	Air Temperature (°F):	33°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	56°
Batch Size:	10.0 cy	Air Content (%):	4.9% uncorrected
Time Batched:	11:38 a.m.	Unit Weight (pcf):	140.5
Time Placed:		Water Added (gal):	0
Time Sampled:	12:15 p.m.	Ticket No.:	99628
Yield Relative:	1.00	W/C Ratio	0.41

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
56A	12/8/06	7	4.00 x	8.00	12.57	48960	3890**	NA
56B	12/8/06	7FC	4.00 x	8.00	12.57	47815	3800**	NA
56C	12/29/06	28	4.00 x	8.00	12.57	86610	6890**	C
56D	12/29/06	28	4.00 x	8.00	12.57	83955	6680**	C

Lab # 6437 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By:_____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER

DOCUMENT TRANSMITTAL FORM

TO:	See Distribution List	PAGE 1 OF 4
		TRANSMITTAL DATE: 12/27/06
		TRANSMITTAL DCN: 71610.2 – ALB06TS044
RETURN RESPONSES/COMMENTS TO:	Perry Hampel	
RETURN RESPONSES/COMMENTS BY:	48 hrs from date of transmission	

PROJECT NO.:	71610	PROJECT NAME:	TA-73 Los Alamos Land Fill
ACTIVITY/DESCRIPTION:	CMT Lab Reports		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
Concrete Cylinder Test Report	0	1	12/20/06	6425C 55
Concrete Cylinder Test Report	0	1	12/21/06	6471C 58

INSTRUCTIONS/REMARKS

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- ☐ Replace with revised/new material
- ☐ Not Applicable

CLIENT RECEIPT	PRINT NAME	SIGNATURE	DATE
Complete & Return this page via Fax/Mail/Email			

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Complete this section upon receipt from client			

CMT LAB REPORT DISTRIBUTION

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KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: December 20, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16480
Sand # 12880 @ 5.5%
Fly Ash # 1350
Cement # 5365
Water # 2037

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: South wall panel.

			Measured
Truck No.	10456	Slump (in.):	3.25"
Date Sampled:	November 22, 2006	Slump w/plasticizer (in.)	"
Date Received:	November 23, 2006	Air Temperature (°F):	50°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	62°
Batch Size:	10.0 cy	Air Content (%):	4.9% uncorrected
Time Batched:	7:59 a.m.	Unit Weight (pcf):	140.4
Time Placed:		Water Added (gal):	0
Time Sampled:	8:20 a.m.	Ticket No.:	99587
Yield Relative:	1.00	W/C Ratio	0.41

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
55A	11/29/06	7	4.00 x	8.00	12.57	51485	4100**	NA
55B	11/29/06	7FC	4.00 x	8.00	12.57	54840	4360**	NA
55C	12/20/06	28	4.00 x	8.00	12.57	81890	6510**	C
55D	12/20/06	28	4.00 x	8.00	12.57	80825	6430**	C

Lab # 6425 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: December 21, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16440
Sand # 12880 @ 5.25%
Fly Ash # 1385
Cement # 5365
Water # 2070

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 398^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Final section of retaining wall on north end.

			Measured
Truck No	10556	Slump (in.):	3.75"
Date Sampled:	December 14, 2006	Slump w/plasticizer (in.)	"
Date Received:	December 21, 2006	Air Temperature (°F):	45°
Sampled By:	M. Torrez/	Mix Temp (°F):	60°
Batch Size:	10.0 cy	Air Content (%):	4.6% uncorrected
Time Batched:	12:32 p.m.	Unit Weight (pcf):	141.0
Time Placed:		Water Added (gal):	0
Time Sampled:	12:57 p.m.	Ticket No.:	99727
Yield Relative:	+	W/C Ratio	+

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
58A	12/21/06	7	4.00 x	8.00	12.57	58215	4630*****	NA
58B	12/21/06	7FC	4.00 x	8.00	12.57	55975	4450*****	NA
58C	1/11/06	28	4.00 x	8.00	12.57			
58D	1/11/06	28	4.00 x	8.00	12.57			

Lab # 6471 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

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Transmittal Date: 12/11/06	**Transmittal DCN: 71610.2 – ALB06TS042**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD042 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Moisture Density Test Report	12/06/06	71610MD.015

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel — Project Manager
12/11/06 — Date

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IN-PLACE DENSITY-MOISTURE

KLEINFELDER

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☑ Yes ☐ No

File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Port	Technician/Engineer: M. Torrez
Date: 12/6/2006	Client: Northwind	Contractor/Representative: Northwind/ Steve Edwards	Time Arrived: 9:30 AM
Daily Field Report No: 71610MD.015	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Clear, cool	Time Departed: 2:10 PM
Reviewed By: P. German	Location of Fill: Retaining wall backfill	Gauge Number: 3253 / Make/Model: MC-3	Travel Time (hours): 3.0
Date Reviewed: 12/7/2006	Specified Compaction Requirements: Density 95 % to 100%; Moisture 7.5 % + 3%	Standardization Counts: Density 35002 / Moisture 8521	Total Time (hours): 9 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
51	Station 2 + 25 10' off wall	6"	-10'	144.5	13.4	133.5	131.1	10.2	98.2	P	SM
52	Station 2 + 00 9' off wall	6"	-9'	139.2	10.2	133.5	129.0	7.9	96.6	P	SM
53	Station 1 + 75 10' off wall	6"	-8'	139.3	9.4	133.5	129.9	7.2	97.3	P	SM
54	Station 2 + 75 10' off wall	6"	-7'	142.5	11.0	133.5	131.5	8.4	98.5	P	SM

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-106	SM		133.5	7.2	ASTM D 1557

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

☐ Continued on next page.

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CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION						Pages:	3
1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3	Steve Edwards sedwards@northwind-inc.com		

Transmittal Date: 12/11/06	**Transmittal DCN: 71610.2 – ALB06TS041**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD041 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	11/29/06	6425C.55
Concrete Cylinder Test Report	12/08/06	6437C.56

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel — Project Manager
12/11/06 — Date

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: November 29, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16480
Sand # 12880 @ 5.5%
Fly Ash # 1350
Cement # 5365
Water # 2037

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: South wall panel.

			Measured
Truck No.	10456	Slump (in.):	3.25"
Date Sampled:	November 22, 2006	Slump w/plasticizer (in.)	"
Date Received:	November 23, 2006	Air Temperature (°F):	50°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	62°
Batch Size:	10.0 cy	Air Content (%):	4.9% uncorrected
Time Batched:	7:59 a.m.	Unit Weight (pcf):	140.4
Time Placed:		Water Added (gal):	0
Time Sampled:	8:20 a.m.	Ticket No.:	99587
Yield Relative:	1.00	W/C Ratio	0.41

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
55A	11/29/06	7	4.00 x	8.00	12.57	51485	4100**	NA
55B	11/29/06	7FC	4.00 x	8.00	12.57	54840	4360**	NA
55C	12/20/06	28	4.00 x	8.00	12.57			
55D	12/20/06	28	4.00 x	8.00	12.57			

Lab # 6425 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: December 8, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16340
Sand # 13040 @ 6.75%
Fly Ash # 1330
Cement # 5370
Water # 1894

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Retaining wall footing.

			Measured
Truck No.	10546	Slump (in.):	4.25"
Date Sampled:	December 1 2006	Slump w/plasticizer (in.)	"
Date Received:	December 2, 2006	Air Temperature (°F):	33°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	56°
Batch Size:	10.0 cy	Air Content (%):	4.9% uncorrected
Time Batched:	11:38 a.m.	Unit Weight (pcf):	140.5
Time Placed:		Water Added (gal):	0
Time Sampled:	12:15 p.m.	Ticket No.:	99628
Yield Relative:	1.00	W/C Ratio	0.41

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
56A	12/8/06	7	4.00 x	8.00	12.57	48960	3890**	NA
56B	12/8/06	7FC	4.00 x	8.00	12.57	47815	3800**	NA
56C	12/29/06	28	4.00 x	8.00	12.57			
56D	12/29/06	28	4.00 x	8.00	12.57			

Lab # 6437 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3	Steve Edwards sedwards@northwind-inc.com		

Transmittal Date: 10/06/06	**Transmittal DCN: 71610.2 – ALB06TS030**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD030 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	10/03/06	6096C 38
Concrete Cylinder Test Report	10/03/06	6097C 39
Concrete Cylinder Test Report	10/03/06	6098C 40

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel
Project Manager

10/06/06
Date

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: October 3, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44 – 4000 ¾"
Design Strength: 4000 PSI

Agg # 16220
Sand # 11460 @ 7.25%
Fly Ash # 1645
Cement # 6515
Water # 1793

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: NE section of pad# 5, 20' W and 2' S of NE corner. Measured

Truck No 10536
Date Sampled: September 5, 2006
Date Received: September 6, 2006
Sampled By: M. Torrez
Batch Size: 10.0 cy
Time Batched: 1:03 a.m.
Time Placed:
Time Sampled: 1:55 a.m.
Yield Relative: 0.99

Slump (in.):
Slump w/plasticizer (in.) 5.75"
Air Temperature (°F): 56°
Mix Temp (°F): 72°
Air Content (%): 5.0% uncorrected
Unit Weight (pcf): 140.9
Water Added (gal): 0
Ticket No.: 98573
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
38A	9/12/06	7	4.00 x	8.00	12.57	65264	5190**	NA
38B	9/12/06	7FC	4.00 x	8.00	12.57	61580	4900**	NA
38C	9/3/06	28	4.00 x	8.00	12.57	66109	5230*****	C
38C	9/3/06	28	4.00 x	8.00	12.57	79595	6300****	C

Lab # 6096 Curing: Lab/Water tanks Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: October 3, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44 – 4000 ¾"
Design Strength: 4000 PSI

Agg # 16280
Sand # 11560 @ 7 25%
Fly Ash # 1645
Cement # 6535
Water # 1798

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: NE section of pad# 5, 15' W and 75' S of NE corner. Measured

Truck No. 10546
Date Sampled: September 5, 2006
Date Received: September 6, 2006
Sampled By: M. Torrez
Batch Size: 10.0 cy
Time Batched: 3:25 a.m.
Time Placed:
Time Sampled: 3:55 a.m.
Yield Relative: 0.99

Slump (in.):
Slump w/plasticizer (in.) 5.5"
Air Temperature (°F): 51°
Mix Temp (°F): 73°
Air Content (%): 6.5% uncorrected
Unit Weight (pcf): 140.8
Water Added (gal): 0
Ticket No.: 98584
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
39A	9/12/06	7	4.00 x	8.00	12.57	59201	4750*****	NA
39B	9/12/06	7FC	4.00 x	8.00	12.57	55825	4440*****	NA
39C	9/3/06	28	4.01 x	8.00	12.63	76234	6040****	C
39C	9/3/06	28	4.01 x	8.00	12.63	84638	6840****	C

Lab # 6097 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: October 3, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44 – 4000 ¾"
Design Strength: 4000 PSI

Agg # 16220
Sand # 11460 @ 7.25%
Fly Ash # 1640
Cement # 6590
Water # 1803

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: SW section of pad# 5, 50' N and 10' E of SW corner.

Measured

Truck No. 10546
Date Sampled: September 5, 2006
Date Received: September 6, 2006
Sampled By: M. Torrez
Batch Size: 10.0 cy
Time Batched: 5:57 a.m.
Time Placed:
Time Sampled: 6:40 a.m.
Yield Relative: 1.00

Slump (in.):
Slump w/plasticizer (in.) 5.0"
Air Temperature (°F): 51°
Mix Temp (°F): 73°
Air Content (%): 5.5% uncorrected
Unit Weight (pcf): 140.1
Water Added (gal): 0
Ticket No.: 98594
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
40A	9/12/06	7	4.00 x	8.00	12.57	63597	5060**	NA
40B	9/12/06	7FC	4.00 x	8.00	12.57	61857	4920**	NA
40C	9/3/06	28	4.01 x	8.00	12.63	88791	7030****	C
40C	9/3/06	28	4.01 x	8.00	12.63	88890	7040****	C

Lab # 6098 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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Transmittal Date: 09/28/06	**Transmittal DCN: 71610.2 – ALB06TS029**

Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD029 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	9/25/06	6050C 36
Concrete Cylinder Test Report	9/26/06	6072C 37

INSTRUCTIONS/REMARKS

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NOTES

Perry Hampel
Project Manager

09/29/06
Date

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 25, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16440
Sand # 13100 @ 6.89%
Fly Ash # 1350
Cement # 5350
Water # 1892

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 322^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Trench drain – Hanger pad #2, 25' S of NW corner of pad

Measured

Truck No. 10546
Date Sampled: August 28, 2006
Date Received: August 29, 2006
Sampled By: M. Torrez
Batch Size: 10.0 cy
Time Batched: 10:30 a.m.
Time Placed:
Time Sampled: 11:05 a.m.
Yield Relative: 1.01

Slump (in.): 4.25"
Slump w/plasticizer (in.)
Air Temperature (°F): 75°
Mix Temp (°F): 72°
Air Content (%): 4.4% uncorrected
Unit Weight (pcf): 140.5
Water Added (gal): 0
Ticket No.: 98449
W/C Ratio 0.42

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
36A	9/4/06	7	4.00 x	8.00	12.57	45348	4710*****	NA
36B	9/4/06	7FC	4.00 x	8.00	12.57	59227	4710**	NA
36C	9/25/06	28	4.00 x	8.00	12.57	66544	5290**	C
36C	9/25/06	28	4.00 x	8.00	12.57	61916	4930**	C

Lab # 6050 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Humpel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 26, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16500
Sand # 13060 @ 6.63%
Fly Ash # 1340
Cement # 5355
Water # 1892

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 326^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Trench drain – Hanger pad #4, 20' S of NW corner of pad. Measured

Truck No. 10546
Date Sampled: August 29, 2006
Date Received: August 30, 2006
Sampled By: M. Torrez
Batch Size: 10.0 cy
Time Batched: 12:14 p.m.
Time Placed:
Time Sampled: 12:45 p.m.
Yield Relative: 1.00

Slump (in.): 4.25"
Slump w/plasticizer (in.)
Air Temperature (°F): 69°
Mix Temp (°F): 77°
Air Content (%): 5.3% uncorrected
Unit Weight (pcf): 141.1
Water Added (gal): 0
Ticket No.: 98468
W/C Ratio 0.42

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
37A	9/5/06	7	4.00 x	8.00	12.57	50980	4060**	NA
37B	9/5/06	7FC	4.00 x	8.00	12.57	49972	3980**	NA
37C	9/26/06	28	4.00 x	8.00	12.57	61798	4920**	C
37C	9/26/06	28	4.00 x	8.00	12.57	72377	5760****	C

Lab # 6072 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CMT LAB REPORT DISTRIBUTION					Pages: 2
1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3	Steve Edwards sedwards@northwind-inc.com

Transmittal Date: 09/28/06	**Transmittal DCN: 71610.2 – ALB06TS028**

Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD028 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Moisture Density Test Report	9/22/06	71610MD 011

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

09/29/06
Date

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IN-PLACE DENSITY-MOISTURE

KLEINFELDER

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☐ Yes ☐ No

File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Port	Technician/Engineer: M. Torrez
Date: 9/22/2006	Client: Nortrhwind	Contractor/Representative: JB Henderson	Time Arrived: 11:45 AM
Daily Field Report No: 71610MD.011	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Cloudy, rain, cool	Time Departed: 1:15 PM
Reviewed By: P. German	Location of Fill: Retaining wall E bench	Gauge Number: 3185 / Make/Model: MC-3	Travel Time (hours): 3.0
Date Reviewed: 9/25/2006	Specified Compaction Requirements: Density 95 % to 100%; Moisture n/a % '+ n/a	Standardization Counts: Density 23563 / Moisture 13494	Total Time (hours): 5 (May not include minimum)

Test No.	Test Location	Probe Depth (Inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
30	Upper E bench station 1 + 75	6"	FSG	144.1	13.2	133.5	130.9	10.1	98.0	P	SM
31	Upper E bench station 3 + 25	6"	FSG	144.3	12.9	133.5	131.4	9.8	98.0	P	SM
32	North side lower E bench station 2 + 70	6"	FSG	138.6	9.9	133.5	128.7	7.7	96.0	P	SM
33	Southside lower E bench station 2 + 70	6"	FSG	139.2	8.9	133.5	130.3	6.8	98.0	P	SM

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-106	SM		133.5	7.2	ASTM D 1557

NOTES

1. Test results, pass/fail indications and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

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☐ Continued on next page

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Transmittal Date: 09/25/06	**Transmittal DCN: 71610.2 – ALB06TS027**

Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD027 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	9/21/06	6028C.35

INSTRUCTIONS/REMARKS

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09/25/06
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 21, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16480
Sand # 13060 @ 6.83%
Fly Ash # 1365
Cement # 5330
Water # 1918

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 324^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Trench drain – Hanger pad #1.

			Measured
Truck No.	10466	Slump (in.):	4.5"
Date Sampled:	August 24, 2006	Slump w/plasticizer (in.)	
Date Received:	August 25, 2006	Air Temperature (°F):	74°
Sampled By:	M. Torrez	Mix Temp (°F):	78°
Batch Size:	10.0 cy	Air Content (%):	3.9% uncorrected
Time Batched:	12:23 p.m.	Unit Weight (pcf):	140.7
Time Placed:		Water Added (gal):	0
Time Sampled:	12:55 p.m.	Ticket No.:	98428
Yield Relative:	1.00	W/C Ratio	0.42

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
35A	8/31/06	7	4.00 x	8.00	12.57	52938	4210*****	NA
35B	8/31/06	7FC	4.00 x	8.00	12.57	49735	3960*****	NA
35C	9/21/06	28	4.00 x	8.00	12.57	71290	5670**	C
35C	9/21/06	28	4.00 x	8.00	12.57	71389	5680**	C

Lab # 6028 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
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Transmittal Date: 09/21/06	**Transmittal DCN: 71610.2 – ALB06TS026**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD026TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	9/14/06	6019C 31
Concrete Cylinder Test Report	9/14/06	6020C 32
Concrete Cylinder Test Report	9/14/06	6021C 33
Concrete Cylinder Test Report	9/19/06	6027C 34
Concrete Cylinder Test Report	9/19/06	6152C 41

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Project Manager

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 14, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16300
Sand # 11480 @ 6.78%
Fly Ash # 1635
Cement # 6520
Water # 1847

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade –footing for hanger pad #5. Set #1.

Truck No. 10536
Date Sampled: August 17, 2006
Date Received: August 22, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:05 a.m.
Time Placed:
Time Sampled: 1:45 a.m.
Yield Relative: 0.99

Measured

Slump (in.): 3.75"
Slump w/plasticizer (in.)
Air Temperature (°F): 55°
Mix Temp (°F): 76°
Air Content (%): 6.0% uncorrected
Unit Weight (pcf): 140.7
Water Added (gal): 0
Ticket No.: 98284
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
31A	8/24/06	7	4.00 x	8.00	12.57	61488	4890******	NA
31B	8/24/06	7FC	4.00 x	8.00	12.57	58475	4650*****	NA
31C	9/14/06	28	4.00 x	8.00	12.57	87308	6950**	C
31C	9/14/06	28	4.00 x	8.00	12.57	84706	6740**	C

Lab # 6019 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 14, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16260
Sand # 11520 @ 6.78%
Fly Ash # 1695
Cement # 6495
Water # 1858

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade –footing for hanger pad #5. Set #2.

Truck No. 10536
Date Sampled: August 17, 2006
Date Received: August 22, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 3:00 a.m.
Time Placed:
Time Sampled: 3:50 a.m.
Yield Relative: 0.97

	Measured
Slump (in.):	5.5"
Slump w/plasticizer (in.)	
Air Temperature (°F):	55°
Mix Temp (°F):	74°
Air Content (%):	3.25% uncorrected
Unit Weight (pcf):	144.3
Water Added (gal):	0
Ticket No.:	98294
W/C Ratio	0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
32A	8/24/06	7	4.00 x	8.00	12.57	70795	5630****	NA
32B	8/24/06	7FC	4.00 x	8.00	12.57	69906	5560**	NA
32C	9/14/06	28	4.00 x	8.00	12.57	92647	7370**	C
32C	9/14/06	28	4.00 x	8.00	12.57	95105	7570**	C

Lab # 6020 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 14, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16200
Sand # 11480 @ 6.78%
Fly Ash # 1635
Cement # 6550
Water # 1857

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade –top 6" of hanger pad #5. Set #2.

Truck No. 10536
Date Sampled: August 17, 2006
Date Received: August 22, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 4:59 a.m.
Time Placed:
Time Sampled: 5:20 a.m
Yield Relative: 0.99

	Measured
Slump (in.):	5.75"
Slump w/plasticizer (in.)	
Air Temperature (°F):	61°
Mix Temp (°F):	71°
Air Content (%):	6.0% uncorrected
Unit Weight (pcf):	141.0
Water Added (gal):	0
Ticket No.:	98304
W/C Ratio	0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
33A	8/24/06	7	4.00 x	8.00	12.57	57665	4590***	NA
33B	8/24/06	7FC	4.00 x	8.00	12.57	59741	4750***	NA
33C	9/14/06	28	4.00 x	8.00	12.57	81355	6470**	C
33C	9/14/06	28	4.00 x	8.00	12.57	80520	6410**	C

Lab # 6021 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 19, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16520
Sand # 13100 @ 6.78%
Fly Ash # 1340
Cement # 5340
Water # 1930

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 324^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Trench drain – Hanger pad #3 – 10' S of NW corner of pad. Measured

Truck No. 10466
Date Sampled: August 22, 2006
Date Received: August 23, 2006
Sampled By: M. Torrez
Batch Size: 10.0 cy
Time Batched: 12:13 p.m.
Time Placed:
Time Sampled: 12:45 p.m.
Yield Relative: 1.01

Slump (in.): 4.25"
Slump w/plasticizer (in.)
Air Temperature (°F): 74°
Mix Temp (°F): 79°
Air Content (%): 4.3% uncorrected
Unit Weight (pcf): 140.3
Water Added (gal): 0
Ticket No.: 98393
W/C Ratio 0.42

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
34A	8/29/06	7	4.00 x	8.00	12.57	54678	4350*****	NA
34B	8/29/06	7FC	4.00 x	8.00	12.57	56676	4510*****	NA
34C	9/19/06	28	4.00 x	8.00	12.57	69866	5560**	C
34C	9/19/06	28	4.00 x	8.00	12.57	66979	5330**	C

Lab # 6027 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 19, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 14400
Sand # 11560 @ 7.50%
Fly Ash # 1155
Cement # 4670
Water # 1593

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 284^{oz}
Air = 39^{oz}

SAMPLE DATA

Location: Trench drain for Pad#5 – 20'S of NW corner of Pad#5.

Measured

Truck No. 10546
Date Sampled: September 12, 2006
Date Received: September 13, 2006
Sampled By: M. Torrez
Batch Size: 8.75 cy
Time Batched: 12:05 p.m.
Time Placed:
Time Sampled: 12:38 a.m.
Yield Relative: 1.01

Slump (in.):
Slump w/plasticizer (in.) 4.0"
Air Temperature (°F): 77°
Mix Temp (°F): 75°
Air Content (%): 4.6% uncorrected
Unit Weight (pcf): 140.0
Water Added (gal): 0
Ticket No.: 98695
W/C Ratio 0.42

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
41A	9/19/06	7	4.00 x	8.00	12.57	56151	4470**	NA
41B	9/19/06	7FC	4.00 x	8.00	12.57	49619	3950**	NA
41C	10/10/06	28	4.00 x	8.00	12.57			
41C	10/10/06	28	4.00 x	8.00	12.57			

Lab # 6152 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
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Transmittal Date: 09/07/06	**Transmittal DCN: 71610.2 – ALB06TS020**

Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD020 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Proctor Test Report	8/28/06	71610P.006
Moisture Density Test Report	8/29/06	71610MD.007
Concrete Cylinder Test Report	8/24/06	6020C 32
Concrete Cylinder Test Report	8/31/06	6028C 35

INSTRUCTIONS/REMARKS

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NOTES

Perry Hampel
Project Manager

09/07/06
Date

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Print Name

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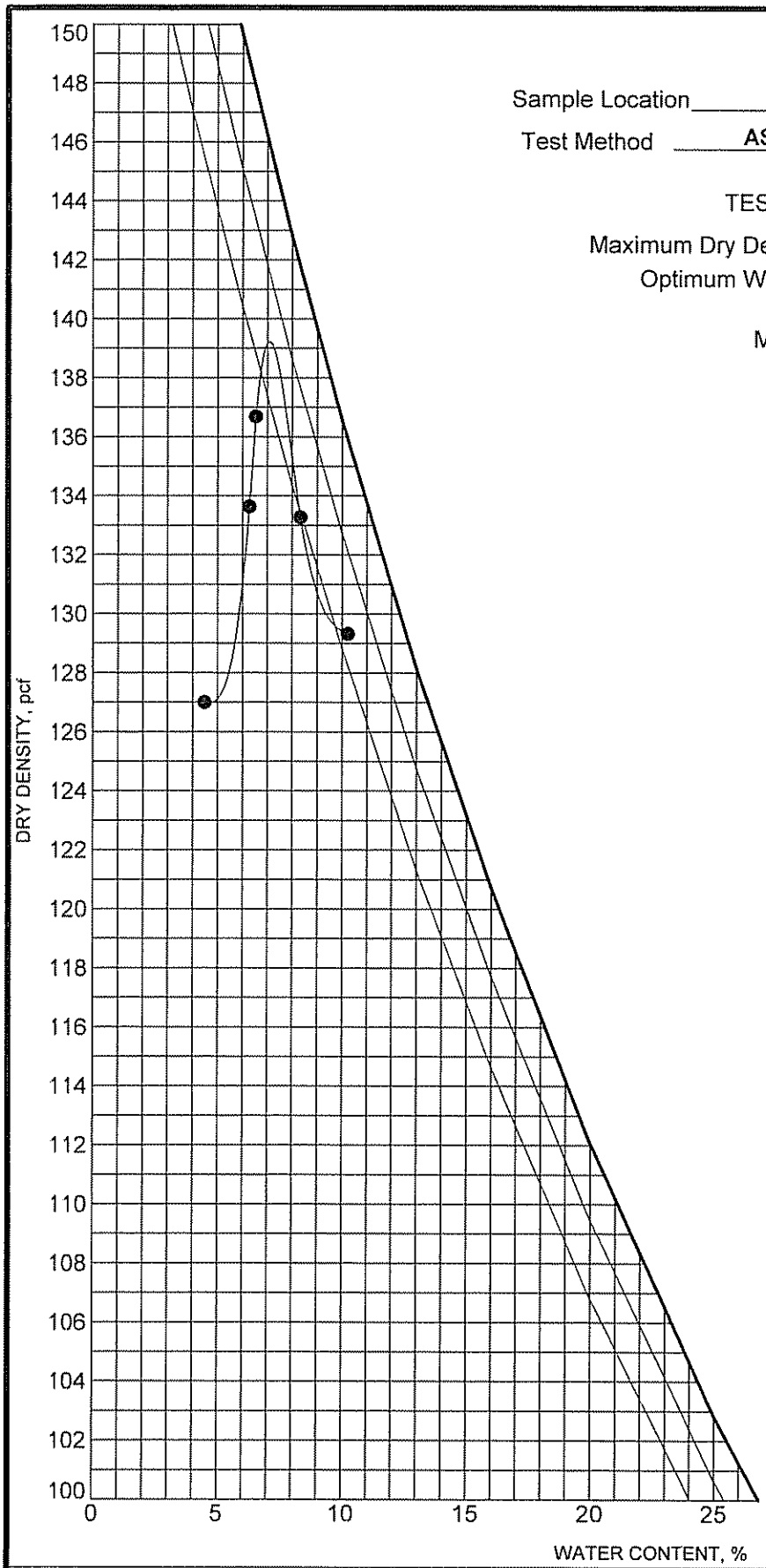


Sample Location stockpile Sample No. 06-273

Test Method **ASTM D698 Method C**

TEST RESULTS

Maximum Dry Density **139.2** **PCF**

Optimum Water Content **7.1** **%**

MATERIAL DESCRIPTION

% clay or silt	7 9
% sand	44 7
% gravel	47 4
Liquid Limit	NV
Plastic Limit	NV
Plasticity Index	NP
% Retained #4 sieve	47 4
% Retained 3/8 Sieve	33
% Retained 3/4 Sieve	2 4

Rammer - Mechanical
Preparation Method Used - Moist

CURVES OF 100% SATURATION
FOR SPECIFIC GRAVITY EQUAL TO:

2 80

2 70

2 60

USCS GP-GM AASHTO A-1-a

KLEINFELDER

MOISTURE-DENSITY RELATIONSHIP

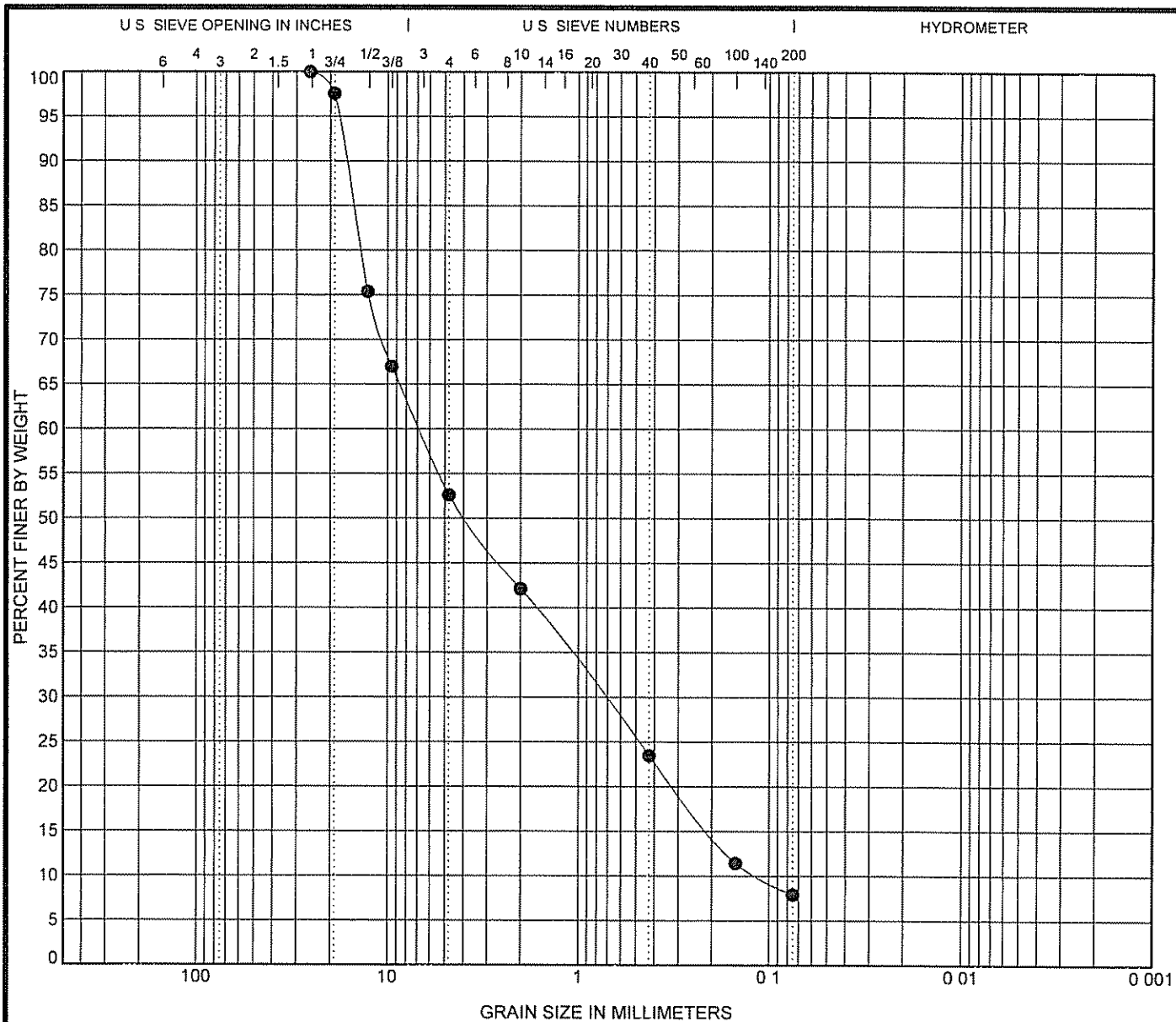
Project: TA-73 LANL Airport Landfill

Location: Onsite Stockpile

Project Number: 71610-2

Copyright Kleinfelder, Inc 9/5/2006

Figure C.6



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	stockpile	0.0	25.4	6.795	0.731	0.113	47.4	44.7	7.9	

Classification

USCS GP-GM AASHTO A-1-a

KLEINFELDER

GRAIN SIZE DISTRIBUTION

Project: TA-73 LANL Airport Landfill

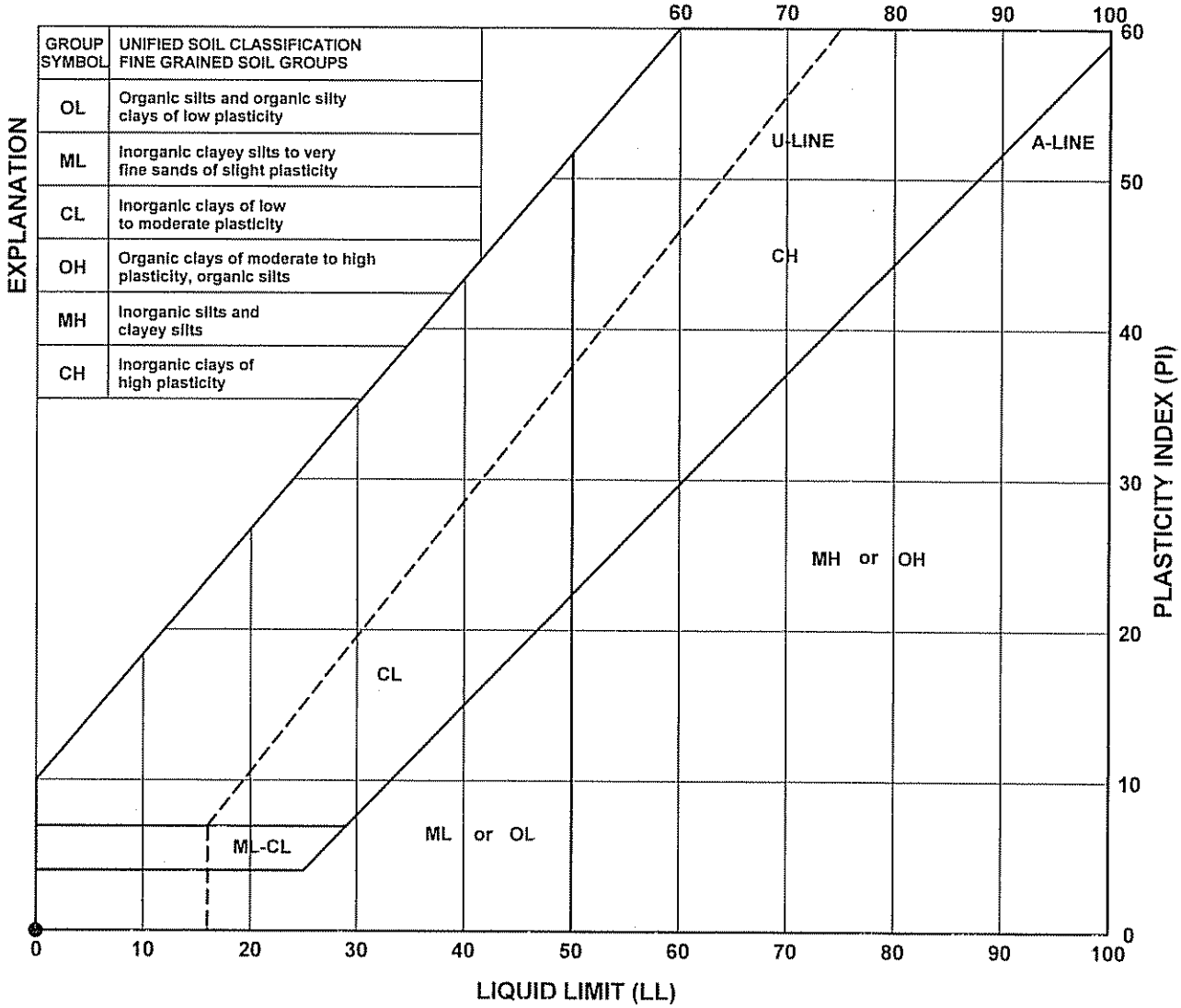
Location: Onsite Stockpile

Project Number: 71610-2

KLI GRAIN SIZE 71610-LAB.GPJ NEWKALOG PLOG.GDT 9/5/06

Copyright Kleinfelder Inc 9/5/2006

Figure F.2



Specimen Identification		Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
● stockpile	0.0	NV	NV	NP

KLI ATTERBERG 71610-LAB.GPJ NEWKALOG PLOG.GDT 9/5/06

KLEINFELDER

ATTERBERG LIMITS

Project: TA-73 LANL Airport Landfill

Location: Onsite Stockpile

Project Number: 71610-2

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Figure C.4

KLEINFELDER

IN-PLACE DENSITY-MOISTURE

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report	☐ Yes ☐ No		Page 1 of 1
File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Bet	Technician/Engineer: M. Torrez
Date: 8/29/2006	Client: Northrhwind	Contractor/Representative: Northwind	Time Arrived: 12:00 PM
Daily Field Report No: 71610MD.007	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Cloudy	Time Departed: 1:45 PM
Reviewed By: P. Hampel	Location of Fill: Infiltration Composite layer FSG	Gauge Number: 3185 / Make/Model: MC-3	Travel Time (hours): 3.0
Date Reviewed: 9/1/2006	Specified Compaction Requirements: Density 100 % to 100%; Moisture 14.2 % + 2%	Standardization Counts: Density 25360 / Moisture 14287	Total Time (hours): 5 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
17	25' (N) 15' (E) of NE corner of pad #1	BS	First 6" lift FSG	126.5	16.5	108.8	110.0	14.9	101.0	P	CL
18	25' (N) 15' (E) of NE corner of pad #2	BS	FSG	125.9	17.0	108.8	108.9	15.6	100.0	P	CL

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-102	CL		108.8	14.2	ASTM D 1557

NOTES

1. Test results pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and therefore should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

☐ Continued on next page

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 24, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16260
Sand # 11520 @ 6.78%
Fly Ash # 1695
Cement # 6495
Water # 1858

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade –footing for hanger pad #5. Set #2.

Measured

Truck No. 10536
Date Sampled: August 17, 2006
Date Received: August 22, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 3:00 a.m.
Time Placed:
Time Sampled: 3:50 a.m.
Yield Relative: 0.97

Slump (in.): 5.5"
Slump w/plasticizer (in.)
Air Temperature (°F): 55°
Mix Temp (°F): 74°
Air Content (%): 3.25% uncorrected
Unit Weight (pcf): 144.3
Water Added (gal): 0
Ticket No.: 98294
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
32A	8/24/06	7	4.00 x	8.00	12.57	70795	5630****	NA
32B	8/24/06	7FC	4.00 x	8.00	12.57	69906	5560**	NA
32C	9/14/06	28	4.00 x	8.00	12.57			
32C	9/14/06	28	4.00 x	8.00	12.57			

Lab # 6020 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 31, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16480 Max. Size Agg. (in.): 7/8"
Sand # 13060 @ 6.83% Admixtures: P997 = 324^{oz}
Fly Ash # 1365 Air = 45^{oz}
Cement # 5330
Water # 1918

SAMPLE DATA

Location: Trench drain – Hanger pad #1

Truck No. 10466
Date Sampled: August 24, 2006
Date Received: August 25, 2006
Sampled By: M. Torrez
Batch Size: 10.0 cy
Time Batched: 12:23 p.m.
Time Placed:
Time Sampled: 12:55 p.m.
Yield Relative: 1.00

Measured

Slump (in.): 4.5"
Slump w/plasticizer (in.)
Air Temperature (°F): 74°
Mix Temp (°F): 78°
Air Content (%): 3.9% uncorrected
Unit Weight (pcf): 140.7
Water Added (gal): 0
Ticket No.: 98428
W/C Ratio 0.42

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
35A	8/31/06	7	4.00 x	8.00	12.57	52938	4210*****	NA
35B	8/31/06	7FC	4.00 x	8.00	12.57	49735	3960*****	NA
35C	9/21/06	28	4.00 x	8.00	12.57			
35C	9/21/06	28	4.00 x	8.00	12.57			

Lab # 6028 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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An employee owned company

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Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION						Pages:	4
1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3			

Transmittal Date: 09/05/06	**Transmittal DCN: 71610.2 – ALB06TS019**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD019 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	8/30/06	5935C 23
Concrete Cylinder Test Report	8/30/06	5936C 24
Concrete Cylinder Test Report	8/29/06	6027C 34

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

09/05/06
Date

RECEIPT AND READ ACKNOWLEDGEMENT
PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 30, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16280
Sand # 11340 @ 5.43%
Fly Ash # 1625
Cement # 6540
Water # 1987

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 75^{oz}

SAMPLE DATA

Location: Slab on grade – 5' Sof SW corner of N third of pad 1. Set #2. Measured

Truck No. 10416
Date Sampled: August 2, 2006
Date Received: August 3, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 1:04 a.m.
Time Placed:
Time Sampled: 2:10 a.m.
Yield Relative: 1.01

Slump (in.): 6.25"
Slump w/plasticizer (in.):
Air Temperature (°F): 57°
Mix Temp (°F): 75°
Air Content (%): 6.8% uncorrected
Unit Weight (pcf): 138.2
Water Added (gal): 0
Ticket No.: 98089
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
23A	8/9/06	7	4.00 x	8.00	12.57	60136	4780**	NA
23B	8/9/06	7FC	4.00 x	8.00	12.57	53017	4220*	NA
23C	8/30/06	28	4.00 x	8.00	12.57	81079	6450*****	C
23C	8/30/06	28	4.00 x	8.00	12.57	71290	5670*****	C

Lab # 5935 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 30, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16180
Sand # 11340 @ 5.43%
Fly Ash # 1655
Cement # 6550
Water # 2017

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade – 5' N, 5' W of NE corner of S third of pad 1. Set #1. Measured

Truck No. 10536
Date Sampled: August 2, 2006
Date Received: August 3, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 3:31 a.m.
Time Placed:
Time Sampled: 4:10 a.m.
Yield Relative: 0.96

Slump (in.): 7.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 55°
Mix Temp (°F): 77°
Air Content (%): 6.8% uncorrected
Unit Weight (pcf): 145.2
Water Added (gal): 0
Ticket No.: 98073
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)		Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
24A	8/9/06	7	4.00	x	8.00	12.57	59781	4760*****	NA
24B	8/9/06	7FC	4.00	x	8.00	12.57	56340	4480**	NA
24C	8/30/06	28	4.00	x	8.00	12.57	63874	5080*****	C
24C	8/30/06	28	4.00	x	8.00	12.57	79991	6360*****	C

Lab # 5936 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
~~Jesse Curlin~~ Kelly Hamel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 29, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16520
Sand # 13100 @ 6.78%
Fly Ash # 1340
Cement # 5340
Water # 1930

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 324^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Trench drain – Hanger pad #3 – 10' S of NW corner of pad. Measured

Truck No. 10466
Date Sampled: August 22, 2006
Date Received: August 23, 2006
Sampled By: M. Torrez
Batch Size: 10.0 cy
Time Batched: 12:13 p.m.
Time Placed:
Time Sampled: 12:45 p.m.
Yield Relative: 1.01

Slump (in.): 4.25"
Slump w/plasticizer (in.)
Air Temperature (°F): 74°
Mix Temp (°F): 79°
Air Content (%): 4.3% uncorrected
Unit Weight (pcf): 140.3
Water Added (gal): 0
Ticket No.: 98393
W/C Ratio 0.42

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
34A	8/29/06	7	4.00 x	8.00	12.57	54678	4350*****	NA
34B	8/29/06	7FC	4.00 x	8.00	12.57	56676	4510*****	NA
34C	9/19/06	28	4.00 x	8.00	12.57			
34C	9/19/06	28	4.00 x	8.00	12.57			

Lab # 6027 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION					Pages:	10
1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3		

Transmittal Date: 08/30/06 | **Transmittal DCN: 71610.2 – ALB06TS018**

Project No.: 71610 | **Task No.: 2** | **File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD018 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	8/23/06	5904C.16
Concrete Cylinder Test Report	8/23/06	5905C.17
Concrete Cylinder Test Report	8/24/06	5918C.18
Concrete Cylinder Test Report	8/24/06	5919C.19
Concrete Cylinder Test Report	8/23/06	6015C.28
Concrete Cylinder Test Report	8/23/06	6016C.29
Concrete Cylinder Test Report	8/23/06	6017C.30
Concrete Cylinder Test Report	8/24/06	6019C.31
Concrete Cylinder Test Report	8/24/06	6021C.33

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

08/30/06
Date

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PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

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ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 23, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16300
Sand # 11400 @ 5.43%
Fly Ash # 1630
Cement # 6555
Water # 2007

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 79^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ A.5 – 17. Set #1.

Measured

Truck No. 10526
Date Sampled: July 26, 2006
Date Received: July 27, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:00 a.m.
Time Placed:
Time Sampled: 1:45 a.m.
Yield Relative: 1.00

Slump (in.): 6.75"
Slump w/plasticizer (in.):
Air Temperature (°F): 69°
Mix Temp (°F): 81°
Air Content (%): 6.0% uncorrected
Unit Weight (pcf): 137.2
Water Added (gal): 0
Ticket No.: 97955
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
16A	8/2/06	7	4.00 x	8.00	12.57	58535	4660*	NA
16B	8/2/06	7FC	4.00 x	8.00	12.57	54619	4350**	NA
16C	8/23/06	28	4.00 x	8.00	12.57	66741	5300*****	C
16D	8/23/06	28	4.00 x	8.00	12.57	68323	5440****	C

Lab # 5904 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 23, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16280
Sand # 11360 @ 5.43%
Fly Ash # 1675
Cement # 6555
Water # 2003

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 79^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ B – 17, top 6". Set #2. Measured

Truck No. 10526
Date Sampled: July 26, 2006
Date Received: July 27, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 2:57 a.m.
Time Placed:
Time Sampled: 3:40 a.m.
Yield Relative: 1.02

Slump (in.): 5.5"
Slump w/plasticizer (in.):
Air Temperature (°F): 64°
Mix Temp (°F): 80°
Air Content (%): 6.75% uncorrected
Unit Weight (pcf): 137.6
Water Added (gal): 0
Ticket No.: 97965
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
17A	8/2/06	7	4.00 x	8.00	12.57	57467	4570*	NA
17B	8/2/06	7FC	4.00 x	8.00	12.57	56484	4490*	NA
17C	8/23/06	28	4.00 x	8.00	12.57	71982	5730*****	C
17D	8/23/06	28	4.00 x	8.00	12.57	69906	5561*****	C

Lab # 5905 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 24, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16200
Sand # 11300 @ 5.43%
Fly Ash # 1625
Cement # 6500
Water # 1998

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 81^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ A.5 – 4. Set #2. Measured

Truck No. 10466
Date Sampled: July 27, 2006
Date Received: July 28, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:05 a.m.
Time Placed:
Time Sampled: 1:48 a.m.
Yield Relative: 1.01

Slump (in.): 5.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 63°
Mix Temp (°F): 78°
Air Content (%): 6.5% uncorrected
Unit Weight (pcf): 138.4
Water Added (gal): 0
Ticket No.: 97987
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
18A	8/3/06	7	4.00 x	8.00	12.57	61007	4850**	NA
18B	8/3/06	7FC	4.00 x	8.00	12.57	61402	4880*	NA
18C	8/24/06	28	4.00 x	8.00	12.57	83155	6620****	C
18D	8/24/06	28	4.00 x	8.00	12.57	82631	6570****	C

Lab # 5918 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: Jesse Carlin
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 24, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16300
Sand # 11280 @ 5.43%
Fly Ash # 1650
Cement # 6530
Water # 1998

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 75^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ A.5 – 2, top 6". Set #2. Measured

Truck No. 10466
Date Sampled: July 27, 2006
Date Received: July 28, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 3:02 a.m.
Time Placed:
Time Sampled: 3:45 a.m.
Yield Relative: 1.02

Slump (in.): 6.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 78°
Mix Temp (°F): 78°
Air Content (%): 6.5% uncorrected
Unit Weight (pcf): 137.2
Water Added (gal): 0
Ticket No.: 97997
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
19A	8/3/06	7	4.00 x	8.00	12.57	57704	4590*****	NA
19B	8/3/06	7FC	4.00 x	8.00	12.57	58148	4630**	NA
19C	8/24/06	28	4.00 x	8.00	12.57	70202	5580****	C
19D	8/24/06	28	4.00 x	8.00	12.57	71648	5700***	C

Lab # 5919 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: ~~Jesse Carlin~~ Perry Hanler
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 23, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16260
Sand # 11440 @ 6.58%
Fly Ash # 1630
Cement # 6565
Water # 1872

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade –SW corner of NW quarter of pad 4. Set #1. Measured

Truck No. 10456
Date Sampled: August 10, 2006
Date Received: August 23, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 2:53 a.m.
Time Placed:
Time Sampled: 3:30 a.m.
Yield Relative: 0.99

Slump (in.): 5.25"
Slump w/plasticizer (in.)
Air Temperature (°F): 60°
Mix Temp (°F): 75°
Air Content (%): 4.8% uncorrected
Unit Weight (pcf): 140.6
Water Added (gal): 0
Ticket No.: 98198
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
28A	8/23/06	13	4.00 x	8.00	12.57	56696	4510**	NA
28B	8/23/06	13FC	4.00 x	8.00	12.57	58574	4660***	NA
28C	9/7/06	28	4.00 x	8.00	12.57			
28C	9/7/06	28						

Lab # 6015 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By:_____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 23, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16260
Sand # 11480 @ 6.58%
Fly Ash # 1640
Cement # 6525
Water # 1871

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 73^{oz}

SAMPLE DATA

Location: Slab on grade –NE corner of NW quarter of pad 4. Set #2. Measured

Truck No. 10466
Date Sampled: August 10, 2006
Date Received: August 23, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 12:57 a.m.
Time Placed:
Time Sampled: 1:35 a.m.
Yield Relative: 1.01

Slump (in.): 6.00"
Slump w/plasticizer (in.)
Air Temperature (°F): 65°
Mix Temp (°F): 78°
Air Content (%): 6.2% uncorrected
Unit Weight (pcf): 139.0
Water Added (gal): 0
Ticket No.: 98188
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
29A	8/23/06	13	4.00 x	8.00	12.57	69114	5500***	NA
29B	8/23/06	13FC	4.00 x	8.00	12.57	65270	5190**	NA
29C	9/7/06	28	4.00 x	8.00	12.57			
29C	9/7/06	28	4.00 x	8.00	12.57			

Lab # 6016 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
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Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 23, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16180
Sand # 11400 @ 6.58%
Fly Ash # 1620
Cement # 6610
Water # 1872

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 73^{oz}

SAMPLE DATA

Location: Slab on grade –middle of Westside of SE quarter of pad 4. Set #3. Measured

Truck No. 10456
Date Sampled: August 10, 2006
Date Received: August 23, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 5:14 a.m.
Time Placed:
Time Sampled: 5:45 a.m.
Yield Relative: 0.99

Slump (in.): 6.00"
Slump w/plasticizer (in.)
Air Temperature (°F): 53°
Mix Temp (°F): 76°
Air Content (%): 5.4% uncorrected
Unit Weight (pcf): 140.6
Water Added (gal): 0
Ticket No.: 98208
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
30A	8/23/06	13	4.00 x	8.00	12.57	72872	5800***	NA
30B	8/23/06	13FC	4.00 x	8.00	12.57	73861	5880****	NA
30C	9/7/06	28	4.00 x	8.00	12.57			
30C	9/7/06	28	4.00 x	8.00	12.57			

Lab # 6017 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 24, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16300
Sand # 11480 @ 6.78%
Fly Ash # 1635
Cement # 6520
Water # 1847

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade –footing for hanger pad #5. Set #1.

Measured

Truck No. 10536
Date Sampled: August 17, 2006
Date Received: August 22, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:05 a.m.
Time Placed:
Time Sampled: 1:45 a.m.
Yield Relative: 0.99

Slump (in.): 3.75"
Slump w/plasticizer (in.)
Air Temperature (°F): 55°
Mix Temp (°F): 76°
Air Content (%): 6.0% uncorrected
Unit Weight (pcf): 140.7
Water Added (gal): 0
Ticket No.: 98284
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
31A	8/24/06	7	4.00 x	8.00	12.57	61488	4890******	NA
31B	8/24/06	7FC	4.00 x	8.00	12.57	58475	4650*****	NA
31C	9/14/06	28	4.00 x	8.00	12.57			
31C	9/14/06	28	4.00 x	8.00	12.57			

Lab # 6019 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By:

Perry Hampel
Kleinfelder, Inc.

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Attention: Mr. John Keck

Report Date: August 24, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16200
Sand # 11480 @ 6.78%
Fly Ash # 1635
Cement # 6550
Water # 1857

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade –top 6" of hanger pad #5 Set #2

Measured

Truck No. 10536
Date Sampled: August 17, 2006
Date Received: August 22, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 4:59 a.m.
Time Placed:
Time Sampled: 5:20 a.m.
Yield Relative: 0.99

Slump (in.): 5.75"
Slump w/plasticizer (in.)
Air Temperature (°F): 61°
Mix Temp (°F): 71°
Air Content (%): 6.0% uncorrected
Unit Weight (pcf): 141.0
Water Added (gal): 0
Ticket No.: 98304
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
33A	8/24/06	7	4.00 x	8.00	12.57	57665	4590***	NA
33B	8/24/06	7FC	4.00 x	8.00	12.57	59741	4750***	NA
33C	9/14/06	28	4.00 x	8.00	12.57			
33C	9/14/06	28	4.00 x	8.00	12.57			

Lab # 6021 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
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KLEINFELDER
An employee owned company

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION					Pages:	5
1	Steve Matier smatier@northwind-inc.com	2		3		

Transmittal Date: 08/25/06	**Transmittal DCN: 71610.2 – ALB06TS017**

Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD017 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Hydraulic Pre Qualification Test Results	7/17/06	71610HC 001/002

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

08/25/06
Date

RECEIPT AND READ ACKNOWLEDGEMENT
PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

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HYDRAULIC CONDUCTIVITY TEST REPORT
ASTM D5084

Project Name	TA 73 Los Alamos Landfill	*Project No.*	71610
Client Name	Kleinfelder	*Date Received*	7/18/2006 10:30
Client Address	Albuquerque, New Mexico	*Date Tested*	7/26/2006 16:00
		Date Issued	7/31/2006 8:50
Boring No.	Borrow Pit, #06-190		
Sample Type	Remolded - 100.1% Compaction		
Sample Depth	NA		
Sample Description	Lean Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	14.9	19.6	%
Dry Unit Weight, Dd	106.9	109.2	pcf
Height, L	2.63	2.62	inches
Diameter, d	2.82	2.82	inches
Degree of Saturation, Sr	69.7	97.3	%

Chamber Pressure:	58.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	57.0	psi
Consolidation Pressure:	1	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	21.6	0	6.50	17.25			
	Finish	21.6	1320	6.95	16.80	5.36E-06	5.2E-06	1.51
2	Start	21.6	1320	6.95	16.80			
	Finish	21.6	2460	7.25	16.50	4.46E-06	4.3E-06	1.42
3	Start	21.6	2460	7.25	16.50			
	Finish	21.5	3960	7.65	16.10	4.88E-06	4.7E-06	1.30
4	Start	21.5	3960	7.65	16.10			
	Finish	21.6	7320	8.35	15.35	4.53E-06	4.4E-06	1.08

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp. 4.8E-06

Average Hydraulic Conductivity "k" (cm/sec) @ 20° C **4.6E-06**

Assumed Specific Gravity, SG 2 7
Area of Tube (cm^2), a (pipette) 0 9721
Permeant : Dealred Tap Water
Formulas:
Permeability (Falling Head-Rising Tailwater Test)
k = [(a*L/(2*A*t)] ln(ho/h1)
k = Hydraulic Conductivity (cm/sec)
a = Area of Tube (cm^2)
L = Height or Length of Sample (cm)
A = Area of Sample (cm^2)
t = Time of Test Interval (sec)
h_0 = Height of Head at Start of Test Interval (cm)
h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation
Sr = w*SG/e Dd = (SG/1+e)Dw
Therefore:
Sr = (w*SG)/((SG*Dw/Dd)-1)
Sr = Degree of Saturation (%)
w = Moisture Content (%)
SG = Specific Gravity
e = Void Ratio
Dd =Dry Unit Weight (pcf)
Dw = Unit Weight of Water (62 4 pcf)

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KLEINFELDER

HYDRAULIC CONDUCTIVITY TEST RESULTS (ASTM D5084)

Project Name	TA 73 Los Alamos Landfill	***Job No.***	71610
Client Name	Kleinfelder	***Date Received***	7/18/2006 10:30
Client Address	Albuquerque, New Mexico	***Date Tested***	7/26/2006 16:00
		Date Issued	7/31/2006 8:50
Boring No.	Borrow Pit, #06-190		
Sample Type	Remolded - 100.1% Compaction		
Sample Depth	NA		
Sample Description	Lean Clay with Fine Sand, Brown		

0 0

	Deviation from Average	Change in Influent(ml)	Change in Effluent (ml)	Ratio Effluent/Influent Change
Test1	1 11	0 44	-0.44	1 00
Test 2	0 93	0.29	-0 29	1 00
Test 3	1 01	0.39	-0 39	1 00
Test 4	0.94	0 68	-0 73	1 07
	ok if within 0.75-1.25			**ok if within 0.75-1.25**

1.0231881

0.022923341

HYDRAULIC CONDUCTIVITY TEST REPORT
ASTM D5084

Project Name	TA 73 Los Alamos Landfill	*Project No.*	71610
Client Name	Kleinfelder	*Date Received*	7/18/2006 10:30
Client Address	Albuquerque, New Mexico	*Date Tested*	7/24/2006 16:40
		Date Issued	7/28/2006 9:45
Boring No.	Borrow Pit, #06-190		
Sample Type	Remolded - 98.3% Compaction		
Sample Depth	NA		
Sample Description	Lean Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	14.9	20.5	%
Dry Unit Weight, Dd	106.9	106.6	pcf
Height, L	2.81	2.80	inches
Diameter, d	2.82	2.82	inches
Degree of Saturation, Sr	69.7	95.3	%

Chamber Pressure:	58.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	57.0	psi
Consolidation Pressure:	1	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	21.8	0	7.90	20.85			
	Finish	21.8	1020	9.05	19.70	1.65E-05	1.6E-05	1.54
2	Start	21.8	1020	9.05	19.70			
	Finish	21.7	1980	9.95	18.80	1.66E-05	1.6E-05	1.28
3	Start	21.7	1980	9.95	18.80			
	Finish	21.7	3300	10.95	17.80	1.67E-05	1.6E-05	0.99
4	Start	21.7	3300	10.95	17.80			
	Finish	21.7	4320	11.55	17.20	1.63E-05	1.6E-05	0.82

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp.	1.7E-05	
Average Hydraulic Conductivity "k" (cm/sec) @ 20° C		**1.6E-05**

Assumed Specific Gravity, SG 2.7
Area of Tube (cm^2) a (pipette) 0 9721
Permeant : Dealred Tap Water
Formulas:
Permeability (Falling Head-Rising Tailwater Test)
k = [(a*L/(2*A*t)] ln(ho/h1)
k = Hydraulic Conductivity (cm/sec)
a = Area of Tube (cm^2)
L = Height or Length of Sample (cm)
A = Area of Sample (cm^2)
t = Time of Test Interval (sec)
h_o = Height of Head at Start of Test Interval (cm)
h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation
Sr = w*SG/e Dd = (SG/1+e)Dw
Therefore:
Sr = (w*SG)/((SG*Dw/Dd)-1)
Sr = Degree of Saturation (%)
w = Moisture Content (%)
SG = Specific Gravity
e = Void Ratio
Dd =Dry Unit Weight (pcf)
Dw = Unit Weight of Water (62 4 pcf)

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KLEINFELDER

HYDRAULIC CONDUCTIVITY TEST RESULTS (ASTM D5084)

Project Name	TA 73 Los Alamos Landfill	***Job No.***	71610
Client Name	Kleinfelder	***Date Received***	7/18/2006 10:30
Client Address	Albuquerque, New Mexico	***Date Tested***	7/24/2006 16:40
		Date Issued	7/28/2006 9:45
Boring No.	Borrow Pit, #06-190		
Sample Type	Remolded - 98.3% Compaction		
Sample Depth	NA		
Sample Description	Lean Clay with Fine Sand, Brown		

0 0

	Deviation from Average	Change in Influent(ml)	Change in Effluent (ml)	Ratio Effluent/Influent Change
Test1	1 00	1 12	-1 12	1.00
Test 2	1.01	0.87	-0 87	1 00
Test 3	1.01	0 97	-0 97	1 00
Test 4	0.98	0 58	-0 58	1 00
	ok if within 0.75-1.25			**ok if within 0.75-1.25**

1.0231881

0.022923341

KLEINFELDER
An employee owned company

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

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Transmittal Date: 08/22/06	**Transmittal DCN: 71610.2 – ALB06TS014**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD014 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Hydraulic Conductivity Test Report	8/16/06	71610HC.005

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel — Project Manager
08/22/06 — Date

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HYDRAULIC CONDUCTIVITY TEST REPORT

ASTM D5084

Project Name	TA 73 Los Alamos Landfill	***Project No.***	71610
Client Name	Kleinfelder	***Date Received***	8/08/2006 12:30
Client Address	Albuquerque, New Mexico	***Date Tested***	8/16/2006 16:40
		Date Issued	8/21/2006 15:10
Boring No.	Infiltration Test Pond		
Sample Type	Drive Cylinder		
Sample Depth	11"-16"		
Sample Description	Lean to Fat Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	12.1		%
Dry Unit Weight, Dd	107.8		pcf
Height, L	1.69		inches
Diameter, d	2.78		inches
Degree of Saturation, Sr	57.9	#DIV/0!	%

Chamber Pressure:	60.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	55.0	psi
Consolidation Pressure:	3	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	21.4	0	9.35	16.95			
	Finish	21.5	2940	9.55	16.75	5.02E-08	4.8E-08	34.44
2	Start	21.5	2940	9.55	16.75			
	Finish	21.1	5880	9.70	16.60	3.77E-08	3.6E-08	34.37
3	Start	21.1	5880	9.70	16.60			
	Finish	20.8	10680	10.00	16.30	4.64E-08	4.5E-08	34.22
4	Start	20.8	10680	10.00	16.30			
	Finish	20.8	16380	10.40	15.95	4.90E-08	4.8E-08	34.04

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp.	4.6E-08	
Average Hydraulic Conductivity "k" (cm/sec) @ 20° C		**4.4E-08**

Assumed Specific Gravity, SG 2.7

Area of Tube (cm^2), a (pipette) 0.9721

Permeant : Dealred Tap Water

Formulas:

Permeability (Falling Head-Rising Tailwater Test)

k = [(a*L/(2*A*t)] ln(ho/h1)

k = Hydraulic Conductivity (cm/sec)

a = Area of Tube (cm^2)

L = Height or Length of Sample (cm)

A = Area of Sample (cm^2)

t = Time of Test Interval (sec)

h_o = Height of Head at Start of Test Interval (cm)

h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation

Sr = w*SG/e Dd = (SG/1+e)Dw

Therefore:

Sr = (w*SG)/((SG*Dw/Dd)-1)

Sr = Degree of Saturation (%)

w = Moisture Content (%)

SG = Specific Gravity

e = Void Ratio

Dd =Dry Unit Weight (pcf)

Dw = Unit Weight of Water (62.4 pcf)

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1	Steve Matier smatier@northwind-inc.com	2	Philip Meehan pmeehan@northwind-inc.com	3		

Transmittal Date: 08/21/06	**Transmittal DCN: 71610.2 – ALB06TS013**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD013 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Moisture Density Test Report	8/3/06	71610MD.006
Hydraulic Conductivity Test Report	8/14/06	71610HC.003
Hydraulic Conductivity Test Report	8/14/06	71610HC.004
Concrete Cylinder Test Report	8/16/06	5871C.12
Concrete Cylinder Test Report	8/16/06	5872C.13
Concrete Cylinder Test Report	8/17/06	5892C.14
Concrete Cylinder Test Report	8/17/06	5893C.15
Concrete Cylinder Test Report	8/15/06	5941C.25
Concrete Cylinder Test Report	8/15/06	5942C.26
Concrete Cylinder Test Report	8/15/06	5940C.27

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

08/21/06
Date

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IN-PLACE DENSITY-MOISTURE

KLEINFELDER

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☐ Yes ☐ No

File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Bet	Technician/Engineer: M. Emms
Date: 8/3/2006	Client: Nortrhwind	Contractor/Representative: Northwind	Time Arrived: 2:30 AM
Daily Field Report No: 71610MD.006	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Cloudy	Time Departed: 6:00 AM
Reviewed By: P. Hampel	Location of Fill: Test Pad	Gauge Number: 3184 / Make/Model: MC-3	Travel Time (hours): 4.0
Date Reviewed: 8/11/2006	Specified Compaction Requirements: Density 100 % to 100%; Moisture 14.2 % + n/a	Standardization Counts: Density 23479 / Moisture 8181	Total Time (hours): 7.5 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
14	Interline infiltration test pad	4"	-12"	133.4	14.1	108.8	119.4	11.8	108.7	P	CL
15	Interline infiltration test pad	6"	-6"	126.7	15.7	108.8	111.0	14.2	102.0	P	CL
16	Interline infiltration test pad	6"	Top	126.1	16.7	108.8	109.0	15.3	100.5	P	CL

Any unresolved test (date/number):

Observations/Remarks:

Used to verify compaction effort needed

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-102	CL		108.8	14.2	ASTM D 1557

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

☐ Continued on next page

HYDRAULIC CONDUCTIVITY TEST REPORT
ASTM D5084

Project Name	TA 73 Los Alamos Landfill	*Project No.*	71610
Client Name	Kleinfelder	*Date Received*	8/8/2006 12:30
Client Address	Albuquerque, New Mexico	*Date Tested*	8/14/2006 16:40
		Date Issued	8/17/2006 9:45
Boring No.	Infiltration Test Pad		
Sample Type	Remolded Sample		
Sample Depth	1"-6"		
Sample Description	Lean Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	14.9	18.4	%
Dry Unit Weight, Dd	106.9	107.2	pcf
Height, L	2.81	2.41	inches
Diameter, d	2.82	2.82	inches
Degree of Saturation, Sr	69.7	86.9	%

Chamber Pressure:	60.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	55.0	psi
Consolidation Pressure:	3	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	20.7	0	15.80	21.80	3.30E-07	3.2E-07	19.98
	Finish	20.7	7980	18.00	19.70			
2	Start	20.7	7980	18.00	19.70	3.12E-07	3.1E-07	19.47
	Finish	20.7	15060	19.80	18.00			
3	Start	20.7	15060	19.80	18.00	3.11E-07	3.1E-07	19.19
	Finish	20.5	19200	20.80	17.00			
4	Start	20.5	19200	20.80	17.00	2.99E-07	2.9E-07	18.86
	Finish	20.4	24120	21.95	15.90			

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp 3.1E-07

Average Hydraulic Conductivity "k" (cm/sec) @ 20° C 3.1E-07

Assumed Specific Gravity, SG 2.7

Area of Tube (cm^2), a (pipette) 0.9721

Permeant : Dealred Tap Water

Formulas:

Permeability (Falling Head-Rising Tailwater Test)

k = [(a*L/(2*A*t)] ln(ho/h1)

k = Hydraulic Conductivity (cm/sec)

a = Area of Tube (cm^2)

L = Height or Length of Sample (cm)

A = Area of Sample (cm^2)

t = Time of Test Interval (sec)

h_o = Height of Head at Start of Test Interval (cm)

h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation

Sr = w*SG/e Dd = (SG/1+e)Dw

Therefore:

Sr = (w*SG)/((SG*Dw/Dd)-1)

Sr = Degree of Saturation (%)

w = Moisture Content (%)

SG = Specific Gravity

e = Void Ratio

Dd =Dry Unit Weight (pcf)

Dw = Unit Weight of Water (62.4 pcf)

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AUG-21-2006 MON 11:27 AM FAX NO. P. 02

HYDRAULIC CONDUCTIVITY TEST REPORT
ASTM D5084

Project Name	TA 73 Los Alamos Landfill	*Project No.*	71610
Client Name	Kleinfelder	*Date Received*	8/08/2006 12:30
Client Address	Albuquerque, New Mexico	*Date Tested*	8/14/2006 16:40
		Date Issued	8/17/2006 9:45
Boring No.	Infiltration Test Pond		
Sample Type	Drive Cylinder		
Sample Depth	6"-11"		
Sample Description	Lean to Fat Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	15.5	17.0	%
Dry Unit Weight, Dd	108.4	110.5	pcf
Height, L	1.76	1.73	inches
Diameter, d	2.78	2.77	inches
Degree of Saturation, Sr	75.5	87.4	%

Chamber Pressure:	60.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	55.0	psi
Consolidation Pressure:	3	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	20.6	0	9.00	23.40			
	Finish	21.3	53340	14.70	18.20	7.82E-08	7.6E-08	32.24
2	Start	21.3	53340	14.70	18.20			
	Finish	20.8	56340	15.00	17.95	7.30E-08	7.1E-08	32.11
3	Start	20.8	56340	15.00	17.95			
	Finish	20.7	61920	15.45	17.50	6.45E-08	6.3E-08	31.90
4	Start	20.7	61920	15.45	17.50			
	Finish	20.7	69900	16.10	16.90	6.32E-08	6.2E-08	31.62

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp. 7.0E-08

Average Hydraulic Conductivity "k" (cm/sec) @ 20° C **6.8E-08**

Assumed Specific Gravity, SG 2.7
Area of Tube (cm^2), a (pipette) 0.9721
Permeant : Desired Tap Water
Formulas:
Permeability (Falling Head-Rising Tailwater Test)
$k = [(a*L/(2*A*t)] \ln(ho/h1)$
k = Hydraulic Conductivity (cm/sec)
a = Area of Tube (cm^2)
L = Height or Length of Sample (cm)
A = Area of Sample (cm^2)
t = Time of Test Interval (sec)
h_o = Height of Head at Start of Test Interval (cm)
h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation
$Sr = w*SG/e$ $Dd = (SG/1+e)Dw$
Therefore:
$Sr = (w*SG)/((SG*Dw/Dd)-1)$
Sr = Degree of Saturation (%)
w = Moisture Content (%)
SG = Specific Gravity
e = Void Ratio
Dd =Dry Unit Weight (pcf)
Dw = Unit Weight of Water (62.4 pcf)

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KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 16, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16240
Sand # 11320 @ 5.58%
Fly Ash # 1655
Cement # 6525
Water # 1996

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ A.5 – 7, Set #1

		Measured	
Truck No.	10526	Slump (in.):	5.5"
Date Sampled:	July 19, 2006	Slump w/plasticizer (in.):	
Date Received:	July 20, 2006	Air Temperature (°F):	66°
Sampled By:	P. German	Mix Temp (°F):	81°
Batch Size:	10.0 cy	Air Content (%):	4.5% at truck
Time Batched:	1:01 a.m.	Unit Weight (pcf):	144.7
Time Placed:		Water Added (gal):	0
Time Sampled:	1:35 a.m.	Ticket No.:	97779
Yield Relative:	0.97	W/C Ratio	0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
12A	7/26/06	7	4.00 x	8.00	12.57	73465	5840**	NA
12B	7/26/06	7FC	4.00 x	8.00	12.57	72377	5760*****	NA
12C	8/16/06	28	4.00 x	8.00	12.57	86616	6890**	C
12D	8/16/06	28	4.00 x	8.00	12.57	88867	7070**	C

Lab # 5871 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 16, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16160
Sand # 11320 @ 5.58%
Fly Ash # 1680
Cement # 6515
Water # 1972

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 79^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ D – 1, Set #2

Truck No. 10486
Date Sampled: July 19, 2006
Date Received: July 20, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 3:04 a.m.
Time Placed:
Time Sampled: 3:45 a.m.
Yield Relative: 0.99

Measured
Slump (in.): 6.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 65°
Mix Temp (°F): 78/°
Air Content (%): 5.0% uncorrected
Unit Weight (pcf): 140.3
Water Added (gal): 0
Ticket No.: 97789
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
13A	7/26/06	7	4.00 x	8.00	12.57	65033	5170***	NA
13B	7/26/06	7FC	4.00 x	8.00	12.57	67038	5330**	NA
13C	8/16/06	28	4.00 x	8.00	12.57	81276	6470**	C
13D	8/16/06	28	4.00 x	8.00	12.57	78333	6230**	C

Lab # 5872 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 17, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16280
Sand # 11340 @ 5.43%
Fly Ash # 1630
Cement # 6560
Water # 1998

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 79^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ A-6, Set #1.

Measured

Truck No. 10546
Date Sampled: July 20, 2006
Date Received: July 21, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:15 a.m.
Time Placed:
Time Sampled: 1:45 a.m.
Yield Relative: 1.00

Slump (in.): 4.75"
Slump w/plasticizer (in.):
Air Temperature (°F): 69°
Mix Temp (°F): 81/°
Air Content (%): 5.8% uncorrected
Unit Weight (pcf): 140.7
Water Added (gal): 0
Ticket No.: 97811
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
14A	7/27/06	7	4.00 x	8.00	12.57	73162	5820**	NA
14B	7/27/06	7FC	4.00 x	8.00	12.57	76431	6080****	NA
14C	8/17/06	28	4.00 x	8.00	12.57	85825	6830****	C
14D	8/17/06	28	4.00 x	8.00	12.57	88099	7010****	C

Lab # 5892 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 17, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16340
Sand # 11280 @ 5.43%
Fly Ash # 1630
Cement # 6565
Water # 2004

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 81^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ C-3, top 6" Set #2

Measured

Truck No. 10546
Date Sampled: July 20, 2006
Date Received: July 21, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:15 a.m.
Time Placed:
Time Sampled: 1:45 a.m.
Yield Relative: 1.00

Slump (in.): 4.75"
Slump w/plasticizer (in.):
Air Temperature (°F): 69°
Mix Temp (°F): 81/°
Air Content (%): 5.8% uncorrected
Unit Weight (pcf): 140.7
Water Added (gal): 0
Ticket No.: 97811
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
15A	7/27/06	7	4.00 x	8.00	12.57	55964	4450*	NA
15B	7/27/06	7FC	4.00 x	8.00	12.57	60670	4830**	NA
15C	8/17/06	28	4.00 x	8.00	12.57	65852	5240*	C
15D	8/17/06	28	4.00 x	8.00	12.57	67335	5360*	C

Lab # 5893 Curing: Lab/Water tanks Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 15, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16140
Sand # 11480 @ 6.83%
Fly Ash # 1665
Cement # 6505
Water # 1847

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade – NE corner of pad#4. Set #1. Measured

Truck No. 10486
Date Sampled: August 8, 2006
Date Received: August 9, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 1:12 a.m.
Time Placed:
Time Sampled: 1:45 a.m.
Yield Relative: 0.99

Slump (in.): 6.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 60°
Mix Temp (°F): 73°
Air Content (%): 6.8% uncorrected
Unit Weight (pcf): 140.8
Water Added (gal): 0
Ticket No.: 98140
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
25A	8/15/06	7	4.00 x	8.00	12.57	63479	5050****	NA
25B	8/15/06	7FC	4.00 x	8.00	12.57			
25C	9/5/06	28	4.00 x	8.00	12.57			
25C	9/5/06	28						

Lab # 5941 Curing: Lab/Water tanks Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 15, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16140
Sand # 11460 @ 6.83%
Fly Ash # 1640
Cement # 6535
Water # 1841

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 73^{oz}

SAMPLE DATA

Location: Slab on grade –5' west of midpoint of E side of pad#4. Set #2. Measured

Truck No. 10486
Date Sampled: August 8, 2006
Date Received: August 9, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 2:57 a.m.
Time Placed:
Time Sampled: 3:30 a.m.
Yield Relative: 0.98

Slump (in.): 6.5"
Slump w/plasticizer (in.):
Air Temperature (°F): 61°
Mix Temp (°F): 76°
Air Content (%): 5.5% uncorrected
Unit Weight (pcf): 141.7
Water Added (gal): 0
Ticket No.: 98150
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
26A	8/15/06	7	4.00 x	8.00	12.57	61007	4850*****	NA
26B	8/15/06	7FC	4.00 x	8.00	12.57			
26C	9/5/06	28	4.00 x	8.00	12.57			
26C	9/5/06	28						

Lab # 5942 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 15, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 17980
Sand # 11440 @ 6.83%
Fly Ash # 1630
Cement # 6500
Water # 1857

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 73^{oz}

SAMPLE DATA

Location: Slab on grade –NW corner of S half of pad 4. Set #3.

Measured

Truck No. 10526
Date Sampled: August 8, 2006
Date Received: August 9, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 4:51 a.m.
Time Placed:
Time Sampled: 5:30 a.m.
Yield Relative: 1.03

Slump (in.): 6.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 61°
Mix Temp (°F): 76°
Air Content (%): 5.4% uncorrected
Unit Weight (pcf): 141.4
Water Added (gal): 0
Ticket No.: 98159
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
27A	8/15/06	7	4.00 x	8.00	12.57	61105	4860*****	NA
27B	8/15/06	7FC	4.00 x	8.00	12.57			
27C	9/5/06	28	4.00 x	8.00	12.57			
27C	9/5/06	28						

Lab # 5940 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
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KLEINFELDER
An employee owned company

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION					Pages:	7
1	Steve Matier smatier@northwind-inc.com	2	Philip Meehan pmeehan@northwind-inc.com	3		

Transmittal Date: 07/28/06	**Transmittal DCN: 71610.2 – ALB06TS009**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD009 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	7/26/06	5857C.10
Concrete Cylinder Test Report	7/26/06	5858C.11
Concrete Cylinder Test Report	7/26/06	5871C.12
Concrete Cylinder Test Report	7/26/06	5872C.13
Concrete Cylinder Test Report	7/27/06	5892C.14
Concrete Cylinder Test Report	7/27/06	5893C.15

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form

NOTES

Perry Hampel — Project Manager
07/28/06 — Date

RECEIPT AND READ ACKNOWLEDGEMENT PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature _____ Date _____

Print Name _____

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: July 26, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16300
Sand # 11300 @ 5.61%
Fly Ash # 1645
Cement # 6565
Water # 1987

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ D-11 Set #1

Measured

Truck No. 10546
Date Sampled: July 17, 2006
Date Received: June 18, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:05 a.m.
Time Placed:
Time Sampled: 1:48 a.m.
Yield Relative: 0.96

Slump (in.): 7.25"
Slump w/plasticizer (in.):
Air Temperature (°F): 68°
Mix Temp (°F): 79°
Air Content (%): 3.5% uncorrected
Unit Weight (pcf): 143.3
Water Added (gal): 0
Ticket No.: 97737
W/C Ratio 0.33

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
10A	7/24/06	7	4.00 x	8.00	12.57	66530	5290**	NA
10B	7/26/06	9FC	4.00 x	8.00	12.57	92449	7350**	NA
10C	8/14/06	28	4.00 x	8.00	12.57			
10D	8/14/06	28	4.00 x	8.00	12.57			

Lab # 5857 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
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Attention: Mr. John Keck

Report Date: July 26, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16260
Sand # 11580 @ 7.84%
Fly Ash # 1660
Cement # 6540
Water # 1743

Max. Size Agg (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ C.5-9 top 6" Set #2 Measured

Truck No. 10546
Date Sampled: July 17, 2006
Date Received: June 18, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 3:05 a.m.
Time Placed:
Time Sampled: 3:50 a.m.
Yield Relative: 0.98

Slump (in.): 7.25"
Slump w/plasticizer (in.):
Air Temperature (°F): 68°
Mix Temp (°F): 79°
Air Content (%): 3.5% uncorrected
Unit Weight (pcf): 143.3
Water Added (gal): 0
Ticket No.: 97737
W/C Ratio 0.33

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
11A	7/24/06	7	4.00 x	8.00	12.57	63182	5030**	NA
11B	7/26/06	9FC	4.00 x	8.00	12.57	81398	6480**	NA
11C	8/14/06	28	4.00 x	8.00	12.57			
11D	8/14/06	28	4.00 x	8.00	12.57			

Lab # 5858 Curing: Lab/Water tanks Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

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Report Date: July 26, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No 44
Design Strength: 4000 PSI

Agg # 16240
Sand # 11320 @ 5.58%
Fly Ash # 1655
Cement # 6525
Water # 1996

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ A.5 – 7, Set #1.

Measured

Truck No. 10526
Date Sampled: July 19, 2006
Date Received: June 20, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:01 a.m.
Time Placed:
Time Sampled: 1:35 a.m.
Yield Relative: 0.97

Slump (in.): 5.5"
Slump w/plasticizer (in.):
Air Temperature (°F): 66°
Mix Temp (°F): 81°
Air Content (%): 4.5% at truck
Unit Weight (pcf): 144.7
Water Added (gal): 0
Ticket No.: 97779
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
12A	7/26/06	7	4.00 x	8.00	12.57	73465	5840**	NA
12B	7/26/06	7FC	4.00 x	8.00	12.57	72377	5760*****	NA
12C	8/16/06	28	4.00 x	8.00	12.57			
12D	8/16/06	28	4.00 x	8.00	12.57			

Lab # 5871 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: July 26, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16160
Sand # 11320 @ 5 58%
Fly Ash # 1680
Cement # 6515
Water # 1972

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 79^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ D – 1, Set #2. Measured

Truck No. 10486
Date Sampled: July 19, 2006
Date Received: June 20, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 3:04 a.m.
Time Placed:
Time Sampled: 3:45 a.m.
Yield Relative: 0.99

Slump (in.): 6.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 65°
Mix Temp (°F): 78/°
Air Content (%): 5.0% uncorrected
Unit Weight (pcf): 140.3
Water Added (gal): 0
Ticket No.: 97789
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
13A	7/26/06	7	4.00 x	8.00	12.57	65033	5170***	NA
13B	7/26/06	7FC	4.00 x	8.00	12.57	67038	5330**	NA
13C	8/16/06	28	4.00 x	8.00	12.57			
13D	8/16/06	28	4.00 x	8.00	12.57			

Lab # 5872 Curing: Lab/Water tanks Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: July 27, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16280
Sand # 11340 @ 5.43%
Fly Ash # 1630
Cement # 6560
Water # 1998

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 79^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ A-6, Set #1.

Measured

Truck No. 10546
Date Sampled: July 20, 2006
Date Received: June 21, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:15 a.m.
Time Placed:
Time Sampled: 1:45 a.m.
Yield Relative: 1.00

Slump (in.): 4.75"
Slump w/plasticizer (in.):
Air Temperature (°F): 69°
Mix Temp (°F): 81/°
Air Content (%): 5.8% uncorrected
Unit Weight (pcf): 140.7
Water Added (gal): 0
Ticket No.: 97811
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
14A	7/27/06	7	4.00 x	8.00	12.57	73162	5820**	NA
14B	7/27/06	7FC	4.00 x	8.00	12.57	76431	6080****	NA
14C	8/17/06	28	4.00 x	8.00	12.57			
14D	8/17/06	28	4.00 x	8.00	12.57			

Lab # 5892 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: July 27, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16340
Sand # 11280 @ 5.43%
Fly Ash # 1630
Cement # 6565
Water # 2004

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 81^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ C-3, top 6" Set #2

Measured

Truck No. 10546
Date Sampled: July 20, 2006
Date Received: June 21, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:15 a.m.
Time Placed:
Time Sampled: 1:45 a.m.
Yield Relative: 1.00

Slump (in.): 4.75"
Slump w/plasticizer (in.):
Air Temperature (°F): 69°
Mix Temp (°F): 81/°
Air Content (%): 5.8% uncorrected
Unit Weight (pcf): 140.7
Water Added (gal): 0
Ticket No.: 97811
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
15A	7/27/06	7	4.00 x	8.00	12.57	55964	4450*	NA
15B	7/27/06	7FC	4.00 x	8.00	12.57	60670	4830**	NA
15C	8/17/06	28	4.00 x	8.00	12.57			
15D	8/17/06	28	4.00 x	8.00	12.57			

Lab # 5893 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER
An employee owned company

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION					Pages:	9
1	Steve Matier smatier@northwind-inc.com	2		3		

Transmittal Date: 5/26/06	**Transmittal DCN: 71610.2 – ALB06TS001**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD001 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Proctor Test Reports	5/24/06	71610P.001
Proctor Test Reports	5/24/06	71610P.002
Proctor Test Reports	5/25/06	71610P.003

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc at the address referenced at the top of this form.

NOTES

Project Manager _____ Date _____

RECEIPT AND READ ACKNOWLEDGEMENT
PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature _____ Date _____

Print Name _____

Project Document Control _____ Date _____

COMPACTION TEST REPORT

Curve No.: 06-102,103,104

Project No.: 71610 **Date:** 5/24/06

Project: TA 73 Los Alamos Landfill

Location: Composite of the Barrow Pit samples for Infiltraion Material

Elev./Depth: -1 0' to -5 0' **Sample No.** 06-102,103,104

Remarks:

MATERIAL DESCRIPTION

Description: Lean clay with sand

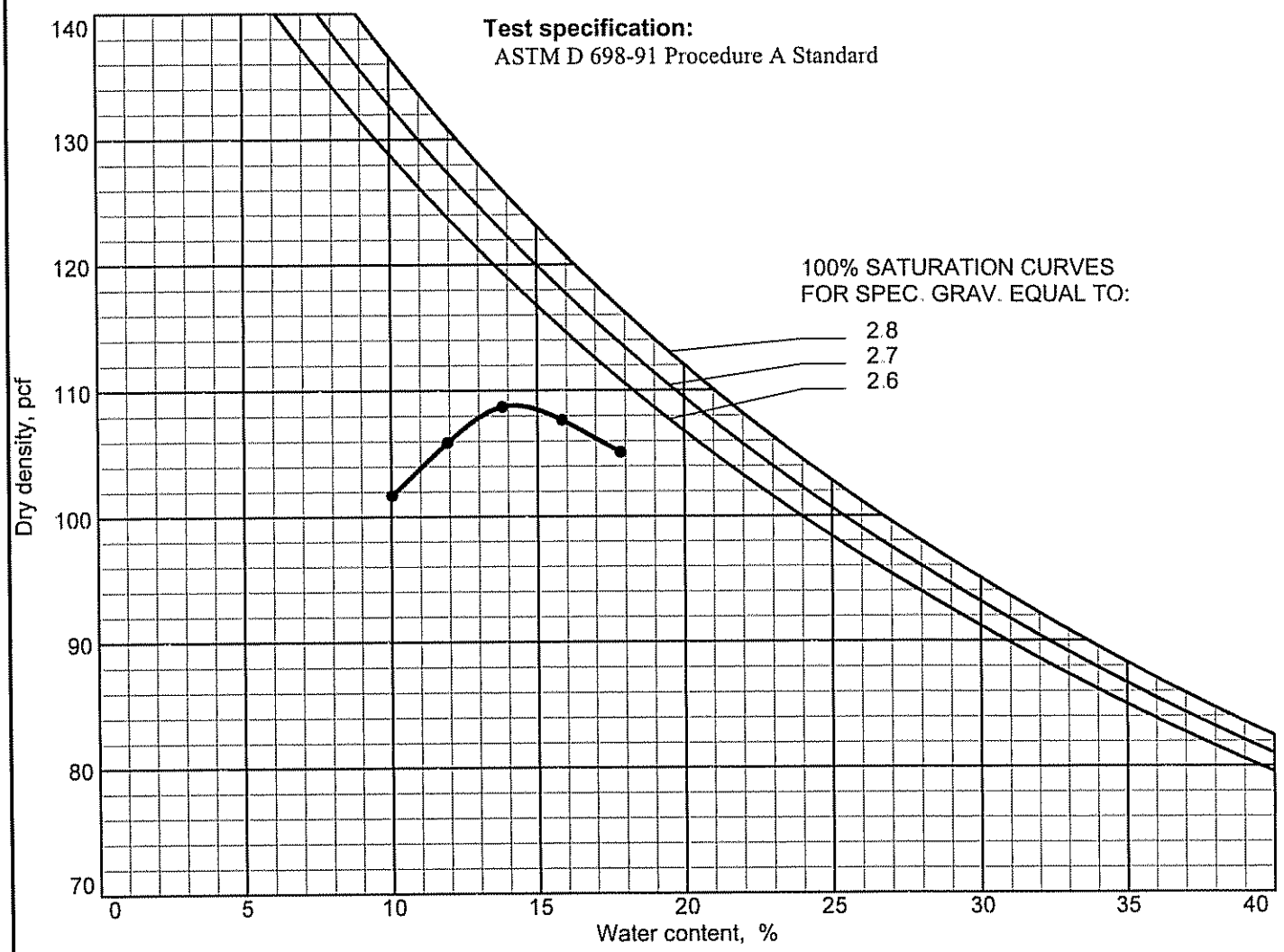
Classifications - **USCS:** CL **AASHTO:** A-4(4)

Nat. Moist. = 13.6 % **Sp.G. =**

Liquid Limit = 27 **Plasticity Index =** 9

% > No.4 = % **% < No.200 =** 77.1 %

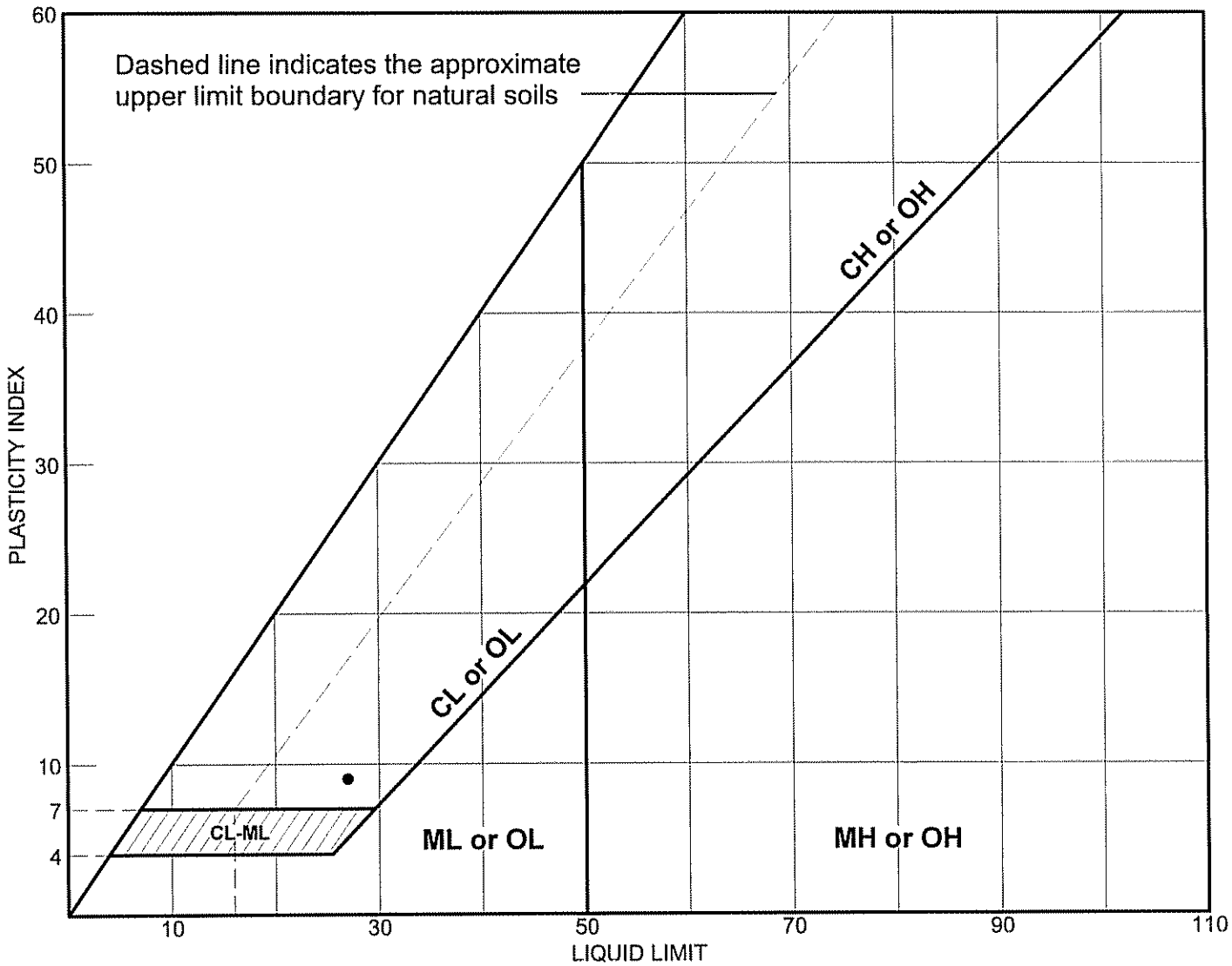
TEST RESULTS
Maximum dry density = 108.8 pcf
Optimum moisture = 14.2 %



PLATE

Kleinfelder, Inc.

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Composite of	06-102,103,	-1.0' to -5.0'	13.6	18	27	9	CL

LIQUID AND PLASTIC LIMITS TEST REPORT

KLEINFELDER, INC.

