Appendix D. Geotechnical Analysis

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Geotechnical Analysis
Operable Unit 1, Meyers Landfill Site
Multilayer Cap
El Dorado County, California

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CERTIFICATION

This document was prepared under the direction and
supervision of a qualified Professional Engineer

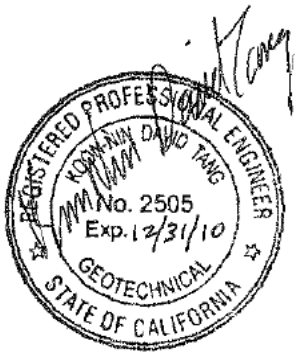

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Table of Contents

List of Figures

List of Tables

List of Attachments

Acronyms and Abbreviations

bgs	below ground surface
EPA	(U.S.) Environmental Protection Agency
ERRG	Engineering/Remediation Resources Group, Inc.
Forest Service	U.S. Department of Agriculture, Forest Service
g	gravity
HELP	Hydrologic Evaluation of Landfill Performance
LLDPE	linear low-density polyethylene
NA	not applicable
OHV	off-highway vehicle
OU	Operable Unit
oz/yd^2	ounce per square yard
pcf	pounds per cubic foot
psf	pounds per square foot
RD	Remedial Design
SCS	(U.S.) Soil Conservation Service
SF	safety factor
SM	silty sand
SP	poorly graded sand
SW-SM	well-graded sand with silt

Section 1. Introduction

This report presents the results of the geotechnical analysis conducted by Engineering/Remediation Resources Group, Inc. (ERRG) in support of the Remedial Design (RD) for Operable Unit (OU)-1 at the Meyers Landfill Site in El Dorado County, California. The RD is being conducted under the U.S. Department of Agriculture Forest Service (Forest Service) Regional Environmental Response Action Contract (AG-91S8-C-06-0056) Activity V, Task 2.

The purpose of the RD is to prepare a plan that implements the remedy selected in the Record of Decision (ROD) for OU-1 issued in November 2007 (Forest Service, 2007). The proposed RD for OU-1 includes the design of (1) a new cap system for the landfill that minimizes infiltration through the waste, controls surface water runoff, and controls potential erosion from the cap; (2) a new French drain; and (3) a passive landfill gas emissions control system. This appendix provides the geotechnical and engineering analysis of the multilayer cap in support of the cap design described in the RD.

Following a review of previous investigations for the site, ERRG concluded that the following parameters necessary for developing the RD had not been evaluated during previous studies:

- Evaluation of the potential borrow material
- Stormwater infiltration rate of the native material
- Geotechnical analysis of the subsurface conditions for design inputs
- Chemical analysis of the existing cap material

ERRG conducted a pre-design investigation on July 24 and 25, 2008, in support of the RD to address these data gaps. The purpose of the pre-design investigation was to evaluate subsurface geotechnical properties, site drainage, and existing site conditions in support of the RD.

The results of the pre-design investigations, included in Appendix B of the RD, were used as input parameters for the repository design to evaluate the following:

- Slope stability of the borrow material excavation, the multilayer cap, and the final cover under static and seismic loading conditions
- Percolation rate through the landfill cap using the Hydrologic Evaluation of Landfill Performance (HELP) computer modeling program
- Settlement of the landfill cover

Figures showing the pre-design investigation sample locations and tables summarizing geotechnical and analytical results, as well as complete laboratory reports, are presented in Appendix B of the RD.

1.1. ORGANIZATION

Section 1 of this appendix provides this introduction. Section 2 presents the results of the percolation analysis for the multilayer cap. Section 3 describes the slope stability analyses for the borrow source, the multilayer cap, and the final cover. Section 4 presents the soil cover settlement analysis. Section 5 summarizes the findings of the geotechnical analyses described in Sections 2, 3, and 4. Section 6 lists the documents used to prepare this report. The following information is also provided in attachments to this appendix:

- Attachment D1 HELP Model Output
- Attachment D2 XSTABL Model Output
- Attachment D3 Direct Shear Laboratory Tests

Section 2. Hydrologic Evaluation of Landfill Performance Analysis

The HELP Model Version 3 computer program was used to estimate the rate at which water may percolate through the multilayer cap and waste in the landfill (U.S. Environmental Protection Agency [EPA] 1994). The HELP Model was developed by the U.S. Army Corps of Engineers Waterways Experiment Station and is a quasi-two-dimensional hydrologic model of water movement across, into, through, and out of landfills. The model was run to evaluate percolation through a multilayer landfill cap over a 30-year period for the landfill. The following sections describe the modeling methodology and assumptions, input parameters, and results. The complete HELP model results are presented in Attachment D1.

2.1. MODELING METHODOLOGY AND ASSUMPTIONS

The HELP computer model uses weather, soil, and design data to generate solutions that incorporate the effects of surface storage, runoff, infiltration, evapotranspiration, vegetative growth, soil moisture storage, lateral subsurface drainage, unsaturated vertical drainage, and leakage through soil or composite liners. The model estimates the amounts of runoff, evapotranspiration, drainage, leachate collection, and liner leakage that may be expected to result from a closure cover. Various assumptions were implemented in the structure of the HELP program. Runoff for the site is computed using the U.S. Soil Conservation Service (SCS) method based on daily amounts of rainfall. The program assumes that areas adjacent to the site do not drain onto the site. Also, the SCS method does not explicitly consider the length and slope of the surface over which overland flow occurs; although, a routine based on a kinematic wave model was developed to account for surface slope and length (EPA, 1994).

Potential evapotranspiration is modeled by an energy-based Penman method, using average quarterly relative humidity and average annual wind speed. It is assumed that the relative humidity is 100 percent on days when precipitation occurs. The program uses an albedo of 0.23 for soils and vegetation. The actual evapotranspiration is a function of other data, and the solar radiation and temperature data are often synthetically generated. The vegetation data are generated by a vegetative growth model, assuming the evaporative zone depth is constant throughout the simulation period. However, outside the growing season, the actual depth of evapotranspiration is limited to the maximum depth of evaporation of soil water, which is a function of the soil saturated hydraulic conductivity (EPA, 1994).

Vegetative growth is based on a crop growth model, with a growth period assumed during the first 75 percent of the growing season based on heating units. Recommendations for the growing season are

primarily for summer grasses and assume that the growing season is the portion of the year when the temperature is above 50 to 55 ºF. However, the optimal growth temperature and base temperature are based on a mixture of winter and summer perennial grasses. Also, the program assumed that other vegetation has similar growth constraints and conditions, and that the vegetation is not harvested (EPA, 1994).

The HELP model assumes Darcian flow for vertical drainage through homogeneous, temporally uniform soil and waste layers. It does not consider preferential flow through channels such as cracks, root holes, or animal burrows. As such, the program will tend to overestimate the storage of water during the early part of the simulation and overestimate the time required for leachate to be generated. To compensate overestimation, the program increases the effective saturated hydraulic conductivity of default soils for vegetation effects (EPA, 1994).

Vertical drainage is assumed to be driven by gravity alone and is limited only by the saturated hydraulic conductivity and available storage of lower segments. If unrestricted, the vertical drainage rate out of a segment is assumed to equal the unsaturated hydraulic conductivity corresponding to the moisture content of the segment. This assumption is valid provided that (1) moisture content is greater than the field capacity or (2) soil suction of the segment is less than the suction of the segment directly below. The unsaturated hydraulic conductivity is computed by the Campbell hydraulic equation using Brooks-Corey parameters. It is assumed that all materials conducting unsaturated vertical drainage have moisture retention characteristics that can be well represented by Brooks-Corey parameters and the Campbell equation. The pressure of soil suction gradient is ignored when applying the Campbell equation; therefore, the unsaturated drainage and velocity of the wetting front may be underestimated. For steady-state conditions, like those at the site, this limitation has little or no effect (EPA, 1994).

The lateral drainage model is based on the assumption that the lateral drainage rate and average saturated depth relationship that exists for steady-state drainage also holds for unsteady drainage. This assumption is reasonable for closed landfills where drainage conditions should be fairly steady. Where drainage conditions are more variable, such as in the cover drainage system, the lateral drainage rate is underestimated when the saturated depth is building and overestimated when the depth is falling. Overall, this assumption causes the maximum depth to be slightly overestimated. The long-term effect on the magnitude of the water balance components should be small (EPA, 1994).

Subsurface inflow is assumed to occur at a constant rate and to be uniformly distributed spatially throughout the layer, despite entering the side.

The program performs water balance analysis for a minimum period of 1 year. All simulations start on January 1 and end on December 31. The condition of the landfill, soil properties, thicknesses, maximum level of vegetation, etc., is assumed to be constant throughout the simulation period.

2.2. GRADUAL SLOPES (6 PERCENT)

2.2.1 Input Parameters for 6 Percent Slope

The HELP Model was run using the input parameters presented in Table D-1. The waste was conservatively assumed to be 50 feet thick.

Other inputs to the model included overall landfill area and weather data. After waste consolidation and capping, the final footprint area of the landfill will be about 9.6 acres (Drawing 6 in Appendix E). Reno's 30-year synthetic weather data were applied in the HELP modeling to represent the Meyers Landfill Site, since no synthetic weather data were available in the model for the nearby area. The input precipitation, however, was modified to reflect the average annual rainfall of about 43 inches measured at the Meyer's Inspection Station located approximately 2.2 miles from the site (Weston Solutions, Inc., 2007). The evaporative zone depth was conservatively estimated at 18 inches, and the maximum leaf area index was estimated at 1.2 based on the recommended values for the region (EPA, 2004). The SCS runoff curve number for this closure cover design, 78.2, was generated using a slope of 6 percent, a length of 200 feet, and poor vegetation.

Incorporating these parameters, the HELP model simulated a project lifetime of 30 years.

2.2.2 Modeling Results for 6 Percent Slope

The first modeling simulation was run for the multilayer cap profile presented on Figure D-1. This profile includes a 60-mil linear low-density polyethylene (LLDPE) geomembrane separating the drainage layer from the foundation layer covering the waste. It also includes a geotextile fabric layer separating the sand drainage layer from the cover soil. This profile represents the recommended multilayer cap schematic, designated as Alternative 3, from the ROD. Results of this simulation are summarized in Table D-2. A comprehensive compilation of the first simulation's model output is presented in Attachment D1.

Modeling results for the first simulation predict the hydraulic head buildup over the geomembrane to reach 5 feet, which is greater than the thickness of the overlying cover material. This buildup would create an unacceptable ponding situation that would act as a significant driving force for water percolation through the geomembrane (through minute manufacturing and installation defects) and into the waste layer. Modeling results also reveal that the specified 12-inch-thick sand drainage layer does not have the capacity to cope with the anticipated volume of rainfall at the site (represented by 30 years of synthetic data generated by the HELP model using rainfall data for the Meyer's Inspection Station).

To increase the drainage capacity of the multilayer cap, the geotextile filter fabric and drainage sand layers were replaced by a 6-ounce per square yard (oz/yd^2) double-sided geocomposite layer and a second simulation was run. The landfill cap profile for the second modeling simulation is presented on Figure D-2. Results of the second simulation are summarized in Table D-3. A comprehensive compilation of the second simulation's model output is presented in Attachment D1.

Modeling results for the second simulation predict the peak hydraulic head buildup over the geomembrane will reach 1.3 feet. This buildup is an acceptable amount of hydraulic head over the geomembrane because it is less than the overall cover thickness of 3 feet. Based on the modeling results from the second simulation, the landfill configuration as designed, including the geocomposite layer, would control percolation through the multilayer cap and the amount of hydraulic head buildup over the geomembrane.

2.3. STEEP SLOPES (25 PERCENT)

2.3.1 Input Parameters for 25 Percent Slope

The HELP Model was used to estimate the height of water accumulated on the LLDPE liner in areas with a 25 percent slope for input into the XSTABL stability model (see Subsections 3.3.3 and 3.3.4). Inputs to the HELP model were constant with the inputs discussed in Subsection 2.2.1, except for the slope and length of slope. The SCS runoff curve (79.9) for this closure cover design was generated using a slope of 25 percent, a length of 100 feet, and poor vegetation. Incorporating these parameters, the HELP model simulated a project lifetime of 30 years.

The HELP model was run for cap configurations both including and excluding the 12-inch drainage sand layer to provide water level inputs for the differing stability analysis scenarios (see Subsections 3.3.3 and 3.3.4).

2.3.2 Modeling Results for 25 Percent Slope

The third modeling simulation was run for the multilayer cap profile presented on Figure D-3. This profile includes a 12-inch sand drainage layer separating the 6-oz/yd^2 geocomposite from the 60-mil LLDPE geomembrane. Modeling results for the second simulation predict the average hydraulic head buildup over the geomembrane will reach 1.3 feet. The results of this simulation are summarized in Table D-4. A comprehensive compilation of the simulation's model output is presented in Attachment D1.

The fourth modeling simulation was run for the multilayer cap profile presented on Figure D-2. This profile represents the configuration in which the 6-oz/yd^2 geocomposite lies directly above the 60-mil LLDPE geomembrane. Modeling results for the fourth simulation predict the average hydraulic head buildup over the geomembrane will reach approximately 0.1 feet. The results of this simulation are summarized in Table D-5. A comprehensive compilation of the simulation's model output is presented in Attachment D1.

Section 3. Slope Stability Analysis

The stabilities of the borrow source excavation slope, multilayer cap system slope, and overall final landfill slope were evaluated under both static and seismic loading conditions. The methods used in the analyses are discussed in Subsection 3.1. Subsections 3.2, 3.3, and 3.4 describe the assumed input parameters, slope stability analyses performed, and results for the slope configurations, respectively. The slope configurations include borrow source excavation, the multilayer cap, and the final.

3.1. ANALYSIS METHODOLOGY

Slope stability analysis methods for static and seismic loading conditions are presented in Subsections 3.1.1 and 3.1.2, respectively.

3.1.1 Static Loading Analysis Method

The XSTABL computer program was used to calculate the safety factor (SF) of each surface for a given slope cross section (Sharma, 2003). In XSTABL, circular failure surfaces are analyzed using the modified Bishop method and block failure surfaces are analyzed using the simplified Janbu method. The failure surface with the lowest SF is defined as the critical failure surface for a given slope or is considered the most likely failure surface if a slope mass actually fails. The SF is defined as the ratio between the forces and moments that act to preserve the stability of a slope (resisting forces) and the forces and moments that act to destabilize the slope (driving forces). An SF of 1.5 or greater is generally considered acceptable for long-term loading conditions. An SF of 1.3 or greater is generally considered acceptable for short-term loading conditions. An SF of 1.0 indicates a condition of impending slope failure.

3.1.2 Seismic Loading Analysis Method

During a seismic event, the propagation of bedrock motions induces a sequence of cyclic shear stresses on the soil. These cyclic shear stresses result in cyclic strains. A certain amount of strain remains when the stress levels are above yield strength, and the residual stress produces permanent deformations in soil.

The deformational analysis is based on the works of Makdisi and Seed (1977). Makdisi and Seed's procedure is an approximate method that uses the concept originally proposed by Newmark (1965) for calculating permanent deformation. The method assumes that failure occurs on a well-defined slip surface, and that the material behaves elastically at stress levels below failure, but develops a plastic behavior above yield strength. For a given potential sliding mass, movement is assumed to occur along

the direction of the failure plane when the induced acceleration exceeds the calculated yield acceleration (the seismic coefficient that reduces the SF to 1.0). The overall deformation is obtained by summing the strains over the failure surface. The strains are estimated based on a time-step, finite-element analysis using the equivalent liner method (Seed et. al., 1973). Based on this type of deformation calculation, Makdisi and Seed graphically summarized the amount of expected total deformation for an earth embankment given the ratio of k_y to k_{max} for various magnitude earthquakes, where k_y is the yield acceleration for a certain location of the slip surface, and k_{max} is the maximum average acceleration from an earthquake event. Deformation is assumed to occur when the k_{max} is greater than the k_y. Seismic deformation at the site was determined by calculating the ratio of k_y to k_{max}, and subsequently using Makdisi and Seed's graphical relationship to estimate deformation for the assumed earthquake magnitude (Figure D-4).