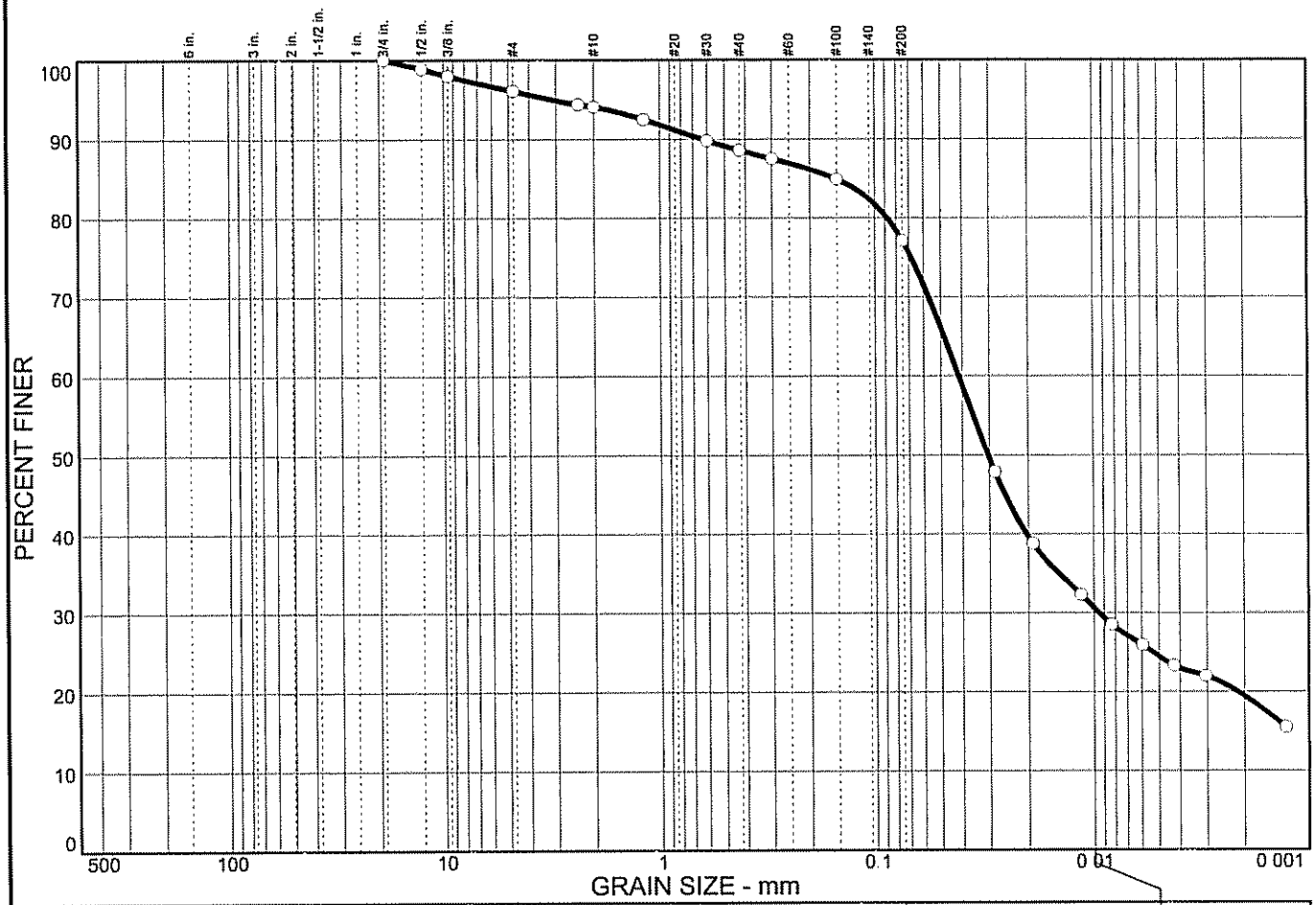
Client: North Wind

Project: TA 73 Los Alamos Landfill

Project No.: 71610

PLATE

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	3.9	19.0	46.5	30.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 in.	100.0		
1/2 in.	98.9		
3/8 in.	98.0		
#4	96.1		
#8	94.4		
#10	94.1		
#16	92.5		
#30	89.8		
#40	88.6		
#50	87.5		
#100	84.9		
#200	77.1		

* (no specification provided)

Soil Description

Lean clay with sand

Atterberg Limits

PL= 18 LL= 27 PI= 9

Coefficients

D_{85}= 0.153 D_{60}= 0.0415 D_{50}= 0.0304
D_{30}= 0.0095 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(4)

Remarks

F.M.=0.57

Sample No.: 06-102,103,104 **Source of Sample:** Composite of the Barrow Pit samples for Infil **Date:** 5/26/05
Location: Composite of the Barrow Pit samples for Infiltraion Material **Elev./Depth:** -1.0' to -5.0'

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

COMPACTION TEST REPORT

Curve No.: 06-106

Project No.: 71610 **Date:** 5/24/06

Project: TA 73 Los Alamos Landfill

Location: Russells Gravel, off Hwy. 84 Espanola

Elev./Depth: Stockpile **Sample No.** 06-106

Remarks:

MATERIAL DESCRIPTION

Description: Silty sand with gravel

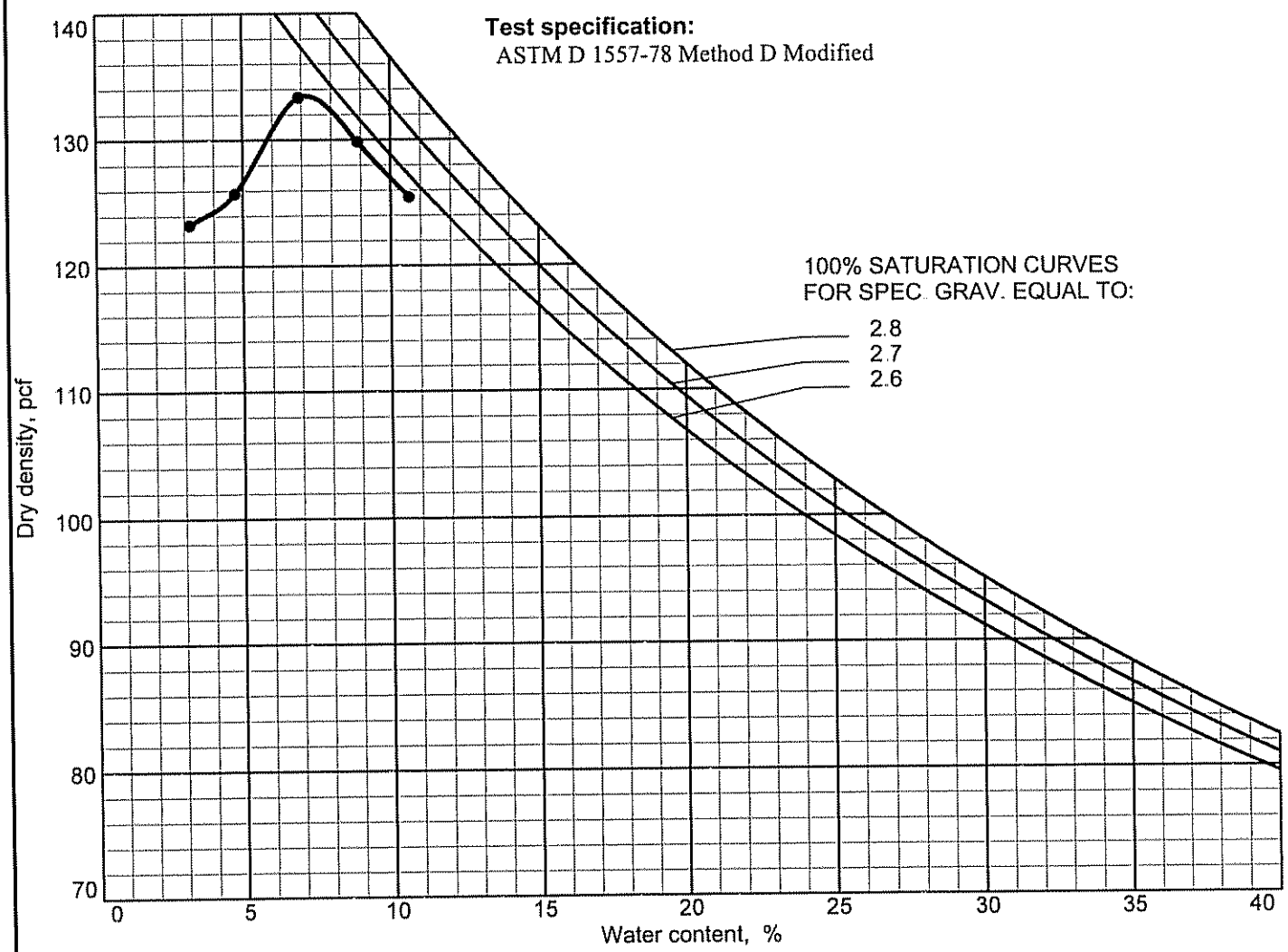
Classifications - **USCS:** SM **AASHTO:** A-1-b

Nat. Moist. = 3.8 % **Sp.G. =**

Liquid Limit = NV **Plasticity Index =** NP

% > 3/4 in. = % **% < No.200 =** 14.7 %

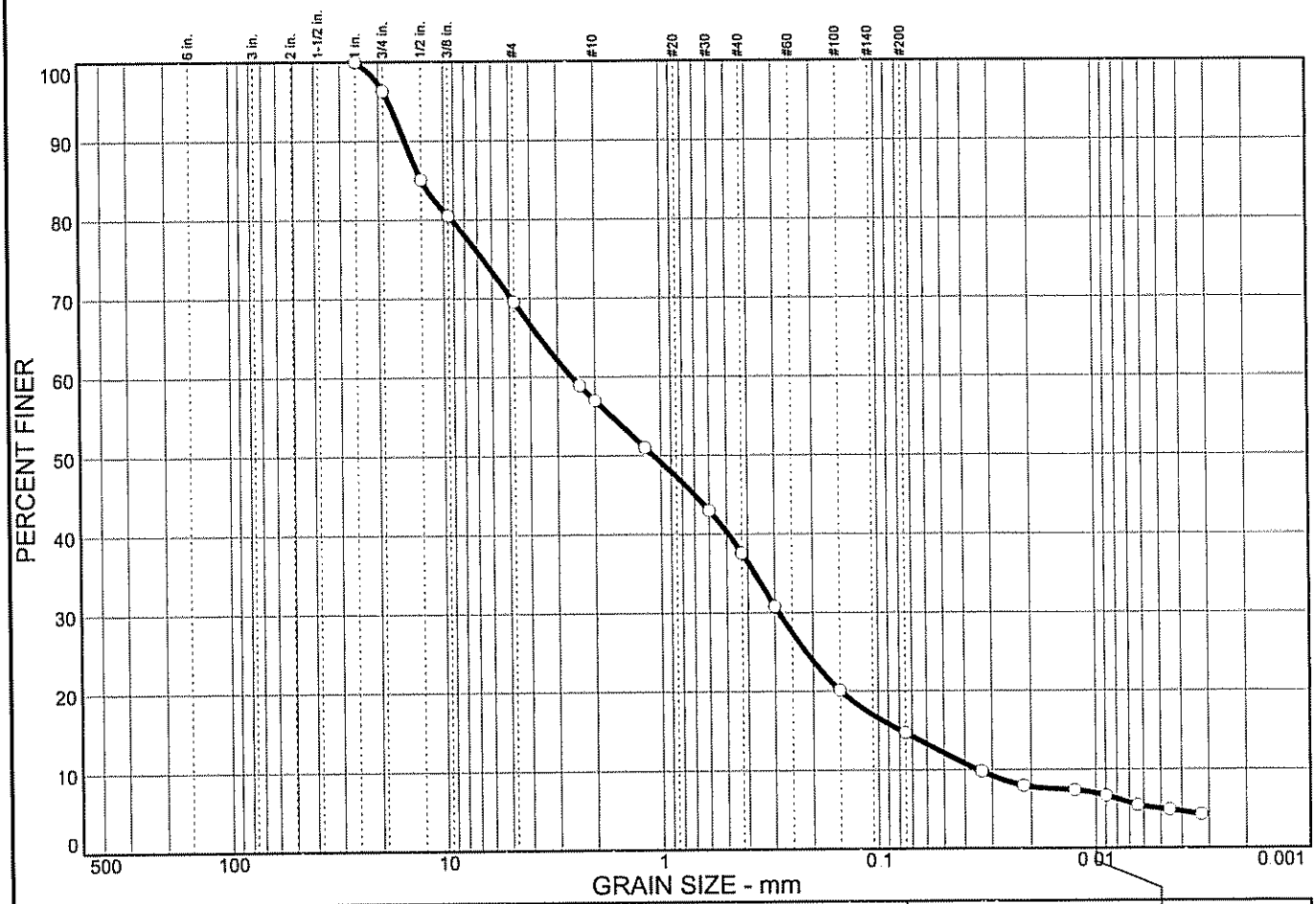
TEST RESULTS
Maximum dry density = 133.5 pcf
Optimum moisture = 7.2 %



PLATE

Kleinfelder, Inc.

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	30.5	54.8	7.7	7.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
3/4 in.	96.3		
1/2 in.	85.1		
3/8 in.	80.5		
#4	69.5		
#8	58.9		
#10	57.0		
#16	51.0		
#30	43.0		
#40	37.6		
#50	30.8		
#100	20.1		
#200	14.7		

* (no specification provided)

Soil Description

Silty sand with gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 12.6 D_{60}= 2.57 D_{50}= 1.08
D_{30}= 0.288 D_{15}= 0.0787 D_{10}= 0.0347
C_u= 74.11 C_c= 0.93

Classification

USCS= SM AASHTO= A-1-b

Remarks

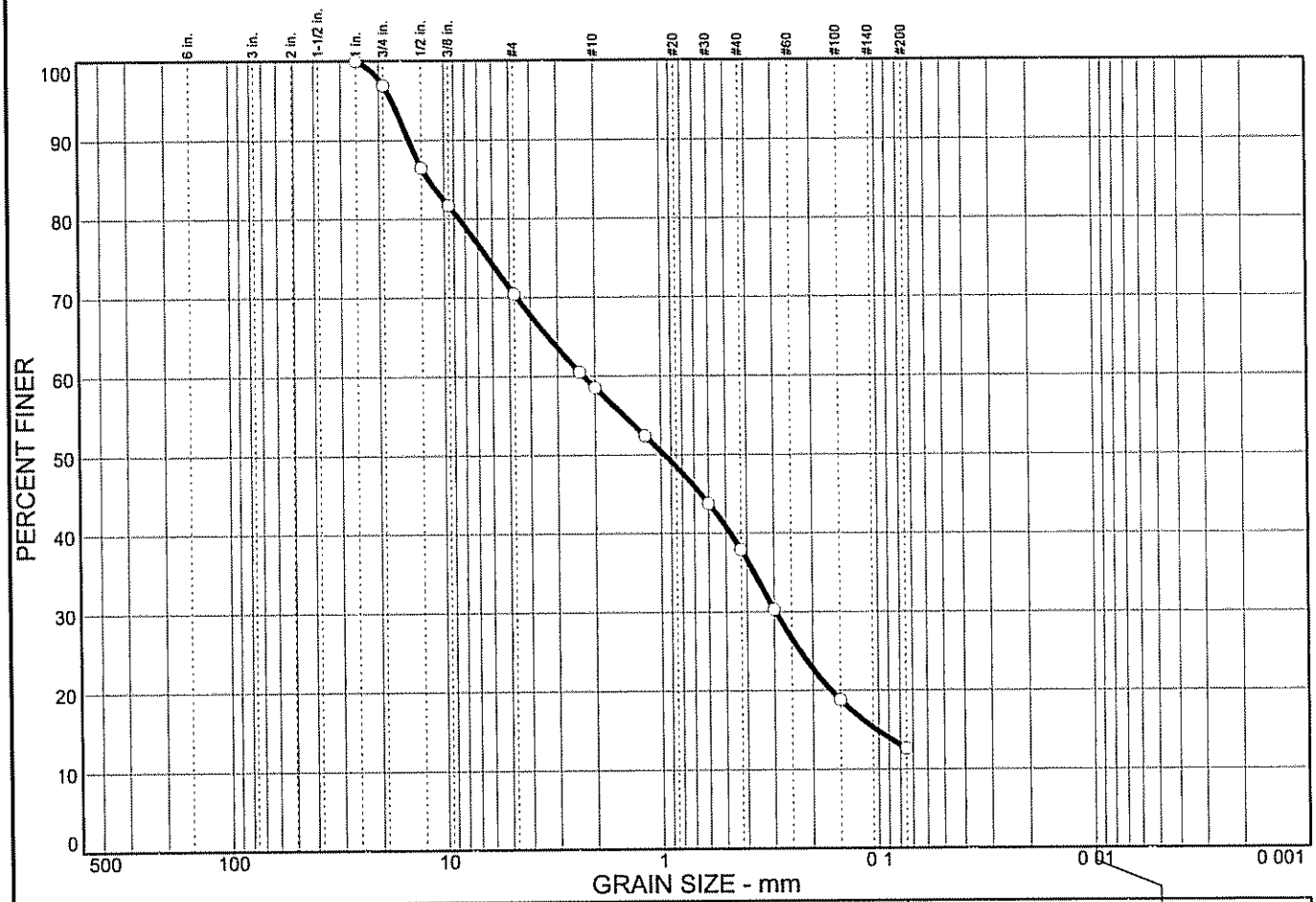
F.M.=3.50

Sample No.: 06-106 **Source of Sample:** Russells Gravel, off Hwy. 84 Espanola **Date:** 5/26/06
Location: Russells Gravel, off Hwy. 84 Espanola **Elev./Depth:** Stockpile

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	29.6	57.8	12.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
3/4 in.	96.9		
1/2 in.	86.5		
3/8 in.	81.7		
#4	70.4		
#8	60.5		
#10	58.5		
#16	52.4		
#30	43.8		
#40	37.9		
#50	30.3		
#100	18.8		
#200	12.6		

* (no specification provided)

Soil Description

Silty sand with gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 11.8 D_{60}= 2.27 D_{50}= 0.961
D_{30}= 0.296 D_{15}= 0.102 D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

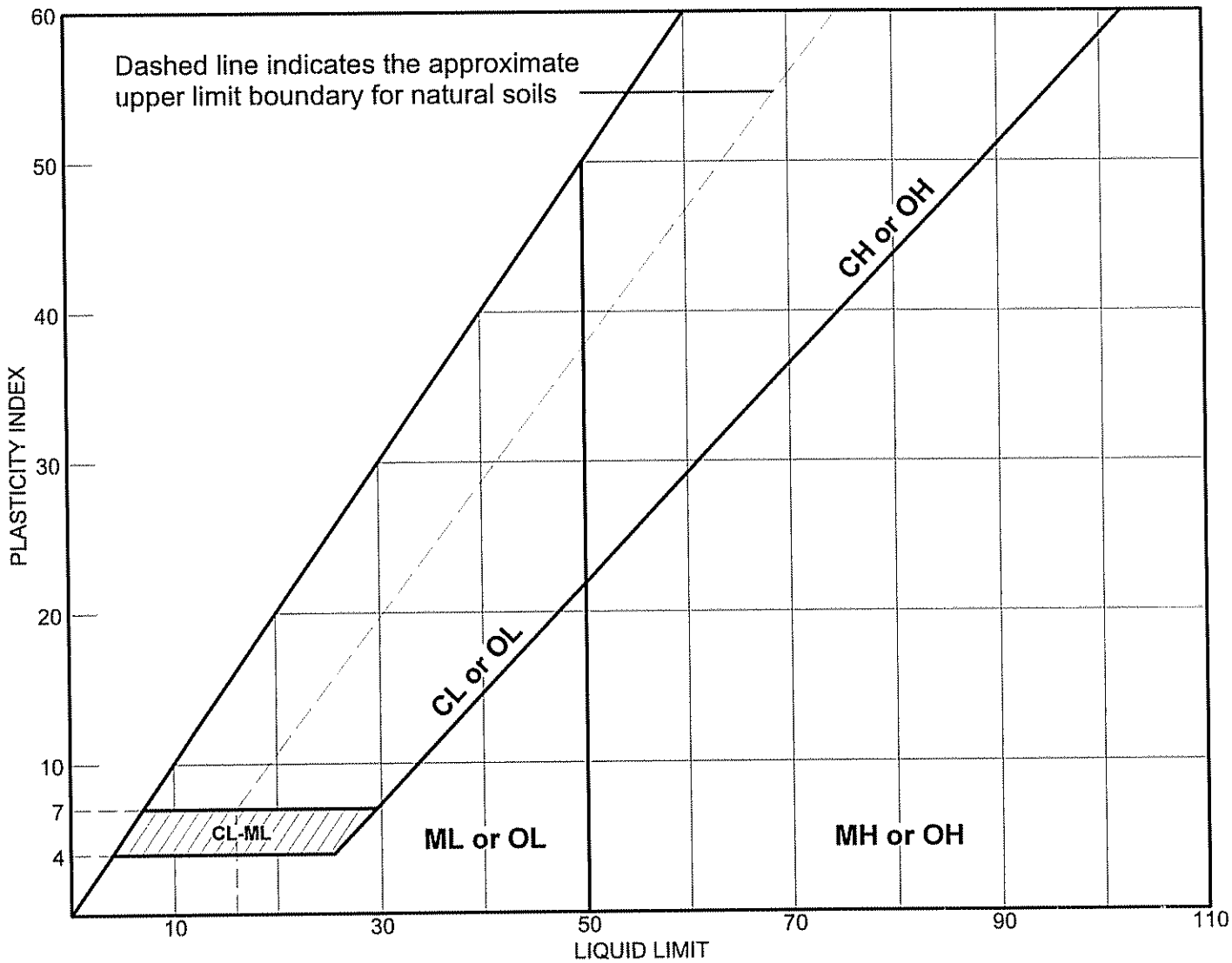
Fracture Faces 1 or More = 89%
Fracture Faces 2 or More = 80%
F.M.=3.45

Sample No.: 06-106 **Source of Sample:** Russells Gravel, off Hwy. 84 Espanola **Date:** 5/25/06
Location: Russells Gravel, off Hwy. 84 Espanola **Elev./Depth:** Stockpile

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Russells	06-106	Stockpile	3.8	NP	NV	NP	SM

LIQUID AND PLASTIC LIMITS TEST REPORT

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No.: 71610

PLATE

Particle Size Distribution Report

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.1	15.3	56.0	28.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in.	100.0		
#4	99.9		
#8	99.5		
#10	99.3		
#16	97.8		
#30	94.6		
#40	93.3		
#50	92.1		
#100	90.1		
#200	84.6		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.0762 D_{60}= 0.0412 D_{50}= 0.0326
D_{30}= 0.0110 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Moisture Content = 9.7%
ASTM D2974 method C, Ash Content = 2.3%
Organic Matter = 97.3%

Sample No.: 06-105 **Source of Sample:** Top Soil, 160' from the E. end of the Barrow **Date:** 5/25/06
Location: Top Soil, 160' from the E. end of the Barrow Pit **Elev./Depth:** Stockpile

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

KLEINFELDER

DOCUMENT TRANSMITTAL FORM

TO:	See Distribution List	PAGE	1	OF	4
		TRANSMITTAL DATE:	03/20/07		
		TRANSMITTAL DCN:	71610.2 – ALB07TS009		

RETURN RESPONSES/COMMENTS TO:	Perry Hampel
RETURN RESPONSES/COMMENTS BY:	48 hrs from date of transmission

PROJECT NO.:	71610	PROJECT NAME:	TA-73 Los Alamos Land Fill
ACTIVITY/DESCRIPTION:	CMT Lab Reports		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
Moisture Density Test Report	0	1	3/6/07	71610MD 022
Moisture Density Test Report	0	1	3/12/07	71610MD 023

INSTRUCTIONS/REMARKS

PLEASE VERIFY RECEIPT OF THIS DELIVERABLE BY REPLYING TO THIS E-MAIL. YOUR REPLY WILL SERVE AS VERIFICATION OF SUCCESSFUL RECEIPT OF THE ATTACHED DOCUMENT.

RECEIPT AND READ ACKNOWLEDGEMENT PLEASE COMPLETE AND RETURN WITHIN 15 WORKING DAYS TO:

KLEINFELDER DOCUMENT CONTROL CENTER

- ☐ Mark previous issues "obsolete", "superseded", or uncontrolled"
- ☐ Destroy previous affected material
- ☐ Return old material with this record
- ☒ New issue (no previous copies received)
- ☐ Replace with revised/new material
- ☐ Not Applicable

CLIENT RECEIPT	PRINT NAME	SIGNATURE	DATE
Complete & Return this page via Fax/Mail/Email			

KLEINFELDER RECEIPT	PRINT NAME	SIGNATURE	DATE
Complete this section upon receipt from client			

CMT LAB REPORT DISTRIBUTION

1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3	Steve Edwards sedwards@northwind-inc.com

IN-PLACE DENSITY-MOISTURE

KLEINFELDER

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☑ Yes ☐ No

File Number	Project Name	Location	Technician/Engineer
71610	TA 73 Los Alamos	Los Alamos Air Port	M. Torrez
Date	**Client**	**Contractor/Representative**	**Time Arrived**
3/6/2007	Nortrhwind	Northwind/ Steve Edwards	10:00 AM
Daily Field Report No	**Source of Fill**	**Weather**	**Time Departed**
71610MD.022	☐ NATIVE ☑ IMPORT	clear, warm	11:00 AM
Reviewed By	**Location of Fill**	**Gauge Number** / **Make/Model**	**Travel Time (hours)**
P. German	Infiltration material on east slope	3753 / MC-3	3.5
Date Reviewed	**Specified Compaction Requirements**	**Standardization Counts**	**Total Time (hours)**
3/8/2007	Density 100 % to 100%; Moisture 14.2 % + 3%	Density 33654; Moisture 6815	5 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
94	50' (W) & 50' (N) of SE corner of (E) slope	BS	FSG	121.9	13.0	108.8	108.9	11.9	100.0	P	CL
95	200' (W) & 25' (N) of SE corner of (E) slope	BS	FSG	123.0	13.6	108.8	109.4	12.4	101.0	P	CL
96	100' (E) & 75' (N) of NW corner of (E) slope	BS	FSG	121.3	12.5	108.8	108.8	11.5	100.0	P	CL
97	250' (E) & 75' (S) of NW corner of (E) slope	BS	FSG	123.5	12.9	108.8	110.6	11.7	102.0	P	CL

CC 3/12/07

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-102,103,104	CL	NA	108.8	14.2	ASTM D 1557

CC 3/12/07

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

☐ Continued on next page

KLEINFELDER

IN-PLACE DENSITY-MOISTURE

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☑ Yes ☐ No

File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Port	Technician/Engineer: M. Torrez
Date: 3/12/2007	Client: Nortrhwind	Contractor/Representative: Northwind/ Steve Edwards	Time Arrived: 10:00 AM
Daily Field Report No: 71610MD.023	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: clear, cool	Time Departed: 11:00 AM
Reviewed By: P. German	Location of Fill: Infiltration top lift	Gauge Number: 3253 / Make/Model: MC-3	Travel Time (hours): 3.5
Date Reviewed: 3/13/2007	Specified Compaction Requirements: Density 100 % to + ; Moisture 14.0 % + NA	Standardization Counts: Density 33481 / Moisture 7087	Total Time (hours): 4.5 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
98	100' (W) & 10' (S) of (E) end of drainage culvert	BS	FSG	129.8	15.7	113.5	114.1	13.8	100.5	P	CL
99	200' (W) & 25' (W) of (E) of drainage culvert	BS	FSG	129.8	16.0	113.5	113.8	14.1	100.3	P	CL
100	300' (W) & 20' (S) of (E) end of drainage culvert	BS	FSG	130.1	15.2	113.5	114.9	13.2	101.2	P	CL
101	50' (W) & 10' (N) of (E) end of drainage culvert	BS	FSG	129.7	15.3	113.5	114.4	13.4	100.8	P	CL

QC 3/14/07

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
07-25	CL	NA	113.5	14.0	ASTM D 1557

QC 3/14/07

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

☐ Continued on next page

KLEINFELDER

DOCUMENT TRANSMITTAL FORM

TO:	See Distribution List	PAGE 1 OF 9
		TRANSMITTAL DATE: 02/15/07
		TRANSMITTAL DCN: 71610.2 – ALB07TS008
RETURN RESPONSES/COMMENTS TO:	Perry Hampel	
RETURN RESPONSES/COMMENTS BY:	48 hrs from date of transmission	

PROJECT NO.:	71610	PROJECT NAME:	TA-73 Los Alamos Land Fill
ACTIVITY/DESCRIPTION:	CMT Lab Reports		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
Proctor Test Report	0	3	02/06/07	71610P 008
Proctor Test Report	0	2	02/06/07	71610P 009
ASTM D2974 Organic Content	0	1	2/12/07	71610MC 002
Moisture Density Test Report	0	1	2/06/07	71610MD 021

INSTRUCTIONS/REMARKS

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- ☐ Replace with revised/new material
- ☐ Not Applicable

CLIENT RECEIPT	PRINT NAME	SIGNATURE	DATE
Complete & Return this page via Fax/Mail/Email			

KLEINFELDER RECEIPT	PRINT NAME	SIGNATURE	DATE
Complete this section upon receipt from client			

CMT LAB REPORT DISTRIBUTION

1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3	Steve Edwards sedwards@northwind-inc.com

COMPACTION TEST REPORT

Project No.: 71610 **Date:** 2-6-07
Project: TA 73 Los Alamos Landfill

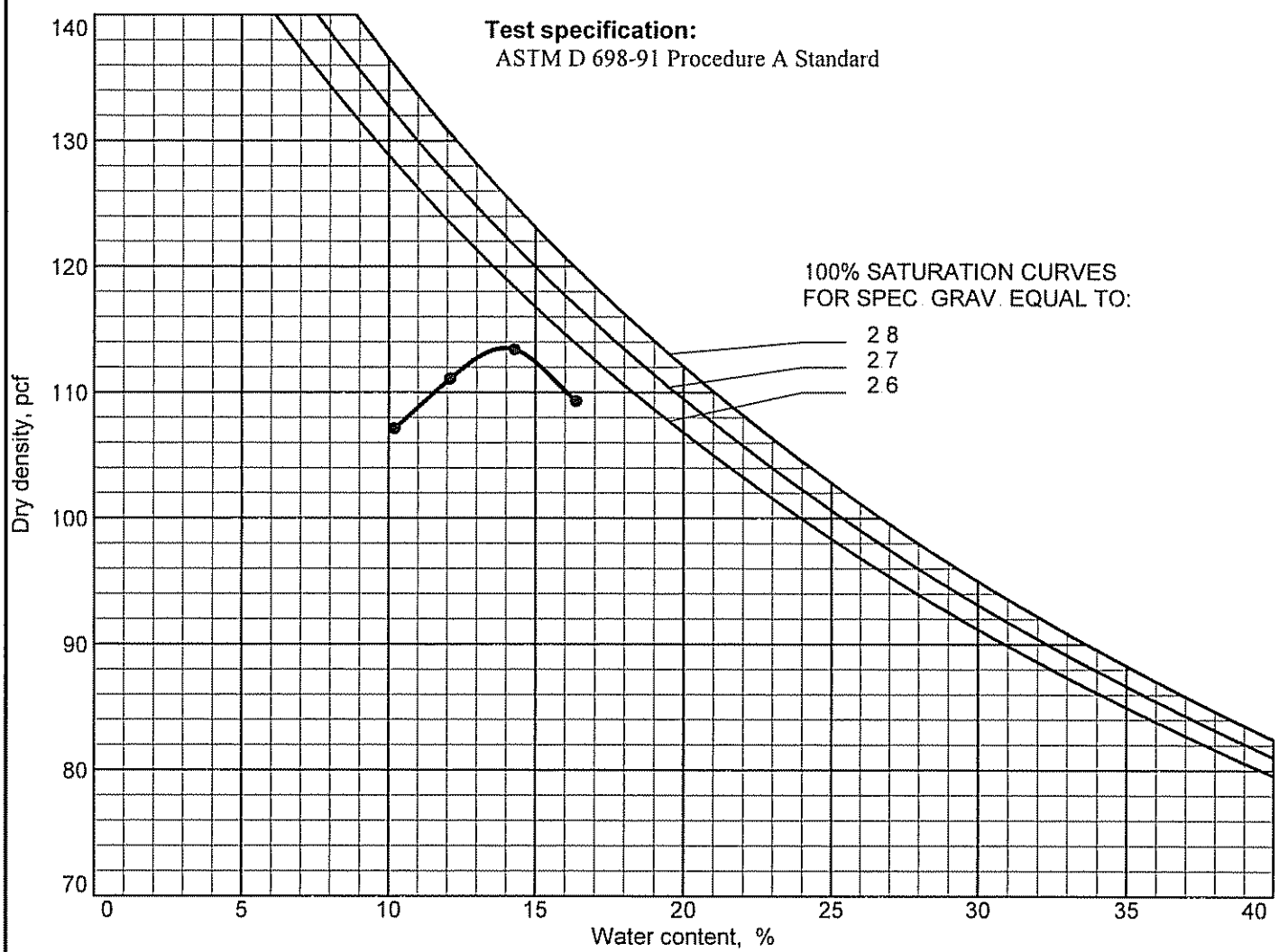
Location: onsite stockpile
Elev./Depth: **Sample No.** 07-25
Remarks:

MATERIAL DESCRIPTION

Description: Infiltration Material - Lean clay with sand

Classifications - **USCS:** CL **AASHTO:** A-6(7)
Nat. Moist. = **Sp.G. =**
Liquid Limit = 29 **Plasticity Index =** 12
% > No.4 = 3.4 % **% < No.200 =** 73.5 %

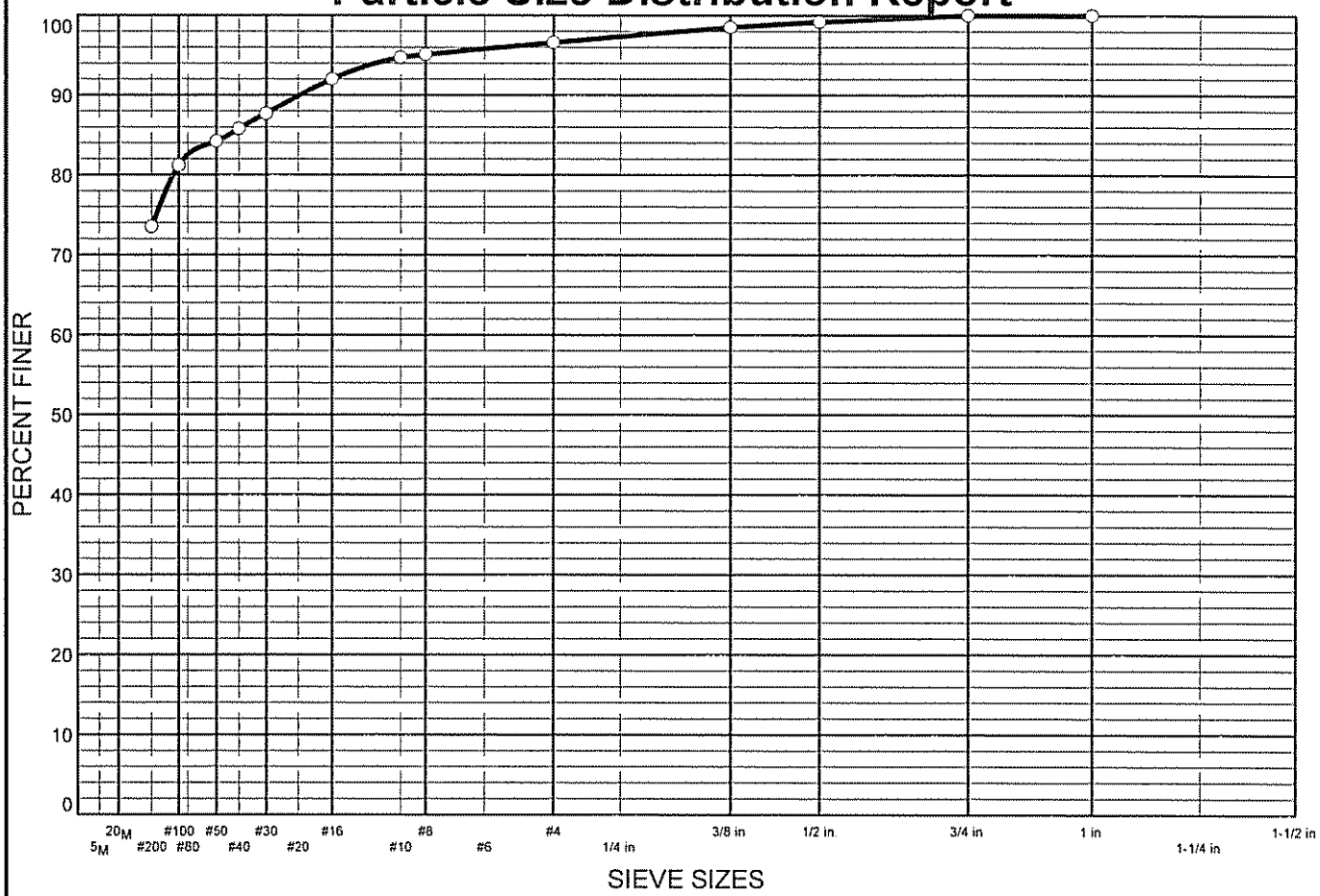
TEST RESULTS
Maximum dry density = 113.5 pcf
Optimum moisture = 14.0 %



PLATE

Kleinfelder, Inc.

Particle Size Distribution Report



% FINES		% SAND			% GRAVEL	
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
73.5		12.3	8.9	1.9	3.4	0.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
0.75 in.	100.0		
0.5 in.	99.2		
0.375 in.	98.5		
#4	96.6		
#8	95.1		
#10	94.7		
#16	92.0		
#30	87.7		
#40	85.8		
#50	84.2		
#100	81.2		
#200	73.5		

* (no specification provided)

Soil Description

Infiltration Material - Lean clay with sand

Atterberg Limits

PL= 17 LL= 29 PI= 12

Coefficients

D_{85}= 0.365 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(7)

Remarks

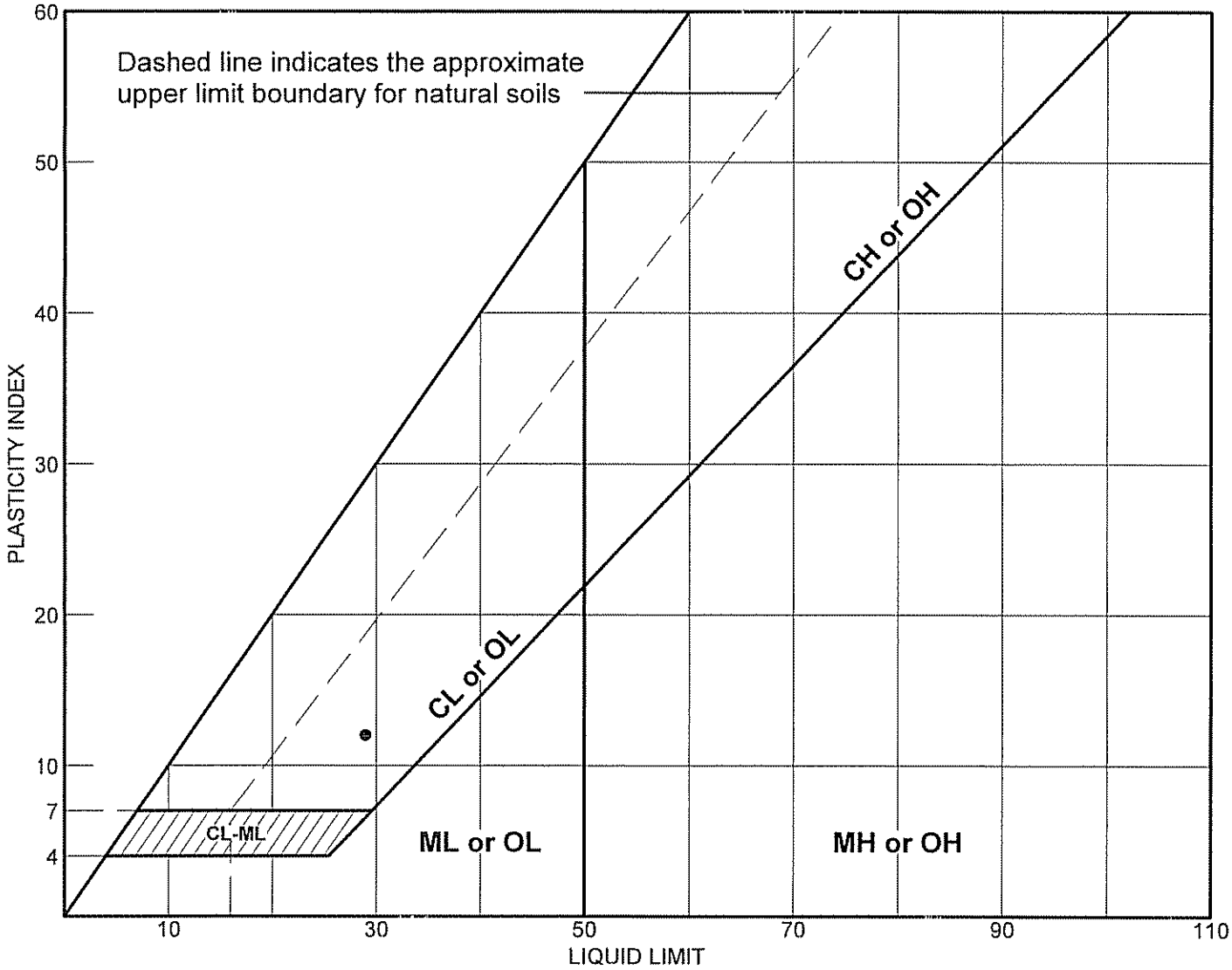
F.M.=0.65

Sample No.: 07-25 **Source of Sample:** onsite **Date:** 2-6-07
Location: onsite stockpile **Elev./Depth:**

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

LIQUID AND PLASTIC LIMITS TEST REPORT

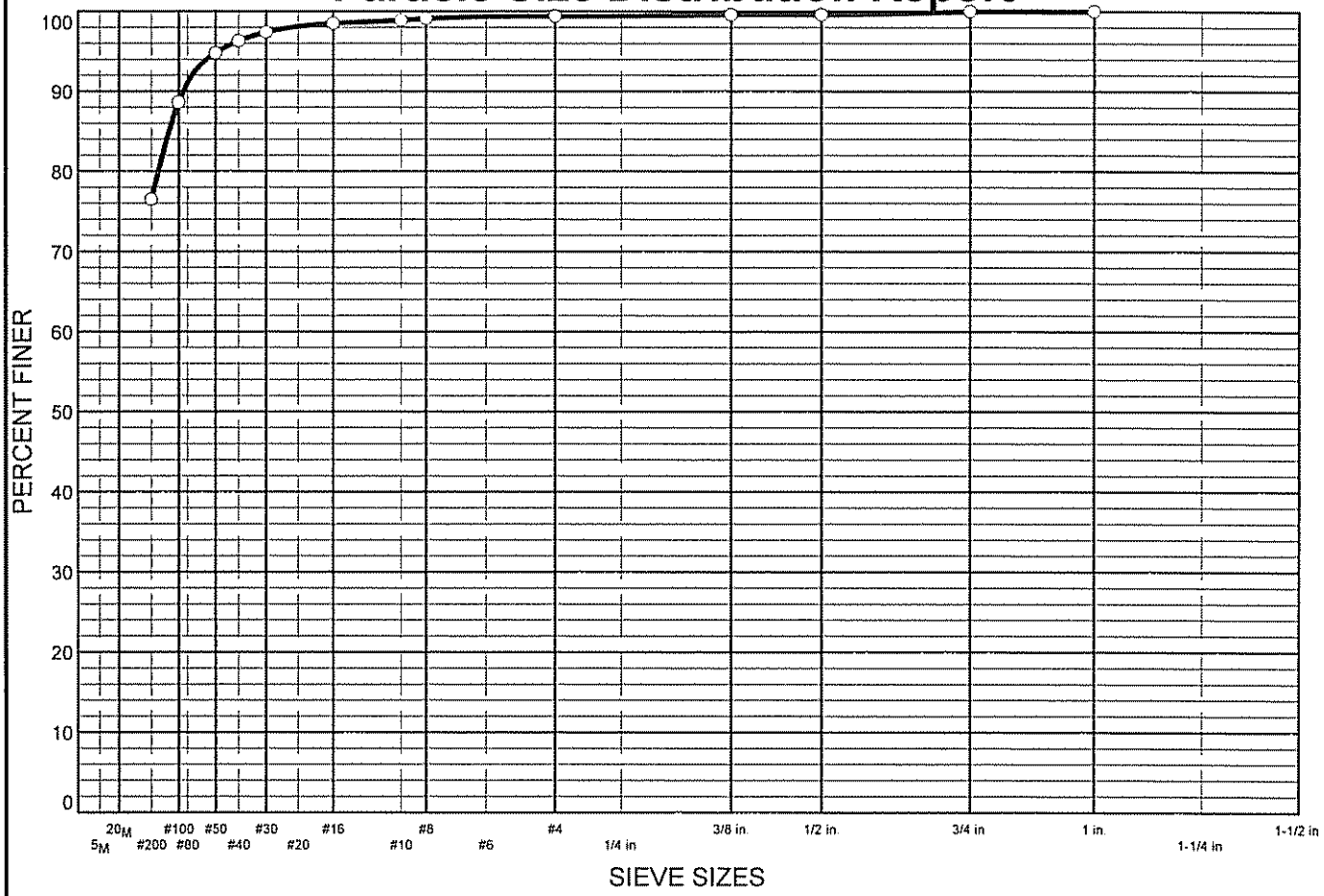


SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	onsite	07-25			17	29	12	CL

LIQUID AND PLASTIC LIMITS TEST REPORT **KLEINFELDER, INC.**	**Client:** North Wind **Project:** TA 73 Los Alamos Landfill **Project No.:** 71610 PLATE

Particle Size Distribution Report



% FINES		% SAND			% GRAVEL	
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
76.5		19.8	2.6	0.5	0.6	0.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
0.75 in.	100.0		
0.5 in.	99.6		
0.375 in.	99.6		
#4	99.4		
#8	99.1		
#10	98.9		
#16	98.5		
#30	97.4		
#40	96.3		
#50	94.8		
#100	88.6		
#200	76.5		

* (no specification provided)

Soil Description

Topsoil - Lean clay with sand

Atterberg Limits

PL= 18 LL= 43 PI= 25

Coefficients

D_{85}= 0.121 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(18)

Remarks

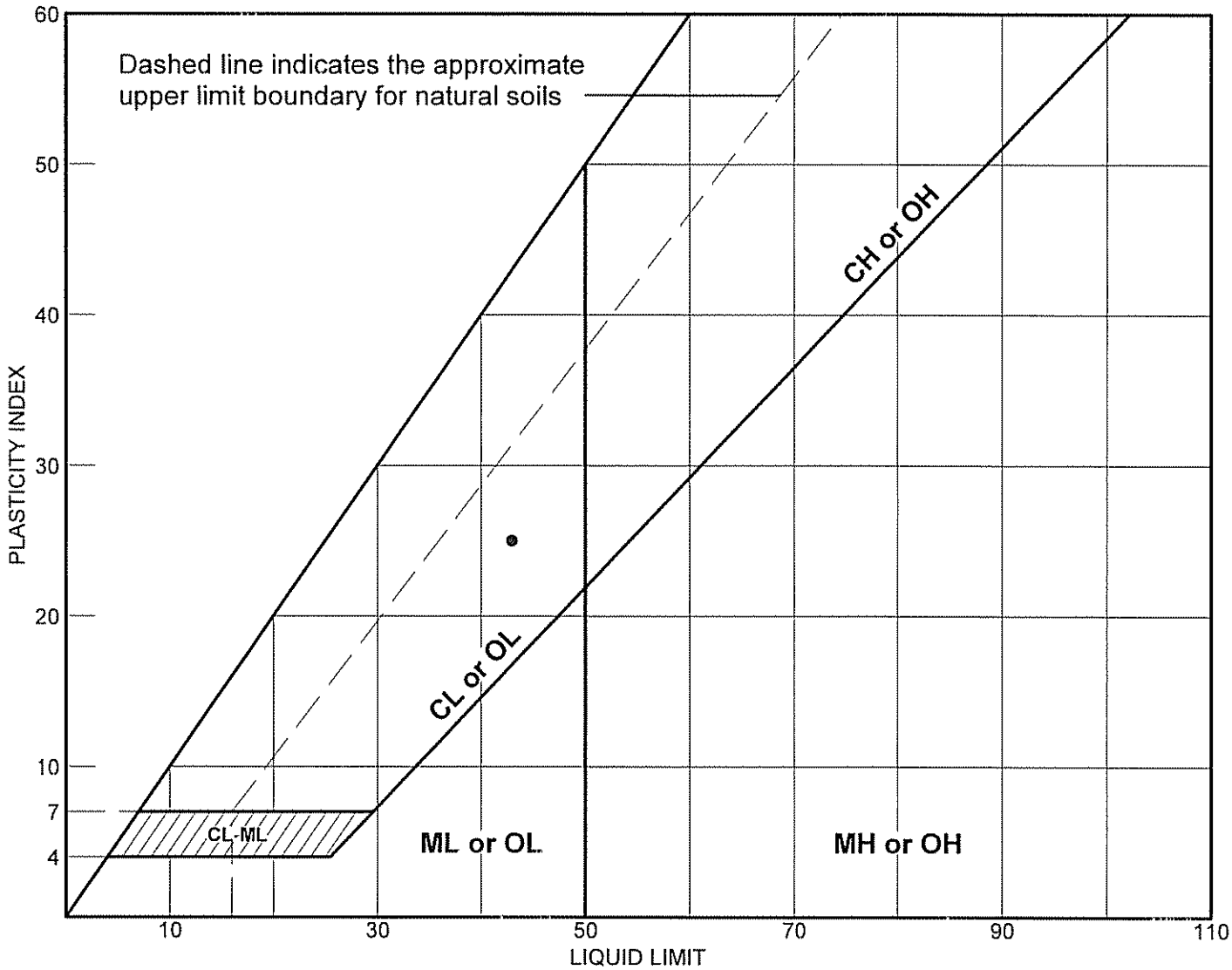
F.M.=0.23

Sample No.: 07-26 **Source of Sample:** Parker pit - Fairview **Date:** 2-6-07
Location: Parker pit **Elev./Depth:**

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Parker pit -	07-26			18	43	25	CL

LIQUID AND PLASTIC LIMITS TEST REPORT

KLEINFELDER, INC.

Client: North Wind

Project: TA 73 Los Alamos Landfill

Project No.: 71610

PLATE

ASTM D2974 Method C Organic Content

Job Name	TA-73	Tested by	MD	Date Tested	2/7/2007	Checked by / Date	SPO 2/12/2007
Job #	71610-1A						
Lab #	07-26						
Dish # & tare	#1 / 602.3						
Sample Location	Parker Pit - Fairview Espanola natural						
Wet Weight (As Received)	2343.6						
Dry Weight (As Received)	2013.90						
A:Dry Weight 110c	128.91						
B:Dry Weight 440c	122.09						
C:A-B	6.82						
D:Percent Ash	5.3						
Percent Organic Matter	94.7						
Moisture Content =	16.4						

Percent Ash = (CX100)/A

Percent Organic Matter = 100-D

Sample #	26-Jul					
Dry Wt. after 16 hr.	128.91					
Dry Wt. after 1 additional hr.	128.91					
Dry Wt. 440c	122.09					
Dry Wt 440c 1 Additional hr.	122.09					

Seth Olsen Kleinfelder, Inc.

Kleinfelder Inc.
8300 Jefferson NE Suite B
Albuquerque, NM 87113

KLEINFELDER

IN-PLACE DENSITY-MOISTURE

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☑ Yes ☐ No

File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Port	Technician/Engineer: M. Torrez
Date: 2/6/2007	Client: Nortrhwind	Contractor/Representative: Northwind/ Steve Edwards	Time Arrived: 12:00 PM
Daily Field Report No.: 71610MD.021	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Clear, cool	Time Departed: 1:15 PM
Reviewed By: P. German	Location of Fill: Infiltration on east slope	Gauge Number: 3753 / Make/Model: MC-3	Travel Time (hours): 3.5
Date Reviewed: 2/7/2007	Specified Compaction Requirements: Density 100 % to 100%; Moisture 14.2 % '+ 2%	Standardization Counts: Density 33456 / Moisture 7013	Total Time (hours): 5 5 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
89	75'(N) & 75' (E) of SE corner of Matron	BS	1st Lift	123.4	14.3	108.8	10901.0	13.1	100.3	P	CL
90	100'(N) & 100' (E) of SE corner of Matron	BS	1st Lift	121.6	2.7	108.8	108.9	11.7	100.1	P	CL
91	250'(N) & 50' (E) of SE corner of Matron	BS	1st Lift	124.5	14.2	108.8	110.3	12.9	101.4	P	CL
92	200'(N) & 75' (N) of SE corner of Matron	BS	1st Lift	121.5	12.8	108.8	108.7	11.8	100.0	P	CL
93	300'(N) & 100' (N) of SE corner of Matron	BS	1st Lift	122.5	12.5	108.8	110.0	11.4	101.1	P	CL

CC 2/9/07

Any unresolved test (date/number):

Observations/Remarks:

Test taken on 1st lift below geo-fabric

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-106,103, 104	CL		108.8	14.2	ASTM D 1557

CC 2/9/07

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

☐ Continued on next page

KLEINFELDER

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TO:	See Distribution List	PAGE 1 OF 3
		TRANSMITTAL DATE: 01/30/07
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RETURN RESPONSES/COMMENTS BY:	48 hrs from date of transmission

PROJECT NO.:	71610	PROJECT NAME:	TA-73 Los Alamos Land Fill
ACTIVITY/DESCRIPTION:	CMT Lab Reports		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
Moisture Density Test Report	0	1	01/25/07	71610MD 020

INSTRUCTIONS/REMARKS

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CMT LAB REPORT DISTRIBUTION

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KLEINFELDER

IN-PLACE DENSITY-MOISTURE

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☑ Yes ☐ No

File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Port	Technician/Engineer: M. Torrez
Date: 1/25/2007	Client: Northrhwind	Contractor/Representative: Northwind/ Steve Edwards	Time Arrived: 9:45 AM
Daily Field Report No.: 71610MD.020	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Clear, cool	Time Departed: 10:45 AM
Reviewed By: P. German	Location of Fill: Infiltration layer north of pad #5	Gauge Number: 3753 / Make/Model: MC-3	Travel Time (hours): 3.5
Date Reviewed: 1/26/2007	Specified Compaction Requirements: Density 100 % to 100%; Moisture 14.2 % + 2%	Standardization Counts: Density 33634 / Moisture 7091	Total Time (hours): 5 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
86	50' (E) & 25' (N) of NE corner of pad #5	6"	Below Geo Comp	124.9	15.8	108.8	109.1	14.4	100.0	P	CL
87	75' (E) & 25' (N) of NW corner of pad #5	BS	Above GeoCom 1st lift	124.4	15.5	108.8	108.9	14.2	100.0	P	CL
88	75' (E) & 40' (N) of NE corner of pad #5	BS	Above GeoCom 2nd lift	124.9	15.2	108.8	109.7	13.9	101.0	P	CL

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-106,103, 104	CL		108.8	14.2	ASTM D 1557

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

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		TRANSMITTAL DCN: 71610.2 – ALB07TS006

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PROJECT NO.:	71610	PROJECT NAME:	TA-73 Los Alamos Land Fill
ACTIVITY/DESCRIPTION:	CMT Lab Reports		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
Moisture Density Test Report	0	1	01/16/07	71610MD 018
Moisture Density Test Report	0	2	1/19/07	71610MD 019

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- ☐ Not Applicable

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CMT LAB REPORT DISTRIBUTION

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IN-PLACE DENSITY-MOISTURE

KLEINFELDER

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☑ Yes ☐ No

File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Port	Technician/Engineer: M. Torrez
Date: 1/16/2007	Client: Nortrhwind	Contractor/Representative: Northwind/ Steve Edwards	Time Arrived: 11:20 AM
Daily Field Report No.: 71610MD.018	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Clear, cool	Time Departed: 12:20 PM
Reviewed By: P. German	Location of Fill: Retaining Wall A & B	Gauge Number: 3253 / Make/Model: MC-3	Travel Time (hours): 3.5
Date Reviewed: 1/17/2007	Specified Compaction Requirements: Density 95 % to 100%; Moisture n/a % + n/a	Standardization Counts: Density 34005 / Moisture 7094	Total Time (hours): 5.5 (May not include minimum)

Test No.	Test Location	Probe Depth (Inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
67	Wall A station 0 + 15	6"	5th level	141.5	10.6	133.5	130.9	8.1	98.0	P	SM
68	Wall A station 0 + 50	6"	5th level	142.8	10.2	133.5	132.6	7.7	99.0	P	SM
69	Wall A station 0 + 60	6"	5th level	139.7	8.3	133.5	131.4	6.3	98.0	P	SM
70	Wall B station 0 + 30	6"	5th level	140.9	9.1	133.5	131.8	6.9	99.0	P	SM
71	Wall B station 0 + 70	6"	5th level	142.4	9.4	133.5	133.0	7.1	99.0	P	SM
72	Wall B station 1 + 00	6"	5th level	141.2	9.7	133.5	131.5	7.4	98.0	P	SM

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-106	SM		133.5	7.2	ASTM D 1557

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

☐ Continued on next page

IN-PLACE DENSITY-MOISTURE

KLEINFELDER

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☑ Yes ☐ No

File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Port	Technician/Engineer: M. Torrez
Date: 1/19/2007	Client: Northrhwind	Contractor/Representative: Northwind/ Steve Edwards	Time Arrived: 9:45 AM
Daily Field Report No: 71610MD.019	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Clear, cool	Time Departed: 11:00 AM
Reviewed By: P. German	Location of Fill: Wall # 2A & 2B	Gauge Number: 3253 / Make/Model: MC-3	Travel Time (hours): 3.5
Date Reviewed: 1/19/2007	Specified Compaction Requirements: Density 95 % to 100%; Moisture 7.2 % + 2%	Standardization Counts: Density 34005 / Moisture 7094	Total Time (hours): 5 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
73	Wall A station 1 + 00	6"	FSG	136.5	8.2	133.5	128.3	6.4	96.0	P	SM
74	Wall A station 0 + 80	6"	FSG	137.7	7.8	133.5	129.9	6.0	97.0	P	SM
75	Wall A station 0 + 60	6"	FSG	140.2	10.1	133.5	130.1	7.8	97.0	P	SM
76	Wall A station 0 + 40	6"	FSG	141.3	9.5	133.5	131.8	7.2	99.0	P	SM
77	Wall A station 0 + 20	6"	FSG	136.5	7.1	133.5	129.4	5.5	97.0	P	SM
78	Wall B station 0 + 55	6"	FSG	141.7	9.1	133.5	132.6	6.9	99.0	P	SM
79	Wall B station 0 + 35	6"	FSG	139.8	9.1	133.5	130.7	7.0	98.0	P	SM
80	Wall B station 0 + 15	6"	FSG	139.3	8.0	133.5	131.3	6.1	98.0	P	SM
81	Between concrete & Wall A station 1 + 50	6"	FSG	138.6	9.9	133.5	128.7	7.7	96.0	P	SM
82	Between concrete & Wall A station 1 + 25	6"	FSG	136.7	7.6	133.5	129.1	5.9	97.0	P	SM

Any unresolved test (date/number):

Observations/Remarks:

Test on subgrade between concrete wall and Wall A were at elevation 7056.0

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-106	SM		133.5	7.2	ASTM D 1557

NOTES

1 Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.

2 Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

☑ Continued on next page

IN-PLACE DENSITY-MOISTURE

KLEINFELDER

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☑ Yes ☐ No

File Number	Project Name	Location	Technician/Engineer
71610	TA 73 Los Alamos	Los Alamos Air Port	M. Torrez
Date	**Client**	**Contractor/Representative**	**Time Arrived**
1/19/2007	Nortrhwind	Northwind/ Steve Edwards	9:45 AM
Daily Field Report No.	**Source of Fill**	**Weather**	**Time Departed**
71610MD.019	☐ NATIVE ☑ IMPORT	Clear, cool	11:00 AM
Reviewed By	**Location of Fill**	**Gauge Number / Make/Model**	**Travel Time (hours)**
P. German	Backfill between concrete walls A & B	3253 / MC-3	3.5
Date Reviewed	**Specified Compaction Requirements**	**Standardization Counts**	**Total Time (hours)**
1/19/2007	Density 95 % to 100% Moisture 7.2 % + 2%	Density 34005 Moisture 7094	5 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
83	Station 2 + 50	6"	FSG	135.3	8.4	133.5	126.9	6.6	95.0	P	SM
84	Station 3 + 00	6"	FSG	136.9	7.5	133.5	129.4	5.8	97.0	P	SM
85	Station 3 + 50	6"	FSG	136.4	8.1	133.5	128.3	6.3	96.0	P	SM

Any unresolved test (date/number):

Observations/Remarks:

Test on backfill were taken at elevation 7056.0

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-106	SM		133.5	7.2	ASTM D 1557

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

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PROJECT NO.:	71610	PROJECT NAME:	TA-73 Los Alamos Land Fill
ACTIVITY/DESCRIPTION:	CMT Lab Reports		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
Moisture Density Test Report	0	1	1/15/07	71610MD 017

INSTRUCTIONS/REMARKS

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IN-PLACE DENSITY-MOISTURE

KLEINFELDER

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☑ Yes ☐ No

File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Port	Technician/Engineer: M. Torrez
Date: 1/15/2007	Client: Northrhwind	Contractor/Representative: Northwind/ Steve Edwards	Time Arrived: 10:50 AM
Daily Field Report No.: 71610MD.017	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Clear, cool	Time Departed: 12:25 PM
Reviewed By: P. German	Location of Fill: Backfill behind retaining wall #2	Gauge Number: 3253 / Make/Model: MC-3	Travel Time (hours): 3.5
Date Reviewed: 1/17/2006	Specified Compaction Requirements: Density 95 % to 100%; Moisture 7.2 % '+ 3%	Standardization Counts: Density 34005 / Moisture 7094	Total Time (hours): 5 5 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
61	Station 0 + 10 Wall 2A	6"	-10'	140.3	8.9	133.5	131.4	6.8	98.0	P	SM
62	Station 0 + 45 Wall 2A	6"	-8'	144.1	12.0	133.5	132.1	9.1	99.0	P	SM
63	Station 0 + 60 Wall 2A	6"	-2'	143.6	11.7	133.5	191.9	8.9	99.0	P	SM
64	Station 0 + 90 Wall 2B	6"	-2'	143.9	10.9	133.5	133.0	8.2	100.0	P	SM
65	Station 0 + 40 Wall 2B	6"	-8'	141.5	10.1	133.5	131.4	7.7	98.0	P	SM
66	Station 0 + 50 Wall 2B	6"	-16'	144.5	11.9	133.5	132.6	9.0	99.0	P	SM

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-106	SM		133.5	7.2	ASTM D 1557

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

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PROJECT NO.:	71610	PROJECT NAME:	TA-73 Los Alamos Land Fill
ACTIVITY/DESCRIPTION:	CMT Lab Reports		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
Moisture Density Test Report	0	1	1/11/07	71610MD 016

INSTRUCTIONS/REMARKS

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IN-PLACE DENSITY-MOISTURE

KLEINFELDER

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☑ Yes ☐ No

File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Port	Technician/Engineer: M. Torrez
Date: 1/11/2007	Client: Northwind	Contractor/Representative: Northwind/ Steve Edwards	Time Arrived: 11:10 AM
Daily Field Report No.: 71610MD.016	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Clear, cool	Time Departed: 12:10 PM
Reviewed By: P. German	Location of Fill: Structural backfill against retaining wall	Gauge Number: 3253 / Make/Model: MC-3	Travel Time (hours): 3.5
Date Reviewed: 1/15/2007	Specified Compaction Requirements: Density 95 % to 100%; Moisture 7.2 % + 3%	Standardization Counts: Density 34005 / Moisture 7094	Total Time (hours): 4 5 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
55	25' (W) of wall station 1 + 60	6"	FSG	141.8	11.2	133.5	130.6	8.6	98.0	P	SM
56	25' (W) of wall station 1 + 80	6"	FSG	143.4	12.0	133.5	131.4	9.1	98.0	P	SM
57	25' (W) of wall station 1 + 25	6"	FSG	142.1	10.2	133.5	131.9	7.7	99.0	P	SM
58	25' (W) of wall station 3 + 30	6"	FSG	142.9	10.0	133.5	132.9	7.5	99.0	P	SM
59	25' (W) of wall station 3 + 66	6"	FSG	142.5	11.8	133.5	130.7	9.0	97.0	P	SM
60	25' (W) of wall station 3 + 80	6"	FSG	143.8	11.6	133.5	132.2	8.8	97.0	P	SM

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-106	SM		133.5	7.2	ASTM D 1557

NOTES

1 Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.

2 Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

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PROJECT NO.:	71610	PROJECT NAME:	TA-73 Los Alamos Land Fill
ACTIVITY/DESCRIPTION:	CMT Lab Reports		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
Concrete Cylinder Test Report	0	1	01/11/07	6471C 58

INSTRUCTIONS/REMARKS

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KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: January 11, 2007
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16440
Sand # 12880 @ 5.25%
Fly Ash # 1385
Cement # 5365
Water # 2070

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 398^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Final section of retaining wall on north end.

Truck No. 10556
Date Sampled: December 14, 2006
Date Received: December 21, 2006
Sampled By: M. Torrez/
Batch Size: 10.0 cy
Time Batched: 12:32 p.m.
Time Placed:
Time Sampled: 12:57 p.m.
Yield Relative: +

Measured

Slump (in.): 3.75"
Slump w/plasticizer (in.) "
Air Temperature (°F): 45°
Mix Temp (°F): 60°
Air Content (%): 4.6% uncorrected
Unit Weight (pcf): 141.0
Water Added (gal): 0
Ticket No.: 99727
W/C Ratio +

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
58A	12/21/06	7	4.00 x	8.00	12.57	58215	4630*****	NA
58B	12/21/06	7FC	4.00 x	8.00	12.57	55975	4450*****	NA
58C	1/11/06	28	4.00 x	8.00	12.57	61805	4920*****	C
58D	1/11/06	28	4.00 x	8.00	12.57	64190	5110*****	C

Lab # 6471 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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ACTIVITY/DESCRIPTION:	CMT Lab Reports		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
Concrete Cylinder Test Report	0	1	01/03/07	6459C 57

INSTRUCTIONS/REMARKS

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KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: January 3, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16520
Sand # 12780 @ 5.25%
Fly Ash # 1370
Cement # 5360
Water #

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 398^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Retaining wall footing sections B, C, and D.

			Measured
Truck No.	10546	Slump (in.):	3.5"
Date Sampled:	December 6 2006	Slump w/plasticizer (in.)	"
Date Received:	December 13, 2006	Air Temperature (°F):	37°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	62°
Batch Size:	10.0 cy	Air Content (%):	4.3% uncorrected
Time Batched:	9:51 a.m.	Unit Weight (pcf):	141.1
Time Placed:		Water Added (gal):	0
Time Sampled:	10:30 a.m.	Ticket No.:	99650
Yield Relative:	+	W/C Ratio	+

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
57A	12/13/06	7	4.00 x	8.00	12.57	51355	4090*****	NA
57B	12/13/06	7FC	4.00 x	8.00	12.57	52290	4160*****	NA
57C	1/3/06	28	4.00 x	8.00	12.57	82290	6550**	C
57D	1/3/06	28	4.00 x	8.00	12.57	81070	6450**	C

Lab # 6459 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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Telephone 505-344-7373 / Fax 505-344-1711

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Transmittal Date: 11/06/06	**Transmittal DCN: 71610.7 – ALB06TS008**

Project No.: 71610	**Task No.: 7**	**File Index No.: 4.9**

SUBJECT: 71610.7 – ALB06TD008 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Asphalt Concrete Test Report	10/26/06	71610.7AC.020
Asphalt Concrete Test Report	10/26/06	71610.7AC.021
Asphalt Concrete Test Report	10/26/06	71610.7AC.022
Asphalt Concrete Test Report	10/27/06	71610.7AC.023
Asphalt Concrete Test Report	10/27/06	71610.7AC.024
Asphalt Concrete Test Report	10/27/06	71610.7AC.025
Asphalt Concrete Test Report	10/30/06	71610.7AC.026
Asphalt Concrete Test Report	10/30/06	71610.7AC.027
Asphalt Concrete Test Report	10/30/06	71610.7AC.028
Asphalt Concrete Test Report	10/31/06	71610.7AC.029
Asphalt Concrete Test Report	10/31/06	71610.7AC.030

INSTRUCTIONS/REMARKS

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NOTES

Perry Hampel — 11/06/06
Project Manager — Date

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #22 Santa Fe batch plant
Sample Date: October 26, 2006 11:10 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon*	Sample No. 06-402 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	93%	5%	1%	X		
No 4	63%	60%	4%	3%	X		
No 8	47%	43%	4%	4%		X	
No 16	36%	33%	4%	3%	X		
No 30	25%	24%	4%	2%	X		
No 50	15%	14%	3%	1%	X		
No 100	10%	8%	3%	2%	X		
No 200	7.4%	5.6%	2.0%	1.8%	X		
% asphalt	8.2%	8.6% uncorrected	6-9%				

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.311	2.327

Tests were performed in accordance with project specifications.

Seth Olsen

Seth Olsen, Kleinfelder, Inc.

www.kleinfelder.com
Telephone: (505) 344-7373
Facsimilie: (505) 344-1711

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8300 Jefferson NE Suite B
Albuquerque, NM 87113

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #8 Santa Fe batch plant
Sample Date: October 26, 2006 8:40 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon*	Sample No. 06-401 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	93%	5%	1%	X		
No 4	63%	57%	4%	6%		X	
No 8	47%	40%	4%	7%			X
No 16	36%	30%	4%	6%		X	
No 30	25%	22%	4%	3%	X		
No 50	15%	13%	3%	2%	X		
No 100	10%	8%	3%	2%	X		
No 200	7.4%	7.0%	2.0%	0.4%	X		
% asphalt	8.2%	8.3%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.325	2.327

Tests were performed in accordance with project specifications.

Seth Olsen

Seth Olsen, Kleinfelder, Inc.

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #39 Santa Fe batch plant
Sample Date: October 26, 2006 1:55 PM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon*	Sample No. 06-404 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	92%	5%	2%	X		
No 4	63%	57%	4%	6%		X	
No 8	47%	39%	4%	8%			X
No 16	36%	30%	4%	6%		X	
No 30	25%	21%	4%	4%		X	
No 50	15%	13%	3%	2%	X		
No 100	10%	8%	3%	2%	X		
No 200	7.4%	6.0%	2.0%	1.4%	X		
% asphalt	8.2%	8.1%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.345	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

www.kleinfelder.com
Telephone: (505) 344-7373
Facsimillie: (505) 344-1711

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #22 Santa Fe batch plant
Sample Date: October 27, 2006 12:05 PM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon*	Sample No. 06-411 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	92%	5%	2%	X		
No 4	63%	59%	4%	4%		X	
No 8	47%	42%	4%	5%		X	
No 16	36%	32%	4%	4%		X	
No 30	25%	23%	4%	2%	X		
No 50	15%	14%	3%	1%	X		
No 100	10%	9%	3%	1%	X		
No 200	7.4%	5.9%	2.0%	1.5%	X		
% asphalt	8.2%	8.8%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.318	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

www.kleinfelder.com
Telephone: (505) 344-7373
Facsimilie: (505) 344-1711

Kleinfelder, Inc.
8300 Jefferson NE Suite B
Albuquerque, NM 87113

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KLEINFELDER, INC.
ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #8 Santa Fe batch plant
Sample Date: October 27, 2006 9:00 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon*	Sample No. 06-410 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	92%	5%	2%	X		
No 4	63%	62%	4%	1%	X		
No 8	47%	44%	4%	3%	X		
No 16	36%	33%	4%	3%	X		
No 30	25%	24%	4%	1%	X		
No 50	15%	15%	3%	0%	X		
No 100	10%	9%	3%	1%	X		
No 200	7.4%	6.2%	2.0%	1.2%	X		
% asphalt	8.2%	8.7%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.314	2.327

Tests were performed in accordance with project specifications.

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #33 Santa Fe batch plant
Sample Date: October 27, 2006 2:40 PM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

Sample No. 06-414

sieve	Matcon*	A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	92%	5%	2%	X		
No 4	63%	58%	4%	5%		X	
No 8	47%	41%	4%	6%		X	
No 16	36%	31%	4%	5%		X	
No 30	25%	23%	4%	2%	X		
No 50	15%	14%	3%	1%	X		
No 100	10%	9%	3%	1%	X		
No 200	7.4%	6.1%	2.0%	1.3%	X		
% asphalt	8.2%	8.6%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.317	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #18 Santa Fe batch plant
Sample Date: October 30, 2006 4:30 PM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

Sample No. 06-423

sieve	Matcon*	A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	93%	5%	1%	X		
No 4	63%	60%	4%	3%	X		
No 8	47%	44%	4%	3%	X		
No 16	36%	34%	4%	2%	X		
No 30	25%	24%	4%	1%	X		
No 50	15%	14%	3%	1%	X		
No 100	10%	8%	3%	2%	X		
No 200	7.4%	5.4%	2.0%	2.0%		X	
% asphalt	8.2%	8.8%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.313	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #5 Santa Fe batch plant
Sample Date: October 30, 2006 9:10 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon*	Sample No. 06-417 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	91%	5%	3%	X		
No 4	63%	59%	4%	4%		X	
No 8	47%	42%	4%	5%		X	
No 16	36%	33%	4%	3%	X		
No 30	25%	24%	4%	1%	X		
No 50	15%	15%	3%	0%	X		
No 100	10%	9%	3%	1%	X		
No 200	7.4%	6.3%	2.0%	1.1%	X		
% asphalt	8.2%	8.5%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.325	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #10 Santa Fe batch plant
Sample Date: October 30, 2006 12:05 PM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon*	Sample No. 06-422 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	91%	5%	3%	X		
No 4	63%	58%	4%	5%		X	
No 8	47%	42%	4%	5%		X	
No 16	36%	33%	4%	3%	X		
No 30	25%	24%	4%	1%	X		
No 50	15%	14%	3%	1%	X		
No 100	10%	9%	3%	1%	X		
No 200	7.4%	6.2%	2.0%	1.2%	X		
% asphalt	8.2%	8.4%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.324	2.327

Tests were performed in accordance with project specifications.

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #5 Santa Fe batch plant
Sample Date: October 31, 2006 8:40 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

Sample No. 06-429

sieve	Matcon*	A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	93%	5%	1%	X		
No 4	63%	58%	4%	5%		X	
No 8	47%	41%	4%	6%		X	
No 16	36%	32%	4%	4%		X	
No 30	25%	23%	4%	2%	X		
No 50	15%	14%	3%	1%	X		
No 100	10%	9%	3%	1%	X		
No 200	7.4%	6.4%	2.0%	1.0%	X		
% asphalt	8.2%	8.5%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.307	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #11 Santa Fe batch plant
Sample Date: October 31, 2006 12:35 PM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon*	Sample No. 06-430 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	93%	5%	1%	X		
No 4	63%	60%	4%	3%	X		
No 8	47%	43%	4%	4%		X	
No 16	36%	32%	4%	4%		X	
No 30	25%	23%	4%	2%	X		
No 50	15%	14%	3%	1%	X		
No 100	10%	9%	3%	1%	X		
No 200	7.4%	6.3%	2.0%	1.1%	X		
% asphalt	8.2%	8.2%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.318	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

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Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION						Pages:	37
1	Steve Matier smatier@northwind-inc.com Jerry Thayer jerrytha@wilderconstruction.com	2	John Keck jkeck@northwind-inc.com Steve Edwards sedwards@northwind-inc.com	3	Abatech Consulting Goeffrey Rowe growe@abatech.com		

Transmittal Date: 11/01/06	**Transmittal DCN: 71610.7 – ALB06TS007**	
Project No.: 71610	**Task No.: 7**	**File Index No.: 4.9**

SUBJECT: 71610.7 – ALB06TD007 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
MatCon Daily Density Summary Report	10/23/06	71610.7MAT.014
MatCon Daily Density Summary Report	10/24/06	71610.7MAT.015
MatCon Daily Density Summary Report	10/27/06	71610.7MAT.016
MatCon Daily Density Summary Report	10/30/06	71610.7MAT.017
MatCon Daily Density Summary Report	10/31/06	71610.7MAT.018

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel
Project Manager

11/01/06
Date

RECEIPT AND READ ACKNOWLEDGEMENT
PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

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MatCon HMA Delivery Tracking Form
MatCon Construction Quality Control

Date: 10/23/06
Job: TA-73 71610-1A

	Time Ordered	Weigh Ticket	Temperature (°F) at Delivery	Tons Lbs. Delivered	Compacted ID Placement Location	Time Placed	Temperature (°F) Placed	Comments
1	8:30	183211	336°	22.90		9:00	335°	
2	8:30	183212	332°	23.10		9:03	330°	
3	8:33	183213	329°	22.50		9.10	328°	
4	8:33	183214	341°	22.95		9:12	339°	
5	8:40	183215	342°	23.05		9.15	340°	
6	8:40	183216	335°	22.65		9.20	331°	
7	8:42	183217	334°	22.80		9:22	332°	
8	10:00	183221	330°	23.25		10:05	328°	
9	10:00	183222	340°	22.90		10:07	335°	
10	10:00	183223	341°	23.05		10:10	339°	
11	1:40	183225	332°	21.85		1:42	329°	
12	1:40	183234	346°	22.40		1:45	345°	
13	2:53	183237	334°	23.10		2:54	332°	
14	2:54	183238	328°	24.00		2:55	327°	
15	2:56	183239	334°	22.35		2:57	333°	
16	3:00	183240	338°	22.90		3:02	337°	
17	3:10	183243	329°	22.74		3:12	328°	
18	3:14	183244	331°	22.65		3:15	330°	
19	3:30	183246	335°	22.70		3:31	335°	
20	3:32	183247	330°	23.00		3:33	330°	
21	3:36	183248	327°	24.10		3:37	327°	
22	3:50	183249	331°	24.00		3:52	330°	
23	3:50	183250	338°	19.55		3:55	336°	
24								
25								
			Total Lbs.					
			Total Tons					

General Notes / Comments:

QC Technician: Joshua Zemke (Print Name) Signature: Josh Zemke Date: 10-23-06

Firm: KleinFelder Wilder Representative: n/a

Attached: Truck Weigh Tickets
Attached: Map / Site Plan

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/24/06
Job: TA-73 71610-1A

	Time	Panel/Panel	Station Location	Test Location	Lot Cal	% Density	% Air Voids	Comments
1	9:45A	#1	NE corner Panel #1	#1	143.1	98.7	1.3	Tests on
2	9:45A	#1	Center of Panel #1	#1	140.7	97.0	3.0	Today's placement
3	10:05A	#2	SW corner of Panel #2	#2	141.3	97.4	2.6	
4	10:05A	#2	NE corner of Panel #2	#2	142.6	98.3	1.7	
5	10:03	#3	Center of Panel #3	#3	142.9	98.5	1.5	
6	11:05	#3	SE corner of Panel #3	#3	141.8	97.8	2.2	
7	11:10	#4	NW corner of Panel #4	#4	141.1	97.3	2.7	
8	11:10	#4	SW corner of Panel #4	#4	142.0	97.9	2.1	
9	12:06	#5	SE corner of Panel #5	#5	140.9	97.1	2.9	
10	12:07	#5	Center of Panel #5	#5	141.1	97.7	1.3	
11	12:09	#6	SW corner of Panel #6	#6	142.1	98.0	2.0	
12	12:09	#6	NE corner of Panel #6	#6	147.6	97.3	1.7	
13	12:20	#7	Center of Panel #7	#7	141.3	97.4	2.6	
14	12:20	#7	SE corner of Panel #7	#7	142.0	97.9	2.1	
15	12:35	#8	NW corner of Panel #8	#8	141.5	97.6	2.4	
16	12:35	#8	SW corner of Panel #8	#8	142.2	98.0	2.0	CC
17	1:45	#9	SE corner of Panel #9	#9	140.6	96.9	3.1	
18	1:45	#9	Center of Panel #9	#9	141.5	97.6	2.4	
19	2:15	#10	NE corner of Panel	#10	142.3	98.1	1.9	
20	2:15	#10	SW corner of Panel	#10	143.0	98.6	1.4	
21	2:22	#11	Center of Pad	#11	141.6	97.6	2.4	
22	2:22	#11	SE corner of Pad	#11	141.1	97.3	2.7	
23	4:59p	#12	Center of Panel	#12	142.0	97.9	2.1	
24	4:59p	#13	Center of Panel	#13	141.5	97.6	2.4	
25	5:00p	#14	Center of Panel	#14	141.4	97.5	2.5	
				Average				

General Notes / Comments:

Correction of -2.7 lbs used GMM = 145.05 from 10/21/06

QC Technician: Mark Tomez
Print Name

Signature: [signature] Date: 10/24/06

Firm: Kleinfelder

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

9/24/06 - 1 of 4

MatCon HMA Delivery Tracking Form
MatCon Construction Quality Control

Date: 10-24-06
Job: TA-73 7/610-1A

	Time Delivered	Water Tests	Temperature (°F) at Delivery	Lbs. Delivered	Paver and ID Placement Location	Time Placed	Temperature (°F) Placed	Comments
1	8:45		339°			8:46	338°	
2	8:47		328°			8:48	327°	
3	9:00		334°			9:02	333°	
4	9:25		329°			9:26	328°	
5	9:42		327°			9:43	325°	
6	10:35		334°			10:37	333°	
7	10:50		332°			10:52	331°	
8	10:56		328°			10:58	327°	
9	11:27	CC	321°	CC		11:29	320°	CC
10	11:30		329°			11:32	328°	
11	11:42		332°			11:44	330°	
12	12:00		331°			12:03	329°	
13	1:00		337°			1:01	336°	
14	1:00		334°			1:03	333°	
15	1:19		329°			1:20	328°	
16	2:00		333°			2:05	332°	
17	2:10		339°			2:11	338°	
18	2:11		332°			2:13	331°	
19	2:53		329°			2:55	328°	
20	3:40		331°			3:41	330°	
21	3:42		340°			3:43	339°	
22	3:43		337°			3:46	336°	
23								
24			CC					
25		CC					CC	
			Total Lbs.					
			Total Tons					

General Notes / Comments:

QC Technician: Joshua Zemke (Print Name) Signature: [signature] Date: 10-24-06

Firm: Kleinfelder Wilder Representative: n/a

Attached: Truck Weigh Tickets
Attached: Map / Site Plan

MatCon Panel Placement and Compaction
MatCon Construction Quality Control

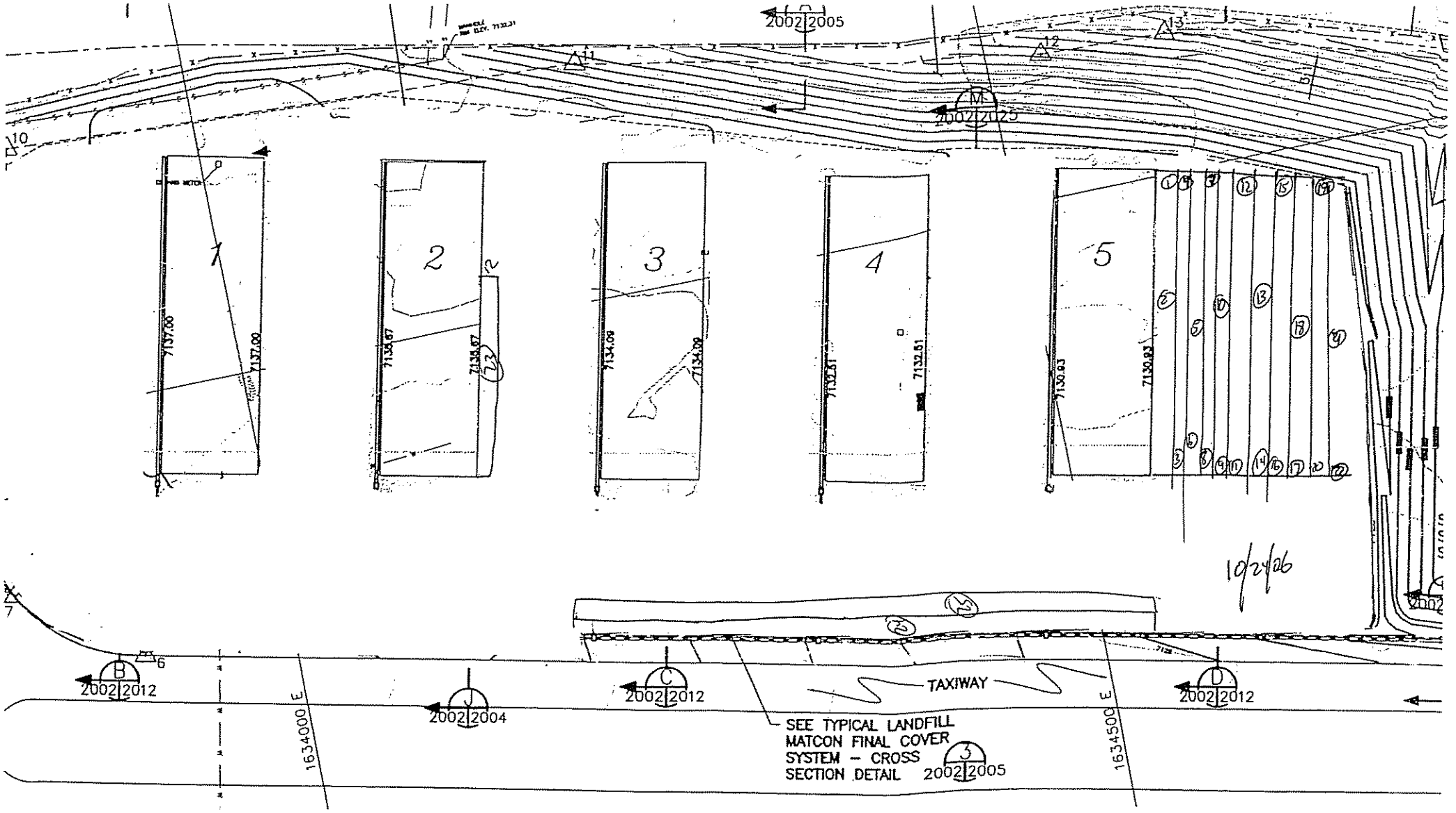
Panel Placement and Compaction	Job: TA-73 71610-1A		Date: 10/24/06	
Activity	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**
Verify panel is within specifications (*Note 1)	10:15A / 12' / 4.75"	12:00P / 12' / 4.5"	2:45P / 12' / 4.5"	/ /
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Verify uniform and thorough compaction (*Note 2)	9:45A / Compliant	10:05A / Compliant	12:35P / Compliant	2:10P / Compliant
	Panel/Time/Density	**Panel/Time/Density**	**Panel/Time/Density**	**Panel/Time/Density**
Field density of compacted panel (*Note 3)	#1 / 10:05A / 141.3	#4 / 11:10A / 142.0	#7 / 12:20P / 141.3	#9 / 2:45P / 140.8
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Inspect cold joints (if any) (*Note 4)	10:45 / Compliant	12:06P / Compliant	2:15P / Compliant	/

***Note 1:** Unless otherwise directed by WILDER or specified in the plans, the nominal compacted depth of dense or open graded MatCon shall be four (4) inches. The panel width shall be as specified in the plans or approved by Wilder
***Note 2:** The compacted course shall be smooth, in conformance with the line. grade. and cross-section shown in the plans or as directed by Wilder, and free of irregularities Roller compaction shall prevent thinning near panel edges
***Note 3:** The field density of the compacted MatCon shall be measured using a nuclear gage in accordance with ASTM D2950. The nuclear density shall be within specifications as directed by Wilder. Air void percentage shall be three (3) percent or less. or as approved by Wilder
***Note 4:** Cold joints are to be avoided by keeping paving panels short enough so that the start of a new panel is placed against a joint that is still hot and not yet compacted At the end of a work shift or when a break in paving activity is anticipated. the cold joint shall be configured. constructedand finished as directed by Wilder or as specified in the plans. All cold joints shall be located on the site lay-out plan with coordinates identified for future identification Cold joint cross-section sketch shall be provided below.

Inspector Notes:

QC Technician: Mark Torrez (Print Name) [signature] (Signature) Date: 10/24/06

Firm: Kleinfelder Wilder Representative: n/a Date n/a



PLAN
1"=50'

TOP OF CAP CONTROL POIN

4 of 4

MatCon HMA Delivery Tracking Form
MatCon Construction Quality Control

Date: 10/27/06
Job: IA-73 1-A 71610

	Time Ordered	Water Test	Temperature (°F) at Delivery	Lbs. Delivered	Load/Grid ID Placement Location	Time Placed	Temperature (°F) Placed	Comments
1	9:15		341			9:16	346	
2	9:22		337			9:23	336	
3	9:30		339			9:31	338	
4	9:45		336			9:46	334	
5	9:52		342			9:53	340	
6	9:57		338			9:56	337	
7	9:58		332			9:59	331	
8	10:08		342			10:10	341	
9	10:15		338			10:16	337	
10	11:35		340	CC		11:36	339	
11	11:45		331			11:46	330	
12	12:02		336			12:02	335	CC
13	12:31		334			12:32	333	
14	12:37		338			12:38	337	
15	12:40	CC	332			12:59	331	
16	12:46		338			1:04	337	
17	1:49		340			1:50	339	
18	2:35		334			3:00	333	
19	2:48		332			3:10	331	
20	3:00		339			3:35	338	
21	3:02		340			4:00	330	
22	3:11		341			4:30	330	
23								
24			CC					
25	CC						CC	
			Total Lbs.					
			Total Tons					

General Notes / Comments:

No Batch Tickets

QC Technician: Joshua Zemke (Print Name) Signature: [signature] Date: 10/27/06

Firm: Klein Felder Wilder Representative: n/a

Attached: Truck Weigh Tickets
Attached: Map / Site Plan

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/27/06
Job: 7160-1A

	Time	Lane/Panel	Station Location	Test Location	Lbs/Cf	% Density	% Air Voids	Comments
1		#1	East end of panel	#1	141.8	97.8	2.2	Tests taken on
2		#1	center of panel		142.3	98.1	1.9	material placed
3		#1	west end of panel		143.6	99.0	1.0	10/27/06
4		#2		#2	140.9	97.1	2.9	
5		#2	center of panel		141.1	97.3	2.7	
6		#3	East end of panel		142.2	98.0	2.0	
7		#3		#3	142.6	98.3	1.7	
8		#3	center of panel		144.0	99.3	0.7	
9		#3	west end of panel		141.3	97.4	2.6	
10		#4		#4	141.9	97.8	2.2	
11		#4	Center of panel		143.7	99.1	0.9	CC
12		#4	East end of panel		140.8	97.1	2.9	
13		#5		#5	144.8	99.8	0.2	
14	CC	#5	Center of panel		142.5	98.2	1.8	
15		#5	west end of panel		143.1	98.7	1.3	
16		#6	southend of panel	#6	141.6	97.6	2.4	
17		#6	Center of panel		142.9	98.5	1.5	
18		#6	north end of panel		143.0	98.6	1.4	
19		#7	South of panel	#7	144.2	99.4	0.6	
20		#7	north end of panel		144.5	99.6	0.4	
21		#8	Center of panel	#8	143.9	99.2	0.8	
22		#8	North end of panel		142.4	98.2	1.8	
23		#9	East end of panel	#9	141.0	97.2	2.8	
24		#9	Center of panel		141.7	97.7	2.3	
25		#9	West end of panel		141.4	97.5	2.5	
				Average				

General Notes / Comments:

Correction of -4.0 lbs used Gmm = 145.05

QC Technician: Mark Tonez (Print Name) Signature Date: 10/27/06

Firm: Kleinfelder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/27/06
Job: 7160-1A

	Lift		Test Panel	Station Location	Test Location	Lbs/Cf	% Density	% Air Voids	Comments
1			#10	Northend of pad	#10	141.9	97.8	2.2	Tests taken on
2			#10	center of pad	#10	143.0	98.6	1.4	Material placed
3			#10	southend of pad	#10	143.2	98.7	1.3	10/27/06
4									
5									
6									
7									
8									
9									
10									
11									
12									
13					CC				
14									
15									
16	CC								
17									
18									
19									
20									
21									
22									
23									
24									
25									
					Average				

General Notes / Comments:

Correction of -4.0 lbs used Gmm = 145.05

QC Technician: Mark Tonez (Print Name) Signature Date: 10/27/06

Firm: Kleinfelder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form

Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/27/06
Job: TA-73 716407A

	Time		Test Panel	Station Location	Test Location	Lbs/Cf	% Density	% Air Voids	Comments
1			1-1	panel #1	1-1	141.3	97.4	2.6	Tests taken
2			1-1		1-1	140.9	97.1	2.9	of material placed
3			1-2		1-2	142.1	98.0	2.0	10/26/06
4			1-2		1-2	141.6	97.6	2.4	
5			1-3		1-3	140.7	97.0	3.0	
6			1-3		1-3	140.7	97.0	3.0	
7			1-4		1-4	141.0	97.2	2.8	
8			1-4		1-4	141.8	97.8	2.2	
9			2-1	panel #2	2-1	143.6	99.0	1.0	
10			2-1		2-1	142.9	98.5	1.5	
11	CU		6-5		6-5	141.1	97.3	2.7	CU
12			6-5		6 5	141.4	97.5	2.5	
13			2-2		2-2	141.4	97.5	2.5	
14			2-2		2-2	142.0	97.9	2.1	
15			2-3		2-3	141.0	97.2	2.8	
16			2-3		2-3	141.9	97.8	2.2	
17			2-4		2-4	140.7	97.0	3.0	
18			2-4		2-4	141.8	97.8	2.2	
19			2-5		2-5	143.1	98.7	1.3	
20			2-5		2-5	142.6	98.3	1.7	
21			2-6		2-6	142.1	98.0	2.0	
22			2-6		2-6	141.5	97.6	2.4	
23			2-7		2-7	140.5	96.9	3.1	
24			2-7		2-7	141.0	97.2	2.8	
25			3-7	panel #3	3-7	140.8	97.1	2.9	
					Average				

General Notes / Comments:

Correction of -2.7 lbs used Gmm = 145.05

QC Technician: Mark Tanez Signature: MT Date: 10/27/06
Print Name

Firm: Kleinfelder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/27/06
Job: TA-73 71407A

	Time		Lane/Panel	Station Location	Test Location	Lab Gm	% Density	% Air Voids	Comments
1			3-7	panel #3	3-7	141.1	97.3	2.7	Tests taken
2			1-5		1-5	141.3	97.4	2.6	of material placed
3			1-5		1-5	140.9	97.1	2.9	10/26/06
4			3-6		3-6	141.6	97.6	2.4	
5			3-6		3-6	142.0	97.9	2.1	
6			3-5		3-5	141.7	97.7	2.3	
7			3-5		3-5	141.0	97.2	2.8	
8			3-4		3-4	142.8	98.4	1.6	
9			3-4		3-4	143.2	98.7	1.3	
10			4-5		4-5	~~136.1~~	~~93.8~~	~~6.2~~	140.8 97.1 2.9
11			4-5		4-5	141.3	97.4	2.6	~~44~~
12			3-3		3-3	142.9	98.1	1.9	
13			3-3		3-3	142.8	98.4	1.6	
14			3-2		3-2	141.5	97.5	2.5	
15			3-2		3-2	142.1	98.0	2.0	
16			3-1		3-1	141.6	97.6	2.4	
17			3-1		3-1	142.2	98.0	2.0	
18			4-1	panel #4	4-1	143.8	99.1	0.9	
19			4-1		4-1	143.1	98.7	1.3	
20			4-2		4-2	141.0	97.2	2.8	
21			4-2		4-2	141.6	97.6	2.4	
22			5-5		5-5	141.3	97.4	2.6	
23			5-5		5-5	140.4	96.8	3.2	
24			4-3		4-3	140.6	96.9	3.1	
25			4-3		4-3	141.9	97.8	2.2	
					Average				

General Notes / Comments:

Correction of -2.7 lbs used Gmm = 145.05

QC Technician: Mark Tarez (Print Name) Signature: MT Date: 10/27/06

Firm: Klein Felder Wilder Representative: N/A

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/27/06
Job: TA-73 71407A

	Time		Pass/Panel	Station Location	Test Location	Lbs/Cf	% Density	% Air Voids	Comments
1			4-4	panel #4	4-4	143.0	98.6	1.4	Tests taken
2			4-4		4-4	148.8	98.1	0.9	of material placed
3			4-5		4-5	141.6	97.6	2.4	10/26/06
4			4-5		4-5	141.2	97.3	2.7	
5			2-5		2-5	140.9	97.1	2.9	
6			2-5		2-5	141.2	97.3	2.7	
7			4-6		4-6	140.8	97.1	2.9	
8			4-6		4-6	141.5	97.6	2.4	
9			4-7		4-7	144.1	99.5	0.7	
10			4-7		4-7	143.8	99.1	0.9	
11			3-5		3-5	141.4	97.5	2.5	CC
12	CC		3-5		3-5	141.7	97.7	2.3	
13			7-5	Joints Added	7-5	141.4	97.5	2.5	
14			7-5		7-5	141.0	97.2	2.8	
15			9-5		9-5	142.8	98.4	1.6	
16			9-5		9-5	143.6	99.0	1.0	
17			10-5		10-5	140.7	97.0	3.0	
18			10-5		10-5	142.0	97.9	2.1	
19			11-5		11-5	141.1	97.2	2.8	
20			11-5		11-5	142.8	98.4	1.6	
21			12-5		12-5	140.3	96.7	3.3	
22			12-5		12-5	141.9	97.8	2.2	
23			13-5		13-5	136.1	93.8	6.2	
24			13-5		13-5	138.5	95.5	4.5	
25			14-5		14-5	141.7	97.7	2.3	
					Average				

General Notes / Comments:

Correction of -2.7 lbs used Gmm = 145.05

QC Technician: Mark Tarez Signature: MTT Date: 10/27/06
Print Name

Firm: Klein Felder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/27/06
Job: TA-73 71607A

	Time	Lane/Panel	Station/Location	Test Location	Lift/Cell	% Density	% Air Voids	Comments
1		14-J	Mid-Joints	14J	139.9	96.4	3.6	Tests taken
2		7-J		7-J	140.9	97.1	2.9	of material placed
3		7-J		7-J	141.8	97.8	2.2	10/26/06
4		15-J		15-J	141.8	~~144.8~~ 97.8	2.2	
5		15-J		15-J	140.6	96.9	3.1	
6		16-J		16-J	140.15	96.9	3.1	
7		16-J		16-J	141.5	97.6	2.4	
8		13-J	Retest	13-J	137.7	94.9	5.1	Retest
9		13-J	Retest	13-J	138.2	95.3	4.7	Retest
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
			Average					

General Notes / Comments:

Correction of -2.7 lbs used GMM = 145.05

QC Technician: Mark Tanez Date: 10/27/06
Print Name Signature

Firm: Klein Felder Wilder Representative: [illegible]

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form

Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Panel Placement and Compaction
MatCon Construction Quality Control

Panel Placement and Compaction	Job: TA-73 7610-1A		Date: 10/27/06	
Activity	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**
Verify panel is within specifications (*Note 1)	10:30A / 12' / 4.25"	11:30A / 12' / 4.5"	1:15P / 12' / 5.00"	
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Verify uniform and thorough compaction (*Note 2)	10:30A / Compliant	11:30A / Compliant	1:15P / Compliant	
	Panel/Time/Density	**Panel/Time/Density**	**Panel/Time/Density**	**Panel/Time/Density**
Field density of compacted panel (*Note 3)	#2 / 10:30A /	#3 / 11:30A /	#5 / 1:00P /	
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Inspect cold joints (if any) (*Note 4)	N/A /	N/A /	N/A /	

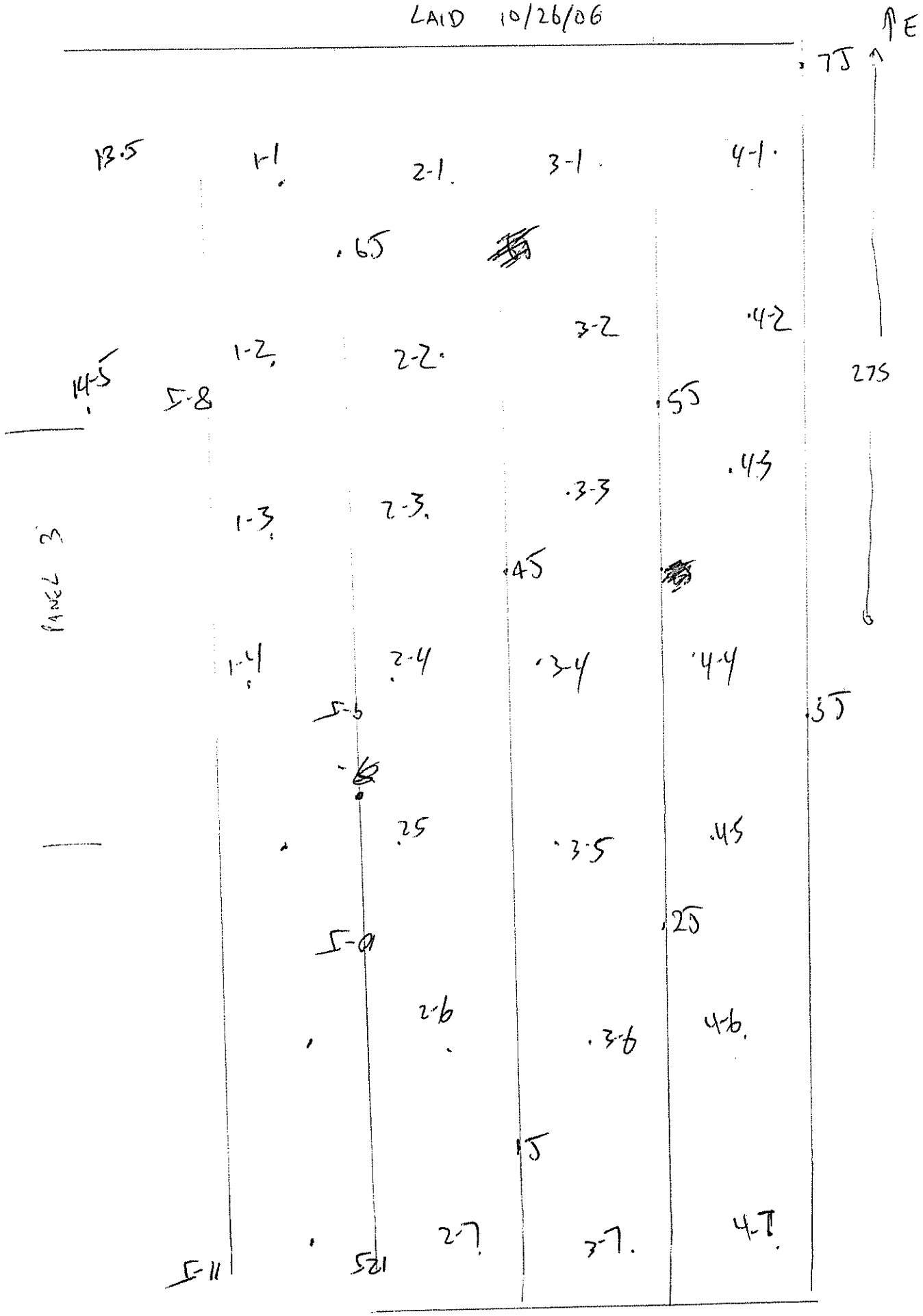
***Note 1:** Unless otherwise directed by WILDER or specified in the plans, the nominal compacted depth of dense or open graded MatCon shall be four (4) inches The panel width shall be as specified in the plans or approved by Wilder
***Note 2:** The compacted course shall be smooth, in conformance with the line. grade, and cross-section shown in the plans or as directed by Wilder, and free of irregularities Roller compaction shall prevent thinning near panel edges
***Note 3:** The field density of the compacted MatCon shall be measured using a nuclear gage in accordance with ASTM D2950 The nuclear density shall be within specifications as directed by Wilder Air void percentage shall be three (3) percent or less, or as approved by Wilder
***Note 4:** Cold joints are to be avoided by keeping paving panels short enough so that the start of a new panel is placed against a joint that is still hot and not yet compacted At the end of a work shift or when a break in paving activity is anticipated. the cold joint shall be configured, constructedand finished as directed by Wilder or as specified in the plans. All cold joints shall be located on the site lay-out plan with coordinates identified for future identification Cold joint cross-section sketch shall be provided below.