The site is situated in the vicinity the North Tahoe-Incline Village fault, the West Tahoe-Dollar Point fault zone, and the East Tahoe fault zone. The East Tahoe fault zone is closest to the site, and individual faults within the zone are located within 3,000 feet north and south of the site. Faults in the area could result in a maximum credible earthquake of 6.5 magnitude (California Department of Transportation, 1996), and the peak ground acceleration for earthquake activity in the vicinity of the site is 0.5 gravity (g) to 0.6 g, with a 2 percent probability of exceedance in 50 years (Petersen, et al., 2008). For modeling purposes, the more conservative (larger) value of 0.6 g was used for k_{max}.

3.2. BORROW SOURCE EXCAVATION SLOPE STABILITY ANALYSIS

The stability of the borrow source excavation slope was evaluated under static and seismic loading conditions. ERRG used the computer program XSTABL to perform the stability evaluation (Sharma, 2003). The model input parameters and results are described in the following subsections.

3.2.1 Model Input Parameters

Table D-6 summarizes the model input parameters for soil strength. The parameters were based on data obtained from the pre-design field investigation. In general, silty sand (SM), well-graded sand with silt (SW-SM), and poorly graded sand (SP) were encountered at the site (see Appendix B of the RD). Samples collected from ML-SB-01 and ML-SB-02 were tested in the laboratory for moisture content and dry density. The moisture and density values of moist and saturated soil were used to estimate the unit weights for both moist and saturated native soil for input into the model. For modeling purposes, the moist unit weight and saturated unit weight were assumed to be 105 pounds per cubic foot (pcf) and 115 pcf, respectively (see Table D-6). During the pre-design field investigation, groundwater was encountered at approximately 60 feet below ground surface (bgs) (see Appendix B of the RD). For modeling purposes, the groundwater elevation was assumed to be constant at 60 feet bgs.

Direct shear tests were performed on samples ML-SB-01V and ML-SB-02D in accordance with ASTM D3080 (ASTM International, 1998). The laboratory results are presented in Attachment D3. Based on

results, the laboratory concluded the cohesion for ML-SB-01V is 170 pounds per square foot (psf), with a friction angle of 33.4 degrees. The cohesion for sample ML-SB-02D is 340 psf, and the friction angle is 34.8 degrees (direct shear results are presented in Table D-7). Because the tests were performed under drained conditions, the laboratory concluded strength parameters represent the long-term effective stress. Conservative values for both the cohesion and friction angle were used to evaluate the stability of the excavation slope. The cohesion for native soil was modeled to be 50 psf with a friction angle of 30 degrees (see Table D-6).

Figure D-5 shows cross section F-F', which is the borrow slope cross section analyzed for stability. The location of the cross section is presented on Drawing 6 of Appendix E. A snow load of 84 psf was imposed on the relatively flat upper portion of the slope, which is equivalent to the weight of the average snow accumulation of approximately 2.8 feet during the winter months (Western Regional Climate Center, 2006). The unit weight of compacted snow is assumed to be 30 pcf.

3.2.2 Modeling Results

Results of the static loading analysis indicate the SF of the excavation slope is 3.3 for circular failure. A static SF greater than 1.5 is generally acceptable for a long-term loading condition, thus the stability of the borrow source excavation slope under static loading is acceptable.

The seismic loading analysis produced a slip surface yield acceleration (k_y) of 0.41 g for the slope configuration of Cross Section F-F' for a circular failure surface. The associated deformation is less than 1 inch using the Makdisi and Seed's graphical relationship (Figure D-4) and is considered acceptable. The computer printouts of the XSTABL analyses are presented in Attachment D2. Table D-8 summarizes the analysis results, including the resulting SFs for the different failure conditions and the estimated seismic deformation.

3.3. MULTILAYER CAP SLOPE STABILITY ANALYSIS

The stability of the multilayer cap system was evaluated under static and seismic loading conditions. ERRG used the computer program XSTABL (Sharma, 2003) to perform the stability evaluations. The model input parameters and results are described in the following subsections. The stability of the multilayer cap was originally analyzed for both the 6 percent and 25 percent slopes with a geocomposite as the drainage layer, which was shown to meet the hydrologic performance requirements using the HELP Model (see Section 2). The stability analysis, summarized herein, revealed that the use of a geocomposite directly overlying a geomembrane created stability issues. To remedy this, the layers were separated by a 12-inch sand layer (in the model) and the stability was reevaluated. The following subsections summarize the stability modeling inputs and results.

3.3.1 Model Input Parameters

For the purpose of the model, the cover layer and vegetative layer were modeled as one material. Large box shear tests (per ASTM D5321 [ASTM International, 2008]) were performed on the geocomposite

(GSE PermaNet UL double-sided 6 oz/yd^2 Geocomposite) and the geomembrane (GSE Ultraflex 60-mil double-sided textured LLDPE) to determine the frictional resistance of the geosynthetics (see Attachment D3). From these laboratory tests, it was concluded that the geomembrane has a lower friction angle than the geocomposite, thus failure is more probable along the geomembrane surface for the geosynthetic and sand interfaces. The large box shear test results for the geocomposite on geomembrane interface resulted in the lowest friction angle of the analyzed configurations. The direct shear results are summarized in Table D-7.

The friction angle for the geomembrane was obtained from the large box direct shear test performed on 60-mil textured geomembrane placed between soil from ML-TP01B/02C and remolded to 85 percent of the dry density and 2 percent above optimum moisture content (see Attachment D3). The test concluded the lowest friction angle and adhesion values were 32 degrees and 100 psf, respectively; however, the more conservative values of 30 degrees and 0 psf were used for the analysis. An average unit weight of 60 pcf was assumed for the geomembrane (see Table D-6).

The friction angle for the geocomposite was obtained from the large box direct shear test performed on 6-oz/yd^2 double-sided geocomposite placed between soil from ML-TP01B/02C and remolded to 85 percent of the dry density and 2 percent above optimum moisture content (see Attachment D3). The test concluded the friction angle and adhesion values were 37 degrees and 110 psf, respectively; however, the more conservative values of 30 degrees and 0 psf obtained from LLDPE and sand were used for the analysis. An average unit weight of 60 pcf was assumed for the geocomposite (see Table D-6).

The friction angle for the geomembrane and geocomposite interface was obtained from the large box direct shear test performed on 60-mil textured geomembrane placed on top of the 6-oz/yd^2 double-sided geocomposite (see Attachment D3). The test concluded the lowest friction angle and adhesion values were 22 degrees and 50 psf, respectively; however, the more conservative values of 20 degrees and 0 psf were used for the analysis. An average unit weight of 60 pcf was assumed for both geosynthetics (see Table D-6).

Soil property values for the cap were assumed to be consistent with the native material; that is, the cohesion is assumed to be 0 psf and the friction angle is 30 degrees (see Subsection 3.2.1). Modified Proctor tests were performed on sample ML-TP-01B/02C to identify the maximum dry density of on-site soils available for the cap material. Based on the typical specification of 85 to 90 percent compaction for placement of soil in the cap, the moist unit weight for the cover material was assumed to be 120 pcf. For analyses with submerged cap soil, the saturated unit weight was assumed to be 125 pcf (see Table D-6).

3.3.2 Modeling Results (No Drainage Sand Layer on 6 Percent Slope)

The multilayer cap configuration, in which the geocomposite and geomembrane are in direct contact, was analyzed for the following soil conditions: (1) 1.3 feet of water above the geomembrane liner (representing the peak head determined from the HELP model, see Subsection 2.2) under static loading

conditions; and (2) 1 foot of water above the geomembrane liner (representing the average head determined from the HELP model, see Subsection 2.3) under seismic loading conditions.

The 6 percent slope, shown on Figure D-6, was analyzed for slope stability to confirm that the slope configuration will be stable without the drainage sand layer.

3.3.2.1 Dry Soil above Geomembrane Liner

This analysis assumed that no standing water is present above the geomembrane liner. Results indicate that the static SF of the excavation slope is 6.3 for block failure. A static SF greater than 1.5 is generally acceptable for a long-term loading condition, thus the stability of the overall landfill slope under static loading is acceptable. The computer printouts of the XSTABL analyses are presented in Attachment D2. Table D-8 summarizes the analysis results, including the resulting SFs for the failure condition.

3.3.2.2 Peak Water Head above Geomembrane Liner

This analysis uses the maximum head of approximately 1.3 feet above the geomembrane calculated from the HELP model run for the gradual, 6 percent slope conditions (see Subsection 2.2.2), which represent the worst-case scenario for the site (see Figure D-6). The analysis was run for bare earth conditions. Results indicate that the static SF against block failure of the multilayer cap is 4.4. A static SF greater than 1.5 is generally acceptable for a long-term loading condition, thus the stability of the overall landfill slope under static loading is unacceptable. The computer printouts of the XSTABL analyses are presented in Attachment D2. Table D-8 summarizes the analysis results, including the resulting SFs for the different failure conditions.

3.3.2.3 Average Water Head above Geomembrane Liner

This analysis uses the average head of approximately 1 foot above the geomembrane calculated from the HELP model run for the gradual 6 percent slope conditions (see Subsection 2.2.2), as shown on Figure D-6. The seismic loading analysis produced the associated yield acceleration (k_y) of slightly less than 0.22 g, which is the established k_y value required to maintain a deformation of about 6 inches (see Makdisi and Seed's graphical relationship presented on Figure D-4). Using a k_y value of 0.22 g, the model calculated that a reinforcing force of approximately 115 pounds is required. The computer printouts of the XSTABL analyses are presented in Attachment D2. Table D-8 summarizes the analysis results, including the resulting SFs for the different failure conditions and the estimated seismic deformation. The required reinforcement can be achieved from the two layers of Mirafi® BXG11 geogrid that are already required to protect the slope from damage caused by off-highway vehicles (OHVs).

3.3.3 Modeling Results (No Drainage Sand Layer on 25 Percent Slope)

The multilayer cap configuration, in which the geocomposite and geomembrane are in direct contact, was analyzed for three different soil conditions: (1) dry soil above the geomembrane liner; (2) 1.3 feet of water above the geomembrane liner (representing the peak head determined from the HELP model, see

Subsection 2.2); and (3) 0.1 feet of water above the geomembrane liner (representing the average head determined from the HELP model, see Subsection 2.3).

The 25 percent slope, shown on Figure D-7, was analyzed for slope stability because it represents the steepest final grade at the site.

3.3.3.1 Dry Soil above Geomembrane Liner

This analysis assumed that no standing water is present above the geomembrane liner. Results indicate that the static SF of the excavation slope is 1.6 for block failure. A static SF greater than 1.5 is generally acceptable for a long-term loading condition, thus the stability of the overall landfill slope under static loading is acceptable. The computer printouts of the XSTABL analyses are presented in Attachment D2. Table D-8 summarizes the analysis results, including the resulting SFs for the failure condition.

3.3.3.2 Peak Water Head above Geomembrane Liner

This analysis uses the maximum head of approximately 1.3 feet above the geomembrane calculated from the HELP model run for the gradual, 6 percent slope conditions (see Subsection 2.2.2), which represent the worst-case scenario for the site. This scenario assumes that the same amount of water head in the upstream 6 percent slope will drain into the downstream 25 percent slope (see Figure D-7). The analysis was run for bare earth conditions. Results indicate that the static SF against block failure of the multilayer cap is 1.4 for no additional loading above the cover. A static SF greater than 1.5 is generally acceptable for a long-term loading condition, thus the stability of the overall landfill slope under static loading is unacceptable. The computer printouts of the XSTABL analyses are presented in Attachment D2. Table D-8 summarizes the analysis results, including the resulting SFs for the different failure conditions. This configuration is unstable under these loading conditions.

3.3.3.3 Average Water Head above Geomembrane Liner

This analysis uses the average head of approximately 0.1 feet above the geomembrane calculated from the HELP model run for the 25 percent slope (see Subsection 2.3.2), which excludes the water from the upstream 6 percent slope (see Figure D-7). The seismic loading analysis produced the associated yield acceleration (k_y) of 0.09 g for the 25 percent slope configuration under block failure. The associated average deformation is 30 inches using the Makdisi and Seed's graphical relationship (see Figure D-4). For landfill liner systems, a deformation of greater than 6 inches due to an earthquake load is generally considered excessive.

The analysis was run a second time to calculate the reinforcement required to maintain a deformation of about 6 inches. Using the Makdisi and Seed's graphical relationship (see Figure D-4), it was concluded that a yield acceleration (k_y) of 0.22 g provides an acceptable amount of seismic deformation. Using a k_y valued of 0.22 g, the model calculated that a reinforcing force of approximately 5,075 pounds is required. To provide the required tensile resistance, a much heavier gauge and more expensive geogrid will have to

be used. The computer printouts of the XSTABL analyses are presented in Attachment D2. Table D-8 summarizes the analysis results, including the resulting SFs for the different failure conditions and the estimated seismic deformation. The required reinforcement cannot be achieved using a reasonable amount of geogrid reinforcement on the 25 percent slopes to protect against seismic deformation. This configuration is not a feasible option under seismic loading conditions.

3.3.4 Modeling Results (With Drainage Sand Layer on 25 Percent Slope)

The multilayer cap configuration, including a 12-inch drainage sand layer between the geocomposite and geomembrane, was analyzed for three different soil conditions: (1) dry soil above the geomembrane liner; (2) 1.3 feet of water above the geomembrane liner under static conditions (representing the peak head determined from the HELP model, see Subsection 2.2); and (3) 1.3 feet of water above the geomembrane liner under seismic loading (representing the average head determined from the HELP model, see Subsection 2.3).

The 25 percent slope, shown on Figure D-8, was analyzed for slope stability because it represents the steepest slope at the site. Approximately one-third of the cap is configured with a 25 percent slope.

3.3.4.1 Dry Soil above Geomembrane Liner

This analysis assumed that no standing water is present above the geomembrane liner (see Figure D-8). Results indicate that the static SF of the excavation slope is 2.5 for block failure. A static SF greater than 1.5 is generally acceptable for a long-term loading condition, thus the stability of the overall landfill slope under static loading is acceptable. The computer printouts of the XSTABL analyses are presented in Attachment D2. Table D-8 summarizes the analysis results, including the resulting SFs for the failure condition.

3.3.4.2 Peak Water Head above Geomembrane Liner

This analysis uses the maximum head of approximately 1.3 feet above the geomembrane calculated from the HELP model run for the gradual slope conditions (see Subsection 2.2.2), which represent the worst-case scenario for the site. This scenario assumes that the same amount of water head in the upstream 6 percent slope will drain into the downstream 25 percent slope. The analysis was run for both bare earth and snow loading conditions. Results indicate that the static SF against block failure of the multilayer cap is 2.0 for no additional loading above the cover and 2.1 for snow loading conditions. A static SF greater than 1.5 is generally acceptable for a long-term loading condition, thus the stability of the overall landfill slope under static loading is acceptable. The computer printouts of the XSTABL5 analyses are presented in Attachment D2. Table D-8 summarizes the analysis results, including the resulting SFs for the different failure conditions.

3.3.4.3 Average Water Head above Geomembrane Liner

This analysis uses the average head of approximately 1.3 feet above the geomembrane calculated from the HELP model run for the steep slope (see Subsection 2.3.2), which represents the most probable amount of head on the 25 percent slope (see Figure D-8). The seismic loading analysis produced an associated yield acceleration (k_y) of 0.20 g for the 25 percent slope configuration under block failure. The associated average deformation is 8 inches using the Makdisi and Seed's graphical relationship (see Figure D-4). For landfill liner systems, a deformation of greater than 6 inches due to an earthquake load is generally considered excessive.

The analysis was run a second time to calculate the reinforcement required to maintain an average deformation of about 6 inches. Using the Makdisi and Seed's graphical relationship (see Figure D-4), it was concluded that a yield acceleration (k_y) of 0.22 g provides an acceptable amount of seismic deformation. Using a k_y valued of 0.22 g, the model calculated that a reinforcing force of approximately 615 pounds is required. The computer printouts of the XSTABL analyses are presented in Attachment D2. Table D-8 summarizes the analysis results, including the resulting SFs for the different failure conditions and the estimated seismic deformation. The required reinforcement can be achieved by the two layers of Mirafi® BXG11 geogrid (total of 600 pounds tensile resistance, or 300 pounds per layer, at 1 percent strain) that are already required at the site to protect against damage from OHVs.

3.4. FINAL LANDFILL SLOPE STABILITY ANALYSIS

The stability of the final grade of the landfill was evaluated under static and seismic loading conditions. ERRG used the computer program XSTABL (Sharma, 2003) to perform the stability evaluation. The model input parameters and results are described in the following subsections.

3.4.1 Model Input Parameters

To simplify the model, the multilayer cap and refuse were treated as one type of material. Input parameters for the refuse were assumed based on generally accepted values for municipal waste. The following assumptions were used for the refuse: the cohesion is 400 psf, the friction angle is 20 degrees, and a unit weight is 65 pcf (see Table D-6).

The input strength parameters for native soil are described in Subsection 3.2.1 and are summarized in Table D-6.

Figure D-9 shows Cross Section E-E', which is the cross section analyzed for slope stability. The location of the cross section is presented on Drawing 6 of Appendix E. A snow load of 84 psf was imposed on the relatively flat upper portion of the slope. This snow load is equivalent to the weight of about 2.8 feet of compacted snow. The unit weight of compacted snow is assumed to be 30 pcf.

3.4.2 Modeling Results

Results of the static loading analysis indicate the SF of the excavation slope is 3.44 for circular failure. A static SF greater than 1.5 is generally acceptable for a long-term loading condition, thus the stability of the overall landfill slope under static loading is acceptable.

The seismic loading analysis produced a slip surface yield acceleration (k_y) of 0.36 g for the slope configuration of Cross Section E-E' for a circular failure surface. The associated deformation is approximately 5 inches using the Makdisi and Seed's graphical relationship (see Figure D-4), thus the stability of the overall landfill slope under seismic loading is acceptable. The computer printouts of the XSTABL analyses are presented in Attachment D2. Table D-8 summarizes the analysis results, including the resulting SFs for the different failure conditions and the estimated seismic deformation.

Section 4. Settlement Analysis

A settlement analysis was performed on the proposed final grade of the landfill. The approximate rate of settlement that had been established for the site is 0.5 foot over 10 years. This settlement value was based on the comparison of topographic maps from 1996 and 2006 (Weston, 2007). Site observations of large hummocks in the cap surface suggest that total settlement in excess of 3 feet has occurred since the time the landfill was closed (1971) and was regraded (1976). Most of the settlement likely occurred during the initial years following the regrading (1976), with the rate of settlement decreasing each year. The purpose of this settlement analysis was to assess the potential for future drainage slope reversal on the cap and to evaluate the potential for damage to landfill gas vents due to settlement.

Based on the findings of the pre-design investigation (see Appendix B of the RD), the native soil generally consists of SM, SW-SM, and SP. A consolidation test was conducted on the native soil to evaluate the consolidation properties of the native material. Due to the low values obtained for both the compression and recompression indices, settlement in the native soil is considered to be minimal and will occur instantaneously. Table D-9 summarizes the consolidation test results.

Because of the heterogeneity of municipal refuse, representative compression and recompression indices are difficult to obtain from grab samples. As a result, the coefficients for primary and secondary consolidation of the refuse were assumed based on previous landfill experience and typical values for municipal waste (Converse Davis Dixon Associates, 1975).

Figures D-10 and D-11 show the typical cross sections along sections E-E' (north-south direction) and F-F' (west-east direction) that were selected to conduct the settlement analysis (see Drawing 6 in Appendix E of the RD for cross section locations). The cross sections represent the critical slopes that need to be maintained in the future. Points were chosen along each cross section for settlement analysis calculations (see Appendix C of the RD). Table D-10 presents the results of the analysis.

The critical design slope of the cap is 6 percent from the highest point in the landfill to the edges. After both primary settlement, which is assumed to occur directly after construction, and secondary settlement, which occurs over the 30-year post closure period, the critical slope will have maintained at least a 3 percent slope. These results indicate that drainage slopes will be maintained over the lifetime of the landfill.

The average rate of settlement was approximately 3 feet over 30 years and was relatively consistent across the cap (ranging from 1.9 feet to 5.4 feet over 30 years) (Table D-10). Due to the limited data

available on the nature of the waste, a detailed differential settlement evaluation was not conducted. However, the relatively consistent settlement rates across the cap indicate differential settlement is not likely to be significant enough to cause damage to the landfill gas system. In addition, the LLDPE liner is designed to account for settlement with tensile properties to accommodate 250 percent elongation prior to breaking in each direction (see Appendix F of the RD). In the unlikely event that significant differential settlement does occur, ongoing maintenance, as described in the Operations, Maintenance, and Monitoring Plan (Appendix H of the RD), will address any needed repairs to the landfill gas system.

Section 5. Summary of Findings

This section summarizes the findings of the geotechnical analyses conducted by ERRG in support of the RD for OU-1. The geotechnical analyses were performed to evaluate the following:

- Slope stability of the borrow material excavation, the multilayer cap, and the final cover under static and seismic loading conditions
- Percolation rates through the landfill cap using the HELP computer modeling program
- Settlement of the landfill cover

Percolation analyses were conducted using the HELP model (EPA, 1994). This model estimates the rate at which water may percolate through the multilayer cap and waste in the landfill. Two multilayer cap configurations were modeled for the 6 percent slopes. The first simulation included a 12-inch-thick sand drainage layer to carry water percolating through the cover soil away from the geomembrane. Modeling results indicated the capacity of the drainage layer was inadequate because the resulting hydraulic head over the liner was higher than the final landfill surface. To resolve this issue, the multilayer cap configuration was modified to replace the drainage sand layer with a geocomposite layer that increases the multilayer cap's capacity to drain water away from the geomembrane along the 6 percent slopes. Modeling results from the second simulation confirmed that inclusion of a geomembrane layer allows for the current multilayer cap configuration to control percolation and the amount of hydraulic head buildup over the geomembrane. Similarly, two configurations were modeled for the 25 percent slope, with and without the 12-inch-thick sand drainage layer. The model results predicted acceptable average hydraulic head in both simulations.

Slope stability analyses were conducted using the XSTABL model (Sharma, 2003). These analyses were performed to determine if the slopes of the aforementioned features, as designed in the RD, could withstand anticipated static and seismic loads without failure. According to the modeling results, the borrow material excavation and the final cover slopes, as designed in the RD, are adequately designed for long-term stability. Analysis of the multilayer cap determined that the drainage sand layer along the 25 percent slopes is necessary to provide sufficient protection against slope failure. Multilayer cap analyses also determined that the geogrid reinforcement included in the RD to protect against damage from OHVs was necessary to minimize excessive seismic deformation on the 25 percent and 6 percent slopes.

A settlement analysis was performed on the proposed final grade of the landfill. The purpose of this settlement analysis was to assess the potential for future drainage slope reversal on the cap and to evaluate

the potential for damage to landfill gas vents due to settlement. Results of the analysis confirmed that the amount of settlement anticipated for the critical slopes will not hinder site drainage or landfill gas collection system over the lifetime of the landfill.

Section 6. References

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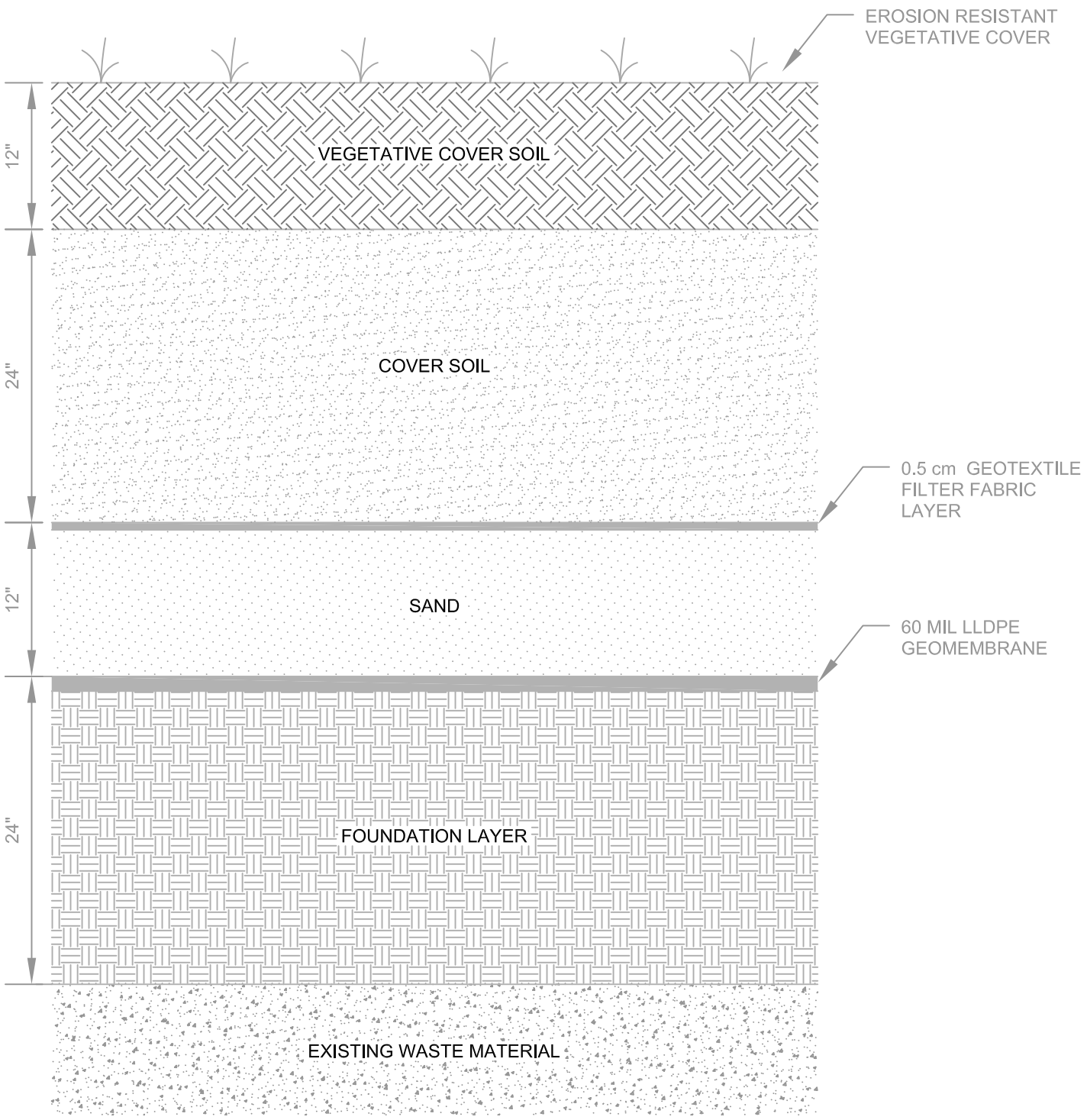
Figures



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CLIENT: FOREST SERVICE	DESIGNED BY: VZC 10/17/08	MULTI LAYER COVER CONFIGURATION HELP MODEL SIMULATION 1				
	CHECKED BY: EB 10/25/08					
LOCATION: MEYERS LANDFILL EL DORADO COUNTY, CA	P.E/P.G.: CG 10/28/08	ERRG PROJECT NO. 28-072	REV. NO. 0	SHEET 1	OF 1	FIGURE D-1

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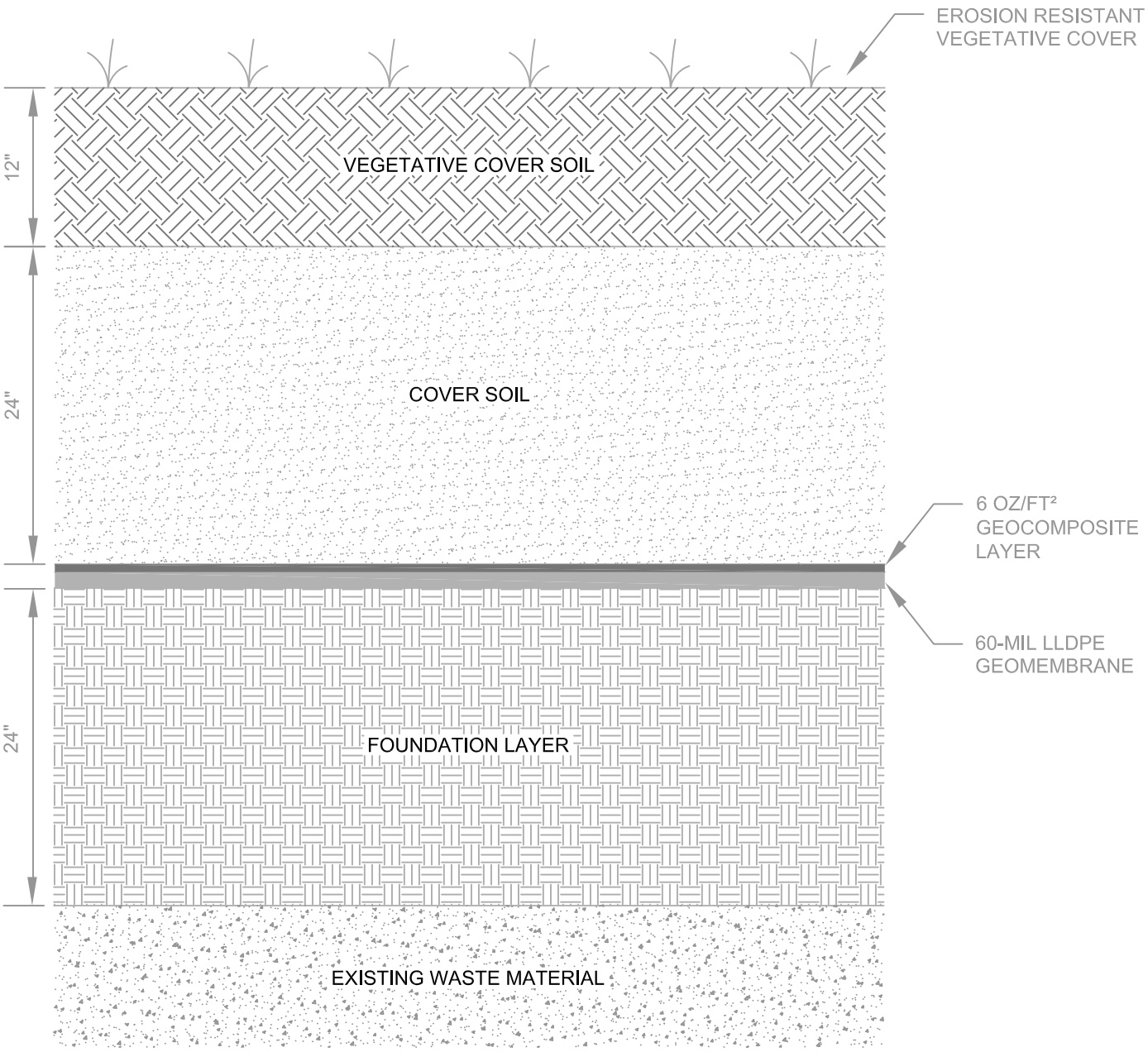