Inspector Notes:

QC Technician: Mark Tonez (Print Name) [signature] (Signature) Date: 10/27/06

Firm: Kleinfelder Wilder Representative: n/a Date n/a

LAID 10/26/06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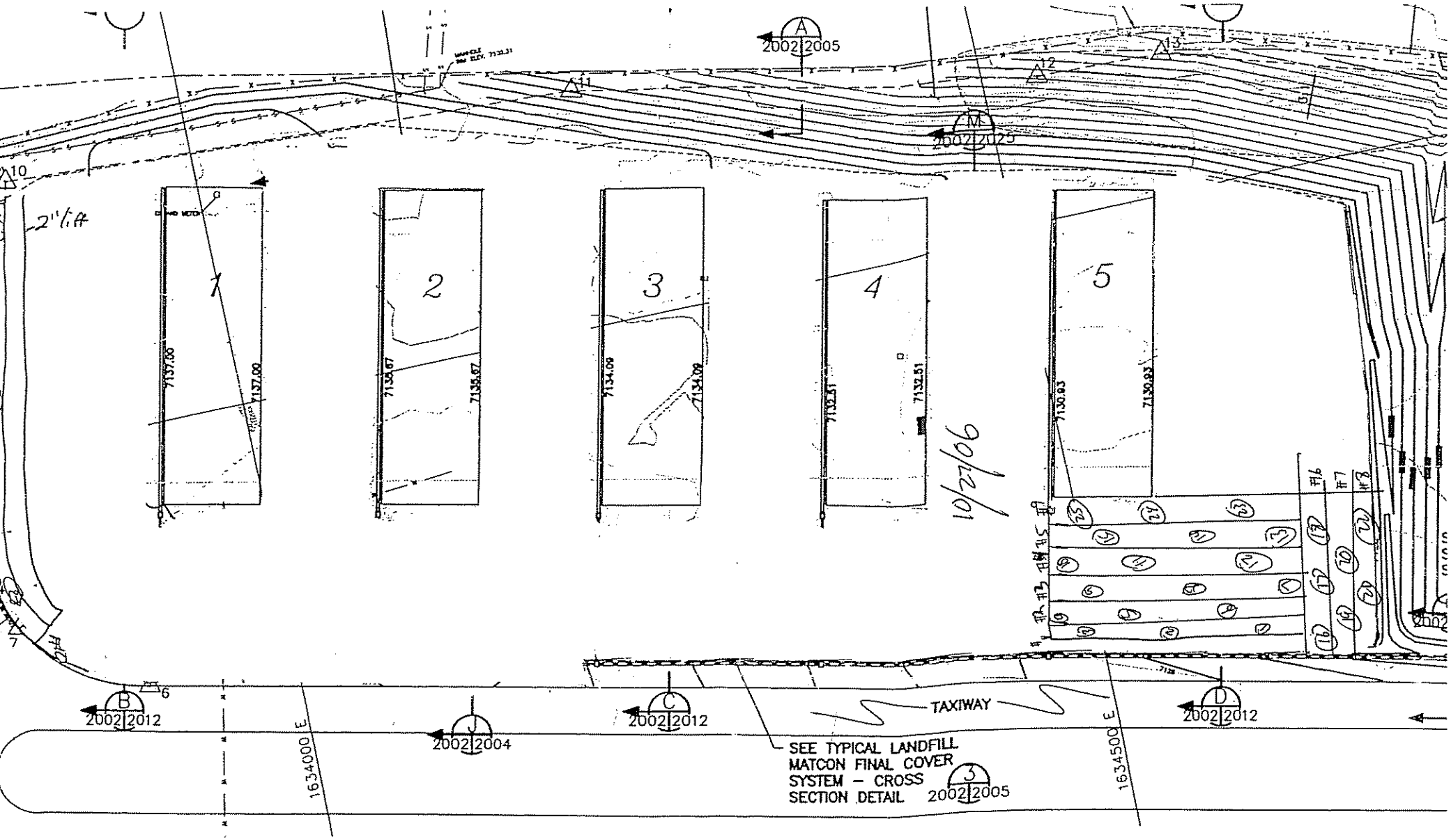

A
2002|2005
M
2002|2025
B
2002|2012
J
2002|2004
C
2002|2012
D
2002|2012
TAXIWAY
SEE TYPICAL LANDFILL MATCON FINAL COVER SYSTEM – CROSS SECTION DETAIL
3
2002|2005
1634000 E
1634500 E
1
2
3
4
5
7137.00
7135.67
7134.09
7132.51
7130.93
2'1/4
10/27/06

PLAN
1"=50'

MatCon HMA Delivery Tracking Form
MatCon Construction Quality Control

Date: 10/30/06
Job: 7/610 1-A

	Time Check	Weigh Tickets	Temperature (°F) at Delivery	Lbs. Delivered	Land/Grid ID Placement Location	Time Placed	Temperature (°F) Placed	Comments
1	9:30		337°			10:00	336°	
2	9:45		334°			10:10	333°	
3	10:05		340°			10:20	339°	
4	10:09		336°			10:38	335°	
5	10:14		339°			10:50	338°	
6	10:56		341°			11:00	340°	
7	12:20		337°			12:30	336	
8	12:30		340°			12:40	339°	
9	1:00	CC	342°			1:10	341°	
10	1:05		338°			1:20	337°	
11	1:32		341°			1:45	340°	
12	1:37		337°			1:50	336°	
13	3:00		338°			3:05	337°	
14	4:09		336°			4:10	335°	
15	4:13		342°			4:25	341°	
16	5:38		335°			5:40	334°	
17	5:47		337°			6:00	336°	
18					CC			CC
19								
20								
21	CC		CC					
22							CC	
23								
24								
25								
			Total Lbs.					
			Total Tons					

General Notes / Comments:

NO BATCH TICKET

QC Technician: Joshua Zemke (Print Name) Joshua Zemke (Signature) Date: 10/30/06

Firm: Klein Felder Wilder Representative: n/a

Attached: Truck Weigh Tickets
Attached: Map / Site Plan

11/01/06

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/30/06
Job: 74-73 76610-1PT

	Time	Rack/Panel #	Station Location	Test Location	Lab Gm	% Density	% Air Voids	Comments
					Gm Results			
1	10:45A	#1	center of panel	#1	141.3	97.4	2.6	Tests taken on
2	10:40A	↓	NW corner of panel	↓	143.2	98.7	1.3	material placed
3	11:20A	#2	SE corner of panel	#2	142.6	98.3	1.7	10/30/06
4	11:20A	↓	NE corner of panel	↓	142.0	97.9	2.1	
5	1:50P	#3	NW corner of panel	#3	144.0	99.3	0.7	
6	1:30P	↓	SW corner of panel	↓	143.3	98.8	1.2	
7	2:15P	#4	sath cut of panel	#4	142.6	98.3	1.7	
8	2:15P	↓	center of panel	↓	141.9	97.8	2.2	
9	3:45	#5	NE corner of panel	#5	142.8	98.4	1.6	
10	3:45	↓	SE corner of panel	↓	143.6	99.0	1.0	
11	4:30	#6	Center of panel	#6	142.0	97.9	2.1	
12	4:30	↓	NW corner of panel	↓	144.0	99.3	0.7	
13	4:40	#7	SW corner of panel	#7	143.1	98.7	1.3	
14	4:40	↓	Center of panel	↓	142.6	98.3	1.7	
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
				Average				

General Notes / Comments:

correction of ~~27~~ -4.0 lbs used

G mm = 145.6

QC Technician: Mark Ortez
Print Name

Signature

Date: 10/30/06

Firm: Reinfelder

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form

Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/30/06
Job: TA-73 76610-01

	Time	Pass/Panel #	Station Location	Test Location	Lab Cert.	Density	Air Void	Comments
1	1-1	#1	Panel #1	1-1	141.8	97.8	2.2	Tests taken on
2	1-1			1-1	140.6	98.9	3.1	material placed
3	1-2			1-2	141.4	97.5	2.5	10/27/06
4	1-2			1-2	141.9	97.8	2.2	
5	1-3			1-3	142.6	98.3	1.7	
6	1-3			1-3	141.8	98.5	1.5	
7	1-5			1-5	141.0	97.2	2.8	
8	1-5			1-5	141.4	97.5	2.5	
9	1-4			1-4	142.0	97.9	2.1	
10	1-4			1-4	141.8	97.8	2.2	
11		2-4	Panel #2	2-4	142.7	98.4	1.6	
12		2-4		2-4	143.1	98.7	1.3	
13		2-3		2-3	141.6	97.6	2.4	
14		2-3		2-3	142.0	97.9	2.1	
15		3-5		3-5	140.9	97.2	2.8	
16		3-5		3-5	141.3	97.3	2.7	
17		2-2		2-2	141.6	97.6	2.4	
18		2-2		2-2	141.2	97.3	2.7	
19		2-1		2-1	141.5	97.6	2.4	
20		2-1		2-1	140.4	96.8	3.2	
21		5-5	Panel #5	5-5	140.7	97.0	3.0	
22		5-5		5-5	141.1	97.3	2.7	
23		3-1		3-1	143.9	99.2	0.8	
24		3-1		3-1	143.5	98.8	1.2	
25		3-2		3-2	142.7	98.4	1.6	
				Average				

CC

CC

General Notes / Comments:

correction of -2.7 lbs used

Gmm = 145.05

QC Technician: Mark Torez
Print Name

Signature

Date: 10/30/06

Firm: Berinfield

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/30/06
Job: TA-73 7610-A

	Time		Pass/Panel #	Station Location	Test Location	Lbs Cf	% Density	% Air Voids	Comments
1			3-2	Pad #3	3-2	141.1	97.3	2.7	Tests taken on
2			3-3		3-3	142.8	98.4	1.6	material placed
3			3-3		3-3	143.2	98.7	1.3	10/27/06
4			3-4		3-4	143.7	99.1	0.9	
5			3-4		3-4	142.9	98.5	1.5	
6			4-5		4-5	141.7	97.7	2.3	
7			4-5		4-5	141.0	97.2	2.8	
8			4-1	Pad #4	4-1	144.1	99.3	0.7	
9			4-1		4-1	143.6	99.0	1.0	
10			4-2		4-2	141.4	97.5	2.5	
11			4-2		4-2	140.5	96.9	3.1	
12			4-3		4-3	142.2	98.0	2.0	
13			4-3		4-3	141.7	97.7	2.3	
14			2-5		2-5	140.5	96.7	3.3	
15			2-5		2-5	141.1	97.3	2.7	
16			4-4		4-4	141.2	97.3	2.7	CC
17			4-4		4-4	141.9	97.8	2.2	
18			5-4	Pad #5	5-4	143.2	98.7	1.3	
19			5-4		5-4	142.6	98.3	1.7	
20			5-3		5-3	141.9	97.8	2.2	
21			5-3		5-3	142.4	98.2	1.8	
22			6-5		6-5	140.7	97.0	3.0	
23			6-5		6-5	141.3	97.4	2.6	
24			5-2		5-2	144.4	99.6	0.4	
25			5-2		5-2	143.7	99.1	0.9	
					Average				

General Notes / Comments:

correction of -2.7 lbs used

GMM = 145.05

QC Technician: Mark Torez
Print Name

Signature

Date: 10/30/06

Firm: Reinfelds

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form

Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/30/06
Job: TA-73 7610-A

	Time		Test Point No.	Station Location	Test Location	Lab Cert.	% Density	% Air Voids	Comments
1			5-1	Panel #5	5-1	143.0	98.6	1.4	Tests taken on material placed 10/27/06
2			5-1		5-1	143.9	99.2	0.8	
3			11-5		11-5	141.0	97.2	2.8	
4			11-5		11-5	141.3	97.4	2.6	
5			6-1	Panel #6	6-1	141.1	97.3	2.7	
6			6-1		6-1	141.8	97.8	2.2	
7			6-2		6-2	142.6	98.3	1.7	
8			6-2		6-2	141.9	97.8	2.2	
9			6-3		6-3	140.6	96.9	3.1	
10			6-3		6-3	141.8	97.8	2.2	
11			7-5		7-5	140.3	96.7	3.3	
12			7-5		7-5	141.8	97.8	2.2	
13			6-4		6-4	142.2	98.0	2.0	CC
14			6-4		6-4	140.9	97.1	2.9	
15			7-1	Panel #7	7-1	141.3	97.4	2.6	
16		CC	7-1		7-1	140.7	97.0	3.0	
17			7-2		7-2	143.3	99.1	0.9	
18			7-2		7-2	143.1	98.7	1.3	
19			7-3		7-3	141.0	97.2	2.8	
20			7-3		7-3	141.5	97.6	2.4	
21			7-3		7-3	142.7	98.4	1.6	
22			7-3		7-3	141.9	97.8	2.2	
23			7-3	Panel #8	7-3	142.3	98.1	1.9	
24			7-3		7-3	142.9	98.5	1.5	
25			10-3		10-3	140.3	96.7	3.3	
					Average				

General Notes / Comments:

correction of -2.7 lbs used

GMM = 145.05

QC Technician: Mark Torez
Print Name

Signature

Date: 10/30/06

Firm: Reinfelds

Wilder Representative: N/A

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form

Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/30/06
Job: TA-73 7600-A

	Under	Over	Test Panel	Station Location	Test Location	Lab Gm	% Density	% Air Voids	Comments
1			10-5	Panel #8	10-5	141.6	97.6	2.4	Tests taken on
2			8-2		8-2	140.6	96.9	3.1	material placed
3			8-2		8-2	141.4	97.5	2.5	10/27/06
4			8-1		8-1	141.2	97.4	2.6	
5			8-1		8-1	141.9	97.8	2.2	
6			9-1	Panel #9	9-1	143.0	98.6	1.4	
7			9-1		9-1	142.6	98.3	1.7	
8			9-5		9-5	140.1	96.6	3.4	
9			9-5		9-5	141.8	97.8	2.2	
10			9-2		9-2	141.0	97.2	2.8	
11			9-2		9-2	141.4	97.5	2.5	
12			9-3		9-3	141.9	97.8	2.2	
13			9-3		9-3	142.5	98.2	1.8	CC
14									
15									
16									
17	CC								
18									
19									
20					CC				
21									
22									
23									
24									
25									
					Average				

General Notes / Comments:

correction of -2.7 lbs used

GMM = 145.05

QC Technician: Mark Torez
Print Name

Signature

Date: 10/30/06

Firm: Rheinfelder

Wilder Representative: n/a

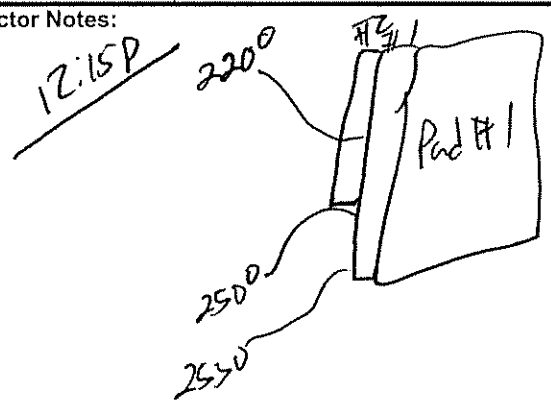
Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Panel Placement and Compaction
MatCon Construction Quality Control

Panel Placement and Compaction	Job: TA-73 76610-11		Date: 10/30/06	
Activity	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**
Verify panel is within specifications (*Note 1)	12:00P / 12' / 4.75"	12:15P / 12' / 4.5"	/ /	
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Verify uniform and thorough compaction (*Note 2)	10:45 / compliant	12:00P / compliant	/	
	Panel/Time/Density	**Panel/Time/Density**	**Panel/Time/Density**	**Panel/Time/Density**
Field density of compacted panel (*Note 3)	#1 / 10:45A / 1413	#2 / 11:20A / 1426	/ /	
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Inspect cold joints (if any) (*Note 4)	10:45A / compliant	12:15P / see below	/	

***Note 1:** Unless otherwise directed by WILDER or specified in the plans, the nominal compacted depth of dense or open graded MatCon shall be four (4) inches. The panel width shall be as specified in the plans or approved by Wilder
***Note 2:** The compacted course shall be smooth, in conformance with the line, grade, and cross-section shown in the plans or as directed by Wilder, and free of irregularities. Roller compaction shall prevent thinning near panel edges
***Note 3:** The field density of the compacted MatCon shall be measured using a nuclear gage in accordance with ASTM D2950. The nuclear density shall be within specifications as directed by Wilder. Air void percentage shall be three (3) percent or less, or as approved by Wilder
***Note 4:** Cold joints are to be avoided by keeping paving panels short enough so that the start of a new panel is placed against a joint that is still hot and not yet compacted. At the end of a work shift or when a break in paving activity is anticipated, the cold joint shall be configured, constructedand finished as directed by Wilder or as specified in the plans. All cold joints shall be located on the site lay-out plan with coordinates identified for future identification. Cold joint cross-section sketch shall be provided below.

Inspector Notes:



QC Technician: Mark Torrez (Print Name) _____ (Signature) Date: 10/30/06

Firm: Henfeldt Wilder Representative: n/a Date n/a

Form 10 - Panel Placement and Compaction
MatCon Construction Quality Control
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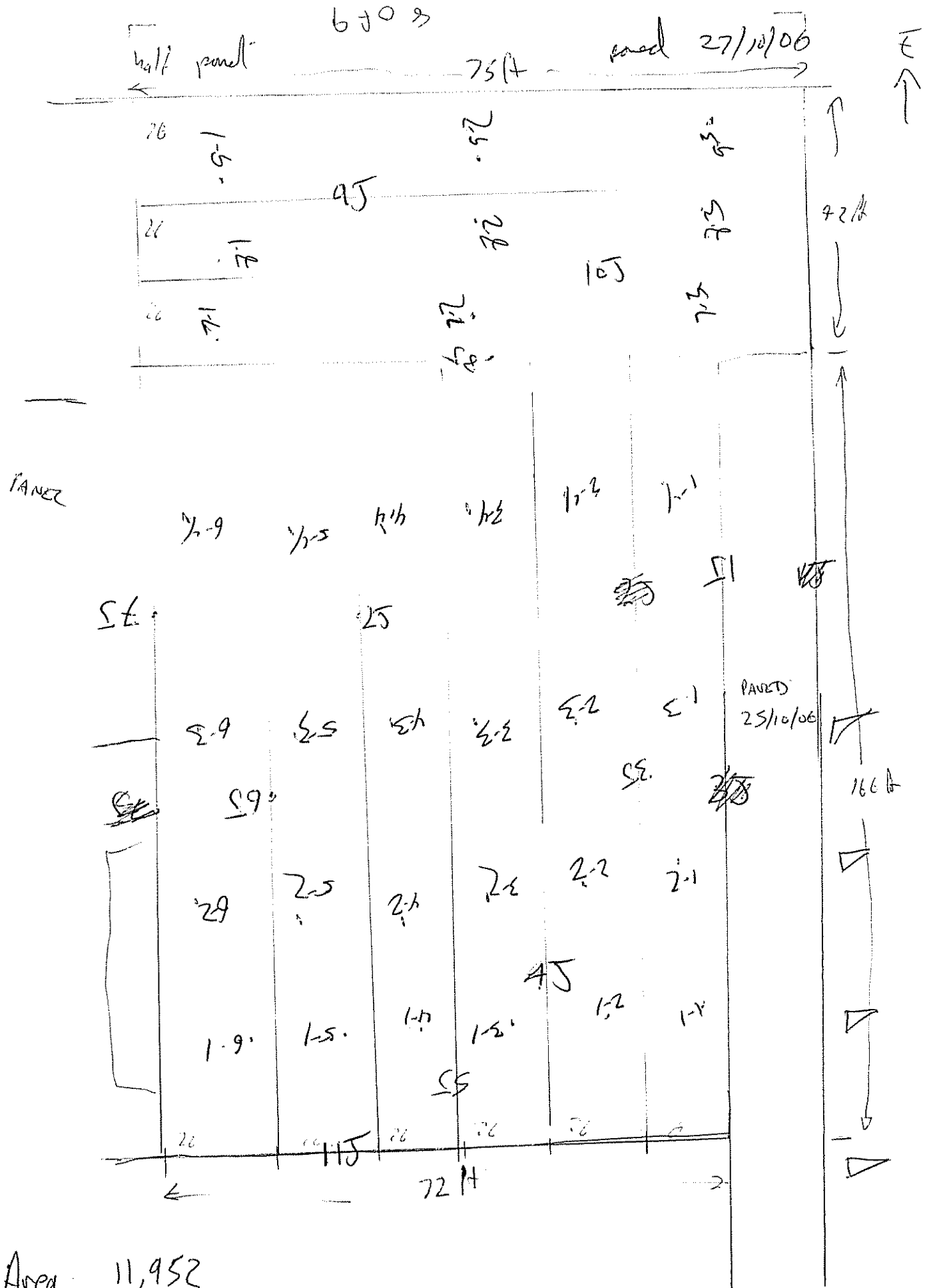
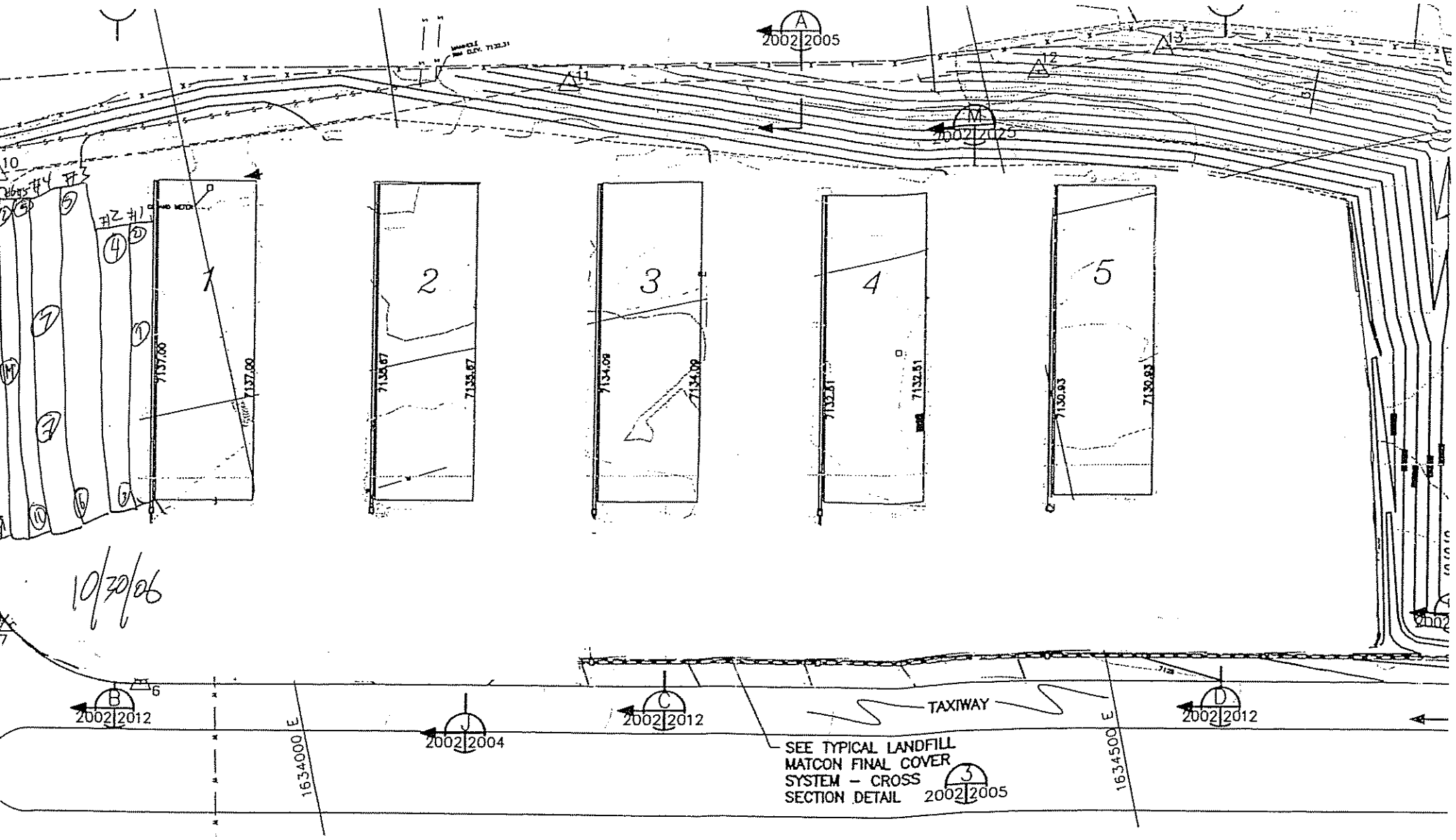
Wilder Construction Company
September 2000



Area 11,952
3,150
15,102 sq ft.

TOTAL REMAINING ON 10/30/06 = 24,617 sq ft.

TOTAL PAVED 10/27/06 = 21,870 sq ft.


A
2002 2005
M
2002 2025
1
2
3
4
5
7137.00
7135.67
7134.09
7132.51
7130.93
10/30/06
B
2002 2012
J
2002 2004
C
2002 2012
D
2002 2012
TAXIWAY
1634000 E
1634500 E
SEE TYPICAL LANDFILL
MATCON FINAL COVER
SYSTEM - CROSS
SECTION DETAIL
3
2002 2005

PLAN
1"=50'

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/31/06
Job: TA73 7680-10

	Time		Pass/Panel #	Station Location	Test Location	Lbs/Cu.Ft.	% Density	% Air Voids	Comments
1			1-1	panel #1	1-1	143.1	98.7	1.3	Tests on pavement
2			1-1		1-1	142.6	98.3	1.7	placed 10/27/06 and
3			1-2		1-2	141.2	97.3	2.7	10/30/06
4			1-2		1-2	141.9	97.8	2.2	
5			1-5		1-5	141.5	97.6	2.4	
6			1-5		1-5	141.0	97.2	2.8	
7			1-3		1-3	144.1	99.3	0.7	
8			1-3		1-3	143.6	99.0	1.0	
9			1-4		1-4	144.8	99.8	0.2	
10			1-4		1-4	144.1	99.3	0.7	
11			2-1	panel #2	2-1	140.7	97.0	3.0	
12			2-1		2-1	142.0	97.9	2.1	
13			2-2		2-2	143.1	98.7	1.3	
14			2-2		2-2	142.5	98.2	1.8	
15			2-3		2-3	141.4	97.5	2.5	
16			2-3		2-3	140.9	97.1	2.9	
17			2-5		2-5	141.3	97.4	2.6	
18			2-5		2-5	140.4	96.8	3.2	
19			2-4		2-4	141.8	97.8	2.2	
20			2-4		2-4	141.8	97.8	2.2	
21			3-4	panel #3	3-4	141.0	97.2	2.8	
22			3-4		3-4	143.6	99.0	1.0	
23			3-3		3-3	142.9	97.5	1.5	
24			3-3		3-3	142.2	97.0	2.0	
25			3-3		3-3	140.5	96.9	3.1	
					Average				

General Notes / Comments:

correction of -2.7 lbs used GMM = 145.05

QC Technician: Mark Tantz Signature: [signature] Date: 10/31/06
Print Name

Firm: Kleinfelder Wilder Representative: N/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/31/06
Job: TA73 7680-10

	Date	Time	Pass/Panel	Station Location	Test Location	Lab Cert	% Density	% Air Voids	Comments
1			3-5	Panel #3	3-5	141.1	97.3	2.7	Tests on pavement
2			3-2		3-2	145.1	100.0	0.0	placed 10/27/06 and
3			3-2		3-2	144.6	99.7	0.3	10/30/06
4			3-1		3-1	143.8	99.1	0.9	
5			3-1		3-1	142.9	97.5	1.5	
6			4-5	Panel #4	4-5	141.1	97.3	2.7	
7			4-5		4-5	141.6	97.6	2.4	
8			4-1		4-1	142.7	98.4	1.6	
9			4-1		4-1	141.9	97.8	2.2	
10			4-2		4-2	144.0	99.3	0.7	
11			4-2		4-2	144.7	99.8	0.2	
12			4-3		4-3	140.9	97.1	2.9	
13			4-3		4-3	141.8	97.8	2.2	
14			4-4		4-4	144.2	99.9	0.1	
15			4-4		4-4	143.6	99.0	1.0	
16			5-4	Panel #5	5-4	142.1	98.0	2.0	
17			5-4		5-4	142.7	98.4	1.6	
18			5-3		5-3	140.9	97.1	2.9	
19			5-3		5-3	142.4	98.2	1.8	
20			5-2		5-2	143.7	99.1	0.9	
21			5-2		5-2	145.4	100.2	-0.2	
22			5-1		5-1	142.0	97.9	2.1	
23			5-1		5-1	142.8	98.4	1.6	
24			5-5		5-5	140.3	96.7	3.3	
25			5-5		5-5	141.4	97.5	2.5	
					Average				

General Notes / Comments:

correction of -2.7 lbs used GMM = 145.05

QC Technician: Mark Tanez (Print Name) Signature: [signature] Date: 10/31/06

Firm: Ellenfilds Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/31/06
Job: TA73 7620-10

	Time		Pass/Panel #	Station Location	Test Location	Lbs/CF	% Density	% Air Voids	Comments
1			6-1	panel #6	6-1	144.3	99.5	0.5	Tests on pavement
2			6-1		6-1	142.7	98.4	1.6	placed 10/27/06 and
3			6-2		6-2	142.2	98.0	2.0	- 10/30/06
4			6-2		6-2	143.6	99.0	1.0	
5			6-5		6-5	142.9	98.5	1.5	
6			6-5		6-5	141.6	97.6	2.4	
7			6-3		6-3	145.3	100.2	-0.2	
8			6-3		6-3	144.7	99.8	0.2	
9			6-4		6-4	143.3	98.8	1.2	
10			6-4		6-4	141.9	97.8	2.2	
11			7-4	panel #7	7-4	144.0	99.3	0.7	
12	CC		7-4		7-4	142.7	98.4	1.6	
13			7-5		7-5	145.0	99.9	0.1	CC
14			7-5		7-5	145.5	100.3	-0.3	
15			7-3		7-3	143.7	99.1	0.9	
16			7-3		7-3	143.0	98.6	1.4	
17			7-2		7-2	145.1	100.0	0.0	
18			7-2		7-2	144.4	99.6	0.4	
19			7-1		7-1	143.7	99.1	0.9	
20			7-1		7-1	142.5	98.2	1.8	
21			8-1	panel #8	8-1	141.1	97.3	2.7	
22			8-1		8-1	142.0	97.9	2.1	
23			8-2		8-2	143.8	99.1	0.9	
24			8-2		8-2	142.2	98.0	2.0	
25			8-3		8-3	141.0	97.2	2.8	
					Average				

General Notes / Comments:

correction of -2.7 lbs used GMM = 145.05

QC Technician: Mark Tanez Date: 10/31/06
Print Name Signature

Firm: Klemfildt Wilder Representative: N/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form

Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/31/06
Job: TA73 7680-103

	Time		Pass/Panel #	Station Location	Test Location	Lbs/CF	% Density	% Air Voids	Comments
1			8-3	Pad #8	8-3	140.1	96.6	3.4	Tests on pavement
2			8-5		8-5	141.3	97.4	2.6	placed 10/27/06 and
3			8-5		8-5	141.7	97.7	2.3	10/30/06
4			8-4		8-4	143.6	99.0	1.0	
5			8-4		8-4	142.1	98.0	2.0	
6			9-1	Pad #9	9-1	145.7	100.4	-0.4	
7			9-1		9-1	144.9	99.9	0.1	
8			9-2		9-2	143.1	98.7	1.3	
9			9-2		9-2	143.8	99.1	0.9	
10			9-3		9-3	140.4	96.8	3.2	
11			9-3		9-3	141.2	97.3	2.7	
12			9-4		9-4	143.5	98.9	1.1	
13			9-4		9-4	144.2	99.4	0.6	
14			9-5		9-5	141.0	97.2	2.8	
15			9-5		9-5	142.2	98.0	2.0	
16			9-6		9-6	141.5	97.6	2.4	
17			9-6		9-6	142.3	98.1	1.9	
18			9-7		9-7	144.1	99.4	0.6	
19			9-7		9-7	142.9	98.5	1.5	
20			9-8		9-8	144.4	99.6	0.4	
21			9-8		9-8	145.3	100.2	-0.2	
22			9-9		9-9	141.7	97.7	2.3	
23			9-9		9-9	142.4	98.2	1.8	
24			9-5		9-5	142.1	98.0	2.0	
25			9-5		9-5	141.0	97.2	2.8	
					Average				

CC CC

General Notes / Comments:

correction of -2.7 lbs used GMM = 145.05

QC Technician: Mark Tanez Date: 10/31/06
Print Name Signature

Firm: Ellenfilds Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/31/06
Job: TA73 7680-103

	Time		Test Panel #	Station Location	Test Location	Lbs/CF	% Density	% Air Voids	Comments
1			8-5	pel #8	8-5	147.6	98.3	1.7	Tests on pavement
2			8-5		8-5	141.0	97.2	2.8	placed 10/27/06 and
3			8-6		8-6	143.9	99.2	0.8	10/30/06
4			8-6		8-6	141.8	97.8	2.2	
5			8-7		8-7	143.5	98.9	1.1	
6			8-7		8-7	141.4	97.5	2.5	
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
				Average					

General Notes / Comments:

correction of -2.7 lbs used GMM = 145.05

QC Technician: Mark Tanez Date: 10/31/06
Print Name Signature

Firm: Elementaldo Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form

Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/31/06
Job: TA-73 71610-1A

	Initial	Retest	Roll Point	Station Location	Test Location	Lift Ch	% Density	% Air Voids	Comments
1			1-2	Panel #1	1-2	141.3	97.4	2.6	Tests on pavement
2			1-2		1-2	140.7	97.0	3.0	pkard 10/31/06
3			1-1		1-1	143.1	98.7	1.3	
4			1-1		1-1	143.9	99.2	0.8	
5			1-5		1-5	141.4	97.5	2.5	
6			1-5		1-5	141.0	97.2	2.8	
7			2-2	panel #2	2-2	140.7	96.7	3.3	
8			2-2		2-2	141.5	97.6	2.4	
9			2-5		2-5	144.1	99.3	0.7	
10			2-5		2-5	142.7	98.4	1.6	
11	CC		2-1		2-1	140.8	97.1	2.9	
12			2-1		2-1	142.0	97.9	2.1	
13			3-1	panel #3	3-1	143.3	98.0	2.0	
14			3-1		3-1	141.7	97.7	2.3	
15			3-5		3-5	142.0	97.9	2.1	
16			3-5		3-5	140.5	96.9	3.1	
17			3-2		3-2	143.1	98.7	1.3	CC
18			3-2		3-2	141.8	97.8	2.2	
19			4-1	panel #4	4-1	145.3	100.8	-0.8	
20			4-1		4-1	143.6	99.0	1.0	
21			4-5		4-5	142.6	98.3	1.7	
22			4-5		4-5	141.1	97.3	2.7	
23			4-2		4-2	143.7	99.1	0.9	
24			4-2		4-2	142.9	98.5	1.5	
25									
				Average					

General Notes / Comments:

Corrections of -2.7 lbs used GMM of 145.05

QC Technician: Mark Tomez
Print Name

Signature: [signature] Date: 10/31/06

Firm: Kleinfelder

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/31/06
Job: TA-73 71610-1A

	Time		Pass/Fail	Station Location	Test Location	Lab Ref	% Density	% Air Voids	Comments
1			5-1	part #5	5-1	144.2	99.4	0.6	Tests on pavement
2			5-1		5-1	143.8	99.1	0.9	placed 10/31/06
3			5-2		5-2	144.4	99.6	0.4	
4			5-2		5-2	142.1	98.0	2.0	
5			5-3		5-3	140.1	96.6	3.4	
6			5-3		5-3	142.4	98.2	1.8	
7			6-1	part #6	6-1	143.8	99.1	0.9	
8			6-1		6-1	145.5	100.3	-0.3	
9			6-2		6-2	142.3	98.1	1.9	
10			6-2		6-2	141.9	97.8	2.2	
11			6-3		6-3	143.1	98.7	1.3	
12			6-3		6-3	141.7	97.7	2.3	
13			5-5		5-5	143.2	98.7	1.3	
14			5-5		5-5	140.9	97.1	2.9	
15			7-1	part #7	7-1	143.1	98.7	1.3	
16			7-1		7-1	143.7	99.1	0.9	
17			7-2		7-2	142.1	98.0	2.0	
18			7-2		7-2	141.4	97.5	2.5	
19			6-5		6-5	142.2	98.0	2.0	
20			6-5		6-5	143.6	99.0	1.0	
21			8-1	lot #8	8-1	142.6	98.3	1.7	
22			8-1		8-1	140.7	97.0	3.0	
23			8-2		8-2	142.0	97.9	2.1	
24			8-2		8-2	141.8	97.8	2.2	
25			7-5		7-5	143.0	98.6	1.4	
					Average				

General Notes / Comments:

Corrections of -2.7 lbs used GMM of 145.05

QC Technician: Mark Tonez (Print Name) Signature: [signature] Date: 10/31/06

Firm: Kleinfelder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/31/06
Job: TA-73 71610-1A

	Time		Pass/Fail	Station Location	Test Location	Test Results: LbsCF	% Density	% Air Voids	Comments
1			75	pad #8	75	141.0	92.2	2.8	Tests on pavement
2									placed 10/31/06
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
					Average				

CC CC

General Notes / Comments:

Corrections of -2.7 lbs used GMM of 145.05

QC Technician: Mark Tonez
Print Name

Signature: [signature]

Date: 10/31/06

Firm: Kleinfelder

Wilder Representative: M/G

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form

Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon HMA Delivery Tracking Form
MatCon Construction Quality Control

Date: 10/31/06
Job: 7/610 1-A

	Time Onsite	Water Test	Temperature (°F) at Delivery	Lbs. Delivered	Equipment Used in Placement / Compaction	Time Placed	Temperature (°F) Placed	Comments
1	9:20		340°			9:25	339°	
2	9:28		338°			9:30	337°	
3	10:00		339°			10:10	338°	
4	10:15		335°			10:20	334°	
5	10:30		339°			10:35	338°	
6	11:26		338°			11:30	337°	
7	12:11		337°			12:20	336°	
8	12:35		335°			12:45	334°	
9	1:35		341°			1:45	340°	
10	2:30		339°			3:00	338°	
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
			Total Lbs.					
			Total Tons					

General Notes / Comments:

NO BATCH TICKET

QC Technician: Joshua Zemke (Print Name) Signature: Joshua Zemke Date: 10/31/06

Firm: Kleinfelder Wilder Representative: n/a

Attached: Truck Weigh Tickets
Attached: Map / Site Plan

MatCon Panel Placement and Compaction
MatCon Construction Quality Control

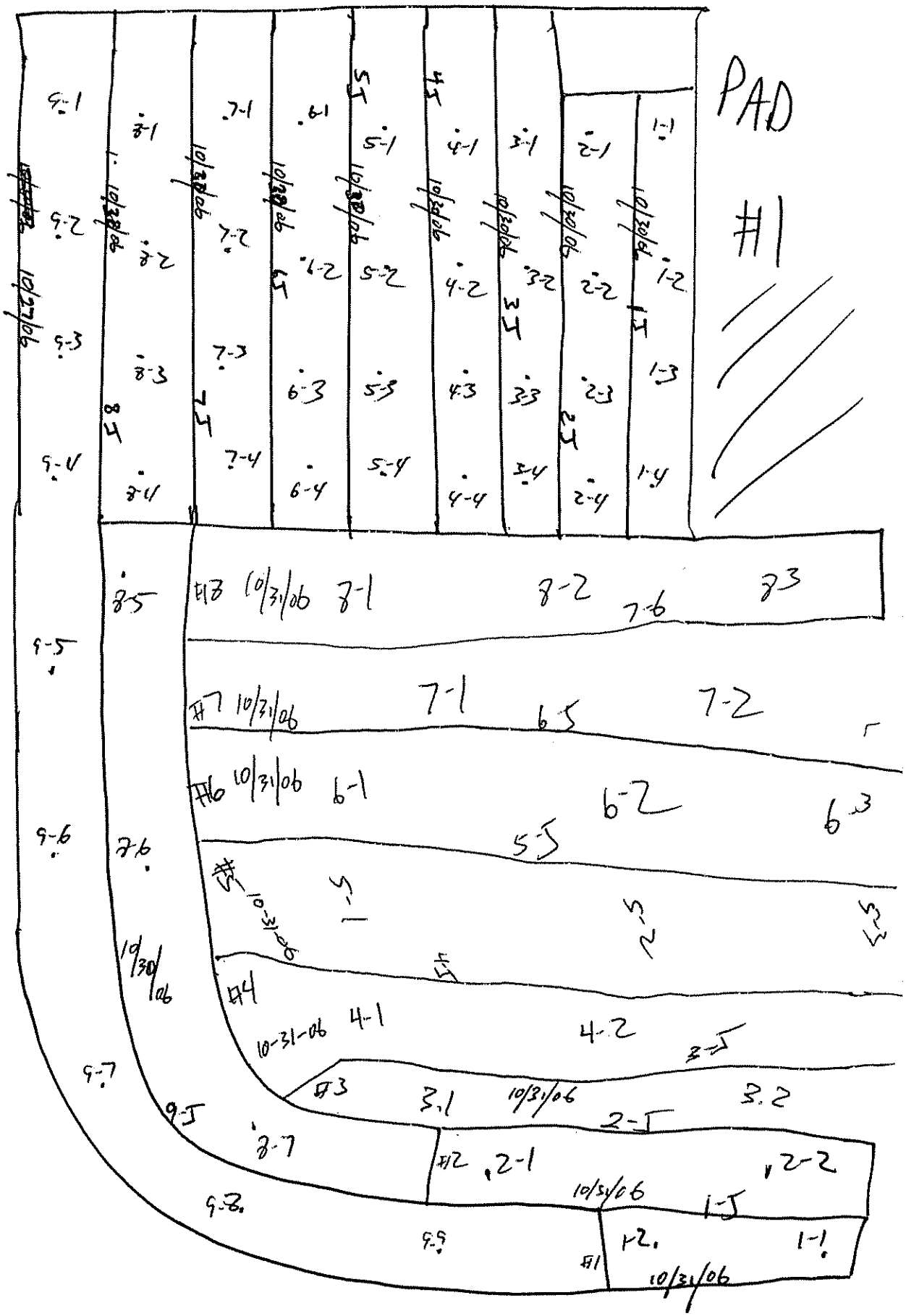
Panel Placement and Compaction	Job: TA-73 71610		Date: 10/31/06	
Activity	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**
Verify panel is within specifications (*Note 1)	10:00A / 12' / 5.00"	11:30A / 12' / 4.75" 60		
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Verify uniform and thorough compaction (*Note 2)	10:00A / Compliant	11:30A / Compliant		
	Panel/Time/Density	**Panel/Time/Density**	**Panel/Time/Density**	**Panel/Time/Density**
Field density of compacted panel (*Note 3)	#1 / 10:40A / 141.3	#3 / 1:00P / 143.1		
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Inspect cold joints (if any) (*Note 4)	N/A	N/A		

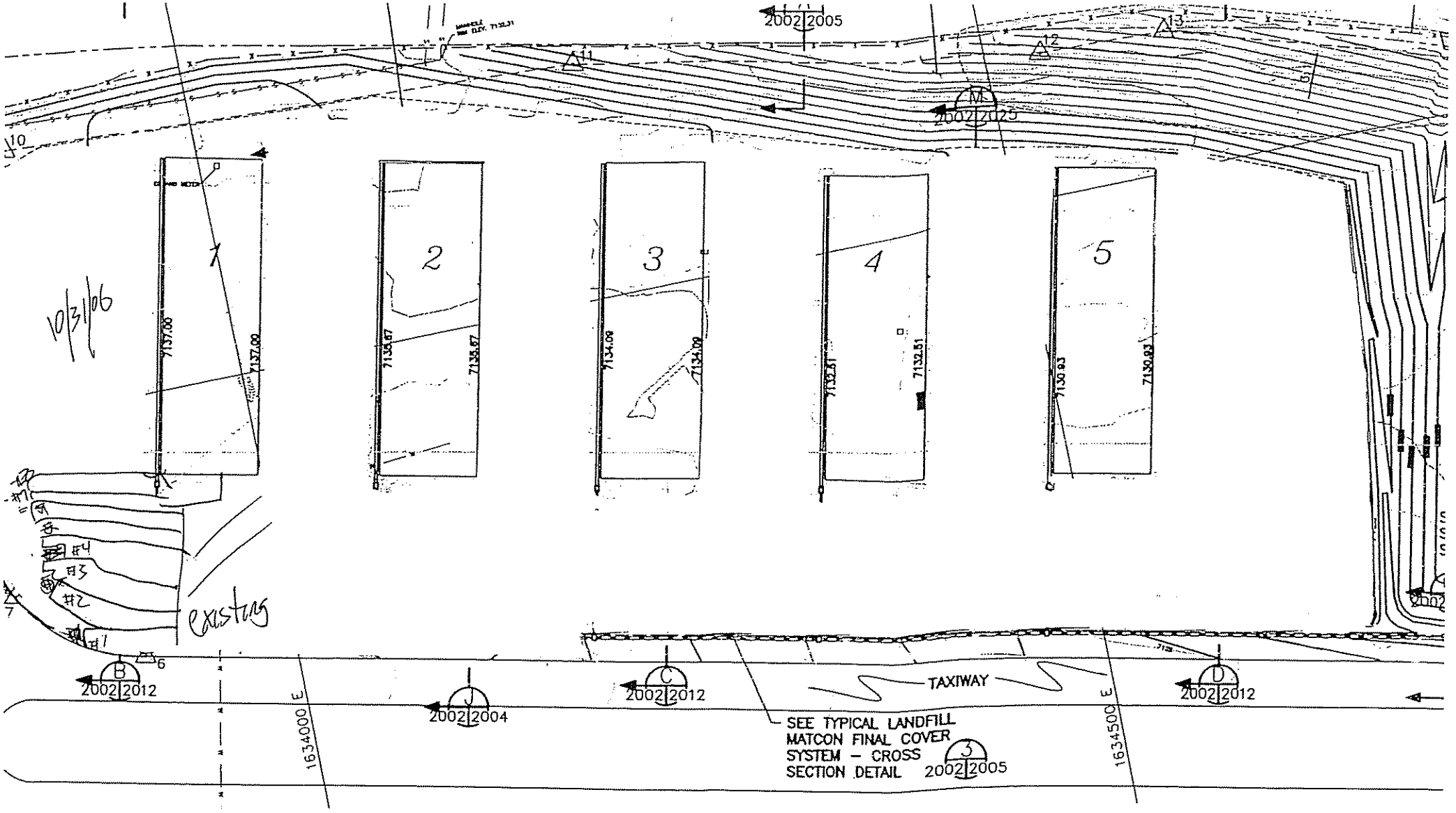
***Note 1:** Unless otherwise directed by WILDER or specified in the plans, the nominal compacted depth of dense or open graded MatCon shall be four (4) inches. The panel width shall be as specified in the plans or approved by Wilder
***Note 2:** The compacted course shall be smooth, in conformance with the line, grade, and cross-section shown in the plans or as directed by Wilder, and free of irregularities. Roller compaction shall prevent thinning near panel edges
***Note 3:** The field density of the compacted MatCon shall be measured using a nuclear gage in accordance with ASTM D2950. The nuclear density shall be within specifications as directed by Wilder. Air void percentage shall be three (3) percent or less, or as approved by Wilder
***Note 4:** Cold joints are to be avoided by keeping paving panels short enough so that the start of a new panel is placed against a joint that is still hot and not yet compacted. At the end of a work shift or when a break in paving activity is anticipated, the cold joint shall be configured, constructedand finished as directed by Wilder or as specified in the plans. All cold joints shall be located on the site lay-out plan with coordinates identified for future identification. Cold joint cross-section sketch shall be provided below.

Inspector Notes:

QC Technician: Mark Torrez (Print Name) [signature] (Signature) Date: 10/31/06

Firm: Kleinfelder Wilder Representative: n/a Date n/a


PAD
#1
#2
#3
#4
#5
#6
#7
#8
10/31/06



PLAN
1"=50'

TOP OF CAP CONTROL POIN

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION						Pages:	12
1	Steve Matier smatier@northwind-inc.com Jerry Thayer jerrytha@wilderconstruction.com	2	John Keck jkeck@northwind-inc.com Steve Edwards sedwards@northwind-inc.com	3	Abatech Consulting Goeffrey Rowe growe@abatech.com		

Transmittal Date: 10/30/06	**Transmittal DCN: 71610.7 – ALB06TS006**	
Project No.: 71610	**Task No.: 7**	**File Index No.: 4.9**

SUBJECT: 71610.7 – ALB06TD006 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Asphalt Concrete Test Report	10/30/06	71610.7AC.016
Asphalt Concrete Test Report	10/30/06	71610.7AC.017
Asphalt Concrete Test Report	10/30/06	71610.7AC.018
Asphalt Concrete Test Report	10/30/06	71610.7AC.019
Sieve Analysis Test Report	10/18/06	71610.7SV.001
Sieve Analysis Test Report	10/19/06	71610.7SV.002
Sieve Analysis Test Report	10/20/06	71610.7SV.003
Sieve Analysis Test Report	10/21/06	71610.7SV.004
Sieve Analysis Test Report	10/23/06	71610.7SV.005
Sieve Analysis Test Report	10/24/06	71610.7SV.006
Sieve Analysis Test Report	10/25/06	71610.7SV.007

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel — Project Manager
10/30/06 — Date

RECEIPT AND READ ACKNOWLEDGEMENT
PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature _____ Date _____

Print Name _____

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KLEINFELDER, INC.
ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #17 Santa Fe batch plant
Sample Date: October 24, 2006 10:00 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon*	Sample No. 06-392 A	Tolerance	D'	$PF_{(1.00)}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	92%	5%	2%	X		
No 4	63%	58%	4%	5%		X	
No 8	47%	41%	4%	6%		X	
No 16	36%	31%	4%	5%		X	
No 30	25%	23%	4%	2%	X		
No 50	15%	14%	3%	1%	X		
No 100	10%	9%	3%	1%	X		
No 200	7.4%	6.3%	2.0%	1.1%	X		
% asphalt	8.2%	8.3%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.324	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

Copyright, 2002

KLEINFELDER, INC.
ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #43 Santa Fe batch plant
Sample Date: October 24, 2006 2:30 PM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon*	Sample No. 06-393-2 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	94%	5%	0%	X		
No 4	63%	62%	4%	1%	X		
No 8	47%	44%	4%	3%	X		
No 16	36%	34%	4%	2%	X		
No 30	25%	24%	4%	1%	X		
No 50	15%	15%	3%	0%	X		
No 100	10%	9%	3%	1%	X		
No 200	7.4%	6.3%	2.0%	1.1%	X		
% asphalt	8.2%	8.7% uncorrected	6-9%				

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.313	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

www.kleinfelder.com
Telephone: (505) 344-7373
Facsimilie: (505) 344-1711

Kleinfelder, Inc.
8300 Jefferson NE Suite B
Albuquerque, NM 87113

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KLEINFELDER, INC.
ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #29 Santa Fe batch plant
Sample Date: October 24, 2006 11:55 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon*	Sample No. 06-393-1 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	92%	5%	2%	X		
No 4	63%	59%	4%	4%		X	
No 8	47%	41%	4%	6%		X	
No 16	36%	32%	4%	4%		X	
No 30	25%	23%	4%	2%	X		
No 50	15%	14%	3%	1%	X		
No 100	10%	9%	3%	1%	X		
No 200	7.4%	5.9%	2.0%	1.5%	X		
% asphalt	8.2%	8.7%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.323	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

www.kleinfelder.com
Telephone: (505) 344-7373
Facsimilie: (505) 344-1711

Kleinfelder, Inc.
8300 Jefferson NE Suite B
Albuquerque, NM 87113

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KLEINFELDER, INC.
ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #15 Santa Fe batch plant
Sample Date: October 25, 2006 10:00 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon*	Sample No. 06-397 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	91%	5%	3%	X		
No 4	63%	54%	4%	10%			X
No 8	47%	37%	4%	10%			X
No 16	36%	28%	4%	8%			X
No 30	25%	20%	4%	5%		X	
No 50	15%	12%	3%	3%		X	
No 100	10%	7%	3%	3%		X	
No 200	7.4%	4.9%	2.0%	2.5%		X	
% asphalt	8.2%	8.3% uncorrected	6-9%				

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.341	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

www.kleinfelder.com
Telephone: (505) 344-7373
Facsimilie: (505) 344-1711

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8300 Jefferson NE Suite B
Albuquerque, NM 87113

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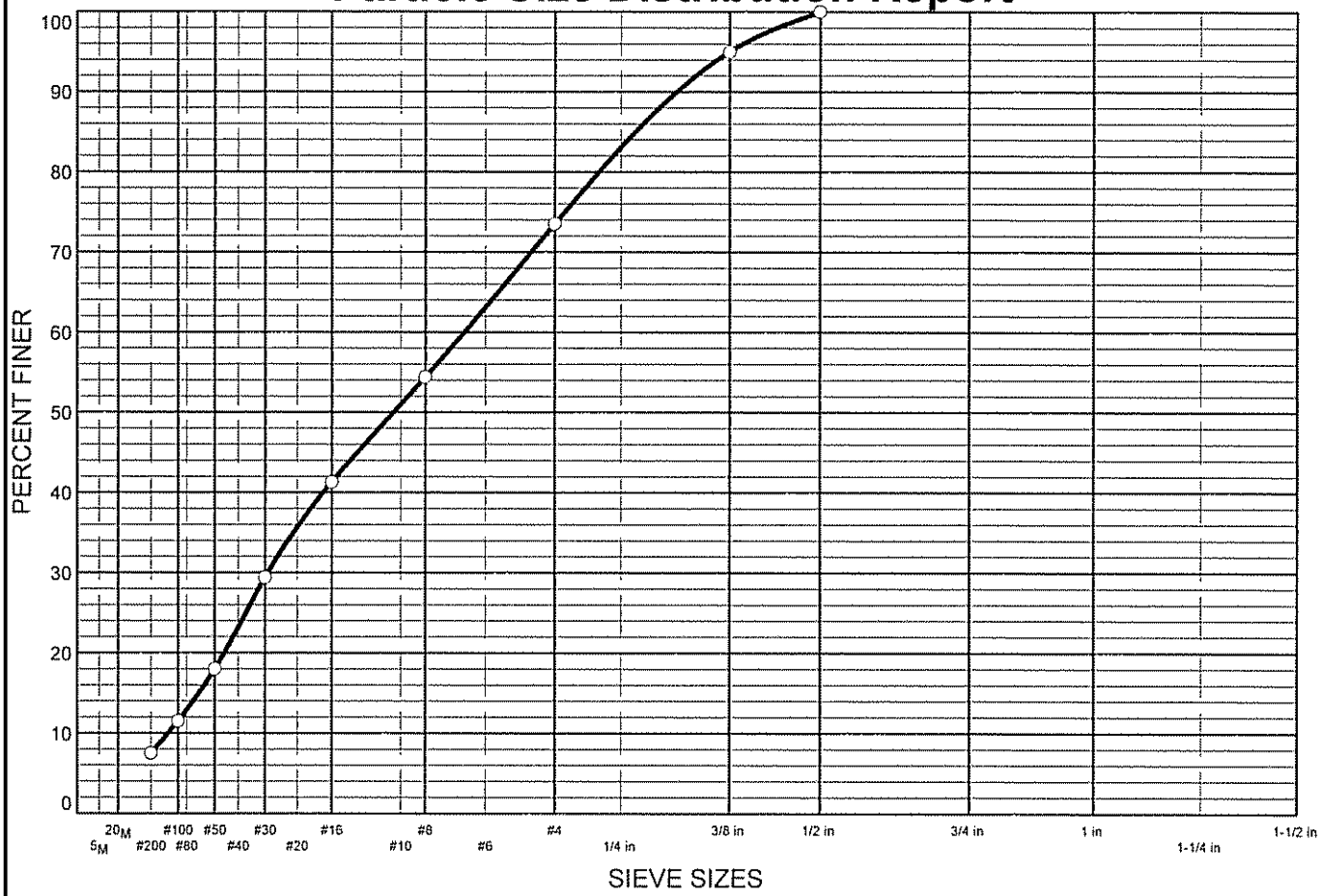
Particle Size Distribution Report



% FINES		% SAND			% GRAVEL	
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
7.5		15.7	27.7	22.6	26.5	0.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2 in.	100.0		
3/8 in.	95.0		
#4	73.5		
#8	54.4		
#16	41.3		
#30	29.4		
#50	18.0		
#100	11.5		
#200	7.5		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 6.74 D_{60}= 2.98 D_{50}= 1.91
D_{30}= 0.620 D_{15}= 0.229 D_{10}= 0.119
C_u= 25.04 C_c= 1.08

Classification

USCS= SW-SM AASHTO= A-1-b

Remarks

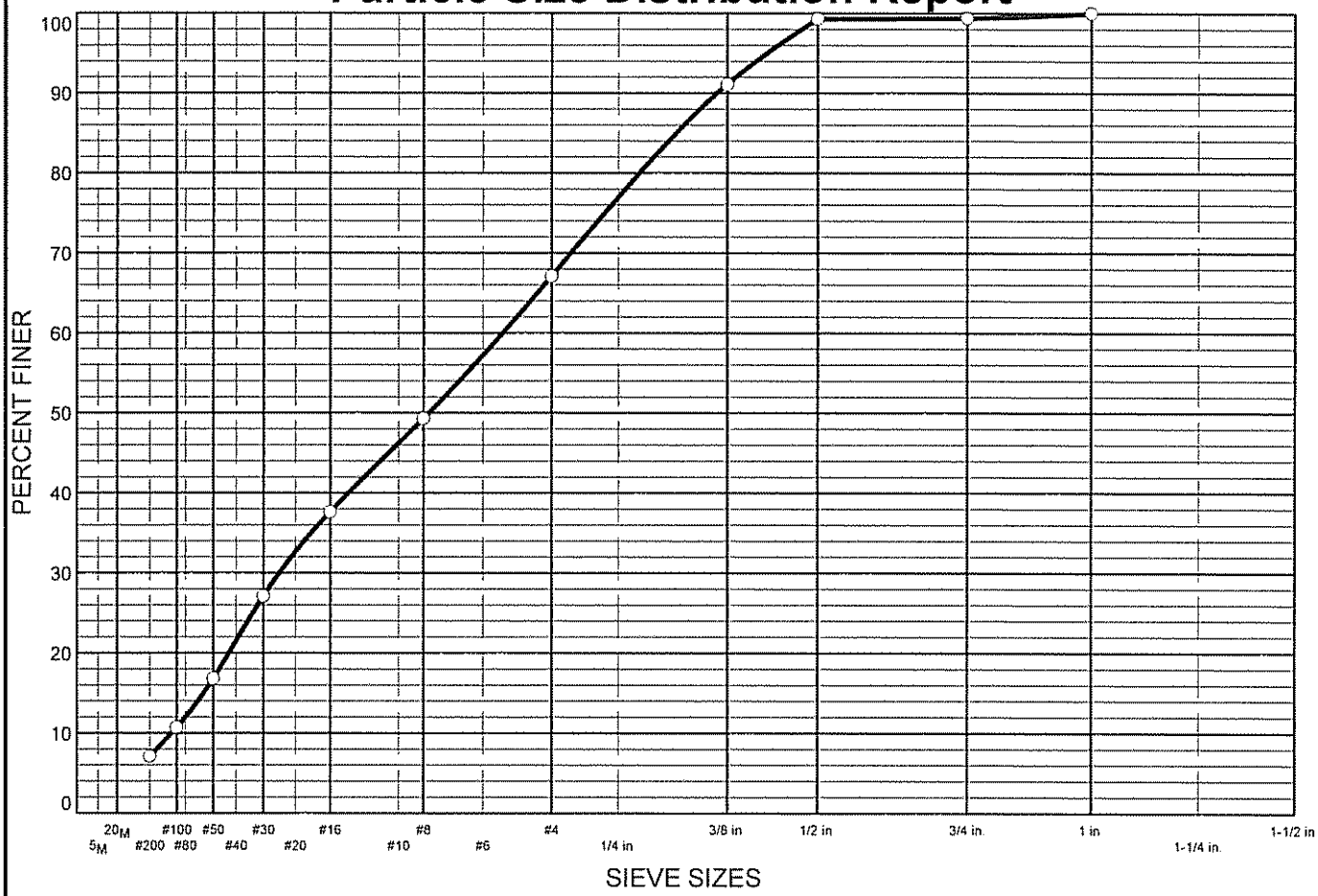
F.M.=3.77

Sample No.: 06-371 **Source of Sample:** Cold feed from Batch Plant **Date:** 10-18-06
Location: Cold feed belt @ Santa Fe Hot Mix Plant **Elev./Depth:**

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

Particle Size Distribution Report



% FINES		% SAND			% GRAVEL	
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
7.1		14.5	24.6	20.9	32.3	0.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
3/4 in.	99.4		
1/2 in.	99.3		
3/8 in.	91.1		
#4	67.1		
#8	49.3		
#16	37.6		
#30	27.1		
#50	16.8		
#100	10.7		
#200	7.1		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 7.95 D_{60}= 3.73 D_{50}= 2.44
D_{30}= 0.719 D_{15}= 0.255 D_{10}= 0.134
C_u= 27.83 C_c= 1.03

Classification

USCS= SW-SM AASHTO= A-1-a

Remarks

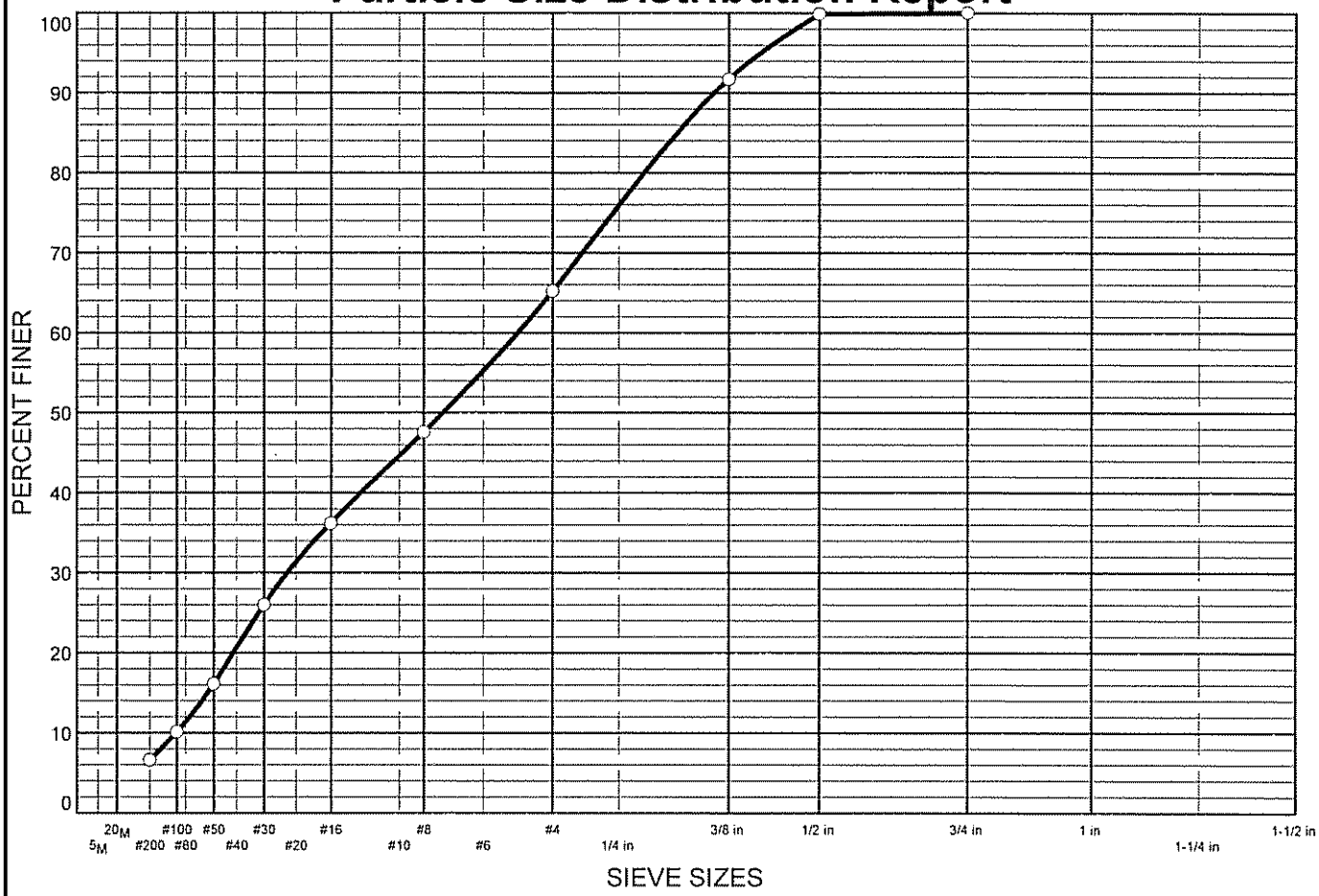
F.M.=4.01

Sample No.: 06-378 **Source of Sample:** Cold feed from Batch Plant **Date:** 10-19-06
Location: Cold feed belt @ Santa Fe Hot Mix Plant **Elev./Depth:**

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

Particle Size Distribution Report



% FINES		% SAND			% GRAVEL	
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
6.6		14.1	23.9	20.6	34.8	0.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 in.	100.0		
1/2 in.	99.9		
3/8 in.	91.7		
#4	65.2		
#8	47.6		
#16	36.2		
#30	26.0		
#50	16.1		
#100	10.1		
#200	6.6		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 7.96 D_{60}= 4.01 D_{50}= 2.66
D_{30}= 0.778 D_{15}= 0.271 D_{10}= 0.148
C_u= 27.18 C_c= 1.02

Classification

USCS= SW-SM AASHTO= A-1-a

Remarks

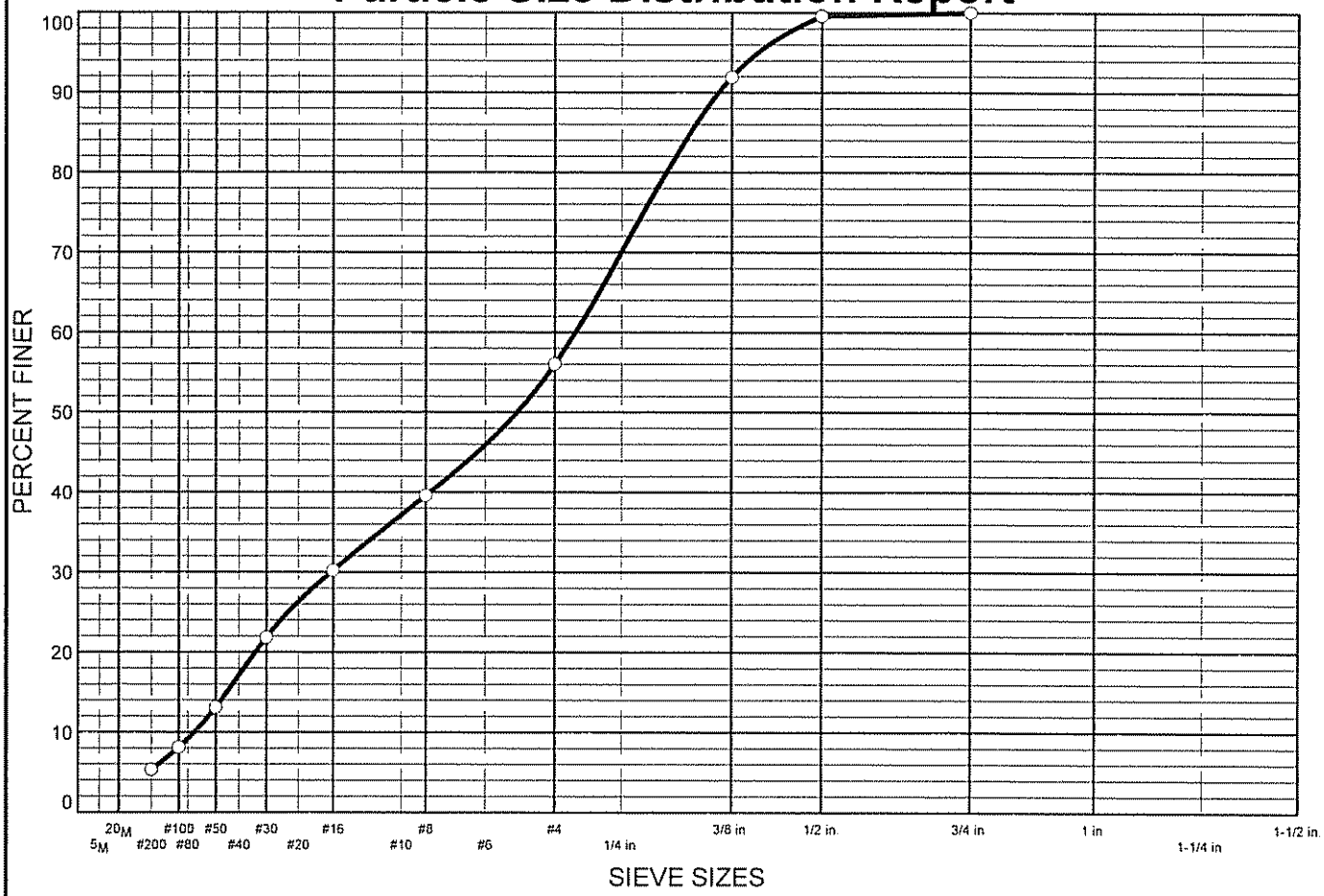
F.M.=4.07

Sample No.: 06-379 **Source of Sample:** Cold feed from Batch Plant **Date:** 10-20-06
Location: Cold feed belt @ Santa Fe Hot Mix Plant **Elev./Depth:**

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

Particle Size Distribution Report



% FINES		% SAND			% GRAVEL	
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
5.3		11.8	20.0	18.9	44.0	0.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 in.	100.0		
1/2 in.	99.6		
3/8 in.	91.9		
#4	56.0		
#8	39.6		
#16	30.2		
#30	21.8		
#50	13.1		
#100	8.1		
#200	5.3		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 8.26 D_{60}= 5.22 D_{50}= 3.96
D_{30}= 1.16 D_{15}= 0.358 D_{10}= 0.206
C_u= 25.28 C_c= 1.25

Classification

USCS= SW-SM AASHTO= A-1-a

Remarks

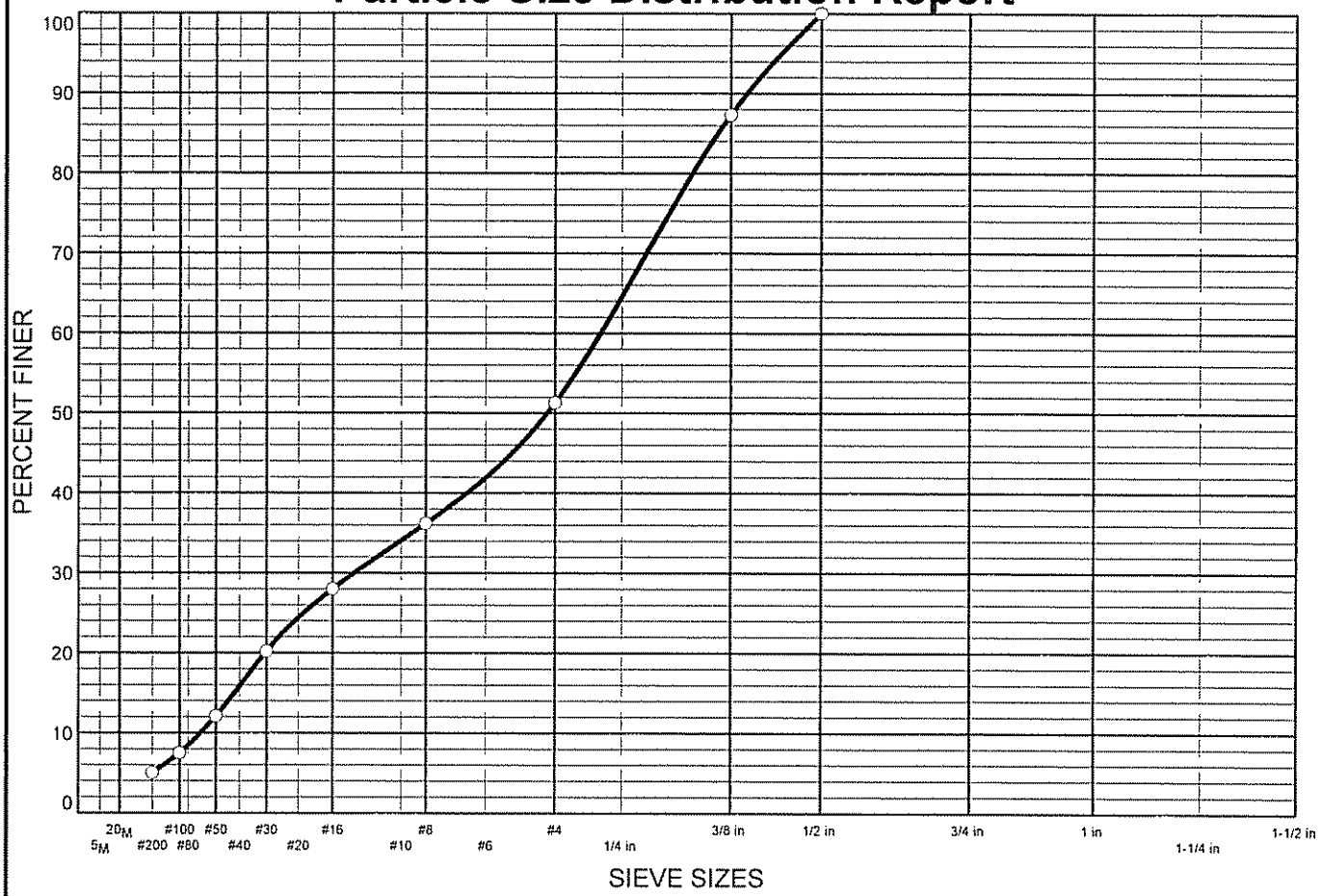
F.M.=4.39

Sample No.: 06-384 **Source of Sample:** Cold feed from Batch Plant **Date:** 10-21-06
Location: Cold feed belt @ Santa Fe Hot Mix Plant **Elev./Depth:**

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

Particle Size Distribution Report



% FINES		% SAND			% GRAVEL	
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
5.0		10.8	18.2	17.3	48.7	0.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2 in.	100.0		
3/8 in.	87.3		
#4	51.3		
#8	36.2		
#16	28.0		
#30	20.2		
#50	12.1		
#100	7.5		
#200	5.0		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 9.12 D_{60}= 5.81 D_{50}= 4.58
D_{30}= 1.41 D_{15}= 0.396 D_{10}= 0.231
C_u= 25.12 C_c= 1.49

Classification

USCS= GW-GM AASHTO= A-1-a

Remarks

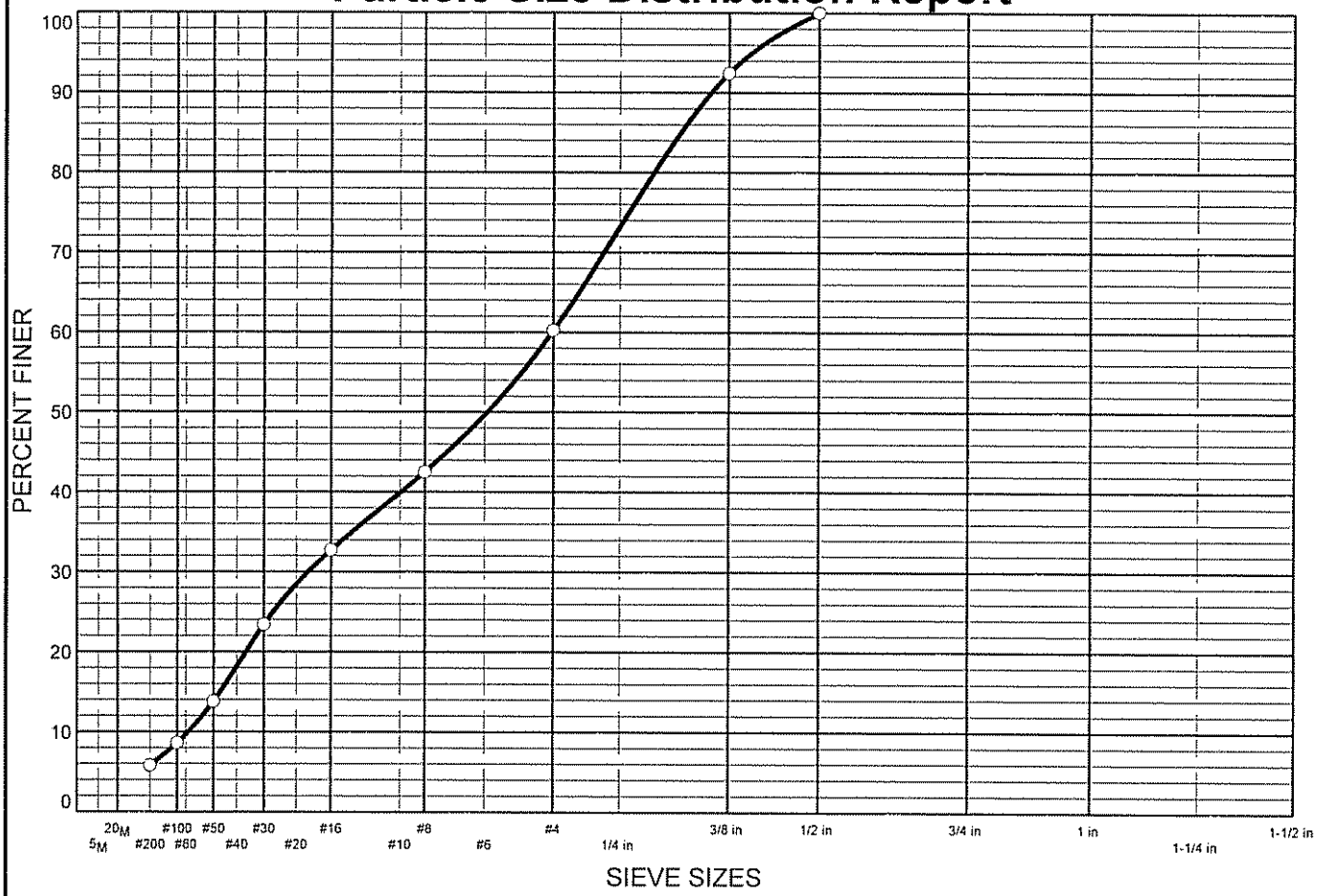
F.M.=4.57

Sample No.: 06-388 **Source of Sample:** Cold feed from Batch Plant **Date:** 10-23-06
Location: Cold feed belt @ Santa Fe Hot Mix Plant **Elev./Depth:**

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

Particle Size Distribution Report



% FINES		% SAND			% GRAVEL	
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
5.8		12.4	21.7	20.3	39.8	0.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2 in.	100.0		
3/8 in.	92.4		
#4	60.2		
#8	42.5		
#16	32.7		
#30	23.4		
#50	13.8		
#100	8.6		
#200	5.8		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 8.04 D_{60}= 4.73 D_{50}= 3.41
D_{30}= 0.958 D_{15}= 0.334 D_{10}= 0.191
C_u= 24.78 C_c= 1.02

Classification

USCS= SW-SM AASHTO= A-1-a

Remarks

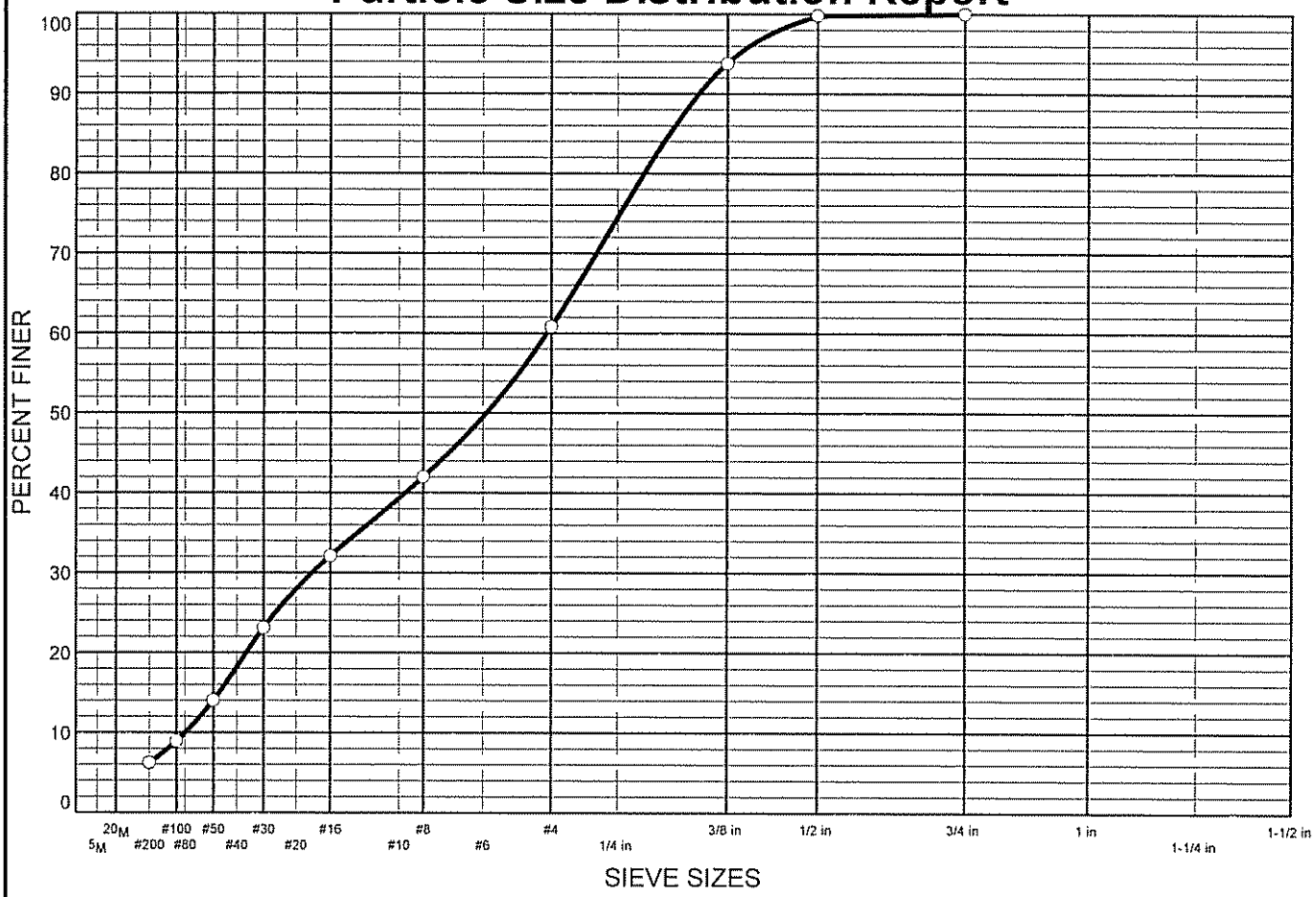
F.M.=4.26

Sample No.: 06-396 **Source of Sample:** Cold feed from Batch Plant **Date:** 10-24-06
Location: Cold feed bin @ Santa Fe Hot Mix Plant **Elev./Depth:**

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

Particle Size Distribution Report



% FINES		% SAND			% GRAVEL	
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
6.2		12.0	21.1	21.5	39.2	0.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 in.	100.0		
1/2 in.	99.8		
3/8 in.	93.8		
#4	60.8		
#8	42.0		
#16	32.1		
#30	23.1		
#50	14.0		
#100	8.9		
#200	6.2		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 7.78 D_{60}= 4.66 D_{50}= 3.42
D_{30}= 1.00 D_{15}= 0.329 D_{10}= 0.182
C_u= 25.51 C_c= 1.18

Classification

USCS= SW-SM AASHTO= A-1-a

Remarks

F.M.=4.25

Sample No.: 06-398 **Source of Sample:** Cold feed from Batch Plant **Date:** 10-25-06
Location: Cold feed bin @ Santa Fe Hot Mix Plant **Elev./Depth:**

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION						Pages:	30
1	Steve Matier smatier@northwind-inc.com Jerry Thayer jerrytha@wilderconstruction.com	2	John Keck jkeck@northwind-inc.com Steve Edwards sedwards@northwind-inc.com	3	Abatech Consulting Goeffrey Rowe growe@abatech.com		

Transmittal Date: 10/27/06	**Transmittal DCN: 71610.7 – ALB06TS005**	
Project No.: 71610	**Task No.: 7**	**File Index No.: 4.9**

SUBJECT: 71610.7 – ALB06TD005 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
MatCon Daily Density Summary Report	10/20/06	71610.7MAT.008
MatCon Daily Density Summary Report	10/24/06	71610.7MAT.009
MatCon Daily Density Summary Report	10/25/06	71610.7MAT.010
MatCon Daily Density Summary Report	10/26/06	71610.7MAT.011
MatCon Daily Density Summary Report	10/26/06	71610.7MAT.012
MatCon Daily Density Summary Report	10/26/06	71610.7MAT.013

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel
Project Manager

10/27/06
Date

RECEIPT AND READ ACKNOWLEDGEMENT
PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

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MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/20/06
Job: 71610-1A TA-73

	Time		Test Panel #	Station Location	Test Location	Dry Density	% Density	% Air Voids	Comments
1			1-1	Panel #1	1-1	144.7	100.3		
2			1-1	Panel #1	1-1	143.9	99.8		
3			1-5	Panel #1	1-5	146.2	101.4		
4			1-5	Panel #1	1-5	144.9	100.5		
5			1-2	Panel #1	1-2	140.7	97.6		
6			1-2	Panel #1	1-2	141.5	98.1		
7			1-3	Panel #1	1-3	145.2	100.7		
8			1-3	Panel #1	1-3	143.8	99.7		
9			1-4	Panel #1	1-4	145.9	101.2		
10			1-4	Panel #1	1-4	144.3	99.2		
11			2-4	Panel #2	2-4	145.7	101.0		
12			2-4	Panel #2	2-4	144.6	100.3		
13			2-3	Panel #2	2-3	144.7	100.4		
14			2-3	Panel #2	2-3	144.1	99.9		
15			2-2	Panel #2	2-2	144.3	100.1		
16			2-2	Panel #2	2-2	143.7	99.7		
17			5-2	Panel #2	5-2	140.7	97.6		
18			5-2	Panel #2	5-2	141.2	97.9		
19			2-1	Panel #2	2-1	144.3	100.1		
20			2-1	Panel #2	2-1	143.7	99.7		
21			3-1	Panel #3	3-1	144.4	100.		
22			3-1	Panel #3	3-1	143.1	99.2		
23			3-2	Panel #3	3-2	144.2	100.1		
24			3-2	Panel #3	3-2	145.2	100.7		
25			3-3	Panel #3	3-3	143.0	99.2		
					Average				

General Notes / Comments:

QC Technician: Mark Tonez (Print Name) Signature: [signature] Date: 10/20/06

Firm: Kleinfelder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form

Note: Correlation between air voids and hydraulic conductivity was established during mix design

RB 20 Oct 06

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/20/06
Job: TA-73 71610-1A

	Time		Test Grid	Station Location	Test Location	Test Results: Wet Density	% Density	% Air Voids	Comments
1			3-3	Panel #3	3-3	142.6	97.9		
2			J-3	panel #3	J-3	140.6	97.5		
3			J-3	panel #3	J-3	141.6	97.2		
4			3-4	pan #3	3-4	140.8	97.6		
5			3-4	panel #3	3-4	142.0	97.5		
6			4-4	Panel #4	4-4	141.6	97.2		
7			4-4	panel #4	4-4	143.0	99.2		
8			4-3	panel #4	4-3	144.0	99.9		
9			4-3	panel #4	4-3	143.1	99.3		
10			4-2	panel #4	4-2	143.2	99.3		
11			4-2	panel #4	4-2	142.6	98.9		
12			4-1	Panel #1	4-1	140.9	97.7		
13			4-1	panel #4	4-1	141.3	98.0		
14			J-H	Header-1	J-H	140.9	97.7		
15			J-H	Header-1	J-H	140.1	97.2		
16			H-1	Header-1	H-1	144.2	1.00		
17			H-1	Header-1	H-1	143.1	99.2		
18			H-2	Header-1	H-2	143.7	99.7		
19			H-2	Header-1	H-2	144.6	100.3		
20			H-3	Header-1	H-2	143.9	99.8		
21			H-3	Header-1	H-3	142.6	98.9		
22			H-4	Header-1	H-4	144.3	100.1		
23			H-4	Header-1	H-4	143.1	99.2		
24									
25									
					Average				

General Notes / Comments:
Rice weight used is average from samples taken from test pad. 144.2

QC Technician: Mark Torrez (Print Name) Signature: MTZ Date: 10/20/06

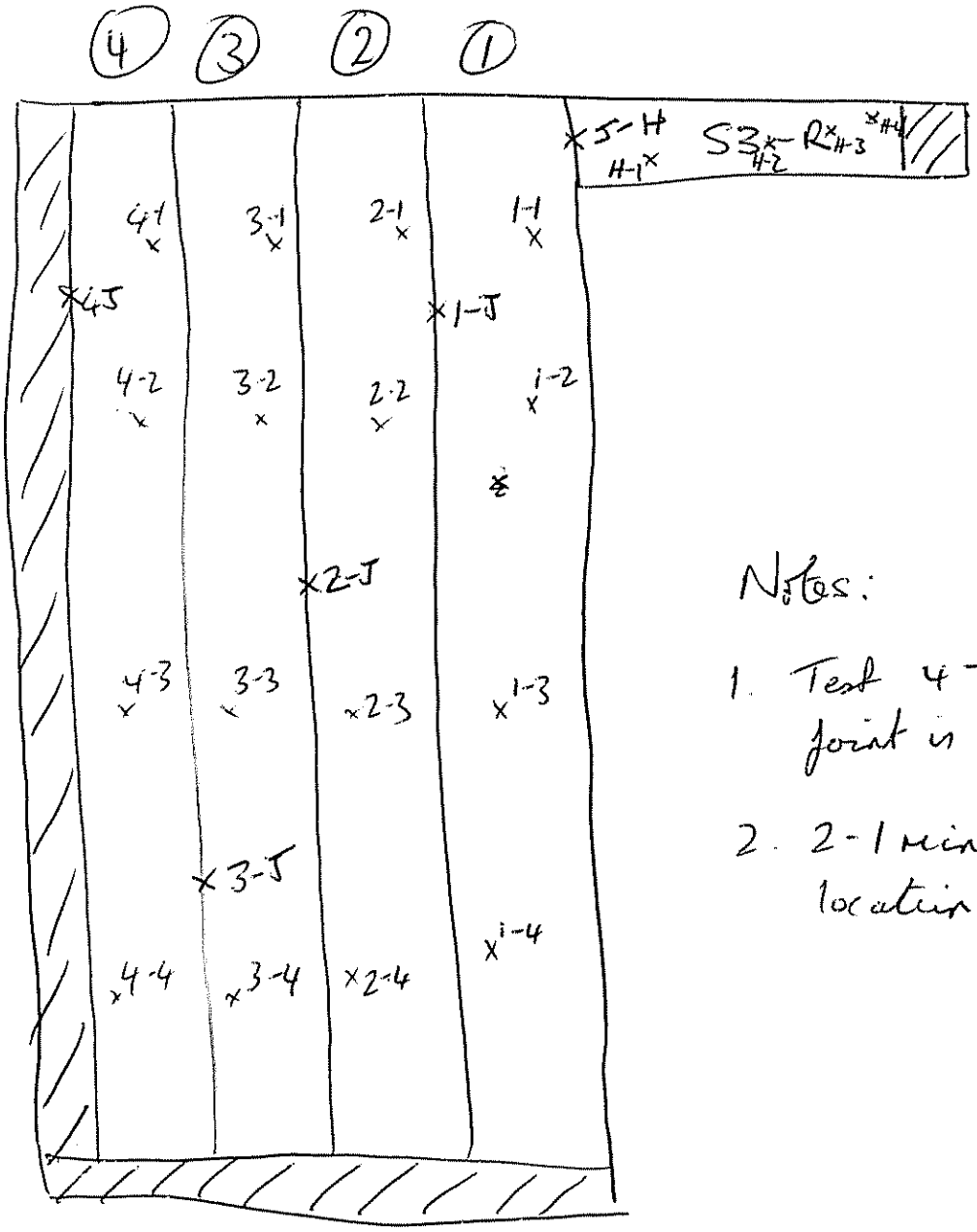
Firm: Kleinfelder Wilder Representative:

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form

Note: Correlation between air voids and hydraulic conductivity was established during mix design

27 Oct 06

Day 2



Notes:

1. Test 4-J when joint is completed
2. 2-1 min counts - per location

(44)
88
132
176

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/24/06
Job: TA-73 - 71610 - R1

	Time		Test Point #	Station Location	Test Location	Lift C	Density	% Air Void	Comments
1			H-1	Header	H-1	140.7	97.0	3.0	Tests on placement
2			H-1		H-1	140.9	97.1	2.9	from 10/23/06
3			H-2		H-2	141.3	97.4	2.6	
4			H-2		H-2	140.4	96.8	3.2	
5			H-3		H-3	142.6	98.3	1.7	
6			H-3		H-3	141.9	97.8	2.2	
7			H-4		H-4	141.1	97.3	2.7	
8			H-4		H-4	140.8	97.1	2.9	
9			J-6		J-6	140.9	97.1	2.9	
10			J-6		J-6	140.2	96.7	3.3	
11			1-1	Pad #1	1-1	142.1	98.0	2.0	
12			1-1		1-1	141.6	97.6	2.4	
13			1-J		1-J	141.1	97.3	2.7	
14			1-J		1-J	141.5	97.6	2.4	
15			1-2		1-2	142.8	98.4	1.6	
16			1-2		1-2	143.3	98.8	1.2	
17			1-3		1-3	141.9	97.8	2.2	
18			1-3		1-3	141.0	97.2	2.8	
19			1-4		1-4	141.4	97.5	2.5	
20			1-4		1-4	140.7	97.0	3.0	
21			2-4	Pad #2	2-4	144.1	99.3	0.7	
22			2-4		2-4	144.7	99.8	0.2	
23			2-3		2-3	141.1	97.3	2.7	
24			2-3		2-3	141.5	97.6	2.4	
25			2-J		2-J	140.5	96.9	3.1	
					Average				

General Notes / Comments:

Correction of -2.7 lbs used. Bin used (GMM = 145.05 from 10/24/06)

QC Technician: Mark Torrez (Print Name) Signature: [signature] Date: 10/24/06

Firm: Klenfilder Wilder Representative: N/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form

Note: Correlation between air voids and hydraulic conductivity was established during mix design

27 Oct 06

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/24/06
Job: TA-73 - 71610-1

	Time		Lift/Panel	Station Location	Test Location	Test Results: Lbs/CF	% Density	% Air Voids	Comments
1			2-5	Pad #2	2-5	140.9	97.1	2.9	Tests on placement
2			2-2		2-2	142.7	98.4	1.6	from 10/23/06
3			2-2		2-2	142.0	97.9	2.1	
4			2-1		2-1	142.9	98.5	1.5	
5			2-1		2-1	143.4	98.9	1.1	
6			3-1	Pad #3	3-1	145.0	99.9	0.1	
7			3-1		3-1	144.2	99.4	0.6	
8			3-2		3-2	144.0	99.3	0.7	
9			3-2		3-2	142.2	98.2	1.5	
10			3-3		3-3	143.7	99.1	0.9	
11			3-3		3-3	144.2	99.4	0.6	
12			3-5		3-5	140.8	97.1	2.9	
13			3-5		3-5	141.0	97.2	2.8	
14			3-4		3-4	141.7	97.7	2.3	
15			3-4		3-4	140.9	97.1	2.9	
16			4-5	Panel #4	4-5	140.6	96.9	3.1	
17			4-5		4-5	140.8	97.1	2.9	
18			4-4		4-4	144.2	99.4	0.6	
19			4-4		4-4	143.6	99.0	1.0	
20			4-3		4-3	141.9	97.8	2.2	
21			4-3		4-3	141.2	97.3	2.7	
22			4-2		4-2	141.8	97.8	2.2	
23			4-2		4-2	142.3	98.1	1.9	
24			4-1		4-1	145.1	100	0.0	
25			4-1		4-1	144.7	99.8	0.2	
					Average				

General Notes / Comments:

Correction of -2.7 lbs used. Bulk used (GMM = 145.05 from 10/23/06)

QC Technician: Mark Torrez (Print Name) Signature: [signature] Date: 10/24/06

Firm: Klemfilder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/24/06
Job: TA-73 - 71610 - 1

	Time	Pass/Panel	Station Location	Test Location	Lbs/Cf	Test Results % Density	% Air Voids	Comments
1		5-1	Panel #5	5-1	143.3	98.8	1.2	Tests on placement
2		5-1		5-1	142.8	98.4	1.6	from 10/23/06
3		5-J		5-J	141.3	97.4	2.6	
4		5-J		5-J	141.8	97.8	2.2	
5		5-2		5-2	144.2	99.4	0.6	
6		5-2		5-2	144.7	99.8	0.2	
7		5-3		5-3	141.0	97.2	2.8	
8		5-3		5-3	141.7	97.7	2.3	
9		5-4		5-4	145.1	100.0	0.0	
10		5-4		5-4	144.6	99.7	0.3	
11		6-4	Panel #6	6-4	144.3	99.5	0.5	
12		6-4		6-4	143.9	99.2	0.8	
13		6-3		6-3	143.1	98.7	1.3	
14		6-3		6-3	142.8	98.4	1.6	
15		6-2		6-2	143.6	99.0	1.0	
16		6-2		6-2	143.0	98.6	1.4	
17		6-1		6-1	142.2	98.0	2.0	
18		6-1		6-1	144.1	99.3	0.7	
19		Below are Panels Adjacent to two-way						
20		1-1	Panel #1	1-1	144.4	99.6	0.4	
21		1-1		1-1	143.9	99.2	0.8	
22		1-2		1-2	145.2	100.1	-0.1	
23		1-2		1-2	144.5	99.6	0.4	
24		1-3		1-3	141.9	97.8	2.2	
25		1-3		1-3	140.9	97.1	2.9	
				Average				

General Notes / Comments:

Correction of -2.7 lbs used. Blue used (GMM = 145.05 from 10/23/06)

QC Technician: Mark Torrez (Print Name) Signature: [signature] Date: 10/24/06

Firm: Klenfilder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/24/06
Job: TA-73 - 71610 - R1

	Time		Pass/Partial	Station Location	Test Location	LB/CF	% Density	% Air Voids	Comments
1			1-4	Panel #1	1-4	143.4	98.9	1.1	Tests on placement
2			1-4	↓	1-4	142.6	98.3	1.7	from 10/23/06
3			2-4	Panel #2	2-4	141.8	97.8	2.2	
4			2-4		2-4	142.1	98.0	2.0	
5			2-3		2-3	142.1 ~~139.6~~	98.0	2.0	
6			2-3		2-3	142.6	98.3	1.7	
7			2-2		2-2	140.7	97.0	3.0	
8			2-2		2-2	141.3	97.4	2.6	
9			2-1		2-1	140.6	96.9	3.1	
10			2-1		2-1	141.1	97.3	2.7	
11			1-5		1-5	139.8	96.4	3.6	
12			1-5	↓	1-5	140.9	97.1	2.9	
13			3-1	Panel #3	3-1	142.9	98.5	1.5	
14			3-1		3-1	140.7	97.0	3.0	
15			3-2		3-2	142.4	98.2	1.8	
16			3-2		3-2	141.8	97.8	2.2	
17			2-5		2-5	140.3	96.7	3.3	
18			2-5		2-5	141.0	97.2	2.8	
19			3-3		3-3	144.0	99.3	0.7	
20			3-3		3-3	143.2	98.7	1.3	
21			3-5		3-5	139.6	96.2	3.8	
22			3-5		3-5	141.0	97.2	2.8	
23			3-4		3-4	140.9	97.1	2.9	
24			3-4	↓	3-4	141.3	97.4	2.6	
25									
				Average					

General Notes / Comments:

Correction of -2.7 lbs used. Rice used (GMM = 145.05 from 10/2/06)

QC Technician: Mark Torrez
Print Name

Signature: [signature]

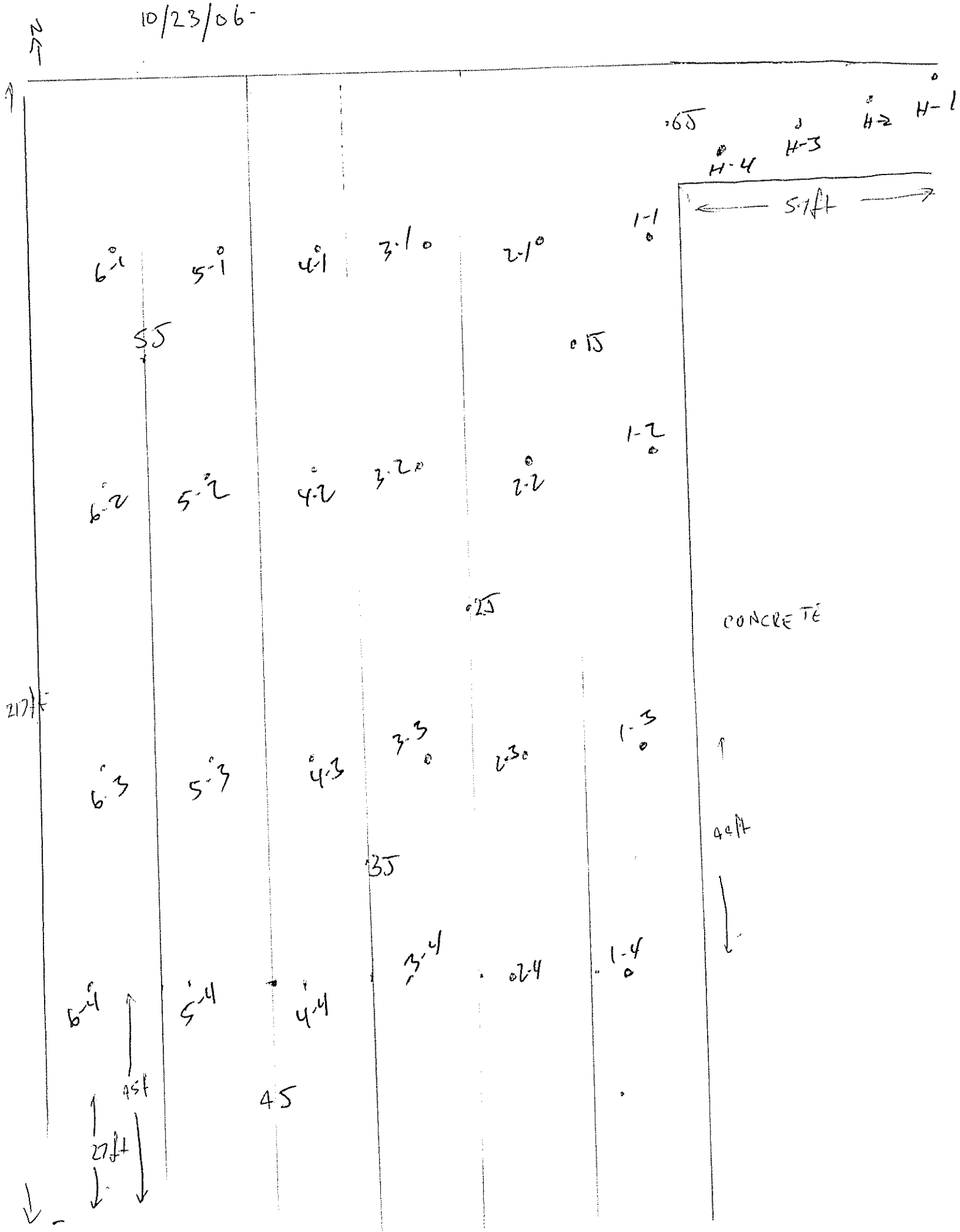
Date: 10/24/06

Firm: Klenfelder

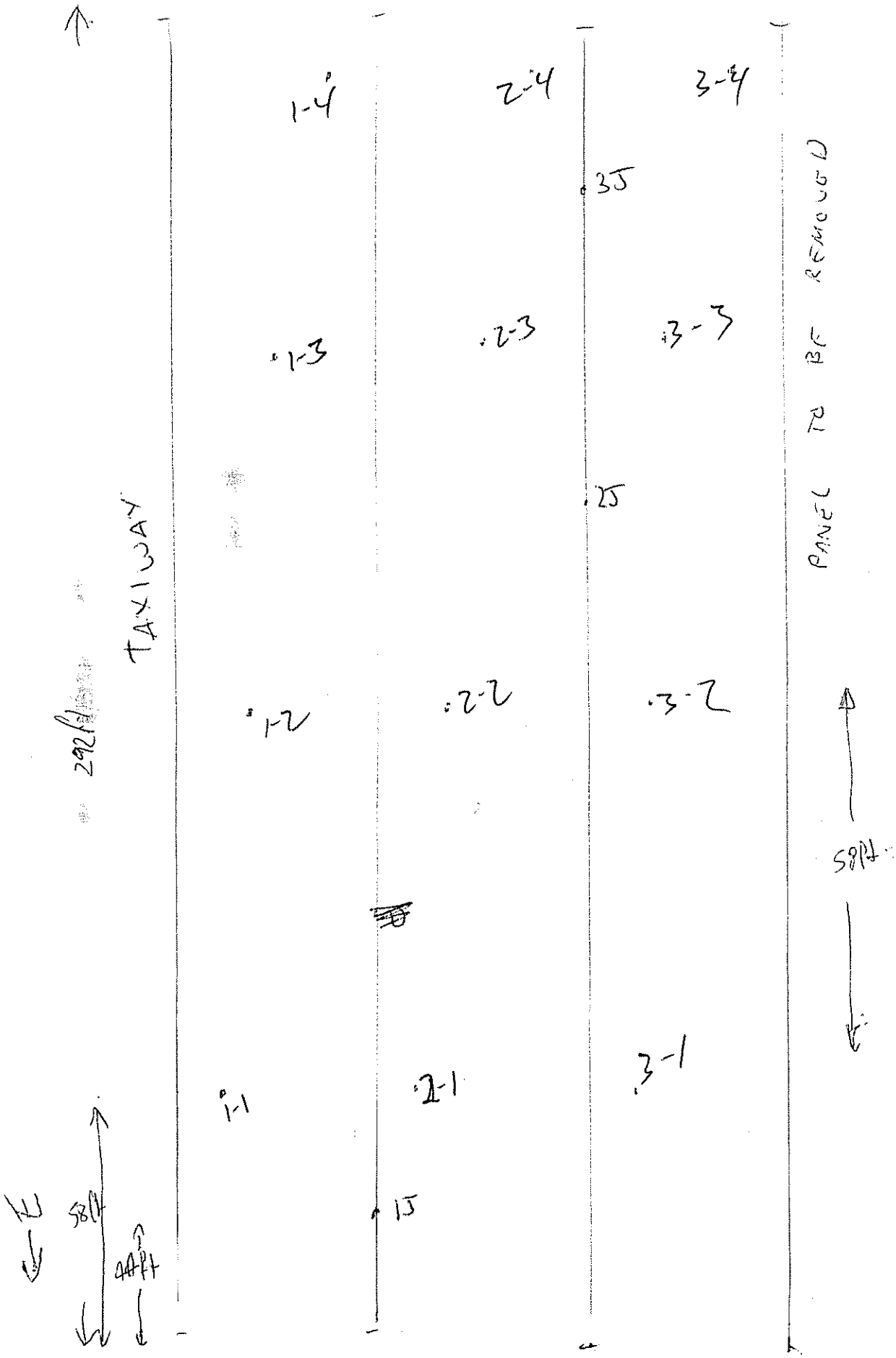
Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

10/23/06


N
.65
H-1
H-2
H-3
H-4
5.7ft
1-1
3.1
2.1
6.1
5.1
4.1
.55
.15
1-2
3.2
2.2
6.2
5.2
4.2
.25
CONCRETE
21.7ft
1.3
3.3
2.3
6.3
5.3
4.3
4.6ft
.35
1.4
3.4
.2.4
6.4
5.4
4.4
4.5ft
4.5
27ft

10/23/06

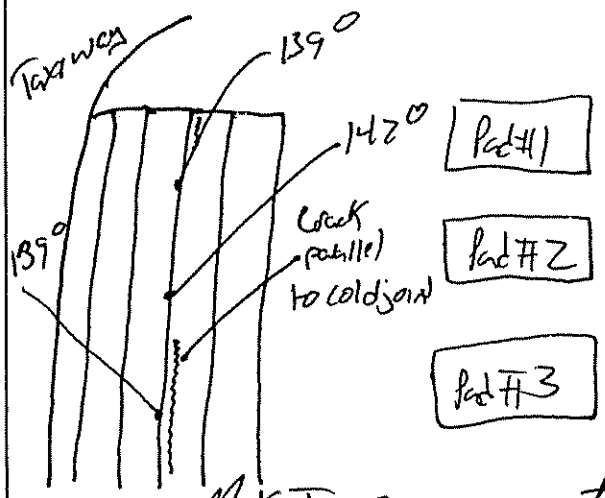

1-4
2-4
3-4
35
1-3
2-3
3-3
25
TAXIWAY
292 ft
1-2
2-2
3-2
PANEL TO BE REMOVED
58 ft
1-1
2-1
3-1
15
58 ft
44 ft

MatCon Panel Placement and Compaction
MatCon Construction Quality Control

Panel Placement and Compaction	Job: 71610-1A		Date: 10/25/06	
Activity	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**
Verify panel is within specifications (*Note 1)	10:50A / 12' / 4.75"	11:30A / 12' / 4.75"		
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Verify uniform and thorough compaction (*Note 2)	10:50A / Complied	11:20A / Complied		
	Panel/Time/Density	**Panel/Time/Density**	**Panel/Time/Density**	**Panel/Time/Density**
Field density of compacted panel (*Note 3)	#1 / /	#3 / /		
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Inspect cold joints (if any) (*Note 4)	10:50A / non-complied	11:30A / complied		

***Note 1:** Unless otherwise directed by WILDER or specified in the plans, the nominal compacted depth of dense or open graded MatCon shall be four (4) inches. The panel width shall be as specified in the plans or approved by Wilder.
***Note 2:** The compacted course shall be smooth, in conformance with the line, grade, and cross-section shown in the plans or as directed by Wilder, and free of irregularities. Roller compaction shall prevent thinning near panel edges.
***Note 3:** The field density of the compacted MatCon shall be measured using a nuclear gage in accordance with ASTM D2950. The nuclear density shall be within specifications as directed by Wilder. Air void percentage shall be three (3) percent or less, or as approved by Wilder.
***Note 4:** Cold joints are to be avoided by keeping paving panels short enough so that the start of a new panel is placed against a joint that is still hot and not yet compacted. At the end of a work shift or when a break in paving activity is anticipated, the cold joint shall be configured, constructedand finished as directed by Wilder or as specified in the plans. All cold joints shall be located on the site lay-out plan with coordinates identified for future identification. Cold joint cross-section sketch shall be provided below.

Inspector Notes:



QC Technician: Mark Tomez (Print Name) _____ (Signature) Date: 10/24/06

Firm: Kleinfelder Wilder Representative: n/a Date n/a

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/25/06
Job: TA-73 71610-1A

	Min.	Max.	Test Point #	Station Location	Test Location	Lab C	Lab Density	% Air Voids	Comments
1			1-5	Pad #1	1-5	140.7	97.0	3.0	
2			1-5		1-5	141.9	97.8	2.2	
3			1-1		1-1	144.2	99.4	0.6	
4			1-1		1-1	143.6	99.0	1.0	
5			1-2		1-2	147.1	98.0	2.0	
6			1-2		1-2	142.6	98.3	1.7	
7			1-3		1-3	141.3	97.4	2.6	
8			1-3		1-3	143.8	99.1	0.9	
9			1-4		1-4	144.1	99.3	0.7	
10			1-4		1-4	141.2	97.3	2.7	
11			2-4	Pad #2	2-4	142.9	98.5	1.5	
12	✓		2-4		2-4	142.2	98.0	2.0	✓
13			2-3		2-3	143.9	99.2	0.8	
14			2-3		2-3	142.6	98.3	1.7	
15			2-2		2-2	144.1	99.3	0.7	
16			2-2		2-2	143.7	99.1	0.9	
17			2-5		2-5	144.3	99.5	0.5	
18			2-5		2-5	144.0	99.3	0.7	
19			2-1		2-1	141.6	97.6	2.4	
20			2-1		2-1	142.0	97.9	2.1	
21			3-1	Pad #3	3-1	143.7	99.1	0.9	
22			3-1		3-1	142.9	98.5	1.5	
23			3-2		3-2	140.8	97.1	2.9	—
24			3-2		3-2	141.5	97.6	2.4	
25			3-5		3-5	142.6	98.3	1.7	
					Average				

General Notes / Comments:

Correction of -2.7 lbs used

GMM = 145.05

QC Technician: Mark Tomz
Print Name

Signature: M Tomz

Date: 10/25/06

Firm: Kleinfelder

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

10/27/06

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/25/06
Job: TA-73 71610-1A

	Time		Panel	Station Location	Test Location	Lbs/Cf	% Density	% Air Voids	Comments
1			3-J	Pavel #3	3-J	141.0	97.2	2.8	
2			3-3		3-3	141.9	97.8	2.2	
3			3-3		3-3	142.2	98.0	2.0	
4			3-4		3-4	140.7	97.0	3.0	
5			3-4		3-4	141.0	97.2	2.8	
6			4-4	Pavel #4	4-4	143.1	98.7	1.3	
7			4-4		4-4	142.5	98.2	1.8	
8			4-J		4-J	141.1	97.3	2.7	
9			4-J		4-J	141.8	97.8	2.2	
10			4-3		4-3	142.9	98.5	1.5	
11			4-3		4-3	141.8	97.8	2.2	
12			4-2		4-2	144.0	99.3	0.7	
13			4-2		4-2	142.6	98.3	1.7	
14			4-1		4-1	141.3	97.4	2.6	
15			4-1		4-1	141.8	97.8	2.2	
16			5-1	Pavel #5	5-1	142.3	98.1	1.9	
17			5-1		5-1	141.9	97.8	2.2	
18			5-2		5-2	142.2	98.0	2.0	
19			5-2		5-2	140.8	97.1	2.9	
20			5-3		5-3	142.3	98.1	1.9	
21			5-3		5-3	143.0	98.6	1.4	
22			5-4		5-4	141.7	97.7	2.3	
23			5-4		5-4	142.5	98.2	1.8	
24			5-J		5-J	142.9	98.5	1.5	
25			5-J		5-J	141.6	97.6	2.4	
					Average				

General Notes / Comments:

Correction of -2.7 lbs used

GMM = 145.05

QC Technician: Mark Tomz
Print Name

Signature: [signature] Date: 10/25/06

Firm: Kleinfelder

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/25/06
Job: TA-73 71610-1A

	Time		Pass/Panel	Station Location	Test Location	Lot Density	% Density	% Air Voids	Comments
1			6-4	Panel #6	6-4	143.8	99.1	0.9	
2			6-4		6-4	143.1	98.7	1.3	
3			6-3		6-3	143.5	98.9	1.1	
4			6-3		6-3	142.2	98.0	2.0	
5			6-2		6-2	141.7	97.7	2.3	
6			6-2		6-2	141.4	97.5	2.5	
7			6-5		6-5	143.4	98.9	1.1	
8			6-5		6-5	142.8	98.4	1.6	
9			6-1		6-1	141.9	97.8	2.2	
10			6-1		6-1	142.4	98.2	1.8	
11			7-1	Panel #7	7-1	144.1	99.3	0.7	
12			7-1		7-1	144.7	99.8	0.2	
13			7-2		7-2	142.6	98.3	1.7	
14			7-2		7-2	143.1	98.7	1.3	
15			~~7-6~~ 7-5		7-5	140.6	96.9	3.1	
16			7-5		7-5	141.0	97.2	2.8	
17			7-3		7-3	144.1	99.3	0.7	
18			7-3		7-3	143.6	99.0	1.0	
19			7-4		7-4	142.2	98.0	2.0	
20			7-4		7-4	142.9	98.5	1.5	
21			8-4	Panel #8	8-4	141.4	97.5	2.5	
22			8-4		8-4	141.8	97.8	2.2	
23			8-5		8-5	141.1	97.3	2.7	
24			8-5		8-5	141.5	97.6	2.4	
25			8-3		8-3	142.6	98.3	1.7	
					Average				

General Notes / Comments:

Correction of -2.7 lbs used

GMM = 145.05

QC Technician: Mark Tomz
Print Name

Signature: M Tomz

Date: 10/25/06

Firm: Kleinfelder

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

RJS 7/12/06

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/25/06
Job: TA-73 71610-1A

	Time		Passi Panel #	Station Location	Test Location	Lab Results: Lab/C	% Density	% Air Voids	Comments
1			8-3	panel #8	8-3	141.8	97.8	2.2	
2			8-2		8-2	144.0	99.3	0.7	
3			8-2		8-2	143.1	98.7	1.3	
4			8-1		8-1	143.1	98.7	1.3	
5			8-1		8-1	142.5	98.2	1.8	
6			9-1	panel #9	9-1	145.0	100	0.0	
7			9-1		9-1	144.6	99.7	0.3	
8			9-2		9-2	145.2	100.1	-.1	
9			9-2		9-2	144.4	99.6	0.4	
10			9-3		9-3	143.7	99.1	0.9	
11			9-3		9-3	143.2	98.7	1.3	
12			9-4		9-4	142.0	97.9	2.1	
13			9-4		9-4	142.7	98.4	1.6	
14			9-5		9-5	143.3	98.8	1.2	
15			9-5		9-5	142.5	98.2	1.8	
16			10-4	Panel #10	10-4	141.0	97.2	2.8	
17			10-4		10-4	141.9	97.8	2.2	
18			10-3		10-3	141.3	97.4	2.6	
19			10-3		10-3	142.3	98.1	1.9	
20			10-2		10-2	140.9	97.1	2.9	
21			10-2		10-2	141.8	97.8	2.2	
22			10-5		10-5	141.9	97.8	2.2	
23			10-5		10-5	141.0	97.2	2.8	
24			10-1		10-1	143.2	98.7	1.3	
25			10-1		10-1	144.0	99.3	0.7	
					Average				

General Notes / Comments:

Correction of -2.7 lbs used

GMM = 145.05

QC Technician: Mark Tontz
Print Name

Signature: M

Date: 10/25/06

Firm: Kleinfelder

Wilder Represenlative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

RAS 27 Oct 06

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/25/06
Job: TA-73 71610-1A

	Unacc.	Passing	Lift	Station Location	Test Location	Lab Gm	% Density	% Air Voids	Comments
1			11-1	Pad #11	11-1	142.6	97.3	1.7	
2			11-1		11-1	143.4	97.9	1.1	
3			11-2		11-2	144.0	98.3	0.7	
4			11-2		11-2	143.1	97.7	1.3	
5			11-3		11-3	141.5	97.6	2.4	
6			11-3		11-3	142.9	97.5	1.5	
7			11-5		11-5	141.3	97.4	2.6	
8			11-5		11-5	142.1	97.0	2.0	
9			11-4		11-4	141.1	97.3	2.7	
10			11-4		11-4	142.9	97.5	1.5	
11			~~12-5~~	~~Pad #11~~	~~12-5~~				
12			~~12-5~~		~~12-5~~	~~142.9~~	~~97.5~~	~~1.5~~	
13			12-5	Pad #11	12-5	142.0	97.9	2.1	
14			12-5		12-5	140.8	97.1	2.9	
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
					Average				

General Notes / Comments:

Correction of -2.7 lbs used GMM = 145.05

QC Technician: Mark Tomez
Print Name

Signature: [signature] Date: 10/25/06

Firm: Kleinfelder

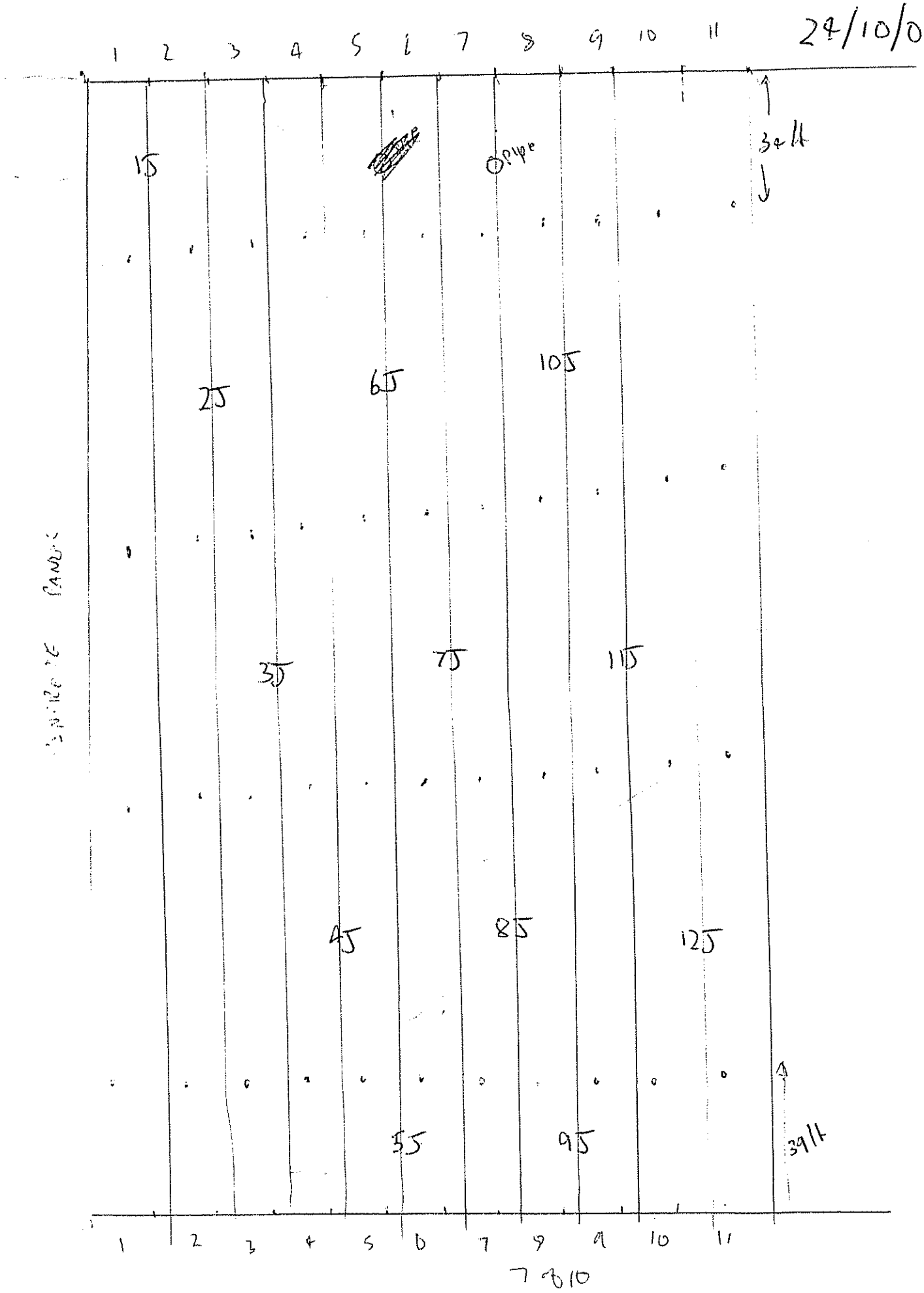
Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

27 Oct 06

→E CAID

24/10/06



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MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/25/06
Job: TA-73 71610-1A

	Time	Test Panel	Station Location	Test Location	Lbs/Cf	% Density	% Air Voids	Comments
1	9:45A	#1	center of panel	#1	147.6	98.3	1.7	
2	9:45	#1	NE corner of Panel	#1	143.6	99.0	1.0	
3	10:20A	#2	center of panel	#2	141.7	97.7	2.3	
4	10:20A	#2	SW corner of panel	#2	143.9	99.2	0.8	
5	10:30A	#3	NW corner of panel	#3	141.3	97.4	2.6	
6	10:30A	#3	SE corner of panel	#3	142.3	98.1	1.9	
7	11:15A	#4	center of panel	#4	141.5	97.6	2.4	
8	11:15A	#4	NW corner of panel	#4	140.9	97.1	2.9	
9	12:00P	#5	SW corner of panel	#5	147.9	98.5	1.5	
10	12:00P	#5	center of panel	#5	141.8	97.8	2.2	
11					143.4	98.9	1.1	
12			Tests below are taken on cold		joint	between	panel on	10/23/06
13			and today's panel #1		141.9	97.8	2.2	
14	10:20A	#1	Joint	#1	142.7	98.4	1.6	
15	10:22A	#1	Joint	#1	147.3	98.1	1.9	
16	10:22A	#1	Joint	#1	139.6	96.2	3.8	
17	10:25A	#1	Joint	#1	141.5	97.6	2.4	
18	~~10:25A~~	~~#1~~	~~Joint~~	~~#1~~				
19			Tests below are taken on today's		Production			
20	2:00P	#6	west end of panel	#6	144.3	99.5	0.5	
21	2:00P	#6	Center of panel	#6	142.0	97.9	2.1	
22	2:15	#7	West end of panel	#7	141.1	97.3	2.7	
23	2:15	#7	center of panel	#7	142.6	98.3	1.7	
24	3:45P	#8	Center of panel	#8	143.9	99.2	0.8	
25	3:50P	#9	Center of panel	#9	143.2	98.7	1.3	
				Average				

General Notes / Comments:

tests taken use -2.7 lb correction GMM = Rice 145.05

QC Technician: Mark Tamez (Print Name) Signature: [signature] Date: 10/25/06

Firm: Kleinfelder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon HMA Delivery Tracking Form
MatCon Construction Quality Control

Date: 10/25/06
Job: 71610 1-A

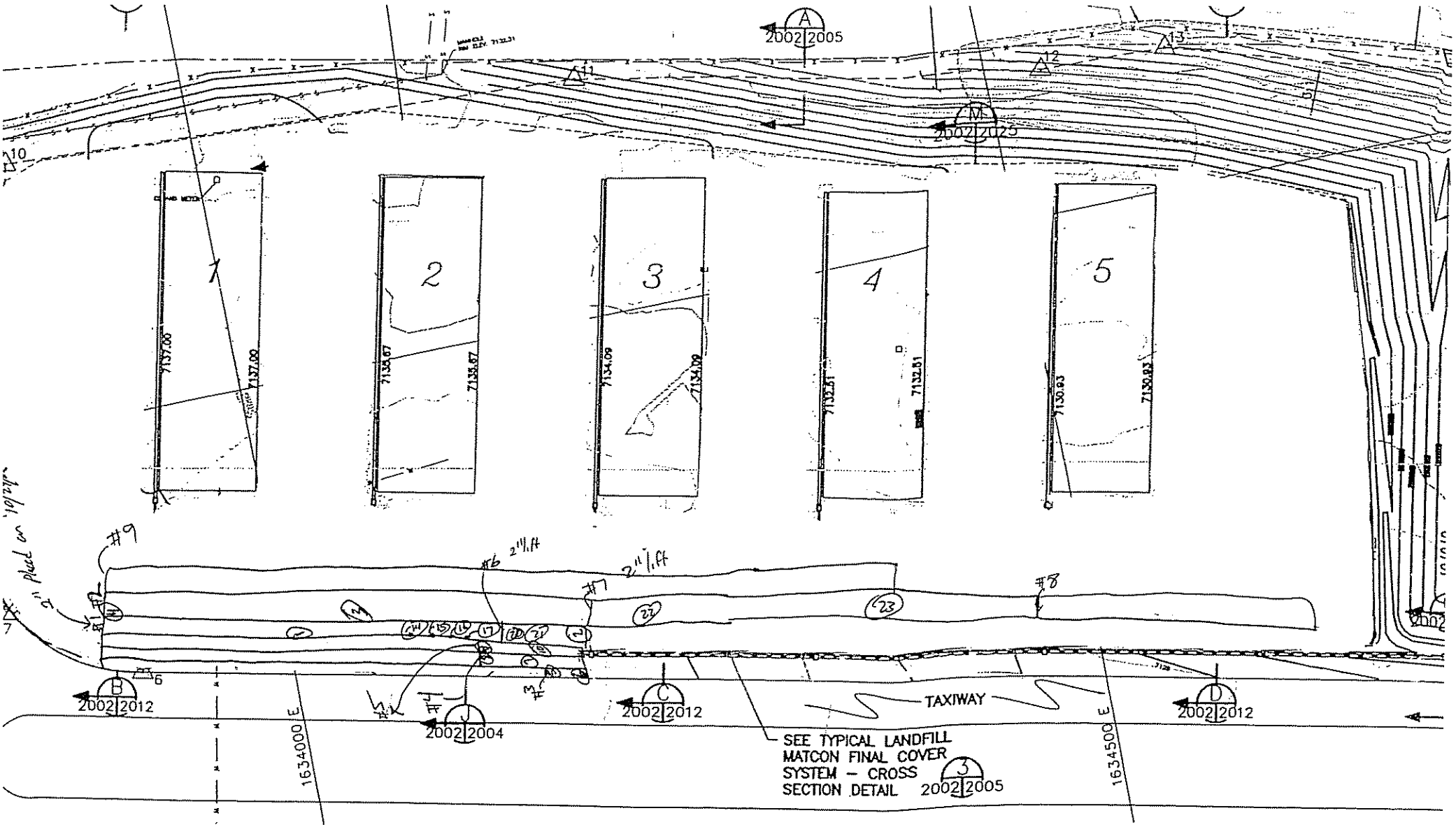
	Time Origin	Weigh Ticket	Temperature (°F) at Delivery	Tons Lbs. Delivered	Load/Grid ID Placement Location	Time Placed	Temperature (°F) Placed	Comments
1	8:20	183309	332°	22.90		8:21	331°	
2	8:20	183310	339°	22.45		8:23	338°	
3	8:30	183311	334°	22.70		8:32	333°	
4	8:30	183312	338°	22.65		8:34	337°	
5	8:45	183313	340°	22.25		8:46	339°	
6	8:45	183314	338°	22.80		8:48	337°	
7	9:00	183315	329°	22.75		9:02	328°	
8	9:10	183318	332°	22.50		9:13	332°	
9	9:31	183320	320°	22.60		9:50	319°	
10	11:00	183321	330°	23.35		2:10	329°	
11	11:00	183324	331°	22.00		2:20	330°	
12	11:45	183325	329°	23.25		2:30	328°	
13	11:45	183326	334°	22.40		2:36	333°	
14	11:57	183327	338°	23.15		2:45	337°	
15	11:58	183329	334°	22.60		2:47	333°	
16	12:05	183330	328°	23.20		2:50	327°	
17	12:07	183331	332°	22.80		2:58	330°	
18	12:08	183332	335°	22.60		3:10	334°	
19	12:45	183333	339°	22.70		3:20	338°	
20	2:20	183334	341°	22.75		3:30	340°	
21								
22								
23								
24								
25								
			Total Lbs.					
			Total Tons					

General Notes / Comments:

QC Technician: Joshua Zemke (Print Name) Signature: Joshua Zemke Date: 10/25/06

Firm: Klein Felder Wilder Representative:

Attached: Truck Weigh Tickets
Attached: Map / Site Plan



PLAN
1"=50'

10 of 10

TOP OF CAP CONTROL POIN

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/26/06
Job: TA-73 71610-1A

	Initial	Test Point	Station Location	Test Location	Lab Density	% Density	% AV Voids	Comments
1		Core #1	110' South, 37' E of SE		141.7	97.7	2.3	Tests taken on
2		Core #1	Corner of Pad #1		140.9	97.1	2.9	core locations
3		Core #2	↓	↓	141.0	97.2	2.8	
4		Core #2	↓	↓	141.4	97.5	2.5	
5		Core #3	30' E, 82' North of		141.0	97.2	2.8	
6		Core #3	SE corner of Pad #1		140.7	97.0	3.0	
7	CW	Core #4	↓	↓	143.5	98.9	1.1	
8		Core #4	↓	↓	142.9	98.5	1.5	
9		Core #5	22' W, 94' N of SW		144.1	99.3	0.7	
10		Core #5	Corner of Pad #3	CW	143.6	99.0	1.0	CW
11		Core #6	↓	↓	145.0	100.0	0.0	
12		Core #6	↓	↓	144.7	99.8	0.2	
13		Core #7	20' W, 68' N of SW		141.9	97.8	2.2	
14		Core #7	Corner of Pad #4		140.9	97.1	2.9	
15		Core #8	↓	↓	142.5	98.3	1.7	
16		Core #8	↓	↓	142.0	97.9	2.1	
17		Core #9	22' W, 78' S of		141.9	97.8	2.2	
18		Core #9	NE Corner of Pad #4		142.5	98.2	1.8	
19		Core #10	↓	↓	141.0	97.2	2.8	
20		Core #10	↓	↓	141.8	97.8	2.2	
21		Core #11	32' E, 48' N of		142.3	98.1	1.9	
22		Core #11	SE corner of Pad #5		141.7	97.7	2.3	
23		Core #12	↓	↓	141.5	97.6	2.4	
24		Core #12	↓	↓	141.8	97.8	2.2	
25								
				Average				

General Notes / Comments:

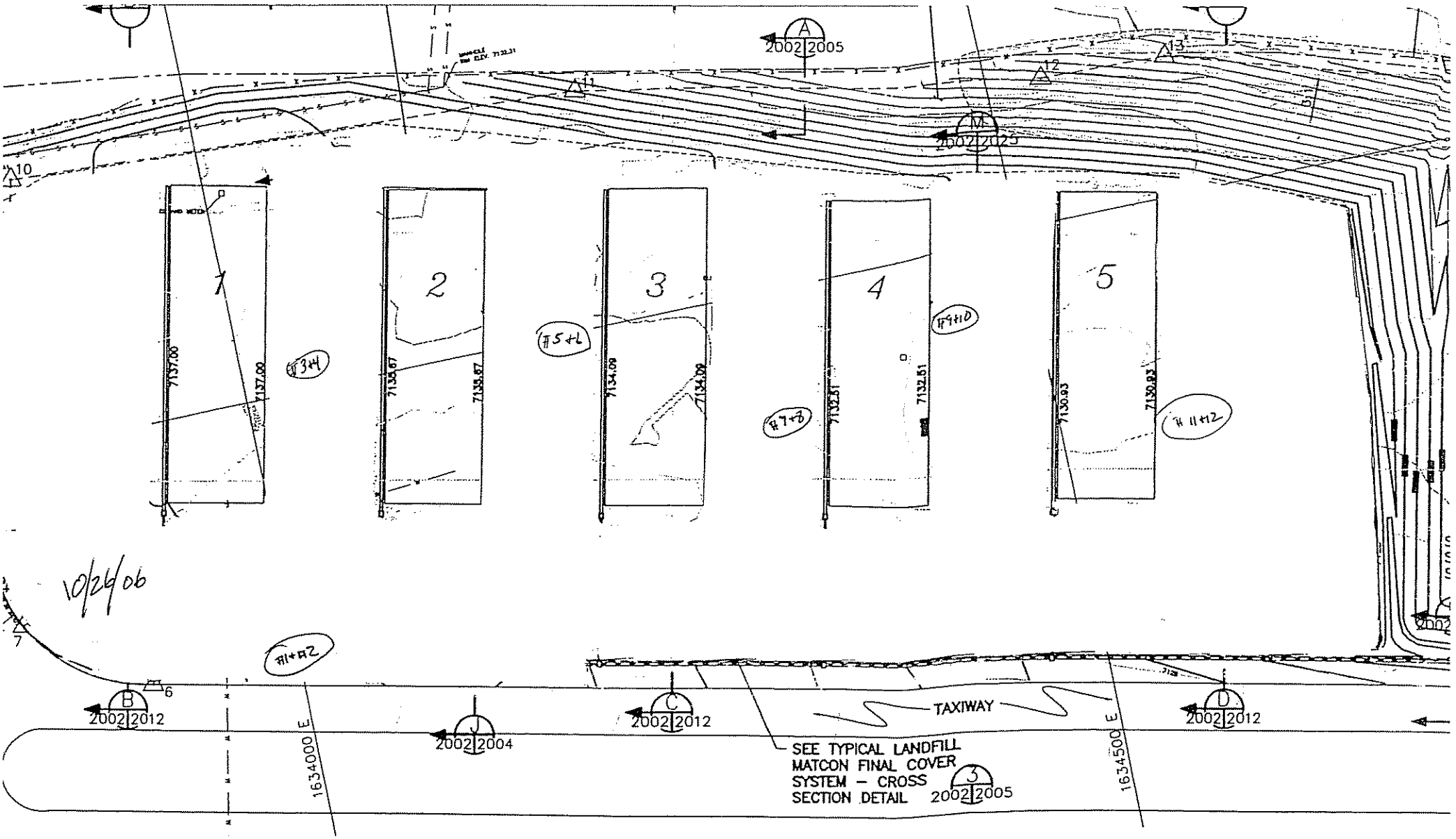
Correction of -2.7 lbs used GMM = 145.05

QC Technician: Mark Tomez (Print Name) Signature: MT Date: 10/26/06

Firm: Kleinfelder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

27 Oct 06


A
2002|2005
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5
7137.00
7137.00
7135.67
7135.67
7134.09
7134.09
7132.51
7132.51
7130.93
7130.93
#3+4
#5+6
#7+8
#9+10
#11+12
10/26/06
#1+2
6
B
2002|2012
2002|2004
C
2002|2012
D
2002|2012
TAXIWAY
1634000 E
1634500 E
SEE TYPICAL LANDFILL
MATCON FINAL COVER
SYSTEM – CROSS
SECTION DETAIL
3
2002|2005

PLAN
1"=50'

282

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/26/06
Job: TA-73 7161D -1A

	Time	Field Panel	Station Location	Test Location	Lab Results: Lab Cert	% Density	% Air Voids	Comments
1		# 1-1	Panel #1	1-1	141.0	97.2	2.8	Tests taken
2		1-1		1-1	141.4	97.5	2.5	on material
3		1-2		1-2	141.8	97.8	2.2	placed 10/25/06
4		1-2		1-2	142.0	97.9	2.1	
5		1-5		1-5	140.7	97.0	3.0	
6		1-5		1-5	141.0	97.2	2.8	
7		2-1	Panel #2	2-1	142.6	98.3	1.7	
8		2-1		2-1	141.9	97.8	2.2	
9		2-5		2-5	142.9	98.5	1.5	
10	✓	2-5		2-5	143.3	98.8	1.2	
11		2-2		2-2	141.0	97.2	2.8	
12		2-2		2-2	141.5	97.6	2.4	
13		2-3		2-3	142.2	98.0	2.0	✓
14		2-3		2-3	142.9	98.5	1.5	
15		3-1	Panel #3	3-1	144.7	99.8	0.2	
16		3-1		3-1	144.1	99.3	0.7	
17		3-2		3-2	141.7	97.7	2.3	
18		3-2		3-2	141.2	97.3	2.7	
19		3-3		3-3	141.9	97.8	2.2	
20		3-3		3-3	142.3	98.1	1.9	
21		3-5		3-5	140.5	96.9	3.1	
22		3-5		3-5	141.3	97.4	2.6	
23		4-1	Panel # 4	4-1	143.6	99.0	1.0	
24		4-1		4-1	144.0	99.3	0.7	
25		4-2		4-2	141.0	97.2	2.8	
				Average				

General Notes / Comments:

Correction of -2.7 lbs used GMM = 145.05

QC Technician: Mark Tarez (Print Name) Signature: [signature] Date: 10/26/06

Firm: Klinkhammer Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/26/06
Job: TA-73 71610 -1A

	Time		Pass/Panel #	Station Location	Test Location	Lbs/Cu Ft	% Density	% Air Voids	Comments
1			4-2	Panel #4	4-2	140.8	97.1	2.9	Tests taken
2			4-3		4-3	141.4	97.5	2.5	on material
3			4-3		4-3	145.0	100	0.0	placed 10/25/06
4			4-4		4-4	144.2	99.4	0.6	
5			4-4		4-4	142.1	98.0	2.0	
6			4-5		4-5	142.8	98.4	1.6	
7			4-5		4-5	141.3	97.4	2.6	
8			6-1	Panel #6	6-1	142.0	97.9	2.1	
9			6-1		6-1	143.6	99.0	1.0	
10			6-2		6-2	142.8	98.4	1.6	
11			6-2		6-2	141.5	97.6	2.4	
12			6-3		6-3	142.1	97.0	2.0	
13			6-3		6-3	143.2	98.7	1.3	
14			6-4		6-4	143.7	99.1	0.9	
15			6-4		6-4	142.4	98.2	1.8	
16			5-1	Pnl #5	5-1	141.3	97.4	2.6	
17			5-1		5-1	142.8	98.4	1.6	
18			5-2		5-2	140.9	97.1	2.9	
19			5-2		5-2	145.2	100.1	-0.1	
20			5-3		5-3	144.6	99.7	0.3	
21			5-3		5-3	143.9	99.2	0.8	
22			5-4		5-4	141.4	97.5	2.5	
23			5-4		5-4	142.1	98.0	2.0	
24			5-5		5-5	142.4	98.2	1.8	
25			5-5		5-5	142.8	98.4	1.6	
					Average				

General Notes / Comments:

Correction of -2.7 lbs used GMM = 145.05

QC Technician: Mark Torrez
Print Name

Signature: [signature]

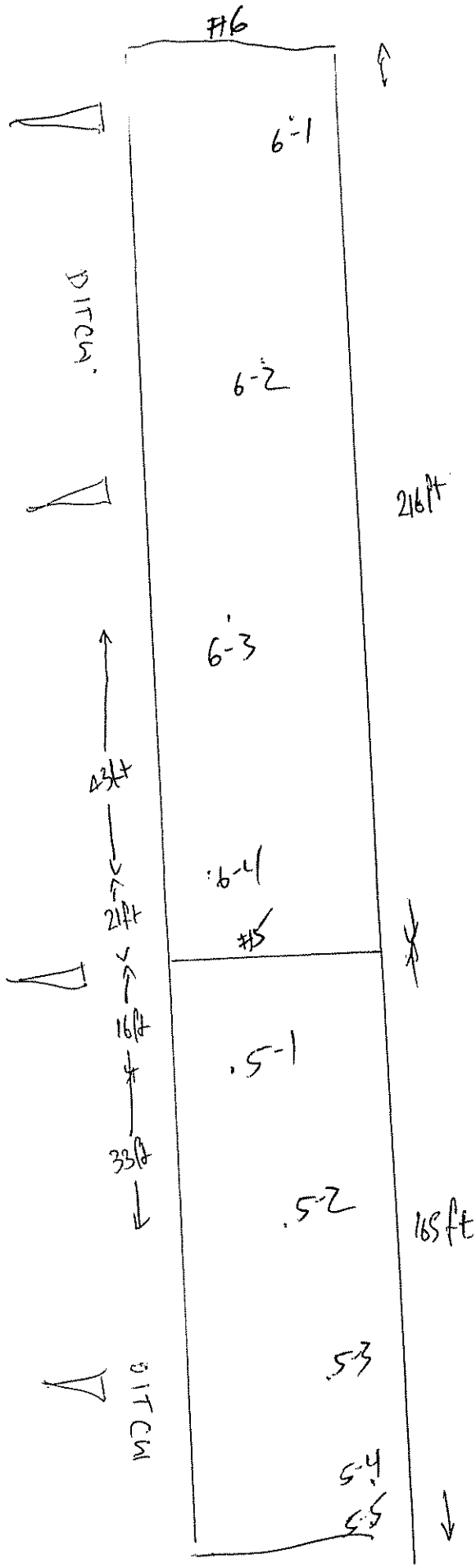
Date: 10/26/06

Firm: Klinkhiller

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

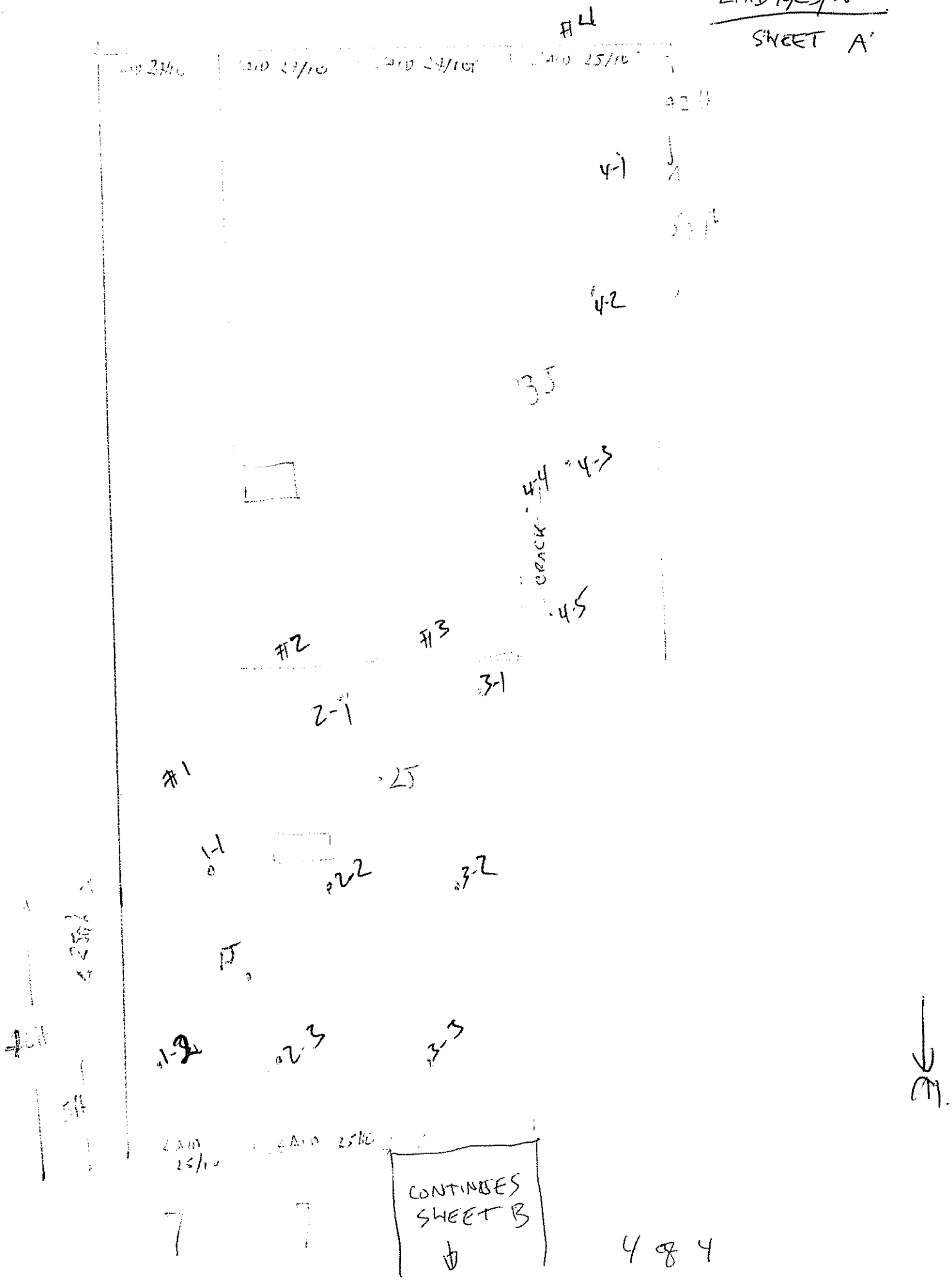
SHEET B
CAID 10/25/06



3 of 4

LAID 10/25/06

SHEET A'



MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/26/06
Job: TA-73 71610-1A

	Time	Paved Panel	Station Location	Test Location	Load	% Density	% Air Voids	Comments
1	10:15	#1	west end of panel	#1	142.6			Tests taken on
2	10:15	#1	center of panel	#1	141.8			material placed
3	11:36	#1	East end of panel	#1	143.1			10/26/06 (Today)
4	11:30	#2	West end of panel	#2	142.9			
5	12:16	#2	Center of panel	#2	142.4			
6	12:10	#2	East end of panel	#2	141.5			
7	12:45	#3	west end of panel	#3	140.8			
8	12:45	#3	center of panel	#3	142.7			
9	1:38	#3	east end of panel	#3	141.9			CC
10	1:38	#4	west end of panel	#4	141.8		CC	
11	2:11	#4	center of panel	#4	143.2			
12	2:11	#4	East end of panel	#4	142.9			
13	2:30	#5	west end of panel	#5	143.4			
14	2:30	#5	center of panel	#5	141.6			
15	2:45	#5	East end of panel	#5	142.8			
16	2:45	#6	west end of panel	#6	142.5			
17	3:00	#6	center of panel	#6	143.1			
18	3:00	#6	east end of panel	#6	142.4			
19								
20								
21				CC				
22								
23								
24								
25								
				Average				

General Notes / Comments:

Correction of -4.0 lbs used GMM = 145.05

QC Technician: Mark Torez (Print Name) Signature: [signature] Date: 10/26/06

Firm: Klenfelder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

27 OCT 06

MatCon HMA Delivery Tracking Form
MatCon Construction Quality Control

Date: 10/26/06
Job: TA-43 71610 1-A

	Time Order	Water Test	Temperature (°F) at Delivery	Lbs. Delivered	Location in Placement Location	Time Placed	Temperature (°F) Placed	Comments
1	8:48		341°			8:49	340°	
2	8:53		339°			8:54	338°	
3	8:58		342°			8:59	341°	CC
4	9:16		338°			9:17	337°	
5	9:45		339°			9:46	338°	
6	9:50		337°			9:52	336°	
7	9:53		343°			9:54	342°	
8	9:55		336°			9:56	376° ← 336°	
9	10:51		338°			10:52	338°	
10	11:03		341°			11:04	340°	
11	11:27		335°			11:28	335°	
12	11:58		343°			11:59	342°	
13	12:10		338°			12:11	337°	
14	12:17	CC	340°			12:18	339°	
15	1:37		335°			1:39	336°	
16	1:42		339°		CC	1:45	338°	
17	1:55		340°			1:57	339°	CC
18	2:33		333°			2:40	332°	
19	2:36		337°			2:47	336°	
20	2:59		339°			3:03	338°	
21	3:01		337°			3:33	337°	
22	3:07		340°			4:00	339°	
23	3:58		341°			4:57	341°	
24			CC					
25		CC					CC	
			Total Lbs.					
			Total Tons					

General Notes / Comments:

QC Technician: Joshua Zemke (Print Name) Signature: Joshua Zemke Date: 10/26/06

Firm: Klein Felder Wilder Representative: n/a

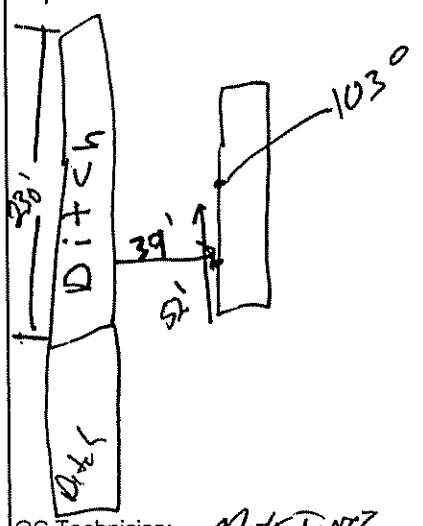
Attached: Truck Weigh Tickets
Attached: Map / Site Plan

MatCon Panel Placement and Compaction
MatCon Construction Quality Control

Panel Placement and Compaction	Job: 71610-17		Date: 10/26/06	
Activity	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**
Verify panel is within specifications (*Note 1)	10:15A / 12' / 4.75"	11:20A / 12' / 4.25"	1:45P / 12' / 4.5"	
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Verify uniform and thorough compaction (*Note 2)	10:45A / compliant	11:20A / compliant	1:45P / compliant	
	Panel/Time/Density	**Panel/Time/Density**	**Panel/Time/Density**	**Panel/Time/Density**
Field density of compacted panel (*Note 3)	#1 / 10:15 / 141.8	#3 / 11:45 / 142.7	#5 / 7:30 / 142.1	
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Inspect cold joints (if any) (*Note 4)	11:30A / nonconform	12:15P / compliant	8:45 / compliant	

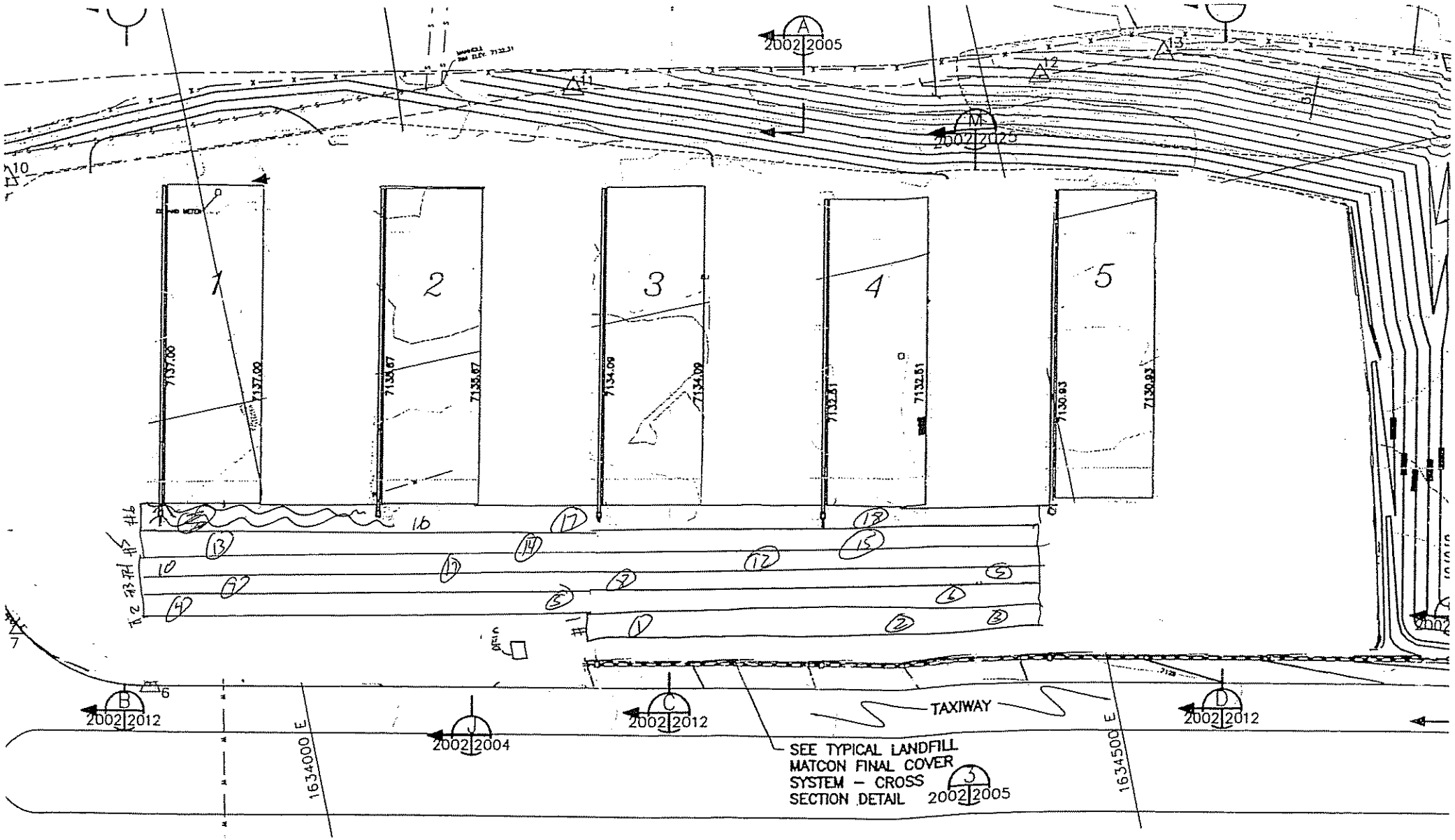
***Note 1:** Unless otherwise directed by WILDER or specified in the plans, the nominal compacted depth of dense or open graded MatCon shall be four (4) inches. The panel width shall be as specified in the plans or approved by Wilder.
***Note 2:** The compacted course shall be smooth, in conformance with the line, grade, and cross-section shown in the plans or as directed by Wilder, and free of irregularities. Roller compaction shall prevent thinning near panel edges.
***Note 3:** The field density of the compacted MatCon shall be measured using a nuclear gage in accordance with ASTM D2950. The nuclear density shall be within specifications as directed by Wilder. Air void percentage shall be three (3) percent or less, or as approved by Wilder
***Note 4:** Cold joints are to be avoided by keeping paving panels short enough so that the start of a new panel is placed against a joint that is still hot and not yet compacted. At the end of a work shift or when a break in paving activity is anticipated, the cold joint shall be configured, constructedand finished as directed by Wilder or as specified in the plans. All cold joints shall be located on the site lay-out plan with coordinates identified for future identification. Cold joint cross-section sketch shall be provided below.

Inspector Notes:



QC Technician: Mark Tonez (Print Name) _____ (Signature) Date: 10/26/06

Firm: Kleinfelder Wilder Representative: n/a Date n/a


A
2002|2005
M
2002|2025
1
2
3
4
5
7137.00
7137.00
7135.67
7135.67
7134.09
7134.09
7132.51
7132.51
7130.93
7130.93
B
2002|2012
J
2002|2004
C
2002|2012
D
2002|2012
TAXIWAY
1634000 E
1634500 E
SEE TYPICAL LANDFILL
MATCON FINAL COVER
SYSTEM – CROSS
SECTION DETAIL
3
2002|2005

PLAN
1"=50'

484

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

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Transmittal Date: 10/27/06	**Transmittal DCN: 71610.7 – ALB06TS004**	
Project No.: 71610	**Task No.: 7**	**File Index No.: 4.9**

SUBJECT: 71610.7 – ALB06TD004 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Asphalt Concrete Test Report	10/21/06	71610.7AC.013
Asphalt Concrete Test Report	10/23/06	71610.7AC.014
Asphalt Concrete Test Report	10/23/06	71610.7AC.015

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel — Project Manager
10/27/06 — Date

RECEIPT AND READ ACKNOWLEDGEMENT PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature _____ Date _____

Print Name _____

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KLEINFELDER, INC.
ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation:
Sample Location: Truck #13 Santa Fe batch plant
Sample Date: October 21, 2006 10:00 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

Sample No. 06-383

sieve	Matcon*	A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	91%	5%	3%	X		
No 4	63%	61%	4%	2%	X		
No 8	47%	44%	4%	3%	X		
No 16	36%	34%	4%	2%	X		
No 30	25%	25%	4%	0%	X		
No 50	15%	16%	3%	1%	X		
No 100	10%	10%	3%	0%	X		
No 200	7.4%	7.1%	2.0%	0.3%	X		
% asphalt	8.2%	9.1%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.327	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

www.kleinfelder.com
Telephone: (505) 344-7373
Facsimilie: (505) 344-1711

Kleinfelder, Inc.
8300 Jefferson NE Suite B
Albuquerque, NM 87113

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KLEINFELDER, INC.
ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #15 Santa Fe batch plant
Sample Date: October 23, 2006 10:20 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

Sample No. 06-387

sieve	Matcon*	A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	91%	5%	3%	X		
No 4	63%	56%	4%	7%			X
No 8	47%	40%	4%	7%			X
No 16	36%		4%	5%		X	
No 30	25%			2%	X		
No 50	15%				X		
No 100	10%						
No 200	7.4%						
% asphalt	8.2%						

* Target Values changed to blend ratio of 43% ggregate, 20% Natural Fine Aggregate, and
0.5% Lime in accordance with recommendations f

Task 7

Maximum Theoretical Specific Gravi performed in accordance with project specifications.

Seth Olsen
Seth Olsen, Kleinfelder, Inc.

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KLEINFELDER, INC.
ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #33 Santa Fe batch plant
Sample Date: October 23, 2006 1:40 PM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon*	Sample No. 06-390 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	95%	5%	1%	X		
No 4	63%	61%	4%	2%	X		
No 8	47%	42%	4%	5%		X	
No 16	36%	32%	4%	4%		X	
No 30	25%	23%	4%	2%	X		
No 50	15%	14%	3%	1%	X		
No 100	10%	9%	3%	1%	X		
No 200	7.4%	6.2%	2.0%	1.2%	X		
% asphalt	8.2%	8.5%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.317	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

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8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

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Transmittal Date: 10/25/06	**Transmittal DCN: 71610.7 – ALB06TS003**	
Project No.: 71610	**Task No.: 7**	**File Index No.: 4.9**

SUBJECT: 71610.7 – ALB06TD003TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
MatCon Daily Density Summary Report	10/21/06	71610.7MAT.005
MatCon Daily Density Summary Report	10/23/06	71610.7MAT.006
MatCon Daily Density Summary Report	10/23/06	71610.7MAT.007
Asphalt Concrete Test Report	10/18/06	71610.7AC.009
Asphalt Concrete Test Report	10/21/06	71610.7AC.010
Asphalt Concrete Test Report	10/21/06	71610.7AC.011
Asphalt Concrete Test Report	10/23/06	71610.7AC.012

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel — Project Manager
10/25/06 — Date

RECEIPT AND READ ACKNOWLEDGEMENT PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

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KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature _____ Date _____

Print Name _____

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MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/21/06
Job: 71610-1A

	Time	Test Point	Start Location	Test Location	Lift	Density	% Voids	Comments
1		H-3	Header	H-3	140.2	97.2		Tests for
2		H-3	Header	H-3	141.1	97.9		Matcon layed
3		H-2	Header	H-2	142.6	98.9		on 10/20/06
4		H-2	Header	H-2	143.3	99.4		
5		H-1	Header	H-1	140.4	97.4		
6		H-1	Header	H-1	141.9	98.4		-2.7 pond
7		H-J	Header	H-J	140.3	97.3		correction used
8		H-J	Header	H-J	140.7	97.6		
9		1-1	Panel #1	1-1	141.0	97.8		
10		1-1	Panel #1	1-1	141.8	98.3		
11		J-1	Panel #1 Joint	J-1	141.2	97.9		
12		J-1	Panel #1 Joint	J-1	142.0	98.5		
13		1-2	Panel #1	1-2	142.6	98.9		
14		1-2	Panel #1	1-2	141.3	98.0		
15		1-3	Panel #1	1-3	142.5	98.8	cc	
16		1-3	Panel #1	1-3	142.9	99.1		cc
17		1-4	Panel #1	1-4	141.2	97.9		
18		1-4	Panel #1	1-4	142.0	98.5		
19		2-4	Panel #2	2-4	143.5	99.5		
20		2-4	Panel #2	2-4	144.1	99.9		
21		2-3	Panel #2	2-3	143.0	99.2		
22		2-3	Panel #2	2-3	142.1	98.5		
23		2-2	Panel #2	2-2	141.6	98.2		
24		2-2	Panel #2	2-2	143.0	99.2		
25		2-1	Panel #2	2-1	141.7	98.3		

General Notes / Comments: Tests for Matcon Placed 10/20/06

Rice weight 144.2 from test pad

QC Technician: Mark Torres (Print Name) Signature: MT Date: 10/21/06

Firm: Ehrenfelder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 7660-1A TA-73
Job: 10/20/06

	Time	Test and	Station Location	Test Location	Lift	% Density	% AC Voids	Comments
1		2-1	Pad #2	2-1	140.8	97.6		-2.7 pound
2		2-5	Pad #2	2-5	142.1	98.5		correction used
3		2-5	Pad #2	2-5	141.4	98.1		
4		3-1	Pad #3	3-1	142.0	98.5		
5		3-1	pad #3	3-1	140.7	97.6		
6		3-2	Pad #3	3-2	141.2	97.9		
7		3-2	Pad #3	3-2	142.4	98.8		
8		3-3	Pad #3	3-3	144.1	99.9		
9		3-3	Pad #3	3-3	142.9	99.1		
10		3-5	Pad #3	3-5	140.0	97.1		
11		3-5	Pad #3	3-5	141.3	98.0		
12		3-4	Pad #3	3-4	143.6	99.6		
13		3-4	Pad #3	3-4	142.9	99.1		
14		4-4	Pad #4	4-4	141.2	97.9		
15		4-4	Pad #4	4-4	141.9	98.4		
16		4-3	Pad #4	4-3	141.0	97.8		
17		4-3	Pad #4	4-3	142.8	99.0		
18		4-2	Pad #4	4-2	143.1	99.2		
19		4-2	Pad #4	4-2	140.7	97.6		
20		4-5	Pad #4	4-5	141.4	98.1		
21		4-5	Pad #4	4-5	143.0	99.2		
22		4-1	Pad #4	4-1	140.2	97.2		
23		4-1	Pad #4	4-1	140.7	97.6		
24		5-1	Pad #5	5-1	142.9	99.1		
25		5-1	Pad #5	5-1	143.6	99.6		
				Average				

General Notes / Comments: Tests for Matcon placed 10/20/06

Pice weight 144.2 from test pad

QC Technician: Mark Tantz
Print Name

Signature: MT

Date: 10/20/06

Firm: Kleinfelder

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/21/06
Job: 9166-1A 7A-73

	Time	Test Panel #	Station Location	Test Location	Lab #	% Density	% Air Voids	Comments
1		5-2	Panel #5	5-2	142.1	98.5		-2.7 pound
2		5-2	panel #5	5-2	141.1	97.9		correction used
3		5-5	panel #5	5-5	142.4	98.8		
4		5-5	panel #5	5-5	143.1	99.2		
5		5-3	panel #5	5-3	142.3	98.7		
6		5-3	panel #5	5-3	143.3	99.4		
7		6-5	panel #6	6-5	140.0	97.1		
8		6-5	Panel #6	6-5	141.4	98.1		
9		5-4	panel #5	5-4	143.1	99.2		
10		5-4	Panel #5	5-4	142.4	98.8		
11		6-4	panel #6	6-4	145.1	100.6		
12		6-4	Panel #6	6-4	144.5	100.2		
13		6-3	Panel #6	6-3	143.2	99.3		
14		6-3	panel #6	6-3	141.9	98.4		
15		6-2	panel #6	6-2	141.2	97.9		
16		6-2	panel #6	6-2	142.6	98.9		
17		6-1	panel #6	6-1	141.9	98.4		
18		6-1	panel #6	6-1	143.5	99.5		
19		E-1	panel #E	E-1	140.2	97.2		
20		E-1	panel #E	E-1	140.7	97.6		
21		E-2	panel #E	E-2	141.0	97.8		
22		E-2	panel #E	E-2	140.4	97.4		
23								
24								
25								
				Average				

General Notes / Comments: Tests for Matcon placed 10/20/06 | Rice Weight 144.2 From test pad

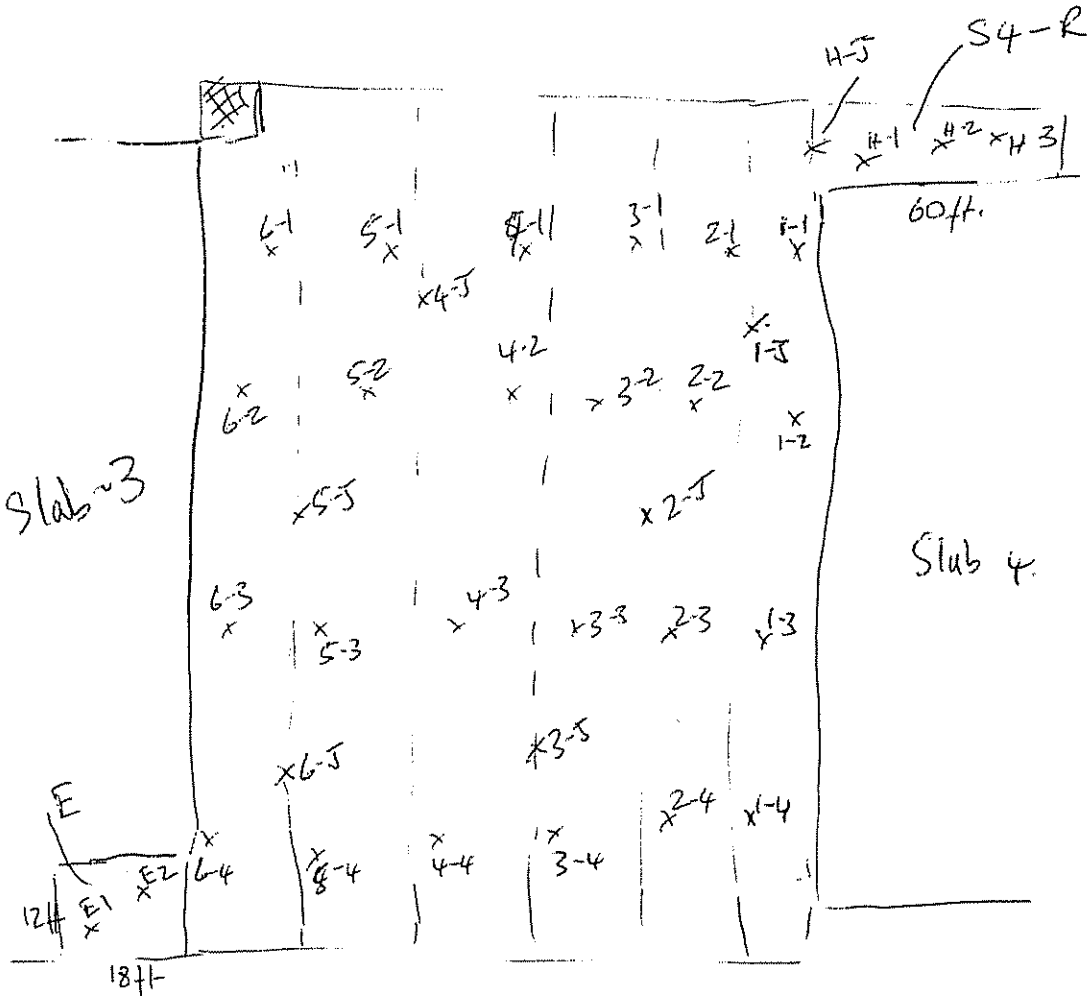
QC Technician: Mark Torrez (Print Name) Signature: [signature] Date: 10/21/06

Firm: Kleinfelder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

Day 3

Friday



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77

205
12
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46

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92
138
184

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/21/06
Job: TA-73 71610-1A

	Test Number	Panel and Pad	Station Location	Test Location	Load Cell	% Density	% Air Voids	Comments
1		Header	Header - NE corner	Header	144.0	99.9		-2.7 pound
2		Header	NW corner of header	Header	141.7	98.3		correction given
3		#1	NW corner of panel	#1	143.1	99.2		to me by Geoff
4		#1	center of panel	#1	140.6	97.5		Rowe with wilder
5		#2	north side of panel	#2	144.2	100		is being used
6		#2	south side of panel	#2	142.9	99.1		for 1 minute tests
7		#3	north side of panel	#3	140.9	97.7		
8		#3	center of panel	#3	141.5	98.1		-4.0 pounds
9		#4	north end of panel	#4	143.9	99.8		for 15 sec test
10		#4	south end of panel	#4	144.6	100.2		
11		#5	Joint of Pad #4 & #5	#5	145.9	101.2		All tests
12		#5	center of panel	#5	144.0	99.9		on this start
13		#5	south end of panel	#5	144.6	101.2		use 14-4.0
14		#6	center of panel	#6	142.9	99.1		pound correction
15		#6	north end of pad	#6	144.0	99.9		
16		#7	south end of pad	#7	141.6	98.2		
17		#7	north end of pad	#7	143.1	99.2		
18		#8	south end of pad	#8	142.9	99.1		
19		#8	north end of pad	#8	141.6	98.2		
20								
21								
22								
23								
24								
25								
				Average				

General Notes / Comments:

Preliminary tests for matrix layed 10/21/06

Rice weight 141.2 from test pad

QC Technician: Mark Tomez (Print Name) Signature: [signature] Date: 10/21/06

Firm: Clearfielder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon HMA Delivery Tracking Form
MatCon Construction Quality Control

Date: 10/21/06
Job: 71610-1A

	Time Loaded	Weight	Temperature (°F) at Delivery	Line Pavement	Location Placement Location	Time Placed	Temperature (°F) Placed	Comments	
1	9:10A		329°		~~#2~~ #1 + Header	9:20A	317°		
2	9:38A		336°		#2	9:49A	322°		
3	9:58A		331°		#3	10:05A	326°		
4	11:28A		329°		#4	11:30A	316°		
5	11:36A		334°		#4	#11:40A	322°		
6	12:45P		337°		#5	12:58P	328°		
7									
8									
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10									
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22									
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24									
25									
			Total Lbs.						
			Total Tons						

General Notes / Comments:

QC Technician: Mark Tomez
Print Name

Signature

Date: 10/21/06

Firm: Kleinfelder

Wilder Representative: n/a

Attached: Truck Weigh Tickets
Attached: Map / Site Plan

MatCon Panel Placement and Compaction
MatCon Construction Quality Control

Panel Placement and Compaction	Job: 71610-1A/TA-73 Date: 10/21/06			
Activity	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**
Verify panel is within specifications (*Note 1)	11:55A/12'/4" panel #4	11:57a/12'/4" panel #5	4:00P/12'/4.5"	
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Verify uniform and thorough compaction (*Note 2)	9:15A/compliant	10:50A/compliant	11:12A/compliant	4:20P/compliant
	Panel/Time/Density	**Panel/Time/Density**	**Panel/Time/Density**	**Panel/Time/Density**
Field density of compacted panel (*Note 3)	#1/11:15A/143.1	#3/2:45P/141.5	#4/3:30P/144.6	#6/4:00P/142.9
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Inspect cold joints (if any) (*Note 4)	9:50A/compliant	11:18a/compliant	1:05P/non-compliant	4:30P/compliant

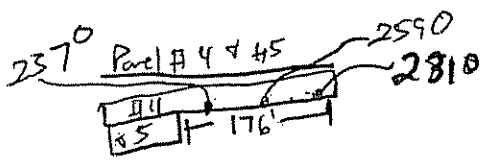
***Note 1:** Unless otherwise directed by WILDER or specified in the plans, the nominal compacted depth of dense or open graded MatCon shall be four (4) inches The panel width shall be as specified in the plans or approved by Wilder

***Note 2:** The compacted course shall be smooth, in conformance with the line. grade, and cross-section shown in the plans or as directed by Wilder, and free of irregularities Roller compaction shall prevent thinning near panel edges.

***Note 3:** The field density of the compacted MatCon shall be measured using a nuclear gage in accordance with ASTM D2950. The nuclear density shall be within specifications as directed by Wilder Air void percentage shall be three (3) percent or less, or as approved by Wilder

***Note 4:** Cold joints are to be avoided by keeping paving panels short enough so that the start of a new panel is placed against a joint that is still hot and not yet compacted At the end of a work shift or when a break in paving activity is anticipated. the cold joint shall be configured, constructedand finished as directed by Wilder or as specified in the plans. All cold joints shall be located on the site lay-out plan with coordinates identified for future identification Cold joint cross-section sketch shall be provided below.

Inspector Notes: Panel #4 & #5 Sand



QC Technician: Mark Tower (Print Name) _____ (Signature) Date: 10/21/06

Firm: Kleinfelder Wilder Representative: n/a Date n/a

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/23/06
Job: TA-73 71610-1A

	Time	Paad Panel	Station Location	Test Location	Lbs/Cf	% Density	% Air Voids	Comments
1		1-5	#1+#2 Joint	1-5	139.3	96.6	3.4	
2		1-5	#1+#2 Joint	1-5	140.4	97.4	2.6	
3		1-5	#1+#2 Joint	1-5	143.5	99.5	0.5	
4		1-5	#1+#2 Joint	1-5	140.5	97.3	2.7	
5		1-5	#1+#2 Joint	1-5	139.2	96.5	3.5	
6		1-5	#1+#2 Joint	1-5	138.9	96.3	3.7	
7		1-5	#1+#2 Joint	1-5	141.7	98.3	1.7	
8		1-5	#1+#2 Joint	1-5	142.9	99.1	0.9	
9		1-5	#1+#2 Joint	1-5	141.0	97.8	2.2	
10		1-5	#1+#2 Joint	1-5	139.3	96.6	3.4	
11		1-5	#1+#2 Joint	1-5	140.6	97.5	2.5	
12		1-5	#1+#2 Joint	1-5	142.3	98.7	1.3	
13		1-5	#1+#2 Joint	1-5	140.3	97.3	2.7	
14		1-5	#1+#2 Joint	1-5	141.7	98.3	1.7	
15		1-5	#1+#2 Joint	1-5	139.9	97.0	3.0	
16		1-5	#1+#2 Joint	1-5	141.6	98.2	1.8	
17		1-5	#1+#2 Joint	1-5	142.0	98.5	1.5	
18		1-5	#1+#2 Joint	1-5	143.9	99.8	0.2	
19		1-5	#1+#2 Joint	1-5	141.7	98.3	1.7	
20		1-5	#1+#2 Joint	1-5	142.1	98.5	1.5	
21		2-5	#2+#3 Joint	2-5	140.5	97.4	2.6	
22		2-5	#2+#3 Joint	2-5	141.2	97.9	2.1	
23		2-5	#2+#3 Joint	2-5	142.0	98.5	1.5	
24		2-5	#2+#3 Joint	2-5	139.9	97.0	3.0	
25		2-5	#2+#3 Joint	2-5	141.4	98.1	1.9	
				Average				

General Notes / Comments: Tests taken at 10 foot-centers accross cold joints between Slab #3 and #4.
Rice weights used today are from test pad samples (2.311) (144.2)

QC Technician: Mark Tomez
Print Name
Signature
Date: 10/23/06

Firm: Kleinfelder
Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form

Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/23/06
Job: 7610-1M

	Time	Pass/Panel	Station Location	Test Location	Lbs/Cf	% Density	% Air Voids	Comments
1		2-5	#2 + #3 Joint	2-5	139.7	96.2	3.8	
2		2-5		2-5	140.9	97.7	2.3	
3		2-5		2-5	141.5	98.0	2.0	
4		2-5		2-5	141.1	97.9	2.1	
5		2-5		2-5	139.2	96.5	3.5	
6		2-5		2-5	140.6	97.5	2.5	
7		2-5		2-5	142.9	99.1	0.9	
8		2-5		2-5	143.1	99.2	0.8	
9		2-5		2-5	142.6	98.9	1.1	
10		2-5		2-5	143.0	99.2	0.8	
11		2-5		2-5	144.0	99.9	0.1	
12		2-5		2-5	143.2	99.3	0.7	
13		2-5		2-5	140.9	97.7	2.3	
14		2-5		2-5	142.1	98.5	1.5	
15		2-5		2-5	141.4	98.1	1.9	
16		3-5	#3 + #4 Joint	3-5	142.3	98.7	1.3	
17		3-5		3-5	141.2	97.9	2.1	
18		3-5		3-5	140.1	97.2	2.8	
19		3-5		3-5	139.4	96.7	3.3	
20		3-5		3-5	140.0	97.1	2.9	
21		3-5		3-5	138.8	96.3	3.7	
22		3-5		3-5	142.0	98.5	1.5	
23		3-5		3-5	140.7	97.6	2.4	
24		3-5		3-5	143.2	99.3	0.7	
25		3-5		3-5	142.9	99.1	0.9	
				Average				

General Notes / Comments:

Correction of -2.7 lbs used

GMM Rice 144.2

QC Technician: Mark Tomez
Print Name

Signature

Date: 10/23/06

Firm: Kleinfelder

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form

Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/23/06
Job: 71610-1A

	Time	Paved Panel	Station Location	Test Location	L.W.C.	% Density	% Air Voids	Comments
1		3-J	#3+#4 Joint	3-J	141.1	97.9	2.1	
2		3-J		3-J	142.6	98.9	1.1	
3		3-J		3-J	141.2	97.9	2.1	
4		3-J		3-J	142.0	98.5	1.5	
5		3-J		3-J	141.8	98.3	1.7	
6		3-J		3-J	142.8	99.0	1.0	
7		3-J		3-J	142.1	98.5	1.5	
8		3-J		3-J	141.9	98.4	1.6	
9		3-J		3-J	142.1	98.5	1.5	
10		3-J		3-J	138.8	96.3	3.7	
11		4-J	#4+#5 Joint	4-J	139.4	96.7	3.3	
12		4-J		4-J	140.3	97.3	2.7	
13		4-J		4-J	140.9	97.7	2.3	
14		4-J		4-J	138.2	95.8	4.2	
15		4-J		4-J	142.1	98.5	1.5	
16		4-J		4-J	140.9	97.7	2.3	
17		4-J		4-J	141.6	98.2	1.8	
18		4-J		4-J	139.9	97.0	3.0	
19		4-J		4-J	141.0	97.8	2.2	
20		4-J		4-J	140.3	97.3	2.7	
21		4-J		4-J	139.1	96.5	3.5	
22		4-J		4-J	140.0	97.1	2.9	
23		4-J		4-J	140.8	97.6	2.4	
24		4-J		4-J	140.2	97.2	2.8	
25		4-J		4-J	138.0	95.7	4.3	
				Average				

General Notes / Comments:

Correction of -2.7 lbs used (mm (144.2))

QC Technician: Mark Tomez
Print Name

Signature

Date: 10/23/06

Firm: Kleinfelder

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/23/06
Job: 71610-10A

	Time	Passi Panel	Station Location	Test Location	Lot Cr	% Density	% Air Voids	Comments
1		4-J	#4+#5 Joint	4-J	139.2	96.5	3.5	
2		4-J		4-J	141.6	98.2	1.8	
3		4-J		4J	140.2	97.2	2.8	
4		4-J		4-J	140.9	97.7	2.3	
5		4J		4-J	141.1	97.9	97.9	
6								
7								
8								
9								
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19								
20								
21								
22								
23								
24								
25								
				Average				

General Notes / Comments:

Correction of -27 lbs used GMM (144.2)

QC Technician: Mark Tomez
Print Name

Signature

Date: 10/23/06

Firm: Kleinfelder

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form

Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/23/06
Job: 71610-1A

	Time	Panel	Station Location	Test Location	Lot Class	% Density	% Air Voids	Comments
1		H-4	Header	H-4	141.8	97.8	2.2	Air voids
2		H-4		H-4	140.5	96.9	3.1	calculated from
3		H-3		H-3	142.8	98.4	1.6	sheet given to me
4		H-3		H-3	142.1	98.0	2.0	by Geoff Lowe.
5		H-2		H-2	141.5	97.6	2.4	(Attached)
6		H-2		H-2	143.4	98.9	1.1	
7		H-1		H-1	141.4	97.5	2.5	
8		H-1		H-1	140.3	96.7	3.3	
9		J-H		J-H	140.7	97.0	3.0	
10		J-H		J-11	141.9	97.8	2.2	
11		1-1	Panel #1	1-1	143.0	98.6	1.4	
12		1-1		1-1	143.8	99.1	0.9	
13		1-5		1-5	140.4	96.8	3.2	
14		1-5		1-5	140.9	97.1	2.9	
15		1-2		1-2	142.1	98.0	2.0	
16		1-2		1-2	141.6	97.6	2.4	
17		1-3		1-3	143.1	98.7	1.3	
18		1-3		1-3	142.6	98.3	1.7	
19		1-4		1-4	142.4	98.2	1.8	
20		1-4		1-4	141.9	97.8	2.2	
21		2-1	Panel #2	2-1	143.4	98.9	1.1	
22		2-1		2-1	142.9	98.5	1.5	
23		2-2		2-2	141.7	97.7	2.3	
24		2-2		2-2	142.1	98.0	2.0	
25		2-3		2-3	140.9	97.1	2.9	
				Average				

General Notes / Comments:

correction of -2.7 lbs used. Gmm of (~~144.21~~) 145.05 used

QC Technician: Mark Tower (Print Name) Signature: [signature] Date: 10/23/06

Firm: Klenfelder Wilder Representative: n/a

Attached Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/23/06
Job: 7610-1A

	Lift	Pass/Panel	Station Location	Test Location	Load Cell	% Density	% Air Voids	Comments
1		2-5	Panel #2	2-5	140.2	96.7	3.3	
2		2-3		2-3	142.4	98.2	1.8	
3		2-3		2-3	141.6	97.6	2.4	
4		2-4		2-4	144.2	99.4	0.6	
5		2-4		2-4	143.3	98.8	1.2	
6		3-1	Panel #3	3-1	140.2	96.7	3.3	
7		3-1		3-1	142.0	98.9	1.1	
8		3-2		3-2	142.7	98.4	1.6	
9		3-2		3-2	141.5	97.6	2.4	
10		3-3		3-3	140.9	97.1	2.9	
11		3-3		3-3	141.2	97.3	2.7	
12		3-5		3-5	141.6	97.6	2.4	
13		3-5		3-5	142.1	98.0	2.0	
14		3-4		3-4	143.1	98.7	1.3	
15		3-4		3-4	142.6	98.3	1.7	
16		4-4	Panel #4	4-4	143.9	99.2	0.8	
17		4-4		4-4	143.3	98.8	1.2	
18		4-3		4-3	143.0	98.6	1.4	
19		4-3		4-3	142.7	98.4	1.6	
20		4-2		4-2	141.9	97.8	2.2	
21		4-2		4-2	142.5	98.2	1.8	
22		4-5		4-5	141.3	97.4	2.6	
23		4-5		4-5	140.7	97.0	3.0	
24		4-1		4-1	142.9	98.5	1.5	
25		4-1		4-1	142.1	98.0	2.0	
				Average				

General Notes / Comments:

Correction of -2.7 lbs used, Raw weight used (145.05)

QC Technician: Mark Tonez
Print Name

Signature: MT

Date: 10/23/06

Firm: Kleinfelder

Wilder Representative: N/A

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/23/06
Job: 91610-1A

	Lift	Panel/Panel	Station Location	Test Location	Lab Cert	% Density	% Air Voids	Comments
1		5-1	panel #5	5-1	141.7	97.7	2.3	Air voids calculated
2		5-1		5-1	141.1	97.3	2.7	from chart given to
3		5-2		5-2	143.0	98.6	1.4	me by Geoffrey
4		5-2		5-2	142.4	98.2	1.8	Rowe (Attached)
5		5-5		5-5	140.9	97.1	2.9	
6		5-5		5-5	140.0	96.5	3.5	
7		5-3		5-3	141.4	97.5	2.5	
8		5-3		5-3	140.9	97.1	2.9	
9		5-4		5-4	141.7	97.7	2.3	
10		5-4		5-4	140.7	97.0	3.0	
11		6-4	panel #6	6-4	140.2	96.7	3.3	
12		6-4		6-4	141.4	97.5	2.5	
13		6-5		6-5	140.9	97.1	2.9	
14		6-5		6-5	141.0	97.2	2.8	
15		6-3		6-3	144.2	99.4	0.6	
16		6-3		6-3	142.9	98.5	1.5	
17		6-2		6-2	144.6	99.7	0.3	
18		6-2		6-2	142.3	98.1	1.9	
19		6-1		6-1	140.7	97.0	3.0	
20		6-1		6-1	141.5	97.6	2.4	
21								
22								
23								
24								
25								
				Average				

General Notes / Comments:

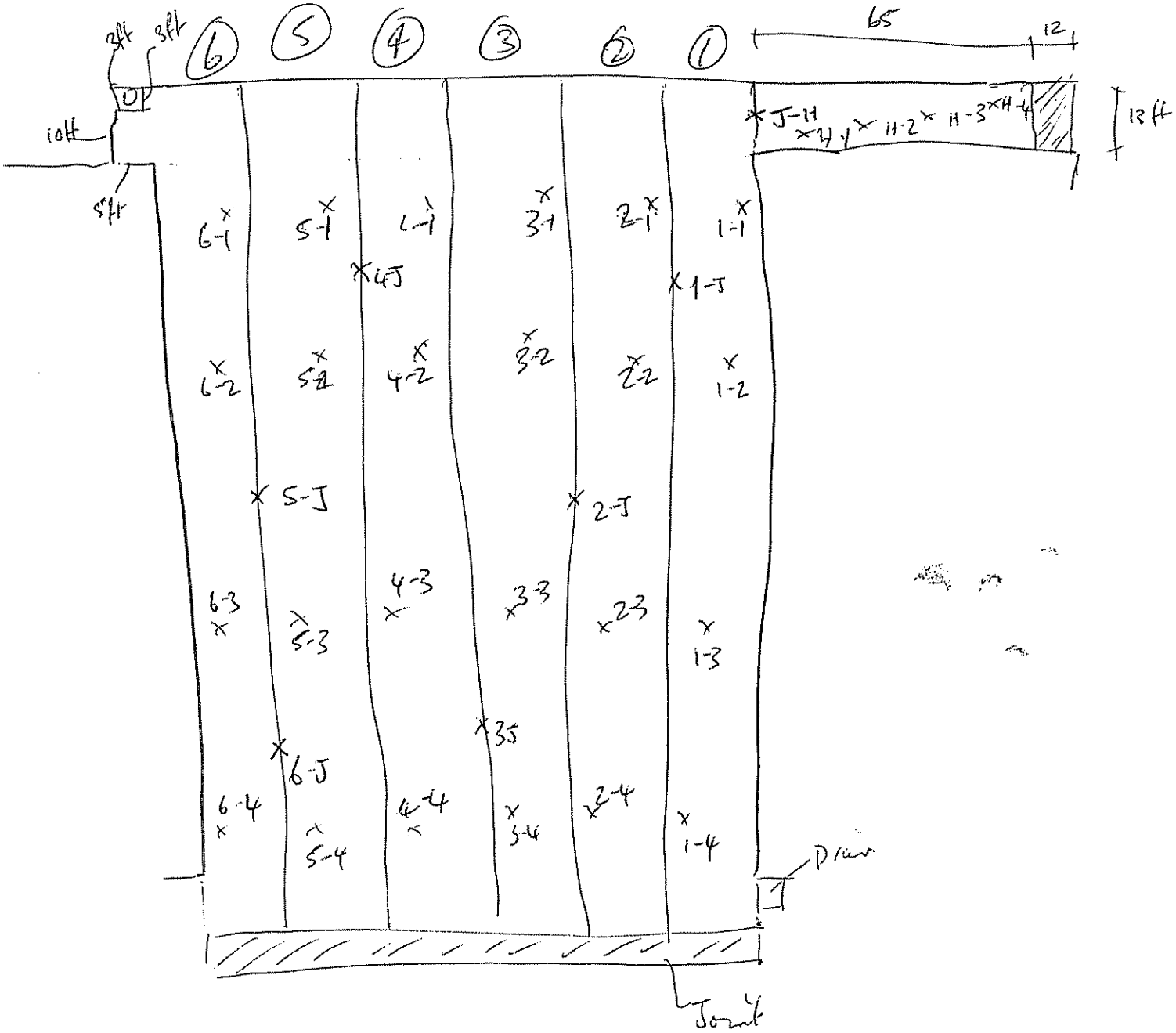
* Percent compaction from (145.05) ~~[illegible]~~

* Correction of -2.7 lbs used Rice weight ~~from last Pad used~~ (144.2)

QC Technician: Mark Foltz Date: 10/23/06
Print Name Signature

Firm: Kleinfelder Wilder Representative: N/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design



226
-10
216 ÷5
= 45

45
90
135
180

MatCon Panel Placement and Compaction
MatCon Construction Quality Control

Panel Placement and Compaction	Job: JA-75 71610-1A Date: 10/23/06			
Activity	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**
Verify panel is within specifications (*Note 1)	panel # 2 / 12' / 4.5"	panel #4 / 12' / 4.75"	/ /	/ /
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Verify uniform and thorough compaction (*Note 2)	10:15A / Compliant	1:15P / Compliant	2:45P / Compliant	4:00P / Compliant
	Panel/Time/Density	**Panel/Time/Density**	**Panel/Time/Density**	**Panel/Time/Density**
Field density of compacted panel (*Note 3)	#2 / 12:00P / 143.0	#5 / 2:00P / 142.2	#6 / 3:15P / 143.7	/ /
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Inspect cold joints (if any) (*Note 4)	10:45A / Compliant	2:40P / Compliant	/	/

***Note 1:** Unless otherwise directed by WILDER or specified in the plans, the nominal compacted depth of dense or open graded MatCon shall be four (4) inches The panel width shall be as specified in the plans or approved by Wilder
***Note 2:** The compacted course shall be smooth, in conformance with the line, grade, and cross-section shown in the plans or as directed by Wilder, and free of irregularities Roller compaction shall prevent thinning near panel edges.
***Note 3:** The field density of the compacted MatCon shall be measured using a nuclear gage in accordance with ASTM D2950. The nuclear density shall be within specifications as directed by Wilder Air void percentage shall be three (3) percent or less, or as approved by Wilder.
***Note 4:** Cold joints are to be avoided by keeping paving panels short enough so that the start of a new panel is placed against a joint that is still hot and not yet compacted. At the end of a work shift or when a break in paving activity is anticipated, the cold joint shall be configured, constructedand finished as directed by Wilder or as specified in the plans. All cold joints shall be located on the site lay-out plan with coordinates identified for future identification. Cold joint cross-section sketch shall be provided below.