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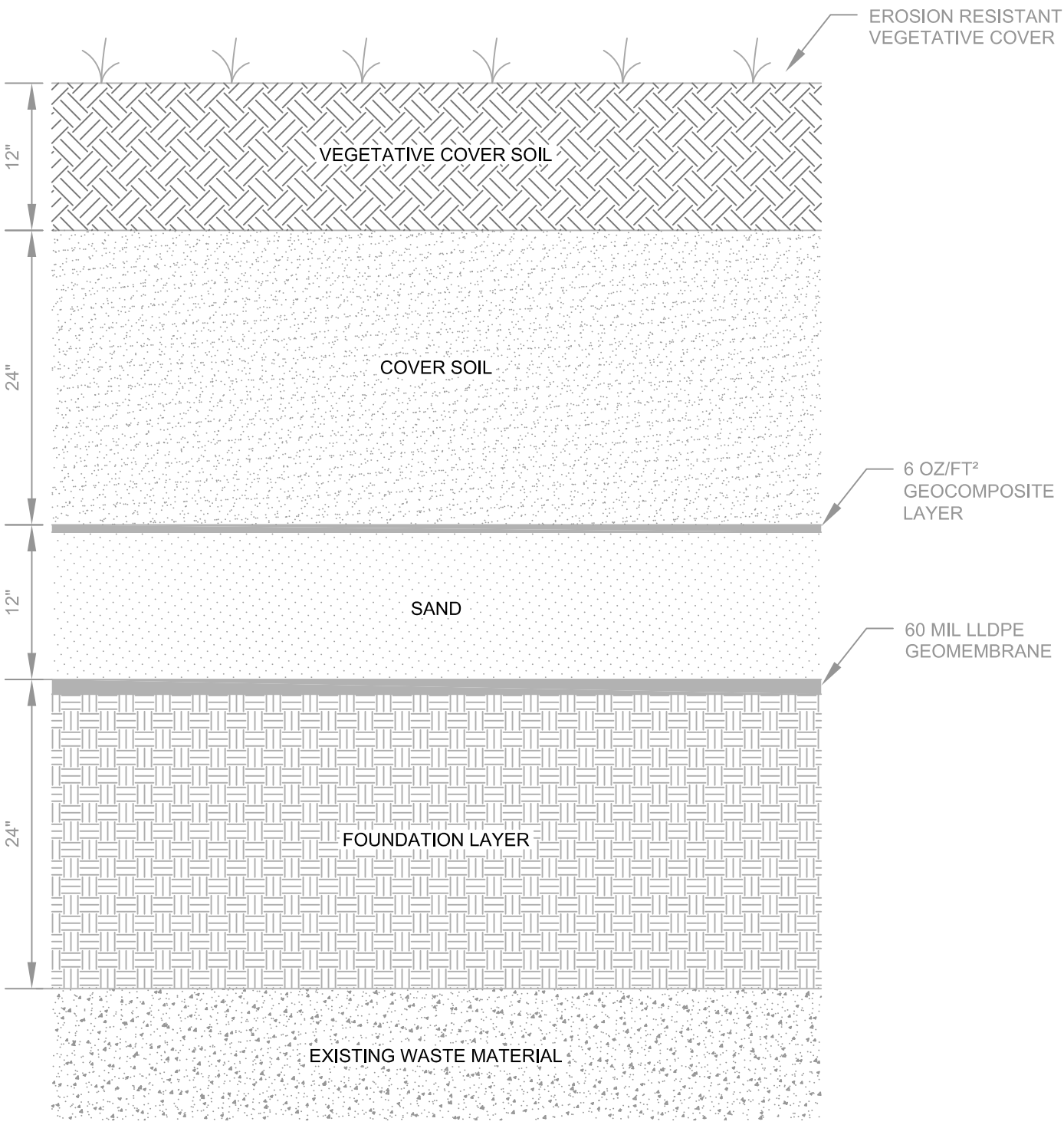
CLIENT: FOREST SERVICE	DESIGNED BY: VZC 12/1/08	MULTILAYER COVER CONFIGURATION HELP MODEL SIMULATION 2 and 4				
	CHECKED BY: EB 12/1/08					
LOCATION: MEYERS LANDFILL EL DORADO COUNTY, CA	P.E/P.G.: CG 12/1/08	ERRG PROJECT NO. 28-072	REV. NO. 0	SHEET 1	OF 1	FIGURE D-2



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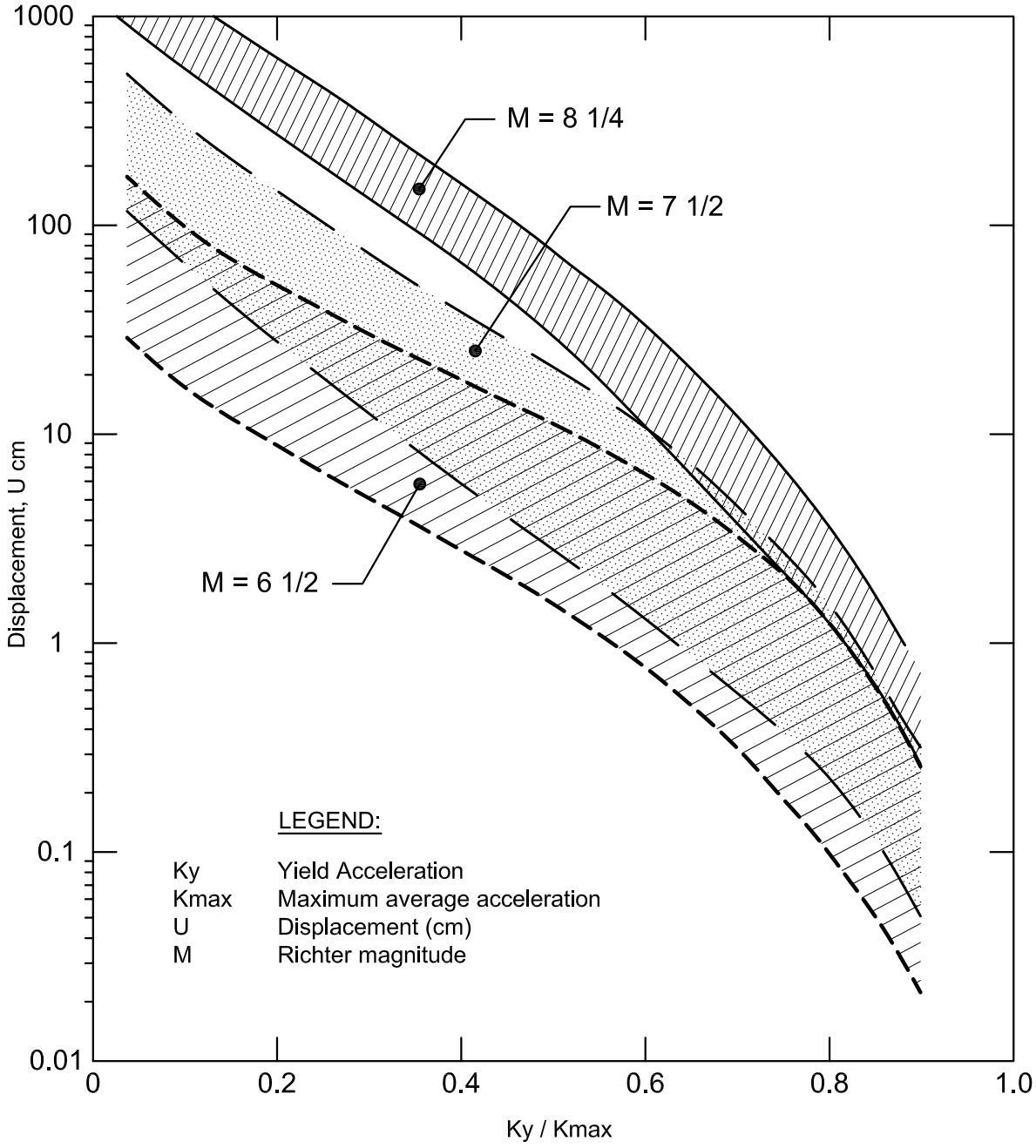
CLIENT: FOREST SERVICE	DESIGNED BY: VZC 10/17/08	MULTI LAYER COVER CONFIGURATION HELP MODEL SIMULATION 3				
	CHECKED BY: EB 10/25/08					
LOCATION: MEYERS LANDFILL EL DORADO COUNTY, CA	P.E/P.G.: CG 10/28/08	ERRG PROJECT NO. 28-072	REV. NO. 0	SHEET 1	OF 1	FIGURE D-3



REFERENCE: Makdisi and Seed, Simplified Procedure for Estimating Dam and Embankment-Induced Deformations, 1977.

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CLIENT: US DEPARTMENT OF AGRICULTURE, FOREST SERVICE	DESIGNED BY: VZC 12/1/08	NEWMARK GRAPH				
	CHECKED BY: EB 12/1/08					
LOCATION: MEYERS LANDFILL EL DORADO COUNTY, CA	P.E/P.G.: DT 12/1/08	ERRG PROJECT NO. 28-072	REVISION NO. -	SHEET 1	OF 1	FIG NO. D-4

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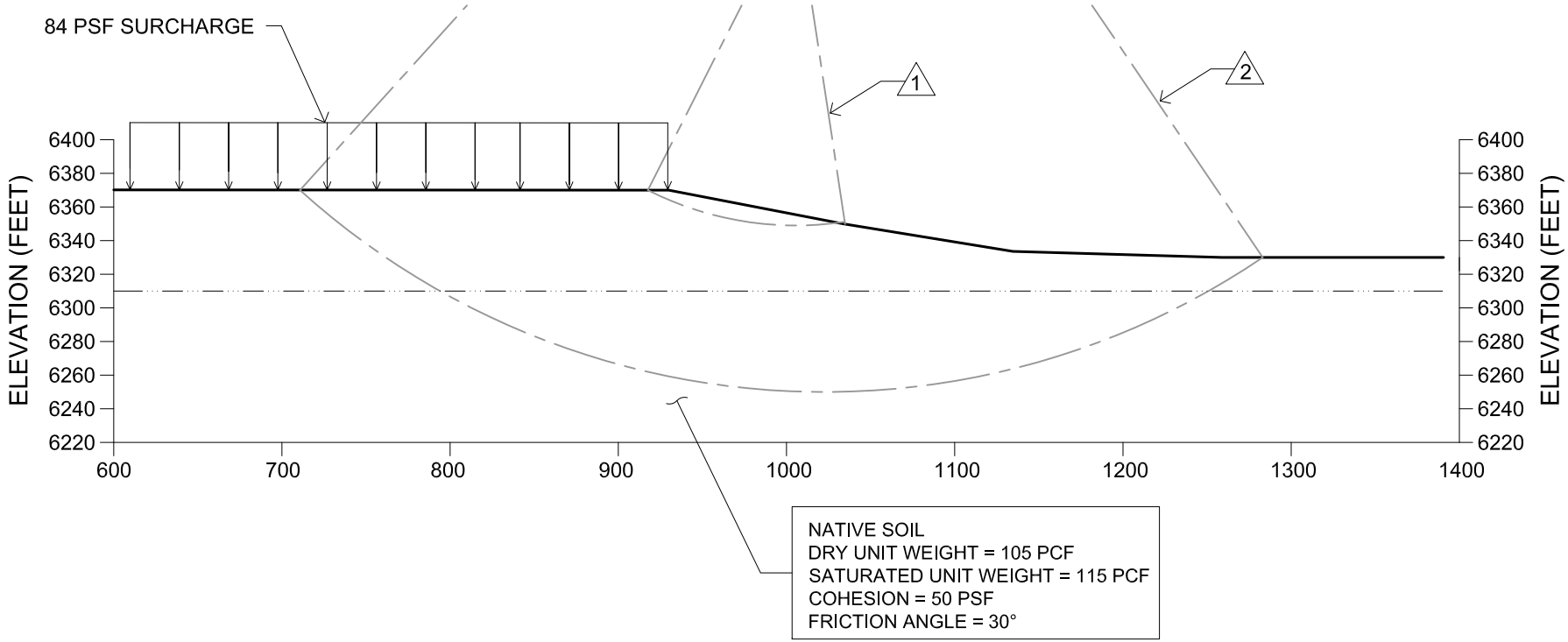
RESULTS OF SLOPE STABILITY ANALYSIS			
FAILURE SURFACE	STATIC FACTOR OF SAFETY	YIELD ACCELERATION	REMARKS
1	3.60	N/A	STATIC CIRCULAR FAILURE
2	NA	0.41g	SEISMIC, CIRCULAR FAILURE

* "g" represents the acceleration of gravity in units of length per time squared (32.2 ft/sec²)

LEGEND:

PCF - POUNDS PER CUBIC FOOT
PSF - POUNDS PER SQUARE FOOT
NA - NOT APPLICABLE



SECTION F-F'

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SCALE IN FEET

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CLIENT: FOREST SERVICE	DESIGNED BY: VZC 10/28/08	BORROW SOURCE EXCAVATION SLOPE STABILITY ANALYSIS			
LOCATION: MEYERS LANDFILL EL DORADO COUNTY, CA	CHECKED BY: EB 10/28/08				
	P.E/P.G.: DKT 10/28/08	ERRG PROJECT NO. 28-072	REVISION NO. -	SHEET 1	OF 1	FIG NO. D-5

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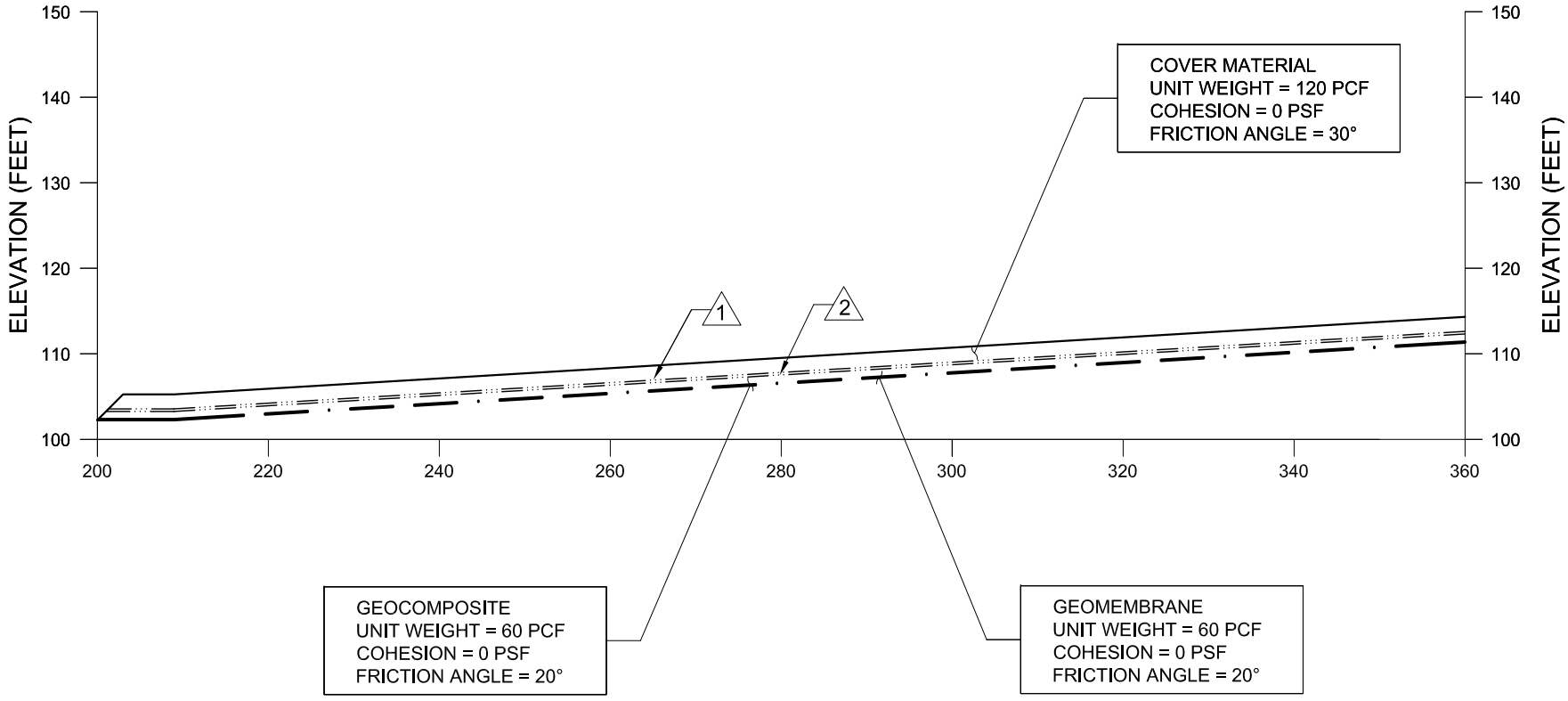
SLOPE STABILITY ANALYSIS CONFIGURATION		
WATER SURFACE	HEIGHT ABOVE GEOMEMBRANE	REMARKS
1	1.3 FEET	PEAK WATER LEVEL
2	1.0 FEET	AVERAGE WATER LEVEL



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MULTILAYER CAP SLOPE
STABILITY ANALYSIS CONFIGURATION
NO DRAINAGE SAND LAYER ON 6% SLOPE

ERRG PROJECT NO.	REVISION NO.	SHEET	OF	FIG NO.
28-072	-	1	1	D-6

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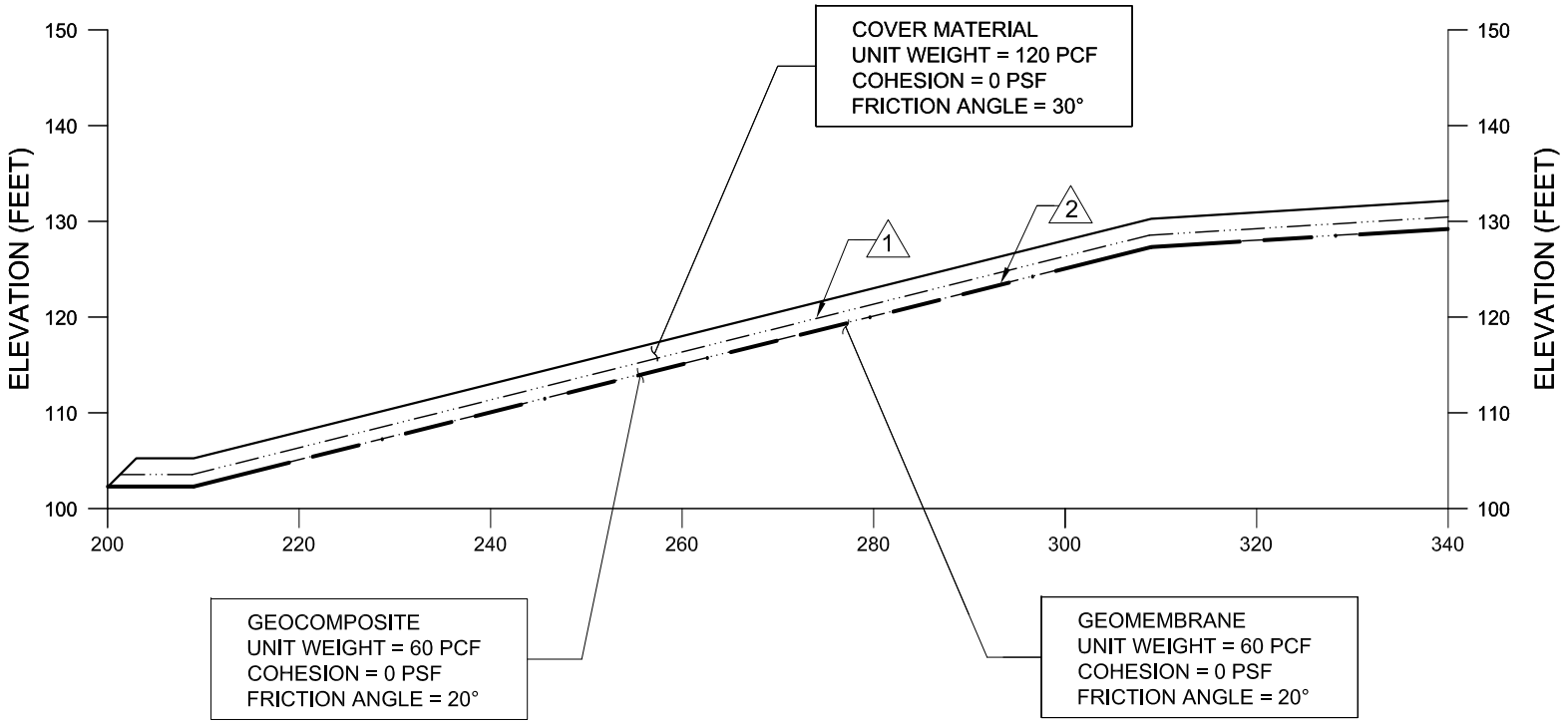
SLOPE STABILITY ANALYSIS CONFIGURATION		
WATER SURFACE	HEIGHT ABOVE GEOMEMBRANE	REMARKS
1	1.3 FEET	PEAK WATER LEVEL
2	0.1 FEET	AVERAGE WATER LEVEL



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CLIENT: FOREST SERVICE	DESIGNED BY: VZC 12/2/08	MULTILAYER CAP SLOPE STABILITY ANALYSIS CONFIGURATION NO DRAINAGE SAND LAYER ON 25% SLOPE				
	CHECKED BY: EB 12/2/08					
LOCATION: MEYERS LANDFILL EL DORADO COUNTY, CA	P.E/P.G.: DKT 12/2/08	ERRG PROJECT NO. 28-072	REVISION NO. -	SHEET 1	OF 1	FIG NO. D-7

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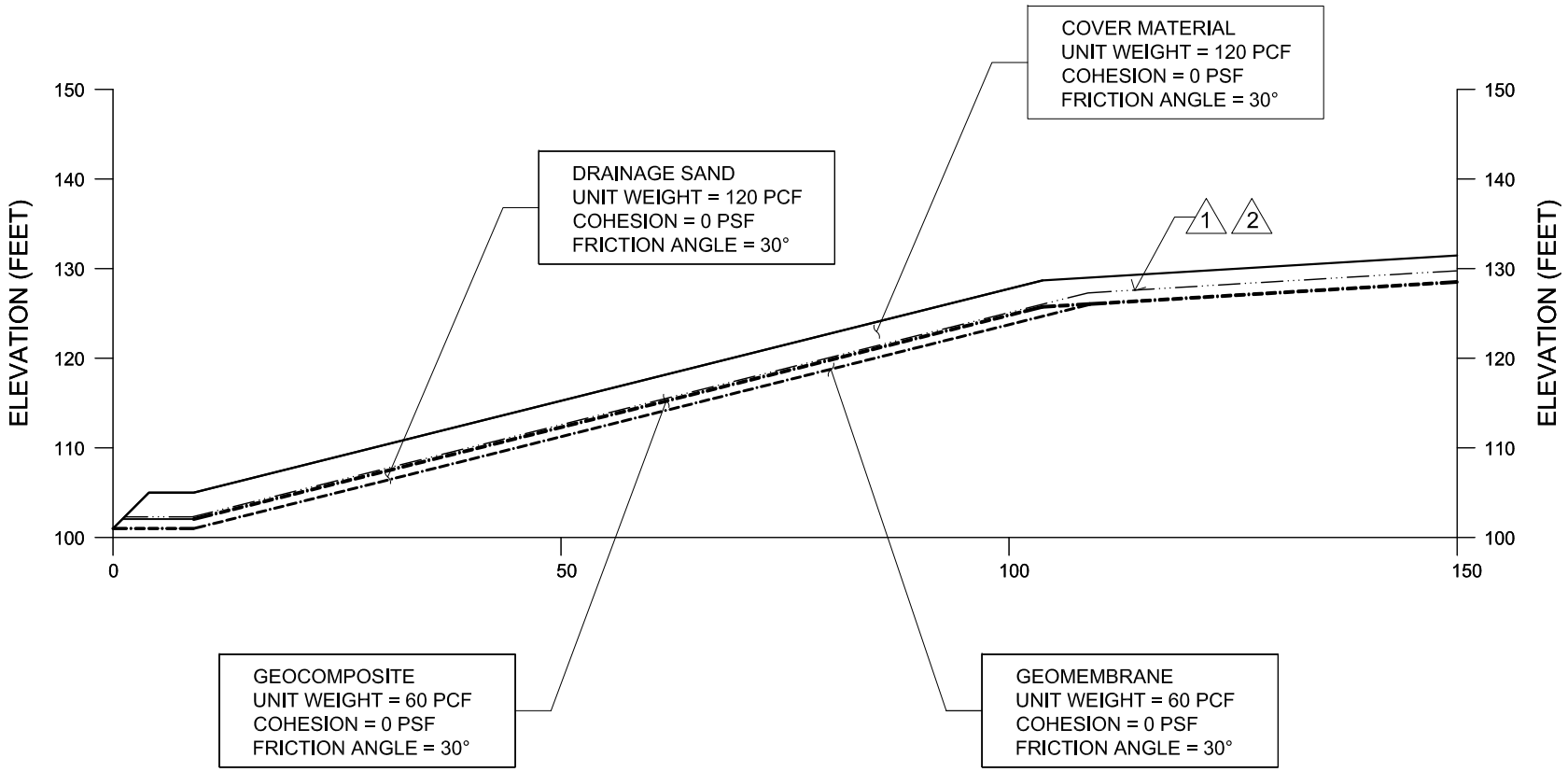
SLOPE STABILITY ANALYSIS CONFIGURATION		
WATER SURFACE	HEIGHT ABOVE GEOMEMBRANE	REMARKS
1	1.3 FEET	PEAK WATER LEVEL
2	1.3 FEET	AVERAGE WATER LEVEL



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SCALE IN FEET

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CLIENT: FOREST SERVICE	DESIGNED BY: VZC 12/2/08	MULTILAYER CAP SLOPE STABILITY ANALYSIS CONFIGURATION WITH DRAINAGE SAND ON 25 PERCENT SLOPE				
	CHECKED BY: EB 12/2/08					
LOCATION: MEYERS LANDFILL EL DORADO COUNTY, CA	P.E/P.G.: DKT 12/2/08	ERRG PROJECT NO. 28-072	REVISION NO. -	SHEET 1	OF 1	FIG NO. D-8

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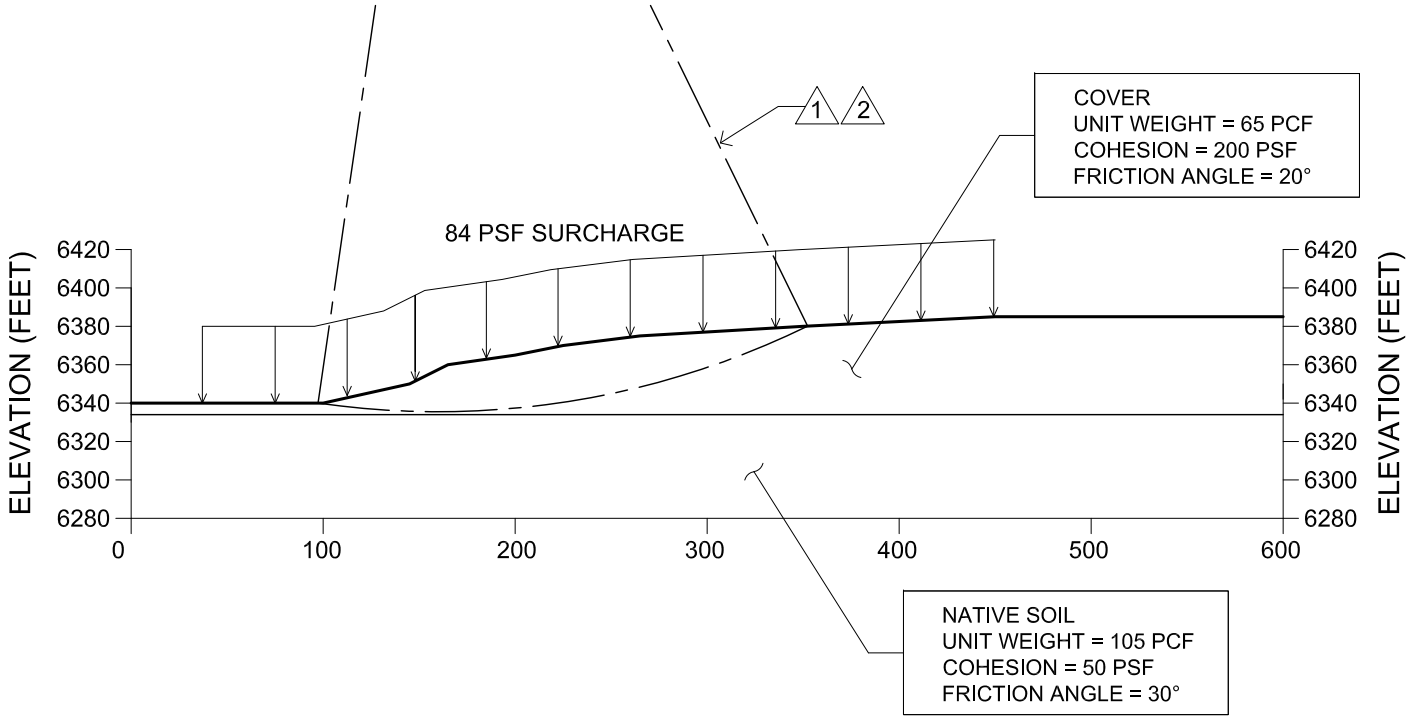
RESULTS OF SLOPE STABILITY ANALYSIS			
FAILURE SURFACE	STATIC FACTOR OF SAFETY	YIELD ACCELERATION	REMARKS
1	3.442	N/A	STATIC CIRCULAR FAILURE
2	NA	0.36g	SEISMIC, CIRCULAR FAILURE

* "g" represents the acceleration due to gravity = 32.2 ft/sec²

LEGEND:

PCF - POUNDS PER CUBIC FOOT
PSF - POUNDS PER SQUARE FOOT
NA - NOT APPLICABLE
ft - FEET
sec - SECONDS



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SCALE IN FEET

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CLIENT: FOREST SERVICE	DESIGNED BY: VZC 10/28/08	FINAL LANDFILL SLOPE STABILITY ANALYSIS			
	CHECKED BY: EB 10/28/08				
LOCATION: MEYERS LANDFILL EL DORADO COUNTY, CA	P.E/P.G.: DKT 10/28/08	ERRG PROJECT NO. 28-072	REVISION NO. -	SHEET 1	OF 1	FIG NO. D-9

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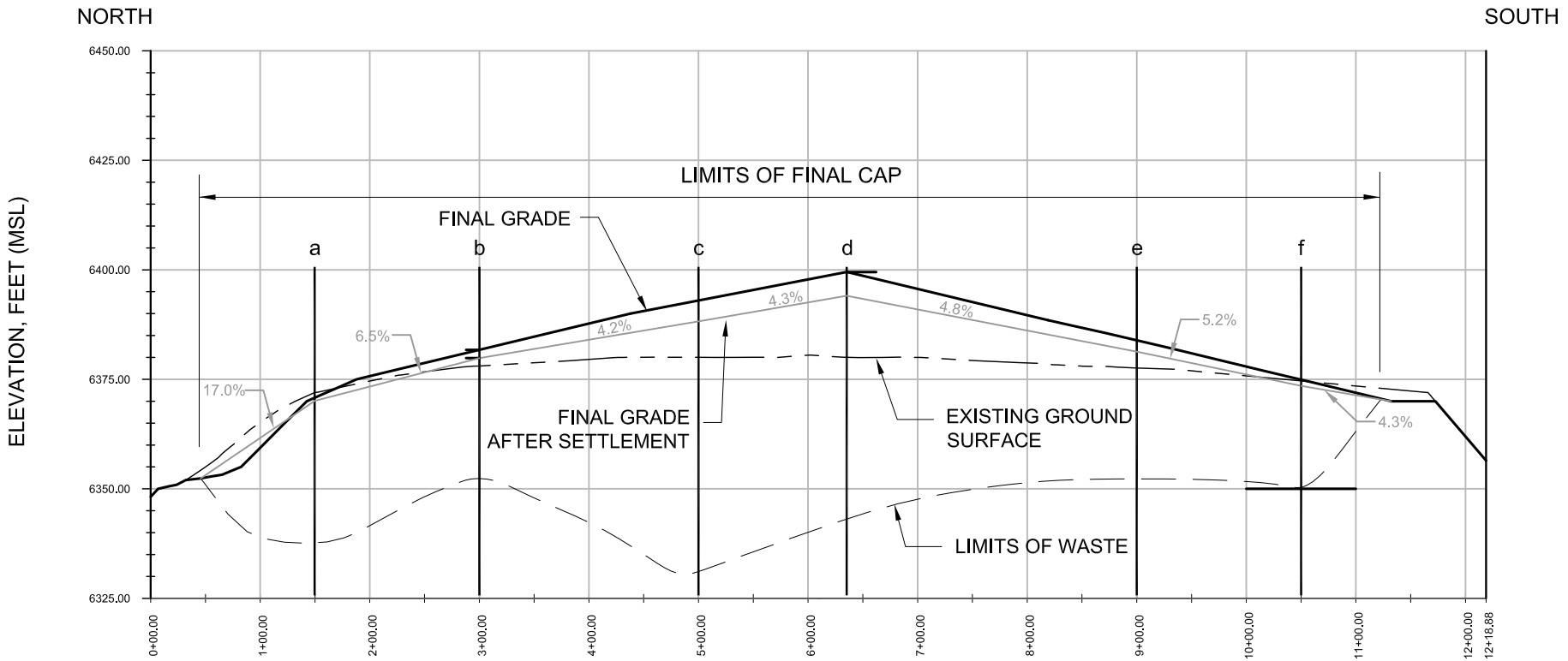
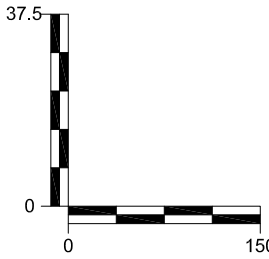