Inspector Notes:

QC Technician: Mark Tontz (Print Name) [signature] (Signature) Date: 10/23/06

Firm: Kleinfelder Wilder Representative: n/a Date n/a

KLEINFELDER, INC.
ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #12 Santa Fe batch plant
Sample Date: October 18, 2006 PM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon	Sample No. 06-370 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	97%	96%	5%	1%	X		
No 4	67%	71%	4%	4%		X	
No 8	47%	51%	4%	4%		X	
No 16	33%	38%	4%	5%		X	
No 30	24%	27%	4%	3%	X		
No 50	16%	17%	3%	1%	X		
No 100	10%	11%	3%	1%	X		
No 200	7.0%	8.0%	2.0%	1.0%	X		
% asphalt	8.2%	9.1%	6-9%				
		uncorrected					

		Target
Maximum Theoretical Specific Gravity:	2.301	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #3 Santa Fe batch plant
Sample Date: October 21, 2006
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

Sample No. 06-382

sieve	Matcon*	A	Tolerance	D'	$PF_{(1.00)}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	92%	5%	2%	X		
No 4	63%	57%	4%	6%		X	
No 8	47%	40%	4%	7%			X
No 16	36%	31%	4%	5%		X	
No 30	25%	23%	4%	2%	X		
No 50	15%	14%	3%	1%	X		
No 100	10%	9%	3%	1%	X		
No 200	7.4%	6.1%	2.0%	1.3%	X		
% asphalt	8.2%	8.8%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.322	2.327

Tests were performed in accordance with project specifications.

Seth Olsen

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #17 Santa Fe batch plant
Sample Date: October 21, 2006 2:15 PM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon*	Sample No. 06-383-A A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	94%	5%	0%	X		
No 4	63%	61%	4%	2%	X		
No 8	47%	44%	4%	3%	X		
No 16	36%	34%	4%	2%	X		
No 30	25%	25%	4%	0%	X		
No 50	15%	15%	3%	0%	X		
No 100	10%	9%	3%	1%	X		
No 200	7.4%	6.4%	2.0%	1.0%	X		
% asphalt	8.2%	8.2% uncorrected	6-9%				

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.348	2.327

Tests were performed in accordance with project specifications.

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #4 Santa Fe batch plant
Sample Date: October 23, 2006 8:10 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

Sample No. 06-385

sieve	Matcon*	A	Tolerance	D'	$PF_{(1.00)}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	94%	92%	5%	2%	X		
No 4	63%	58%	4%	5%		X	
No 8	47%	41%	4%	6%		X	
No 16	36%	32%	4%	4%		X	
No 30	25%	23%	4%	2%	X		
No 50	15%	14%	3%	1%	X		
No 100	10%	9%	3%	1%	X		
No 200	7.4%	6.2%	2.0%	1.2%	X		
% asphalt	8.2%	8.5%	6-9%				
		uncorrected					

* Target Values changed to blend ratio of 43% 1/2" Crushed Intermediate Aggregate, 36.5% Crushed Fine Aggregate, 20% Natural Fine Aggregate, and 0.5% Lime in accordance with recommendations from abatech.

		Target
Maximum Theoretical Specific Gravity:	2.315	2.327

Tests were performed in accordance with project specifications.

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Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION						Pages:	13
1	Steve Matier smatier@northwind-inc.com Jerry Thayer jerrytha@wilderconstruction.com	2	John Keck jkeck@northwind-inc.com Steve Edwards sedwards@northwind-inc.com	3	Abatech Consulting Goeffrey Rowe growe@abatech.com		

Transmittal Date: 10/24/06	**Transmittal DCN: 71610.7 – ALB06TS002**	
Project No.: 71610	**Task No.: 7**	**File Index No.: 4.9**

SUBJECT: 71610.7 – ALB06TD002 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Asphalt Concrete Test Report	10/23/06	71610.7AC.001
Asphalt Concrete Test Report	10/23/06	71610.7AC.002
Asphalt Concrete Test Report	10/23/06	71610.7AC.003
Asphalt Concrete Test Report	10/23/06	71610.7AC.004
Asphalt Concrete Test Report	10/23/06	71610.7AC.005
Asphalt Concrete Test Report	10/23/06	71610.7AC.006
Asphalt Concrete Test Report	10/23/06	71610.7AC.007
Asphalt Concrete Test Report	10/23/06	71610.7AC.008
Bulk Specific Gravity Results	10/23/06	71610.7BS.001
Proctor Test Reports	10/17/06	71610.7P.001

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form Keep one copy for your records and mail the other copy to Kleinfelder, Inc at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

10/24/06
Date

RECEIPT AND READ ACKNOWLEDGEMENT
PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

KLEINFELDER, INC.
ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Batch Plant Test Pad
Sample Date: October 17, 2006
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

Sample No. 06-361

sieve	Matcon	Trial #1	Trial #2	M	R	D'	D	$PF_{(1.00)}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%	100%	100%	0%	0%				
3/4"	100%	100%	100%	100%	0%	0%				
1/2"	100%	100%	100%	100%	0%	0%	0%	X		
3/8"	97%	97%	97%	97%	0%	0%	4%	X		
No 4	67%	82%	81%	82%	1%	15%	4%			Dev >Max Deviation
No 8	47%	64%	64%	64%	0%	17%	4%			Dev >Max Deviation
No 16	33%	51%	51%	51%	0%	18%				
No 30	24%	37%	37%	37%	0%	13%	3%			Dev >Max Deviation
No 50	16%	21%	22%	21.5%	1.0%	6%	3%			Dev >Max Deviation
No 100	10%	12%	13%	12.5%	1.0%	3%	3%	X		
No 200	7.0%	7.9%	8.6%	8.3%	0.7%	1%	2.0%	X		
% asphalt	8.2%	8.7%	8.7%	8.7%	0.0%	0.5%				

uncorrected

	10 Blow	25 Blow	50 Blow	Target
Actual Specific Gravity:	2.126	2.204	2.237	2.280
Maximum Theoretical Specific Gravity:	2.311	2.311	2.311	2.327
VMA:	23.2	20.4	19.2	17
PA:	8	4.6	3.2	2(3.0 max)
VFA:	65.5	77.3	83.3	89

Tests were performed in accordance with project specifications

Seth Olsen, Kleinfelder, Inc.

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Batch Plant Test Pad
Sample Date: October 17, 2006
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

Sample No. 06-360

sieve	Matcon	Trial #1	Trial #2	M	R	D'	D	$PF_{(1.00)}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%	100%	100%	0%	0%				
3/4"	100%	100%	100%	100%	0%	0%				
1/2"	100%	100%	100%	100%	0%	0%	0%	X		
3/8"	97%	97%	96%	97%	1%	0%	4%	X		
No 4	67%	82%	81%	82%	1%	15%	4%			Dev >Max Deviation
No 8	47%	65%	64%	65%	1%	18%	4%			Dev >Max Deviation
No 16	33%	51%	51%	51%	0%	18%				
No 30	24%	37%	37%	37%	0%	13%	3%			Dev >Max Deviation
No 50	16%	22%	22%	22.0%	0.0%	6%	3.0%			Dev >Max Deviation
No 100	10%	13%	13%	13.0%	0.0%	3%	3.0%	X		
No 200	7.0%	8.7%	8.4%	8.6%	0.3%	2%	2.0%	X		
% asphalt	8.2%	8.9%	8.8%	8.9%	0.1%	0.7%				

uncorrected

	10 Blow	25 Blow	50 Blow	Target
Actual Specific Gravity:	2.140	2.223	2.246	2.280
Maximum Theoretical Specific Gravity:	2.307	2.307	2.307	2.327
VMA:	22.9	19.9	19.1	17
PA:	7.2	3.6	2.6	2(3.0 max)
VFA:	68.4	81.7	86.1	89

Tests were performed in accordance with project specification:

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #3 Landfill Paving
Sample Date: October 18, 2006 PM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon	Sample No. 06-368 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	99%	0%	1%			X
3/8"	97%	93%	5%	4%	X		
No 4	67%	70%	4%	3%	X		
No 8	47%	53%	4%	6%		X	
No 16	33%	41%	4%	8%			X
No 30	24%	29%	4%	5%		X	
No 50	16%	17%	3%	1%	X		
No 100	10%	10%	3%	0%	X		
No 200	7.0%	6.8%	2.0%	0.2%	X		
% asphalt	8.2%	8.0% uncorrected	6-9%				

		Target
Actual Specific Gravity:	2.271	2.280
Maximum Theoretical Specific Gravity:	2.305	2.327
VMA:	17.4	17
PA:	1.5	2(3 max)
VFA:	91.5	89

Tests were performed in accordance with project specifications.

Seth Olsen

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #7 Santa Fe batch plant
Sample Date: October 19, 2006 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon	Sample No. 06-373 A	Tolerance	D'	$PF_{(1.00)}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	97%	92%	5%	5%		X	
No 4	67%	68%	4%	1%	X		
No 8	47%	51%	4%	4%		X	
No 16	33%	39%	4%	6%		X	
No 30	24%	28%	4%	4%		X	
No 50	16%	18%	3%	2%	X		
No 100	10%	11%	3%	1%	X		
No 200	7.0%	8.2%	2.0%	1.2%	X		
% asphalt	8.2%	9.4%	6-9%				
		uncorrected					

		Target
Maximum Theoretical Specific Gravity:	2.319	2.327

Tests were performed in accordance with project specifications.

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #17 Santa Fe batch plant
Sample Date: October 19, 2006 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon	Sample No. 06-375 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	97%	93%	5%	4%	X		
No 4	67%	69%	4%	2%	X		
No 8	47%	51%	4%	4%		X	
No 16	33%	39%	4%	6%		X	
No 30	24%	28%	4%	4%		X	
No 50	16%	17%	3%	1%	X		
No 100	10%	11%	3%	1%	X		
No 200	7.0%	6.9%	2.0%	0.1%	X		
% asphalt	8.2%	7.7% uncorrected	6-9%				

		Target
Maximum Theoretical Specific Gravity:	2.319	2.327

Tests were performed in accordance with project specifications.

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ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #18 Santa Fe batch plant
Sample Date: October 19, 2006 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon	Sample No. 06-376 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	97%	93%	5%	4%	X		
No 4	67%	67%	4%	0%	X		
No 8	47%	49%	4%	2%	X		
No 16	33%	38%	4%	5%		X	
No 30	24%	29%	4%	5%		X	
No 50	16%	19%	3%	3%		X	
No 100	10%	13%	3%	3%		X	
No 200	7.0%	9.3%	2.0%	2.3%		X	
% asphalt	8.2%	9.0%	6-9%				
		uncorrected					

		Target
Maximum Theoretical Specific Gravity:	2.304	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

www.kleinfelder.com
Telephone: (505) 344-7373
Facsimilie: (505) 344-1711

Kleinfelder, Inc.
8300 Jefferson NE Suite B
Albuquerque, NM 87113

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KLEINFELDER, INC.
ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #10 Santa Fe batch plant
Sample Date: October 20, 2006 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon	Sample No. 06-380 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	97%	94%	5%	3%	X		
No 4	67%	70%	4%	3%	X		
No 8	47%	52%	4%	5%		X	
No 16	33%	40%	4%	7%			X
No 30	24%	29%	4%	5%		X	
No 50	16%	18%	3%	2%	X		
No 100	10%	12%	3%	2%	X		
No 200	7.0%	8.4%	2.0%	1.4%	X		
% asphalt	8.2%	9.4% uncorrected	6-9%				

		Target
Maximum Theoretical Specific Gravity:	2.318	2.327

Tests were performed in accordance with project specifications.

Seth Olsen

Seth Olsen, Kleinfelder, Inc.

www.kleinfelder.com
Telephone: (505) 344-7373
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Albuquerque, NM 87113

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KLEINFELDER, INC.
ASPHALT CONCRETE - DAILY TEST REPORT - SAMPLE ANALYSIS

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Los Alamos, New Mexico

Distribution: Client
File

Sample Elevation: ACSC
Sample Location: Truck #11 Santa Fe batch plant
Sample Date: October 20, 2006 AM
Sampled By: Kleinfelder Client: Northwind
Mix Code: Matcon Modified Asphalt Cap
Supplier: Espanola Transit

sieve	Matcon	Sample No. 06-381 A	Tolerance	D'	$PF_{(1.00}$	$PF_{(0.95)}$	$PF_{(0.85)}$
1"	100%	100%		0%			
3/4"	100%	100%		0%			
1/2"	100%	100%	0%	0%	X		
3/8"	97%	93%	5%	4%	X		
No 4	67%	67%	4%	0%	X		
No 8	47%	50%	4%	3%	X		
No 16	33%	39%	4%	6%		X	
No 30	24%	29%	4%	5%		X	
No 50	16%	18%	3%	2%	X		
No 100	10%	12%	3%	2%	X		
No 200	7.0%	8.5%	2.0%	1.5%	X		
% asphalt	8.2%	8.6% uncorrected	6-9%				

		Target
Maximum Theoretical Specific Gravity:	2.310	2.327

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder, Inc.

www.kleinfelder.com
Telephone: (505) 344-7373
Facsimilie: (505) 344-1711

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8300 Jefferson NE Suite B
Albuquerque, NM 87113

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KLEINFELDER, INC.

Bulk Specific Gravity Results from Cored Specimens
AASHTO T-166

Project: TA-73 Los Alamos National Laboratory Airport Landfill
Project # 71610 Albuquerque, NM

Distribution: Client
File

Sample Elevation: ACSC
Sample Date: 17-Oct-06 Test Date: 18-Oct-06
Sampled By: Mark Torrez Tested By: Blair Peterson
Material Descr.. 6" Cores Theoretical Maximum Specific Gravity: 2.311
Proposed Use: ACSC
Lab No.: 06-366

Test No:	Location	Thickness"	Weight Grams Air	Water	SSD	Vol cc	Specific Gravity/GMB	% compact	Unit Wt. pcf	Field Unit Wt. pcf
1	Test Pad	3.5	3173.6	1741.9	3184.6	1442.7	2.200	95.2%	137.3	140.5
2	Test Pad	4.4	4023.9	2240.3	4032.3	1792.0	2.245	97.2%	140.1	142.4
3	Test Pad	3.7	3260	1778.1	3268.4	1490.3	2.187	94.7%	136.5	140.2
4	Test Pad	3.8	3383	1836.7	3393.4	1556.7	2.173	94.0%	135.6	139.9
5	Test Pad	3.9	3482.6	1892.7	3492.3	1599.6	2.177	94.2%	135.9	138.7
6	Test Pad	3.7	3346.6	1863.7	3355.2	1491.5	2.244	97.1%	140.0	142.9
7	Test Pad	4.0	3649.9	2038.4	3658.9	1620.5	2.252	97.5%	140.5	143.6
8	Test Pad	3.9	3581	1991.2	3588.9	1597.7	2.241	97.0%	139.9	141.5
9	Test Pad	3.9	3496.4	1907.6	3504.3	1596.7	2.190	94.8%	136.6	142.0
10	Test Pad	4.2	3674.4	1985.0	3685.7	1700.7	2.161	93.5%	134.8	138.7

Tests were performed in accordance with project specifications.

Seth Olsen, Kleinfelder Inc.

Reviewed By: Date: Oct 23/06

www.kleinfelder.com
Telephone: (505) 344-7373
Facsimilie: (505) 344-1711

Kleinfelder, Inc.
8300 Jefferson NE Suite B
Albuquerque, NM 87113

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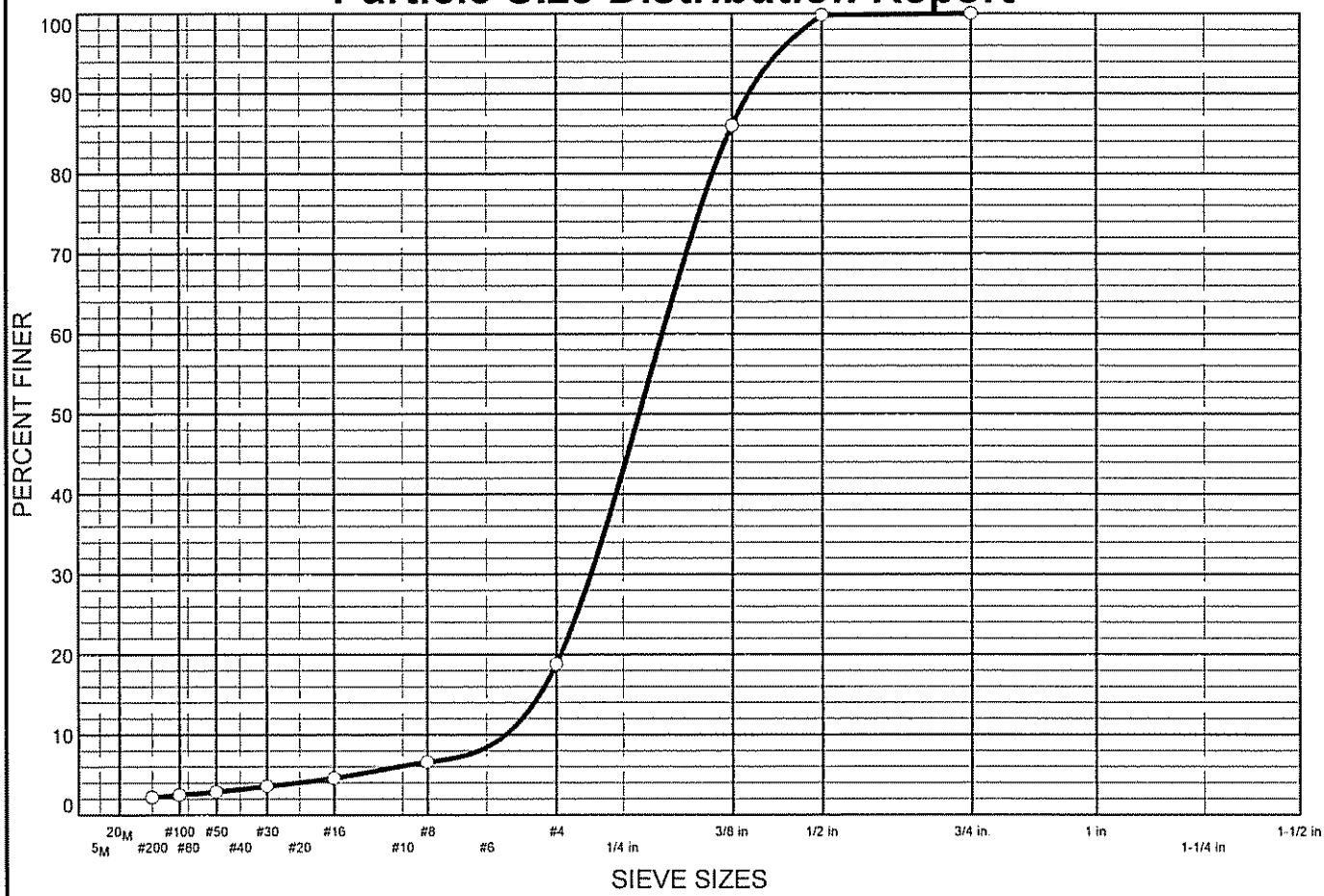
Particle Size Distribution Report



% FINES		% SAND			% GRAVEL	
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
2.2		1.0	2.9	12.7	81.2	0.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 in.	100.0		
1/2 in.	99.8		
3/8 in.	86.0		
#4	18.8		
#8	6.6		
#16	4.6		
#30	3.6		
#50	2.9		
#100	2.5		
#200	2.2		

* (no specification provided)

Soil Description

Mat-con aggregate

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 9.41 D_{60}= 7.40 D_{50}= 6.78
D_{30}= 5.55 D_{15}= 4.39 D_{10}= 3.71
C_u= 1.99 C_c= 1.12

Classification

USCS= GP AASHTO= A-1-a

Remarks

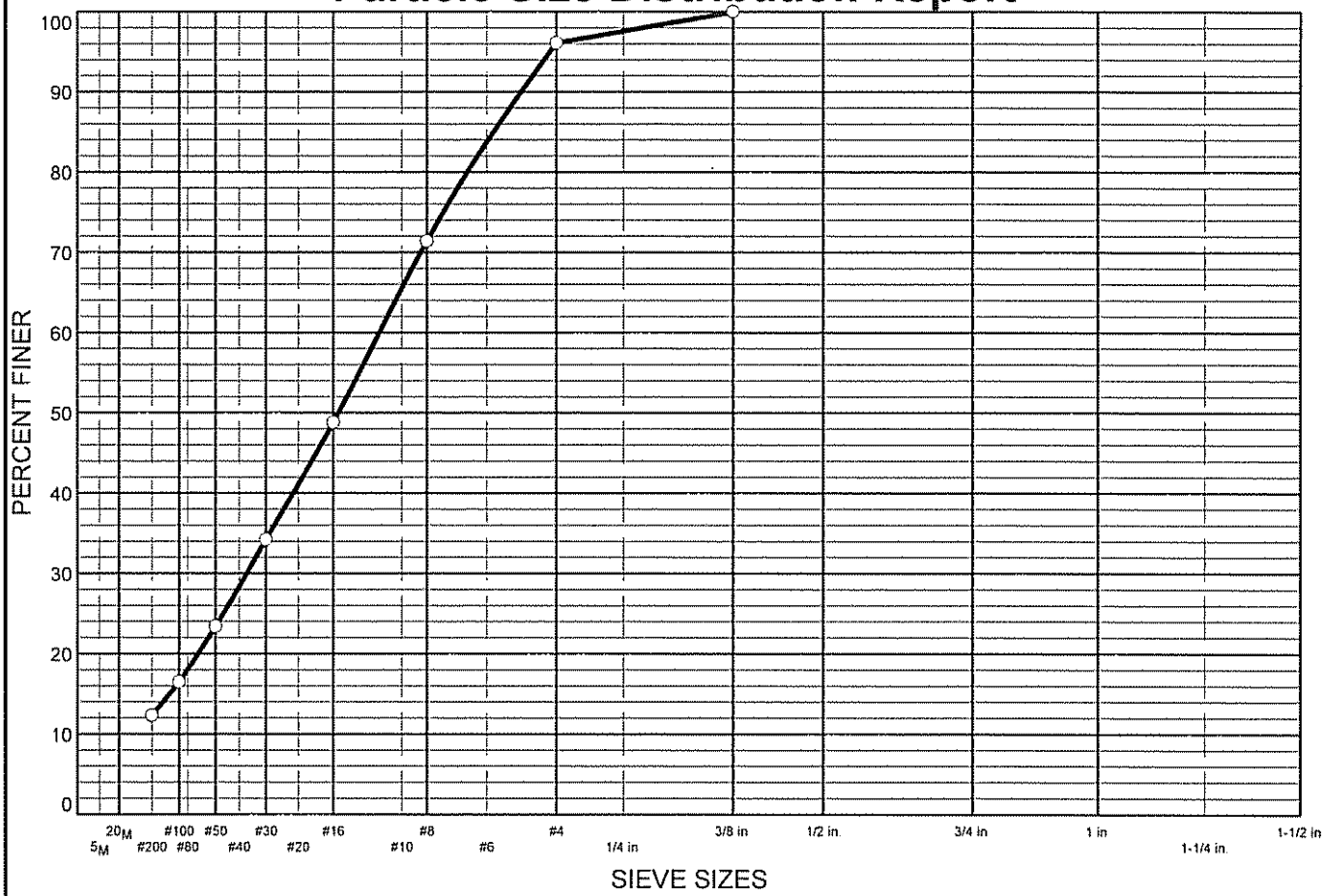
F.M.=5.75

Sample No.: 06-362-1 **Source of Sample:** Cold feed from Batch Plant **Date:** 10-17-06
Location: Stockpile - cold feed **Elev./Depth:**

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

Particle Size Distribution Report



% FINES		% SAND			% GRAVEL	
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
12.3		16.0	37.2	30.6	3.9	0.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in.	100.0		
#4	96.1		
#8	71.4		
#16	48.8		
#30	34.2		
#50	23.4		
#100	16.5		
#200	12.3		

* (no specification provided)

Soil Description

Mat-con crusher fines

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 3.48 D_{60}= 1.71 D_{50}= 1.23
D_{30}= 0.472 D_{15}= 0.121 D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

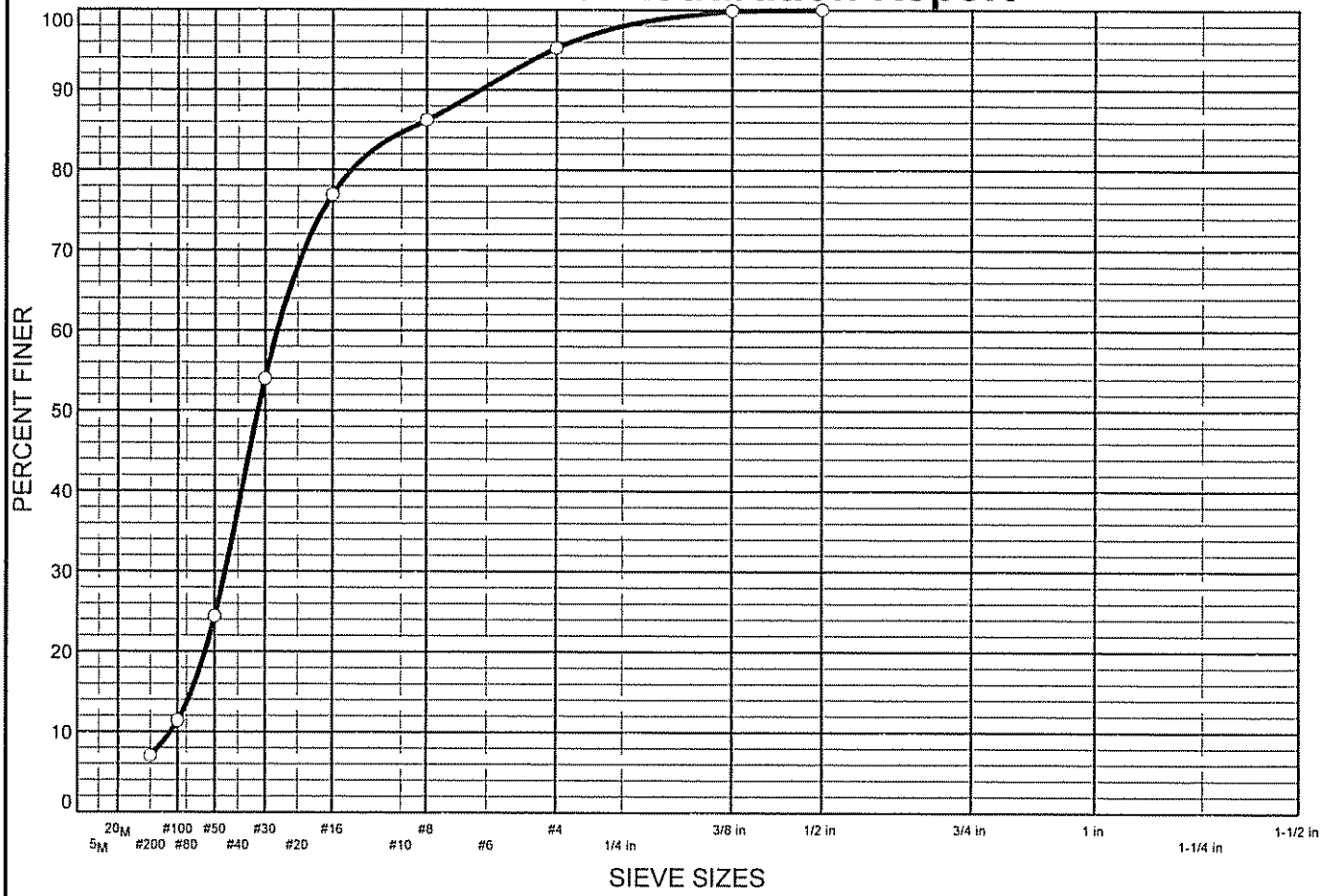
F.M.=3.10

Sample No.: 06-362-2 **Source of Sample:** Cold feed from Batch Plant **Date:** 10-17-06
Location: Stockpile - cold feed **Elev./Depth:**

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

Particle Size Distribution Report



% FINES		% SAND			% GRAVEL	
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
7.0		30.8	46.8	10.6	4.8	0.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2 in.	100.0		
3/8 in.	99.9		
#4	95.2		
#8	86.2		
#16	76.9		
#30	54.0		
#50	24.4		
#100	11.4		
#200	7.0		

* (no specification provided)

Soil Description

Mat-con fines

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 2.08 D_{60}= 0.689 D_{50}= 0.551
D_{30}= 0.353 D_{15}= 0.199 D_{10}= 0.128
C_u= 5.39 C_c= 1.41

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

F.M.=2.52

Sample No.: 06-362-3 **Source of Sample:** Cold feed from Batch Plant **Date:** 10-17-06
Location: Stockpile - cold feed **Elev./Depth:**

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

KLEINFELDER

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION						Pages:	5
1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com Steve Edwards sedwards@northwind-inc.com	3	Abatech Consulting Goeffery Rowe growe@abatech.com		

Transmittal Date: 10/23/06	**Transmittal DCN: 71610.7 – ALB06TS001**	
Project No.: 71610	**Task No.: 7**	**File Index No.: 4.9**

SUBJECT: 71610.7 – ALB06TD001 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
MatCon Daily Density Summery Report	10/17/06	71610.7MAT 001
MatCon Daily Density Summery Report	10/18/06	71610 7MAT 002
MatCon Daily Density Summery Report	10/19/06	71610.7MAT 003
MatCon Daily Density Summery Report	10/20/06	71610 7MAT 004

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc at the address referenced at the top of this form

RECEIPT AND READ ACKNOWLEDGEMENT
PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

NOTES

Recipient Signature _____ Date _____

Print Name _____

Perry Hampel
Project Manager

10/23/06
Date

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/17/06
Job: 71610-1A TA-73 Test Pad

	Time	Test Pad #	Station Location	Test Location	Test Results: Lab Density	Lab Density	% Air Voids	Comments
1	11:00A	Test Pad	Core #1	1 min	139.7 140.9			
2	11:00A	Test Pad	Core #1	15 sec	139.0 142.4			
3	11:00A	Test Pad	Core #2	1 min	141.1 140.5			
4	11:00A	Test Pad	Core #2	15 sec	143.4 144.2			
5	11:00A	Test Pad	Core #3	1 min	139.1 140.7			
6	11:00A	Test Pad	Core #3	15 sec	138.5 142.5			
7	11:00A	Test Pad	Core #4	1 min	138.3 139.7			
8	11:00A	Test Pad	Core #4	15 sec	139.8 142.1			
9	11:00A	Test Pad	Core #5	1 min	138.5 139.2			
10	11:00A	Test Pad	Core #5	15 sec	137.8 139.3			
11	11:00A	Test Pad	Core #6	1 min	142.6 140.9			
12	11:00A	Test Pad	Core #6	15 sec	144.0 144.1			
13	11:00A	Test Pad	Core #7	1 min	145.0 142.5			
14	11:00A	Test Pad	Core #7	15 sec	142.4 144.4			
15	11:00A	Test Pad	Core #8	1 min	140.6 140.5			
16	11:00A	Test Pad	Core #8	15 sec	141.8 143.2			
17	11:00A	Test Pad	Core #9	1 min	140.1 141.9			
18	11:00A	Test Pad	Core #9	15 sec	144.6 141.6			
19	11:00A	Test Pad	Core #10	1 min	139.5 139.2			
20	11:00A	Test Pad	Core #10	15 sec	138.9 139.3			
21								
22								
23								
24								
25								
				Average				

QC

General Notes / Comments:

QC Technician: Mark Torrez (Print Name) Signature: [signature] Date: 10/17/06

Firm: n/a Wilder Representative: N/A

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/18/06
Job: 71610-14

	Time	Pass/Trial	Station Location	Test Location	Test Results: Dry Density	% Air Voids	Comments
1	4:05p	#1	Header #1	NE edge of Panel	144.0	99.4	
2	4:22p	#1	Header #1	center of Panel	143.1	99.2	
3	4:30p	#1	Header #1	nw edge of panel	143.6	99.6	
4	5:10p	#2	Adjacent/wside of Pad #1	North corner/Pad #1	144.3	100.1	
5	5:25p	#2	Adjacent/wside of Pad #1	center/Pad #1	142.9	99.1	
6	5:30p	#2	Adjacent/wside of Pad #1	South corner/Pad #1	143.8	99.7	
7	5:40p	#3	30' w of Pad #1	North end of Panel	144.5	100.2	
8	6:00p	#3	30' w of Pad #1	center of panel	142.0	98.5	
9	6:15p	#3	30' w of Pad #1	south end of Pad	142.6	98.9	
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
				Average			

2.311 144.2

General Notes / Comments:

* Rice weights used is the average of the two Rices from the test pad

QC Technician: Mark Torrez
Print Name

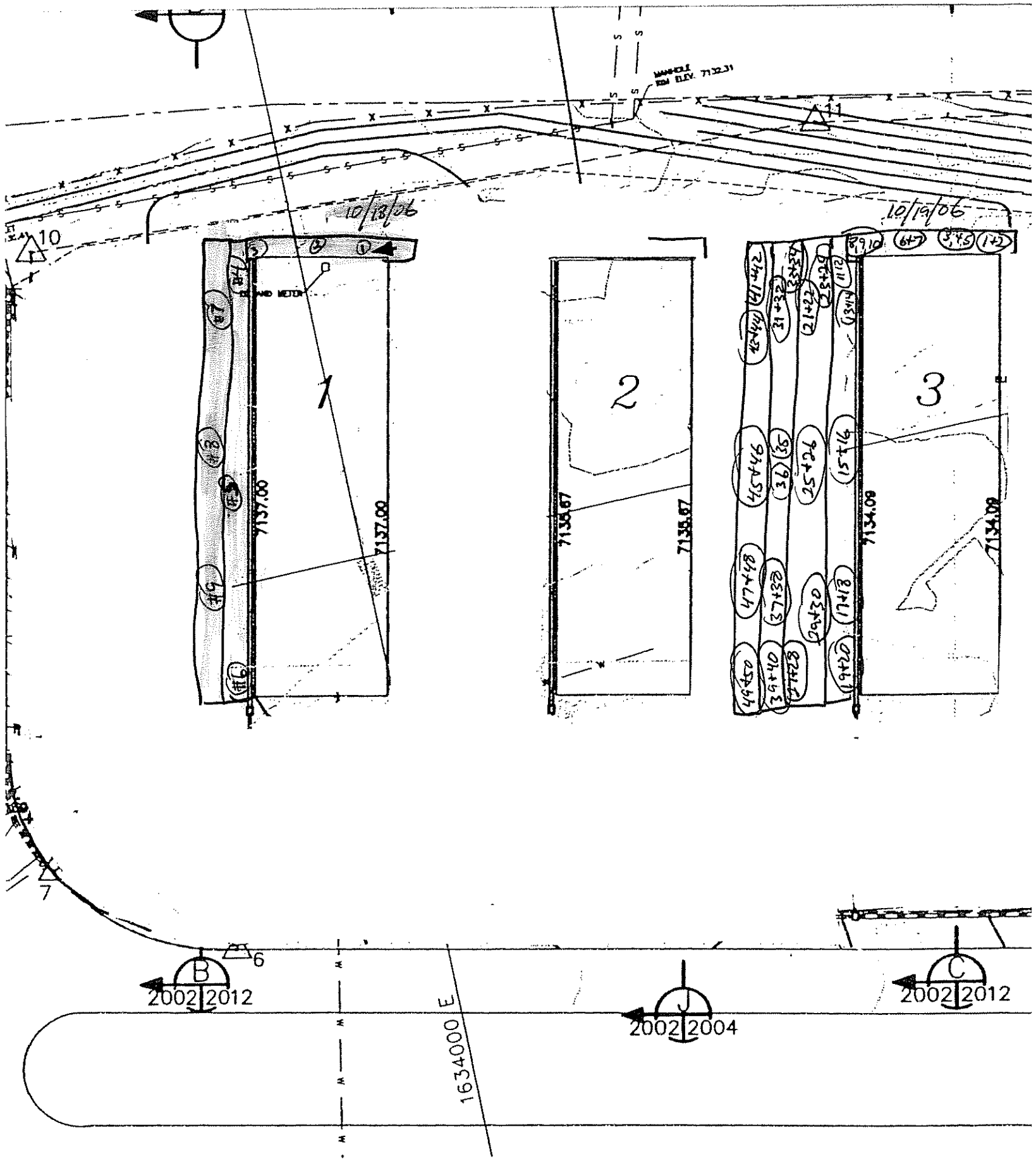
Signature

Date: 10/18/06

Firm: Klinfelder

Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design


10/18/06
10/19/06
1
2
3
7137.00
7137.00
7135.67
7135.67
7134.00
7134.00
10
11
7
6
B
2002 2012
J
2002 2004
C
2002 2012
1634000 E

MatCon Panel Placement and Compaction
MatCon Construction Quality Control

Panel Placement and Compaction	Job: 71610-17A		Date: 10/18/06	
Activity	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**
Verify panel is within specifications (*Note 1)	10/20/06 9:20A / Panel #3 / 12 FT / 5"	10/20/06 9:20A / Panel #3 / 12 FT / 4.5"	10/20/06 9:20A / Panel #3 / 12 FT / 5.25"	10/20/06 9:20A / Panel #3 / 12 FT / 5.25"
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Verify uniform and thorough compaction (*Note 2)	2:30p / Compliant	3:45 / Compliant	5:30p / Compliant	
	Panel/Time/Density	**Panel/Time/Density**	**Panel/Time/Density**	**Panel/Time/Density**
Field density of compacted panel (*Note 3)	#1 / 4:22p / 148.1	#2 / 5:10p / 144.3	#3 / 6:15p / 142.6	
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Inspect cold joints (if any) (*Note 4)	N/A	N/A	N/A	

***Note 1:** Unless otherwise directed by WILDER or specified in the plans, the nominal compacted depth of dense or open graded MatCon shall be four (4) inches The panel width shall be as specified in the plans or approved by Wilder
***Note 2:** The compacted course shall be smooth, in conformance with the line, grade, and cross-section shown in the plans or as directed by Wilder, and free of irregularities Roller compaction shall prevent thinning near panel edges
***Note 3:** The field density of the compacted MatCon shall be measured using a nuclear gage in accordance with ASTM D2950. The nuclear density shall be within specifications as directed by Wilder Air void percentage shall be three (3) percent or less, or as approved by Wilder.
***Note 4:** Cold joints are to be avoided by keeping paving panels short enough so that the start of a new panel is placed against a joint that is still hot and not yet compacted. At the end of a work shift or when a break in paving activity is anticipated. the cold joint shall be configured. constructedand finished as directed by Wilder or as specified in the plans. All cold joints shall be located on the site lay-out plan with coordinates identified for future identification Cold joint cross-section sketch shall be provided below.

Inspector Notes:

See attached sketch of paving.

QC Technician: Mark Torrez (Print Name) [signature] (Signature) Date: 10/18/06

Firm: Klenfelder Wilder Representative: n/a Date n/a

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/19/06
Job: TA-73 - 71610-1A

	Time	Test Panel	Station Location	Test Location	Lab Cal	% Density	% Air Voids	Comments
1	11:52	#1	north side Pad #3	NE corner Pad #3	143.9	99.8		
2	11:55	#1	northside Pad #3	↓	142.6	98.9		
3	12:07p	#1	northside Pad #3	NE corner Pad #3	140.7	97.6		
4	12:10	#1	↓	↓	141.3	98.0		
5	12:12	#1	↓	↓	142.9	99.1		
6	12:16	#1	↓	Center of Pad #3	141.1	97.9		
7	12:20	#1	↓	↓	143.0	99.2		
8	12:24	#1	↓	NW corner Pad #3	143.6	99.6		
9	12:26	#1	↓	↓	144.1	99.9		
10	12:30p	#1	↓	↓	142.8	99.0		
11	1:35p	#2	Adjacent to Pad #3 west side	N end of Panel	144.9	100.5		
12	1:38p	#2	↓	↓	143.6	99.6		
13	1:40p	#2	↓	↓	145.2	100.7		
14	1:42p	#2	↓	↓	142.6	98.9		
15	1:43p	#2	↓	Center of Panel	143.1	99.2		
16	1:45p	#2	↓	↓	141.8	98.3		
17	1:47p	#2	↓	South end of Panel	142.2	98.6		
18	1:48p	#2	↓	↓	144.4	100.1		
19	1:49p	#2	↓	↓	142.9	99.1		
20	1:49p	#2	↓	↓	144.0	99.9		
21	1:50p	#3	West of Panel #2	north end of Panel	141.6	100.3		
22	1:50p	#3	↓	↓	142.3	98.7		
23	1:50p	#3	↓	↓	143.8	99.7		
24	1:51p	#3	↓	↓	143.1	99.2		
25	1:51p	#3	↓	center of Panel	144.0	99.9		
				Average				

General Notes / Comments:

2.311 144.2

Rice weight used is average weight from test pad samples

QC Technician: Mark Tanez (Print Name) Signature Date: 10/19/06

Firm: Kleinfelder Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/19/06
Job: TA-73 71610-1A

	Time	Test Panel	Station Location	Test Location	Test Results: Lbs/Cf	Test Results: % Density	Test Results: % Air Voids	Comments
1	1:52p	#3	west of Panel #2	Center of Panel	142.6	98.9		
2	1:53p	#3		south end of Panel	144.4	100.1		
3	1:53p	#3			141.8	98.3		
4	1:54p	#3			143.9	99.8		
5	1:54p	#3			143.6	99.6		
6	2:59	#4	west of Panel #3	north end of Panel	144.1	99.9		
7	3:01	#4			141.9	98.4		
8	3:01	#4			142.6	98.9		
9	3:04	#4			143.3	99.4		
10	3:15	#4		center of Panel	144.6	100.3		
11	3:17	#4			144.0	99.9		
12	3:17	#4		south end of Panel	144.0	99.9		
13	3:22	#4			142.8	99.0		
14	3:22	#4			143.3	99.4		
15	3:22	#4			143.1	99.2		CV
16	4:00p	#5	west of Panel #4	north end of Panel	141.9	98.4		
17	4:01p	#5			142.6	98.9		
18	4:01	#5			142.8	99.0		
19	4:05	#5			144.3	100.1		
20	4:05	#5		center of Panel	141.5	98.1		
21	4:15	#5			142.9	99.1		
22	4:15	#5		South end of Panel	143.6	99.6		
23	4:15	#5			144.5	100.2		
24	4:26	#5			141.9	98.4		
25	4:26	#5			143.1	99.2		
				Average				

General Notes / Comments:

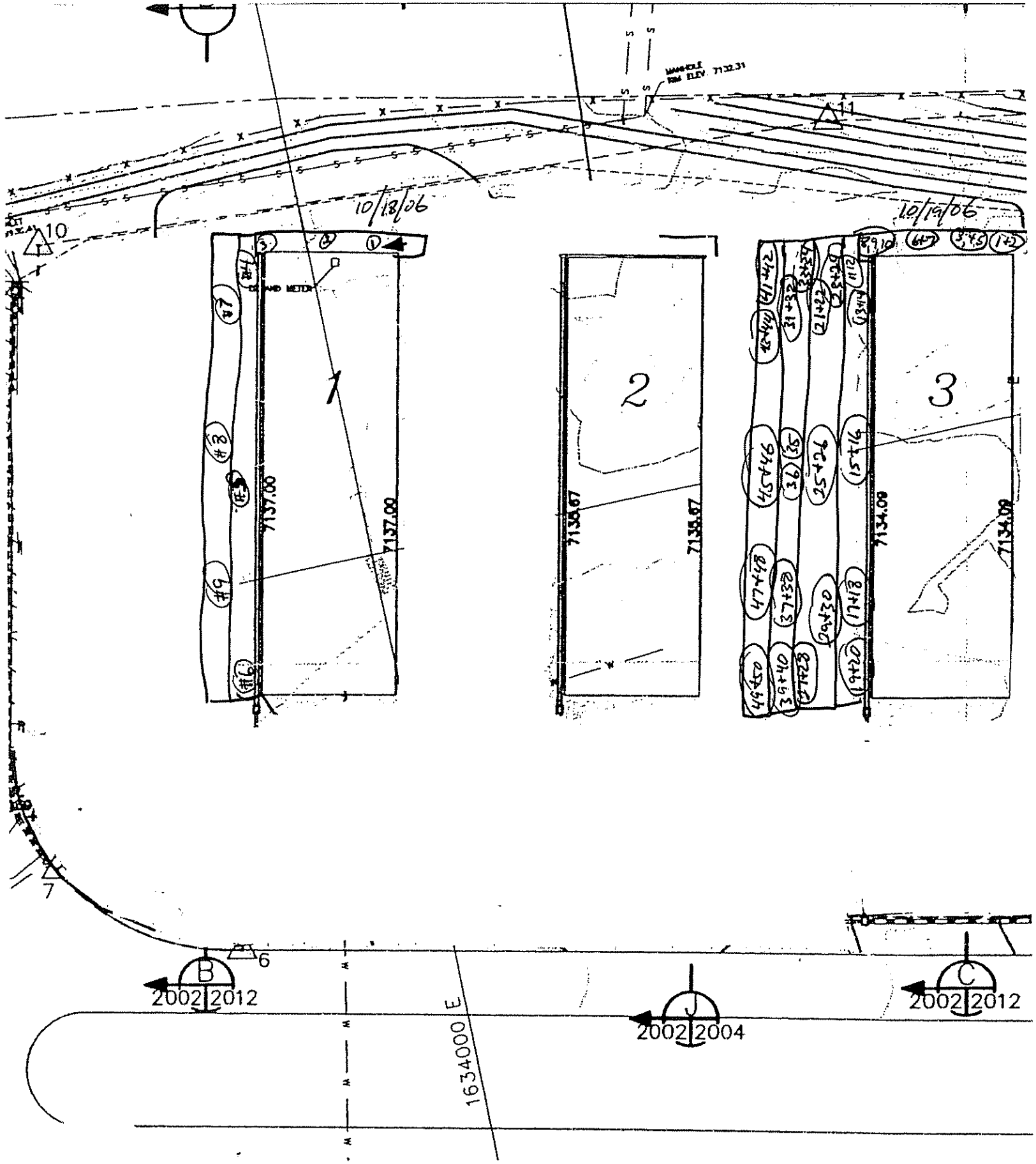
2.311 144.2

Rice weight used is Average weight from test pad samples

QC Technician: Mark Torez (Print Name) Signature: [signature] Date: 10/19/06

Firm: Wilder Representative: n/a

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design


10/13/06
10/19/06
1
2
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MatCon Panel Placement and Compaction
MatCon Construction Quality Control

Panel Placement and Compaction	Job: 71610-1A		Date: 10/19/06	
Activity	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**
Verify panel is within specifications (*Note 1)	10/20/06 9:15A / 12' width / 5.5" Thick / Panel #5	10/20/06 9:15A / Panel #5 / 12'	10/20/06 9:15A / Panel #5 / 12' / 5.5"	10/20/06 9:15A / Panel #5 / 12' / 6.5" (~70' N of SW corner of pad #3)
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Verify uniform and thorough compaction (*Note 2)	12:30p / Compliant	2:00p / Compliant	3:30p / Compliant	4:00p / Compliant
	Panel/Time/Density	**Panel/Time/Density**	**Panel/Time/Density**	**Panel/Time/Density**
Field density of compacted panel (*Note 3)	1 / 11:55 / 142.6	2 / 1:43 / 143.1	3 / 1:51 / 144.0	5 / 4:05 / 141.5
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Inspect cold joints (if any) (*Note 4)	Compliant	Compliant	Compliant	Compliant

***Note 1:** Unless otherwise directed by WILDER or specified in the plans, the nominal compacted depth of dense or open graded MatCon shall be four (4) inches. The panel width shall be as specified in the plans or approved by Wilder
***Note 2:** The compacted course shall be smooth. in conformance with the line, grade, and cross-section shown in the plans or as directed by Wilder, and free of irregularities Roller compaction shall prevent thinning near panel edges
***Note 3:** The field density of the compacted MatCon shall be measured using a nuclear gage in accordance with ASTM D2950. The nuclear density shall be within specifications as directed by Wilder. Air void percentage shall be three (3) percent or less, or as approved by Wilder.
***Note 4:** Cold joints are to be avoided by keeping paving panels short enough so that the start of a new panel is placed against a joint that is still hot and not yet compacted. At the end of a work shift or when a break in paving activity is anticipated, the cold joint shall be configured. constructedand finished as directed by Wilder or as specified in the plans All cold joints shall be located on the site lay-out plan with coordinates identified for future identification. Cold joint cross-section sketch shall be provided below.

Inspector Notes: Joint between Panel #2 and Panel # 3 was between 265° F and 275° F at north end when Panel #3 was placed (Between Panel #2 + #3)

Temperature	Feet ahead of laydown machine
206° F	15' S of NW corner of Pad #3
225° F	30' S of NW corner of Pad #3
219° F	45' S of NW corner of Pad #3
242° F	60' S of NW corner of Pad #3
231° F	100' S of NW corner of Pad #3
220° F	125' S of NW corner of Pad #3
243° F	150' S of NW corner of Pad #3
249° F	175' S of NW corner of Pad #3

QC Technician: Mark Tonez (Print Name) M Tonez (Signature) Date: 10/19/06

Firm: KleinGilder Wilder Representative: n/a Date n/a

4 84

MatCon Daily Density Summary Report
MatCon Construction Quality Control

Date: 10/20/06
Job: TA-73 71610-1A

	Time	Test Panel #	Station Location	Test Location	Dry Density	% Dry Density	% Air Voids	Comments
1	10:45	Header-1	center of Header	center	143.9	99.8		
2	10:45	Header-1	SW corner of Header	SW corner	141.6	98.2		
3	11:30	Pad #2	NE corner of Pad #2	NE corner	142.5	98.8		
4	11:30	Pad #2	center of Pad #2	center	142.1	98.5		
5	11:35	Pad #3	NW corner of Pad #3	NW corner	143.6	99.6		
6	11:35	Pad #3	SE corner of pad #3	SE corner	143.6	99.2		
7	1:20P	Pad #4	center of Pad #4	center	142.1	98.5		
8	1:20P	Pad #4	SW corner of Pad #4	SW corner	144.0	99.9		
9	2:15P	Pad #5	NE corner of Pad #5	NE corner	141.8	99.3		
10	2:17P	Pad #5	SW corner of Pad #5	SW corner	140.9	97.7		
11	3:20P	Pad #6	west of Pad #5	center of pad	142.9	99.1		
12	3:22P	Pad #6	west of Pad #5	SE corner of Pad	143.6	99.6		
13	4:40P	Pad #7	west of Pad #6	NW corner of Pad	141.7	98.3		
14	4:23P	Pad #7	west of Pad #6	SW corner of Pad	142.5	98.8		
15	5:30P	Pad #8	south of Pad #3	SW corner of Pad #8	141.6	98.2		
16	5:30P	Pad #8	south of Pad #3	NE corner of pad #8	142.9	99.1		
17	3:30P	#1+#2 Joint	cold Joint/#1+#2	southend	142.1	98.5		
18	3:32P	#2+#3 Joint	cold Joint/#2+#3	northend	141.4	98.1		
19	3:50P	#3+#4 Joint	cold Joint/#3+#4	southend	140.7	97.6		
20	3:55P	#4 and #5	cold Joint/#4+#5	northend	141.9	98.4		
21								
22								
23								
24								
25								
				Average				

General Notes / Comments:
Rice weight used is Average from Samples taken on test Pad.
2.311 (144.2)

QC Technician: Mark Tonez
Print Name
Signature
Date: 10/20/06

Firm: Kleinfelder
Wilder Representative:

Attached: Nuclear Density Calibration (per instrument manufacturer) data
Attached: Map / Site Plan
Attached: Field Form
Note: Correlation between air voids and hydraulic conductivity was established during mix design

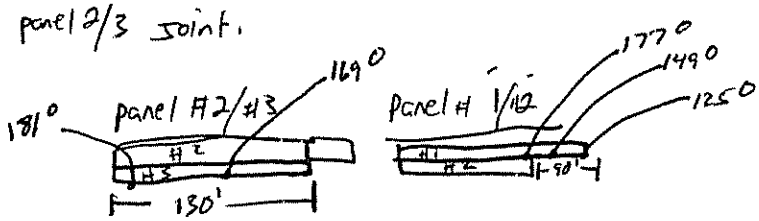
MatCon Panel Placement and Compaction
MatCon Construction Quality Control

Panel Placement and Compaction	Job: 7160-14		Date: 10/20/06	
Activity	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**	**Time/Width/Thickness**
Verify panel is within specifications (*Note 1)	#2 11:30A / 12' / 4.75"	#5 2:15P / 12' / 5.25"	#6 4:00P / 12' / 4.75"	#6 4:15P / 12' / 4.25"
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Verify uniform and thorough compaction (*Note 2)	11:30A / compliant	2:15P / compliant	4:00P / compliant	4:30P / compliant
	Panel/Time/Density	**Panel/Time/Density**	**Panel/Time/Density**	**Panel/Time/Density**
Field density of compacted panel (*Note 3)	Heater #1 / 10:45 / 143.9	#2 / 11:35A / 142.1	#4 / 1:20P / 144.0	#6 / 3:20P / 148.6
	Time/Results	**Time/Results**	**Time/Results**	**Time/Results**
Inspect cold joints (if any) (*Note 4)	12:50P / non compliant	12:50P / non-compliant	2:45P / non-compliant	4:15 / compliant — panel 6+7 joint

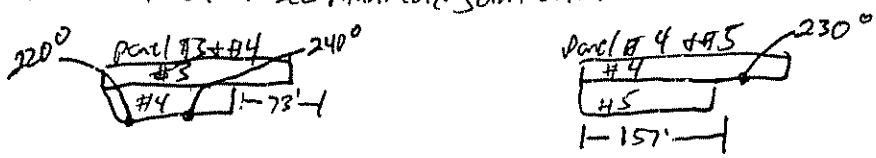
***Note 1:** Unless otherwise directed by WILDER or specified in the plans, the nominal compacted depth of dense or open graded MatCon shall be four (4) inches. The panel width shall be as specified in the plans or approved by Wilder.
***Note 2:** The compacted course shall be smooth, in conformance with the line. grade, and cross-section shown in the plans or as directed by Wilder, and free of irregularities. Roller compaction shall prevent thinning near panel edges
***Note 3:** The field density of the compacted MatCon shall be measured using a nuclear gage in accordance with ASTM D2950 The nuclear density shall be within specifications as directed by Wilder Air void percentage shall be three (3) percent or less, or as approved by Wilder
***Note 4:** Cold joints are to be avoided by keeping paving panels short enough so that the start of a new panel is placed against a joint that is still hot and not yet compacted. At the end of a work shift or when a break in paving activity is anticipated. the cold joint shall be configured, constructedand finished as directed by Wilder or as specified in the plans All cold joints shall be located on the site lay-out plan with coordinates identified for future identification. Cold joint cross-section sketch shall be provided below.

Inspector Notes:
Measurements of non-compliant cold joint between south half of panel 1/2 joint and panel 2/3 joint.

Temperatures taken at time of joint placement



measurements of non compliant cold joint between south half of panel 3+4 and panel 4+5



QC Technician: Mark Torrez (Print Name) Signature Date: 10/20/06

Firm: Kleinfelder Wilder Representative: n/a Date n/a

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION						Pages:	8
1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3	Steve Edwards sedwards@northwind-inc.com		

Transmittal Date: 12/01/06	**Transmittal DCN: 71610.2 – ALB06TS040**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD040 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	11/23/06	6286C.48
Concrete Cylinder Test Report	11/23/06	6287C.49
Concrete Cylinder Test Report	11/22/06	6414C.50
Concrete Cylinder Test Report	11/22/06	6415C.51
Concrete Cylinder Test Report	11/22/06	6416C.52
Concrete Cylinder Test Report	11/21/06	6392C.53
Concrete Cylinder Test Report	11/21/06	6393C.54

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel
Project Manager

12/01/06
Date

RECEIPT AND READ ACKNOWLEDGEMENT
PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

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KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: November 23, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16420
Sand # 12980 @ 6.75%
Fly Ash # 1350
Cement # 5405
Water # 1873

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: 75' From SE corner

			Measured
Truck No.	10466	Slump (in.):	5.25"
Date Sampled:	October 26, 2006	Slump w/plasticizer (in.)	"
Date Received:	October 27, 2006	Air Temperature (°F):	27.8°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	77°
Batch Size:	10.0 cy	Air Content (%):	5.0% uncorrected
Time Batched:	7:13 a.m.	Unit Weight (pcf):	143.3
Time Placed:		Water Added (gal):	0
Time Sampled:	7:40 a.m.	Ticket No.:	99284
Yield Relative:	.98	W/C Ratio	0.407

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
48A	10/31/06	5	4.00 x	8.00	12.57	49260	3920*****	NA
48B	11/2/06	7	4.00 x	8.00	12.57	52859	4200**	NA
48C	11/2/06	7FC	4.00 x	8.00	12.57	43881	3490*****	NA
48D	11/23/06	28	4.00 x	8.00	12.57	70840	5640**	C

Lab # 6286 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

ONLY 1 28 DAY BREAK - CLIENT REQUESTED 5 DAY BREAK

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: November 23, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16480
Sand # 13020 @ 6.75%
Fly Ash # 1350
Cement # 5355
Water # 1884

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: NW wall section middle approximately 14' up first panel placed. Measured

Truck No. 10460
Date Sampled: October 26, 2006
Date Received: October 27, 2006
Sampled By: M. Torrez/ A. Gutierrez
Batch Size: 10.0 cy
Time Batched: 2:21p.m.
Time Placed:
Time Sampled: 2:55 p.m.
Yield Relative: .97

Slump (in.): 4.5"
Slump w/plasticizer (in.) "
Air Temperature (°F):
Mix Temp (°F):
Air Content (%): 4.75% uncorrected
Unit Weight (pcf): 144.9
Water Added (gal): 0
Ticket No.: 99302
W/C Ratio 0.412

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
49A	10/31/06	5	4.00 x	8.00	12.57	56498	4500**	NA
49B	11/2/06	7	4.00 x	8.00	12.57	56280	4480**	NA
49C	11/2/06	7FC	4.00 x	8.00	12.57	51712	4110*****	NA
49D	11/23/06	28	4.00 x	8.00	12.57	81120	6450**	C

Lab # 6287 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Client Request 5 Day Break Therefore Only 1 28 Day Avail.

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: November 22, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16440
Sand # 13120 @ 6.00%
Fly Ash # 1330
Cement # 5375
Water # 1973

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Section E retaining wall, south end.

			Measured
Truck No	10466	Slump (in.):	3.25"
Date Sampled:	November 15, 2006	Slump w/plasticizer (in.)	"
Date Received:	November 16, 2006	Air Temperature (°F):	31°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	58°
Batch Size:	10.0 cy	Air Content (%):	4.7% uncorrected
Time Batched:	7:09 a.m.	Unit Weight (pcf):	141.1
Time Placed:		Water Added (gal):	0
Time Sampled:	7:36 a.m.	Ticket No.:	99487
Yield Relative:	1.00	W/C Ratio	0.412

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
50A	11/22/06	7	4.00 x	8.00	12.57	45605	3630*****	NA
50B	11/22/06	7FC	4.00 x	8.00	12.57	44440	3530*****	NA
50C	12/13/06	28	4.00 x	8.00	12.57			
50D	12/13/06	28	4.00 x	8.00	12.57			

Lab # 6414 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: November 22, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16580
Sand # 12900 @ 6.00%
Fly Ash # 1380
Cement # 5340
Water # 1980

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 402^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Section E retaining wall, south end

			Measured
Truck No.	10466	Slump (in.):	4.5"
Date Sampled:	November 15, 2006	Slump w/plasticizer (in.)	"
Date Received:	November 16, 2006	Air Temperature (°F):	40°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	58°
Batch Size:	10.0 cy	Air Content (%):	5.4% uncorrected
Time Batched:	10:53 a.m.	Unit Weight (pcf):	140.4
Time Placed:		Water Added (gal):	0
Time Sampled:	11:20 a.m.	Ticket No.:	99501
Yield Relative:	1.00	W/C Ratio	0.41

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
51A	11/22/06	7	4.00 x	8.00	12.57	50430	4010**	NA
51B	11/22/06	7FC	4.00 x	8.00	12.57	46415	3690**	NA
51C	12/13/06	28	4.00 x	8.00	12.57			
51D	12/13/06	28	4.00 x	8.00	12.57			

Lab # 6415 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: November 22, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16340
Sand # 12920 @ 6.00%
Fly Ash # 1330
Cement # 5335
Water # 1974

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Section E retaining wall, south end.

			Measured
Truck No.	10556	Slump (in.):	4.5"
Date Sampled:	November 15, 2006	Slump w/plasticizer (in.)	"
Date Received:	November 16, 2006	Air Temperature (°F):	48°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	68°
Batch Size:	10.0 cy	Air Content (%):	5.1% uncorrected
Time Batched:	2:24 p.m.	Unit Weight (pcf):	140.6
Time Placed:		Water Added (gal):	0
Time Sampled:	2:50 p.m.	Ticket No.:	99514
Yield Relative:	1.00	W/C Ratio	0.41

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
52A	11/22/06	7	4.01 x	8.00	12.63	45805	3630*****	NA
52B	11/22/06	7FC	4.00 x	8.00	12.57	45965	3660*****	NA
52C	12/13/06	28	4.00 x	8.00	12.57			
52D	12/13/06	28	4.00 x	8.00	12.57			

Lab # 6416 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: November 21, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16460
Sand # 12980 @ 6.25%
Fly Ash # 1335
Cement # 5335
Water # 1947

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 398^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Footings B, C, and D south ends.

			Measured
Truck No.	10556	Slump (in.):	4.0"
Date Sampled:	November 14, 2006	Slump w/plasticizer (in.)	"
Date Received:	November 15, 2006	Air Temperature (°F):	52°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	63°
Batch Size:	10.0 cy	Air Content (%):	5.0% uncorrected
Time Batched:	9:36 a.m.	Unit Weight (pcf):	140.9
Time Placed:		Water Added (gal):	0
Time Sampled:	10:10 a.m.	Ticket No.:	99475
Yield Relative:	1.00	W/C Ratio	0.41

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
53A	11/21/06	7	4.00 x	8.00	12.57	63355	5040**	NA
53B	11/21/06	7FC	4.00 x	8.00	12.57	59320	4720**	NA
53C	12/12/06	28	4.00 x	8.00	12.57			
53D	12/12/06	28	4.00 x	8.00	12.57			

Lab # 6392 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: November 21, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16460
Sand # 12900 @ 6.25%
Fly Ash # 1330
Cement # 5365
Water # 1944

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Footings B, C, and D south ends.

Truck No. 10556
Date Sampled: November 14, 2006
Date Received: November 15, 2006
Sampled By: M. Torrez/ A. Gutierrez
Batch Size: 10.0 cy
Time Batched: 11:59 a.m.
Time Placed:
Time Sampled: 12:35 p.m.
Yield Relative: 1.00

Measured

Slump (in.): 4.25"
Slump w/plasticizer (in.) "
Air Temperature (°F): 44°
Mix Temp (°F): 68°
Air Content (%): 5.1% uncorrected
Unit Weight (pcf): 140.5
Water Added (gal): 10
Ticket No.: 99483
W/C Ratio 0.41

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
54A	11/21/06	7	4.00 x	8.00	12.57	61885	4920**	NA
54B	11/21/06	7FC	4.00 x	8.00	12.57	62235	4950**	NA
54C	12/12/06	28	4.00 x	8.00	12.57			
54D	12/12/06	28	4.00 x	8.00	12.57			

Lab # 6393 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3	Steve Edwards sedwards@northwind-inc.com		

Transmittal Date: 11/10/06	**Transmittal DCN: 71610.2 – ALB06TS039**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD039 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	11/09/06	6265C.46
Concrete Cylinder Test Report	11/09/06	6266C.47

INSTRUCTIONS/REMARKS

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NOTES

Perry Hampel
Project Manager

11/10/06
Date

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: November 9, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16560
Sand # 13200 @ 7.25%
Fly Ash # 1330
Cement # 5335
Water # 1858

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: 160' North of Bulkhead - Footing E.

Measured

Truck No. 10466
Date Sampled: October 12, 2006
Date Received: October 13, 2006
Sampled By: M. Torrez/ A. Gutierrez
Batch Size: 10.0 cy
Time Batched: 10:41 a.m.
Time Placed:
Time Sampled: 11:15 a.m.
Yield Relative: 1.01

Slump (in.): 4.5"
Slump w/plasticizer (in.) "
Air Temperature (°F): 55°
Mix Temp (°F): 67°
Air Content (%): 4.4% uncorrected
Unit Weight (pcf): 140.7
Water Added (gal): 0
Ticket No.: 99113
W/C Ratio 0.413

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
46A	10/19/06	7	4.01 x	8.00	12.63	45859	3630*****	NA
46B	10/19/06	7	4.00 x	8.00	12.57	49952	3970*****	NA
46C	11/9/06	28	4.00 x	8.00	12.57	72694	5780*****	C
46C	11/9/06	28	4.00 x	8.00	12.57	80881	6430*****	C

Lab # 6265 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: November 9, 2006
Page 1 of 1
Project No 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No 3000 ¾"
Design Strength: 3000 PSI

Agg # 16480
Sand # 13080 @ 7.25%
Fly Ash # 1335
Cement # 5370
Water # 1825

Max. Size Agg (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: 130' North of Bulkhead - Footing E

			Measured
Truck No.	10466	Slump (in.):	4.5"
Date Sampled:	October 12, 2006	Slump w/plasticizer (in.)	"
Date Received:	October 13, 2006	Air Temperature (°F):	59°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	70°
Batch Size:	10.0 cy	Air Content (%):	5.0% uncorrected
Time Batched:	12:36 p.m.	Unit Weight (pcf):	140.4
Time Placed:		Water Added (gal):	0
Time Sampled:	1:10 p.m.	Ticket No.:	99124
Yield Relative:	1.00	W/C Ratio	0.414

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
47A	10/19/06	7	4.01 x	8.00	12.63	47678	3770*****	NA
47B	10/19/06	7	4.02 x	8.00	12.69	58125	4580*****	NA
47C	11/9/06	28	4.00 x	8.00	12.57	70420	5580*****	C
47D	11/9/06	28	4.00 x	8.00	12.57	72440	5740*****	C

Lab # 6266 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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Transmittal Date: 11/06/06	**Transmittal DCN: 71610.2 – ALB06TS038**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD038 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	11/02/06	6286C.48
Concrete Cylinder Test Report	11/02/06	6287C.49

INSTRUCTIONS/REMARKS

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NOTES

Perry Hampel
Project Manager

11/06/06
Date

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: November 2, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16420
Sand # 12980 @ 6.75%
Fly Ash # 1350
Cement # 5405
Water # 1873

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: 75' From SE corner

Measured

Truck No. 10466
Date Sampled: October 26, 2006
Date Received: October 27, 2006
Sampled By: M. Torrez/ A. Gutierrez
Batch Size: 10.0 cy
Time Batched: 7:13 a.m.
Time Placed:
Time Sampled: 7:40 a.m.
Yield Relative: .98

Slump (in.): 5.25"
Slump w/plasticizer (in.) "
Air Temperature (°F): 27.8°
Mix Temp (°F): 77°
Air Content (%): 5.0% uncorrected
Unit Weight (pcf): 143.3
Water Added (gal): 0
Ticket No.: 99284
W/C Ratio 0.407

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
48A	10/31/06	5	4.00 x	8.00	12.57	49260	3920*****	NA
48B	11/2/06	7	4.00 x	8.00	12.57	52859	4200**	NA
48C	11/2/06	7FC	4.00 x	8.00	12.57	43881	3490*****	NA
48D	11/23/06	28	4.00 x	8.00	12.57			

Lab # 6286 Curing: Lab/Water tanks Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: November 2, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16480
Sand # 13020 @ 6.75%
Fly Ash # 1350
Cement # 5355
Water # 1884

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400oz
Air = 45oz

SAMPLE DATA

Location: NW wall section middle approximately 14' up first panel placed. Measured

Truck No. 10460
Date Sampled: October 26, 2006
Date Received: October 27, 2006
Sampled By: M. Torrez/ A. Gutierrez
Batch Size: 10.0 cy
Time Batched: 2:21p.m.
Time Placed:
Time Sampled: 2:55 p.m.
Yield Relative: .97

Slump (in.): 4.5"
Slump w/plasticizer (in.) "
Air Temperature (°F):
Mix Temp (°F):
Air Content (%): 4.75% uncorrected
Unit Weight (pcf): 144.9
Water Added (gal): 0
Ticket No.: 99302
W/C Ratio 0.412

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
49A	10/31/06	5	4.00 x	8.00	12.57	56498	4500**	NA
49B	11/2/06	7	4.00 x	8.00	12.57	56280	4480**	NA
49C	11/2/06	7FC	4.00 x	8.00	12.57	51712	4110*****	NA
49D	11/23/06	28	4.00 x	8.00	12.57			

Lab # 6287 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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Transmittal Date: 11/01/06	**Transmittal DCN: 71610.2 – ALB06TS037**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD037 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Moisture Density Test Report	10/23/06	71610MD 014

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel
Project Manager

11/01/06
Date

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Date

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IN-PLACE DENSITY-MOISTURE

KLEINFELDER

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☑ Yes ☐ No

File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Port	Technician/Engineer: M. Torrez
Date: 10/23/2006	Client: Nortrhwind	Contractor/Representative: Northwind/ Steve Edwards	Time Arrived: 9:00 AM
Daily Field Report No.: 71610MD.014	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Clear, cool	Time Departed: 10:00 AM
Reviewed By: P. German	Location of Fill: Base course (E) of pad #5	Gauge Number: 3253 / Make/Model: MC-3	Travel Time (hours): 3.0
Date Reviewed: 10/27/2006	Specified Compaction Requirements: Density 95 % to 100%; Moisture 7.5 % + 3%	Standardization Counts: Density 35166 / Moisture 8605	Total Time (hours): 4 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
48	15' (E) 50' (S) of NE corner of pad	BS	BCFSG	140.9	7.3	138.6	133.6	5.5	96.0	P	GP-GM
49	25' (E) 100' (S) of NE corner of pad	BS	BCFSG	143.0	6.8	138.6	136.2	5.0	98.0	P	GP-GM
50	50' (E) 25' (S) of NE corner of pad	BS	BCFSG	143.1	8.2	138.6	34.9	6.1	97.0	P	GP-GM

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-115	GP-GM		138.6	7.5	ASTM D 1557

NOTES

1 Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.

2 Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

☐ Continued on next page.

KLEINFELDER

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Transmittal Date: 11/01/06	**Transmittal DCN: 71610.2 – ALB06TS036**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD036 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	10/27/06	6217C.42
Concrete Cylinder Test Report	10/27/06	6218C.43
Concrete Cylinder Test Report	10/27/06	6219C.44
Concrete Cylinder Test Report	10/27/06	6220C.45
Concrete Cylinder Test Report	10/31/06	6286C.48
Concrete Cylinder Test Report	10/31/06	6287C.49

INSTRUCTIONS/REMARKS

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NOTES

Perry Hampel
Project Manager

11/01/06
Date

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Date

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: October 27, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16520
Sand # 13020 @ 7.00%
Fly Ash # 1330
Cement # 5365
Water # 1904

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 328^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Retaining wall footing 30' N of bulk head.

			Measured
Truck No.	10466	Slump (in.):	4.25"
Date Sampled:	September 29, 2006	Slump w/plasticizer (in.)	"
Date Received:	October 5, 2006	Air Temperature (°F):	48°
Sampled By:	M. Torrez/ A. Gutierrez	Mix Temp (°F):	73°
Batch Size:	10.0 cy	Air Content (%):	4.0% uncorrected
Time Batched:	6:35 a.m.	Unit Weight (pcf):	139.1
Time Placed:		Water Added (gal):	5
Time Sampled:	7:15 a.m.	Ticket No.:	98918
Yield Relative:	1.02	W/C Ratio	0.42

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
42A	10/6/06	7	4.00 x	8.00	12.57	50427	4470*****	NA
42B	10/6/06	7FC	4.00 x	8.00	12.57	50348	4010*****	NA
42C	10/27/06	28	4.00 x	8.00	12.57	78132	6210*****	C
42C	Hold	Hold	4.00 x	8.00	12.57			

Lab # 6217 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: October 27, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16460
Sand # 13040 @ 7.00%
Fly Ash # 1450
Cement # 5335
Water # 1874

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 328^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Retaining wall footing 10' N of bulk head

Truck No. 10466
Date Sampled: September 29, 2006
Date Received: October 5, 2006
Sampled By: M. Torrez/ A. Gutierrez
Batch Size: 10.0 cy
Time Batched: 7:48 a.m.
Time Placed:
Time Sampled: 8:15 a.m.
Yield Relative: 1.01

Measured

Slump (in.): 5.0"
Slump w/plasticizer (in.) "
Air Temperature (°F): 61°
Mix Temp (°F): 68°
Air Content (%): 4.8% uncorrected
Unit Weight (pcf): 139.6
Water Added (gal): 5
Ticket No.: 98924
W/C Ratio 0.41

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
43A	10/6/06	7	4.00 x	8.00	12.57	58218	4630*****	NA
43B	10/6/06	7FC	4.00 x	8.00	12.57	51613	4110****	NA
43C	10/27/06	28	4.00 x	8.00	12.57	49099	3906**	C
43C	Hold	Hold	4.00 x	8.00	12.57			

Lab # 6218 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: October 27, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16400
Sand # 13060 @ 7.00%
Fly Ash # 1335
Cement # 5345
Water # 1891

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 328^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Retaining wall footing 100' N of bulk head

Measured

Truck No. 10546
Date Sampled: September 29, 2006
Date Received: October 5, 2006
Sampled By: M. Torrez/ A. Gutierrez
Batch Size: 10.0 cy
Time Batched: 8:37 a.m.
Time Placed:
Time Sampled: 9:05 a.m.
Yield Relative: 1.01

Slump (in.): 4.0"
Slump w/plasticizer (in.) "
Air Temperature (°F): 62°
Mix Temp (°F): 68°
Air Content (%): 5.0% uncorrected
Unit Weight (pcf): 139.4
Water Added (gal): 0
Ticket No.: 98928
W/C Ratio 0.42

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
44A	10/6/06	7	4.00 x	8.00	12.57	48805	3860*****	NA
44B	10/6/06	7FC	4.00 x	8.00	12.57	46135	3650*****	NA
44C	10/27/06	28	4.00 x	8.00	12.57	65199	5190**	C
44C	Hold	Hold	4.00 x	8.00	12.57			

Lab # 6219 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: October 27, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16420
Sand # 13080 @ 7.00%
Fly Ash # 1350
Cement # 5435
Water # 1894

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 400oz
Air = 45oz

SAMPLE DATA

Location: Retaining wall footing 140' N of bulk head.

Truck No. 10456
Date Sampled: September 29, 2006
Date Received: October 5, 2006
Sampled By: M. Torrez/ A. Gutierrez
Batch Size: 10.0 cy
Time Batched: 10:10 a.m.
Time Placed:
Time Sampled: 10:42 a.m.
Yield Relative: 1.02

Measured

Slump (in.): 4.0"
Slump w/plasticizer (in.) "
Air Temperature (°F): 68°
Mix Temp (°F): 68°
Air Content (%): 5.8% uncorrected
Unit Weight (pcf): 138.9
Water Added (gal): 0
Ticket No.: 98939
W/C Ratio 0.42

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
45A	10/6/06	7	4.01 x	8.00	12.57	59326	4700****	NA
45B	10/6/06	7FC	4.00 x	8.00	12.57	52029	4120****	NA
45C	10/27/06	28	4.00 x	8.00	12.57	77282	6150*****	C
45C	Hold	Hold	4.00 x	8.00	12.57			

Lab # 6220 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: October 31, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16420
Sand # 12980 @ 6.75%
Fly Ash # 1350
Cement # 5405
Water # 1873

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: 75' From SE corner.

Truck No. 10466
Date Sampled: October 26, 2006
Date Received: October 27, 2006
Sampled By: M. Torrez/ A. Gutierrez
Batch Size: 10.0 cy
Time Batched: 7:13 a.m.
Time Placed:
Time Sampled: 7:40 a.m.
Yield Relative: .98

Measured

Slump (in.): 5.25"
Slump w/plasticizer (in.) "
Air Temperature (°F): 27.8°
Mix Temp (°F): 77°
Air Content (%): 5.0% uncorrected
Unit Weight (pcf): 143.3
Water Added (gal): 0
Ticket No.: 99284
W/C Ratio 0.407

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
48A	10/31/06	5	4.00 x	8.00	12.57	49260	3920*****	NA
48B	11/2/06	7	4.00 x	8.00	12.57			
48C	11/2/06	7FC	4.00 x	8.00	12.57			
48D	11/23/06	28	4.00 x	8.00	12.57			

Lab # 6286 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: October 31, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16480
Sand # 13020 @ 6.75%
Fly Ash # 1350
Cement # 5355
Water # 1884

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: NW wall section middle approximately 14' up first panel placed

Measured

Truck No. 10460
Date Sampled: October 26, 2006
Date Received: October 27, 2006
Sampled By: M. Torrez/ A. Gutierrez
Batch Size: 10.0 cy
Time Batched: 2:21p.m.
Time Placed:
Time Sampled: 2:55 p.m.
Yield Relative: .97

Slump (in.): 4.5"
Slump w/plasticizer (in.) "
Air Temperature (°F):
Mix Temp (°F):
Air Content (%): 4.75% uncorrected
Unit Weight (pcf): 144.9
Water Added (gal): 0
Ticket No.: 99302
W/C Ratio 0.412

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
49A	10/31/06	5	4.00 x	8.00	12.57	56498	4500**	NA
49B	11/2/06	7	4.00 x	8.00	12.57			
49C	11/2/06	7FC	4.00 x	8.00	12.57			
49D	11/23/06	28	4.00 x	8.00	12.57			

Lab # 6287 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: Perry Hampel
Kleinfelder, Inc

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KLEINFELDER

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION					Pages:	2
1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3	Steve Edwards sedwards@northwind-inc.com	

Transmittal Date: 10/23/06	**Transmittal DCN: 71610.2 – ALB06TS035**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD035 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Moisture Density Test Report	10/18/06	71610MD.013

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form Keep one copy for your records and mail the other copy to Kleinfelder, Inc at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

10/23/06
Date

RECEIPT AND READ ACKNOWLEDGEMENT PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

IN-PLACE DENSITY-MOISTURE

KLEINFELDER

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report	☑ Yes ☐ No		Page 1 of 1
File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Port	Technician/Engineer: M. Torrez
Date: 10/18/2006	Client: Northwind	Contractor/Representative: Northwind/ Steve Edwards	Time Arrived: 11:00 AM
Daily Field Report No.: 71610MD.013	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Clear, cool	Time Departed: 6:45 PM
Reviewed By: P. German	Location of Fill: Base course subgrade	Gauge Number: 3253 / Make/Model: MC-3	Travel Time (hours): 3.0
Date Reviewed: 10/23/2006	Specified Compaction Requirements: Density 95 % to 100%; Moisture 7.5 % '+ 3%	Standardization Counts: Density 35166 / Moisture 8605	Total Time (hours): 11 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
38	85' (N) 15' (W) of SW corner of pad #2	BS	BCFSG	139.1	6.5	138.6	132.6	4.9	956.0	P	GP-GM
39	25' (E) 90' (N) of SE corner of pad #2	BS	BCFSG	139.8	6.5	138.6	133.2	4.9	96.1	P	GP-GM
40	20' (E) 50' (S) of NE corner of pad #4	BS	BCFSG	143.0	7.8	138.6	135.2	5.8	98.0	P	GP-GM
41	45' (E) 30' (N) of SE corner of pad #4	BS	BCFSG	140.7	6.8	138.6	133.9	5.1	96.6	P	GP-GM
42	30' (E) 20' (N) of SE corner of pad #2	BS	BCFSG	142.1	7.4	138.6	134.7	5.5	97.1	P	GP-GM
43	40' (N) 30' (W) of SW corner of pad #2	BS	BCFSG	143.3	8.2	138.6	135.1	6.1	97.6	P	GP-GM
44	50' (S) 10' (W) of SE corner of pad # 4	BS	BCFSG	144.7	8.1	138.6	136.6	5.9	98.6	P	GP-GM
45	50' (S) 15' (W) of SW corner of pad #3	BS	BCFSG	140.1	6.4	138.6	133.7	4.8	96.5	P	GP-GM
46	5' (N) 20' (W) of NW corner of pad #2	BS	BCFSG	142.7	6.9	138.6	135.8	5.1	98.0	P	GP-GM
47	5' (N) 20' (W) of NW corner of pad #1	BS	BCFSG	142.1	7.9	138.6	134.2	5.9	96.8	P	GP-GM

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-115	GP-GM		138.6	7.5	ASTM D 1557

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed.

KLEINFELDER REPRESENTATIVE

Concrete/Soil Nuclear Gauge

K L E I N F E L D E R

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION					Pages:	3
1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3	Steve Edwards sedwards@northwind-inc.com	

Transmittal Date: 10/23/06	**Transmittal DCN: 71610.2 – ALB06TS034**

Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD034 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	10/19/06	6265C 46
Concrete Cylinder Test Report	10/19/06	6266C 47

INSTRUCTIONS/REMARKS

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NOTES

Perry Hampel
Project Manager

10/23/06
Date

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PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: October 19, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16560
Sand # 13200 @ 7.25%
Fly Ash # 1330
Cement # 5335
Water # 1858

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: 160' North of Bulkhead - Footing E

Measured

Truck No. 10466
Date Sampled: October 12, 2006
Date Received: October 13, 2006
Sampled By: M. Torrez/ A. Gutierrez
Batch Size: 10.0 cy
Time Batched: 10:41 a.m.
Time Placed:
Time Sampled: 11:15 a.m.
Yield Relative: 1.01

Slump (in.): 4.5"
Slump w/plasticizer (in.) "
Air Temperature (°F): 55°
Mix Temp (°F): 67°
Air Content (%): 4.4% uncorrected
Unit Weight (pcf): 140.7
Water Added (gal): 0
Ticket No.: 99113
W/C Ratio 0.413

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
46A	10/19/06	7	4.01 x	8.00	12.63	45859	3630*****	NA
46B	10/19/06	7	4.00 x	8.00	12.57	49952	3970*****	NA
46C	11/9/06	28	4.00 x	8.00	12.57			
46C	11/9/06	28	4.00 x	8.00	12.57			

Lab # 6265 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: October 19, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16480
Sand # 13080 @ 7.25%
Fly Ash # 1335
Cement # 5370
Water # 1825

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: 130' North of Bulkhead - Footing E

Measured

Truck No. 10466
Date Sampled: October 12, 2006
Date Received: October 13, 2006
Sampled By: M. Torrez/ A. Gutierrez
Batch Size: 10.0 cy
Time Batched: 12:36 p.m.
Time Placed:
Time Sampled: 1:10 p.m.
Yield Relative: 1.00

Slump (in.): 4.5"
Slump w/plasticizer (in.) "
Air Temperature (°F): 59°
Mix Temp (°F): 70°
Air Content (%): 5.0% uncorrected
Unit Weight (pcf): 140.4
Water Added (gal): 0
Ticket No.: 99124
W/C Ratio 0.414

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
47A	10/19/06	7	4.01 x	8.00	12.63	47678	3770*****	NA
47B	10/19/06	7	4.02 x	8.00	12.69	58125	4580*****	NA
47C	11/9/06	28	4.00 x	8.00	12.57			
47D	11/9/06	28	4.00 x	8.00	12.57			

Lab # 6266 Curing: Lab/Water tanks Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CMT LAB REPORT DISTRIBUTION					Pages:	3
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Transmittal Date: 10/23/06	**Transmittal DCN: 71610.2 – ALB06TS034**

Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD034 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	10/19/06	6265C 46
Concrete Cylinder Test Report	10/19/06	6266C 47

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form Keep one copy for your records and mail the other copy to Kleinfelder, Inc at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

10/23/06
Date

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Date

Print Name

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: October 19, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16560
Sand # 13200 @ 7.25%
Fly Ash # 1330
Cement # 5335
Water # 1858

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: 160' North of Bulkhead - Footing E

Measured

Truck No. 10466
Date Sampled: October 12, 2006
Date Received: October 13, 2006
Sampled By: M. Torrez/ A. Gutierrez
Batch Size: 10.0 cy
Time Batched: 10:41 a.m.
Time Placed:
Time Sampled: 11:15 a.m.
Yield Relative: 1.01

Slump (in.): 4.5"
Slump w/plasticizer (in.) "
Air Temperature (°F): 55°
Mix Temp (°F): 67°
Air Content (%): 4.4% uncorrected
Unit Weight (pcf): 140.7
Water Added (gal): 0
Ticket No.: 99113
W/C Ratio 0.413

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
46A	10/19/06	7	4.01 x	8.00	12.63	45859	3630*****	NA
46B	10/19/06	7	4.00 x	8.00	12.57	49952	3970*****	NA
46C	11/9/06	28	4.00 x	8.00	12.57			
46C	11/9/06	28	4.00 x	8.00	12.57			

Lab # 6265 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: October 19, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16480
Sand # 13080 @ 7.25%
Fly Ash # 1335
Cement # 5370
Water # 1825

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 400^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: 130' North of Bulkhead - Footing E

Measured

Truck No. 10466
Date Sampled: October 12, 2006
Date Received: October 13, 2006
Sampled By: M. Torrez/ A. Gutierrez
Batch Size: 10.0 cy
Time Batched: 12:36 p.m.
Time Placed:
Time Sampled: 1:10 p.m.
Yield Relative: 1.00

Slump (in.): 4.5"
Slump w/plasticizer (in.) "
Air Temperature (°F): 59°
Mix Temp (°F): 70°
Air Content (%): 5.0% uncorrected
Unit Weight (pcf): 140.4
Water Added (gal): 0
Ticket No.: 99124
W/C Ratio 0.414

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
47A	10/19/06	7	4.01 x	8.00	12.63	47678	3770*****	NA
47B	10/19/06	7	4.02 x	8.00	12.69	58125	4580*****	NA
47C	11/9/06	28	4.00 x	8.00	12.57			
47D	11/9/06	28	4.00 x	8.00	12.57			

Lab # 6266 Curing: Lab/Water tanks Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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Transmittal Date: 10/11/06	**Transmittal DCN: 71610.2 – ALB06TS033**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD033 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	10/10/06	6152C 41

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form Keep one copy for your records and mail the other copy to Kleinfelder, Inc at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

10/11/06
Date

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: October 10, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 14400
Sand # 11560 @ 7.50%
Fly Ash # 1155
Cement # 4670
Water # 1593

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 284^{oz}
Air = 39^{oz}

SAMPLE DATA

Location: Trench drain for Pad#5 – 20'S of NW corner of Pad#5 Measured

Truck No. 10546
Date Sampled: September 12, 2006
Date Received: September 13, 2006
Sampled By: M. Torrez
Batch Size: 8.75 cy
Time Batched: 12:05 p.m.
Time Placed:
Time Sampled: 12:38 a.m.
Yield Relative: 1.01

Slump (in.):
Slump w/plasticizer (in.) 4.0"
Air Temperature (°F): 77°
Mix Temp (°F): 75°
Air Content (%): 4.6% uncorrected
Unit Weight (pcf): 140.0
Water Added (gal): 0
Ticket No.: 98695
W/C Ratio 0.42

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
41A	9/19/06	7	4.00 x	8.00	12.57	56151	4470**	NA
41B	9/19/06	7FC	4.00 x	8.00	12.57	49619	3950**	NA
41C	10/10/06	28	4.00 x	8.00	12.57	77816	6190****	C
41C	10/10/06	28	4.00 x	8.00	12.57	73070	5810****	C

Lab # 6152 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: Scott Olson for
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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Transmittal Date: 10/11/06	**Transmittal DCN: 71610.2 – ALB06TS032**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD032 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Moisture Density Test Report	10/05/06	71610MD 012

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form Keep one copy for your records and mail the other copy to Kleinfelder, Inc at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

10/11/06
Date

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Date

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IN-PLACE DENSITY-MOISTURE

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☑ Yes ☐ No

File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Port	Technician/Engineer: M. Torrez
Date: 10/5/2006	Client: Northwind	Contractor/Representative: Northwind/ Steve Edwards	Time Arrived: 11:40 AM
Daily Field Report No.: 71610MD.012	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Overcast, warm	Time Departed: 1:30 PM
Reviewed By: P. German	Location of Fill: Base course matcon subgrade	Gauge Number: 3253 / Make/Model: MC-3	Travel Time (hours): 3.5
Date Reviewed: 9/25/2006	Specified Compaction Requirements: Density 95 % to 100%; Moisture 7.5 % + 2%	Standardization Counts: Density 34843 / Moisture 8459	Total Time (hours): 5.5 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
34	West of pad #1 30' (W), 100' (S) of NW corner	BS	BCFSG	142.7	7.7	138.6	135.0	5.7	97.0	P	GP-GW
35	30' (W), 75'(S) of NW corner of pad #4	BS	BCFSG	144.0	7.1	138.6	136.9	5.2	99.0	P	GP-GW
36	45' (S) 10' (E) of SE corner of pad #1	BS	BCFSG	140.2	6.7	138.6	133.5	5.2	96.0	P	GP-GW
37	60' (S) 30' (E) of SE corner of pad #3	BS	BCFSG	142.6	8.2	138.6	134.4	6.1	97.0	P	GP-GW

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-115	GP-GM		138.6	7.5	ASTM D 1557

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed.

KLEINFELDER REPRESENTATIVE

☐ Continued on next page

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Transmittal Date: 09/21/06	**Transmittal DCN: 71610.2 – ALB06TS025**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD025TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Moisture Density Test Report	9/12/06	71610MD.009
Moisture Density Test Report	9/19/06	71610MD.010
Direct Shear Test Report	9/19/06	71610DS.002
Carbonate Content	8/30/06	71610CC.002

INSTRUCTIONS/REMARKS

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NOTES

Perry Hampel
Project Manager

09/21/06
Date

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IN-PLACE DENSITY-MOISTURE

KLEINFELDER

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

		Client Received Copy of this Report ☐ Yes ☐ No	Page 1 of 1
File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Port	Technician/Engineer: M. Torrez
Date: 9/12/2006	Client: Nortrhwind	Contractor/Representative: Northwind	Time Arrived: 12:00 AM
Daily Field Report No.: 71610MD.009	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Cloudy	Time Departed: 1:30 PM
Reviewed By: P. German	Location of Fill: 1st lift above geo composite infilteration	Gauge Number: 3185 / Make/Model: MC-3	Travel Time (hours): 3.0
Date Reviewed: 9/14/2006	Specified Compaction Requirements: Density 100 % to 100%; Moisture 14.2 % + 3%	Standardization Counts: Density 23653 / Moisture 14080	Total Time (hours): 5 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
22	10' (E) 30' (N) of NE corner of pad #1	BS	top 6" on geo	127.3	15.2	108.8	112.1	13.6	103.0	P	CL
23	10' (W) 45' (N) of NW corner of pad #1	BS	top 6" on geo	123.1	13.2	108.8	109.9	12.0	101.0	P	CL

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-102	CL		108.8	14.2	ASTM D 698

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and, therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

☐ Continued on next page.

IN-PLACE DENSITY-MOISTURE

KLEINFELDER

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report: ☐ Yes ☐ No

File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Port	Technician/Engineer: M. Torrez
Date: 9/19/2006	Client: Nortrhwind	Contractor/Representative: Northwind	Time Arrived: 1:45 PM
Daily Field Report No.: 71610MD.010	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: clear, cool	Time Departed: 4:00 PM
Reviewed By: P. German	Location of Fill: Retaining wall footing Infiltration lift	Gauge Number: 3185 / Make/Model: MC-3	Travel Time (hours): 3.0
Date Reviewed: 9/20/2006	Specified Compaction Requirements: Density 95 % to 100%; Moisture n/a % + n/a	Standardization Counts: Density 23653 / Moisture 14080	Total Time (hours): 5.5 (May not include minimum)

Test No.	Test Location	Probe Depth (Inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max. Dry Density	Comments: Pass/Fail	Comments: Material Classification
24	Footing - bench E-1 station 169 + 00	6"	FSG	142.4	13.2	133.5	129.2	10.2	97.0	P	SM
25	Footing - 185 + 00	6"	FSG	142.9	11.8	133.5	131.1	9.0	98.0	P	SM
26	Footing - 235 + 00	6"	FSG	139.2	11.6	133.5	127.6	9.1	96.0	P	SM
27	Footing - 285 + 00	6"	FSG	140.2	11.9	133.5	128.3	9.3	96.0	P	SM
28	Infiltration 25' (N), 15' (W) of NE corner of pad # 4	BS	Top lift FSG	120.9	11.0	108.8	109.9	10.0	101.0	P	CL
29	Infiltration 30' (N), 15' (E) of NE of pad # 3	BS	Top lift FSG	120.2	11.3	108.8	109.9	10.4	100.0	P	CL

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-106	SM		133.5	7.2	ASTM D 1557
06-102	CL		108.8	14.2	ASTM D 698

NOTES

1. Test results, pass/fail indications, and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and therefore, should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed.

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☐ Continued on next page.

LARGE SCALE INTERNAL DIRECT SHEAR TEST DATA

ASTM D 3080 - 12" x 12" Box

Client:	Kleinfelder	Date:	09/19/2006
Project No:	2304-74	Test Date:	09-18&19-06
Project:	Los Alamos Landfill Gravel Pit, #71610	Technician:	SR
Interface:	Sample #06-106	Shear Rate:	0.04"/min
Special conditions:	Inundated, 95% of 133.5 MDD, 7.2% Moisture Content	Test Series:	DS-2

Displacement (inches)	Normal Force 504 psf Shear Stress (psf)	Normal Force 1512 psf Shear Stress (psf)	Normal Force 3024 psf Shear Stress (psf)
0	0	0	0
0.029	549	693	815
0.092	941	1571	1740
0.159	994	1913	2228
0.224	996	1988	2537
0.293	1012	2034	2738
0.361	1001	2094	2879
0.425	992	2135	2990
0.493	986	2169	3081
0.563	986	2208	3169
0.628	976	2230	3232
0.695	974	2273	3309
0.76	961	2296	3372
0.827	956	2281	3417
0.894	969	2260	3460
0.957	976	2243	3506
1.022	979	2222	3513
1.091	974	2187	3556
1.155	984	2155	3563
1.22	987	2114	3584
1.285	1002	2077	3601
1.35	1007	2071	3599
1.417	1007	2046	3579
1.481	1007	2041	3591
1.543	1011	2016	3596
1.608	1019	1979	3596
1.673	1032	1956	3568
1.735	1034	1953	3559
1.8	1044	1956	3563
1.866	1049	1931	3578
1.928	1057	1914	3569
1.992	1060	1875	3549
2.055	1075	1885	3508
2.119	1090	1905	3495

Data Entered By: SR Date: 09/19/2006

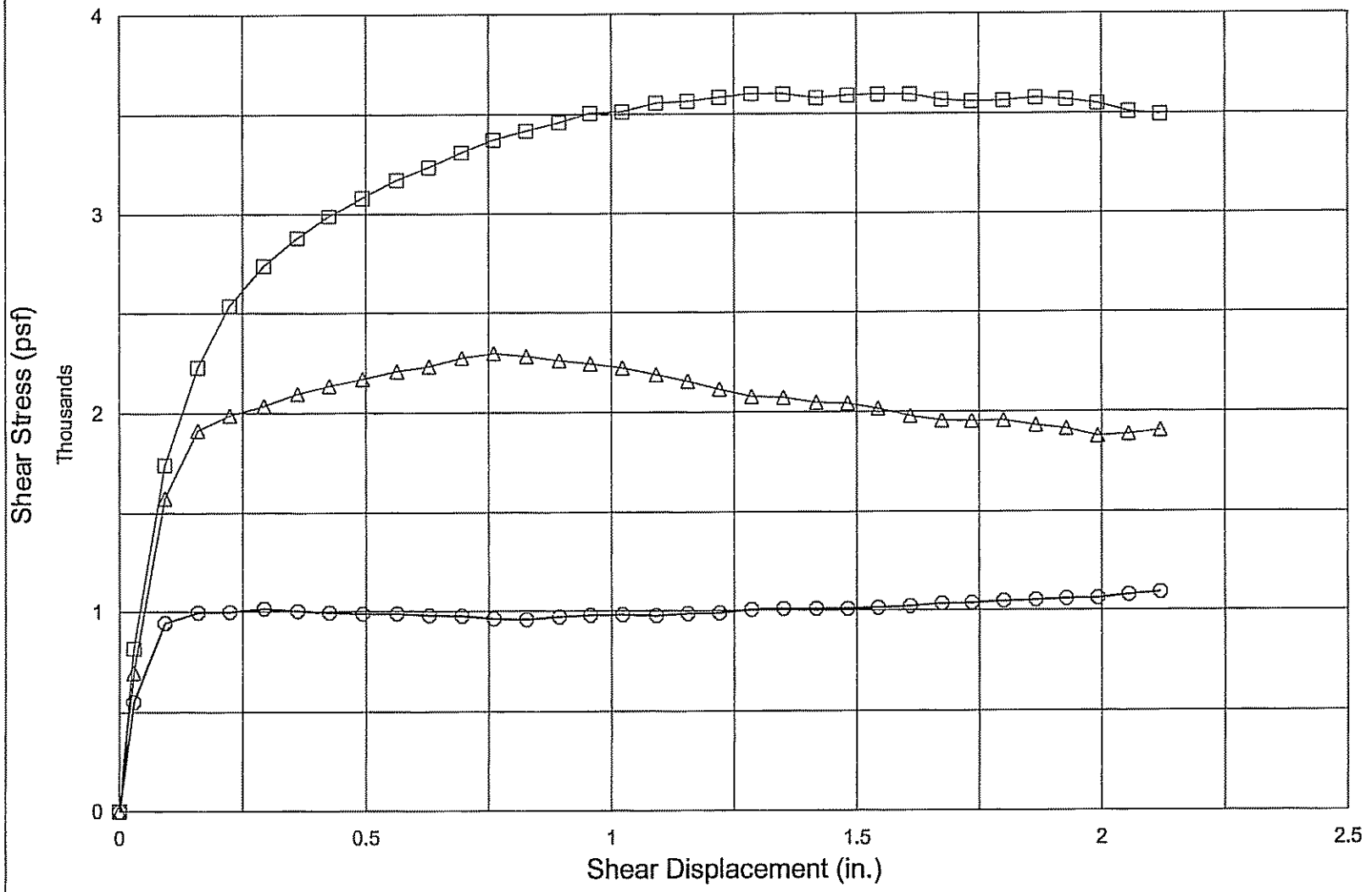
Data Checked By: CJ Date: 09/19/06

File Name: KIDSNATI

Advanced Terra Testing, Inc.