SECTION E-E'

SEE DRAWING 6



APPROXIMATE SCALE IN FEET
VERTICAL EXAGGERATION = 4X

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CLIENT: FOREST SERVICE	DESIGNED BY: RDB 11-24-08	SETTLEMENT ANALYSIS SECTION E-E'				
	CHECKED BY: EB 11-24-08					
LOCATION: MEYERS LANDFILL EL DORADO COUNTY, CA	P.E/P.G.: DT 11-24-08	ERRG PROJECT NO. 28-072	REV. NO. 0	SHEET 1	OF 1	FIG NO. D-10

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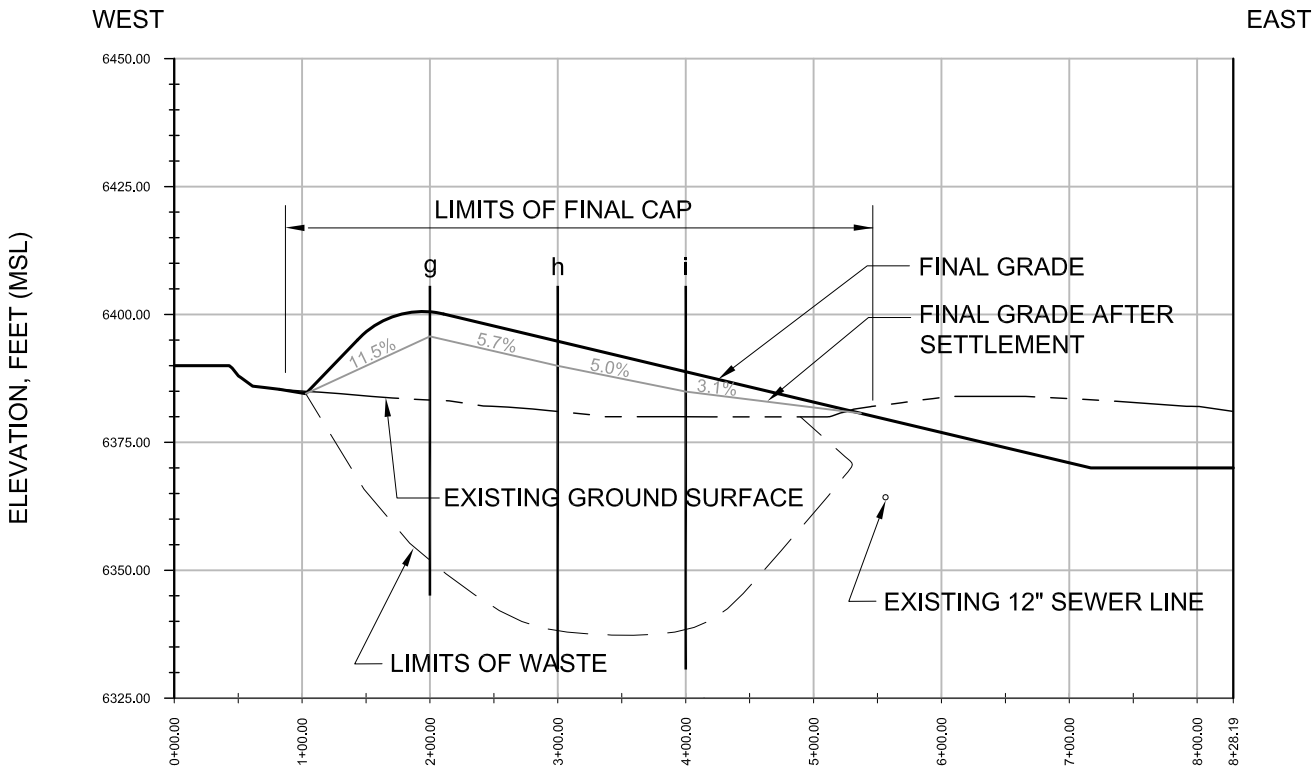
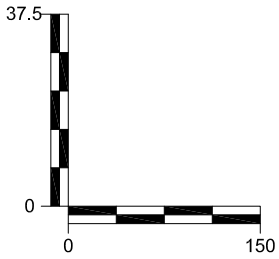


SECTION F-F'
SEE DRAWING 6



APPROXIMATE SCALE IN FEET
VERTICAL EXAGGERATION = 4X

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	CHECKED BY: EB 11-24-08					
LOCATION: MEYERS LANDFILL EL DORADO COUNTY, CA	P.E/P.G.: DT 11-24-08	ERRG PROJECT NO. 28-072	REV. NO. 0	SHEET 1	OF 1	FIG NO. D-11

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Tables

Table D-1. Key Input Parameters for HELP Model Version 3 Computer Simulations

Layer Type/Material	Thickness	Permeability (cm/sec)	Basis/Assumption
Vegetative Soil	12 inches	1.0×10^{-3}	Conservative value; assumption based on laboratory test result
Cover Soil	24 inches	1.0×10^{-3}	Conservative value; assumption based on laboratory test result
Geocomposite	0.2 inches	$1.0 \times 10^{+1}$	Value from HELP Model
Drainage Sand Layer	12 inches	1.0×10^{-3}	Conservative value; assumption based on laboratory test result
LLDPE Liner	0.06 inches	4.0×10^{-13}	Value from HELP Model
Foundation Layer	24 inches	1.0×10^{-3}	Conservative value; assumption based on laboratory test result
Municipal Waste[1]	50 feet	1.0×10^{-3}	Value from HELP Model

Notes:

1. The bottom of the waste has an average depth of approximately 25 feet below grade, with portions reaching depths of up to 50 feet (Weston Solutions, Inc. 2007). A thickness of 50 feet was used to simulate the worst-case scenario.

cm/sec = centimeter per second

HELP = Hydrologic Evaluation of Landfill Performance

LLDPE = linear low-density polyethylene

Table D-2. Summary of HELP Model Results – 1st Simulation

Layer Description	Percolation Rate (gpd per acre)	Percolation Rate (gpd)	Percolation Rate (inches per year)	Average Head Above Layer (inches)	Maximum Head Above Layer (inches)
60-mil LLDPE liner	303	2905	4.1	21.3	59.8
50 feet of refuse	301	2892	4.0	NA	NA

Notes:

gpd = gallons per day

LLDPE = linear low-density polyethylene

NA = not analyzed

Table D-3. Summary of HELP Model Results – 2nd Simulation

Layer Description	Percolation Rate (gpd per acre)	Percolation Rate (gpd)	Percolation Rate (inches per year)	Average Head Above Layer (inches)	Maximum Head Above Layer (inches)
60-mil LLDPE liner	0.5	4.4	0.01	14.9	11.2
50 feet of refuse	0.4	4.0	0.01	NA	NA

Notes:
gpd = gallons per day
LLDPE = linear low-density polyethylene
NA = not analyzed

Table D-4. Summary of HELP Model Results – 3rd Simulation

Layer Description	Average Head Above Layer (inches)
60-mil LLDPE liner	14.2

Note:
LLDPE = linear low-density polyethylene

Table D-5. Summary of HELP Model Results – 4th Simulation

Layer Description	Average Head Above Layer (inches)
60-mil LLDPE liner	0.1

Note:
LLDPE = linear low-density polyethylene

Table D-6. Input Parameters for Stability Analyses

Analyzed Case	Material Type	Thickness (feet)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degree)
Excavation Slope Stability	Native Soil	NA	105	50	30
	Saturated Native Soil	NA	115	50	30
Multilayer Cap System Stability	Cover Material	3	120	0	30
	Geocomposite	0.1	60	0	30
	Drainage Sand	1	120	0	30
	Geomembrane	1	60	0	30
	Geocomposite/ Geomembrane Interface	NA	NA	0	20
Overall Landfill Stability	Refuse	NA	65	200	20
	Native Soil	NA	105	50	30

Notes:
NA = not applicable
pcf = pounds per cubic foot
psf = pounds per square foot

Table D-7. Direct Shear (ASTM D 3080 and 5321B)‡

Sample	Parameter				Description
ML-SB-01V	Normal Stress (psf)	1,000	5,000	9,000	Native Soil
	Peak Shear Strength (psf)	1,208	4,767	8,539	
	Shear Strength at End of Test (psf)	782	3,568	6,063	
	Horizontal Displacement Rate (in/min)	0.02	0.02	0.02	
ML-SB-02D	Normal Stress (psf)	1,000	5,000	9,000	Native Soil
	Peak Shear Strength (psf)	885	4,100	6,439	
	Shear Strength @ End of Test (psf)	885	4,100	6,439	
	Horizontal Displacement Rate (in/min)	0.02	0.02	0.02	
ML-TP-01B/02C[1]	Normal Stress (psf)	500	1,000	2,000	On-site Soil
	Peak Shear Strength (psf)	557	1,048	2,025	
	Shear Strength @ End of Test (psf)	393	729	1,780	
	Horizontal Displacement Rate (in/min)	0.017	0.017	0.017	
ML-TP-01B/02C[1] and GSE Ultraflex 60 mil LLDPE	Normal Stress (psf)	500	1,000	2,000	On-site Soil and Geomembrane
	Peak Shear Strength (psf)	420	820	1,460	
	Shear Strength @ End of Test (psf)	410	740	1,360	
	Horizontal Displacement Rate (in/min)	0.04	0.04	0.04	
ML-TP-01B/02C[1] and GSE PermaNet UL Geocomposite	Normal Stress (psf)	500	1,000	2,000	On-site Soil and Geocomposite
	Peak Shear Strength (psf)	500	850	1,620	
	Shear Strength at End of Test (psf)	490	850	1,620	
	Horizontal Displacement Rate (in/min)	0.04	0.04	0.04	
GSE Ultraflex 60 mil LLDPE and GSE PermaNet UL Geocomposite	Normal Stress (psf)	250	500	1,000	Geomembrane and Geocomposite
	Peak Shear Strength (psf)	200	380	670	
	Shear Strength @ End of Test (psf)	150	260	460	
	Horizontal Displacement Rate (in/min)	0.04	0.04	0.04	

Notes:

1. Specimens prepared at 90 percent of the maximum dry density and at 2 percent above optimum moisture content.

‡ = The tests were performed under a drained condition. Therefore, the strength parameters obtained from direct shear tests represent the long-term effective stress.

psf = pounds per square foot

in/min = inches per minute

Table D-8. Summary of Stability Analysis Results

Analyzed Case	Static Factor of Safety		Yield Acceleration, k_y (g[1])		Average Seismic Deformation[2] (inch)	
	Circular Failure Mode	Block Failure Mode	Circular Failure Mode	Block Failure Mode	Circular Failure Mode	Block Failure Mode
Borrow Source Excavation Slope Stability	3.60	NA	0.41	NA	<1	NA
Multilayer Cap System Stability (25 Percent Slope With Sand) – Dry Soil Conditions	NA	2.53	NA	NA	NA	NA
Multilayer Cap System Stability (25 Percent Slope With Sand) – Peak Water Head, No Snow Loading	NA	1.97	NA	NA	NA	NA
Multilayer Cap System Stability (25 Percent Slope With Sand) – Peak Water Head, Snow Loading	NA	2.08	NA	NA	NA	NA
Multilayer Cap System Stability (25 Percent Slope With Sand) – Average Water Head, No Reinforcement	NA	NA	NA	0.20	NA	8
Multilayer Cap System Stability (25 Percent Slope With Sand) – Average Water Head, Reinforced	NA	NA	NA	0.22	NA	6
Multilayer Cap System Stability (25 Percent Slope No Sand) – Dry Soil Conditions	NA	1.57	NA	NA	NA	NA
Multilayer Cap System Stability (25 Percent Slope No Sand) – Peak Water Head, No Snow Loading	NA	1.40	NA	NA	NA	NA
Multilayer Cap System Stability (25 Percent Slope No Sand) – Average Water Head, No Reinforcement	NA	NA	NA	0.09	NA	30
Multilayer Cap System Stability (25 Percent Slope No Sand) – Average Water Head, Reinforced	NA	NA	NA	0.22	NA	6

Table D-8. Summary of Stability Analysis Results *(continued)*

Analyzed Case	Static Factor of Safety		Yield Acceleration, k_y (g^1)		Average Seismic Deformation[2] (inch)	
	Circular Failure Mode	Block Failure Mode	Circular Failure Mode	Block Failure Mode	Circular Failure Mode	Block Failure Mode
Multilayer Cap System Stability (25 Percent Slope No Sand) – Dry Soil Conditions	NA	6.33	NA	NA	NA	NA
Multilayer Cap System Stability (25 Percent Slope No Sand) – Peak Water Head, No Snow Loading	NA	4.44	NA	NA	NA	NA
Multilayer Cap System Stability (25 Percent Slope No Sand) – Average Water Head, No Reinforcement	NA	NA	NA	0.21	NA	6.5
Multilayer Cap System Stability (25 Percent Slope No Sand) – Average Water Head, Reinforced	NA	NA	NA	0.22	NA	6
Final Landfill Slope Stability	3.44	NA	0.36	NA	4	NA

Notes:

1. g represents the acceleration of gravity in units of length per time squared (32.2 feet per square second).
2. Based on maximum acceleration k_{max} of 0.6 g and earthquake magnitude of 6.0.

NA = not analyzed

Table D-9. Consolidation Test Results (ASTM D1557)

Sample	Preconsolidation Pressure (psf)	Compression Index (Cc)	Recompression Index (Cr)	Soil Description
ML-SB-01D	4,000	0.08	0.0075	Sand

Notes:
psf = pounds per square foot

Table D-10. Estimated Settlement

Section E-E'					Section F-F'				
Point ID	Thickness of Refuse (feet)	Primary Settlement (feet)	Secondary Settlement (feet)	Total Settlement (feet)	Point ID	Thickness of Refuse (feet)	Primary Settlement (inches)	Secondary Settlement (inches)	Total Settlement (inches)
a	33	0.6	1.3	1.9	g	48.5	2.5	2.3	4.8
b	29	0.9	1.0	1.9	h	56.6	2.4	2.4	4.8
c	62	2.4	2.6	5.0	I	50.4	1.9	2.0	3.9
d	56	2.7	2.7	5.4					
e	32	1.4	1.2	2.6					
f	25	0.6	0.9	1.5					

Notes: Point IDs correspond to analysis locations on Figure D-10 and D-11.
1. Rounded value; actual value presented in Appendix C.

Attachment D1. HELP Output

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**********************************************************************************
**********************************************************************************
**                                                                              **
**                                                                              **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE                   **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                    **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                       **
**                    USAE WATERWAYS EXPERIMENT STATION                         **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY                  **
**                                                                              **
**                                                                              **
**********************************************************************************
**********************************************************************************


 PRECIPITATION DATA FILE:    C:\HELP\USER\DATAML.D4
 TEMPERATURE DATA FILE:      C:\HELP\USER\DATAML.D7
 SOLAR RADIATION DATA FILE:  C:\HELP\USER\DATAML.D13
 EVAPOTRANSPIRATION DATA:    C:\HELP\USER\DATAML.D11
 SOIL AND DESIGN DATA FILE:  C:\HELP\USER\DATAML-3.D10
 OUTPUT DATA FILE:           C:\HELP\USER\ML-3.OUT


 TIME:  13:59     DATE:  10/22/2008


 **********************************************************************************

      TITLE:  Meyers Landfill

 **********************************************************************************


      NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
               COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                    LAYER  1
                                    --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   5
            THICKNESS                    =     12.00   INCHES
            POROSITY                     =      0.4570 VOL/VOL
            FIELD CAPACITY               =      0.1310 VOL/VOL
            WILTING POINT                =      0.0580 VOL/VOL
            INITIAL SOIL WATER CONTENT   =      0.4570 VOL/VOL
            EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC
          NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  2.01
                   FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.



                                    LAYER  2
                                    --------

                     TYPE 1 - VERTICAL PERCOLATION LAYER
                         MATERIAL TEXTURE NUMBER   5
            THICKNESS                    =     24.00   INCHES
            POROSITY                     =      0.4570 VOL/VOL
            FIELD CAPACITY               =      0.1310 VOL/VOL
            WILTING POINT                =      0.0580 VOL/VOL
            INITIAL SOIL WATER CONTENT   =      0.2220 VOL/VOL
            EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC
```

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 5

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4570	VOL/VOL
FIELD CAPACITY	=	0.1310	VOL/VOL
WILTING POINT	=	0.0580	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3499	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC
SLOPE	=	6.00	PERCENT
DRAINAGE LENGTH	=	200.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	2.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	4 - POOR	

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 5

THICKNESS	=	24.00	INCHES
POROSITY	=	0.4570	VOL/VOL
FIELD CAPACITY	=	0.1310	VOL/VOL
WILTING POINT	=	0.0580	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1873	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 6

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	600.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2919	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 5 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 6.% AND A SLOPE LENGTH OF 200. FEET.

SCS RUNOFF CURVE NUMBER	=	78.20	
FRACTION OF AREA ALLOWING RUNOFF	=	70.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	9.600	ACRES
EVAPORATIVE ZONE DEPTH	=	18.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	7.013	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	8.226	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.044	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	194.676	INCHES
TOTAL INITIAL WATER	=	194.676	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM RENO NEVADA

STATION LATITUDE	=	38.50 DEGREES
MAXIMUM LEAF AREA INDEX	=	1.20
START OF GROWING SEASON (JULIAN DATE)	=	129
END OF GROWING SEASON (JULIAN DATE)	=	281
EVAPORATIVE ZONE DEPTH	=	18.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	6.40 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	60.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	43.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	40.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	59.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR RENO NEVADA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
7.81	6.09	4.52	3.52	1.78	1.07
0.33	0.98	0.78	2.64	5.74	7.11

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR RENO NEVADA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
32.20	37.40	40.60	46.40	54.60	62.40
69.50	66.90	60.20	50.30	39.70	32.50

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR RENO NEVADA AND STATION LATITUDE = 38.53 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	30.56	1064955.000	100.00
RUNOFF	3.834	133592.922	12.54
EVAPOTRANSPIRATION	10.082	351331.937	32.99
DRAINAGE COLLECTED FROM LAYER 3	12.2198	425835.469	39.99
PERC./LEAKAGE THROUGH LAYER 4	3.779792	131718.187	12.37
AVG. HEAD ON TOP OF LAYER 4	19.8032		
PERC./LEAKAGE THROUGH LAYER 6	3.671310	127937.820	12.01
CHANGE IN WATER STORAGE	0.753	26256.707	2.47
SOIL WATER AT START OF YEAR	196.248	6838857.500	
SOIL WATER AT END OF YEAR	197.002	6865114.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.191	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	56.20	1958457.750	100.00
RUNOFF	13.328	464469.844	23.72
EVAPOTRANSPIRATION	15.379	535942.062	27.37
DRAINAGE COLLECTED FROM LAYER 3	10.7234	373687.625	19.08
PERC./LEAKAGE THROUGH LAYER 4	3.357107	116988.469	5.97
AVG. HEAD ON TOP OF LAYER 4	17.2725		
PERC./LEAKAGE THROUGH LAYER 6	3.352929	116842.875	5.97
CHANGE IN WATER STORAGE	13.416	467516.219	23.87
SOIL WATER AT START OF YEAR	197.002	6865114.000	
SOIL WATER AT END OF YEAR	193.017	6726250.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	17.401	606380.250	30.96
ANNUAL WATER BUDGET BALANCE	0.0000	-0.864	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.62	1659461.750	100.00
RUNOFF	21.769	758618.062	45.71
EVAPOTRANSPIRATION	11.801	411226.281	24.78
DRAINAGE COLLECTED FROM LAYER 3	13.9666	486708.437	29.33
PERC./LEAKAGE THROUGH LAYER 4	4.133094	144030.062	8.68
AVG. HEAD ON TOP OF LAYER 4	21.6051		
PERC./LEAKAGE THROUGH LAYER 6	4.133138	144031.594	8.68
CHANGE IN WATER STORAGE	-4.050	-141122.625	-8.50
SOIL WATER AT START OF YEAR	193.017	6726250.000	
SOIL WATER AT END OF YEAR	190.749	6647229.500	
SNOW WATER AT START OF YEAR	17.401	606380.250	36.54
SNOW WATER AT END OF YEAR	15.619	544278.187	32.80
ANNUAL WATER BUDGET BALANCE	0.0000	0.100	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.51	1376844.750	100.00
RUNOFF	24.990	870856.812	63.25
EVAPOTRANSPIRATION	8.967	312466.781	22.69
DRAINAGE COLLECTED FROM LAYER 3	10.7105	373238.437	27.11
PERC./LEAKAGE THROUGH LAYER 4	3.351815	116804.047	8.48
AVG. HEAD ON TOP OF LAYER 4	17.2337		
PERC./LEAKAGE THROUGH LAYER 6	3.159314	110095.781	8.00
CHANGE IN WATER STORAGE	-8.316	-289813.375	-21.05
SOIL WATER AT START OF YEAR	190.749	6647229.500	
SOIL WATER AT END OF YEAR	195.562	6814954.500	
SNOW WATER AT START OF YEAR	15.619	544278.187	39.53
SNOW WATER AT END OF YEAR	2.489	86740.187	6.30
ANNUAL WATER BUDGET BALANCE	0.0000	0.291	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.65	1521115.120	100.00
RUNOFF	10.254	357348.531	23.49
EVAPOTRANSPIRATION	16.430	572537.000	37.64
DRAINAGE COLLECTED FROM LAYER 3	12.0397	419558.875	27.58
PERC./LEAKAGE THROUGH LAYER 4	3.723780	129766.281	8.53
AVG. HEAD ON TOP OF LAYER 4	19.4530		
PERC./LEAKAGE THROUGH LAYER 6	3.414352	118983.344	7.82
CHANGE IN WATER STORAGE	1.512	52687.980	3.46
SOIL WATER AT START OF YEAR	195.562	6814954.500	
SOIL WATER AT END OF YEAR	199.563	6954382.500	
SNOW WATER AT START OF YEAR	2.489	86740.187	5.70
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.507	0.00

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ANNUAL TOTALS FOR YEAR 6

	INCHES	CU. FEET	PERCENT
PRECIPITATION	29.32	1021743.500	100.00
RUNOFF	6.504	226657.234	22.18
EVAPOTRANSPIRATION	13.667	476270.625	46.61
DRAINAGE COLLECTED FROM LAYER 3	12.7530	444415.156	43.50
PERC./LEAKAGE THROUGH LAYER 4	3.919194	136576.078	13.37
AVG. HEAD ON TOP OF LAYER 4	20.5812		
PERC./LEAKAGE THROUGH LAYER 6	4.468287	155710.891	15.24
CHANGE IN WATER STORAGE	-8.073	-281310.781	-27.53
SOIL WATER AT START OF YEAR	199.563	6954382.500	
SOIL WATER AT END OF YEAR	190.686	6645034.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.805	28037.561	2.74
ANNUAL WATER BUDGET BALANCE	0.0000	0.415	0.00

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ANNUAL TOTALS FOR YEAR 7

	INCHES	CU. FEET	PERCENT
PRECIPITATION	42.21	1470933.870	100.00
RUNOFF	2.595	90440.000	6.15
EVAPOTRANSPIRATION	12.461	434240.656	29.52
DRAINAGE COLLECTED FROM LAYER 3	12.3269	429566.844	29.20
PERC./LEAKAGE THROUGH LAYER 4	3.804723	132586.984	9.01
AVG. HEAD ON TOP OF LAYER 4	19.7920		
PERC./LEAKAGE THROUGH LAYER 6	3.615195	125982.312	8.56
CHANGE IN WATER STORAGE	11.212	390704.250	26.56
SOIL WATER AT START OF YEAR	190.686	6645034.000	
SOIL WATER AT END OF YEAR	195.875	6825845.000	
SNOW WATER AT START OF YEAR	0.805	28037.561	1.91
SNOW WATER AT END OF YEAR	6.828	237931.094	16.18
ANNUAL WATER BUDGET BALANCE	0.0000	-0.166	0.00

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ANNUAL TOTALS FOR YEAR 8

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.52	1307497.370	100.00
RUNOFF	6.563	228705.328	17.49
EVAPOTRANSPIRATION	12.746	444170.344	33.97
DRAINAGE COLLECTED FROM LAYER 3	17.0313	593506.937	45.39
PERC./LEAKAGE THROUGH LAYER 4	4.978428	173488.266	13.27
AVG. HEAD ON TOP OF LAYER 4	26.4394		
PERC./LEAKAGE THROUGH LAYER 6	4.887107	170305.922	13.03
CHANGE IN WATER STORAGE	-3.707	-129191.898	-9.88
SOIL WATER AT START OF YEAR	195.875	6825845.000	
SOIL WATER AT END OF YEAR	196.965	6863827.000	
SNOW WATER AT START OF YEAR	6.828	237931.094	18.20
SNOW WATER AT END OF YEAR	2.030	70757.133	5.41
ANNUAL WATER BUDGET BALANCE	0.0000	0.781	0.00

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ANNUAL TOTALS FOR YEAR 9

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.01	1498812.370	100.00
RUNOFF	8.253	287593.187	19.19
EVAPOTRANSPIRATION	16.771	584439.375	38.99
DRAINAGE COLLECTED FROM LAYER 3	17.3878	605929.750	40.43
PERC./LEAKAGE THROUGH LAYER 4	5.106197	177940.766	11.87
AVG. HEAD ON TOP OF LAYER 4	27.2734		
PERC./LEAKAGE THROUGH LAYER 6	4.997171	174141.437	11.62
CHANGE IN WATER STORAGE	-4.399	-153290.891	-10.23
SOIL WATER AT START OF YEAR	196.965	6863827.000	
SOIL WATER AT END OF YEAR	194.596	6781293.000	
SNOW WATER AT START OF YEAR	2.030	70757.133	4.72
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.499	0.00

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ANNUAL TOTALS FOR YEAR 10

	INCHES	CU. FEET	PERCENT
PRECIPITATION	34.64	1207134.870	100.00
RUNOFF	12.210	425484.531	35.25
EVAPOTRANSPIRATION	10.143	353450.344	29.28
DRAINAGE COLLECTED FROM LAYER 3	11.6522	406054.219	33.64
PERC./LEAKAGE THROUGH LAYER 4	3.606456	125677.773	10.41
AVG. HEAD ON TOP OF LAYER 4	18.8217		
PERC./LEAKAGE THROUGH LAYER 6	3.982519	138782.812	11.50
CHANGE IN WATER STORAGE	-3.347	-116636.797	-9.66
SOIL WATER AT START OF YEAR	194.596	6781293.000	
SOIL WATER AT END OF YEAR	191.249	6664656.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.216	0.00

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ANNUAL TOTALS FOR YEAR 11

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51.59	1797808.370	100.00
RUNOFF	10.727	373823.531	20.79
EVAPOTRANSPIRATION	13.282	462857.375	25.75
DRAINAGE COLLECTED FROM LAYER 3	13.7621	479581.500	26.68
PERC./LEAKAGE THROUGH LAYER 4	4.177787	145587.516	8.10
AVG. HEAD ON TOP OF LAYER 4	21.8863		
PERC./LEAKAGE THROUGH LAYER 6	3.649637	127182.539	7.07
CHANGE IN WATER STORAGE	10.169	354364.312	19.71
SOIL WATER AT START OF YEAR	191.249	6664656.500	
SOIL WATER AT END OF YEAR	199.288	6944793.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	2.130	74227.016	4.13
ANNUAL WATER BUDGET BALANCE	0.0000	-0.806	0.00

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ANNUAL TOTALS FOR YEAR 12

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.38	1511706.250	100.00
RUNOFF	11.797	411116.312	27.20
EVAPOTRANSPIRATION	12.979	452301.594	29.92
DRAINAGE COLLECTED FROM LAYER 3	15.8015	550651.937	36.43
PERC./LEAKAGE THROUGH LAYER 4	4.736912	165071.922	10.92
AVG. HEAD ON TOP OF LAYER 4	25.0826		
PERC./LEAKAGE THROUGH LAYER 6	4.930160	171806.219	11.37
CHANGE IN WATER STORAGE	-2.128	-74170.680	-4.91
SOIL WATER AT START OF YEAR	199.288	6944793.500	
SOIL WATER AT END OF YEAR	194.448	6776113.000	
SNOW WATER AT START OF YEAR	2.130	74227.016	4.91
SNOW WATER AT END OF YEAR	4.842	168737.016	11.16
ANNUAL WATER BUDGET BALANCE	0.0000	0.847	0.00

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ANNUAL TOTALS FOR YEAR 13

	INCHES	CU. FEET	PERCENT
PRECIPITATION	32.84	1144408.370	100.00
RUNOFF	8.967	312466.031	27.30
EVAPOTRANSPIRATION	12.232	426251.594	37.25
DRAINAGE COLLECTED FROM LAYER 3	11.1390	388170.437	33.92
PERC./LEAKAGE THROUGH LAYER 4	3.467767	120844.758	10.56
AVG. HEAD ON TOP OF LAYER 4	17.9987		
PERC./LEAKAGE THROUGH LAYER 6	3.837437	133727.000	11.69
CHANGE IN WATER STORAGE	-3.335	-116206.578	-10.15
SOIL WATER AT START OF YEAR	194.448	6776113.000	
SOIL WATER AT END OF YEAR	191.796	6683721.500	
SNOW WATER AT START OF YEAR	4.842	168737.016	14.74
SNOW WATER AT END OF YEAR	4.159	144922.109	12.66
ANNUAL WATER BUDGET BALANCE	0.0000	-0.091	0.00

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ANNUAL TOTALS FOR YEAR 14

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.45	1339905.870	100.00
RUNOFF	5.254	183092.641	13.66
EVAPOTRANSPIRATION	13.274	462563.687	34.52
DRAINAGE COLLECTED FROM LAYER 3	7.2386	252251.844	18.83
PERC./LEAKAGE THROUGH LAYER 4	2.368028	82521.039	6.16
AVG. HEAD ON TOP OF LAYER 4	11.6829		
PERC./LEAKAGE THROUGH LAYER 6	2.278318	79394.820	5.93
CHANGE IN WATER STORAGE	10.405	362602.937	27.06
SOIL WATER AT START OF YEAR	191.796	6683721.500	
SOIL WATER AT END OF YEAR	197.008	6865333.000	
SNOW WATER AT START OF YEAR	4.159	144922.109	10.82
SNOW WATER AT END OF YEAR	9.352	325913.562	24.32
ANNUAL WATER BUDGET BALANCE	0.0000	-0.091	0.00

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ANNUAL TOTALS FOR YEAR 15

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.50	1341648.120	100.00
RUNOFF	21.203	738874.125	55.07
EVAPOTRANSPIRATION	10.856	378315.187	28.20
DRAINAGE COLLECTED FROM LAYER 3	13.2159	460546.000	34.33
PERC./LEAKAGE THROUGH LAYER 4	3.999727	139382.516	10.39
AVG. HEAD ON TOP OF LAYER 4	20.9292		
PERC./LEAKAGE THROUGH LAYER 6	3.849018	134130.578	10.00
CHANGE IN WATER STORAGE	-10.624	-370218.000	-27.59