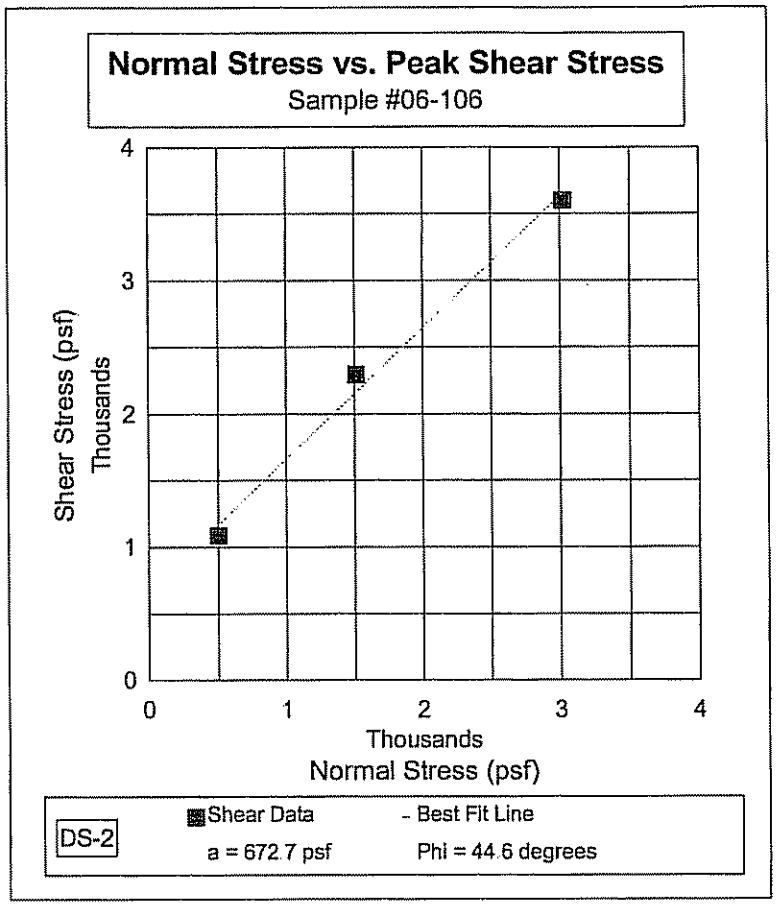
Shear Stress vs. Displacement

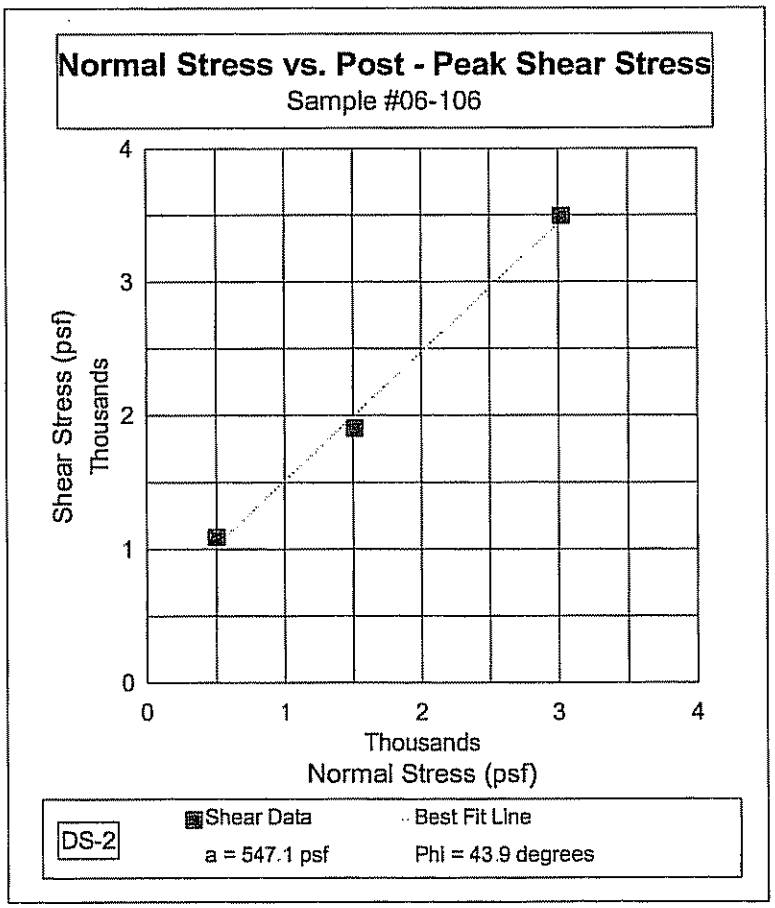
Sample #06-106



DS-2

⊖ Normal Force 504 psf △ Normal Force 1512 psf ⊟ Normal Force 3024 psf





ADVANCED TERRA TESTING, Inc.

CARBONATE CONTENT
ASTM D 4373

PROJECT TITLE	KLEINFELDER/TA73 LOS ALAMOS AIRPORT LF/NM
PROJECT NUMBER	063-3468
REMARKS	-

SAMPLE ID	06-257	-	-
SPECIMEN NUMBER	$CaCO_3$ %	$CaCO_3$ %	$CaCO_3$ %
1	4.8	-	-
2	5.1	-	-
AVERAGE	5.0	-	-

SAMPLE ID	-	-	-
SPECIMEN NUMBER	$CaCO_3$ %	$CaCO_3$ %	$CaCO_3$ %
1	-	-	-
2	-	-	-
AVERAGE	-	-	-

SAMPLE ID	-	-	-
SPECIMEN NUMBER	$CaCO_3$ %	$CaCO_3$ %	$CaCO_3$ %
1	-	-	-
2	-	-	-
AVERAGE	-	-	-

SAMPLE ID	-	-	-
SPECIMEN NUMBER	$CaCO_3$ %	$CaCO_3$ %	$CaCO_3$ %
1	-	-	-
2	-	-	-
AVERAGE	-	-	-

TECH	DA
DATE	8/30/2006
CHECK	DA
REVIEW	PWM

KLEINFELDER/TA 73 LOS ALAMOS AIRPORT LF/NM
SUMMARY OF SOIL DATA

Sample Identification	Sample Type	Sample Depth	Soil Classification	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Carbonate Content %	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Moisture %	Dry (lb/cuft)			
06-257	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	-

ABBREVIATIONS: LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
LIQUIDITY INDEX (LI)
SPECIFIC GRAVITY (Gs)
MOISTURE (Mc)

NOTES: T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

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Transmittal Date: 09/18/06	**Transmittal DCN: 71610.2 – ALB06TS024**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD024TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Aggregate Index Test Report	9/12/06	71610AI 002

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel
Project Manager

09/18/06
Date

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ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

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September 13, 2006
File No: 71610
Project: TA 73 Los Alamos Landfill
Lab No: 06-257

Subject: **NMDOT Aggregate Index Testing** – # 71610 AI. 2

Submitted here within are the results of the laboratory testing on the submitted aggregate sample of Russels Gravel Pit base course representing the purposed backfill material submitted August 15, 2006. This sample was tested in accordance with New Mexico State Highway and Transportation Department Standard Specifications for Highway and Bridge Construction, 2000 edition.

The sample submitted was tested for,

- Resistance to degradation by L.A. machine. = 25.3%
- Sulfate Soundness of Aggregates. = 4.5%
- Absorption. = 2.3%
- NMDOT Aggregate Index = 12.3

If you have any questions regarding this information, please contact us at (505) 344-7373.

Sincerely,

Kleinfelder, Inc.

Seth Olsen

Seth Olsen
Laboratory Manager

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Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD023TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	9/12/06	6096C.38
Concrete Cylinder Test Report	9/12/06	6097C.39
Concrete Cylinder Test Report	9/12/06	6098C.40

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

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Perry Hampel — Project Manager
09/18/06 — Date

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KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 12, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44 – 4000 ¾"
Design Strength: 4000 PSI

Agg # 16220
Sand # 11460 @ 7.25%
Fly Ash # 1645
Cement # 6515
Water # 1793

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: NE section of pad# 5, 20' W and 2' S of NE corner. Measured

Truck No. 10536
Date Sampled: September 5, 2006
Date Received: September 6, 2006
Sampled By: M. Torrez
Batch Size: 10.0 cy
Time Batched: 1:03 a.m.
Time Placed:
Time Sampled: 1:55 a.m.
Yield Relative: 0.99

Slump (in.):
Slump w/plasticizer (in.) 5.75"
Air Temperature (°F): 56°
Mix Temp (°F): 72°
Air Content (%): 5.0% uncorrected
Unit Weight (pcf): 140.9
Water Added (gal): 0
Ticket No.: 98573
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
38A	9/12/06	7	4.00 x	8.00	12.57	65264	5190**	NA
38B	9/12/06	7FC	4.00 x	8.00	12.57	61580	4900**	NA
38C	9/3/06	28	4.00 x	8.00	12.57			
38C	9/3/06	28	4.00 x	8.00	12.57			

Lab # 6096 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 12, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44 – 4000 ¾"
Design Strength: 4000 PSI

Agg # 16280
Sand # 11560 @ 7.25%
Fly Ash # 1645
Cement # 6535
Water # 1798

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: NE section of pad# 5, 15' W and 75' S of NE corner. Measured

Truck No. 10546
Date Sampled: September 5, 2006
Date Received: September 6, 2006
Sampled By: M. Torrez
Batch Size: 10.0 cy
Time Batched: 3:25 a.m.
Time Placed:
Time Sampled: 3:55 a.m.
Yield Relative: 0.99

Slump (in.):
Slump w/plasticizer (in.) 5.5"
Air Temperature (°F): 51°
Mix Temp (°F): 73°
Air Content (%): 6.5% uncorrected
Unit Weight (pcf): 140.8
Water Added (gal): 0
Ticket No.: 98584
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
39A	9/12/06	7	4.00 x	8.00	12.57	59201	4750*****	NA
39B	9/12/06	7FC	4.00 x	8.00	12.57	55825	4440*****	NA
39C	9/3/06	28	4.00 x	8.00	12.57			
39C	9/3/06	28	4.00 x	8.00	12.57			

Lab # 6097 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 12, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44 – 4000 ¾"
Design Strength: 4000 PSI

Agg # 16220
Sand # 11460 @ 7.25%
Fly Ash # 1640
Cement # 6590
Water # 1803

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: SW section of pad# 5, 50' N and 10' E of SW corner. Measured

Truck No. 10546
Date Sampled: September 5, 2006
Date Received: September 6, 2006
Sampled By: M. Torrez
Batch Size: 10.0 cy
Time Batched: 5:57 a.m.
Time Placed:
Time Sampled: 6:40 a.m.
Yield Relative: 1.00

Slump (in.):
Slump w/plasticizer (in.) 5.0"
Air Temperature (°F): 51°
Mix Temp (°F): 73°
Air Content (%): 5.5% uncorrected
Unit Weight (pcf): 140.1
Water Added (gal): 0
Ticket No.: 98594
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
40A	9/12/06	7	4.00 x	8.00	12.57	63597	5060**	NA
40B	9/12/06	7FC	4.00 x	8.00	12.57	61857	4920**	NA
40C	9/3/06	28	4.00 x	8.00	12.57			
40C	9/3/06	28	4.00 x	8.00	12.57			

Lab # 6098 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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Transmittal Date: 09/11/06	**Transmittal DCN: 71610.2 – ALB06TS022**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD022TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Moisture Density Test Report	8/10/06	71610MD.008

INSTRUCTIONS/REMARKS

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Perry Hampel
Project Manager

09/11/06
Date

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IN-PLACE DENSITY-MOISTURE

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

		Client Received Copy of this Report ☐ Yes ☐ No	Page 1 of 1
File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Bet	Technician/Engineer: M. Emms
Date: 8/10/2006	Client: Northwind	Contractor/Representative: Northwind/ JB Henderson	Time Arrived: 12:00 AM
Daily Field Report No.: 71610MD.008	Source of Fill: ☐ NATIVE ☑ IMPORT	Weather: Cloudy	Time Departed: 11:00 AM
Reviewed By: P. German	Location of Fill: Pad 5	Gauge Number: 3184 / Make/Model: MC-3	Travel Time (hours): 3.0
Date Reviewed: 9/11/2006	Specified Compaction Requirements: Density 100 % to 100%; Moisture 14.2 % + 2%	Standardization Counts: Density 24784 / Moisture 14734	Total Time (hours): 14 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max Dry Density	Comments: Pass/Fail	Comments: Material Classification
19	Middle of Pad 5	BS	FSG	138.7	7.1	138.6	131.6	5.4	95.0	P	GP-GM
20	Between (S) piers of pad 5	BS	FSG	140.7	8.1	138.6	132.7	6.1	95.7	P	GP-GM
21	NE corner of pad 5	BS	FSG	14.6	10.1	138.6	133.5	7.6	96.4	P	GP-GM

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-115	GP-GM		138.6	7.5	ASTM D 1557

NOTES

1. Test results pass/fail indications and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and therefore should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

☐ Continued on next page

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Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD021 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Grout Compressive Test Report	9/06/06	5949GC.13
Grout Compressive Test Report	9/06/06	5955GC.14
Concrete Cylinder Test Report	8/15/06	5941C.25
Concrete Cylinder Test Report	9/06/06	5942C.26
Concrete Cylinder Test Report	9/06/06	5940C.27
Concrete Cylinder Test Report	9/07/06	6015C.28
Concrete Cylinder Test Report	9/07/06	6016C.29
Concrete Cylinder Test Report	9/07/06	6017C.30
Concrete Cylinder Test Report	9/06/06	6050C.36
Concrete Cylinder Test Report	9/06/06	6072C.37

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GROUT COMPRESSIVE STRENGTH TEST REPORT

Report To: Boyle Engineering
6501 Americas Parkway NE Suite 800
Albuquerque, NM 87110

Report Date: September 6, 2006
Page 1 of 1
Project No. 63251-3
Project Name: Raw water transmission line Diversion Channel to Treatment Plant Albuquerque, NM

Attention: Kevin Collins

MIX DATA

PCC Supplier: Lafarge
Mix No.: 41024
Design Strength: 4000 PSI

SAMPLE DATA

Location: Auger cast pile, pile #21, north Pino – south side of arroyo. Measured

Truck No. 4780204
Date Sampled: August 7, 2006
Date Received: August 8, 2006
Sampled By: B. Panos
Batch Size: 8.0 cy
Time Batched: 10:34 a.m.
Time Sample: 11:45 a.m.
Ticket Number: 3335675

Flow (sec.): 18
Air Temperature (°F): 75°
Mix Temp (°F): 82°
Water Added (gal) 10

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas) Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
13A	8/14/06	7	2" x 2"	4.00	13467	3370	NA
13B	8/21/06	14	2" x 2"	4.00	14664	3670	NA
13C	8/21/06	14	2" x 2"	4.00	14218	3550	NA
13D	9/4/06	28	2" x 2"	4.00	20091	5020*	C
13E	9/4/06	28	2" x 2"	4.00	19814	4950*	C

Lab # 5949 Curing: Lab/Water tanks
Remarks:

Distribution: Addressee (1)
File (1)

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Tests were performed in accordance with project specifications.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

Forney 85145/KA3108, Fowler 001100246

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

GROUT COMPRESSIVE STRENGTH TEST REPORT

Report To: Boyle Engineering
6501 Americas Parkway NE Suite 800
Albuquerque, NM 87110

Report Date: September 6, 2006
Page 1 of 1
Project No. 63251-3
Project Name: Raw water transmission line Diversion Channel to Treatment Plant Albuquerque, NM

Attention: Kevin Collins

MIX DATA

PCC Supplier: Lafarge
Mix No.: 41024
Design Strength: 4000 PSI

SAMPLE DATA

Location: Auger cast pile, pile #15, north Pino – nouth side of arroyo. Measured

Truck No. 4786548
Date Sampled: August 8, 2006
Date Received: August 9, 2006
Sampled By: B. Panos
Batch Size: 8.0 cy
Time Batched: 12:41 p.m.
Time Sample: 1:45 p.m.
Ticket Number: 3335701

Flow (sec.): 17
Air Temperature (°F): 78°
Mix Temp (°F): 80°
Water Added (gal) 10

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas) Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
14A	8/15/06	7	2" x 2"	4.00	14890	3720	NA
14B	8/22/06	14	2" x 2"	4.00	15216	3800	NA
14C	8/22/06	14	2" x 2"	4.00	15488	3870	NA
14D	9/5/06	28	2" x 2"	4.00	16091	4020	C
14E	9/5/06	28	2" x 2"	4.00	17060	4270	C

Lab # 5955 Curing: Lab/Water tanks
Remarks:

Distribution: Addressee (1)
File (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Humpel
Kleinfelder, Inc.

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Forney 85145/KA3108, Fowler 001100246

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 15, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16140
Sand # 11480 @ 6.83%
Fly Ash # 1665
Cement # 6505
Water # 1847

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade – NE corner of pad#4. Set #1. Measured

Truck No. 10486
Date Sampled: August 8, 2006
Date Received: August 9, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 1:12 a.m.
Time Placed:
Time Sampled: 1:45 a.m.
Yield Relative: 0.99

Slump (in.): 6.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 60°
Mix Temp (°F): 73°
Air Content (%): 6.8% uncorrected
Unit Weight (pcf): 140.8
Water Added (gal): 0
Ticket No.: 98140
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
25A	8/15/06	7	4.00 x	8.00	12.57	63479	5050****	NA
25B	8/15/06	7FC	4.00 x	8.00	12.57	61105	4860*****	NA
25C	9/5/06	28	4.00 x	8.00	12.57	83748	6660**	C
25C	9/5/06	28	4.00 x	8.00	12.57	80730	6420**	C

Lab # 5941 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Tests were performed in accordance with project specifications.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 6, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16140
Sand # 11460 @ 6.83%
Fly Ash # 1640
Cement # 6535
Water # 1841

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 73^{oz}

SAMPLE DATA

Location: Slab on grade –5' west of midpoint of E side of pad#4. Set #2. Measured

Truck No. 10486
Date Sampled: August 8, 2006
Date Received: August 9, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 2:57 a.m.
Time Placed:
Time Sampled: 3:30 a.m.
Yield Relative: 0.98

Slump (in.): 6.5"
Slump w/plasticizer (in.):
Air Temperature (°F): 61°
Mix Temp (°F): 76°
Air Content (%): 5.5% uncorrected
Unit Weight (pcf): 141.7
Water Added (gal): 0
Ticket No.: 98150
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam (Meas)		Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
26A	8/15/06	7	4.00	x	8.00	12.57	61007	4850*****	NA
26B	8/15/06	7FC	4.00	x	8.00	12.57	63479	5050****	NA
26C	9/5/06	28	4.00	x	8.00	12.57	82937	6600**	C
26C	9/5/06	28	4.00	x	8.00	12.57	84162	6700**	C

Lab # 5942 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 6, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 17980
Sand # 11440 @ 6.83%
Fly Ash # 1630
Cement # 6500
Water # 1857

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 73^{oz}

SAMPLE DATA

Location: Slab on grade –NW corner of S half of pad 4. Set #3.

Measured

Truck No. 10526
Date Sampled: August 8, 2006
Date Received: August 9, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 4:51 a.m.
Time Placed:
Time Sampled: 5:30 a.m.
Yield Relative: 1.03

Slump (in.): 6.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 61°
Mix Temp (°F): 76°
Air Content (%): 5.4% uncorrected
Unit Weight (pcf): 141.4
Water Added (gal): 0
Ticket No.: 98159
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
27A	8/15/06	7	4.00 x	8.00	12.57	61105	4860*****	NA
27B	8/15/06	7FC	4.00 x	8.00	12.57	61007	4850*****	NA
27C	9/5/06	28	4.00 x	8.00	12.57	71784	5710*****	C
27C	9/5/06	28	4.00 x	8.00	12.57	70180	5580*****	C

Lab # 5940 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 7, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16260
Sand # 11440 @ 6.58%
Fly Ash # 1630
Cement # 6565
Water # 1872

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade –SW corner of NW quarter of pad 4. Set #1. Measured

Truck No. 10456
Date Sampled: August 10, 2006
Date Received: August 23, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 2:53 a.m.
Time Placed:
Time Sampled: 3:30 a.m.
Yield Relative: 0.99

Slump (in.): 5.25"
Slump w/plasticizer (in.)
Air Temperature (°F): 60°
Mix Temp (°F): 75°
Air Content (%): 4.8% uncorrected
Unit Weight (pcf): 140.6
Water Added (gal): 0
Ticket No.: 98198
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
28A	8/23/06	13	4.00 x	8.00	12.57	56696	4510**	NA
28B	8/23/06	13FC	4.00 x	8.00	12.57	58574	4660***	NA
28C	9/7/06	28	4.00 x	8.00	12.57	65278	5190**	C
28C	9/7/06	28	4.00 x	8.00	12.57	63993	5090**	C

Lab # 6015 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: Perry Hammel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 7, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16260
Sand # 11480 @ 6.58%
Fly Ash # 1640
Cement # 6525
Water # 1871

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 73^{oz}

SAMPLE DATA

Location: Slab on grade –NE corner of NW quarter of pad 4. Set #2 Measured

Truck No. 10466
Date Sampled: August 10, 2006
Date Received: August 23, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 12:57 a.m.
Time Placed:
Time Sampled: 1:35 a.m.
Yield Relative: 1.01

Slump (in.): 6.00"
Slump w/plasticizer (in.)
Air Temperature (°F): 65°
Mix Temp (°F): 78°
Air Content (%): 6.2% uncorrected
Unit Weight (pcf): 139.0
Water Added (gal): 0
Ticket No.: 98188
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
29A	8/23/06	13	4.00 x	8.00	12.57	69114	5500***	NA
29B	8/23/06	13FC	4.00 x	8.00	12.57	65270	5190**	NA
29C	9/7/06	28	4.00 x	8.00	12.57	78251	6230**	C
29C	9/7/06	28	4.00 x	8.00	12.57	80125	5190**	C

Lab # 6016 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Tests were performed in accordance with project specifications.

Reviewed By: _____
Perry Hammel
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 7, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16180
Sand # 11400 @ 6.58%
Fly Ash # 1620
Cement # 6610
Water # 1872

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 73^{oz}

SAMPLE DATA

Location: Slab on grade –middle of Westside of SE quarter of pad 4. Set #3. Measured

Truck No. 10456
Date Sampled: August 10, 2006
Date Received: August 23, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 5:14 a.m.
Time Placed:
Time Sampled: 5:45 a.m.
Yield Relative: 0.99

Slump (in.): 6.00"
Slump w/plasticizer (in.)
Air Temperature (°F): 53°
Mix Temp (°F): 76°
Air Content (%): 5.4% uncorrected
Unit Weight (pcf): 140.6
Water Added (gal): 0
Ticket No.: 98208
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
30A	8/23/06	13	4.00 x	8.00	12.57	72872	5800***	NA
30B	8/23/06	13FC	4.00 x	8.00	12.57	73861	5880****	NA
30C	9/7/06	28	4.00 x	8.00	12.57	80150	6380**	C
30C	9/7/06	28	4.00 x	8.00	12.57	81731	6500**	C

Lab # 6017 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 6, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16440 Max. Size Agg. (in.): 7/8"
Sand # 13100 @ 6.89% Admixtures: P997 = 322^{oz}
Fly Ash # 1350 Air = 45^{oz}
Cement # 5350
Water # 1892

SAMPLE DATA

Location: Trench drain – Hanger pad #2, 25' S of NW corner of pad. Measured

Truck No. 10546
Date Sampled: August 28, 2006
Date Received: August 29, 2006
Sampled By: M. Torrez
Batch Size: 10.0 cy
Time Batched: 10:30 a.m.
Time Placed:
Time Sampled: 11:05 a.m.
Yield Relative: 1.01

Slump (in.): 4.25"
Slump w/plasticizer (in.)
Air Temperature (°F): 75°
Mix Temp (°F): 72°
Air Content (%): 4.4% uncorrected
Unit Weight (pcf): 140.5
Water Added (gal): 0
Ticket No.: 98449
W/C Ratio 0.42

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
36A	9/4/06	7	4.00 x	8.00	12.57	45348	4710*****	NA
36B	9/4/06	7FC	4.00 x	8.00	12.57	59227	4710**	NA
36C	9/25/06	28	4.00 x	8.00	12.57			
36C	9/25/06	28	4.00 x	8.00	12.57			

Lab # 6050 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: September 6, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 3000 ¾"
Design Strength: 3000 PSI

Agg # 16500
Sand # 13060 @ 6.63%
Fly Ash # 1340
Cement # 5355
Water # 1892

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 326^{oz}
Air = 45^{oz}

SAMPLE DATA

Location: Trench drain – Hanger pad #4, 20' S of NW corner of pad. Measured

Truck No. 10546
Date Sampled: August 29, 2006
Date Received: August 30, 2006
Sampled By: M. Torrez
Batch Size: 10.0 cy
Time Batched: 12:14 p.m.
Time Placed:
Time Sampled: 12:45 p.m.
Yield Relative: 1.00

Slump (in.): 4.25"
Slump w/plasticizer (in.)
Air Temperature (°F): 69°
Mix Temp (°F): 77°
Air Content (%): 5.3% uncorrected
Unit Weight (pcf): 141.1
Water Added (gal): 0
Ticket No.: 98468
W/C Ratio 0.42

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
37A	9/5/06	7	4.00 x	8.00	12.57	50980	4060**	NA
37B	9/5/06	7FC	4.00 x	8.00	12.57	49972	3980**	NA
37C	9/26/06	28	4.00 x	8.00	12.57			
37C	9/26/06	28	4.00 x	8.00	12.57			

Lab # 6072 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
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KLEINFELDER
An employee owned company

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION					Pages:	10
1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3		

Transmittal Date: 08/30/06 | **Transmittal DCN: 71610.2 – ALB06TS018**

Project No.: 71610 | **Task No.: 2** | **File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD018 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	8/23/06	5904C.16
Concrete Cylinder Test Report	8/23/06	5905C.17
Concrete Cylinder Test Report	8/24/06	5918C.18
Concrete Cylinder Test Report	8/24/06	5919C.19
Concrete Cylinder Test Report	8/23/06	6015C.28
Concrete Cylinder Test Report	8/23/06	6016C.29
Concrete Cylinder Test Report	8/23/06	6017C.30
Concrete Cylinder Test Report	8/24/06	6019C.31
Concrete Cylinder Test Report	8/24/06	6021C.33

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

08/30/06
Date

RECEIPT AND READ ACKNOWLEDGEMENT
PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 23, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16300
Sand # 11400 @ 5.43%
Fly Ash # 1630
Cement # 6555
Water # 2007

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 79^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ A.5 – 17. Set #1.

Measured

Truck No. 10526
Date Sampled: July 26, 2006
Date Received: July 27, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:00 a.m.
Time Placed:
Time Sampled: 1:45 a.m.
Yield Relative: 1.00

Slump (in.): 6.75"
Slump w/plasticizer (in.):
Air Temperature (°F): 69°
Mix Temp (°F): 81°
Air Content (%): 6.0% uncorrected
Unit Weight (pcf): 137.2
Water Added (gal): 0
Ticket No.: 97955
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
16A	8/2/06	7	4.00 x	8.00	12.57	58535	4660*	NA
16B	8/2/06	7FC	4.00 x	8.00	12.57	54619	4350**	NA
16C	8/23/06	28	4.00 x	8.00	12.57	66741	5300*****	C
16D	8/23/06	28	4.00 x	8.00	12.57	68323	5440****	C

Lab # 5904 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 23, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16280
Sand # 11360 @ 5.43%
Fly Ash # 1675
Cement # 6555
Water # 2003

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 79^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ B – 17, top 6". Set #2. Measured

Truck No. 10526
Date Sampled: July 26, 2006
Date Received: July 27, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 2:57 a.m.
Time Placed:
Time Sampled: 3:40 a.m.
Yield Relative: 1.02

Slump (in.): 5.5"
Slump w/plasticizer (in.):
Air Temperature (°F): 64°
Mix Temp (°F): 80°
Air Content (%): 6.75% uncorrected
Unit Weight (pcf): 137.6
Water Added (gal): 0
Ticket No.: 97965
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
17A	8/2/06	7	4.00 x	8.00	12.57	57467	4570*	NA
17B	8/2/06	7FC	4.00 x	8.00	12.57	56484	4490*	NA
17C	8/23/06	28	4.00 x	8.00	12.57	71982	5730*****	C
17D	8/23/06	28	4.00 x	8.00	12.57	69906	5561*****	C

Lab # 5905 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 24, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16200
Sand # 11300 @ 5.43%
Fly Ash # 1625
Cement # 6500
Water # 1998

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 81^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ A.5 – 4. Set #2. Measured

Truck No. 10466
Date Sampled: July 27, 2006
Date Received: July 28, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:05 a.m.
Time Placed:
Time Sampled: 1:48 a.m.
Yield Relative: 1.01

Slump (in.): 5.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 63°
Mix Temp (°F): 78°
Air Content (%): 6.5% uncorrected
Unit Weight (pcf): 138.4
Water Added (gal): 0
Ticket No.: 97987
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
18A	8/3/06	7	4.00 x	8.00	12.57	61007	4850**	NA
18B	8/3/06	7FC	4.00 x	8.00	12.57	61402	4880*	NA
18C	8/24/06	28	4.00 x	8.00	12.57	83155	6620****	C
18D	8/24/06	28	4.00 x	8.00	12.57	82631	6570****	C

Lab # 5918 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: Jesse Carlin
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 24, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16300
Sand # 11280 @ 5.43%
Fly Ash # 1650
Cement # 6530
Water # 1998

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 75^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ A.5 – 2, top 6". Set #2. Measured

Truck No. 10466
Date Sampled: July 27, 2006
Date Received: July 28, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 3:02 a.m.
Time Placed:
Time Sampled: 3:45 a.m.
Yield Relative: 1.02

Slump (in.): 6.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 78°
Mix Temp (°F): 78°
Air Content (%): 6.5% uncorrected
Unit Weight (pcf): 137.2
Water Added (gal): 0
Ticket No.: 97997
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
19A	8/3/06	7	4.00 x	8.00	12.57	57704	4590*****	NA
19B	8/3/06	7FC	4.00 x	8.00	12.57	58148	4630**	NA
19C	8/24/06	28	4.00 x	8.00	12.57	70202	5580****	C
19D	8/24/06	28	4.00 x	8.00	12.57	71648	5700***	C

Lab # 5919 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: ~~Jesse Carlin~~ Perry Hanler
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 23, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16260
Sand # 11440 @ 6.58%
Fly Ash # 1630
Cement # 6565
Water # 1872

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade –SW corner of NW quarter of pad 4. Set #1. Measured

Truck No. 10456
Date Sampled: August 10, 2006
Date Received: August 23, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 2:53 a.m.
Time Placed:
Time Sampled: 3:30 a.m.
Yield Relative: 0.99

Slump (in.): 5.25"
Slump w/plasticizer (in.)
Air Temperature (°F): 60°
Mix Temp (°F): 75°
Air Content (%): 4.8% uncorrected
Unit Weight (pcf): 140.6
Water Added (gal): 0
Ticket No.: 98198
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
28A	8/23/06	13	4.00 x	8.00	12.57	56696	4510**	NA
28B	8/23/06	13FC	4.00 x	8.00	12.57	58574	4660***	NA
28C	9/7/06	28	4.00 x	8.00	12.57			
28C	9/7/06	28						

Lab # 6015 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By:_____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 23, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16260
Sand # 11480 @ 6.58%
Fly Ash # 1640
Cement # 6525
Water # 1871

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 73^{oz}

SAMPLE DATA

Location: Slab on grade –NE corner of NW quarter of pad 4. Set #2. Measured

Truck No. 10466
Date Sampled: August 10, 2006
Date Received: August 23, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 12:57 a.m.
Time Placed:
Time Sampled: 1:35 a.m.
Yield Relative: 1.01

Slump (in.): 6.00"
Slump w/plasticizer (in.)
Air Temperature (°F): 65°
Mix Temp (°F): 78°
Air Content (%): 6.2% uncorrected
Unit Weight (pcf): 139.0
Water Added (gal): 0
Ticket No.: 98188
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
29A	8/23/06	13	4.00 x	8.00	12.57	69114	5500***	NA
29B	8/23/06	13FC	4.00 x	8.00	12.57	65270	5190**	NA
29C	9/7/06	28	4.00 x	8.00	12.57			
29C	9/7/06	28	4.00 x	8.00	12.57			

Lab # 6016 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 23, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16180
Sand # 11400 @ 6.58%
Fly Ash # 1620
Cement # 6610
Water # 1872

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 73^{oz}

SAMPLE DATA

Location: Slab on grade –middle of Westside of SE quarter of pad 4. Set #3. Measured

Truck No. 10456
Date Sampled: August 10, 2006
Date Received: August 23, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 5:14 a.m.
Time Placed:
Time Sampled: 5:45 a.m.
Yield Relative: 0.99

Slump (in.): 6.00"
Slump w/plasticizer (in.)
Air Temperature (°F): 53°
Mix Temp (°F): 76°
Air Content (%): 5.4% uncorrected
Unit Weight (pcf): 140.6
Water Added (gal): 0
Ticket No.: 98208
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
30A	8/23/06	13	4.00 x	8.00	12.57	72872	5800***	NA
30B	8/23/06	13FC	4.00 x	8.00	12.57	73861	5880****	NA
30C	9/7/06	28	4.00 x	8.00	12.57			
30C	9/7/06	28	4.00 x	8.00	12.57			

Lab # 6017 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 24, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16300
Sand # 11480 @ 6.78%
Fly Ash # 1635
Cement # 6520
Water # 1847

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade –footing for hanger pad #5. Set #1.

Measured

Truck No. 10536
Date Sampled: August 17, 2006
Date Received: August 22, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:05 a.m.
Time Placed:
Time Sampled: 1:45 a.m.
Yield Relative: 0.99

Slump (in.): 3.75"
Slump w/plasticizer (in.)
Air Temperature (°F): 55°
Mix Temp (°F): 76°
Air Content (%): 6.0% uncorrected
Unit Weight (pcf): 140.7
Water Added (gal): 0
Ticket No.: 98284
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
31A	8/24/06	7	4.00 x	8.00	12.57	61488	4890******	NA
31B	8/24/06	7FC	4.00 x	8.00	12.57	58475	4650*****	NA
31C	9/14/06	28	4.00 x	8.00	12.57			
31C	9/14/06	28	4.00 x	8.00	12.57			

Lab # 6019 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By:

Perry Hampel
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 24, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16200
Sand # 11480 @ 6.78%
Fly Ash # 1635
Cement # 6550
Water # 1857

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade –top 6" of hanger pad #5 Set #2

Measured

Truck No. 10536
Date Sampled: August 17, 2006
Date Received: August 22, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 4:59 a.m.
Time Placed:
Time Sampled: 5:20 a.m.
Yield Relative: 0.99

Slump (in.): 5.75"
Slump w/plasticizer (in.)
Air Temperature (°F): 61°
Mix Temp (°F): 71°
Air Content (%): 6.0% uncorrected
Unit Weight (pcf): 141.0
Water Added (gal): 0
Ticket No.: 98304
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
33A	8/24/06	7	4.00 x	8.00	12.57	57665	4590***	NA
33B	8/24/06	7FC	4.00 x	8.00	12.57	59741	4750***	NA
33C	9/14/06	28	4.00 x	8.00	12.57			
33C	9/14/06	28	4.00 x	8.00	12.57			

Lab # 6021 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Perry Hampel
Kleinfelder, Inc.

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KLEINFELDER
An employee owned company

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION						Pages:	4
1	Steve Matier smatier@northwind-inc.com	2		3			

Transmittal Date: 08/25/06	**Transmittal DCN: 71610.2 – ALB06TS016**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD016 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Hydraulic Test Pad Results	8/14/06	71610HC 003/004/005

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc at the address referenced at the top of this form

NOTES

Perry Hampel
Project Manager

08/25/06
Date

RECEIPT AND READ ACKNOWLEDGEMENT PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

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HYDRAULIC CONDUCTIVITY TEST REPORT
ASTM D5084

Project Name	TA 73 Los Alamos Landfill	*Project No.*	71610
Client Name	Kleinfelder	*Date Received*	8/8/2006 12:30
Client Address	Albuquerque, New Mexico	*Date Tested*	8/14/2006 16:40
		Date Issued	8/17/2006 9:45
Boring No.	Infiltration Test Pad		
Sample Type	Remolded Sample		
Sample Depth	1"-6"		
Sample Description	Lean Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	14.9	18.4	%
Dry Unit Weight, Dd	106.9	107.2	pcf
Height, L	2.81	2.41	Inches
Diameter, d	2.82	2.82	Inches
Degree of Saturation, Sr	69.7	86.9	%

Chamber Pressure:	60.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	55.0	psi
Consolidation Pressure:	3	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	20.7	0	15.80	21.80	3.30E-07	3.2E-07	19.98
	Finish	20.7	7980	18.00	19.70			
2	Start	20.7	7980	18.00	19.70	3.12E-07	3.1E-07	19.47
	Finish	20.7	15060	19.80	18.00			
3	Start	20.7	15060	19.80	18.00	3.11E-07	3.1E-07	19.19
	Finish	20.5	19200	20.80	17.00			
4	Start	20.5	19200	20 80	17.00	2.99E-07	2.9E-07	18.86
	Finish	20.4	24120	21.95	15.90			

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp 3.1E-07

Average Hydraulic Conductivity "k" (cm/sec) @ 20° C 3.1E-07

Assumed Specific Gravity SG 2.7

Area of Tube (cm^2), a (pipette) 0 9721

Permeant : Dealred Tap Water

Formulas:

Permeability (Falling Head-Rising Tailwater Test)

$k = [(a*L/(2*A*t)] \ln(ho/h1)$

k = Hydraulic Conductivity (cm/sec)

a = Area of Tube (cm^2)

L = Height or Length of Sample (cm)

A = Area of Sample (cm^2)

t = Time of Test Interval (sec)

h_o = Height of Head at Start of Test Interval (cm)

h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation

$Sr = w*SG/e$ $Dd = (SG/1+e)Dw$

Therefore:

$Sr = (w*SG)/((SG*Dw/Dd)-1)$

Sr = Degree of Saturation (%)

w = Moisture Content (%)

SG = Specific Gravity

e = Void Ratio

Dd =Dry Unit Weight (pcf)

Dw = Unit Weight of Water (62 4 pcf)

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KLEINFELDER

AUG-21-2006 MON 11:27 AM FAX NO. P. 02

HYDRAULIC CONDUCTIVITY TEST REPORT

ASTM D5084

Project Name	TA 73 Los Alamos Landfill	*Project No.*	71610
Client Name	Kleinfelder	*Date Received*	8/08/2006 12:30
Client Address	Albuquerque, New Mexico	*Date Tested*	8/14/2006 16:40
		Date Issued	8/17/2006 9:45
Boring No.	Infiltration Test Pond		
Sample Type	Drive Cylinder		
Sample Depth	6"-11"		
Sample Description	Lean to Fat Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	15.5	17.0	%
Dry Unit Weight, Dd	108.4	110.5	pcf
Height, L	1.76	1.73	inches
Diameter, d	2.78	2.77	inches
Degree of Saturation, Sr	75.5	87.4	%

Chamber Pressure:	60.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	55.0	psi
Consolidation Pressure:	3	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	20.6	0	9.00	23.40			
	Finish	21.3	53340	14.70	18.20	7.82E-08	7.6E-08	32.24
2	Start	21.3	53340	14.70	18.20			
	Finish	20.8	56340	15.00	17.95	7.30E-08	7.1E-08	32.11
3	Start	20.8	56340	15.00	17.95			
	Finish	20.7	61920	15.45	17.50	6.45E-08	6.3E-08	31.90
4	Start	20.7	61920	15.45	17.50			
	Finish	20.7	69900	16.10	16.90	6.32E-08	6.2E-08	31.62

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp. 7.0E-08

Average Hydraulic Conductivity "k" (cm/sec) @ 20° C 6.8E-08

Assumed Specific Gravity, SG 2.7

Area of Tube (cm^2), a (pipette) 0.9721

Permeant : Desired Tap Water

Formulas:

Permeability (Falling Head-Rising Tailwater Test)

$k = [(a*L/(2*A*t)] \ln(ho/h1)$

k = Hydraulic Conductivity (cm/sec)

a = Area of Tube (cm^2)

L = Height or Length of Sample (cm)

A = Area of Sample (cm^2)

t = Time of Test Interval (sec)

h_0 = Height of Head at Start of Test Interval (cm)

h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation

Sr = w*SG/e Dd = (SG/1+e)Dw

Therefore:

Sr = (w*SG)/((SG*Dw/Dd)-1)

Sr = Degree of Saturation (%)

w = Moisture Content (%)

SG = Specific Gravity

e = Void Ratio

Dd =Dry Unit Weight (pcf)

Dw = Unit Weight of Water (62.4 pcf)

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KLEINFELDER

AUG-21-2006 MON 11:27 AM FAX NO. P. 03

HYDRAULIC CONDUCTIVITY TEST REPORT
ASTM D5084

Project Name	TA 73 Los Alamos Landfill	*Project No.*	71610
Client Name	Kleinfelder	*Date Received*	8/08/2006 12:30
Client Address	Albuquerque, New Mexico	*Date Tested*	8/16/2006 16:40
		Date Issued	8/21/2006 15:10
Boring No.	Infiltration Test Pond		
Sample Type	Drive Cylinder		
Sample Depth	11"-16"		
Sample Description	Lean to Fat Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	12.1	16.9	%
Dry Unit Weight, Dd	107.8	110.2	pcf
Height, L	1.69	1.65	inches
Diameter, d	2.78	2.76	inches
Degree of Saturation, Sr	57.9	86.4	%

Chamber Pressure:	60.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	55.0	psi
Consolidation Pressure:	3	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	21.4	0	9.35	16.95			
	Finish	21.5	2940	9.55	16.75	5.02E-08	4.8E-08	34.44
2	Start	21.5	2940	9.55	16.75			
	Finish	21.1	5880	9.70	16.60	3.77E-08	3.6E-08	34.37
3	Start	21.1	5880	9.70	16.60			
	Finish	20.8	10680	10.00	16.30	4.64E-08	4.5E-08	34.22
4	Start	20.8	10680	10.00	16.30			
	Finish	20.8	16380	10.40	15.95	4.90E-08	4.8E-08	34.04

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp 4.6E-08

Average Hydraulic Conductivity "k" (cm/sec) @ 20° C **4.4E-08**

Assumed Specific Gravity, SG 2.7
Area of Tube (cm^2), a (pipette) 0.9721
Permeant : Dealred Tap Water
Formulas:
Permeability (Falling Head-Rising Tailwater Test)
k = [(a*L/(2*A*t)] ln(ho/h1)
k = Hydraulic Conductivity (cm/sec)
a = Area of Tube (cm^2)
L = Height or Length of Sample (cm)
A = Area of Sample (cm^2)
t = Time of Test Interval (sec)
h_0 = Height of Head at Start of Test Interval (cm)
h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation
Sr = w*SG/e Dd = (SG/1+e)Dw
Therefore:
Sr = (w*SG)/((SG*Dw/Dd)-1)
Sr = Degree of Saturation (%)
w = Moisture Content (%)
SG = Specific Gravity
e = Void Ratio
Dd =Dry Unit Weight (pcf)
Dw = Unit Weight of Water (62.4 pcf)

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Transmittal Date: 08/23/06	**Transmittal DCN: 71610.2 – ALB06TS015**

Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD015 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Hydraulic Conductivity Test Report	8/16/06	71610HC 005/ added information on moisture content in the After units column

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form Keep one copy for your records and mail the other copy to Kleinfelder, Inc at the address referenced at the top of this form.

NOTES

Perry Hampel — Project Manager
08/23/06 — Date

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HYDRAULIC CONDUCTIVITY TEST REPORT
ASTM D5084

Project Name	TA 73 Los Alamos Landfill	*Project No.*	71610
Client Name	Kleinfelder	*Date Received*	8/08/2006 12:30
Client Address	Albuquerque, New Mexico	*Date Tested*	8/16/2006 16:40
		Date Issued	8/21/2006 15:10
Boring No.	Infiltration Test Pond		
Sample Type	Drive Cylinder		
Sample Depth	11"-16"		
Sample Description	Lean to Fat Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	12.1	16.9	%
Dry Unit Weight, Dd	107.8	110.2	pcf
Height, L	1.69	1.65	inches
Diameter, d	2.78	2.76	inches
Degree of Saturation, Sr	57.9	86.4	%

Chamber Pressure:	60.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	55.0	psi
Consolidation Pressure:	3	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	21.4	0	9.35	16.95			
	Finish	21.5	2940	9.55	16.75	5.02E-08	4.8E-08	34.44
2	Start	21.5	2940	9.55	16.75			
	Finish	21.1	5880	9.70	16.60	3.77E-08	3.6E-08	34.37
3	Start	21.1	5880	9.70	16.60			
	Finish	20.8	10680	10.00	16.30	4.64E-08	4.5E-08	34.22
4	Start	20.8	10680	10.00	16.30			
	Finish	20.8	16380	10.40	15.95	4.90E-08	4.8E-08	34.04

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp 4.6E-08

Average Hydraulic Conductivity "k" (cm/sec) @ 20° C **4.4E-08**

Assumed Specific Gravity, SG 2.7

Area of Tube (cm^2), a (pipette) 0.9721

Permeant : Deaired Tap Water

Formulas:

Permeability (Falling Head-Rising Tailwater Test)

k = [(a*L/(2*A*t)] ln(ho/h1)

k = Hydraulic Conductivity (cm/sec)

a = Area of Tube (cm^2)

L = Height or Length of Sample (cm)

A = Area of Sample (cm^2)

t = Time of Test Interval (sec)

h_o = Height of Head at Start of Test Interval (cm)

h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation

Sr = w*SG/e Dd = (SG/1+e)Dw

Therefore:

Sr = (w*SG)/((SG*Dw/Dd)-1)

Sr = Degree of Saturation (%)

w = Moisture Content (%)

SG = Specific Gravity

e = Void Ratio

Dd =Dry Unit Weight (pcf)

Dw = Unit Weight of Water (62.4 pcf)

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Transmittal Date: 08/22/06	**Transmittal DCN: 71610.2 – ALB06TS014**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD014 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Hydraulic Conductivity Test Report	8/16/06	71610HC.005

INSTRUCTIONS/REMARKS

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NOTES

Perry Hampel — Project Manager
08/22/06 — Date

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HYDRAULIC CONDUCTIVITY TEST REPORT

ASTM D5084

Project Name	TA 73 Los Alamos Landfill	***Project No.***	71610
Client Name	Kleinfelder	***Date Received***	8/08/2006 12:30
Client Address	Albuquerque, New Mexico	***Date Tested***	8/16/2006 16:40
		Date Issued	8/21/2006 15:10
Boring No.	Infiltration Test Pond		
Sample Type	Drive Cylinder		
Sample Depth	11"-16"		
Sample Description	Lean to Fat Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	12.1		%
Dry Unit Weight, Dd	107.8		pcf
Height, L	1.69		inches
Diameter, d	2.78		inches
Degree of Saturation, Sr	57.9	#DIV/0!	%

Chamber Pressure:	60.0	psi
Applied Pressure (influent):	57.0	psi
Applied Pressure (effluent):	55.0	psi
Consolidation Pressure:	3	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	21.4	0	9.35	16.95			
	Finish	21.5	2940	9.55	16.75	5.02E-08	4.8E-08	34.44
2	Start	21.5	2940	9.55	16.75			
	Finish	21.1	5880	9.70	16.60	3.77E-08	3.6E-08	34.37
3	Start	21.1	5880	9.70	16.60			
	Finish	20.8	10680	10.00	16.30	4.64E-08	4.5E-08	34.22
4	Start	20.8	10680	10.00	16.30			
	Finish	20.8	16380	10.40	15.95	4.90E-08	4.8E-08	34.04

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp.	4.6E-08	
Average Hydraulic Conductivity "k" (cm/sec) @ 20° C		**4.4E-08**

Assumed Specific Gravity, SG 2.7

Area of Tube (cm^2), a (pipette) 0.9721

Permeant : Dealred Tap Water

Formulas:

Permeability (Falling Head-Rising Tailwater Test)

k = [(a*L/(2*A*t)] ln(ho/h1)

k = Hydraulic Conductivity (cm/sec)

a = Area of Tube (cm^2)

L = Height or Length of Sample (cm)

A = Area of Sample (cm^2)

t = Time of Test Interval (sec)

h_o = Height of Head at Start of Test Interval (cm)

h_1 = Height of Head at End of Test Interval (cm)

Degree of Saturation

Sr = w*SG/e Dd = (SG/1+e)Dw

Therefore:

Sr = (w*SG)/((SG*Dw/Dd)-1)

Sr = Degree of Saturation (%)

w = Moisture Content (%)

SG = Specific Gravity

e = Void Ratio

Dd =Dry Unit Weight (pcf)

Dw = Unit Weight of Water (62.4 pcf)

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Transmittal Date: 08/15/06	**Transmittal DCN: 71610.2 – ALB06TS012**

Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD012 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Concrete Cylinder Test Report	8/10/06	5832C.7
Concrete Cylinder Test Report	8/10/06	5833C.8
Concrete Cylinder Test Report	8/10/06	5834C.9
Concrete Cylinder Test Report	8/14/06	5857C.10
Concrete Cylinder Test Report	8/14/06	5858C.11
Concrete Cylinder Test Report	8/09/06	5935C.23
Concrete Cylinder Test Report	8/09/06	5936C.24

INSTRUCTIONS/REMARKS

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Perry Hampel — Project Manager
08/15/06 — Date

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KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 10, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16220
Sand # 11220 @ 5.23%
Fly Ash # 1630
Cement # 6590
Water # 2017

Max. Size Agg. (in.): 1"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Slab on Grade, 7' W & 15' N of the NE corner of pad 2. Set #1. Measured

Truck No. 10526
Date Sampled: July 13, 2006
Date Received: July 14, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 1:12 a.m.
Time Placed:
Time Sampled: 1:45 a.m.
Yield Relative: 1.00

Slump (in.): 6.5"
Slump w/plasticizer (in.):
Air Temperature (°F): 72°
Mix Temp (°F): 80°
Air Content (%): 5.5% uncorrected
Unit Weight (pcf): 140.2
Water Added (gal): 0
Ticket No.: 97694
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
7A	7/20/06	7	4.00 x	8.00	12.57	68422	5440**	NA
7B	7/20/06	7FC	4.00 x	8.00	12.57	60809	4840***	NA
7C	8/10/06	28	4.00 x	8.00	12.57	88474	7040**	C
7D	8/10/06	28	4.00 x	8.00	12.57	91461	7280**	C

Lab # 5832 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 10, 2006
Page 1 of 1
Project No 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No 44
Design Strength: 4000 PSI

Agg # 16360
Sand # 11400 @ 5.84%
Fly Ash # 1675
Cement # 6530
Water # 1947

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Slab on Grade, 30' E & 4' S of the SE corner of pad 2. Set #2. Measured

Truck No. 10556
Date Sampled: July 13, 2006
Date Received: July 14, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 2:58 a.m.
Time Placed:
Time Sampled: 3:30 a.m.
Yield Relative: 1.00

Slump (in.): 7.25"
Slump w/plasticizer (in.):
Air Temperature (°F): 68°
Mix Temp (°F): 75°
Air Content (%): 4.7% uncorrected
Unit Weight (pcf): 141.0
Water Added (gal): 0
Ticket No.: 97703
W/C Ratio 0.31

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
8A	7/20/06	7	4.00 x	8.00	12.57	66939	5330**	NA
8B	7/20/06	7FC	4.00 x	8.00	12.57	53729	4270**	NA
8C	8/10/06	28	4.00 x	8.00	12.57	81375	6470**	C
8D	8/10/06	28	4.00 x	8.00	12.57	84836	6750**	C

Lab # 5833 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 10, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16300
Sand # 11285 @ 4.59%
Fly Ash # 1640
Cement # 6560
Water # 2088

Max. Size Agg. (in.): 3/4"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Slab on Grade, 5' E & 5' N of the NW corner of pad 2. Set #3. Measured

Truck No. 10466
Date Sampled: July 13, 2006
Date Received: July 14, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 4:28 a.m.
Time Placed:
Time Sampled: 5:00 a.m.
Yield Relative: 0.99

Slump (in.): 7.5"
Slump w/plasticizer (in.):
Air Temperature (°F): 61°
Mix Temp (°F): 78°
Air Content (%): 4.0% uncorrected
Unit Weight (pcf): 141.8
Water Added (gal): 0
Ticket No.: 97712
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
9A	7/20/06	7	4.00 x	8.00	12.57	65555	5220**	NA
9B	7/20/06	7FC	4.00 x	8.00	12.57	52998	4220**	NA
9C	8/10/06	28	4.00 x	8.00	12.57	90076	7170**	C
9D	8/10/06	28	4.00 x	8.00	12.57	88726	7060**	C

Lab # 5834 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 14, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16300
Sand # 11300 @ 5.61%
Fly Ash # 1645
Cement # 6565
Water # 1987

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ D-11 Set #1.

Measured

Truck No. 10546
Date Sampled: July 17, 2006
Date Received: July 18, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:05 a.m.
Time Placed:
Time Sampled: 1:48 a.m.
Yield Relative: 0.96

Slump (in.): 7.25"
Slump w/plasticizer (in.):
Air Temperature (°F): 68°
Mix Temp (°F): 79°
Air Content (%): 3.5% uncorrected
Unit Weight (pcf): 143.3
Water Added (gal): 0
Ticket No.: 97737
W/C Ratio 0.33

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
10A	7/24/06	7	4.00 x	8.00	12.57	66530	5290**	NA
10B	7/26/06	9FC	4.00 x	8.00	12.57	92449	7350**	NA
10C	8/14/06	28	4.00 x	8.00	12.57	98876	7870*****	C
10D	8/14/06	28	4.00 x	8.00	12.57	100360	7980**	C

Lab # 5857 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 14, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16260
Sand # 11580 @ 7.84%
Fly Ash # 1660
Cement # 6540
Water # 1743

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ C.5-9 top 6" Set #2. Measured

Truck No. 10546
Date Sampled: July 17, 2006
Date Received: July 18, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 3:05 a.m.
Time Placed:
Time Sampled: 3:50 a.m.
Yield Relative: 0.98

Slump (in.): 7.25"
Slump w/plasticizer (in.):
Air Temperature (°F): 68°
Mix Temp (°F): 79°
Air Content (%): 3.5% uncorrected
Unit Weight (pcf): 143.3
Water Added (gal): 0
Ticket No.: 97737
W/C Ratio 0.33

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
11A	7/24/06	7	4.00 x	8.00	12.57	63182	5030**	NA
11B	7/26/06	9FC	4.00 x	8.00	12.57	81398	6480**	NA
11C	8/14/06	28	4.00 x	8.00	12.57	86022	6840***	C
11D	8/14/06	28	4.00 x	8.00	12.57	87209	6940**	C

Lab # 5858 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 9, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16280
Sand # 11340 @ 5.43%
Fly Ash # 1625
Cement # 6540
Water # 1987

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 75^{oz}

SAMPLE DATA

Location: Slab on grade – 5' Sof SW corner of N third of pad 1 Set #2 Measured

Truck No. 10416
Date Sampled: August 2, 2006
Date Received: August 3, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 1:04 a.m.
Time Placed:
Time Sampled: 2:10 a.m.
Yield Relative: 1.01

Slump (in.): 6.25"
Slump w/plasticizer (in.):
Air Temperature (°F): 57°
Mix Temp (°F): 75°
Air Content (%): 6.8% uncorrected
Unit Weight (pcf): 138.2
Water Added (gal): 0
Ticket No.: 98089
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
23A	8/9/06	7	4.00 x	8.00	12.57	60136	4780**	NA
23B	8/9/06	7FC	4.00 x	8.00	12.57			
23C	8/30/06	28	4.00 x	8.00	12.57			
23C	8/30/06	28						

Lab # 5935 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 9, 2006
Page 1 of 1
Project No 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No 44
Design Strength: 4000 PSI

Agg # 16180
Sand # 11340 @ 5.43%
Fly Ash # 1655
Cement # 6550
Water # 2017

Max. Size Agg (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 72^{oz}

SAMPLE DATA

Location: Slab on grade – 5' N, 5' W of NE corner of S third of pad 1 Set #1. Measured

Truck No. 10536
Date Sampled: August 2, 2006
Date Received: August 3, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 3:31 a.m.
Time Placed:
Time Sampled: 4:10 a.m.
Yield Relative: 0.96

Slump (in.): 7.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 55°
Mix Temp (°F): 77°
Air Content (%): 6.8% uncorrected
Unit Weight (pcf): 145.2
Water Added (gal): 0
Ticket No.: 98073
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
24A	8/9/06	7	4.00 x	8.00	12.57	59781	4760*****	NA
24B	8/9/06	7FC	4.00 x	8.00	12.57			
24C	8/30/06	28	4.00 x	8.00	12.57			
24C	8/30/06	28						

Lab # 5936 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

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KLEINFELDER
An employee owned company

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION					Pages:	16
1	Steve Matier smatier@northwind-inc.com	2	Philip Meehan pmeehan@northwind-inc.com	3		

Transmittal Date: 08/10/06	**Transmittal DCN: 71610.2 – ALB06TS011**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD011 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
NMDOT Aggregate Index Test Report	8/8/06	71610AI.001
Proctor Test Report	8/7/06	71610P.005
Moisture Density Test Report	7/17/06	71610DS.001
Direct Shear Test Report	8/7/06	5828C.3
Concrete Cylinder Test Report	8/8/06	5829C.4
Concrete Cylinder Test Report	8/8/06	5830C.5
Concrete Cylinder Test Report	8/8/06	5831C.6
Concrete Cylinder Test Report	8/8/06	5904C.16
Concrete Cylinder Test Report	8/2/06	5905C.17
Concrete Cylinder Test Report	8/2/06	5918C.18
Concrete Cylinder Test Report	8/3/06	5919C.19
Concrete Cylinder Test Report	8/3/06	5825C.20
Concrete Cylinder Test Report	8/7/06	5826C.21
Concrete Cylinder Test Report	8/7/06	5827C.22
Concrete Cylinder Test Report	8/7/06	

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel
Project Manager

08/10/06
Date

RECEIPT AND READ ACKNOWLEDGEMENT
PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature

Date

Print Name

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August 8, 2006
File No: 71610
Project: TA 73 Los Alamos Landfill
Lab No: 06-209

Subject: NMDOT Aggregate Index Testing

Submitted here within are the results of the laboratory testing on the submitted aggregate sample of San Pedro Pit base course representing the purposed Rip Rap material submitted July 31, 2006. This sample was tested in accordance with New Mexico State Highway and Transportation Department Standard Specifications for Highway and Bridge Construction, 2000 edition.

The sample submitted was tested for,

- Resistance to degradation by L.A. machine. = 21.4%
- Sulfate Soundness of Aggregates. = 8.72%
- Absorption. = 1.7%
- NMDOT Aggregate Index = 13.15

If you have any questions regarding this information, please contact us at (505) 344-7373.

Sincerely,

Kleinfelder, Inc.

Jesse Carlin
Laboratory Manager

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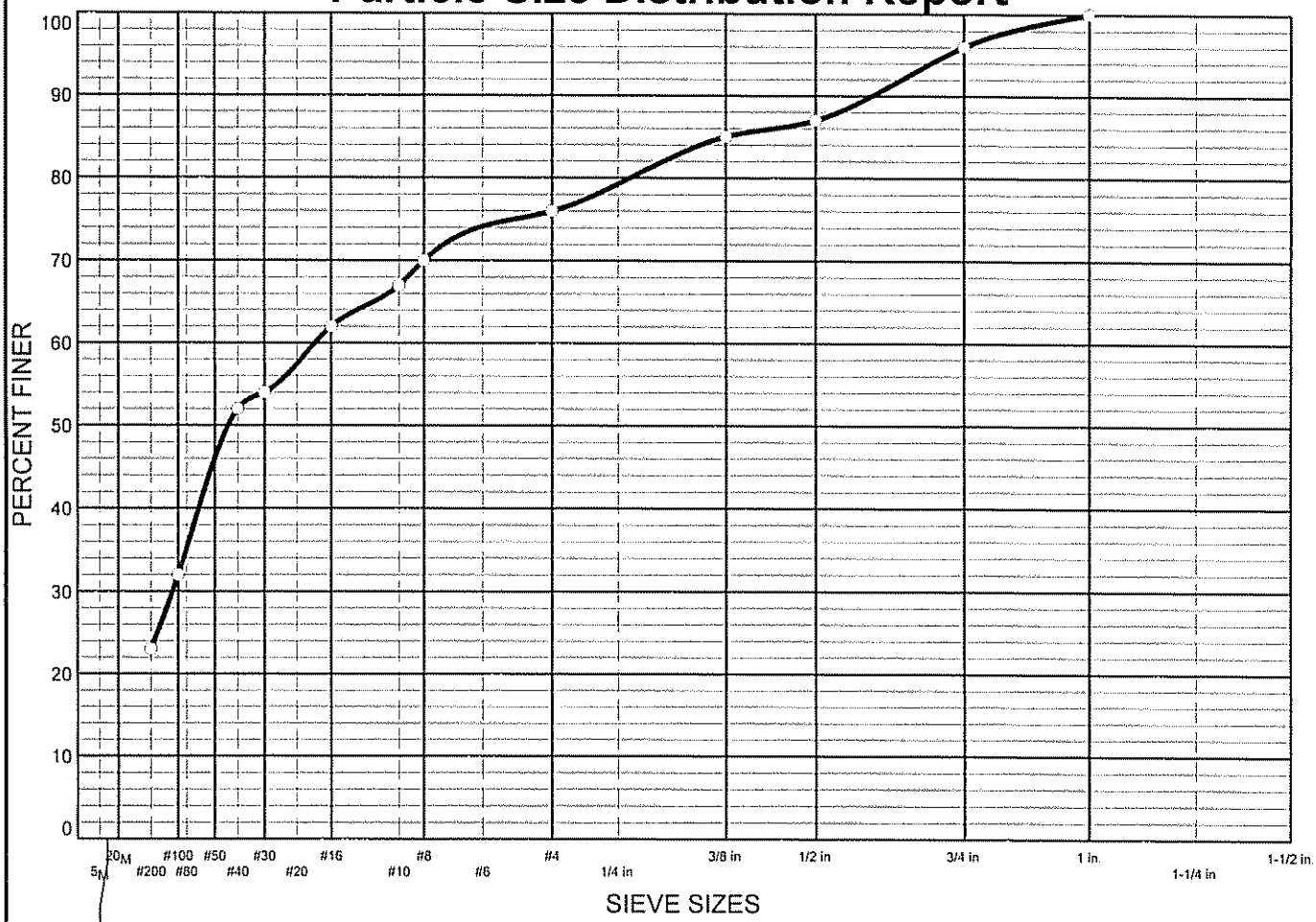
Particle Size Distribution Report



CLAY	SILT	% SAND	% GRAVEL
23.0		53.0	24.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.0 in.	100.0		
.75 in.	96.0		
.5 in.	87.0		
.375 in.	85.0		
#4	76.0		
#8	70.0		
#10	67.0		
#16	62.0		
#30	54.0		
#40	52.0		
#100	32.0		
#200	23.0		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 9.52 D_{60}= 1.02 D_{50}= 0.369
D_{30}= 0.132 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

F.M.=2.25

Sample No.: 06-218 **Source of Sample:** Russells Gravel, off Hwy 84 Espanola **Date:** 8/7/06
Location: Russels Gravel on site stockpile **Elev./Depth:** Stockpile

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

KLEINFELDER

IN-PLACE DENSITY-MOISTURE

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

Client Received Copy of this Report ☐ Yes ☐ No			Page 1 of 1
File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos Air Bet	Technician/Engineer: P. German
Date: 7/17/2006	Client: Northwind	Contractor/Representative: Northwind	Time Arrived: 12:30 PM
Daily Field Report No: 71610MD.005	Source of Fill: ☑ NATIVE ☑ IMPORT	Weather: Cool, clear	Time Departed: 7:30 PM
Reviewed By: P. Hampel	Location of Fill: Base course for Hanger pad #1	Gauge Number: 6682 / Make/Model: 3411 Troxler	Travel Time (hours): 3.0
Date Reviewed: 8/1/2006	Specified Compaction Requirements: Density 96 % to 100%; Moisture N/A % + n/a	Standardization Counts: Density 1607 / Moisture 581	Total Time (hours): 10 (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max Dry Density	Comments: Pass/Fail	Comments: Material Classification
12	A.5-15	BS	FG	141.7	6.7	138.6	135.0	5.0	97.4	P	ML
13	B.5-13	BS	FG	139.6	6.6	138.6	132.9	5.0	96.0	P	ML

Any unresolved test (date/number):

Observations/Remarks:

Desnities for pad Certification

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-115	ML		138.6	7.5	ASTM D 1557

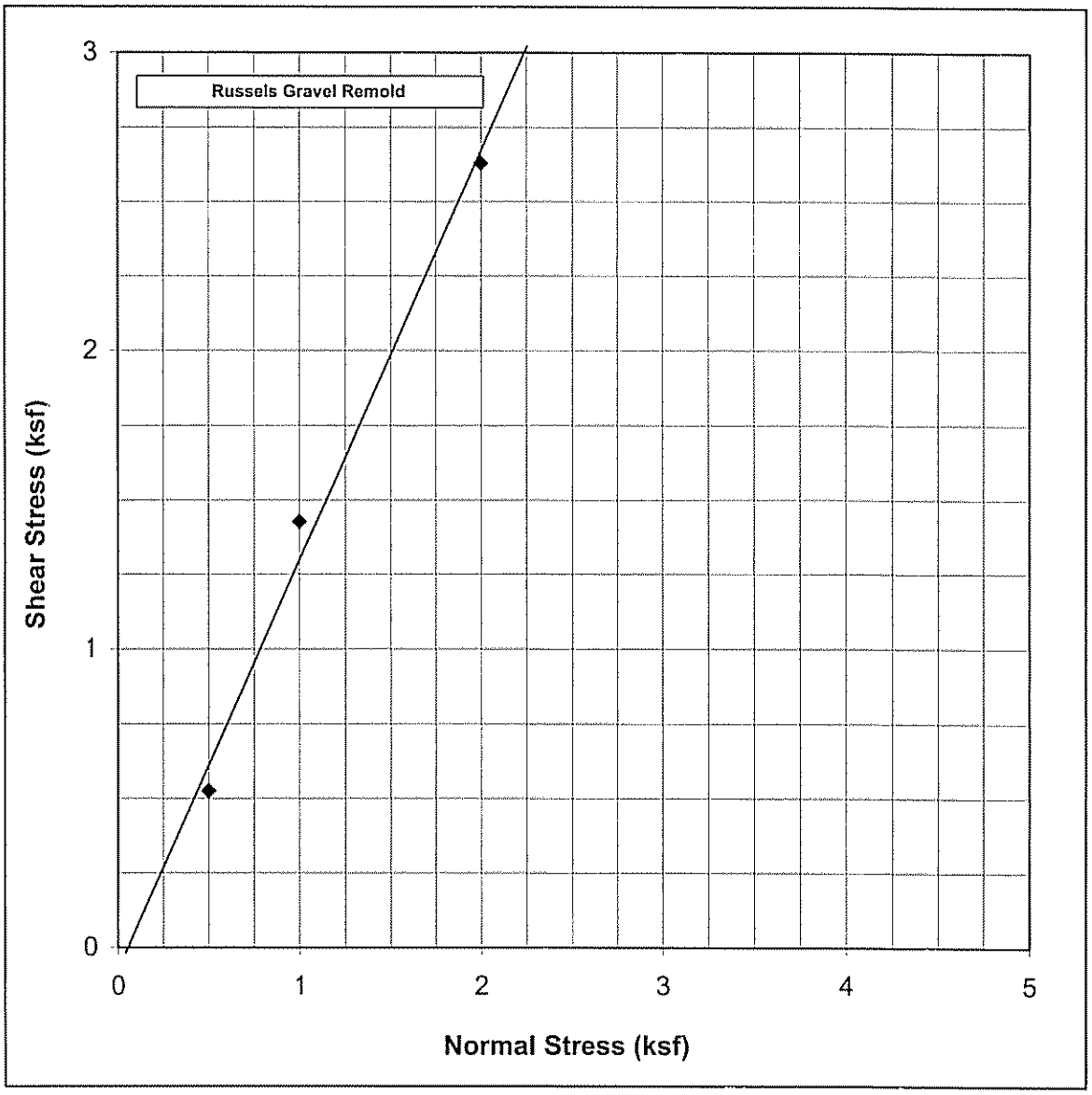
1 Test results, pass/fail indications and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and therefore should be considered preliminary and subject to change

KLEINFELDER REPRESENTATIVE

DIRECT SHEAR TEST RESULTS

PROJECT NUMBER:	71610
DATE:	8/7/2006
BORING NO.:	Russels Gravel Remold
DEPTH:	On Site Stockpile
SAMPLE DESCRIPTION:	Gravely Sand
UNIFIED SOIL CLASSIFACTION:	SP

		In-Situ		
Normal Stress (ksf)	Shear Stress (ksf)	Dry Density (pcf)	Moisture Content (%)	% MDD
0.5	0.526	126.2	7.5	94.5
1.0	1.428	126.1	7.4	94.5
2.0	2.630	126.5	7.4	94.8
MDD=	133.5	@7.2%		



Mohr-Coulomb Failure Envelope

$\phi = 54.0°$

c = 0.08 ksf

KLEINFELDER

PROJECT: TA 73 Los Alamos Land Fill
Los Alamos, New Mexico
PROJECT NO: 71610

Figure C.14

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

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Report To: North Wind
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Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 8, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No 44
Design Strength: 4000 PSI

Agg # 16280
Sand # 11140 @ 4.02%
Fly Ash # 1650
Cement # 6555
Water # 2148

Max. Size Agg. (in.): 1"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Slab on Grade, 2' S & 38' W of the NE corner of pad C Measured

Truck No. 10466
Date Sampled: July 11, 2006
Date Received: July 12, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 2:21 a.m.
Time Placed:
Time Sampled: 2:55 a.m.
Yield Relative: 1.00

Slump (in.): 4.25"
Slump w/plasticizer (in.):
Air Temperature (°F): 62°
Mix Temp (°F): 77°
Air Content (%): 4.6 uncorrected
Unit Weight (pcf): 140.0
Water Added (gal): 8
Ticket No.: 97638
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
3A	7/18/06	7	4.00 x	8.00	12.57	71454	5680**	NA
3B	8/8/06	28	4.00 x	8.00	12.57	96800	7700**	C
3C	8/8/06	28	4.00 x	8.00	12.57	95296	7580*	C
3D	8/8/06	28FC	4.00 x	8.00	12.57	82793	6590*****	C

Lab # 5828 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 8, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16320
Sand # 11180 @ 4.62%
Fly Ash # 1630
Cement # 6510
Water # 2100

Max. Size Agg. (in.): 1"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Slab on Grade, 20' S & 2' E of the NW corner of pad 2. Set #2 Measured

Truck No. 10456
Date Sampled: July 11, 2006
Date Received: July 12, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 3:48 a.m.
Time Placed:
Time Sampled: 4:30 a.m.
Yield Relative: 1.02

Slump (in.): 8.25"
Slump w/plasticizer (in.):
Air Temperature (°F): 62°
Mix Temp (°F): 74°
Air Content (%): 5.5 uncorrected
Unit Weight (pcf): 137.6
Water Added (gal): 0
Ticket No.: 97646
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
4A	7/18/06	7	4.00 x	8.00	12.57	65611	5220******	NA
4B	8/8/06	28	4.00 x	8.00	12.57	79497	6320*****	C
4C	8/8/06	28	4.00 x	8.00	12.57	81066	6450*****	C
4D	8/8/06	28FC	4.00 x	8.00	12.57	69699	5540*****	C

Lab # 5829 Curing: Lab/Water tanks Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 8, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16160
Sand # 11520 @ 7.46%
Fly Ash # 1625
Cement # 6535
Water # 1785

Max. Size Agg. (in.): 1"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Slab on Grade, 2' E & 24' S of the NW corner of pad 2. Set #3. Measured

Truck No. 10524
Date Sampled: July 11, 2006
Date Received: July 12, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 4:16 a.m.
Time Placed:
Time Sampled: 4:45 a.m.
Yield Relative: 0.99

Slump (in.): 5.5"
Slump w/plasticizer (in.):
Air Temperature (°F): 62°
Mix Temp (°F): 75°
Air Content (%): 5.3% uncorrected
Unit Weight (pcf): 140.4
Water Added (gal): 0
Ticket No.: 97648
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
5A	7/18/06	7	4.00 x	8.00	12.57	70991	5650*****	NA
5B	8/8/06	28	4.00 x	8.00	12.57	96108	7650*****	C
5C	8/8/06	28	4.00 x	8.00	12.57	94796	7540*****	C
5D	8/8/06	28FC	4.00 x	8.00	12.57	80211	6380*****	C

Lab # 5830 Curing: Lab/Water tanks Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 8, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No 44
Design Strength: 4000 PSI

Agg # 16360
Sand # 11560 @ 7.51%
Fly Ash # 1645
Cement # 6525
Water # 1786

Max. Size Agg. (in.): 1"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Slab on Grade, 15' W & 10' S of the NE corner of pad 2. Set #4. Measured

Truck No. 10466
Date Sampled: July 11, 2006
Date Received: July 12, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 6:09 a.m.
Time Placed:
Time Sampled: 7:00 a.m.
Yield Relative: 1.00

Slump (in.): 6.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 63°
Mix Temp (°F): 75°
Air Content (%): 4.4% uncorrected
Unit Weight (pcf): 140.8
Water Added (gal): 0
Ticket No.: 97657
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
6A	7/18/06	7	4.00 x	8.00	12.57	70792	5630**	NA
6B	8/8/06	28	4.00 x	8.00	12.57	85924	6840**	C
6C	8/8/06	28	4.00 x	8.00	12.57	88216	7020*****	C
6D	8/8/06	28FC	4.00 x	8.00	12.57	76827	6110*****	C

Lab # 5831 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 2, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16300
Sand # 11400 @ 5.43%
Fly Ash # 1630
Cement # 6555
Water # 2007

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 79^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ A.5 – 17. Set #1.

Measured

Truck No. 10526
Date Sampled: July 26, 2006
Date Received: July 27, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:00 a.m.
Time Placed:
Time Sampled: 1:45 a.m.
Yield Relative: 1.00

Slump (in.): 6.75"
Slump w/plasticizer (in.):
Air Temperature (°F): 69°
Mix Temp (°F): 81°
Air Content (%): 6.0% uncorrected
Unit Weight (pcf): 137.2
Water Added (gal): 0
Ticket No.: 97955
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
16A	8/2/06	7	4.00 x	8.00	12.57	58535	4660*	NA
16B	8/2/06	7FC	4.00 x	8.00	12.57	54619	4350**	NA
16C	8/23/06	28	4.00 x	8.00	12.57			
16D	8/23/06	28	4.00 x	8.00	12.57			

Lab # 5904 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 2, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16280
Sand # 11360 @ 5.43%
Fly Ash # 1675
Cement # 6555
Water # 2003

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 79^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ B – 17, top 6". Set #2 Measured

Truck No. 10526
Date Sampled: July 26, 2006
Date Received: July 27, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 2:57 a.m.
Time Placed:
Time Sampled: 3:40 a.m.
Yield Relative: 1.02

Slump (in.): 5.5"
Slump w/plasticizer (in.):
Air Temperature (°F): 64°
Mix Temp (°F): 80°
Air Content (%): 6.75% uncorrected
Unit Weight (pcf): 137.6
Water Added (gal): 0
Ticket No.: 97965
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
17A	8/2/06	7	4.00 x	8.00	12.57	57467	4570*	NA
17B	8/2/06	7FC	4.00 x	8.00	12.57	56484	4490*	NA
17C	8/23/06	28	4.00 x	8.00	12.57			
17D	8/23/06	28	4.00 x	8.00	12.57			

Lab # 5905 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 3, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16200
Sand # 11300 @ 5.43%
Fly Ash # 1625
Cement # 6500
Water # 1998

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 81^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ A.5 – 4. Set #2.

Measured

Truck No. 10466
Date Sampled: July 27, 2006
Date Received: July 28, 2006
Sampled By: P. German
Batch Size: 10.0 cy
Time Batched: 1:05 a.m.
Time Placed:
Time Sampled: 1:48 a.m.
Yield Relative: 1.01

Slump (in.): 5.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 63°
Mix Temp (°F): 78°
Air Content (%): 6.5% uncorrected
Unit Weight (pcf): 138.4
Water Added (gal): 0
Ticket No.: 97987
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
18A	8/3/06	7	4.00 x	8.00	12.57	61007	4850**	NA
18B	8/3/06	7FC	4.00 x	8.00	12.57	61402	4880*	NA
18C	8/24/06	28	4.00 x	8.00	12.57			
18D	8/24/06	28	4.00 x	8.00	12.57			

Lab # 5918 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 3, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16300
Sand # 11280 @ 5.43%
Fly Ash # 1650
Cement # 6530
Water # 1998

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 75^{oz}

SAMPLE DATA

Location: Footing, Hanger Pad @ A.5 – 2, top 6". Set #2.

			Measured
Truck No.	10466	Slump (in.):	6.0"
Date Sampled:	July 27, 2006	Slump w/plasticizer (in.):	
Date Received:	July 28, 2006	Air Temperature (°F):	78°
Sampled By:	P. German	Mix Temp (°F):	78°
Batch Size:	10.0 cy	Air Content (%):	6.5% uncorrected
Time Batched:	3:02 a.m.	Unit Weight (pcf):	137.2
Time Placed:		Water Added (gal):	0
Time Sampled:	3:45 a.m.	Ticket No.:	97997
Yield Relative:	1.02	W/C Ratio	0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
19A	8/3/06	7	4.00 x	8.00	12.57	57704	4590*****	NA
19B	8/3/06	7FC	4.00 x	8.00	12.57	58148	4630**	NA
19C	8/24/06	28	4.00 x	8.00	12.57			
19D	8/24/06	28	4.00 x	8.00	12.57			

Lab # 5919 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 7, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16260
Sand # 10880 @ 1.24%
Fly Ash # 1645
Cement # 6560
Water # 2625

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Slab on grade – 60' N of SE corner of pad 2 on E edge. Set #1. Measured

Truck No. 10526
Date Sampled: July 10, 2006
Date Received: August 8, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 2:10 a.m.
Time Placed:
Time Sampled: 3:0 a.m.
Yield Relative: 0.97

Slump (in.): 6.5"
Slump w/plasticizer (in.):
Air Temperature (°F): 53°
Mix Temp (°F): 70°
Air Content (%): 5.1% uncorrected
Unit Weight (pcf): 145.7
Water Added (gal): 0
Ticket No.: 97608
W/C Ratio 0.34

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
20A	8/7/06	28	4.00 x	8.00	12.57	88297	7020*	C
20B	8/7/06	28	4.00 x	8.00	12.57	89240	7100**	C
20C	8/7/06	28FC	4.00 x	8.00	12.57	76827	6110**	C

Lab # 5825 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 7, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 44
Design Strength: 4000 PSI

Agg # 16300
Sand # 11500 @ 6.99%
Fly Ash # 1680
Cement # 6535
Water # 1825

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Slab on grade – 10' N, 30' W of SE corner of pad 2. Set #2 Measured

Truck No. 10466
Date Sampled: July 10, 2006
Date Received: August 8, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 3:53 a.m.
Time Placed:
Time Sampled: 4:50 a.m.
Yield Relative: 1.00

Slump (in.): 5.25"
Slump w/plasticizer (in.):
Air Temperature (°F): 56°
Mix Temp (°F): 73°
Air Content (%): 4.8% uncorrected
Unit Weight (pcf): 139.6
Water Added (gal): 0
Ticket No.: 97616
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
21A	8/7/06	28	4.00 x	8.00	12.57	88697	7060*	C
21B	8/7/06	28	4.00 x	8.00	12.57	86911	6910**	C
21C	8/7/06	28FC	4.00 x	8.00	12.57	79595	6330**	C

Lab # 5826 Curing: Lab/Water tanks Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: August 7, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No 44
Design Strength: 4000 PSI

Agg # 16280
Sand # 11160 @ 3.76%
Fly Ash # 1625
Cement # 6550
Water # 2172

Max. Size Agg. (in.): 7/8"
Admixtures: P997 = 580^{oz}
Air = 65^{oz}

SAMPLE DATA

Location: Slab on grade – SW corner of pad 2. Set #3.

Truck No. 10486
Date Sampled: July 10, 2006
Date Received: August 8, 2006
Sampled By: M. Emms
Batch Size: 10.0 cy
Time Batched: 5:53 a.m.
Time Placed:
Time Sampled: 6:25 a.m.
Yield Relative: 0.98

Measured

Slump (in.): 6.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 58°
Mix Temp (°F): 73°
Air Content (%): 5.5% uncorrected
Unit Weight (pcf): 143.2
Water Added (gal): 0
Ticket No.: 97625
W/C Ratio 0.32

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
22A	8/7/06	28	4.00 x	8.00	12.57	83946	6680**	C
22B	8/7/06	28	4.00 x	8.00	12.57	85791	6830*	C
22C	8/7/06	28FC	4.00 x	8.00	12.57	70795	5630*	C

Lab # 5827 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

KLEINFELDER
An employee owned company

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION					Pages:	13
1	Steve Matier smatier@northwind-inc.com	2		3		

Transmittal Date: 07/13/06	**Transmittal DCN: 71610.2 – ALB06TS005**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD005 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Moisture Density Test Report	6/14/06	71610MD 001
Moisture Density Test Report	6/22/06	71610MD.001
Concrete Cylinder Test Report	6/26/06	5727C 1
Concrete Cylinder Test Report	6/26/06	5728C.2
Proctor Test Report	6/12/06	71610P.4
CBR Test Report	6/22/06	71610CB.2

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form Keep one copy for your records and mail the other copy to Kleinfelder, Inc at the address referenced at the top of this form

NOTES

Perry Hampel — Project Manager
07/13/06 — Date

RECEIPT AND READ ACKNOWLEDGEMENT
PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature _____ Date _____

Print Name _____

KLEINFELDER

IN-PLACE DENSITY-MOISTURE

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

		Client Received Copy of this Report ☐ Yes ☐ No	Page 1 of 1
File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos	Technician/Engineer: P. German
Date: 6/14/2006	Client: Nortrhwind	Contractor/Representative:	Time Arrived: 10:00 AM
Daily Field Report No:	Source of Fill: ☐ NATIVE ☐ IMPORT Espinola Transit mix base	Weather: Warm, windy	Time Departed: 12:30 PM
Reviewed By: P. German	Location of Fill: Base course for Hanger pad	Gauge Number: 6682 / Make/Model: 3411 Troxler	Travel Time (hours):
Date Reviewed: 6/23/2006	Specified Compaction Requirements: Density 95 % to 100%; Moisture % +	Standardization Counts: Density 1612; Moisture 566	Total Time (hours): (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max. Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max Dry Density	Comments: Pass/Fail	Comments: Material Classification
1	A.5 - 17	BS	FG	139.8	4.7	138.6	135.1	3.5	97.5	P	
2	B.5 - 13	BS	FG	144.2	5.2	138.6	139.0	3.7	100.3	P	
3	A-18	BS	FG	138.9	5.7	138.6	133.2	4.3	96.1	P	

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-115			138.6	7.5	

NOTES

1. Test results, pass/fail indications and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and therefore should be considered preliminary and subject to change.
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed.

KLEINFELDER REPRESENTATIVE

☐ Continued on next page

KLEINFELDER

IN-PLACE DENSITY-MOISTURE

NUCLEAR METHOD ASTM D-2922; D-3017

DAILY FIELD REPORT

		Client Received Copy of this Report ☐ Yes ☐ No	Page 1 of 1
File Number: 71610	Project Name: TA 73 Los Alamos	Location: Los Alamos	Technician/Engineer: P. German
Date: 6/22/2006	Client: Northrwind	Contractor/Representative	Time Arrived: 8:40 AM
Daily Field Report No.	Source of Fill: ☐ NATIVE ☑ IMPORT Espinola Transit mix base	Weather: Warm, windy	Time Departed: 11:25 AM
Reviewed By: P. German	Location of Fill: Hanger pad	Gauge Number: 6682 / Make/Model: 3411 Troxler	Travel Time (hours)
Date Reviewed: 6/23/2006	Specified Compaction Requirements: Density 95 % to 100%; Moisture % +	Standardization Counts: Density 1618 / Moisture 572	Total Time (hours) (May not include minimum)

Test No.	Test Location	Probe Depth (inches)	Test Elevation (feet)	Test Wet Density (lbs/cf)	Water Content (lbs/cf)	Lab Max Dry Density (lbs/cu ft)	Test Dry Density (lbs/cu ft)	Test Moisture (%)	Percent of Max Dry Density	Comments: Pass/Fail	Comments: Material Classification
4	C.5 - 15	BS	FG	139.7	5.8	138.6	133.9	4.3	96.6	P	
5	A.5 - 15	BS	FG	141.4	4.9	138.6	136.5	3.6	98.6	P	

Any unresolved test (date/number):

Observations/Remarks:

LABORATORY DETERMINED MAXIMUM DENSITY AT OPTIMUM MOISTURE

Sample No.	Material Classification	Max Density (Asphalt)	Max. Dry Density (Soil)	Optimum Moisture	Test Method
06-115			138.6	7.5	

NOTES

1. Test results pass/fail indications and/or recommendations (if applicable) provided herein have not been reviewed by supervisory staff and therefore should be considered preliminary and subject to change
2. Tests were conducted in general accordance with generally accepted testing procedures practiced within the site area at the time tests were performed

KLEINFELDER REPRESENTATIVE

☐ Continued on next page

KLEINFELDER, INC. 8300 Jefferson NE, Suite B, Albuquerque, NM 87113 (505)344-7373 Fax: (505)344-1711

CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: June 26, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 18
Design Strength: 3000 PSI

Agg # 3260
Sand # 2480 2.13%
Fly Ash # 385
Cement # 1075
Water # 531

Max. Size Agg. (in.): 1"
Admixtures: P997 = 64^{oz}
Air = 9^{oz}

SAMPLE DATA

Location: Wall Panel, Test Placement. Mock up by construction trailers. Measured

Truck No. 10456
Date Sampled: June 12, 2006
Date Received: June 13, 2006
Sampled By: P. German
Batch Size: 2.0 cy
Time Batched: 1:57 p.m.
Time Placed:
Time Sampled: 2:40 p.m.
Yield Relative: +

Slump (in.): 7.25"
Slump w/plasticizer (in.):
Air Temperature (°F): 93°
Mix Temp (°F): 82°
Air Content (%): 4.0 uncorrected
Unit Weight (pcf): +
Water Added (gal): 0
Ticket No.: 97389
W/C Ratio 0.40

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
1A	6/19/06	7	4.00 x	8.00	12.57	38245	3040**	NA
1B	6/26/06	14	4.00 x	8.00	12.57	41844	3330*****	C
1C	6/26/06	14	4.00 x	8.00	12.57	40287	3210*****	C
1D	6/26/06	14FC	4.00 x	8.00	12.57	39748	3160**	C

Lab # 5727 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, +=unit weight not provided. FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 3000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

As a mutual protection to our clients, the public, and ourselves, all reports submitted are the confidential property of our clients, and authorization for publication of statements, conclusions, or extracts from or regarding our reports is reserved pending our written approval. Tests by our personnel are performed in general accordance with ASTM C172, C143, C138, C231, C173, C31, C39, C42, C78, C293, C109, C192, C447, C1019 and C1064 standards unless noted otherwise.

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CONCRETE CYLINDER COMPRESSIVE STRENGTH TEST REPORT

Report To: North Wind
1425 Higham Street
Idaho Falls, 83402

Attention: Mr. John Keck

Report Date: June 26, 2006
Page 1 of 1
Project No. 71610
Project Name: TA 73 Los Alamos Land Fill

MIX DATA

PCC Supplier: Los Alamos Transit Mix
Mix No. 18
Design Strength: 4000 PSI

Agg # 3300
Sand # 2220 2.27%
Fly Ash # 330
Cement # 1330
Water # 499

Max. Size Agg. (in.): 1"
Admixtures: P997 = 116^{oz}
Air = 13^{oz}

SAMPLE DATA

Location: Wall Panel, Test Placement. Mock up by construction trailers. Measured

Truck No. 10486
Date Sampled: June 12, 2006
Date Received: June 13, 2006
Sampled By: P. German
Batch Size: 2.0 cy
Time Batched: 2:04 p.m.
Time Placed:
Time Sampled: 2:45 p.m.
Yield Relative: 0.99

Slump (in.): 3.0"
Slump w/plasticizer (in.):
Air Temperature (°F): 93°
Mix Temp (°F): 85°
Air Content (%): 3.75 uncorrected
Unit Weight (pcf): 144.1
Water Added (gal): 0
Ticket No.: 97390
W/C Ratio 0.33

LABORATORY DATA

Sample Number	Date Tested	Sample Age (days)	Dimensions (in.) Diam. (Meas)	Height	Area (in^2)	Ultimate Load (lbs)	Compressive Strength (psi)	Compliant/ Noncompliant
2A	6/19/06	7	4.00 x	8.00	12.57	63716	5070*****	NA
2B	6/26/06	14	4.00 x	8.00	12.57	68482	5450*****	C
2C	6/26/06	14	4.00 x	8.00	12.57	74909	5960*****	C
2D	6/26/06	14FC	4.00 x	8.00	12.57	65555	5220**	C

Lab # 5728 Curing: Lab/Water tanks. Forney 85145/KA3108, Fowler 001100246
Remarks: *Type 1, **Type 2, ***Type 3, ****Type 4, *****Type 5,******Type 6, +=unit weight not provided. FC = field cure
Distribution: Addressee (1)

Tests were performed in accordance with project specifications.

Job Design Strength: 4000 psi at 28 days

Unless prior arrangements are made, HOLD samples will be discarded if desgin strength is attained.

Reviewed By: _____
Jesse Carlin
Kleinfelder, Inc.

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COMPACTION TEST REPORT

Curve No.: 06-115

Project No.: 71610 **Date:** 6/12/06

Project: TA 73 Los Alamos Landfill

Location: Espanola Transit Mix Base Course

Elev./Depth: stockpile **Sample No.** 06-125

Remarks: Sand Equivalent = 43
LA Abrasion = 20 Fracture Face 2 Faces = 85

MATERIAL DESCRIPTION

Description: Poorly graded gravel with silt and sand

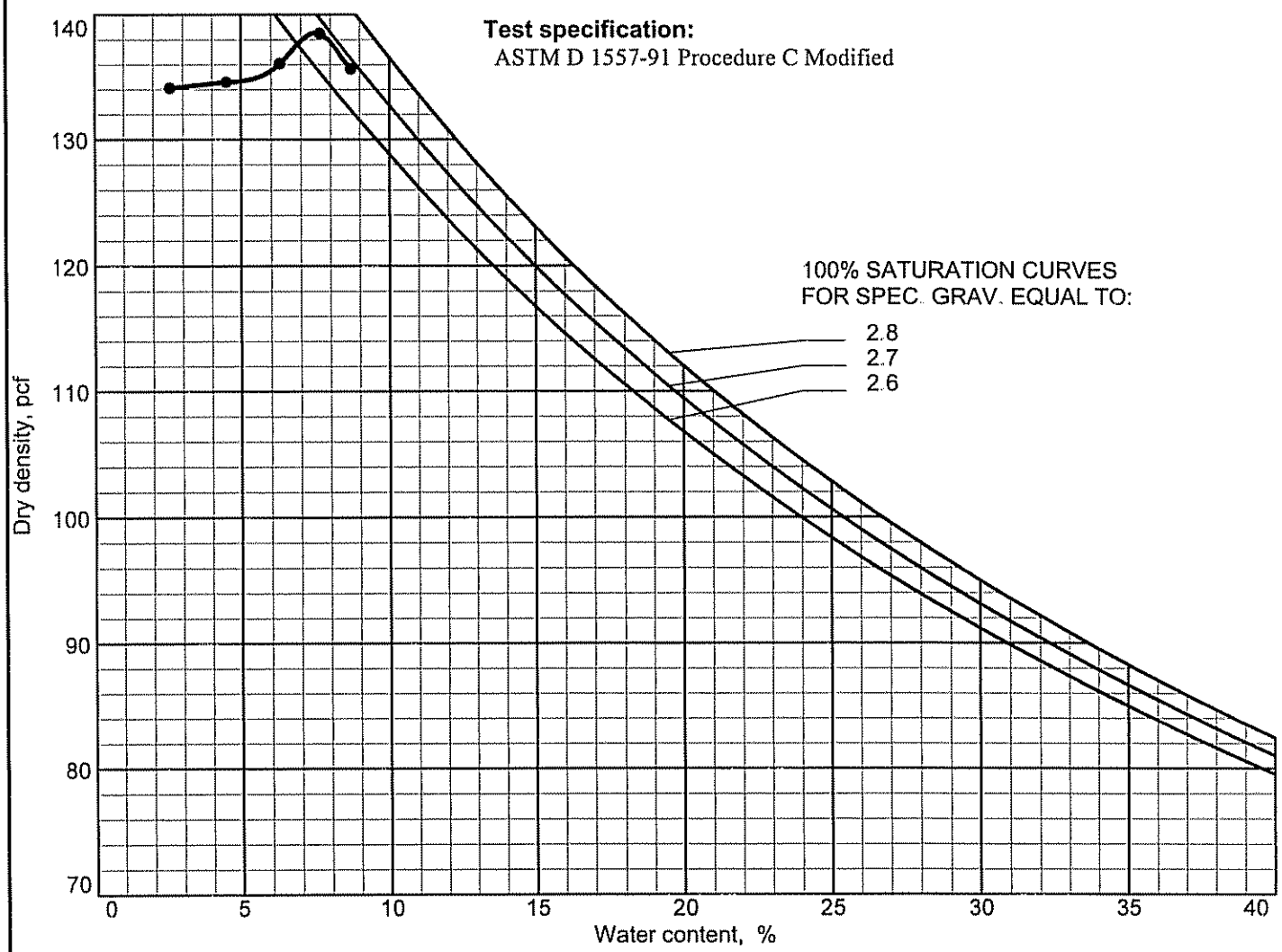
Classifications - **USCS:** GP-GM **AASHTO:** A-1-a

Nat. Moist. = 2.7 % **Sp.G. =**

Liquid Limit = NV **Plasticity Index =** NP

% > 3/4 in. = 7.0 % **% < No.200 =** 5.9 %

TEST RESULTS
Maximum dry density = 138.6 pcf
Optimum moisture = 7.5 %

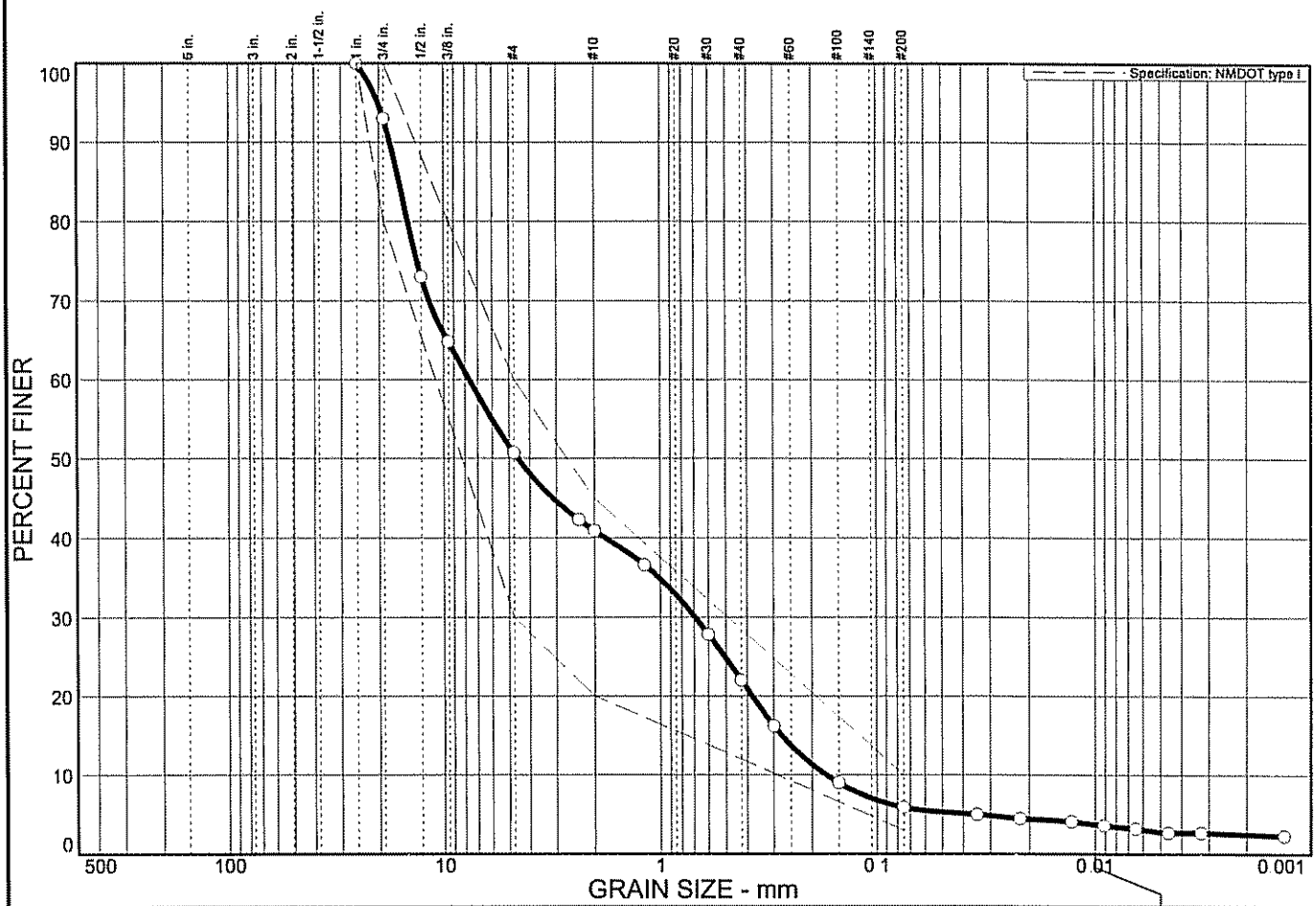


PLATE

Kleinfelder, Inc.

Jim Cali 6-22-06

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	49.3	44.8	2.2	3.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0	100 - 100	
3/4 in.	93.0	80 - 100	
1/2 in.	73.0		
3/8 in.	64.8		
#4	50.7	30 - 60	
#8	42.3		
#10	40.9	20 - 45	
#16	36.6		
#30	27.8		
#40	22.0		
#50	16.2		
#100	9.0		
#200	5.9	3 - 10	

* NMDOT type I

Soil Description

Poorly graded gravel with silt and sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 16.1 D_{60}= 7.66 D_{50}= 4.55
D_{30}= 0.692 D_{15}= 0.276 D_{10}= 0.172
C_u= 44.57 C_c= 0.36

Classification

USCS= GP-GM AASHTO= A-1-a

Remarks

F.M.=4.60

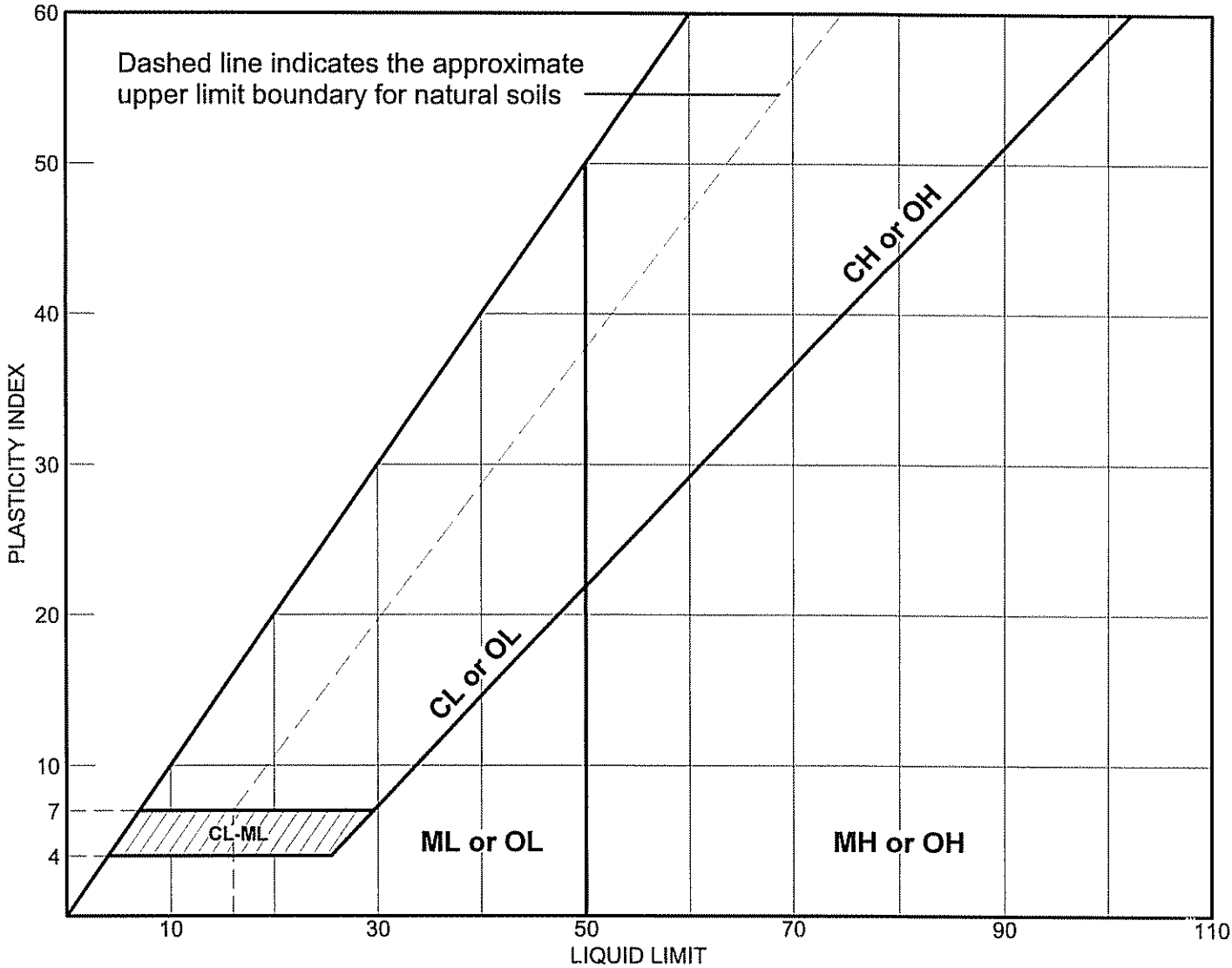
Sample No.: 06-125 **Source of Sample:** Espanola Transit Mix. Base Course **Date:** 6/16/06
Location: Espanola Transit Mix. Base Course **Elev./Depth:** stockpile

KLEINFELDER, INC.

Client: North Wind
Project: TA 73 Los Alamos Landfill
Project No: 71610 **PLATE**

Jane Cabi 6-14-06

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Espanola	06-125	stockpile	2.7	NP	NV	NP	GP-GM

LIQUID AND PLASTIC LIMITS TEST REPORT

KLEINFELDER, INC.

Client: North Wind

Project: TA 73 Los Alamos Landfill

Project No.: 71610

PLATE

Jon Cali 6-14-06

PROJECT:	TA 73 Los Alamos Landfill	JOB NO:	71610
LOCATION:	Los Alamos	WORK ORDER NO:	3
MATERIAL:	Base Course	LAB NO:	06-125 / 06-140
SAMPLE SOURCE:	Espanola Transit Mix	DATE SAMPLED:	6/12/06 & 6/22/06

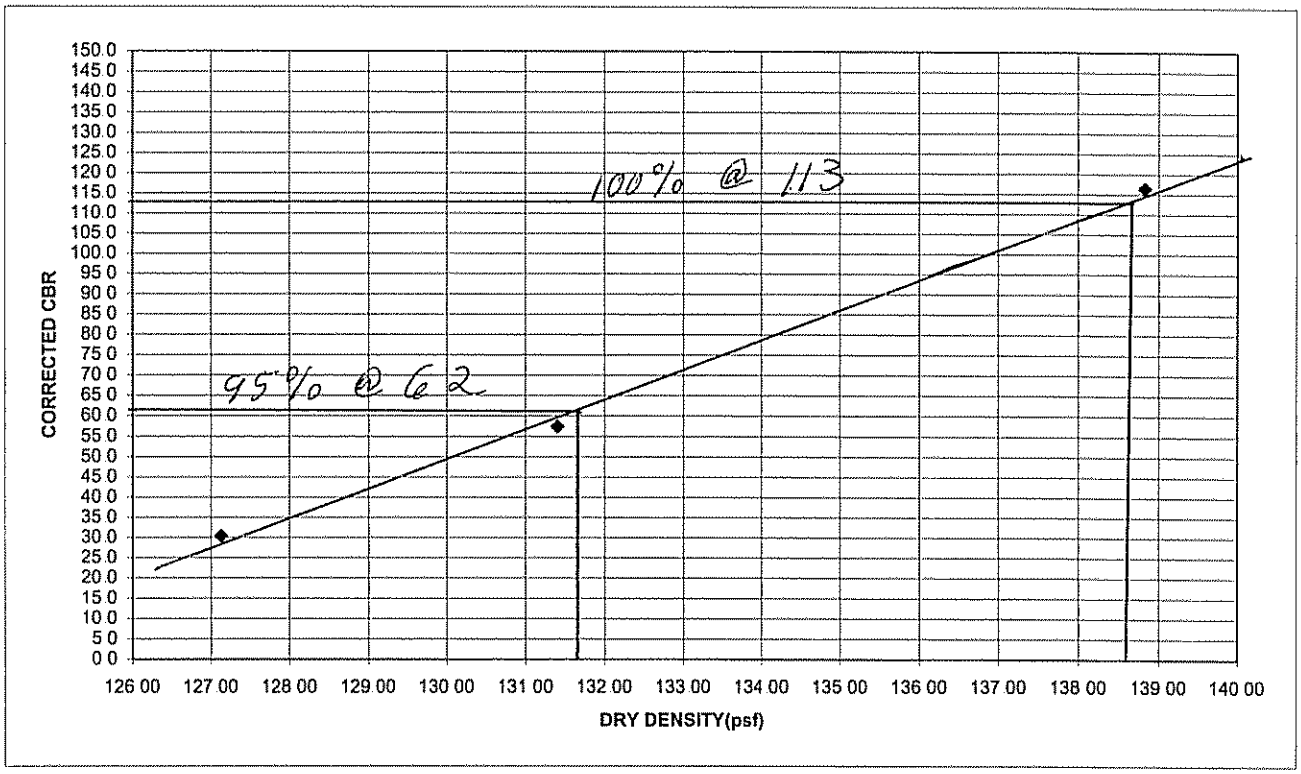
CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS(ASTM D1883)

COMPACTION(%) 90/95/100

PERCENT SWELL -0.04%

CORRECTED C B R	
62	@ 95%
113	@ 100%

SURCHARGE WEIGHT 10 LBS. lbs.



NOTE: Composite of two samples. Sampled 6/12/06 & 6/22/06 lab # 06-125 & 06-140

Jane Cabi
6-28-06

California Bearing Ratio

PROJECT:	TA 73 Los Alamos Landfill	JOB NO:	71610
LOCATION:	Los Alamos	WORK ORDER NO:	3
MATERIAL:	Base Course	LAB NO:	06-125 / 06-140
SAMPLE SOURCE:	Espanola Transit Mix	DATE SAMPLED:	6/12/06 & 6/22/06
REVISED (Y/N)?	N # OF REVISIONS 1		

		POINT 1				POINT 2				POINT 3			
PENETRATION	PROVING RING READING	TOTAL LOAD	UNIT LOAD	CORRECTED LOAD	C B R	TOTAL LOAD	UNIT LOAD	CORRECTED LOAD	C B R	TOTAL LOAD	UNIT LOAD	CORRECTED LOAD	C B R
0.025	0.0011	102	34	34		407	137	137		1156	388	388	
0.050	0.0040	370	124	124		879	295	295		1924	646	646	
0.075	0.0067	620	208	208		1156	388	388		2729	916	916	
0.100	0.0098	906	304	304	30.4	1711	574	574	57.4	3469	1164	1164	116.4
0.150	0.0166	1536	515	515		2608	875	875		4967	1667	1667	
0.200	0.0225	2081	698	698	46.6	3284	1102	1102	73.5	6327	2123	2123	141.5
0.250	0.0275	2544	854	854		4042	1356	1356		7261	2437	2437	
0.300	0.0315	2914	978	978		4643	1558	1558		8158	2738	2738	
0.400	0.0366	3386	1136	1136		5550	1862	1862		8936	2999	2999	
0.500	0.0380	3515	1180	1180		5920	1987	1987		9333	3132	3132	

	POINT 1	POINT 2	POINT 3
CORRECTION			
# OF LAYERS	5	5	5
# OF BLOWS/LAYER	10	20	50
Surcharge Wgt.(lbs.)	10	10	10

COVER PAGE INPUT INFORMATION		
Compaction(%)	90/95/100	Corrected CBR
Percent Swell	-0.04%	
Surcharge Wgt.	10 LBS.	62
CBR	57	

	POINT 1		POINT 2		POINT 3	
	MOIST BEFORE	MOIST AFTER	MOIST BEFORE	MOIST AFTER	MOIST BEFORE	MOIST AFTER
Wgt Sample+Mold(g)	11843.2	11854.4	12023.5	12034.9	12259.3	12270.2
Wgt Mold(g)	7201.3	7201.3	7225.6	7225.6	7195.0	7195.0
Wgt Wet Sample(g)	4641.9	4653.1	4797.9	4809.3	5064.3	5075.2
Wgt Wet Sample(lbs.)	10.24	10.26	10.58	10.60	11.17	11.19
Wet Density(lbs./cu.ft)	136.4	136.7	141.0	141.3	148.8	149.1
% Moisture	7.3%	7.9%	7.3%	7.6%	7.2%	7.4%
Dry Density(lbs./cu.ft)	127.1	126.7	131.4	131.4	138.8	138.9

PROCTOR INFO.

D1557C DENSITY	138.6
D1557C MOISTURE	7.5

SWELL CALCULATIONS

POINT 1			POINT 2			POINT 3		
DATE	READING	% SWELL	DATE	READING	% SWELL	DATE	READING	% SWELL
6/23/2006	0.566		6/23/2006	0.587		6/23/2006	0.654	
6/27/2006	0.564	-0.04%	6/27/2006	0.585	-0.04%	6/27/2006	0.652	-0.04%

NOTE: Composite of two samples, Sampled 6/12/06 & 6/22/06 lab # 06-125 & 06-140

Jane Cahi
6-28-06

PROJECT:	TA 73 Los Alamos Landfill	**JOB NO:**	71610
LOCATION:	Los Alamos	**WORK ORDER NO:**	3
MATERIAL:	Base Course	**LAB NO:**	06-125 / 06-140
SAMPLE SOURCE:	Espanola Transit Mix	**DATE SAMPLED:**	6/12/06 & 6/22/06

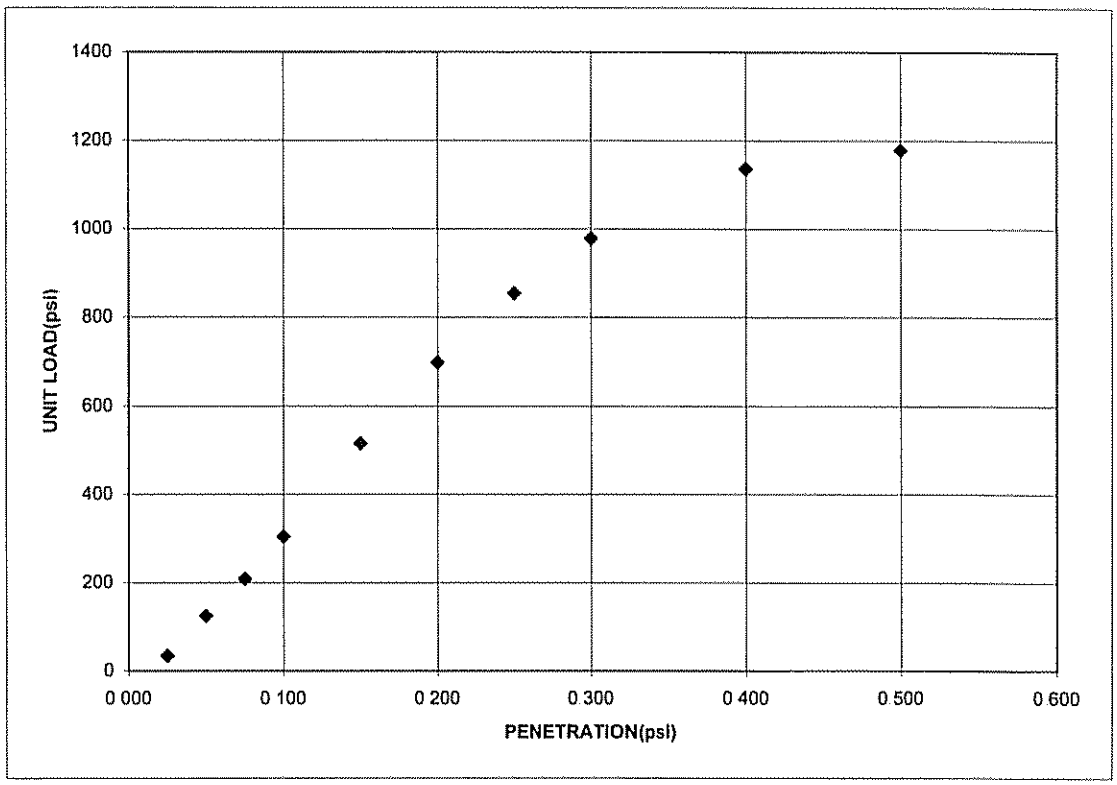
CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS(ASTM D1883)

COMPACTION(%)	91 7
COMPACTION:	5 LIFTS @ 10 BLOWS/LIFT
PERCENT SWELL	-0 04%

PENETRATION	CORRECTED C B R
0 100	30
0 200	47

	BEFORE SOAK	AFTER SOAK
DRY DENSITY	127.1 lbs /cu ft	126.7 lbs /cu ft
PERCENT MOISTURE	7 3 %	7 9 %
SURCHARGE WEIGHT	10 lbs	

D1557C PROCTOR	
DRY DENSITY(pcf)	138 6
MOISTURE(%)	7 5



CBR 30

NOTE: Composite of two samples. Sampled 6/12/06 & 6/22/06 lab # 06-125 & 06-140

Jim Cabi
6-28-06

PROJECT:	TA 73 Los Alamos Landfill	**JOB NO:**	71610
LOCATION:	Los Alamos	**WORK ORDER NO:**	3
MATERIAL:	Base Course	**LAB NO:**	06-125 / 06-140
SAMPLE SOURCE:	Espanola Transit Mix	**DATE SAMPLED:**	6/12/06 & 6/22/06

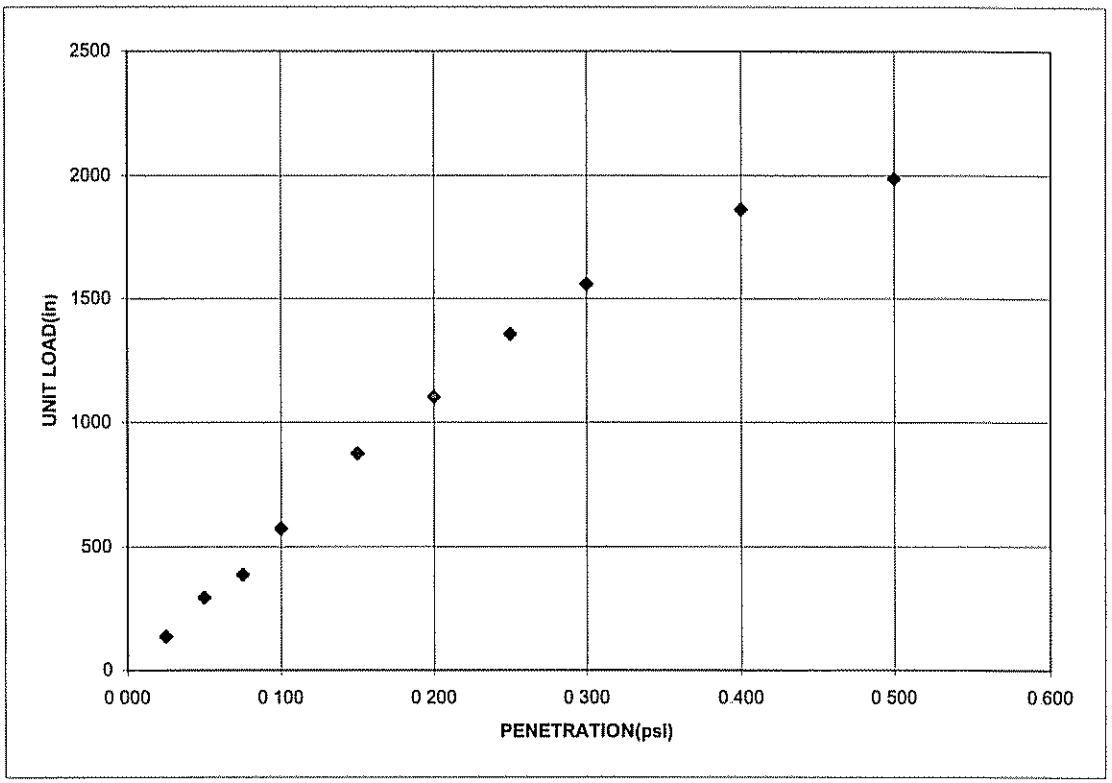
CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS(ASTM D1883)

COMPACTION(%)	94 8
COMPACTION:	5 LIFTS @ 20 BLOWS/LIFT
PERCENT SWELL	-0 04%

PENETRATION	CORRECTED C B R
0 100	57
0 200	73

	BEFORE SOAK	AFTER SOAK
DRY DENSITY	131 4 lbs /cu ft	131.4 lbs /cu ft
PERCENT MOISTURE	7.3 %	7.6 %
SURCHARGE WEIGHT	10 lbs	

D1557C PROCTOR	
DRY DENSITY(pcf)	138 6
MOISTURE(%)	7.5



CBR 57

NOTE: Composite of two samples, Sampled 6/12/06 & 6/22/06 lab # 06-125 & 06-140

Jim Carlo
6-28-06

PROJECT:	TA 73 Los Alamos Landfill	**JOB NO:**	71610
LOCATION:	Los Alamos	**WORK ORDER NO:**	3
MATERIAL:	Base Course	**LAB NO:**	06-125 / 06-140
SAMPLE SOURCE:	Espanola Transit Mix	**DATE SAMPLED:**	6/12/06 & 6/22/06

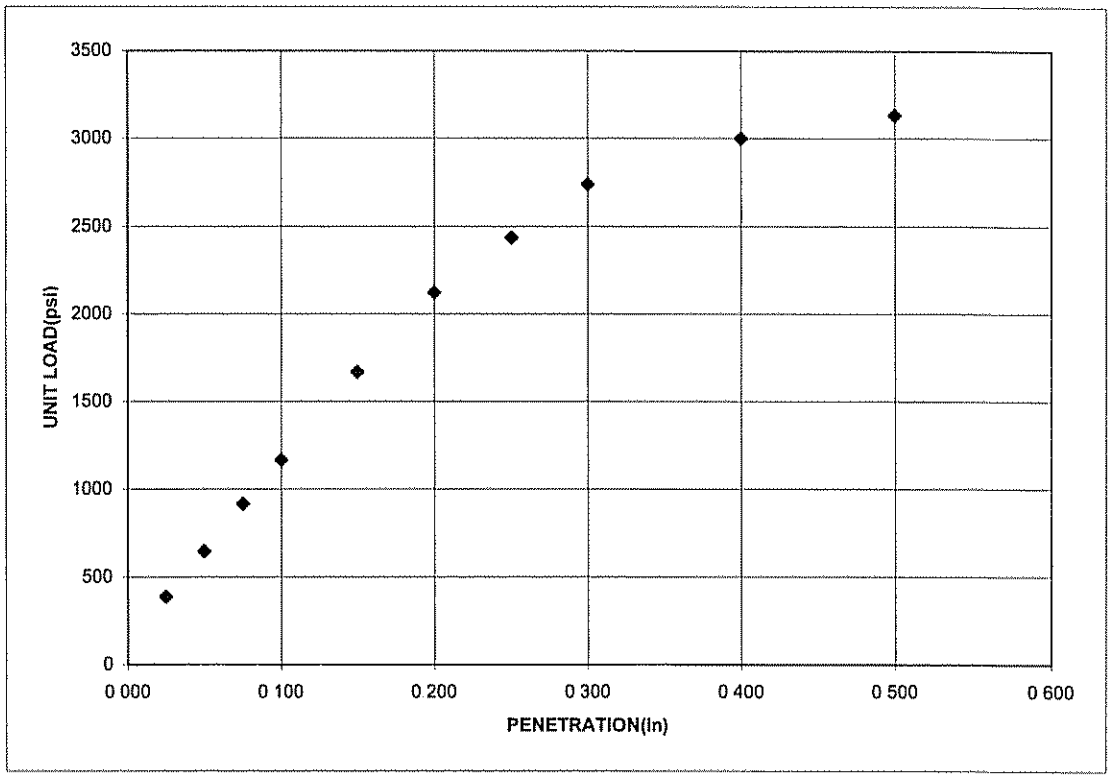
CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS(ASTM D1883)

COMPACTION(%)	100.2
COMPACTION	5 LIFTS @ 50 BLOWS/LIFT
PERCENT SWELL	-0 04%

PENETRATION	CORRECTED C B R
0.100	116
0.200	142

	BEFORE SOAK	AFTER SOAK
DRY DENSITY	138.8 lbs./cu ft	138 9 lbs./cu ft
PERCENT MOISTURE	7 2 %	7 4 %
SURCHARGE WEIGHT	10 lbs	

D1557C PROCTOR	
DRY DENSITY(pcf)	138 6
MOISTURE(%)	7.5



CBR 116

NOTE: Composite of two samples. Sampled 6/12/06 & 6/22/06 lab # 06-125 & 06-140

Jim Cali
6-28-06

KLEINFELDER
An employee owned company

8300 Jefferson NE, Suite B, Albuquerque, NM 87113
Telephone 505-344-7373 / Fax 505-344-1711

CONTROLLED DOCUMENT TRANSMITTAL/RECEIPT AND READ ACKNOWLEDGEMENT FORM

CMT LAB REPORT DISTRIBUTION						Pages:	4
1	Steve Matier smatier@northwind-inc.com	2		3			

Transmittal Date: 06/12/06	**Transmittal DCN: 71610.2 – ALB06TS003**	
Project No.: 71610	**Task No.: 2**	**File Index No.: 4.9**

SUBJECT: 71610.2 – ALB06TD003 TA73 Los Alamos Landfill Lab Reports

ITEM	DATE	LAB REPORT NO.
Hall Environmental Analysis Laboratory	5/12/06	71610HE 001

INSTRUCTIONS/REMARKS

Please sign both copies of this Transmittal form. Keep one copy for your records and mail the other copy to Kleinfelder, Inc. at the address referenced at the top of this form.

NOTES

Perry Hampel — Project Manager
6/12/06 — Date

RECEIPT AND READ ACKNOWLEDGEMENT
PLEASE COMPLETE AND RETURN WITHIN 5 WORKING DAYS TO:

DOCUMENT CONTROL SPECIALIST
KLEINFELDER, INC.
8300 JEFFERSON NE, SUITE B
ALBUQUERQUE, NM 87113

Recipient Signature _____ Date _____

Print Name _____

Hall Environmental Analysis Laboratory

Date: *05-Jun-06*

CLIENT:	Kleinfelder	**Client Sample ID:**	06-105
Lab Order:	0605277	**Collection Date:**	5/12/2006
Project:	Los Alamos Landfill	**Date Received:**	5/25/2006
Lab ID:	0605277-01	**Matrix:**	SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 9056A: ANIONS						Analyst: **MAP**
Nitrogen, Nitrate (As N)	8.0	3.0		mg/Kg	10	5/30/2006 7:56:04 PM
Nitrogen, Nitrite (As N)	ND	3.0		mg/Kg	10	5/30/2006 7:56:04 PM
Phosphorus, Orthophosphate (As P)	ND	15		mg/Kg	10	5/30/2006 7:56:04 PM
TOTAL NITROGEN SOIL						Analyst: **CMC**
Nitrogen, Organic	460	1.0		mg/Kg	1	6/5/2006
EPA METHOD 150.1: PH						Analyst: **ks**
pH	6.30	0.010		pH Units	1	5/30/2006
EPA METHOD 351.3: TKN						Analyst: **TES**
Nitrogen, Total Kjeldahl	450	50		mg/Kg	1	6/2/2006

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
S	Spike Recovery outside accepted recovery limits		

QA/QC SUMMARY REPORT

Client: Kleinfelder
Project: Los Alamos Landfill

Work Order: 0605277

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: E300									Batch ID: 10520
Sample ID: MB-10520		*MBLK*							Analysis Date: 5/30/2006
Nitrogen, Nitrate (As N)	ND	mg/Kg	0.30						
Nitrogen, Nitrite (As N)	ND	mg/Kg	0 30						
Phosphorus, Orthophosphate (As P)	ND	mg/Kg	1.5						
Sample ID: LCS-10520		*LCS*							Analysis Date: 5/30/2006
Nitrogen, Nitrate (As N)	7.173	mg/Kg	0.30	95.6	90	110			
Nitrogen, Nitrite (As N)	3 015	mg/Kg	0.30	101	90	110			
Phosphorus, Orthophosphate (As P)	14.36	mg/Kg	1.5	95.7	90	110			
Method: M4500-Norg									Batch ID: 10544
Sample ID: MB-10544		*MBLK*							Analysis Date: 6/2/2006
Nitrogen. Total Kjeldahl	ND	mg/Kg	50						
Sample ID: LCS-10544		*LCS*							Analysis Date: 6/2/2006
Nitrogen, Total Kjeldahl	938.0	mg/Kg	50	93.8	80	120			

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory

Sample Receipt Checklist

Client Name KLEIN

Date and Time Received: 5/25/2006

Work Order Number 0605277

Received by LMM

Checklist completed by Lisa Holewka 5/25/06
Signature | Date

Matrix

Carrier name Client drop-off

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☐	Not Shipped ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	N/A ☑	
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Water - VOA vials have zero headspace?	No VOA vials submitted ☑	Yes ☐	No ☐	
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑	

Container/Temp Blank temperature? **27°** *4° C ± 2 Acceptable*
If given sufficient time to cool.

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

Corrective Action _____

KLEINFELDER

DOCUMENT TRANSMITTAL FORM

TO:	See Distribution List	PAGE 1 OF 4
		TRANSMITTAL DATE: 04/02/07
		TRANSMITTAL DCN: 71610.2 – ALB07TS011
RETURN RESPONSES/COMMENTS TO:	Perry Hampel	
RETURN RESPONSES/COMMENTS BY:	48 hrs from date of transmission	

PROJECT NO.:	71610	PROJECT NAME:	TA-73 Los Alamos Land Fill
ACTIVITY/DESCRIPTION:	CMT Lab Reports		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
Hydraulic Conductivity Test Report	0	2	3/18/07	71610HC 006

INSTRUCTIONS/REMARKS

PLEASE VERIFY RECEIPT OF THIS DELIVERABLE BY REPLYING TO THIS E-MAIL. YOUR REPLY WILL SERVE AS VERIFICATION OF SUCCESSFUL RECEIPT OF THE ATTACHED DOCUMENT.

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- ☐ Replace with revised/new material
- ☐ Not Applicable

CLIENT RECEIPT	PRINT NAME	SIGNATURE	DATE
Complete & Return this page via Fax/Mail/Email			

KLEINFELDER RECEIPT	PRINT NAME	SIGNATURE	DATE
Complete this section upon receipt from client			

CMT LAB REPORT DISTRIBUTION

1	Steve Matier smatier@northwind-inc.com	2	John Keck jkeck@northwind-inc.com	3	Steve Edwards sedwards@northwind-inc.com

HYDRAULIC CONDUCTIVITY TEST REPORT
ASTM D5084

Project Name	TA 73 Los Alamos Airport	***Project No.***	71610
Client Name	Northwind	***Date Received***	2/20/2007 12:00
Client Address	Albuquerque, New Mexico	***Date Tested***	3/7/2007 16:00
		Date Issued	3/18/2007 10:00
Lab No.	#07-44 Parker Pit Stockpile - Infiltration Material		
Sample Type	Remolded Sample		
Sample Depth	NA		
Sample Description	Lean Clay with Fine Sand, Brown		

	Before	*After*	*Units*
Moisture Content, w	15.5	19.6	%
Dry Unit Weight, Dd	106.9	107.5	pcf
Height, L	2.19	2.18	inches
Diameter, d	2.82	2.82	inches
Degree of Saturation, Sr	72.7	93.2	%

Chamber Pressure:	61.6	psi
Applied Pressure (influent):	58.6	psi
Applied Pressure (effluent):	57.0	psi
Consolidation Pressure:	3	psi

Test Number		*Temp. Deg. C*	*Time (sec)*	*Influent Reading*	*Effluent Reading*	*Hydraulic Conductivity (cm/sec) @ Test Temp.*	*Hydraulic Conductivity (cm/sec) @ 20° C*	*Hydraulic Gradient h/L*
1	Start	21.9	0	11.85	18.05			
	Finish	21.9	600	12.55	17.35	1.36E-06	1.3E-06	21.16
2	Start	21.9	600	12.55	17.35			
	Finish	21.9	1260	13.25	16.65	1.25E-06	1.2E-06	20.90
3	Start	21.9	1260	13.25	16.65			
	Finish	21.9	1680	13.75	16.15	1.42E-06	1.4E-06	20.71
4	Start	21.9	1680	13.75	16.15			
	Finish	21.9	2580	14.65	15.20	1.24E-06	1.2E-06	20.37

Average Hydraulic Conductivity "k" (cm/sec) @ Test Temp.	1.3E-06	
Average Hydraulic Conductivity "k" (cm/sec) @ 20° C		**1.3E-06**

Assumed Specific Gravity, SG 2 7
Area of Tube (cm^2), a (pipette) 0 9721
Permeant : Dealred Tap Water
Formulas:
Permeability (Falling Head-Rising Tailwater Test)
k = [(a*L/(2*A*t)] ln(ho/h1)
k = Hydraulic Conductivity (cm/sec)
a = Area of Tube (cm^2)
L = Height or Length of Sample (cm)
A = Area of Sample (cm^2)
t = Time of Test Interval (sec)
h_o = Height of Head at Start of Test Interval (cm)
h_f = Height of Head at End of Test Interval (cm)

Degree of Saturation
Sr = w*SG/e Dd = (SG/1+e)Dw
Therefore:
Sr = (w*SG)/((SG*Dw/Dd)-1)
Sr = Degree of Saturation (%)
w = Moisture Content (%)
SG = Specific Gravity
e = Void Ratio
Dd =Dry Unit Weight (pcf)
Dw = Unit Weight of Water (62 4 pcf)

L:\Quality\Labreports\Newperm xls

KLEINFELDER

HYDRAULIC CONDUCTIVITY TEST RESULTS (ASTM D5084)

Project Name	TA 73 Los Alamos Airport	***Job No.***	71610
Client Name	Northwind	***Date Received***	2/20/2007 12:00
Client Address	Albuquerque, New Mexico	***Date Tested***	3/7/2007 16:00
		Date Issued	3/18/2007 10:00
Boring No.	#07-44 Parker Pit Stockpile - Infiltration Material		
Sample Type	Remolded Sample		
Sample Depth	NA		
Sample Description	Lean Clay with Fine Sand, Brown		

0.0

	Deviation from Average	Change in Influent(ml)	Change in Effluent (ml)	Ratio Effluent/Influent Change
Test1	1.03	0.68	-0.68	1.00
Test 2	0.95	0.68	-0.68	1.00
Test 3	1.08	0.49	-0.49	1.00
Test 4	0.94	0.87	-0.92	1.06
	ok if within 0.75-1.25			**ok if within 0.75-1.25**

1.0231881

0.022923341

KLEINFELDER

DOCUMENT TRANSMITTAL FORM

TO:	Mr. John Keck	PAGE	1	OF	11
		TRANSMITTAL DATE:	03/30/07		
		TRANSMITTAL DCN:	71610.2 – ALB07TS010		

RETURN RESPONSES/COMMENTS TO:	Perry Hampel
RETURN RESPONSES/COMMENTS BY:	48 hrs from date of transmission

PROJECT NO.:	71610	PROJECT NAME:	TA-73 Los Alamos Land Fill
ACTIVITY/DESCRIPTION:	CMT Lab Reports		

DOCUMENTS BEING TRANSMITTED

ITEM	REV.	PAGES	DATE	DESIGNATOR
Hall Environmental Lab Report	0	10	3/14/07	71610HE 001

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- ☒ New issue (no previous copies received)
- ☐ Replace with revised/new material
- ☐ Not Applicable

CLIENT RECEIPT	PRINT NAME	SIGNATURE	DATE
Complete & Return this page via Fax/Mail/Email			

KLEINFELDER RECEIPT	PRINT NAME	SIGNATURE	DATE
Complete this section upon receipt from client			

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

COVER LETTER

Wednesday, March 14, 2007

Phillip German
Kleinfelder
8300 Jefferson, NE Suite B
Albuquerque, NM 87113

TEL: (505) 344-7373
FAX (505) 344-1711

RE: TA73 Los Alamos Airport

Order No.: 0702242

Dear Phillip German:

Hall Environmental Analysis Laboratory, Inc. received 3 sample(s) on 2/21/2007 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

Reporting limits are determined by EPA methodology. No determination of compounds below these (denoted by the ND or < sign) has been made.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

NM Lab # NM9425
AZ license # AZ0682
ORELAP Lab # NM100001

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505 345 3975 ■ Fax 505 345 4107
www.hallenvironmental.com

Hall Environmental Analysis Laboratory, Inc.

Date: *14-Mar-07*

CLIENT:	Kleinfelder	**Client Sample ID:**	07-26-1
Lab Order:	0702242	**Collection Date:**	2/21/2007
Project:	TA73 Los Alamos Airport	**Date Received:**	2/21/2007
Lab ID:	0702242-01	**Matrix:**	SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 9056A: ANIONS						Analyst: **TES**
Nitrogen, Nitrite (As N)	ND	0.30		mg/Kg	1	2/23/2007 11:42:04 AM
Nitrogen. Nitrate (As N)	29	0.30		mg/Kg	1	2/23/2007 11:42:04 AM
Phosphorus. Orthophosphate (As P)	ND	1.5		mg/Kg	1	2/23/2007 11:42:04 AM
EPA METHOD 150.1: PH						Analyst: **TES**
pH	8.18	0.10		pH Units	1	2/23/2007

Qualifiers:				
	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
	S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *14-Mar-07*

CLIENT:	Kleinfelder	**Client Sample ID:**	07-26-2
Lab Order:	0702242	**Collection Date:**	2/21/2007
Project:	TA73 Los Alamos Airport	**Date Received:**	2/21/2007
Lab ID:	0702242-02	**Matrix:**	SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 9056A: ANIONS						Analyst: TES
Nitrogen, Nitrite (As N)	ND	0.30		mg/Kg	1	2/23/2007 12:24:43 PM
Nitrogen, Nitrate (As N)	25	0.30		mg/Kg	1	2/23/2007 12:24:43 PM
Phosphorus, Orthophosphate (As P)	ND	1.5		mg/Kg	1	2/23/2007 12:24:43 PM
EPA METHOD 150.1: PH						Analyst: TES
pH	8.11	0.10		pH Units	1	2/23/2007

Qualifiers:	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
	S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *14-Mar-07*

CLIENT:	Kleinfelder	**Client Sample ID:**	07-26-3
Lab Order:	0702242	**Collection Date:**	2/21/2007
Project:	TA73 Los Alamos Airport	**Date Received:**	2/21/2007
Lab ID:	0702242-03	**Matrix:**	SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 9056A: ANIONS						Analyst: **TES**
Nitrogen, Nitrite (As N)	ND	0.30		mg/Kg	1	2/23/2007 1:16:55 PM
Nitrogen, Nitrate (As N)	28	0.30		mg/Kg	1	2/23/2007 1:16:55 PM
Phosphorus, Orthophosphate (As P)	ND	1.5		mg/Kg	1	2/23/2007 1:16:55 PM
EPA METHOD 150.1: PH						Analyst: **TES**
pH	8.19	0.10		pH Units	1	2/23/2007

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit	RL	Reporting Limit
S	Spike recovery outside accepted recovery limits		

LABORATORY ANALYTICAL REPORT

Client: Hall Environmental
Project: 0702242
Lab ID: C07020878-001
Client Sample ID: 07-26-1

Report Date: 03/08/07
Collection Date: 02/21/07
DateReceived: 02/23/07
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Phosphorus. Olsen	5 5	mg/kg		1 0		ASA24-5	03/01/07 14:12 / eli-b

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit
MCL - Maximum contaminant level
ND - Not detected at the reporting limit

LABORATORY ANALYTICAL REPORT

Client: Hall Environmental
Project: 0702242
Lab ID: C07020878-002
Client Sample ID: 07-26-2

Report Date: 03/08/07
Collection Date: 02/21/07
DateReceived: 02/23/07
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Phosphorus, Olsen	11	mg/kg		1 0		ASA24-5	03/01/07 14:13 / eli-b

Report Definitions:
RL - Analyte reporting limit
QCL - Quality control limit
MCL - Maximum contaminant level
ND - Not detected at the reporting limit

LABORATORY ANALYTICAL REPORT

Client: Hall Environmental
Project: 0702242
Lab ID: C07020878-003
Client Sample ID: 07-26-3

Report Date: 03/08/07
Collection Date: 02/21/07
DateReceived: 02/23/07
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS - TOTAL							
Phosphorus, Olsen	6 8	mg/kg		1 0		ASA24-5	03/01/07 14:15 / eli-b

Report Definitions:
RL - Analyte reporting limit
QCL - Quality control limit
MCL - Maximum contaminant level
ND - Not detected at the reporting limit

QA/QC SUMMARY REPORT

Client: Kleinfelder
Project: TA73 Los Alamos Airport **Work Order:** 0702242

Analyte	Result	Units	PQL	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: SW9056A									
Sample ID: MB-12375		*MBLK*			Batch ID:	**12375**	Analysis Date:	2/23/2007 11:07:15 AM	
Nitrogen, Nitrite (As N)	ND	mg/Kg	0.30						
Nitrogen, Nitrate (As N)	ND	mg/Kg	0.30						
Phosphorus, Orthophosphate (As P)	ND	mg/Kg	1.5						
Sample ID: LCS-12375		*LCS*			Batch ID:	**12375**	Analysis Date:	2/23/2007 11:24:39 AM	
Nitrogen, Nitrite (As N)	3.267	mg/Kg	0.30	109	90	110			
Nitrogen, Nitrate (As N)	7.524	mg/Kg	0.30	100	90	110			
Phosphorus, Orthophosphate (As P)	15.04	mg/Kg	1.5	100	90	110			
Method: SW9045B									
Sample ID: 0702242-03ADUP		*DUP*			Batch ID:	**R22583**	Analysis Date:	2/23/2007	
pH	8.170	pH Units	0.10						

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name KLEIN

Date and Time Received: 2/21/2007

Work Order Number 0702242

Received by AMF

Checklist completed by B Schlupp 2-21-07
Signature Date

Matrix

Carrier name Client drop-off

Shipping container/cooler in good condition?	Yes ☐	No ☐	Not Present ☑	
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☐	Not Shipped ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	N/A ☑	
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Water - VOA vials have zero headspace? No VOA vials submitted ☑		Yes ☐	No ☐	
Water - Preservation labels on bottle and cap match?	Yes ☐	No ☐	N/A ☑	
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑	
Container/Temp Blank temperature?	**21°**	*4° C ± 2 Acceptable* If given sufficient time to cool		

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

Corrective Action _____

CHAIN-OF-CUSTODY RECORD

QA / QC Package:
Std ☐ Level 4 ☐
Other:

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite D
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: KLEINFELDER

Address: 8300 JEFFERSON NE
SUITE B
ALBUQUERQUE NM 87113

Phone #: 344-7373

Fax #: 344-1711

Project Name: TA73 LOS ALAMOS AIR PORT

Project #: 71610-2

Project Manager: PERRY HAMPEL
PHILIP GERMAN

Sampler:

Sample Temperature:

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	Preservative	HEAL No. 0702242	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)	PH	NITROGEN NO_2 + NO_3	PHOSPHORUS ORTHOPHOSPHATE		Air Bubbles or Headspace (Y or N)
		Soil																							
21-2			07-26-1	~~2417G~~				1													X	X	X		
21-2			07-26-2					2													X	X	X		
21-2			07-26-3					3													X	X	X		

Date	Time	Relinquished By: (Signature)	Received By: (Signature)
21 FEB 07	2:19	[signature]	[signature] 2/21/07 2:20
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks:

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039.

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. CESQG

Manifest Document No. 52110

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
US Department of Energy
528 35th St
Los Alamos, NM 87544

4. Generator's Phone (505) 667-7640

A. State Manifest Document Number

B. State Generator's ID

5. Transporter 1 Company Name
RINCHEM CO INC

6. US EPA ID Number
NMD002208627

C. State Transporter's ID

D. Transporter's Phone (505)345-3655

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
Rinchem Company, Inc.
6133 Edith Blvd NE
Albuquerque, NM 87107

10. US EPA ID Number
NMD002208627

G. State Facility's ID

H. Facility's Phone (505)345-3655

GENERATOR

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Environmentally Hazardous Substances Liquid, N.O.S.(Freon 113 1,1,2-Trichloro- 1,2,2-Trifluoroethane),9,UN3082,PG III	X	1	DF	40	P	N/R
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a) RC7641 S3 #5

K. Handling Codes for Wastes Listed Above
a) ERG# 171

15. Special Handling Instructions and Additional Information
24 hour emergency contact: Bob Enz Phone # 505-667-7640

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Robert D. Enz | Signature | Month Day Year: 08 10 06

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Ron Sharks | Signature | Month Day Year: 08 10 06

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: Deanne Watkins | Signature | Month Day Year: 08 10 06

Style CF 17 LABELMASTER® (800) 621-5808 www.labelmaster.com

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

ORIGINAL - RETURN TO GENERATOR

PRINTED ON RECYCLED PAPER USING SOYBEAN INK
PRINTED WITH SOY INK

RINCHEM COMPANY, INC.
6133 EDITH BOULEVARD NE
ALBUQUERQUE, NM 87107
PHONE (505) 345-3655

Waste Acceptance Notification

08/18/2006

Bill To:

US Department of Energy
528 35th Street
MS-A316
Los Alamos, NM 87544

Ship From:

US Department of Energy
528 35th Street MS-A316
Los Alamos, NM 87544
Contact: Robert Enz
Phone: (505) 667-7640

Waste Stream #:	RC7641
Waste Description:	Freon 113
Profile Start Date:	08/09/2006
Profile Last Modified Date:	08/09/2006
Profile Expiration Date:	08/09/2007

We thank you for choosing Rinchem Company, Inc. to comply with your hazardous waste management requirements. Your waste has been reviewed and is found acceptable for management in our Albuquerque, NM facility.

Our company has the necessary permit to appropriately manage your accepted wastes. Note the identification number of the waste RC7641 on all correspondence. Please retain these documents for your files and for future reference.

Acceptance Information:

This waste, identified as RC7641 is accepted in our program for Stabilization & Landfill with Veolia Henderson in Henderson, CO. Containers for this waste include: UN/DOT Approved Containers.

This waste will be cleared for delivery beginning 8/9/2006 through 8/9/2007, or when another revision is required to maintain acceptance.

NOTE: The identification number of the waste, RC7641 must be written on every container sent.

To schedule a shipment, please contact a representative of our customer service center at 505-998-4154 or 505-998-4155.

We Care,

Deanne L. Watkins

Deanne L. Watkins
Hazardous Waste Coordinator

NACD Responsible Distribution Process

UL Documentation Verification Assessment 1995
File T7: NC2015

WE DO IT WELL **BECAUSE WE CARE**

Table C-1. FCN index

FCN#	Scope	Affected design elements	Affected DFOW
4200-001	Delete geotextile under access road	Dwg 2024	NA
4200-002	Change spec for access road gravel	Spec 02500	NA
4200-003	Delete use of plastic liner at material storage area	SWPPP	NA
4200-004	Change location of equipment parking area	SWPPP	NA
4200-005	Select one air content test for concrete	Spec 03300	Retaining wall 1/ hangar pads
4200-006	Eliminate compaction “window” for the infiltration layer	Spec 02200 1.04 B. 3	Infiltration layer
4200-007	Delete requirement in Spec 02266 for survey of top of relocated waste	Spec 02266.1.04.A	Excavate at main landfill
4200-008	Delete hangar pad #6	Dwgs 2001, 2002, 2003, 2010, 2013, 2018, 2024, 3003	Hangar pads
4200-009	Identify UFGS 02722 for aggregate base under MatCon	Spec 02200.2.03	MatCon cover
4200-010	Revise MSE wall backfill spec	Spec 02200.2.04.B	Retaining wall 2
4200-011	Delete requirements in 02200.2.01 re: "Existing/relocated interim cover material	Spec 02200.1.01.A.	Subgrade preparation
4200-12	Change slump requirements for both 3000 and 4000 psi concrete	03300.2.04	Retaining wall 1/hangar pads
4200-13	Identify 2 layers of 6-oz non-woven as adequate substitute for single-layer 10-oz nonwoven under hangar pads	Dwg 3003 note 15	Hangar pads
4200-14	Clarify definition of interim cover, common borrow, and testing requirements	Spec 022001.03., Table 02200-1, Table 02200-2,	Subgrade preparation
4200-15	Change finish surface slopes on hangar pads 1-3 to uniform grade edge to center	Dwg 3003	Hangar pads
4200-16	Change detail for hangar pad trench drain shown on Dwg 2024 and 3003 to be consistent with Dwg 2002 and 2021 detail 3.	Dwg 2024 and 3003	Hangar pads
4200-17	Change Spec 03300.2.02.C requirement for water reducing admixture.	Spec 03300.2.02.C	Retaining wall 1/Hangar pads
4200-18	Change location of vapor barrier under hangar pads	Dwg 3003 Sections 1 and 2	Hangar pads
4200-19	Create an aggregate base course thickness tolerance ±1" below each hangar pad.	Dwg 3003 Sections 1 and 2	Hangar pads

FCN#	Scope	Affected design elements	Affected DFOW
4200-20	Eliminate the requirement for concrete curing compound and replace with a visqueen vapor barrier placed over concrete for 5 days.	Dwg 3003 Section 3.	Hangar pads
4200-21	Change spec 3300-2.04A to allow a 6" slump for mix design 44 (4000 psi-hangar pad)	3300-2.04A	Hangar pads
4200-22	Revise specification 2200-3.02E to state that the infiltration layer shall be compacted to at least 100% of the maximum dry density as determined by the Standard Proctor.	2200-3.02E	Infiltration layer
4200-23	Revise specification for wall backfill to describe placement of specified fills 10 ft behind Walls 1 and 2, with interim material behind that.	2200.2.04	Retaining walls1/structural fill
4200-24	Revise Drawing 3002C Detail “Typical Wall-Footing Construction Keys” to invert key and change dimensions to 1.5-in deep by 3.5-in wide.	Drawing 3002C	Retaining wall 1
4200-25	Revise Drawing 3002C Detail “Vertical Joint Detail-Concrete Wall” to replace “zipper strips” with a trapezoidal channel 3-in wide at exterior face and 2-in wide interior dimension and 1.5-in deep	Drawing 3002C	Retaining wall 1
4200-26	Revise Drawing 3000B. Add Note 5 to Structural Notes: “In areas where bottom of footing is not embedded a minimum of 2-ft into bedrock, an area 5-ft in width shall be excavated in front of the toe of the footing and backfilled with structural fill to 9-in above top of footing and compacted to 95% of standard Proctor maximum dry density.”	Drawing 3000B	Retaining wall 1
4200-27	Revise Drawing 2003C to show that diameter of RCP pipe actually used between inlet 2 and inlet 4, and inlet 4 and inlet 6; was 15-in at 0.0107 ft/ft, and 18-in at 0.0153 ft/ft, respectively.	Drawing 2003C	Stormwater system
4200-28	Add tolerance of + 1 in to maximum specified slump of 4-in, as measured using ASTM C143. The intent is not to change maximum allowable slump beyond 4-inches.	Specification 03300.2.04	Hangar pads/retaining wall 1
4200-29	Change maximum specified air content of 6% ± 1% to a range of 3.5% to 6.5% for AMEC Mix #18.	Specification 03300.2.02.B	Retaining wall 1

FCN#	Scope	Affected design elements	Affected DFOW
4200-30	Add sections in areas where passive pressures are available on toe of footing, and where total excavation widths are restricted due to presence of bedrock. See attached drawings.	Drawing 3001B	Retaining wall 1
4200-31	Add subsection F to describe use of additional rebar posts to support temporary formwork used to provide guides for structural steel layout. Cut posts at top of foundation after concrete sets. Posts shall not be within one inch of structural rebar.	Specification 03300.3.01	Retaining wall 1
4200-32	Revise compaction requirement in UFGS 02722 for aggregate base course under MatCon pavement to 95% of modified Proctor	Specification 02200.2.03; UFGS 02722	MatCon cover, structural fill
4200-34	Reduce frequency of on-site testing for concrete to minimum of 1 per 10 trucks.	Specification 03300.1.03.D	Hangar pads/retaining wall 1
4200-35	Eliminate “A”-Lok Resilient Seal	Dwg 2004A Detail 4	Stormwater system
4200-36	Replace 36” RCP storm drain pipe from Sta. 12+05 to Sta. 12+95 with 18” HDPE pipe and eliminating the impact basin at Sta. 12+95	Dwg 2003 D	Stormwater system
4200-37	Revise area between Walls 1 and 2	a) Drawing 2005 C Detail 5; b) Drawing 2025 A Section N	Retaining walls
4200-38	Revise compaction specified in Table 02200-2 for fill materials from 98% of standard Proctor to 95% specifically for Russells gravel aggregate used as retaining wall backfill.	Specification 02200	Retaining walls
4200-39	Reduce frequency of testing for Wall 2 backfill.	Specification 02200	Retaining wall 2
4200-40	Revise interface of taxiway and drainage channel	Drawing 2005 Section G	Stormwater system
4200-41	Reduce frequency of testing for Wall 2 backfill	Specification 02200	Retaining wall 2
4200-42	Eliminate testing requirements for concrete used for aircraft tie-downs.	Specification 03300	NA

FCN#	Scope	Affected design elements	Affected DFOW
4200-43	Eliminate chain-link fences shown on tops of Walls 1, 2a and 2b.	Drawings 2004A, 2007A, 2008A	Retaining walls

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-042 **Affected Document:** Specification 03300

Date Prepared: 01/31/07 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change):
Eliminate testing requirements for concrete used for aircraft tie-downs.
Reason for Field Change: Over 200 concrete break tests have been performed to verify compressive strength of 3000 and 4000 psi concrete mixes supplied by Los Alamos Transit Mix. All of the break test values exceeded requirements. Therefore there is high confidence that the concrete from the same supplier used for tie downs will meet the required 3000 psi compressive strength and testing is not needed. The QCSM will verify that the concrete mix on the truck ticket matches the approved 3000 psi mix.

Testing requires that a field technician travel from Albuquerque, a round trip time of 3-4 hours. Eliminating testing for concrete used for the tie-downs will reduce costs.

This field change will impact project schedule by _____ Months; _____ cost

Approval See attachment 1/31/07

Engineer of Record Signature Date

2/2/07

Project Manager Signature Date

Steven D. Edwards

From: John Keck
Sent: Wednesday, January 31, 2007 2:43 PM
To: Steven D. Edwards; Christopher Richardson; Stephen Matier
Cc: Keshian, Berg
Subject: FW: FCN-4200-042.doc

Thanks Berg. Chris and Steves fyi.

From: Keshian, Berg [mailto:Berg.Keshian@WestonSolutions.com]
Sent: Wednesday, January 31, 2007 2:37 PM
To: John Keck
Subject: RE: FCN-4200-042.doc

Attach this email as my approval of FCN-4200-042
Berg Keshian PE
Engineer of Record

From: John Keck [mailto:jkeck@northwind-inc.com]
Sent: Wednesday, January 31, 2007 2:38 PM
To: Keshian, Berg
Subject: FCN-4200-042.doc

Berg please take a look, thanks.

CONFIDENTIALITY: This e-mail and attachments may contain information which is confidential and proprietary. Disclosure or use of any such information without the written permission of Weston Solutions, Inc. is strictly prohibited. If you received this e-mail in error, please notify the sender by return e-mail and delete this e-mail from your system. Thank You.

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-0~~38~~ 41 **Affected Document:** Specification 02200

Date Prepared: 01/17/07 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change):
Reduce frequency of testing for Wall 2 backfill.
Reason for Field Change: Results for the three initial days of field moisture and density testing of the MSE wall backfill are provided in the attached worksheet. Results show a) little variability for field dry density, ranging from 129.5 pcf to 133.5 pcf; and b) show little correlation to moisture content (see the chart in the worksheet).

Specification 02200 currently requires that every lift shall be tested. Due to the construction method described below, approximately 30 tests are required per wall. Testing requires that a field technician travel from Albuquerque daily, a round trip time of 3-4 hours. Discontinuing testing will reduce costs.

The current construction method consists of placing the structural fill material on top of the geo-grid in a 12" then a 6" lift with compaction between lifts This process is repeated as up to 15 18-in layers are constructed. The compactor is an Ingersol Rand SD 40 smooth drum roller, which passes over each lift three times. This compactor has a 54" drum and weighs approximately 11,000 lbs. Due to recent snowfall addition of water has not been required. Wetter overlying material has been removed and segregated to bring moisture contents to the acceptable range.

Tensar Corp. design parameters for the MSE wall reinforced backfill, are an effective friction angle of 32° and moist unit weight of 130 pcf. Backfill is required to be compacted to at least 95% of maximum dry density as determined using standard Proctor testing.

The Russells Gravel aggregate was determined using modified Proctor testing (ASTM D1557) to have a maximum dry density of 133.5 pcf. Friction angle was determined in direct shear testing to be 44°.

Calculated moist unit weight presented in the attached worksheet ranges from 135 to 140 pcf and therefore meets the design parameters. Based on these results, the Tensar Corp. design parameters and technical requirements can be met with reasonable assurance without further field testing, under the following conditions:

1. The QCSM or his designee must witness all lift installation and compaction each day and state in each DQCR that they observed compaction being performed using the placement and compaction procedure described above.
2. If conditions or procedures change, e.g. replacement of equipment, additional

precipitation, etc., testing must resume.

3. If drier material from the Russell's stockpile is encountered, testing should resume to establish required water addition.

Specification 02200, Table 02200-2, Footnote 1, will be revised to add the sentence: "MSE wall backfill shall be tested until a reproducible procedure that results in the required density and moisture content is demonstrated. The Engineer shall determine if further testing is required or if observation and documentation of continued use of the approved procedure can be used instead."

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature	Date
	2/2/07
Project Manager Signature	Date

PWIF-4201-005.1 – FIELD CHANGE NOTICE

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-030 4// **Affected Document:** Specification 02200

Date Prepared: 01/17/07 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change):
Reduce frequency of testing for Wall 2 backfill.
Reason for Field Change: Results for the three initial days of field moisture and density testing of the MSE wall backfill are provided in the attached worksheet. Results show a) little variability for field dry density, ranging from 129.5 pcf to 133.5 pcf; and b) show little correlation ~~to~~ between density and ~~moisture~~ moisture content (see the chart in the worksheet). J.Keck 1/18/07

Specification 02200 currently requires that every lift shall be tested. Due to the construction method described below, approximately 30 tests are required per wall. Testing requires that a field technician travel from Albuquerque daily, a round trip time of 3-4 hours. Discontinuing testing will reduce costs.

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This field change will impact project schedule by _____ Months; _____ cost

Approval Daniel F. Brennecke for Keshian 1/17/07

Engineer of Record Signature Date

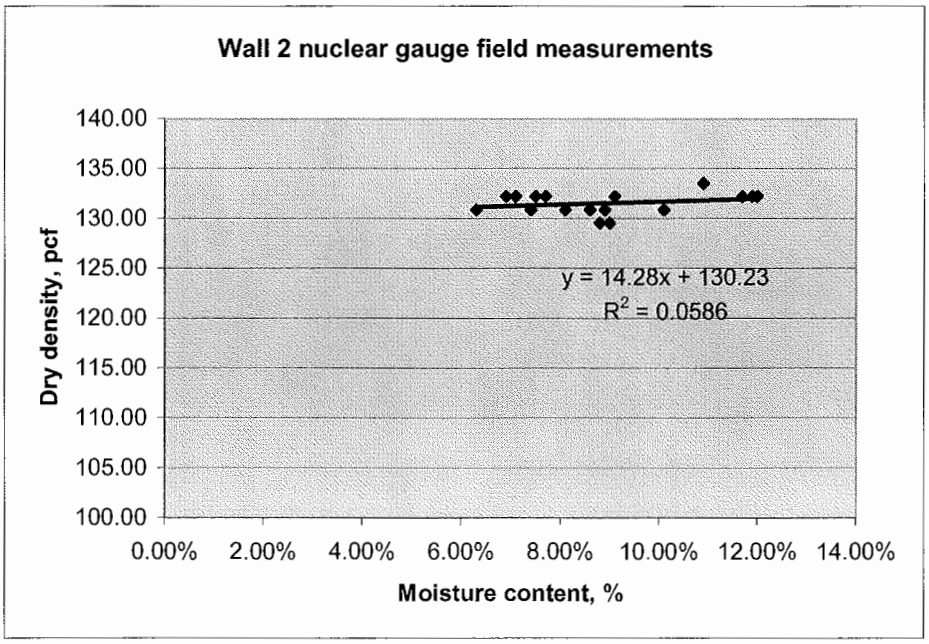
Project Manager Signature Date

FIELD TESTING RESULTS FOR WALL 2 BACKFILL

Max dry density, pcf **133.5 ASTM D1557 result for Russells Gravel**

Optimum moisture, % **7.2 ASTM D1557 result for Russells Gravel**

Date	Location	Test #	Measured moisture content, %	Measured dry density, % of max	Measured dry density, pcf	Calculated moist density, pcf
1/11/2007	Foundation	1	8.60%	98.00%	130.83	136.20
1/11/2007	Foundation	2	9.10%	99.00%	132.17	137.84
1/11/2007	Foundation	3	7.70%	99.00%	132.17	136.97
1/11/2007	Foundation	4	7.50%	99.00%	132.17	136.85
1/11/2007	Foundation	5	9.00%	97.00%	129.50	135.11
1/11/2007	Foundation	6	8.80%	97.00%	129.50	134.99
1/15/2007	Wall 2 reinforcement backfill	1	8.90%	98.00%	130.83	136.38
1/15/2007	Wall 2 reinforcement backfill	2	12.00%	99.00%	132.17	139.65
1/15/2007	Wall 2 reinforcement backfill	3	11.70%	99.00%	132.17	139.47
1/15/2007	Wall 2 reinforcement backfill	4	10.90%	100.00%	133.50	140.30
1/15/2007	Wall 2 reinforcement backfill	5	10.10%	98.00%	130.83	137.13
1/15/2007	Wall 2 reinforcement backfill	6	11.90%	99.00%	132.17	139.59
1/16/2007	Wall 2 reinforcement backfill	1	8.10%	98.00%	130.83	135.88
1/16/2007	Wall 2 reinforcement backfill	2	7.70%	99.00%	132.17	136.97
1/16/2007	Wall 2 reinforcement backfill	3	6.30%	98.00%	130.83	134.76
1/16/2007	Wall 2 reinforcement backfill	4	6.90%	99.00%	132.17	136.47
1/16/2007	Wall 2 reinforcement backfill	5	7.10%	99.00%	132.17	136.60
1/16/2007	Wall 2 reinforcement backfill	6	7.40%	98.00%	130.83	135.45



PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-040 **Affected Document:** Drawing 2005 C Section G

Date Prepared: 12/7/06 **Prepared by:** S. Edwards

Description of Field Change (Cite section in document and description of change): a) Drawing 2005 C Section G Typical Taxiway Side Slope Section requires sealing the 40 mil VFPE membrane linear to be sealed with a liquid boot seal . Due to an uneven asphalt taxiway edge, the Liquid Boot representative stated they did not have a product which would work on a vertical edge that was not a smooth surface. The 40 mil VFPE was installed in a key trench next to the taxiway, backfilled and compacted then folded into the rock armor channel. See detail attached.

Reason for Field Change: a) Could not establish an adequate seal between the taxiway and the 40 mil VFPE membrane linear due to the uneven edge of asphalt along the taxiway.

This field change will impact project schedule by _____ Months; _____ cost

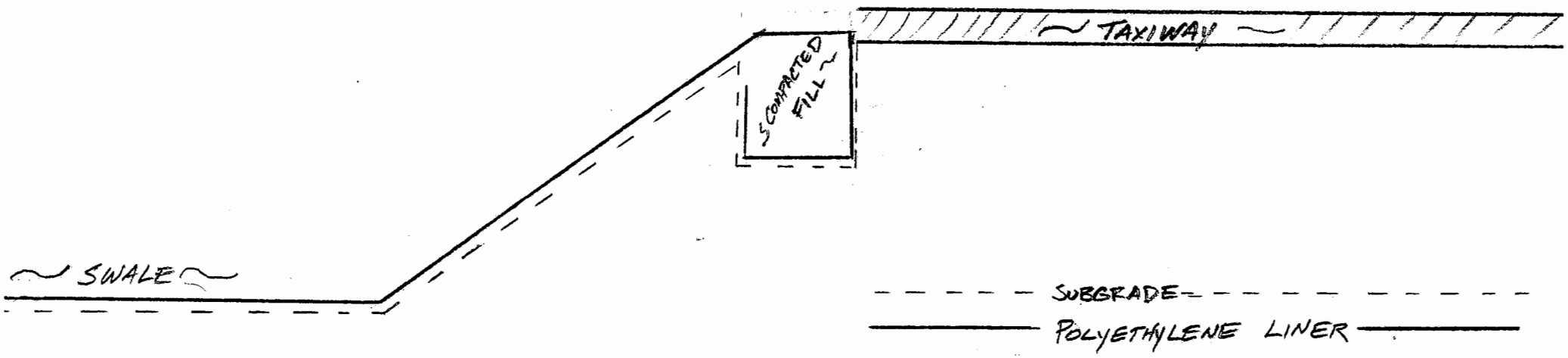
Approval Daniel F Bonnecke for Kathian 12/7/06

Engineer of Record Signature Date

12/7/06

Project Manager Signature Date

TERMINATION OF POLYETHYLENE LINER AT TAXIWAY



PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-039 **Affected Document:** 2005C, Detail 5

Date Prepared: 12-7-06 **Prepared by:** Steve Edwards

Description of Field Change (Cite section in document and description of change):

Structural backfill material in the first 10 feet immediately adjacent to Wall 1 shall be free draining gravel materials loosely placed. Structural fill placed beyond the 10 foot limit shall be placed in layers and compacted per the specifications. A minimum of 2 feet of structural fill shall be placed below the bottom of the MSE wall (Wall 2) footing. See attached sketch.

Reason for Field Change: Original design assumed that all waste material would be removed between Wall 1 and Wall 2 and replaced with structural fill. Design change accommodates the backfill requirements needed to leave waste in place beneath Wall 2 and still provide structural stability for Wall 2.

This field change will impact project schedule by _____ Months; _____ cost

Approval Daniel F Bennett for Keshian 12/7/06

Engineer of Record Signature Date

12/7/06

Project Manager Signature Date

FCN 39

WESTON
MANAGERS DESIGNERS/CONSULTANTS

SHEET ____ of ____

CLIENT/SUBJECT _____ W.O. NO. _____

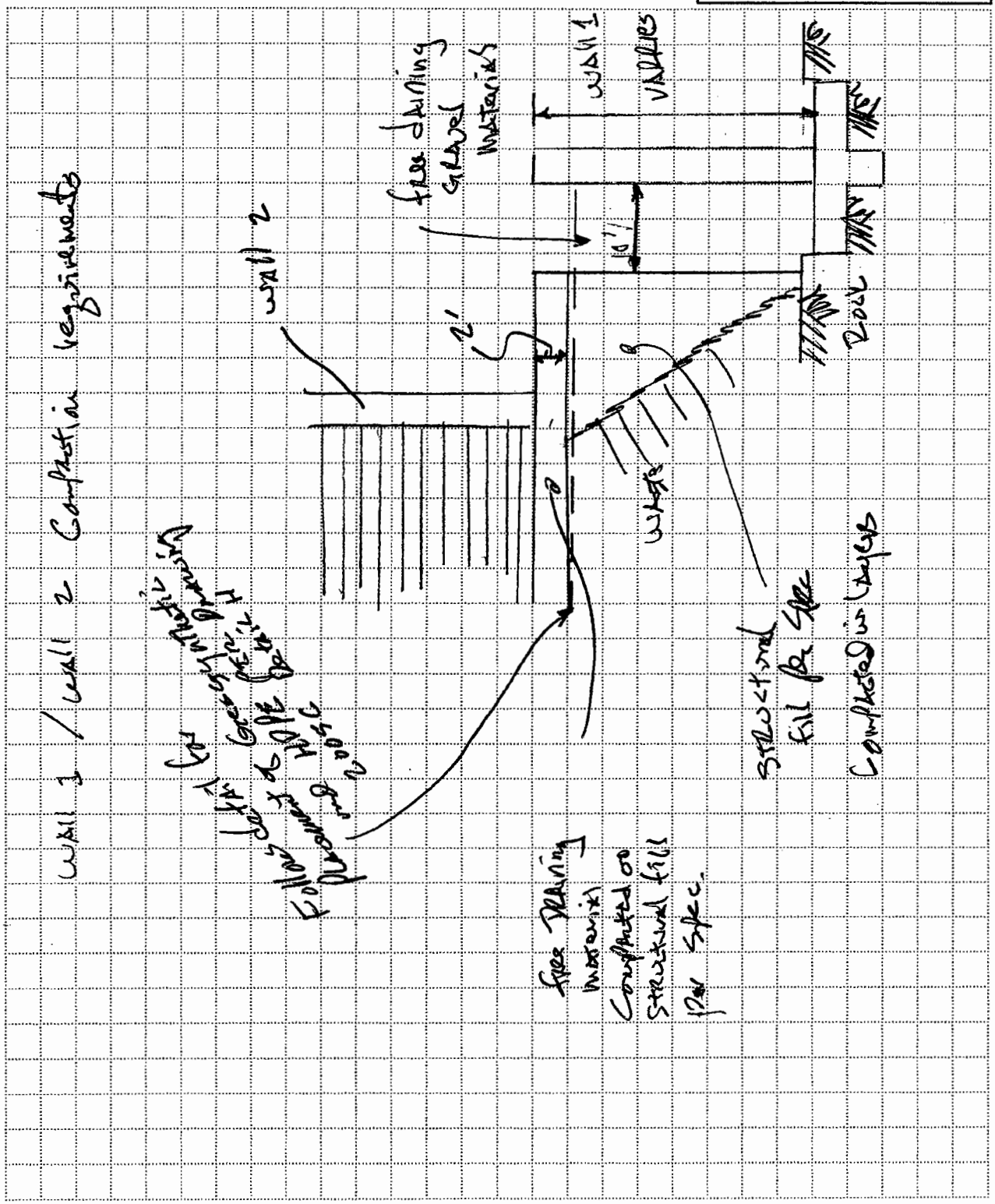
TASK DESCRIPTION LANL TA-73 Land fill TASK NO. _____

PREPARED BY BK DEPT _____ DATE 12-4-08

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY _____ DEPT _____ DATE _____



RFW 10-05-003/A-5/85
512-5643

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-038 **Affected Document:** Specification 02200

Date Prepared: 12/06/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change): Revise compaction specified in Table 02200-2 for fill materials from 98% of standard Proctor to 95% specifically for Russells gravel aggregate used as retaining wall backfill. FOR BOTH WALL 1 + WALL 2.
Reason for Field Change: 95% compaction is adequate for the Russells gravel material because this value was used in direct shear testing to establish the friction angle for wall backfill. 95% compaction produced a friction angle of 44° which is well above the design angle used for both Walls 1 and 2 and is therefore acceptable.

This field change will impact project schedule by _____ Months; _____ cost

Approval Daniel F. Bernecke for Keshia 12/7/06

Engineer of Record Signature Date

12/7/06

Project Manager Signature Date

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-037

Affected Document: a) Drawing 2005 C Detail 5; b) Drawing 2025 A Section N

Date Prepared: 11/30/06

Prepared by: J. Keck

Description of Field Change (Cite section in document and description of change): a) Add geosynthetic liner system, as shown in Drawing 2005 Detail H, to Detail 5. Extend the liner system from 2-ft behind face of Wall 2, at a depth of 2-ft below the bottom of the wall, to the back of Wall 1. Slope the liner at 5% minimum downward toward Wall 1. Complete surface with 6" of topsoil with the turf reinforcement mat. Riprap adjacent to retaining wall #1 shall be 3' wide and slope laterally from the center of the wall to each end of the wall at 0.5%

b) Change all references to "Wall(s) 3 and 4" to "Wall 2". Delete geocell/infiltration layer/drainage composite liner system shown at face of Wall 2. Replace with geosynthetic liner system shown in Drawing 2005 Detail H, starting 2-ft behind face of Wall 2, at a depth of 2-ft below the bottom of the wall, to the back of Wall 1 as described above. Revise "6" Geocell with topsoil" behind wall to "6" topsoil with turf reinforcement mat".

Reason for Field Change: a) The original design assumptions included removing all waste from the area between Walls 1 and 2. This was not feasible due to the depth of natural ground encountered behind Wall 1 during construction. Therefore the bench between Walls 1 and 2 will be covered using the geosynthetic liner and geotextile configuration used for drainage benches, in order to meet the requirement to cover all waste.

b) Walls 3 and 4 were eliminated. Geocell was replaced with turf reinforcement mat on shallow slopes.

This field change will impact project schedule by _____ Months; _____ cost

Approval Donald F. Bonnecke for Kerfoot 12/7/06

Engineer of Record Signature Date

Project Manager Signature

Date 2/2/07

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-036 **Affected Document:** Plans Sheet 2003 D

Date Prepared: 11/28/06 **Prepared by:** S. Edwards

Description of Field Change (Cite section in document and description of change):
Replace 36" RCP storm drain pipe from Sta. 12+05 to Sta. 12+95 with 18" HDPE pipe and eliminating the impact basin at Sta. 12+95 .

Reason for Field Change: The main reason was due to safety. To install 36" RCP on a slope with a 26% grade with an excavator transporting the pipe strapped in a choker was considered to be unsafe due to running the risk of having the pipe slipping out of the choker and possibly injuring an employee while trying to install each section of pipe. Calculations were performed and it was determined that an 18" pipe would handle the expected runoff into the storm drain system. ^ AT THE STEEP DESIGN GRADES

Based on these calculations the impact basin was determined to not be required. Additionally, there is not enough area to safely install the large impact basin on a ledge with has a vertical drop in elevation of approximately 200' into Pueblo Canyon. Instead the 18" HDPE pipe will extend 2' over solid rock and discharge into Pueblo Canyon.

This field change will impact project schedule by Months; cost

Approval

Engineer of Record Signature Date

Project Manager Signature Date 2/2/07

Jennifer Buseck

From: Steven D. Edwards
Sent: Friday, February 02, 2007 1:51 PM
To: Jennifer Buseck
Subject: FW: Requested Scan

Jennie,

If you could please print this e-mail out and attach it to FCN - 036, I would appreciate it. Then just go ahead and copy everything and send it up to John.

Thanks

Steve

From: John Keck
Sent: Friday, February 02, 2007 1:16 PM
To: Steven D. Edwards
Subject: FW: Requested Scan

From: Keshian, Berg [mailto:Berg.Keshian@WestonSolutions.com]
Sent: Friday, February 02, 2007 1:05 PM
To: John Keck; Brennecke, Dan
Subject: RE: Requested Scan

I approve FCN 4200-036
Berg Keshian PE
Engineer of Record

From: John Keck [mailto:jkeck@northwind-inc.com]
Sent: Friday, February 02, 2007 1:04 PM
To: Brennecke, Dan; Keshian, Berg
Subject: FW: Requested Scan

Dan or Berg, this FCN was never signed, please give us an email approval note, thanks.

From: Jennifer Buseck
Sent: Friday, February 02, 2007 12:51 PM
To: Steven D. Edwards; John Keck
Subject: Requested Scan

Jennie von Buseck
jbuseck@northwind-inc.com
Office:505-661-4290

Fax:505-661-4298
Cell: 505-412-9551

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12/7/06
need to attach
design calcs from
~~Ath~~ Andrew Harper

LBT

Need to determine
final resolution of
pipe anchor +
outlet before this
is signed.

Steven D. Edwards

From: Brennecke, Dan [Dan.Brennecke@WestonSolutions.com]
Sent: Monday, December 11, 2006 10:04 AM
To: Steven D. Edwards
Cc: John Keck; Keshian, Berg
Subject: FW: Design calcs for 18 dia stormwater pipe at LANL

Steve,

Here are the calcs that need to be printed out and attached to the FCN that approved using the 18 inch pipe for the stormwater outfall. Like we talked about last Thur., we need to add another pipe anchor at the joint just down slope from the one that is in place. In regard to the impact basin that was part of the original design (and referenced below), I need to talk to Berg to see how he wants to handle this.

Dan Brennecke, P.E.
Weston Solutions, Inc.
3151 Primrose Court
Grand Junction, Colorado 81506

Ph. (970) 241-5050
Fax (970) 256-7100
Cell (970) 260-5886

From: Wilson, Sviatlana
Sent: Monday, December 11, 2006 7:23 AM
To: Harpur, Andrew; Brennecke, Dan
Subject: RE: Design calcs for 18 dia stormwater pipe at LANL

Dan,

Attached please find the results summary for the LANL SWMM model run, showing that the 18-inch discharge pipe at the last section will work. Note that no flooding/surcharges occurs in other inlets.

Please also note excessive maximum velocities at the outfall (over 33 fps). ADS (HDPE pipe manufacturer) recommends that velocity should not exceed 20 fps in their Technical Note 2.170. Considering that these flows will not be frequent, and that HDPE pipe with no bends may withhold a bit more, it may still have a limited life due to abrasives and high-velocity flow corrosion. At the outfall, I would still recommend a stilling structure, in order to avoid significant erosion.

Hope this helps, please let me know if you have questions.

Sviatlana

From: Harpur, Andrew
Sent: Thursday, December 07, 2006 3:10 PM
To: Brennecke, Dan; Wilson, Sviatlana
Subject: RE: Design calcs for 18 dia stormwater pipe at LANL

Dan, I will have Sviatlana send them to you tomorrow. She is out today.

Sviatlana, can you forward the requested calculations to Dan. Thanks.

Andrew

From: Brennecke, Dan
Sent: Thursday, December 07, 2006 1:44 PM
To: Harpur, Andrew
Cc: Keshian, Berg; 'John Keck'; Steven D. Edwards
Subject: Design calcs for 18 dia stormwater pipe at LANL

Andrew,

Can you send me the supporting design calcs that allowed us to reduce the pipe size from 36 inches to 18 inches on the stormwater pipe that dumps into the canyon?

Dan Brennecke, P.E.
Weston Solutions, Inc.
3151 Primrose Court
Grand Junction, Colorado 81506

Ph. (970) 241-5050
Fax (970) 256-7100
Cell (970) 260-5886

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EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.004)

****
Analysis Options
****

```
Flow Units ............... CFS
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ MAY-18-2005 00:00:00
Ending Date .............. MAY-18-2005 06:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 01:00:00
Routing Time Step ........ 00:05:00
Report Time Step ......... 00:15:00
```

********** Runoff Quantity Continuity **********	Volume acre-feet	Depth inches
Total Precipitation	0.502	0.935
Evaporation Loss	0.000	0.000
Infiltration Loss	0.022	0.041
Surface Runoff	0.496	0.924
Final Surface Storage	0.001	0.001
Continuity Error (%)	-3.355	

********** Flow Routing Continuity **********	Volume acre-feet	Volume Mgallons
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.496	0.162
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	14.262	4.647
Internal Flooding	0.000	0.000
External Outflow	14.674	4.782
Evaporation Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.084	0.027
Continuity Error (%)	0.000	

****
Node Depth Summary
****

		Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Average Depth Change	Total Minutes Flooded
JUNCTION	t1	0.63	0.89	7137.38	0 01:25	0.0328	0
JUNCTION	I2	0.80	1.10	7133.93	0 01:15	0.0340	0
JUNCTION	t2	0.66	0.96	7135.63	0 01:30	0.0193	0
JUNCTION	I4	1.01	1.50	7132.85	0 01:15	0.0430	0
JUNCTION	t3	0.65	0.94	7134.03	0 01:30	0.0189	0
JUNCTION	I6	1.13	1.38	7130.67	0 01:30	0.0303	0
JUNCTION	t4	0.63	0.89	7132.40	0 01:30	0.0176	0
JUNCTION	I8	1.26	1.58	7129.26	0 01:30	0.0346	0
JUNCTION	I10	0.97	1.15	7126.46	0 01:20	0.0225	0
JUNCTION	MH1	0.79	0.98	7112.58	0 01:20	0.0191	0
JUNCTION	I1	0.52	0.74	7134.89	0 01:15	0.0289	0
JUNCTION	I3	0.44	0.57	7133.08	0 01:20	0.0109	0
JUNCTION	I5	0.41	0.52	7131.36	0 01:20	0.0100	0
JUNCTION	I7	0.53	0.68	7129.80	0 01:20	0.0129	0
JUNCTION	t5	0.65	0.93	7130.86	0 01:30	0.0185	0
JUNCTION	I11	1.38	1.74	7118.95	0 01:20	0.0349	0
JUNCTION	I9	0.51	0.65	7128.36	0 01:20	0.0124	0
JUNCTION	I12	1.34	1.63	7115.63	0 01:20	0.0311	0
OUTFALL	EW1	0.00	0.00	7086.90	0 00:00	0.0000	0

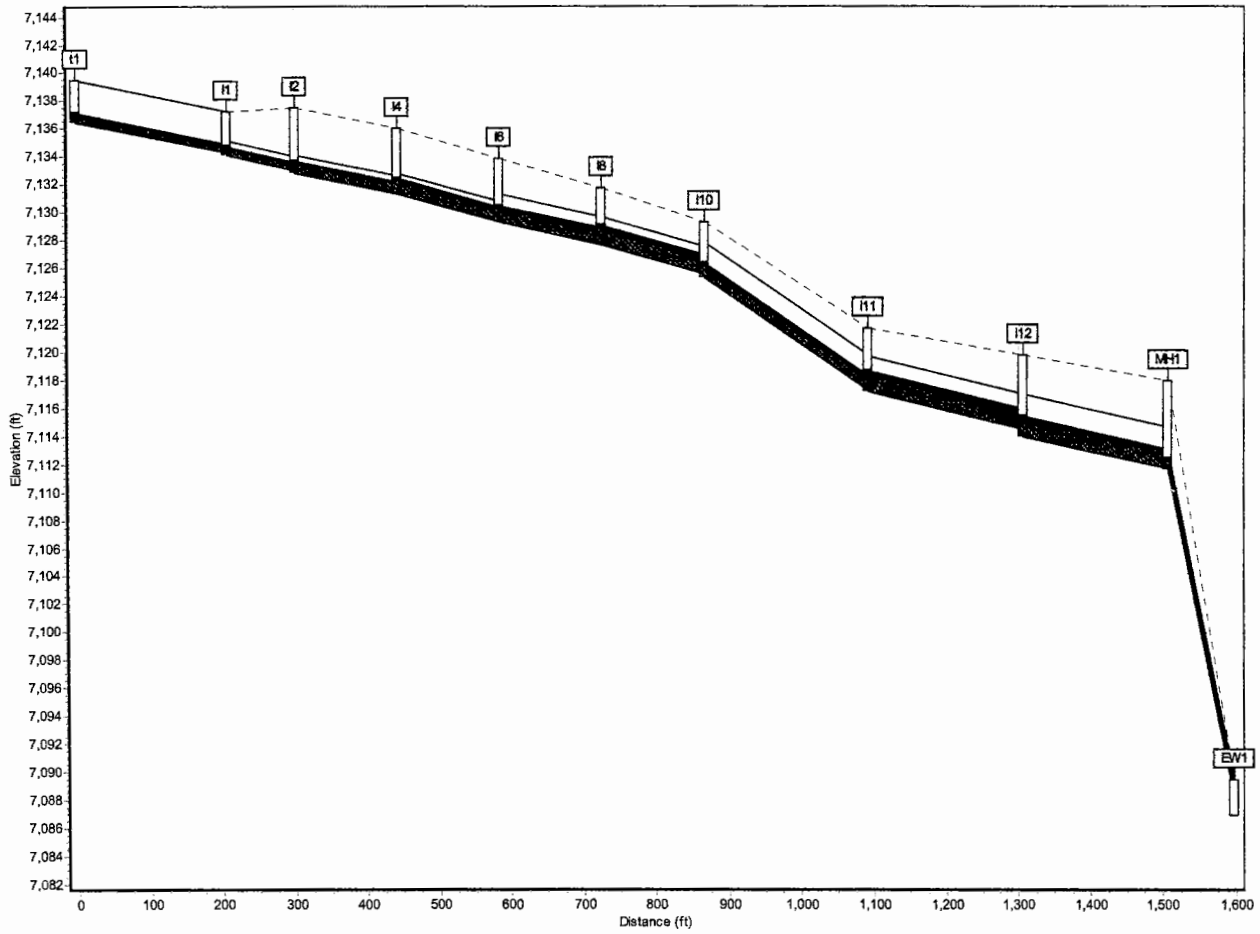
****
Conduit Flow Summary
****

	Maximum	Time of Max	Maximum	Length	Maximum	Total

Conduit	Flow CFS	Occurrence days	hr:min	Velocity ft/sec	Factor	/Design Flow	Minutes Surcharged
Trench1	3.81e+000	0	01:25	5.12	1.00	0.25	0
Trench2	3.98e+000	0	01:30	4.99	1.00	0.33	0
Trench3	3.98e+000	0	01:30	5.08	1.00	0.33	0
Trench4	3.87e+000	0	01:30	5.24	1.00	0.30	0
I1-I2	4.16e+000	0	01:15	6.70	1.00	0.89	0
I3-I4	4.00e+000	0	01:20	6.52	1.00	0.30	0
I5-I6	4.00e+000	0	01:20	7.26	1.00	0.26	0
I7-I8	3.88e+000	0	01:20	5.00	1.00	0.42	0
I2-I4	6.55e+000	0	01:15	6.12	1.00	0.99	0
I4-I6	1.32e+001	0	01:30	8.19	1.00	1.04	0
I6-I8	1.98e+001	0	01:30	8.58	1.00	0.82	0
I8-I10	2.65e+001	0	01:30	9.96	1.00	0.96	0
MH1-EW1	4.10e+001	0	01:20	33.52	1.00	0.76	0
Trench5	3.92e+000	0	01:30	5.09	1.00	0.32	0
I9-I10	3.94e+000	0	01:20	5.38	1.00	0.39	0
I10-I11	3.34e+001	0	01:20	15.15	1.00	0.43	0
I11-I12	3.84e+001	0	01:20	10.49	1.00	0.83	0
I12-MH1	4.10e+001	0	01:20	10.46	1.00	0.57	0

Analysis begun on: Mon Dec 11 08:39:40 2006
Total elapsed time: 00:00:01

LANL Stormsewer Profile: Node t1 - EW1



05/18/2005 05:00:00

[TITLE]

```
 TIONS]
 OW_UNITS              CFS
INFILTRATION           GREEN_AMPT
FLOW_ROUTING           KINWAVE
START_DATE             05/18/2005
START_TIME             00:00:00
REPORT_START_DATE      05/18/2005
REPORT_START_TIME      00:00:00
END_DATE               05/18/2005
END_TIME               06:00:00
SWEEP_START            01/01
SWEEP_END              12/31
DRY_DAYS               0
WET_STEP               00:15:00
DRY_STEP               01:00:00
ROUTING_STEP           00:05:00
REPORT_STEP            00:15:00
ALLOW_PONDING          NO
INERTIAL_DAMPING       PARTIAL
VARIABLE_STEP          0.00
LENGTHENING_STEP       0
MIN_SURFAREA           0
COMPATIBILITY          5
```

[RAINGAGES]

;;Name	Rain Type	Recd. Freq.	Snow Catch	Data Source	Source Name	Station ID	Rain Units
Gage2	INTENSITY	1:00	1.0	TIMESERIES	SCSII-A		

[SUBCATCHMENTS]

;;Name	Raingage	Outlet	Total Area	Pcnt. Imperv	Width	Pcnt. Slope	Curb Length	Snow Pack
S1	Gage2	t1	0.74	90	30	2	0	
S2	Gage2	i2	0.03	100	40	2	0	
S3	Gage2	t2	0.83	100	140	2	0	
S4	Gage2	i4	0.22	100	140	2	0	
S5	Gage2	t3	0.83	100	140	2	0	
S6	Gage2	i6	0.1	100	140	2	0	
S7	Gage2	t4	0.77	100	140	2	0	
S8	Gage2	i8	0.28	90	140	2	0	
S9	Gage2	t5	0.8	100	140	2	0	
S10	Gage2	i10	0.26	90	140	2	0	
S11	Gage2	I11	1.4	95	200	2	0	
S12	Gage2	I12	0.18	40	200	0.5	0	

[SUBAREAS]

;;Subcatchment	N-Imperv	N-Perv	S-Imperv	S-Perv	PctZero	RouteTo	PctRouted
S1	0.01	0.1	0	0	25	OUTLET	
S2	0.01	0.1	0	0	25	OUTLET	
S3	0.01	0.1	0	0	25	OUTLET	
S4	0.01	0.1	0	0	25	OUTLET	
S5	0.01	0.1	0	0	25	OUTLET	
S6	0.01	0.1	0	0	25	OUTLET	
S7	0.01	0.1	0	0	25	OUTLET	
S8	0.01	0.1	0	0	25	OUTLET	
S9	0.01	0.1	0	0	25	OUTLET	
S10	0.01	0.1	0	0	25	OUTLET	
S11	0.01	0.1	0	0	25	OUTLET	
S12	0.01	0.1	0.05	0.05	25	OUTLET	

[INFILTRATION]

;;Subcatchment	Suction	HydCon	IMDmax
S1	3.5	0.5	0.26
S2	3.5	0.5	0.26
S3	3.5	0.5	0.26
S4	3.5	0.5	0.26
S5	3.5	0.5	0.26
S6	3.5	0.5	0.26
S7	3.5	0.5	0.26
S8	3.5	0.5	0.26
S9	3.5	0.5	0.26
S10	3.5	0.5	0.26
S11	3.5	0.5	0.26
S12	3.5	0.5	0.26

[JUNCTIONS]

;;Name	Invert Elev.	Max. Depth	Init. Depth	Surcharge Depth	Ponded Area
	7136.49	0.51	0	0	0
I2	7132.83	4.72	0	0	0
t2	7134.67	1	0	0	0
I4	7131.35	4.7	0	0	0
t3	7133.09	1	0	0	0
I6	7129.29	4.58	0	0	0
t4	7131.51	1	0	0	0
I8	7127.68	4.11	0	0	0
I10	7125.31	4.02	0	0	0
MH1	7111.6	6.4	0	0	0
I1	7134.15	3	0	0	0
I3	7132.51	3.23	0	0	0
I5	7130.84	3.23	0	0	0
I7	7129.12	3.23	0	0	0
t5	7129.93	1	0	0	0
I11	7117.21	4.54	0	0	0
I9	7127.71	3.23	0	0	0
I12	7114.00	5.8	0	0	0

[OUTFALLS]

;;Name	Invert Elev.	Outfall Type	Stage/Table Time Series	Tide Gate
EW1	7086.9	FREE		NO

[CONDUITS]

;;Name	Inlet Node	Outlet Node	Length	Manning N	Inlet Height	Outlet Height	Init. Flow
Trench1	t1	I1	208	0.013	0	0.1	0
Trench2	t2	I3	208	0.013	0	.1	0
Trench3	t3	I5	208	0.013	0	.1	0
Trench4	t4	I7	203	0.013	0	.1	0
I1-I2	I1	I2	94	0.011	0	0.17	0
I3-I4	I3	I4	94	0.011	0	0.11	0
I5-I6	I5	I6	103	0.011	0	0	0
I7-I8	I7	I8	103	0.011	0	0.87	0
[illegible]-I4	I2	I4	141	0.013	0	0	0
[illegible]-I6	I4	I6	141	0.013	0	0	0
I6-I8	I6	I8	141	0.013	0	0	0
I8-I10	I8	I10	141	0.013	0	0.29	0
MH1-EW1	MH1	EW1	90	0.013	0	1.1	0
Trench5	t5	I9	203	0.013	0	.1	0
I9-I10	I9	I10	103	0.011	0	1.71	0
I10-I11	I10	I11	226	0.013	0	.1	0
I11-I12	I11	I12	215	0.013	0	0.5	0
I12-MH1	I12	MH1	200	0.013	0	.1	0

[XSECTIONS]

;;Link	Type	Geom1	Geom2	Geom3	Geom4	Barrels
Trench1	RECT_OPEN	3	.8333	0	0	1
Trench2	RECT_OPEN	2.5	0.8333	0	0	1
Trench3	RECT_OPEN	2.5	.8333	0	0	1
Trench4	RECT_OPEN	2.5	.8333	0	0	1
I1-I2	CIRCULAR	1	0	0	0	1
I3-I4	CIRCULAR	1.5	0	0	0	1
I5-I6	CIRCULAR	1.5	0	0	0	1
I7-I8	CIRCULAR	1.5	0	0	0	1
I2-I4	CIRCULAR	1.25	0	0	0	1
I4-I6	CIRCULAR	1.5	0	0	0	1
I6-I8	CIRCULAR	2	0	0	0	1
I8-I10	CIRCULAR	2	0	0	0	1
MH1-EW1	CIRCULAR	1.5	0	0	0	1
Trench5	RECT_OPEN	2.5	.8333	0	0	1
I9-I10	CIRCULAR	1.5	0	0	0	1
I10-I11	CIRCULAR	2.5	0	0	0	1
I11-I12	CIRCULAR	2.5	0	0	0	1
I12-MH1	CIRCULAR	3	0	0	0	1

[INFLOWS]

;;Node	Parameter	Time Series	Concen /Mass	Conversion Factor
t1	FLOW	SCSII-A		
[illegible]	FLOW	SCSII-A		
	FLOW	SCSII-A		
I4	FLOW	SCSII-A		
t3	FLOW	SCSII-A		

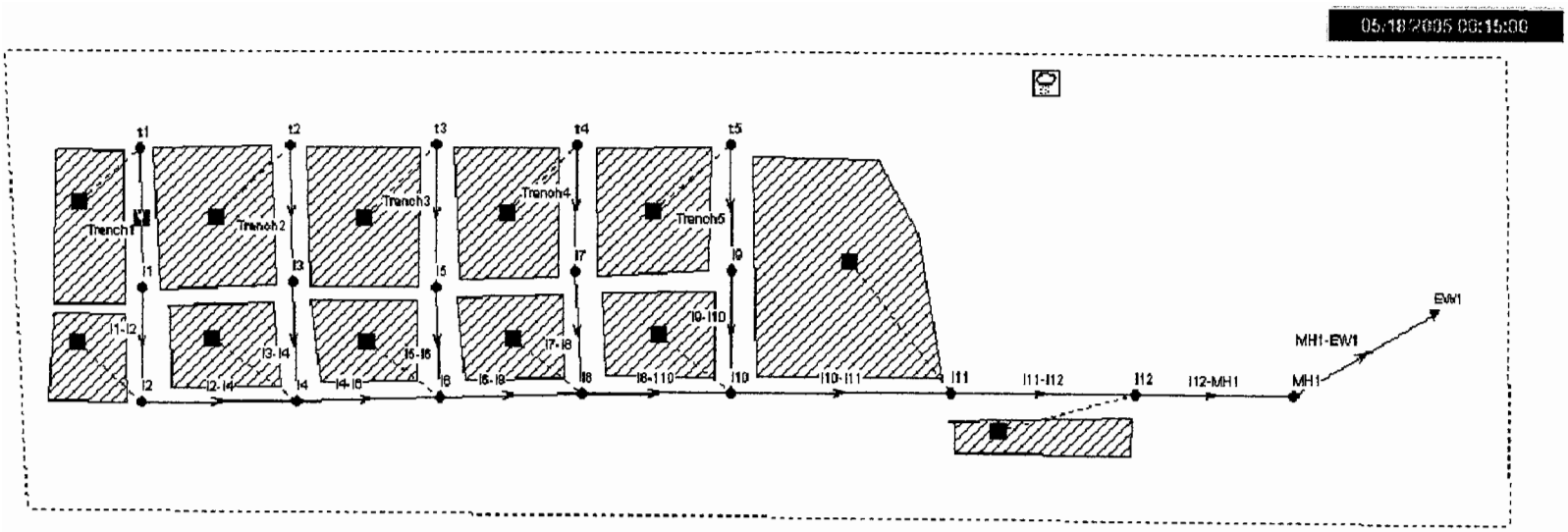
```
  I6                FLOW              SCSII-A
  t4                FLOW              SCSII-A
  `9                FLOW              SCSII-A
   .0               FLOW              SCSII-A
  ⌊5                FLOW              SCSII-A
  I11               FLOW              SCSII-A
  I12               FLOW              SCSII-A

[DWF]
;;                                    Average    Time
;;Node               Parameter        Value      Patterns
;;-----------------------------------------------------
  t1                FLOW              0
  I2                FLOW              0
  t2                FLOW              0
  I4                FLOW              0
  t3                FLOW              0
  I6                FLOW              0
  t4                FLOW              0
  I8                FLOW              0
  I10               FLOW              0
  t5                FLOW              0
  I11               FLOW              0

[TIMESERIES]
;;Name               Date        Time        Value
;;-----------------------------------------------
;6-hr 100-yr storm
  SCSII-A                       00:00       0
  SCSII-A                       00:30       1.87
  SCSII-A                       01:00       2.35
  SCSII-A                       06:00       2.8

[REPORT]
 CONTROLS  NO

[OPTIONS]
 TEMPDIR   "C:\DOCUME~1\wilsons\LOCALS~1\Temp\"
```



LANL

Schematic Diagram of Stormwater Drainage Pattern

November 2006

North Wind

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-035 **Affected Document:** Plans Sheet # 2004A Detail 4

Date Prepared: 11/28/06 **Prepared by:** S. Edwards

Description of Field Change (Cite section in document and description of change):
Eliminate "A"-Lok Resilient Seal + 100% DRY BENTONITE

Reason for Field Change: Pipe companies were contacted and there is no resilient seal manufactured which fits around a pipe which is offset in the knock-outs in the drop inlet boxes. The pipe needed to be placed at the bottom of the knock-outs to maintain proper elevations and to maintain proper flow. Non-shrink grout will be applied in the openings between the pipe and the inlets as specified in Detail titled Stormwater Inlets 1 to 13 on Plans Sheet 2004 A.

This field change will impact project schedule by _____ Months; _____ cost

Approval Daniel F. Brennecke for Kerhan 12/7/06
Engineer of Record Signature Date

12/7/06
Project Manager Signature Date

North Wind

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-034 **Affected Document:** Specification 03300.1.03.D

Date Prepared: 10/12/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change):
Reduce frequency of on-site slump testing to a minimum of one test per 10 trucks.
Reason for Field Change: Sampling and testing every truck would result in significant delay in pouring concrete and would require two technicians. The specification will be revised to require a minimum of one test per 10 truckloads, with allowance for the QCSM to require more testing at his discretion; based on observed variability in and appearance of the concrete, addition of water on site and professional judgment of the QCSM and the Engineer.

This field change will impact project schedule by _____ Months; _____ cost

Approval David F. Bannerke for Kerfian 12/7/06
Engineer of Record Signature Date

12/7/06
Project Manager Signature Date

North Wind

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-033 **Affected Document:** Drawing 3002C

Date Prepared: 10/06/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change):
Remove Amerdrain 500 sheet drain, composite drainage sheet and protection boards shown in Drawing 3002C, from back of Wall 1.
Reason for Field Change: The drainage sheet/sheet drain provides no function beyond that provided by the free-draining aggregate used behind the wall. Removing the drainage sheet will improve constructability and reduce cost at equivalent performance.

NOT APPROVED
Daniel F Brennecke for
Keshan 12/7/06

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature Date

Project Manager Signature Date

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-032 **Affected Document:** Specification UFGS 02722 Section 3.5

Date Prepared: 10/05/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change): Revise the compaction requirement in Specification UFGS 02722 Section 3.5 from 100% of the maximum density at optimum moisture content (as established using modified Proctor compaction testing) to 95%.

Reason for Field Change: This specification was adopted for the aggregate base course under MatCon. The reduced compaction requirement provides better constructability while providing adequate subgrade density, given that post-closure loadings are restricted to over-the-road equipment and light aircraft. The reduced compaction requirement was approved by the Wilder Construction MatCon technical representative (see attached email).

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 10/6/06

Project Manager Signature — Date 10/6/06

Steven D. Edwards

From: Jerry Thayer [jerrytha@WilderConstruction.com]
Sent: Monday, October 02, 2006 8:15 PM
To: John Keck
Cc: Keshian, Berg; Brennecke, Dan; Stephen Matier; Steven D. Edwards
Subject: RE: COMPACTION OF AGGREGATE BASE COURSE UNDER MATCON

John,

I sent this to both Ron Terrel and Geoff Rowe and they agree that 95% will be fine for the anticipated usage of the site.

I have not been able to get a confirmation from Ignacio that we will do the test strip at their plant on the 10th. We need two days to do the analysis so any later than that will not work for us. We need to purchase our airline tickets. Can you confirm the date with him for us?

Thanks,

Jerry

From: John Keck [mailto:jkeck@northwind-inc.com]
Sent: Friday, September 29, 2006 3:15 PM
To: Jerry Thayer
Cc: Keshian, Berg; Brennecke, Dan; Stephen Matier; Steven D. Edwards
Subject: COMPACTION OF AGGREGATE BASE COURSE UNDER MATCON

Jerry, Specification UFGS 02722 Section 3.5 re: compacting aggregate base course (for use under MatCon) calls for "Continue compacting until the layer is compacted through the full depth to a field density of at least 100 percent of the maximum density at optimum moisture content tested in accordance with ASTM D 1556 or and ASTM D 3017." We would like to reduce this to 95% of maximum dry density, given that loadings here are restricted to over-the-road equipment and light aircraft. Please advise thanks.

John F. Keck, P.E.
North Wind, Inc.
1425 Higham St.
Idaho Falls, ID 83402
jkeck@northwind-inc.com
208-557-7831 (office)
208-241-3447 (cell)

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-031 **Affected Document:** Specification 03300.3.~~01~~ 02

Date Prepared: 09/28/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change): Add subsection F to describe use of additional rebar posts to support temporary formwork used to provide guides for structural steel layout. Cut posts at top of foundation after concrete sets. Posts shall not be within one inch of structural rebar.
Reason for Field Change: Provide guides for placing structural steel.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 9/29/06

Project Manager Signature — Date 9/29/06

North Wind

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-030 **Affected Document:** Drawing 3001B

Date Prepared: 09/28/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change): Add sections in areas where passive pressures are available on toe of footing, and where total excavation widths are restricted due to presence of bedrock. See attached drawings. Revised

Reason for Field Change: Actual excavation widths would not accommodate original design.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 9/29/06

Project Manager Signature — Date 9/29/06

ENGINEERING
CONSTRUCTION
COMMISSIONING

TCPI

September 26, 2006

Mr. Berg Keshian, Jr., P.E.
Weston Solutions, Inc.
3840 Commons Avenue, NE
Albuquerque, NM 87109

RE: Los Alamos Site Office
TA-73 Airport Landfills
Los Alamos, NM
Revised per Field Changes to the Retaining Wall No. 1
TCPI Project No. E-06130

Dear Berg;

Per several telephone conversation and field data that we received from Dan Brennecke, of Weston Solutions, Inc. over the last several days we are including with this letter eight (8) sketches that depict the changes in the Retaining Wall No.1 from Station 1+00 to 1+41 for Wall's Mk's. B, C, and D. In addition there is a sketch that addresses Wall Mk. E-1 from Station 1+58 to 1+69. These changes reflect actual field conditions and also utilize the bearing capacity of the site Tuff to take a bearing load of 6,000 psf. per your E Mail dated today. The attached separate table No. 1 is a summary of requested changes to each wall section.

While the heel dimensions of the walls may have changed from the original design shown on drawing 3001 the toe dimension and main reinforcement bars in each wall type remains the same as the original design. We have also included Detail 'Z', on sketch 7 which shows the typical step in the footing between Stationing 1+00 to 1+41. This should simplify the rebar fabrication and placement at the step areas.

If you have any questions please contact me at 610-423-6234.

Sincerely,

Joseph J. Ferry

Joseph J. Ferry, P.E.
Senior Engineer
Attachment
CC: Andrew Harpur, Weston Solutions.
Dan Brennecke, P.E. Weston Solutions

436 Creamery Way, Suite 100
Exton, Pennsylvania 19341
610.524.5920
610.524.2443 Fax

www.tcpi-dbv.com

5012 Medical Center Circle
Allentown, Pennsylvania 18106
610.391.1037
610.391.1039 Fax

Los Alamos Retaining Wall No. 1

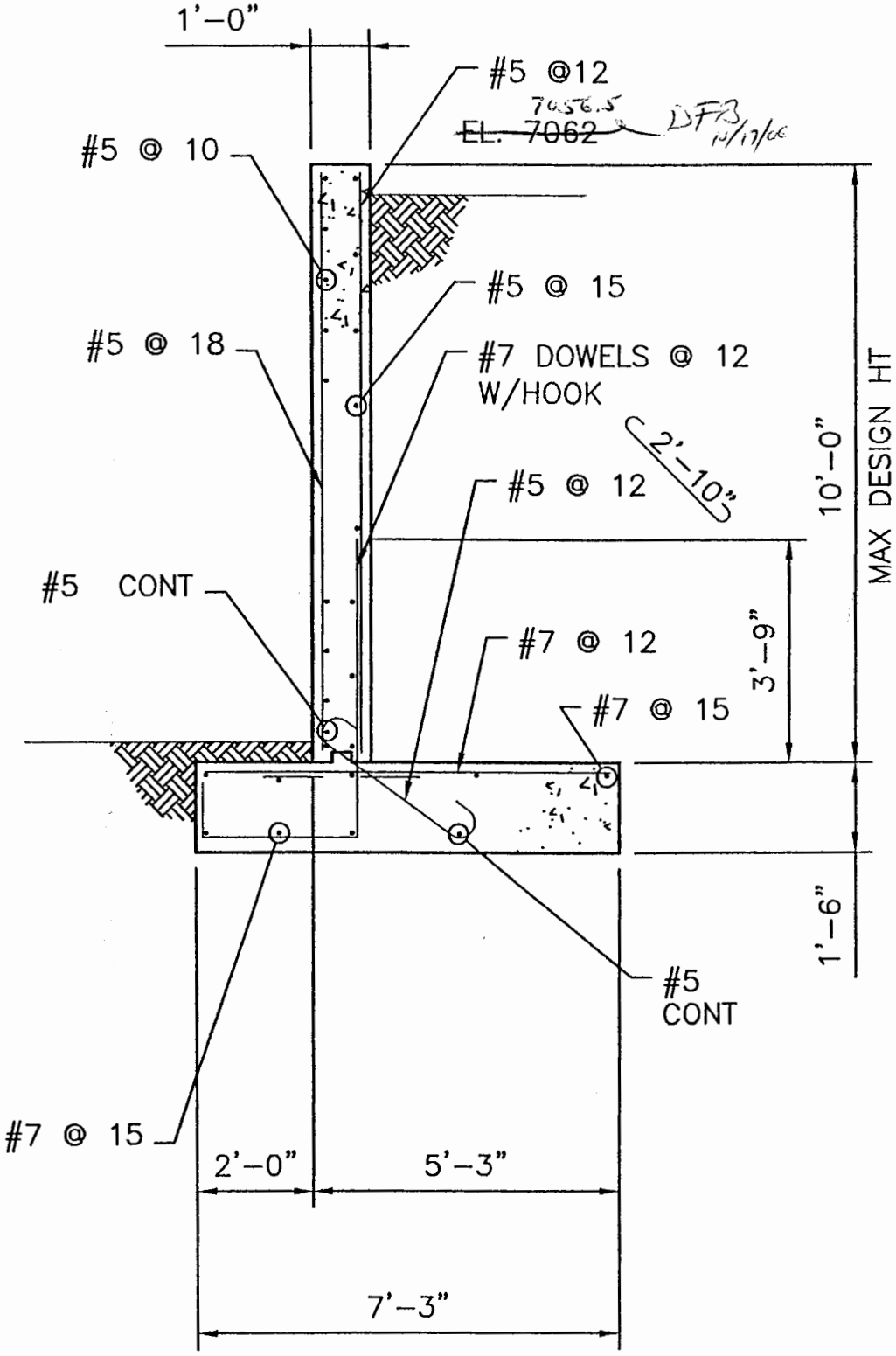
Table No. 1

Date: September 26, 2006 **Revision: 0**

Wall Mk	Start	End	Sketch No.	Base Width	Toe Dimension	Key Required	Remarks	Wall Mk
B-2	1+00	1+20	1	7'-3"	2'-0"	No		B-2
B-1	1+18.1	1+24	1	7'-3"	2'-0"	No		B-1
C-3	1+22.6	1+29	2	9'-9"	3'-0"	Yes	See Note 1	C-3
C-2	1+27.3	1+33	2	9'-9"	3'-0"	Yes	See Note 1	C-2
C-1	1+31.4	1+36	2	9'-9"	3'-0"	Yes	See Note 1	C-1
D-2	1+34.8	1+41	4	11'-4"	4'-0"	Yes	See Note 1	D-2
D-1	1+39.4	1+58 ±	3	13'-6"	4'-0"	Yes	See Note 1	D-1
E-1	1+58	1+69	6	14'-0"	5'-0"	Yes	See Note 1	E-1
E (Typ)	Balance of Wall 'E'		5	16'-0"	5'-6"	Yes	See Note 1	E (Typ)

Notes:

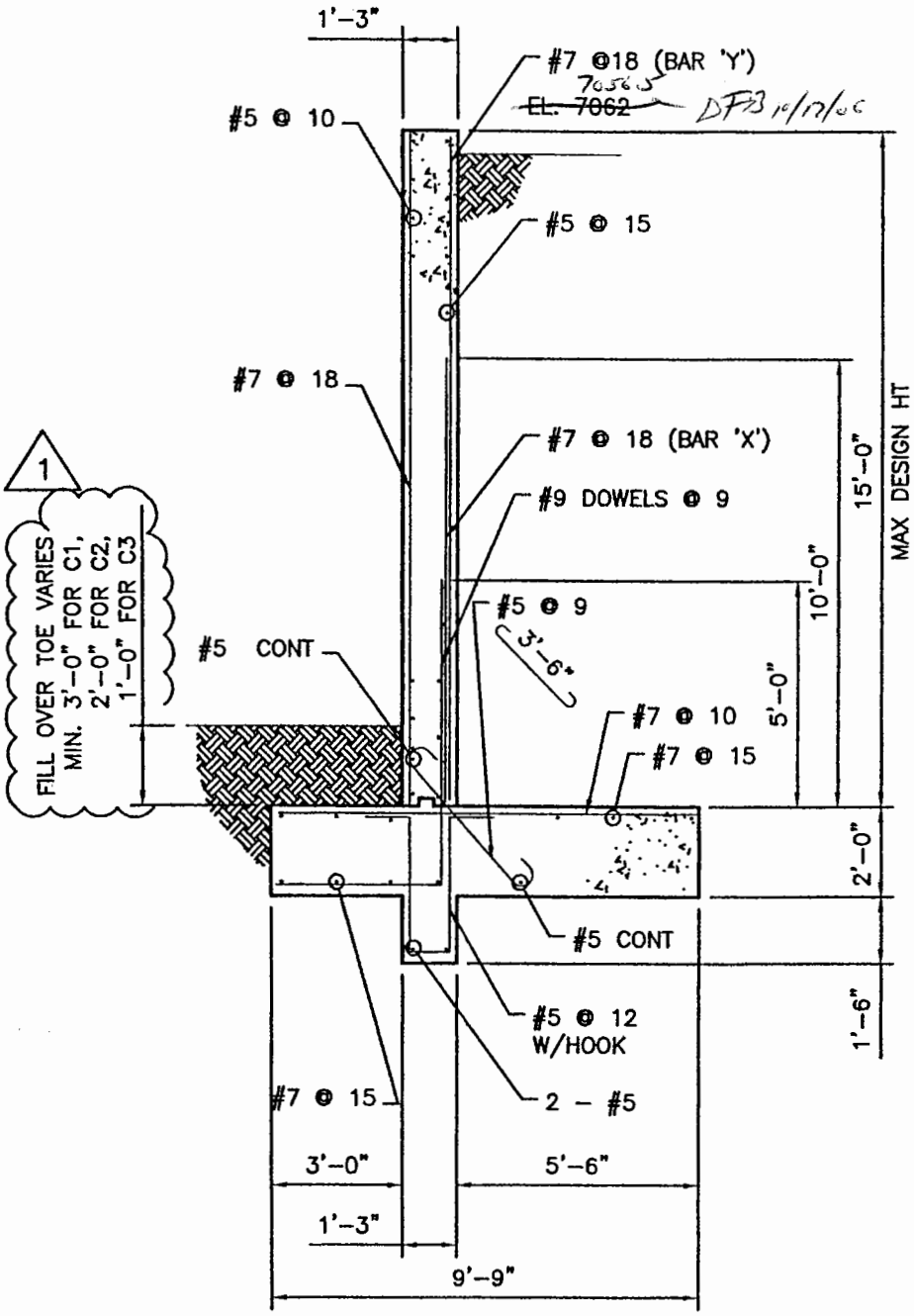
1. The location of the footing key may vary to suite field conditions.
2. See detail 'Z' on sketch 7 for step details between stations 1+00 to 1+41.



RETAINING WALL B-1 & B-2

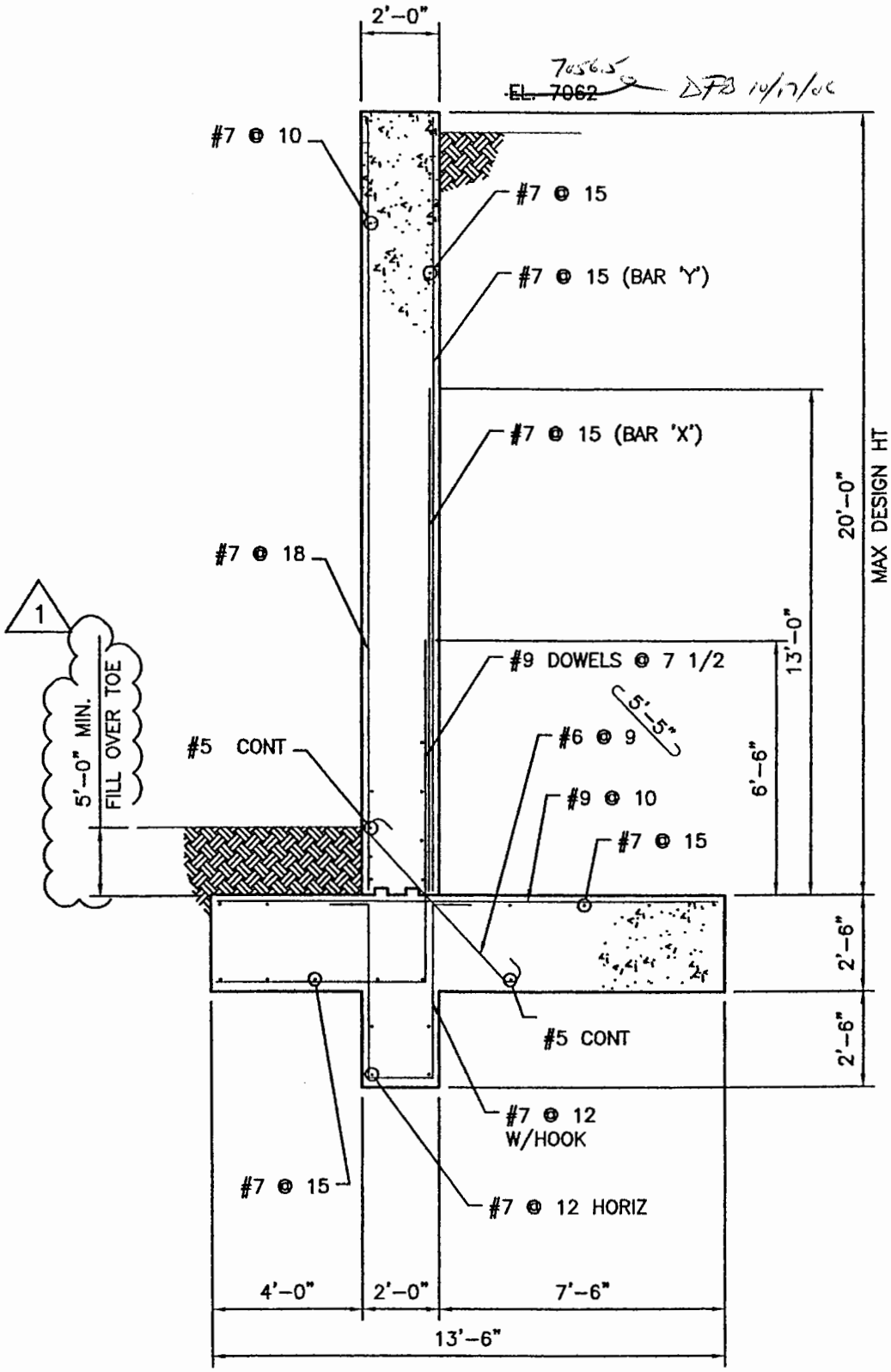
SCALE: 3/8"=1'-0"

SEE DWG. 3002 FOR KEY AND JOINT DETAILS



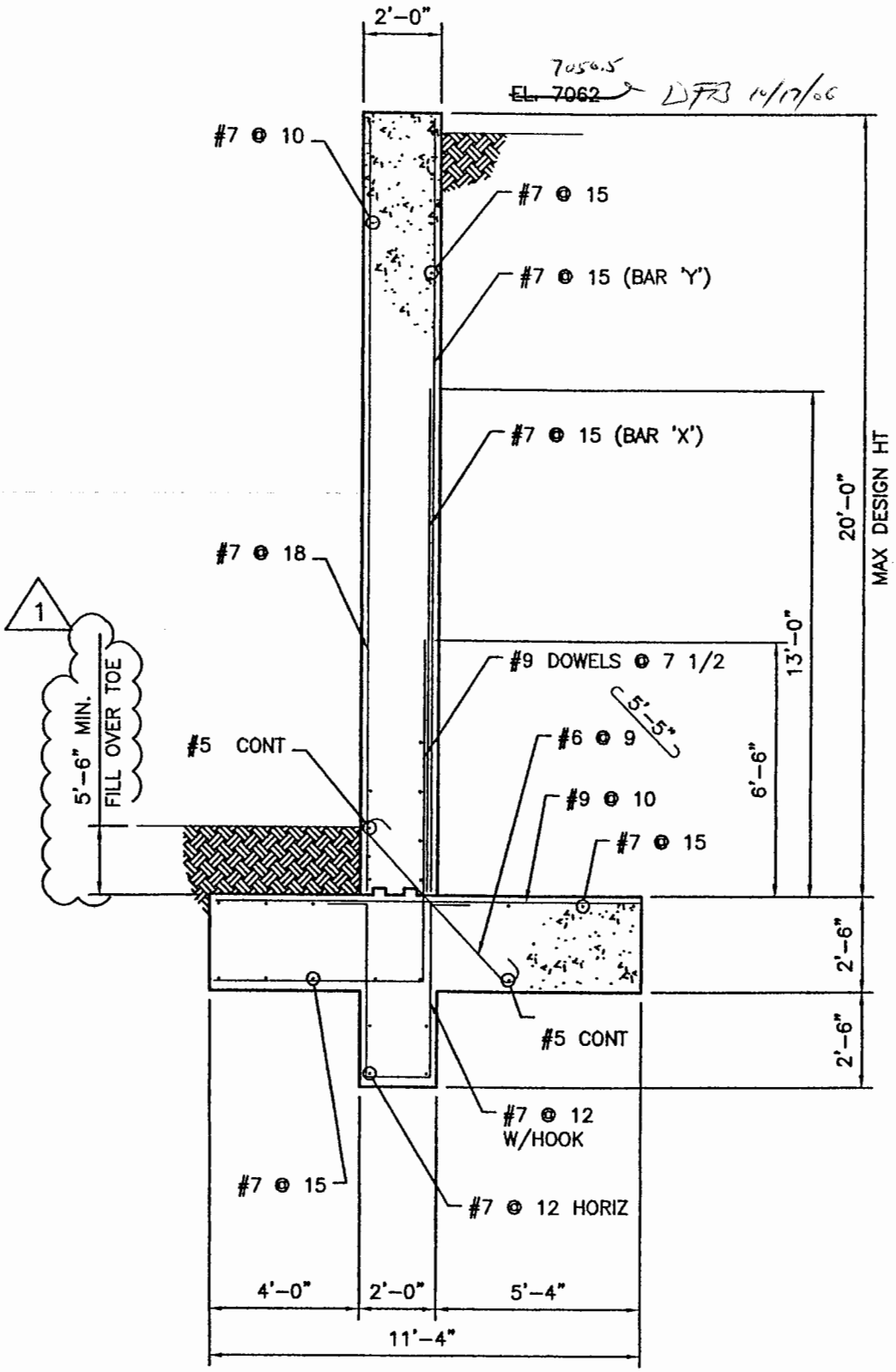
RETAINING WALL C-1, C-2 & C-3

SCALE: 1/4"=1'-0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS



RETAINING WALL D-1

SCALE: 1/4"=1'-0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS



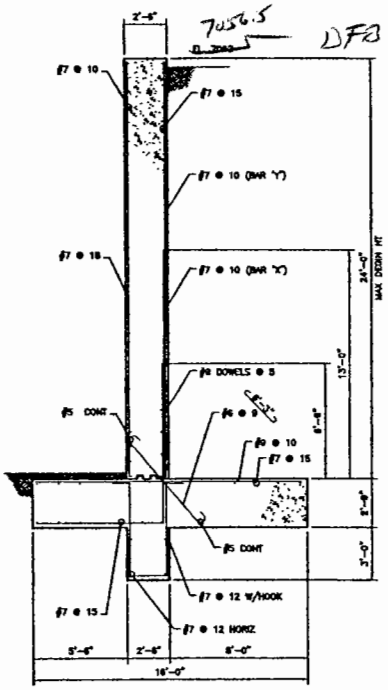
RETAINING WALL D-2

SCALE: 1/4"=1'-0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS

REV. 1 = 9-28-06

SK-5

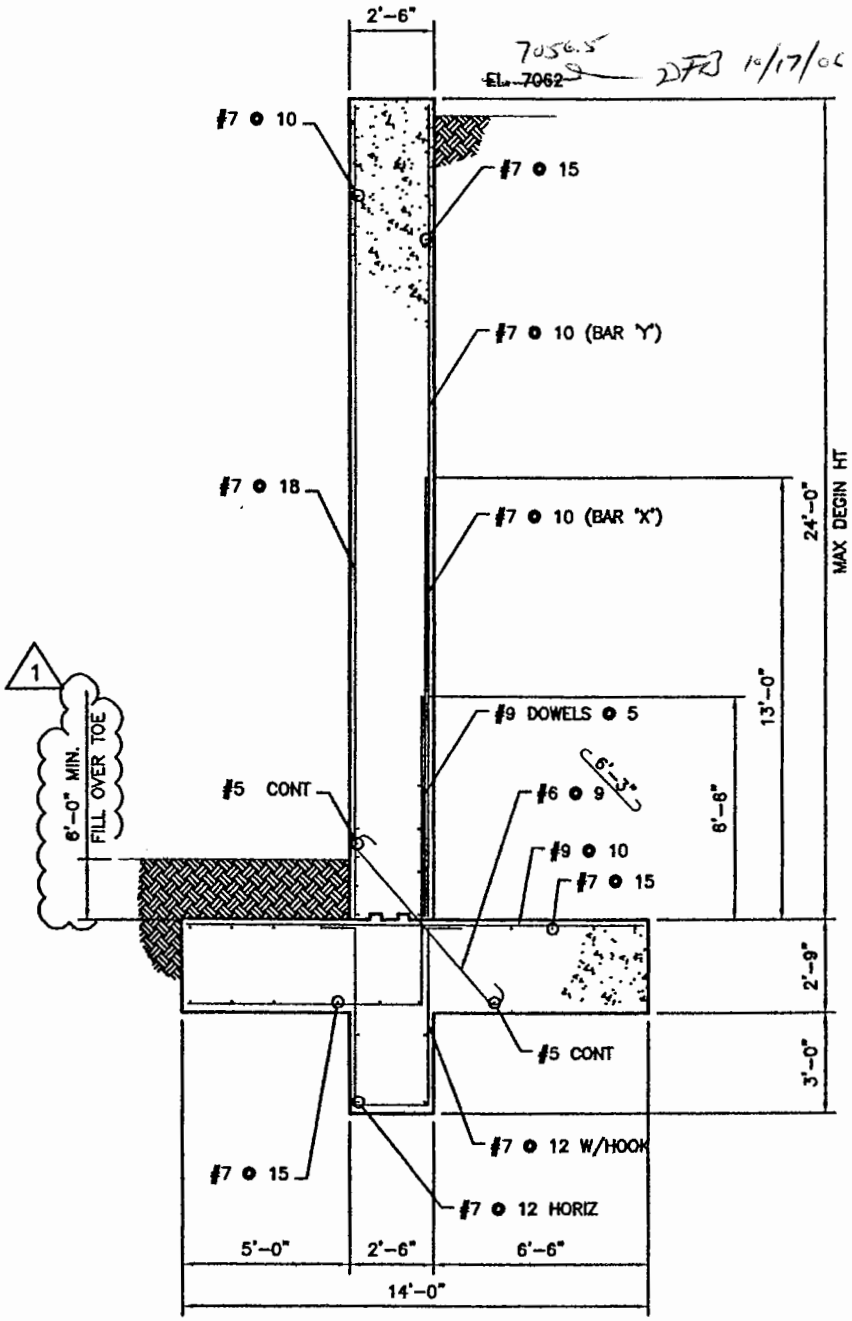
7056.5 DFB 10/17/00



RETAINING WALL E-TYP

SCALE: 3/16"=1'-0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS

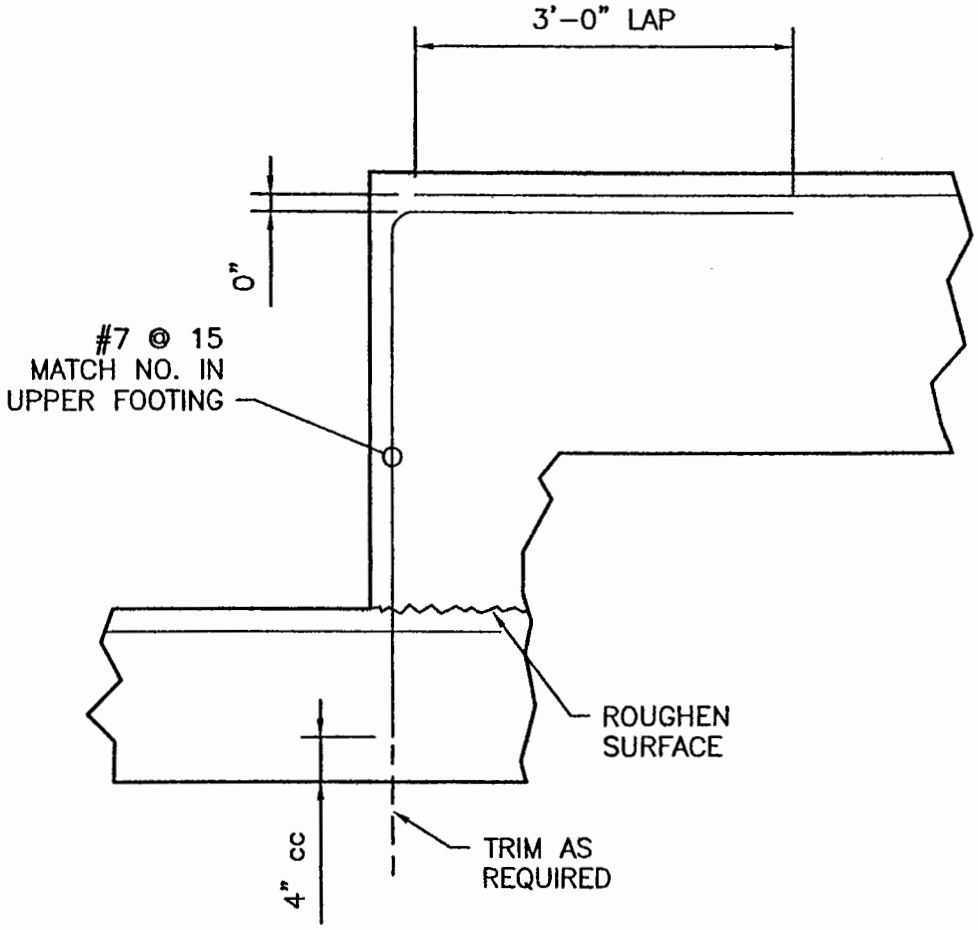
NOTE:
FOR ADDITIONAL RETAINING WALL DETAILS,
SEE TYPICAL RETAINING WALL DETAIL,
DWG NO 3002.



RETAINING WALL E-1
(STA. 1+58 TO 1+69)

SCALE: 3/16"=1'-0"
SEE DWG. 3002 FOR KEY AND JOINT DETAILS

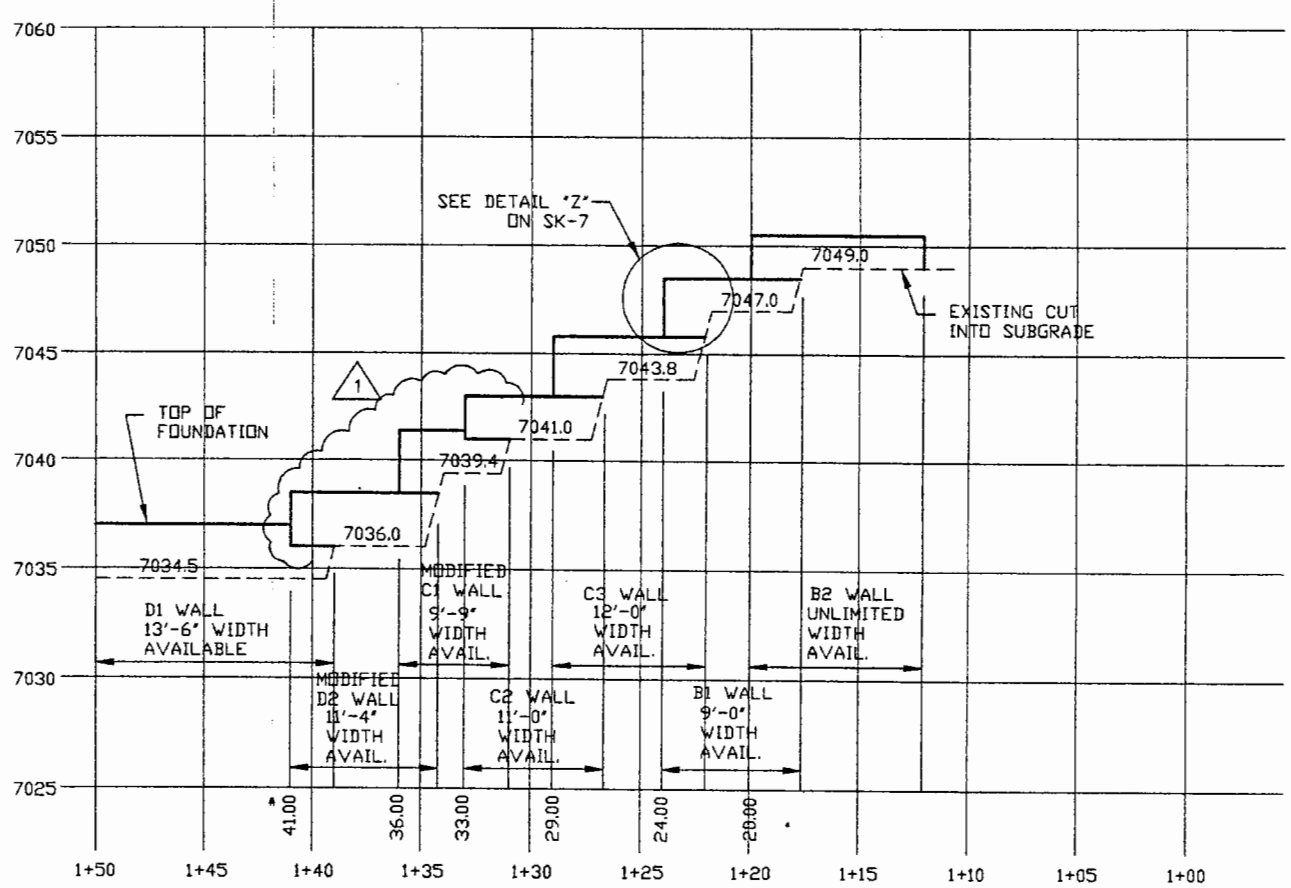
NOTE:
FOR ADDITIONAL RETAINING WALL DETAILS,
SEE TYPICAL RETAINING WALL DETAIL,
DWG NO 3002.



DETAIL "Z"

TYP FOOTING LAP @ STEP-UP

SCALE: 3/4"=1'-0"



LOOKING EAST (TOWARDS CANYON)

SCALE: 1/8"=1'-0"

REV 2 = 9-29-06

TCPI
436 Creamery Way
Suite 100
Exton, Pennsylvania 19341
Phone (610) 524-5920
Fax (610) 524-2443

CHECKED BY:						
DES. ENG:						
PROJ. ENG:						
PROJ. MGR:			DATE:	PROJ. NO:	DRAWN BY:	SCALE:
APPROVED BY:			9/25/06	E05129	T.S.	1/8"=1'-0"

OWG. NO: SK-A1

REV. NO: 2

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-029 **Affected Document:** Specification 03300.2.02.B

Date Prepared: 09/28/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change):
Change maximum specified air content of 6% ± 1% to a range of 3.5% to 6.5% for AMEC Mix #18.
Reason for Field Change: Match approved mix design #18.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 9/29/06

Project Manager Signature — Date 9/29/06

North Wind

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-028 **Affected Document:** Specification 03300.2.04

Date Prepared: 09/28/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change): Add tolerance of + 1 in to maximum specified slump of 4-in, as measured using ASTM C143. The intent is not to change maximum allowable slump beyond 4-inches.

Reason for Field Change: ASTM C143 identifies single operator pre[illegible] inches for a 3.4-in slump.

for 3000 psi concrete based on Amec Mix No. 18 design,
J. Keck
4/10/07

This field change will impact project schedule by _____ Months; _____ cost

Engineer of Record Signature — Date 9/29/06

Project Manager Signature — Date 9/29/06

Unsigned original attached for legibility.
J. Keck
4/10/07

PWIF-4201-005.1 – FIELD CHANGE NOTICE

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-028 **Affected Document:** Specification 03300.2.04

Date Prepared: 09/28/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change): Add tolerance of + 1 in to maximum specified slump of 4-in, as measured using ASTM C143. The intent is not to change maximum allowable slump beyond 4-inches.
Reason for Field Change: ASTM C143 identifies single-operator precision of the test as 1.07 inches for a 3.4-in slump.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature Date

Project Manager Signature Date

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-027 **Affected Document:** Drawing 2003C

Date Prepared: 09/28/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change): Revise Drawing 2003C to show that diameter of RCP pipe actually used between inlet 2 and inlet 4, and inlet 4 and inlet 6; was 15-in at 0.0107 ft/ft, and 18-in at 0.0153 ft/ft, respectively.
Reason for Field Change: RCP pipe was ordered and delivered as per [illegible] Drawing 2003B, before Revision C was published.

This field change will impact project schedule by _____ Months, _____ days

Approval

Engineer of Record Signature — Date: 9/29/06

Project Manager Signature — Date: 9/29/06

PWIF-4201-005.1 Rev. A
Effective 06/20/05

Unsigned original attached for legibility.
J. Keck
4/10/07

PWIF-4201-005.1 – FIELD CHANGE NOTICE

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-027 **Affected Document:** Drawing 2003C

Date Prepared: 09/28/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change): Revise Drawing 2003C to show that diameter of RCP pipe actually used between inlet 2 and inlet 4, and inlet 4 and inlet 6; was 15-in at 0.0107 ft/ft, and 18-in at 0.0153 ft/ft, respectively.
Reason for Field Change: RCP pipe was ordered and delivered as per dimensions shown on Drawing 2003B, before Revision C was published.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature Date

Project Manager Signature Date

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-026 **Affected Document:** Drawing 3000B

Date Prepared: 09/28/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change): Revise Drawing 3000B. Add Note 5 to Structural Notes: "In areas where bottom of footing is not embedded a minimum of 2-ft into bedrock, an area 5-ft in width shall be excavated in front of the toe of the footing and backfilled with structural fill to 9-in above top of footing and compacted to 95% of standard Proctor maximum dry density."

Reason for Field Change: Provide additional structural stability and resistance to sliding in areas without sufficient thickness of bedrock.

This field change will impact project schedule by _____ Months _____ cost

Approval

Engineer of Record Signature — Date: 9/29/06

Project Manager Signature — Date: 9/29/06

PWIF-4201-005.1 Rev. 2
Effective 04/18/06

Unsigned original attached for legibility -
J. Keck
4/10/07

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-026 **Affected Document:** Drawing 3000B

Date Prepared: 09/28/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change): Revise Drawing 3000B. Add Note 5 to Structural Notes: "In areas where bottom of footing is not embedded a minimum of 2-ft into bedrock, an area 5-ft in width shall be excavated in front of the toe of the footing and backfilled with structural fill to 9-in above top of footing and compacted to 95% of standard Proctor maximum dry density."
Reason for Field Change: Provide additional structural stability and resistance to sliding in areas without sufficient thickness of bedrock.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature Date

Project Manager Signature Date

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-025 **Affected Document:** Drawing 3002C

Date Prepared: 09/28/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change): Revise Drawing 3002C Detail "Vertical Joint Detail-Concrete Wall" to replace "zipper strips" with a trapezoidal channel 3-in wide at exterior face and 2-in wide interior dimension and 1.5-in deep.
Reason for Field Change: Better constructability and equivalent performance.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 9/29/06

Project Manager Signature — Date 9/29/06

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-024 **Affected Document:** Drawing 3002C

Date Prepared: 09/28/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change): Revise Drawing 3002C Detail "Typical Wall-Footing Construction Keys" to invert key and change dimensions to 1.5-in deep by 3.5-in wide. Resulting key will be a channel in the top of the foundation instead of a ridge, for walls A through C (single keyway) and D and E (double keyway).

Reason for Field Change: Better constructability and equivalent performance.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 9/29/06

Project Manager Signature — Date 9/29/06

North Wind

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-023 **Affected Document:** Spec 02200.2.04

Date Prepared: 08/23/06 **Prepared by:** J. Keck

Description of Field Change (Cite section in document and description of change): Revise specification 2200.2.04 to state that backfill behind Walls 1 and 2 must meet Spec 02200.2.04 or vendor spec for the 10-ft immediately behind the wall; and that interim cover material can be used behind that to the limit of the preparatory grade.
Reason for Field Change: Lower cost and equivalent performance.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 8-24-06

Project Manager Signature — Date 8/24-06

North Wind

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind **Field Change Notice**

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-022 **Affected Document:** Spec 02200.3.02E

Date Prepared: 08/04/06 **Prepared by:** P. Meehan

Description of Field Change (Cite section in document and description of change): Revise specification 2200-3.02E to state that the infiltration layer shall be compacted to at least 100% of the maximum dry density as determined by the Standard Proctor compaction test (ASTM D698).

Reason for Field Change: Compaction testing performed by Kleinfelder on 7/24/06 and 7/26/06 indicate that in order for the infiltration layer to demonstrate a hydraulic conductivity of less than 1×10^{-5} cm/sec, the material must be compacted to at least 100% of the maximum dry density as determined by the Standard Proctor compaction test (ASTM D698).

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 8/9/06

Project Manager Signature — Date 8/9/06

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-021 **Affected Document:** Spec 03300.2.04

Date Prepared: 07/10/06 **Prepared by:** P. Meehan

Description of Field Change (Cite section in document and description of change):
Change Spec 03300.2.04 to allow a 6 inch maximum slump for the 4000 psi concrete (mix design #44-concrete used for hangar pads).
Reason for Field Change: Approved mix design specifies a 6" maximum slump. Also, allowing greater slump will improve ability to pump concrete for hangar pads.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 7/10/06

Project Manager Signature — Date 7/10/06

PWIF-4201-005.1 Rev. 2
Effective 04/04/06

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-020 **Affected Document:** Specification 03300.3.12.A

Date Prepared: 07/05/06 **Prepared by:** P. Meehan

Description of Field Change (Cite section in document and description of change): Modify the specification to allow the concrete subcontractor to eliminate the curing compound requirement. In lieu of the curing compound, cover the placed concrete with a plastic moisture barrier and allow the concrete to self cure for a period of 5 days. On the sixth day, the plastic barrier will be removed and the concrete will be allowed to dry for 24 hours. On the seventh day after the concrete placement, the sealing compound will be applied per the specifications.
Reason for Field Change: The concrete subcontractor requested this revision as he feels that a self cured concrete will have less surface imperfections and will result in a more durable product.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 7/5/06

Project Manager Signature — Date 7/5/06

North Wind

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-019 **Affected Document:** Specification 02200.2.03.A

Date Prepared: 06/29/06 **Prepared by:** P. Meehan

Description of Field Change (Cite section in document and description of change): Modify the specification to allow a tolerance of ±1" aggregate base course thickness below all hangar pads.

Reason for Field Change: To allow for proper amount of concrete clearance under and around steel reinforcement.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 6/28/06

Project Manager Signature — Date 6/29/06

Philip Meehan

From: Keshian, Berg [Berg.Keshian@WestonSolutions.com]
Sent: Monday, July 03, 2006 2:27 PM
To: Philip Meehan
Subject: RE: Hangar Pad 2 Rework Procedure

Phil
This should work
See you wed
T
Berg

From: Philip Meehan [mailto:pmeehan@northwind-inc.com]
Sent: Friday, June 30, 2006 12:41 PM
To: Keshian, Berg
Subject: Hangar Pad 2 Rework Procedure

Berg:
Based on yesterday's meeting, I would like to prepare and document the hangar pad 2 rework procedure. The following applies to any areas that are disturbed to provide the 4" aggregate base course thickness (±1" tolerance) and 3" rebar clearance.

The field crews should be directed to remove or place the necessary aggregate base material to obtain the above dimensions. The reworked aggregate base should be compacted by hand tamper (or pneumatic tamper if able to use) and should be watered throughout the compaction process.

The field crew should also be directed to relocate the vapor barrier as required to obtain a minimum of 4" (±1" tolerance) between the top of aggregate and the vapor barrier. If the vapor barrier is required to be cut in order to maintain the above criteria, the replaced vapor barrier should overlap the existing adjacent vapor barrier for a distance of 6".

Let me know if you feel that this procedure requires any revisions or clarifications. Thanks.

Philip S. Meehan, P.E.
1425 Higham Street
Idaho Falls, ID 83402
office: 208-557-0821
cell: 208-521-9508
pmeehan@northwind-inc.com

North Wind

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-018 **Affected Document:** Specification 03300.2.02.C

Date Prepared: 06/24/06 **Prepared by:** J. F. Keck

Description of Field Change (Cite section in document and description of change):
Change Drawing 3003 Sections 1 and 2, location of vapor barrier, to show barrier 6-in below bottom of aggregate in grade beam trenches for hangar pads 1 and 3. This same elevation will be used everywhere across hangar pads 1 and 3. The original design was used for hangar pad 2. Ensure vapor barrier is wrapped up sides of concrete pad. After concrete poured, prior to compacting soil against concrete.
Change was verbally approved by ER during HP-2 construction.
Reason for Field Change: Improve constructability while maintaining function of the vapor barrier.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 7/5/06

Project Manager Signature — Date 7/5/06

North Wind

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-017 **Affected Document:** Specification 03300.2.02.C

Date Prepared: 06/18/06 **Prepared by:** J. F. Keck

Description of Field Change (Cite section in document and description of change):
Change Spec 03300.2.02.C requirement for Type D water reducing admixture to Type A; accept Polyflex 997 Type A water reducing admixture as acceptable.
Reason for Field Change: Allow for use of admix proposed by concrete supplier based on equivalency.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 6/19/06

Project Manager Signature — Date 6/19/06

WESTON
MANAGERS DESIGNERS/CONSULTANTS

SHEET ____ of ____

CLIENT/SUBJECT _____ W.O. NO. _____

TASK DESCRIPTION Concrete Admixture TASK NO. _____

PREPARED BY Bc DEPT _____ DATE 6/12/06

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY _____

DEPT _____ DATE _____

- Change 3300.
2.02 C

change requirements Type D water reducing to Type A water reducing Admixture.

Type D sets too slow and Type A sets at a normal rate

Accept Polyflex 997 Type A water reducing Admixture as Acceptable

RFW 10-05-003/A-5/85
512-5643

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-016 **Affected Document:** Drawing 3003

Date Prepared: 06/18/06 **Prepared by:** J. F. Keck

Description of Field Change (Cite section in document and description of change):
Change detail for hangar pad trench drain shown on Dwg 2024 and Dwg 2002 and 2021 Detail 3 to be consistent with Dwg 3003 Section 1.
Reason for Field Change: Make the drawings consistent re: trench drain notch.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 6/19/06

Project Manager Signature — Date 6/19/06

WESTON
MANAGERS DESIGNERS/CONSULTANTS

SHEET ____ of ____

CLIENT/SUBJECT Trench Drain / Foundation Interface Details W.O. NO. ____

TASK DESCRIPTION ____ TASK NO. ____

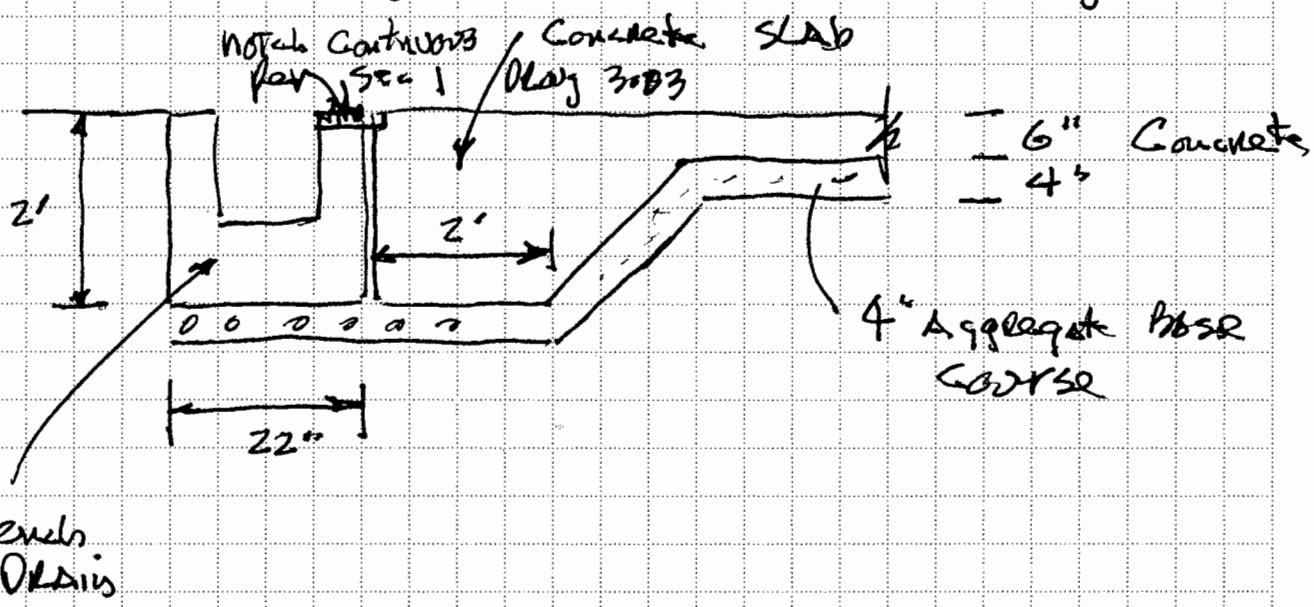
PREPARED BY BK DEPT ____ DATE 6-12-06

MATH CHECK BY ____ DEPT ____ DATE ____

METHOD REV. BY ____ DEPT ____ DATE ____

APPROVED BY ____ DEPT ____ DATE ____

Change Details for Trench Drain / Foundation Interface - Dwg 2024 and 3003 to the following:



This is to be consistant with Dwg 2002 Dwg 2021 Detail 3 and Dwgs 2024 and 3003

RFW 10-05-003/A-5/85
512-5643

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-015 **Affected Document:** Drawing 3003

Date Prepared: 06/18/06 **Prepared by:** J. F. Keck

Description of Field Change (Cite section in document and description of change):
Change surface finish grade on hangar pads 1-3 as shown on Drawing 3003 to a constant 1.5 in vertical change from edge to center.
Reason for Field Change: Simplify construction (see attached note).

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 6/19/06

Project Manager Signature — Date 6/19/06

From: Keshian, Berg [Berg.Keshian@WestonSolutions.com]
Sent: Thursday, May 25, 2006 4:00 PM
To: Harpur, Andrew; John Keck
Cc: Douglas Jorgensen
Subject: RE: DRAFT Settlement calculations.
Since we do not have final design drawings from them, we will send them the as builts for them to fit to

---

From: Harpur, Andrew
Sent: Thursday, May 25, 2006 3:52 PM
To: Keshian, Berg; 'John Keck'
Cc: 'Douglas Jorgensen'
Subject: RE: DRAFT Settlement calculations.

Do we need to involve Erect-a-Tube in this decision?

From: Keshian, Berg
Sent: Wednesday, May 24, 2006 10:24 AM
To: John Keck; Harpur, Andrew
Cc: Douglas Jorgensen
Subject: RE: DRAFT Settlement calculations.

Let's do it

Also after meeting with the concrete sub yesterday, the question came up about the slope of the concrete and the flat area in the center
I discussed it with the Airport Manger (Dave) and asked why?
He said it is down for drainage
Since we have the drain on the west side and the slope is to the west, that is not a concern

I asked if we could slope from the middle, and he said he did not have a problem

Therefore, let's prepare the change and also I said we would notify the airport and county of the change formally
We will have a 1.5 inch slope from the middle to the edge

This should help all

Berg

From: John Keck [mailto:jkeck@northwind-inc.com]
Sent: Monday, May 22, 2006 4:43 PM
To: Keshian, Berg; Harpur, Andrew
Cc: Douglas Jorgensen
Subject: RE: DRAFT Settlement calculations.

Let's plan for that, I will prepare an FCN if that's OK with everyone.

From: Keshian, Berg [mailto:Berg.Keshian@WestonSolutions.com]
Sent: Monday, May 22, 2006 4:41 PM
To: John Keck; Harpur, Andrew
Cc: Douglas Jorgensen

From: Keshian, Berg [Berg.Keshian@WestonSolutions.com]
Sent: Tuesday, June 06, 2006 2:19 PM
To: Harpur, Andrew
Cc: John Keck
Subject: RE:
Thanks
John
Fyi
Keep for the files
Berg

From: Harpur, Andrew
Sent: Tuesday, June 06, 2006 2:00 PM
To: Keshian, Berg
Subject: RE:

Berg,

The structural engineer has no issue with changing the slope of the slabs.

Andrew

From: Keshian, Berg
Sent: Monday, June 05, 2006 1:14 PM
To: Harpur, Andrew
Cc: John Keck
Subject:

Please check with structural guy to see if buy changing the slope if it effects the lateral loading on the concrete
T
Berg

Berg Keshian, Jr. PE
Vice President

New Address as of Jan. 30, 2006
3840 Commons Ave NE
Albuquerque, NM 87109
505-837-6541
505-837-6595 fax

PWIF-4201-005.1 – FIELD CHANGE NOTICE

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-014

Affected Document: Specification 02200 Sections 022001.03., Table 02200-1, Table 02200-2,

Date Prepared: 06/14/06

Prepared by: J. F. Keck

Description of Field Change (Cite section in document and description of change): Clarify definition of interim cover, common borrow, and testing requirements-see affected Spec 02200 sections.

Reason for Field Change: Clarify material definitions, allowed uses, specifications and testing requirements for use of interim cover material.

-Attach copies of redlined pages

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 6/14/06

Project Manager Signature — Date 6/14/06

SECTION 02200

EARTHWORK

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. The work to be performed under this section includes requirements for excavation; subgrade preparation; placement and compaction of structural fill and other soil or aggregate materials, including low-permeability soil; grading; items associated with the backfilling of pipe/utility trenches; filling for roads, channels, etc. as required; and performing laboratory and field testing of earthwork materials, as shown on the Drawings or as directed by the Engineer. The work shall also include completing up to 5 geotechnical test borings along the alignment of Wall No.1.

1.02 RELATED SECTIONS AND REFERENCES

A. Section 02100 – Clearing and Stripping

B. Section 02270 – Channel Protection

C. Section 02750 – Stormwater Management and Discharge

D. Section 02930 – Erosion and Sediment Control

E. SWPPP, June 2005.

F. CQCP, June 2005.

G. Construction Plan for LASO TA-73 Airport Landfill, June 2005.

H. New Mexico Department of Transportation (NMDOT) Specifications for Highway and Bridge Construction, 2000 Edition.

1.03 DEFINITIONS

A. Definitions pertinent to the earthwork requirements of this project include:

BK 6/12/06

1. Existing/Relocated Interim Cover Material – on-site soil suitable for backfilling pipe trenches ~~and~~ associated in-line structures, and for use in backfilling areas from which waste was removed. FCN 4200-14

2. Structural fill – suitable imported soil/aggregate used for wall backfill.

3. Common borrow – suitable soils meting the material requirements specified herein and provided from locations within the limits of the site property. Common borrow, to the greatest extent practicable, within the limits of construction methods, engineering judgment and design and in accordance with these Specifications shall be used for site construction. IT IS ANTICIPATED THAT ALL COMMON BORROW WILL be generated from existing/relocated INTERIM COVER MATERIALS

BK 6/12/06 FCN 4200-14

4. Foreign borrow – suitable material meeting the material requirements specified herein and provided from sources outside the limits of the site property. Foreign borrow will be used to supplement common borrow material as needed.

5. Infiltration layer soils – defined as foreign borrow, suitable material meeting the requirements specified herein, and infiltration layer soil for use within the main landfill cover system shall be common borrow, environmentally-clean and free of organic material, frozen material, wood, or foreign trash, or other objectionable materials which may be decomposable, compressible, or which cannot be properly compacted, shall not contain recycled materials.

6. Topsoil – suitable material meeting the material requirements specified herein; and provided from sources within or outside the limits of the site property.

7. Unsuitable material – unsuitable material not meeting the requirements set forth herein for fill materials or as otherwise determined by the Engineer to be inappropriate and/or unacceptable for use. Unsuitable material shall be disposed of by the Contractor in the main landfill.

8. Environmentally-clean – soil purchased from commercially available sources shall be certified to be free of chemical contaminants by the seller. The Engineer reserves the right to require additional chemical testing by the Contractor, at no cost to the Engineer, of proposed foreign borrow material to verify its environmental cleanliness should the borrow site history suggest the possible presence of contamination. The Engineer also reserves the right to inspect the foreign borrow site at any time prior to or during construction activities.

9. Noncalcareous – soil or aggregate that, when tested in accordance with ASTM D3042 for soils and ASTM D4373 for aggregates, possesses no more than a 5% loss of weight (dry basis) for aggregates or a maximum carbonate content of 15%.

10. Subgrade – excavation bottom or existing grade, as specified herein, prepared to receive ~~soil fill or~~ aggregate materials, or in alternative layer

6/12/06
FCN 4200-14

1.04 QUALITY CONTROL

A. General

1. Unless otherwise indicated, all laboratory and field testing shall be performed by an independent geotechnical testing laboratory (GTL) employed by the Contractor, with test materials furnished by the Contractor under the direction of the Engineer. The GTL proposed by the Contractor shall be reviewed and approved by the Engineer. The laboratory shall, at a minimum, be in compliance with ASTM D3740 Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rocks as Used in Engineering Design and Construction.

2. The Contractor shall test materials as set forth in the applicable referenced sections and as required herein.

B. Preconstruction Material Testing Requirements

1. The Contractor shall arrange for an inspection by the Engineer of each proposed foreign and common borrow source prior to the commencement of earthwork operations. During said inspection, the Contractor shall provide any equipment necessary to excavate test pits throughout the limits of the proposed source so as to provide the Engineer with a thorough inspection of the type(s) and uniformity of material(s) throughout the proposed source. Upon the Engineer's visual inspection and preliminary acceptance of a proposed borrow source, the Contractor shall collect representative samples of the borrow soils for

Table 02200-1
Material Quality Control
*Minimum Preconstruction Testing Requirements

Property	Test Method	Fill Materials[3,5] Frequency	Infiltration Layer Frequency	Topsoil Frequency
Particle Size Analysis w/Hydrometer[1]	ASTM D421/D422	10,000CY	5,000CY	5,000 CY
Atterberg Limits	ASTM D4318	10,000 CY	5,000CY	———
Organic Content	ASTM D2974	10,000 CY	———	5,000 CY
Moisture Content	ASTM D2216	10,000 CY	5,000CY	5,000 CY
Standard Proctor Compaction	ASTM D698	10,000 CY	5,000CY	———
Permeability[2]	ASTM D5084	———	5,000CY	———
pH	ASTM D4972	———	———	5,000 CY
Nitrogen (TKN)	EPA 351.3	———	———	5,000 CY
Phosphorus, Orthophosphate (as P)	EPA 9056A	———	———	5,000 CY

[1]Provide USCS designations for Structural Fill/Common Borrow/Foreign Borrow and Infiltration Layer samples and USDA classification for topsoil samples.
[2]Permeability tests for infiltration layer soil shall be conducted on remolded samples compacted to 95% degree of compaction as determined from ASTM D698 within -1% to +2% of optimum moisture content. The permeability test shall be performed under a confining stress of between 0.5 and 2.0 psi, with the lowest value being preferred and a hydraulic gradient of 1.0.
[3]Fill materials include Structural Fill, Common Borrow and Foreign Borrow.
[4]Testing frequency requirements for imported materials obtained from a NMDOT certified source may be reduced by the Engineer based on review of historical records for material produced by the source.
5. Excluding materials used to Achieve Subgrade elevations. [illegible] 6/15/06
FCN 4200-14

Preconstruction
Minimum Testing Acceptance Criteria

Property	Test Method	Fill Materials[1,3]	Infiltration Layer	Topsoil
Particle Size Analysis w/Hydrometer	ASTM D421/D422	See 2.01.A.2.e	———	———
Atterberg Limits	ASTM D4318	LL ≤ 40; PI ≤ 12	———	———
Organic Content	ASTM D2974	≤ 6%	———	> 5%
Standard Proctor Compaction	ASTM D698	Dry density[2] ≥ 105 pcf	———	———
Permeability	ASTM D5084	———	$K \leq 1x10^{-5}$ cm/s	———
pH	ASTM D4972	———	———	5.5 – 7.6
USDA Classification	Via ASTM D421/D422	———	———	Sandy loam, loam, silty loam, sandy clay loam
Nitrogen (TKN)	EPA 351.3	———	———	None; used to guide amendment
Phosphorus, Orthophosphate (as P)	EPA 9056A	———	———	None; used to guide amendment

[1]Fill materials include Structural Fill, Common Borrow and Foreign Borrow.
[2]Maximum dry density for structural fill used behind retaining walls shall be at least 110 pcf.
3. Excluding materials used to Achieve Subgrade Elevations. [illegible] 6/15/06
FCN 4200-14

C. Field Quality Control Testing Requirements

1. The Contractor shall provide all horizontal and vertical controls necessary for all earthworks as well as associated grid layout and staking using benchmarks and monuments, if any, shown on the Drawings and required by these Specifications.

2. Placing soil material and performing earthworks will be subject to periodic QA inspection by the Engineer. The GTL shall provide continuous quality control (QC) inspection including field moisture and density tests during the compaction of each lift of soil in accordance with Table 02200-2. The Contractor shall also provide labor and equipment to prepare smooth surface spot locations as designated by the independent GTL or the Engineer on which to perform field tests.

Table 02200-2
Field Quality Control
Minimum Testing Requirements

Property	Test Method	Fill Materials[1,2] Frequency	Infiltration Layer Frequency
Field Dry Density	ASTM D2922	10,000 SF	2/Ac/Lift
Field Moisture Content	ASTM D3017	10,000 SF	2/Ac/Lift
Particle Size Analysis (Sieve only)	ASTM D421/422	———	2500 CY
Standard Proctor	ASTM D698	———	5000 CY

[1]Fill materials include Structural Fill, Common Borrow and Foreign Borrow.
2. Excluding materials used to achieve subgrade elevations MJ 6/15/06
FCN 4200-14

Field Quality Control
Minimum Testing Acceptance Criteria

Property	Test Method	Fill Materials[1] 3	Infiltration Layer
Field Dry Density	ASTM D2922	98% Standard Proctor	95% Standard Proctor[1]
Field Moisture Content	ASTM D3017	± 3% Optimum	-1 to +2% Optimum[1]
Particle Size Analysis (Sieve Only)	ASTM D421/422	———	Range to be determined[2]

[1]Fill materials include Structural Fill, Common Borrow and Foreign Borrow.
[2]Acceptable range will be established upon completion of preconstruction testing.
3. Excluding materials used to achieve subgrade elevations MJ 6/15/06

3. Following the placement and compaction of each lift of soil, said lift shall be tested to determine the in-place compacted dry density and moisture content of the in-place soils, and to determine conformance of these data with the project specifications, before subsequent lifts are placed. The testing results from the infiltration layer shall also show that in-place density and moisture content fall within the permeability window determined for the infiltration layer soils as described in Subsection 1.04.B.3. Tests outside of the window shall be considered failing unless otherwise approved by the Engineer. Deficient areas shall be recompacted in accordance with approved techniques as stated herein. FCN 4200-14

The GTL shall perform in-place field density and moisture tests of each compacted lift in accordance with the following approved methods:

a. ASTM D2922 and D3017 (Moisture Content and Density of Soil and Soil-Aggregate in Place by Nuclear Methods). The direct transmission method shall be used unless otherwise directed by the Engineer.

PWIF-4201-005.1 – FIELD CHANGE NOTICE

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-013 **Affected Document:** Dwg 3003 Note 15

Date Prepared: 06/06/06 **Prepared by:** J. F. Keck

Description of Field Change (Cite section in document and description of change):
Change note to allow for use of two 6-oz layers of nonwoven geotextile in lieu of one 10-oz layer under hangar pads.
Reason for Field Change: Revision will allow for use of available materials without adversely affecting required properties.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature Date

B. Keshian-Approved per telecon 06/06/06
Project Manager Signature Date

6/1/06

PWIF-4201-005.1 Rev. 2
Effective 04/04/06

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-012 **Affected Document:** Spec 03300.2.04

Date Prepared: 06/06/06 **Prepared by:** J. F. Keck

Description of Field Change (Cite section in document and description of change):
Change Spec 03300.2.04 to allow 6 inches slump for both 3000 and 4000 psi concrete.
Reason for Field Change: Allowing greater slump will improve ability to pump concrete for both hangar pads and retaining wall.

Rejected
Does not meet design
mix
6/6/06

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature Date

Project Manager Signature Date

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-011

Affected Document: Delete Spec 02200.2.01.A.2.a-d, and f, .3, .4; retain all else

Date Prepared: 06/06/06

Prepared by: J. F. Keck

Description of Field Change (Cite section in document and description of change): Delete cited requirements in 02200.2.01 re: "Existing/relocated interim cover material.
Reason for Field Change: Revisions will allow for use of recovered interim cover materials and minimize off-site transport and disposal of interim cover material, or importing foreign borrow soil, while meeting structural requirements of cover subgrade, thereby facilitating procurement of materials and reducing costs. Waste or other oversize material will be excluded to the extent feasible.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date 6/8/06

Project Manager Signature — Date 6/12/06

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-010 **Affected Document:** Specification 02200.2.04

Date Prepared: 05/17/06 **Prepared by:** J. F. Keck

Description of Field Change (Cite section in document and description of change):
Specification 02200.2.04 stipulates "noncalcareous aggregate meeting the requirements of NMDOT Section 304.21 for Class 1 Base Course" for backfill behind both the MSE and concrete walls. The selected MSE wall facing (Tensar Sierrascape) specifies the "reinforced backfill" as:

"Granular fill with a pH range of 2 to 12, when tested in accordance with AASHTO T 289, and be classified as a well graded material that falls within the sieve sizes as follows:

1. 100 to 75% passing a 2-inch (51 mm) sieve
2. 100 to 75% passing a ¾ inch (19 mm sieve)
3. 100 to 20% passing a No. 4 sieve
4. 0 to 60 % passing a No. 40 sieve
5. 0 to 35% passing a No. 200 sieve

Tensar's backfill specifications will be substituted for the existing NMDOT specification to allow for use of a wider range of materials, while meeting structural and drainage requirements. North Wind, Inc. will submit a grain size analysis of potential materials to the Engineer for approval prior to construction of the MSE wall.

Reason for Field Change: Tensar's backfill specifications allow for use of a wider range of materials, while meeting structural and drainage requirements, thereby facilitating procurement

of materials and reducing costs.

This field change will impact project schedule by _____ Months; _____ cost

Approval

Engineer of Record Signature — Date: 5-11-06

Project Manager Signature — Date: 5/23/06

PWIF-4201-005.1 – FIELD CHANGE NOTICE

North Wind

Field Change Notice

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No: 4200-~~008~~ 009 21C **Affected Document:** Spec 02200.2.03

Date Prepared: 05/17/06 **Prepared by:** J. F. Keck

Description of Field Change (Cite section in document and description of change): Identify Specification UFO02722-"Graded crushed aggregate base course for flexible pavement", as provided by Wilder Const. and as modified by Berg Keshian, for specifying aggregate base under MatCon, as allowed under Spec 02200.2.03, "...or as otherwise may be required to satisfy the design requirements for the support of the MatCon pavement". The revised spec is attached.

Reason for Field Change: UFO02722 was identified by Wilder Construction as preferred for aggregate base for MatCon. This spec was reviewed and revised by Berg Keshian, Weston Solutions, Inc. Engineer of Record, and John Keck, NWI Design Supervisor. Revisions included selecting a gradation for the aggregate and identification of an appropriate proof rolling method. These revisions were approved by Wilder Construction.

This field change will impact project schedule by 0 0 cost

Approval 5/18/06

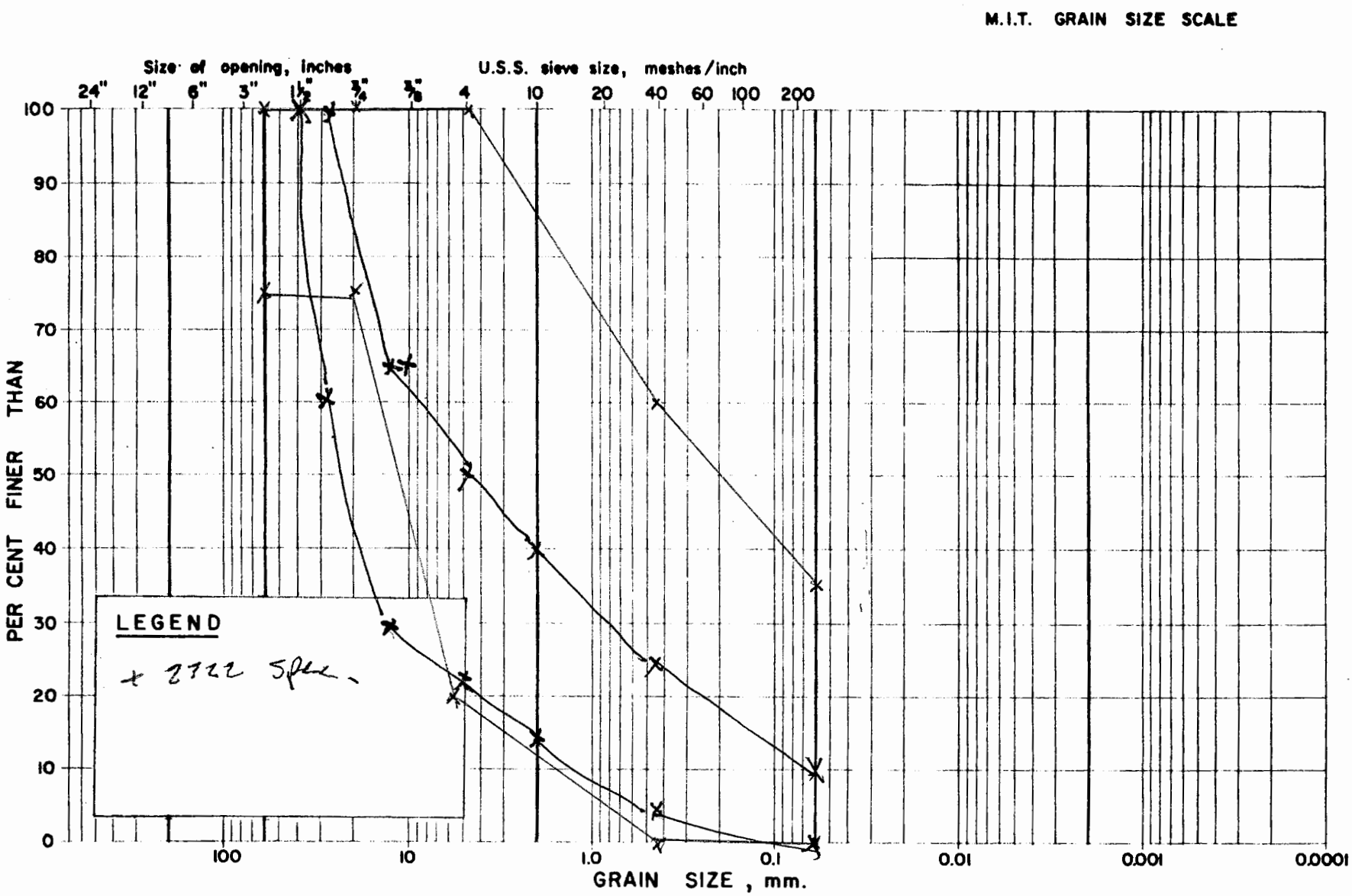
Engineer of Record Signature Date

Project Manager Signature

5/22/06
Date

PWIF-4201-005.1 Rev. 2
Effective 04/04/06

Project No. Drawn Reviewed Date



GRAIN SIZE DISTRIBUTION

Figure

Supplementing (New Specs) 5/16/06

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DIVISION 02 - SITE CONSTRUCTION

SECTION 02722

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SECTION 02722

GRADED CRUSHED AGGREGATE BASE COURSE FOR FLEXIBLE PAVEMENT

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C 117	(2004) Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 131	(2003) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(2004) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 29/C 29M	(1997; R 2003) Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2002e1) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 1883	(1999) CBR (California Bearing Ratio) of Laboratory-Compacted Soils
ASTM D 2217	(1985;R 1998) Wet Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants
ASTM D 2922	(2004) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(2004) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(2000) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 75	(2003) Sampling Aggregates

SD-06 Test Reports

- Gradation
- Bearing ratio
- Liquid limit
- Plasticity index
- Gradation
- Smoothness
- Density
- Thickness

1.3 DELIVERY AND STORAGE

Inspect materials delivered to site for damage and store as to prevent segregation and contamination.

1.4 WEATHER LIMITATIONS

Do not construct base course when atmospheric temperature is below 2 degrees C 35 degrees F or when rainfall or other weather conditions detrimentally affect the quality of the finished course.

1.5 CONSTRUCTION EQUIPMENT

Equipment shall be dependable and adequate for the purpose intended. Maintain equipment in satisfactory and safe operating condition. Subject to approval, special equipment dictated by local conditions may be used. Calibrated equipment, such as scales, batching equipment, spreaders, and similar items, shall have been recalibrated by an approved calibration laboratory within 12 months of commencing work.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Aggregates

Consist of durable and sound crushed gravel, crushed stone, or crushed slag, free of lumps or balls of clay or other objectionable matter. Crushed stone and gravel shall be free from flat, elongated, soft, or disintegrated pieces. Crushed gravel retained on a No. 4 sieve shall have at least 90 percent by weight with at least two fractured faces and 100 percent by weight with at least one fractured face. Base course materials samples shall have a bearing ratio of at least 100 as determined by laboratory tests on a 4-day soaked specimen in accordance with ASTM D 1883; compact specimen in accordance with ASTM D 1557, Method D. Determine grain size in accordance with ASTM C 136 and amount of material finer than 75 micrometers 200 mesh sieve in accordance with ASTM C 117. Soil binder material, that portion of material passing the No. 40 sieve, shall be of such composition that the composite material conforms to the requirements specified herein. The base course shall be of such nature that it can be compacted readily with watering and rolling to a firm, stable base and shall conform to one of the following sizes:

Percentage by Weight Passing
Square Mesh Laboratory Sieves

Sieves	Percent passing
1 1/2 inch	100
1 inch	60-100
1/2 inch	30-65
No. 4	20-50
No. 10	15-40
No. 40	5-25
No. 200	0-10

That portion of the material passing the No. 40 sieve shall have a liquid limit of not more than 25 and a plasticity index of not more than 5 as determined by ASTM D 4318. Prepare samples in accordance with ASTM D 2217, Procedure A.

PART 3 EXECUTION

3.1 BASE COURSE

Construct the graded aggregate base course on a prepared sub-grade, as indicated. Provide line and grade stakes for control. Place grade stakes in lanes parallel to the centerline of areas to be paved and space for string lining or other control methods. The base course shall consist of aggregate processed, deposited, spread, and compacted on a prepared surface. The Contractor shall be responsible for protection of completed areas against detrimental effects. Recondition, reshape, and re-compact areas damaged by freezing, rainfall, or other weather conditions.

3.2 Reserved

3.3 MIXING OF MATERIALS

Mix aggregates in a stationary or traveling plant. Proportion aggregates by weight or volume in such quantities that specified gradation, liquid limit, and plasticity index requirements are met after the base course has been placed and compacted. Incorporate, during the mixing operation, water in quantities sufficient to provide the necessary moisture content for the specified compaction. Mixing operations shall produce satisfactory uniform blending and the method of discharging into trucks shall not produce segregation.

3.4 PLACING

Do not dump mixed materials in piles, but place on prepared sub grade or sub base in layers of uniform thickness with a spreader. When a compacted course 6 inches in thickness is required, place material in a single layer. When a compacted course in excess of 6 inches is required, place material in layers of equal thickness. Do not exceed 6 inches or have less than 3 inches in thickness for any compacted layer. Place layers so that when compacted, they will be true to grades or levels required with the least possible surface disturbance. Where the base course is constructed in more than one layer, clean previously constructed layers of loose and foreign matter. Maintain material water content during the placing period to obtain the compaction specified. Make adjustments in placing procedures or

equipment to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to insure a satisfactory base course.

3.4.1 Stationary-Plant Method

Mix aggregates, binder material and water until a uniform homogeneous mixture is obtained. Do not dump materials in piles; place in layers of essentially uniform thickness, not to exceed 6 inches after compaction, by an approved spreader. Tail gate spreading will be acceptable only with permission, under conditions such as where space limitations prohibit use of the spreader.

3.4.2 Windrow Traveling-Plant Method

Place aggregates and binder materials in windrows of such cross section and proportions that, when picked up, mixed, and re-deposited in windrows, the finished mixture shall conform to the specified requirements. Do not exceed the rated capacity of the traveling plant with the size of the windrow of the combined materials. Add water, in quantity sufficient to provide the necessary moisture content for compacting, to the aggregates at the time of mixing. Mix materials uniformly by the traveling plant, deposit in windrows of uniform cross section, and spread in a layer of uniform thickness to the required contour and grades.

3.5 COMPACTING AND FINISHING

Immediately following the placing, spread the finished mixture uniformly in a layer and bring to optimum moisture content. The loose thickness and the surface of the layer shall be such that the specified density and the required thickness shall be obtained after compaction. Compact the layer with steel-faced, vibrating or pneumatic-tired rollers, or other suitable compacting equipment or combinations thereof. Continue compacting until the layer is compacted through the full depth to a field density of at least 100 percent of the maximum density at optimum moisture content tested in accordance with ASTM D 1556 or and ASTM D 3017. In areas not accessible to rollers or compactors, compact the mixture with mechanical hand tampers. If the mixture is excessively moistened by rain, aerate by blade graders, or other suitable equipment. Aerate until the moisture content of the material is that needed to obtain the required density. Finish the surface of the layer by a combination of rolling and blading. Final surface shall be smooth and free from waves, irregularities, and ruts or soft yielding spots.

3.6 PROOF ROLLING

In addition to compacting the base course to the required density, proof roll the top surface of the completed base course by making eight coverage's with a heavy rubber-tired roller having four tires with each tire loaded to 30,000 pounds or more and inflated to at least 150 psi. Make four coverage's over other areas to be paved, excluding the runway over-runs, blast protection areas, and shoulders. A coverage is defined as one application of one tire print over each point in the surface of the designated area. When under the action of the proof rolling, the base course yields, pumps, or otherwise fails, remove, replace with suitable materials, and re-compact materials in the base course or in the underlying layers indicated to be unsatisfactory. The speed of the roller shall not exceed 8 kph 5 miles per hour. Obtain approval upon completion of the proof rolling of the base course.

3.7 FINISHING AT EDGES OF BASE COURSE

Place earth or other approved materials along the edges of the base course in such quantity that it will compact to the thickness of the course being constructed. When the course is being constructed in two

or more layers, place material to the thickness of each layer. In each operation, allow at least a one foot width of the shoulder to be rolled and compacted simultaneously with the rolling and compacting of each layer.

3.8 FIELD QUALITY CONTROL

Approve materials and material sources in advance of the use of such materials in the work. Replace base where samples are removed. Take duplicate samples at the same time and in the same manner as the original.

3.8.1 Sampling

3.8.1.1 Aggregates at the Source

Prior to production and delivery of aggregates, take at least one initial sample in accordance with ASTM D 75. Collect each sample by taking three incremental samples at random from the source material to make a composite sample of not less than 50 pounds. Repeat above sampling when source of material is changed or when unacceptable deficiencies or variations from specified grading of materials are found in testing.

3.8.1.2 During Construction

Take one random sample from each 1000 tons of completed course material, but not less than one random sample per day's run. Take samples in accordance with ASTM D 75.

3.8.1.3 Sample Identification

Place each sample in a clean container, securely fastened to prevent loss of material. Tag each sample for identification and with the following information:

Contract No._____
Sample No._____ Quality _____
Date of Sample_____
Sampler_____
Source_____
Intended Use_____
For Testing_____

3.8.2 Testing

3.8.2.1 Aggregates

Test each sample of base course material without delay. Make gradation tests from each sample in accordance with ASTM C 136. Make sieve analysis on material passing the No. 200 sieve in accordance with ASTM C 117.

3.8.2.2 Smoothness Tests

Test with a 10 foot straightedge, applied parallel with and at right angles to the center line of the paved area. Correct deviations in the surface in excess of 1/2 inch by loosening, adding or removing material, reshaping, watering, and compacting. The smoothness requirements specified herein apply only to the top layer when base course is constructed in more than one layer.

3.8.2.3 Field Density Tests

ASTM D 1556 or ASTM D 3017. Take one test for each 500 square yards of each layer of base course.

3.8.2.4 Laboratory Density Tests

In accordance with ASTM D 1557, Method D.

3.8.2.5 Thickness Tests

Measure thickness of base course at intervals such that there will be a depth measurement for at least each 500 square yards of complete base course. Make depth measurements by test holes, at least 3 inches in diameter, through the base course. Where base course deficiency is more than 1/2 inch, correct by scarifying, adding mixture of proper gradation, reblading, and re-compacting. Where the measured thickness is more than 1/2 inch thicker than indicated, consider it as the indicated thickness plus 1/2 inch for determining the average. The average thickness is the average of the depth measurements and shall not under run the thickness indicated.

3.9 MAINTENANCE

After construction is completed, maintain the base course throughout, except where portion of the succeeding course is under construction thereon. Maintenance includes drainage, rolling, shaping, and watering, as necessary, to maintain the course in proper condition. Correct deficiencies in thickness, composition, construction, smoothness, and density, which develop during the maintenance, to conform to the requirements specified herein. Maintain sufficient moisture by light sprinkling with water at the surface to prevent a dusty condition.

-- End of Section -

North Wind

Field Change Notice

Project:	DOE-LASO TA-73 Airport Landfill Closure (North Wind Inc. Project #4200)		
FCN No.:	4200-~~8~~ 9	**Affected Document:**	Drawings 2001, 2002, 2003, 2010, 2013, 2018, 2024
Date Prepared:	05/17/06	**Prepared by:**	J. F. Keck

Description of Field Change (Cite section in document and description of change):

Delete hangar pad #6 (farthest east) and trench drain from referenced design drawings, replace with tie-downs where they fit, depending on final slope intersection, resulting in a layout starting from the west end of the cap moving to the east of:

- one (1) row of nested tie-down,
- three (3) row of pads for nested T-hangars (Erect-a-Tube N60-45),
- two (2) rows of rectangle hangars (Erect-a-Tube 3 Unit RG62-65), and
- a partial row of nested tie-downs.

The hangar slabs for the rectangle hangars will be oriented so they will open to the west.

Also delete utility pole for pad 6.

Reason for Field Change:

Hangar Pad 6 (farthest east) as shown on the referenced drawings is deleted due to potentially excessive differential settlement, as identified in the Weston Solutions, Inc. elastic settlement calculations dated 04/19/06. Differential settlement from center to edge of Pad 6 could be as much as 4 inches, likely resulting in cracking. For this reason, Pad 6 was proposed to be deleted and replaced with aircraft tie-downs, in a 05/02/06 meeting with Bob Enz of DOE-LASO, Kyle Zimmerman of Los Alamos County, Berg Keshian of Weston Solutions, Inc. and Engineer of Record, and John Keck of North Wind, Inc. This proposal was accepted by both DOE-LASO and Los Alamos County.

Additionally the RDWP Rev 2 drawings showed hangar pad designs for the nested T-hangars (Erect-a-Tube N60-45) only. Los Alamos county requested addition of hangar pads for rectangular hangars (Erect-a-Tube 3 Unit RG62-65) at the east end of the cap. The County also requested that utility poles to provide electrical supply to the hangars be shown in the design. (Utility poles were on the drawings for all 6 hangers)

This field change will impact project schedule by _____ Months; cost _____

Approval

Engineer of Record Signature — Date 5-17-06

Project Manager Signature — Date 5/23/06

North Wind

Field Change Notice

Project:	DOE-LASO TA-73 Airport Landfill Closure (North Wind Inc. Project #4200)		
FCN No.:	4200-~~006~~ 007 JK	**Affected Document:**	Specification 02266
Date Prepared:	05/04/06	**Prepared by:**	J. F. Keck

Description of Field Change (Cite section in document and description of change):

Remedy Design Work Plan (NWI-ID-2004-039 Rev 2) Specification 02266.1.04.A states "Contractor shall perform a topographic survey of the finished surface of relocated waste for use in calculating the volume of waste moved. The survey shall be compared to the pre-construction survey required by Section 02005." Deletion of this requirement to survey the top of the waste is proposed.

Reason for Field Change:

Since waste will be covered as it is placed, this would essentially require a full-time surveyor on site during waste relocation. The desired volume of relocated waste will be obtained by other methods including truck counts of waste removed from the north and east slopes; and from surveys of preconstruction surface elevations, top of subgrade elevations, and top of interim cover.

This field change will impact project schedule by _____ Months; cost _____

Approval

Engineer of Record Signature — Date 5/8/06

Project Manager Signature — Date

North Wind

Field Change Notice

Project:	Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)		
FCN No.:	4200-005	**Affected Document:**	Spec ~~02200~~ 03300 L. Kerk 6/18/06
Date Prepared:	26 April 06	**Prepared by:**	Tom Matzen

Description of Field Change (Cite section in document and description of change):
North Wind, Inc. would like to request to change and clarify the specification at 03300 1.03 related to concrete testing.

We would like to clarify that the concrete supplier is required to mix and test the test batches of concrete and that the geotechnical materials testing provider will only be required to collect samples of the test batches and verify that concrete mix specifications.

We would like to change the air content testing spec in 2.02 B from ASTM C173 to ASTM to ASTM C231 so that the air content testing spec is the same at 1.03 E and 2.02 B. To section 1.03 we would like to add unit weight testing per ASTM C138. One unit weight test per day is recommended.

Reason for Field Change:

Clarification of Specification 03300.

This field change will impact project schedule by 0 Months; cost 0.0

Approval

Engineer of Record Signature — Date 5-1-06

Kim M. Redmond

Project Manager Signature — Date 5-1-06

Field Change Notice

North Wind

Project:	Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)		
FCN No.:	4200-004	**Affected Document:**	SWPP
Date Prepared:	4/6/06	**Prepared by:**	Chris Richardson

Description of Field Change (Cite section in document and description of change):

North Wind, Inc. would like to request to change the location of the equipment parking area at the TA-73 Airport Project. The proposed area we would like to utilize for equipment parking lies to the east of the airport's hot pad, and will be constructed adjacent to the temporary access route.

Reason for Field Change:

The original area proposed for equipment parking lies within the perimeter of work areas, and would require relocation of the designated equipment parking area several times in anticipation of project activities in this area. Using the above mentioned area east of the airport's hot pad negates the relocation of the equipment parking area to facilitate the execution of on-going project work activities. This area has been inspected by the Airport Manager, and deemed appropriate.

This field change will impact project schedule by 0 Months; cost .0

Approval

Engineer of Record Signature	Date
N/A	
Project Manager Signature	**Date**
[signature]	4/7/06

Field Change Notice

North Wind

Project:	Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)		
FCN No.:	4200-003	**Affected Document:**	SWPP
Date Prepared:	4/5/06	**Prepared by:**	Chris Richardson

Description of Field Change (Cite section in document and description of change):

North Wind, Inc. would like to delete the use of heavy mil plastic or other impermeable material placed on the ground in the material storage area at the TA-73 Airport Landfill Project.

Reason for Field Change:

North Wind, Inc. plans to store only geotextile materials, erosion control materials, straw, and similar materials in this area. All of these materials will be covered to protect them from adverse weather conditions while placed in this area. All fuels, oils, grease, solvents, fertilizers and similar materials will be stored in approved tanks mounted on a fuel and lube construction unit, or in approved storage containers at other locations. Heavy mil plastic or other impermeable materials placed on the ground at the material storage area would be damaged by heavy equipment moving these items and also create a slipping hazard in times of heavy precipitation.

This field change will impact project schedule by	0	Months;	Cost	$3000 savings est.

Approval

Engineer of Record Signature N/A	Date
Project Manager Signature	Date 4/5/06

North Wind

Field Change Notice

Project:	Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)		
FCN No.:	4200-002	**Affected Document:**	RDWP (specs)
Date Prepared:	4/4/06	**Prepared by:**	Chris Richardson

Description of Field Change (Cite section in document and description of change):

North Wind, Inc. would like to request a field change for the AASHTO #3 material gradation proposed for the temporary access at the TA-73 Airport Landfill Project. Limited aggregate base course material would be used only at the approach to this access only. The aggregate base course will be placed to provide a smooth transition while exiting NMSR 502, as well as aid in delivery truck tire cleaning while entering NMSR 502. Guaje Mountain Quad., Section # 3.

Reason for Field Change:

The AASHTO #3 material gradation specified for this access consists of a extremely "clean" rock. It does not contain "binder" material. In past experience we have found that rock of this gradation does not remain in its original placement limits, as it has nothing to hold it in a compacted state. The results of this include constant maintenance, constant addition of rock, and a greater area of impact. Aggregate base would only be placed at the access approach. Other existing conditions of this access have been inspected. Adverse effects from not placing aggregate products throughout the rest of the access alignment are not anticipated.

This field change will impact project schedule by 1/8 Months; cost N/A

Approval

Engineer of Record Signature	Date
per attached email	4/11/06
Project Manager Signature	Date
	4/11/06

Douglas Jorgensen

From: Keshian, Berg [Berg.Keshian@WestonSolutions.com]
Sent: Tuesday, April 11, 2006 11:34 AM
To: Douglas Jorgensen
Cc: John Keck; Christopher Richardson; Keshian, Berg
Subject: RE:

Doug
I had talked to John last week
I approve the change to the proposed material, although it is significantly finer than ASHTO #3
I agree that for a temporary road, this material may be better

Make sure that we do not use anything finer than that proposed or you will end up with mostly sand

Berg

From: Douglas Jorgensen [mailto:djorgensen@northwind-inc.com]
Sent: Tuesday, April 11, 2006 10:07 AM
To: Keshian, Berg
Cc: John Keck; Christopher Richardson
Subject:

Berg, we discussed this and provided you particle size analysis for this last week. Consequently, I need to close the loop on this FCN and have your approval via email or telecom for my records. Thanks.

Douglas Jorgensen
Environmental Restoration Manager
North Wind Incorporated
Phone: (208) 557-7864
Cell: (208) 520-1097

Field Change Notice

North Wind

Project: Los Alamos Site Office TA-73 Airport Landfill (North Wind Inc. Project #4200)

FCN No.: 4200-001 **Affected Document:** RDWP (specs), Dwg 2004 Detail 3

Date Prepared: 4/4/06 **Prepared by:** Chris Richardson

D. Koch 4/18/06

Description of Field Change (Cite section in document and description of change):

North Wind, Inc. would like to delete the use of geotextile fabric beneath the aggregate base course material located atop the temporary project access. This access begins by exiting NMSR 502 on the south side of the Los Alamos County Airport, continues to the east end of the runway and further continues along the north side of the runway ending at the main landfill area of the TA-73 Airport Landfill Project. Guaje Mountain Quad., Section 3.

Reason for Field Change:

This access is temporary, not a permanent route. Traffic traveling this access will be limited to construction machinery needed to execute the project, truck traffic used to deliver import materials, and occasional project management individuals. The existing material conditions of the proposed route have been inspected, and adverse effects of not installing the geotextile material are not anticipated.

This field change will impact project schedule by 1/8 Months; cost $2000 approx.

Approval

Engineer of Record Signature: Per attached email — Date: 4/4/06

Project Manager Signature — Date: 4/5/06

Douglas Jorgensen

From: Keshian, Berg [Berg.Keshian@WestonSolutions.com]
Sent: Tuesday, April 04, 2006 10:24 AM
To: John Keck; Christopher Richardson; Kevin Redmond
Cc: Douglas K. Jorgensen
Subject: RE: Geotextiles

John
As long as the natural material is not a clayey material that when it gets wet will cause a problem, I think we can remove the geotextile

As for the gravel that goes on the road, we just need a grain size of the proposed material, and then we can approve it

Berg

From: John Keck [mailto:jkeck@northwind-inc.com]
Sent: Monday, April 03, 2006 9:15 AM
To: Christopher Richardson; Kevin Redmond
Cc: Douglas K. Jorgensen; Keshian, Berg
Subject: RE: Geotextiles

Chris you are correct, this is a temporary road, and has no requirements attached to it other than our own. If the geotextile is not needed I recommend we delete it as a field change and note it as per Section 5.8 of the CQCP.

Berg please reply if you disagree, thanks.

From: Christopher Richardson
Sent: Monday, April 03, 2006 8:54 AM
To: Kevin Redmond; John Keck
Cc: Douglas K. Jorgensen
Subject: RE: Geotextiles

Guys:

This issue seems to contradict itself. DWG sheet 2000 note #6 states we shall install and maintain the access during operations, remove access road after project completion, work shall be coordinated with the airport mgr. DWG sheet 2004, detail 3 shows geotextile beneath roadway gravel or approved alternate. Project Specifications - Section 2500, Part 3.01 Temporary Gravel Roads is very broad. Although we have agreed (with the Airprot Mgr.) to leave the road in after completion to support planned runway expansion efforts, I think this is clearly, as far a NWI is concerned, a temporary gravel road. I have walked the alignment and discussed this with the AP Mgr., and have told him we plan to place some rock at the entrance only. Told him we may place material as needed on areas of heavy debris, mainly to save on tires. John...can you provide some information here, as one could interpret this several ways. If we need geotextile, we need to order immediately. Thanks

Chris

From: Kevin Redmond
Sent: Sunday, April 02, 2006 12:52 PM
To: Christopher Richardson

Subject: Geotextiles
Importance: High

Chris.....I get get you the geotextiles we discussed by the 17th no problem.

Do you need something before that for the road??

Kevin M. Redmond
Construction Division Manager
Kellogg, Idaho Office
208-783-1069
208-818-1713 mobile

MAR 16 2007

MAR 16 2007

2007.03.20 09:01

2007.03.20 09:06

2007.03.20 08:59

29 10:12 AM

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JAN 27 2006

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JAN 27 2006

2006.10.19 15:26

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JAN 12 2007

29 9:42 AM

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ESTOR'S CALENDAR
IN THE MARKET
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What makes
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