SOIL WATER AT START OF YEAR	197.008	6865333.000	
SOIL WATER AT END OF YEAR	195.737	6821028.500	
SNOW WATER AT START OF YEAR	9.352	325913.562	24.29
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.316	0.00

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ANNUAL TOTALS FOR YEAR 16

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.66	1730551.620	100.00
RUNOFF	6.601	230047.281	13.29
EVAPOTRANSPIRATION	14.324	499173.562	28.84
DRAINAGE COLLECTED FROM LAYER 3	11.8931	414450.312	23.95
PERC./LEAKAGE THROUGH LAYER 4	3.687651	128507.266	7.43
AVG. HEAD ON TOP OF LAYER 4	19.1557		
PERC./LEAKAGE THROUGH LAYER 6	3.789759	132065.531	7.63
CHANGE IN WATER STORAGE	13.051	454814.781	26.28
SOIL WATER AT START OF YEAR	195.737	6821028.500	
SOIL WATER AT END OF YEAR	193.223	6733443.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	15.565	542399.562	31.34
ANNUAL WATER BUDGET BALANCE	0.0000	0.158	0.00

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ANNUAL TOTALS FOR YEAR 17

	INCHES	CU. FEET	PERCENT
PRECIPITATION	23.33	813003.937	100.00
RUNOFF	8.989	313232.656	38.53
EVAPOTRANSPIRATION	10.516	366455.531	45.07
DRAINAGE COLLECTED FROM LAYER 3	12.4217	432870.906	53.24
PERC./LEAKAGE THROUGH LAYER 4	3.813515	132893.359	16.35
AVG. HEAD ON TOP OF LAYER 4	19.9461		
PERC./LEAKAGE THROUGH LAYER 6	3.934028	137093.031	16.86
CHANGE IN WATER STORAGE	-12.530	-436648.500	-53.71
SOIL WATER AT START OF YEAR	193.223	6733443.500	
SOIL WATER AT END OF YEAR	192.305	6701456.500	
SNOW WATER AT START OF YEAR	15.565	542399.562	66.72
SNOW WATER AT END OF YEAR	3.953	137738.312	16.94
ANNUAL WATER BUDGET BALANCE	0.0000	0.299	0.00

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ANNUAL TOTALS FOR YEAR 18

	INCHES	CU. FEET	PERCENT
PRECIPITATION	31.28	1090045.750	100.00
RUNOFF	6.375	222163.187	20.38
EVAPOTRANSPIRATION	12.549	437297.469	40.12
DRAINAGE COLLECTED FROM LAYER 3	9.4850	330533.281	30.32
PERC./LEAKAGE THROUGH LAYER 4	3.005314	104729.172	9.61
AVG. HEAD ON TOP OF LAYER 4	15.2948		
PERC./LEAKAGE THROUGH LAYER 6	2.704614	94250.406	8.65
CHANGE IN WATER STORAGE	0.166	5801.257	0.53
SOIL WATER AT START OF YEAR	192.305	6701456.500	
SOIL WATER AT END OF YEAR	196.424	6844996.000	
SNOW WATER AT START OF YEAR	3.953	137738.312	12.64
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.116	0.00

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ANNUAL TOTALS FOR YEAR 19

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.47	1549690.750	100.00
RUNOFF	7.996	278629.219	17.98
EVAPOTRANSPIRATION	10.815	376893.000	24.32
DRAINAGE COLLECTED FROM LAYER 3	13.5808	473264.687	30.54
PERC./LEAKAGE THROUGH LAYER 4	4.161589	145023.062	9.36
AVG. HEAD ON TOP OF LAYER 4	21.9668		
PERC./LEAKAGE THROUGH LAYER 6	3.920448	136619.781	8.82
CHANGE IN WATER STORAGE	8.158	284284.219	18.34
SOIL WATER AT START OF YEAR	196.424	6844996.000	
SOIL WATER AT END OF YEAR	200.331	6981147.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	4.251	148133.156	9.56
ANNUAL WATER BUDGET BALANCE	0.0000	-0.100	0.00

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ANNUAL TOTALS FOR YEAR 20

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.22	1297042.620	100.00
RUNOFF	13.542	471894.562	36.38
EVAPOTRANSPIRATION	12.869	448464.125	34.58
DRAINAGE COLLECTED FROM LAYER 3	16.0726	560096.375	43.18
PERC./LEAKAGE THROUGH LAYER 4	4.696963	163679.781	12.62
AVG. HEAD ON TOP OF LAYER 4	24.7976		
PERC./LEAKAGE THROUGH LAYER 6	4.999394	174218.891	13.43
CHANGE IN WATER STORAGE	-10.263	-357631.687	-27.57
SOIL WATER AT START OF YEAR	200.331	6981147.000	
SOIL WATER AT END OF YEAR	194.320	6771648.500	
SNOW WATER AT START OF YEAR	4.251	148133.156	11.42
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.415	0.00

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ANNUAL TOTALS FOR YEAR 21

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.69	1696749.120	100.00
RUNOFF	3.369	117389.508	6.92
EVAPOTRANSPIRATION	13.970	486813.156	28.69
DRAINAGE COLLECTED FROM LAYER 3	15.2945	532982.875	31.41
PERC./LEAKAGE THROUGH LAYER 4	4.574442	159410.156	9.40
AVG. HEAD ON TOP OF LAYER 4	24.2447		
PERC./LEAKAGE THROUGH LAYER 6	4.625993	161206.625	9.50
CHANGE IN WATER STORAGE	11.431	398357.344	23.48
SOIL WATER AT START OF YEAR	194.320	6771648.500	
SOIL WATER AT END OF YEAR	201.427	7019342.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	4.323	150663.547	8.88
ANNUAL WATER BUDGET BALANCE	0.0000	-0.366	0.00

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ANNUAL TOTALS FOR YEAR 22

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.60	1623917.000	100.00
RUNOFF	7.244	252435.344	15.54
EVAPOTRANSPIRATION	14.465	504092.187	31.04
DRAINAGE COLLECTED FROM LAYER 3	18.8375	656447.562	40.42
PERC./LEAKAGE THROUGH LAYER 4	5.426657	189108.141	11.65
AVG. HEAD ON TOP OF LAYER 4	29.0450		
PERC./LEAKAGE THROUGH LAYER 6	5.065909	176536.812	10.87
CHANGE IN WATER STORAGE	0.987	34404.582	2.12
SOIL WATER AT START OF YEAR	201.427	7019342.500	
SOIL WATER AT END OF YEAR	199.668	6958025.500	
SNOW WATER AT START OF YEAR	4.323	150663.547	9.28
SNOW WATER AT END OF YEAR	7.070	246385.000	15.17
ANNUAL WATER BUDGET BALANCE	0.0000	0.499	0.00

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ANNUAL TOTALS FOR YEAR 23

	INCHES	CU. FEET	PERCENT
PRECIPITATION	25.57	891063.500	100.00
RUNOFF	12.387	431655.656	48.44
EVAPOTRANSPIRATION	10.266	357755.375	40.15
DRAINAGE COLLECTED FROM LAYER 3	15.1169	526793.500	59.12
PERC./LEAKAGE THROUGH LAYER 4	4.414012	153819.500	17.26
AVG. HEAD ON TOP OF LAYER 4	23.3430		
PERC./LEAKAGE THROUGH LAYER 6	4.945446	172338.891	19.34
CHANGE IN WATER STORAGE	-17.145	-597479.562	-67.05
SOIL WATER AT START OF YEAR	199.668	6958025.500	
SOIL WATER AT END OF YEAR	189.593	6606931.000	
SNOW WATER AT START OF YEAR	7.070	246385.000	27.65
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.316	0.00

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ANNUAL TOTALS FOR YEAR 24

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.62	1310981.750	100.00
RUNOFF	7.807	272068.750	20.75
EVAPOTRANSPIRATION	10.830	377397.750	28.79
DRAINAGE COLLECTED FROM LAYER 3	9.8444	343058.031	26.17
PERC./LEAKAGE THROUGH LAYER 4	3.080245	107340.367	8.19
AVG. HEAD ON TOP OF LAYER 4	15.6790		
PERC./LEAKAGE THROUGH LAYER 6	3.081453	107382.477	8.19
CHANGE IN WATER STORAGE	6.057	211074.609	16.10
SOIL WATER AT START OF YEAR	189.593	6606931.000	
SOIL WATER AT END OF YEAR	194.925	6792763.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.724	25242.166	1.93
ANNUAL WATER BUDGET BALANCE	0.0000	0.166	0.00

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ANNUAL TOTALS FOR YEAR 25

	INCHES	CU. FEET	PERCENT
PRECIPITATION	61.20	2132697.500	100.00
RUNOFF	10.406	362642.812	17.00
EVAPOTRANSPIRATION	20.212	704357.500	33.03
DRAINAGE COLLECTED FROM LAYER 3	18.2016	634290.375	29.74
PERC./LEAKAGE THROUGH LAYER 4	5.283193	184108.703	8.63
AVG. HEAD ON TOP OF LAYER 4	28.2046		
PERC./LEAKAGE THROUGH LAYER 6	4.913219	171215.875	8.03
CHANGE IN WATER STORAGE	7.466	260191.484	12.20
SOIL WATER AT START OF YEAR	194.925	6792763.500	
SOIL WATER AT END OF YEAR	196.543	6849146.000	
SNOW WATER AT START OF YEAR	0.724	25242.166	1.18
SNOW WATER AT END OF YEAR	6.573	229050.781	10.74
ANNUAL WATER BUDGET BALANCE	0.0000	-0.432	0.00

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ANNUAL TOTALS FOR YEAR 26

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.60	1310284.870	100.00
RUNOFF	15.818	551240.500	42.07
EVAPOTRANSPIRATION	13.468	469329.750	35.82
DRAINAGE COLLECTED FROM LAYER 3	13.7408	478839.250	36.54
PERC./LEAKAGE THROUGH LAYER 4	4.153349	144735.922	11.05
AVG. HEAD ON TOP OF LAYER 4	21.8226		
PERC./LEAKAGE THROUGH LAYER 6	4.303600	149971.875	11.45
CHANGE IN WATER STORAGE	-9.731	-339096.187	-25.88
SOIL WATER AT START OF YEAR	196.543	6849146.000	
SOIL WATER AT END OF YEAR	193.386	6739101.000	
SNOW WATER AT START OF YEAR	6.573	229050.781	17.48
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.282	0.00

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ANNUAL TOTALS FOR YEAR 27

	INCHES	CU. FEET	PERCENT
PRECIPITATION	53.95	1880049.870	100.00
RUNOFF	11.822	411972.844	21.91
EVAPOTRANSPIRATION	12.905	449727.031	23.92
DRAINAGE COLLECTED FROM LAYER 3	15.7463	548725.875	29.19
PERC./LEAKAGE THROUGH LAYER 4	4.561049	158943.437	8.45
AVG. HEAD ON TOP OF LAYER 4	24.0079		
PERC./LEAKAGE THROUGH LAYER 6	4.259508	148435.328	7.90
CHANGE IN WATER STORAGE	9.217	321188.562	17.08
SOIL WATER AT START OF YEAR	193.386	6739101.000	
SOIL WATER AT END OF YEAR	202.602	7060289.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.282	0.00

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ANNUAL TOTALS FOR YEAR 28

	INCHES	CU. FEET	PERCENT
PRECIPITATION	50.61	1763657.750	100.00
RUNOFF	23.788	828955.375	47.00
EVAPOTRANSPIRATION	8.792	306400.094	17.37
DRAINAGE COLLECTED FROM LAYER 3	16.6166	579055.500	32.83
PERC./LEAKAGE THROUGH LAYER 4	4.704792	163952.578	9.30
AVG. HEAD ON TOP OF LAYER 4	24.7977		
PERC./LEAKAGE THROUGH LAYER 6	5.235616	182450.750	10.35
CHANGE IN WATER STORAGE	-3.822	-133203.969	-7.55
SOIL WATER AT START OF YEAR	202.602	7060289.500	
SOIL WATER AT END OF YEAR	190.403	6635173.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	8.377	291912.312	16.55
ANNUAL WATER BUDGET BALANCE	0.0000	0.066	0.00

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ANNUAL TOTALS FOR YEAR 29

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.89	1599174.870	100.00
RUNOFF	16.685	581444.875	36.36
EVAPOTRANSPIRATION	13.176	459145.469	28.71
DRAINAGE COLLECTED FROM LAYER 3	11.5249	401620.781	25.11
PERC./LEAKAGE THROUGH LAYER 4	3.576254	124625.320	7.79
AVG. HEAD ON TOP OF LAYER 4	18.4846		
PERC./LEAKAGE THROUGH LAYER 6	3.140365	109435.445	6.84
CHANGE IN WATER STORAGE	1.364	47528.379	2.97
SOIL WATER AT START OF YEAR	190.403	6635173.000	
SOIL WATER AT END OF YEAR	199.032	6935866.500	
SNOW WATER AT START OF YEAR	8.377	291912.312	18.25
SNOW WATER AT END OF YEAR	1.112	38747.453	2.42
ANNUAL WATER BUDGET BALANCE	0.0000	-0.033	0.00

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ANNUAL TOTALS FOR YEAR 30

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.11	1676537.370	100.00
RUNOFF	7.196	250755.250	14.96
EVAPOTRANSPIRATION	18.245	635791.312	37.92
DRAINAGE COLLECTED FROM LAYER 3	14.4846	504757.875	30.11
PERC./LEAKAGE THROUGH LAYER 4	4.363024	152042.656	9.07
AVG. HEAD ON TOP OF LAYER 4	23.0328		
PERC./LEAKAGE THROUGH LAYER 6	4.317970	150472.625	8.98
CHANGE IN WATER STORAGE	3.867	134760.344	8.04
SOIL WATER AT START OF YEAR	199.032	6935866.500	
SOIL WATER AT END OF YEAR	203.223	7081923.500	
SNOW WATER AT START OF YEAR	1.112	38747.453	2.31
SNOW WATER AT END OF YEAR	0.788	27450.434	1.64
ANNUAL WATER BUDGET BALANCE	0.0000	0.000	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 30

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	8.44	5.19	4.69	4.18	1.79	0.66
	0.32	1.04	0.86	1.82	5.00	7.70
STD. DEVIATIONS	4.07	4.48	3.29	3.35	1.55	0.67
	0.36	1.24	1.26	1.87	4.50	6.01
RUNOFF						
TOTALS	2.546	4.933	1.938	0.410	0.041	0.000
	0.000	0.003	0.010	0.086	0.443	0.533
STD. DEVIATIONS	2.891	4.829	2.652	0.654	0.094	0.000
	0.000	0.010	0.049	0.217	0.738	0.962
EVAPOTRANSPIRATION						
TOTALS	0.651	0.787	1.901	1.865	1.481	1.222
	1.132	0.759	0.672	0.698	1.000	0.781
STD. DEVIATIONS	0.216	0.492	0.523	0.761	0.943	0.519
	0.525	0.916	0.797	0.605	0.383	0.219
LATERAL DRAINAGE COLLECTED FROM LAYER 3						
TOTALS	0.9961	1.1275	1.8809	1.8175	1.6678	1.3216
	1.1183	0.8587	0.6167	0.5458	0.6015	0.9419
STD. DEVIATIONS	0.6363	0.6377	0.5657	0.3810	0.3358	0.2155
	0.1941	0.1923	0.1200	0.1405	0.2576	0.5468
PERCOLATION/LEAKAGE THROUGH LAYER 4						
TOTALS	0.3009	0.3320	0.5317	0.5239	0.4938	0.3999
	0.3433	0.2704	0.2016	0.1824	0.1968	0.2904
STD. DEVIATIONS	0.1617	0.1614	0.1277	0.0901	0.0864	0.0610
	0.0546	0.0539	0.0337	0.0396	0.0726	0.1489
PERCOLATION/LEAKAGE THROUGH LAYER 6						
TOTALS	0.2552	0.2647	0.3293	0.4631	0.5339	0.4761
	0.4231	0.3647	0.3016	0.2499	0.2092	0.1780
STD. DEVIATIONS	0.1295	0.1414	0.2013	0.1776	0.0956	0.0710
	0.0550	0.0490	0.0493	0.0374	0.0345	0.0591

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 4						
AVERAGES	18.3639	22.5882	33.6526	34.3560	31.2827	25.9818
	21.2867	16.3453	12.1305	10.3894	11.8243	17.6697
STD. DEVIATIONS	10.7347	11.6611	8.3361	6.0653	5.6640	4.2207
	3.6953	3.6607	2.3595	2.6742	5.0594	9.9545

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 30

	INCHES		CU. FEET	PERCENT
PRECIPITATION	41.69	(9.045)	1452929.5	100.00
RUNOFF	10.942	(5.9007)	381322.22	26.245
EVAPOTRANSPIRATION	12.949	(2.6115)	451248.56	31.058
LATERAL DRAINAGE COLLECTED FROM LAYER 3	13.49431	(2.74558)	470249.719	32.36563
PERCOLATION/LEAKAGE THROUGH LAYER 4	4.06710	(0.70837)	141730.141	9.75478
AVERAGE HEAD ON TOP OF LAYER 4	21.323	(4.007)		
PERCOLATION/LEAKAGE THROUGH LAYER 6	4.04877	(0.76634)	141091.672	9.71084
CHANGE IN WATER STORAGE	0.259	(8.4488)	9017.21	0.621

PEAK DAILY VALUES FOR YEARS 1 THROUGH 30

	(INCHES)	(CU. FT.)
PRECIPITATION	9.01	313980.500
RUNOFF	7.090	247055.4840
DRAINAGE COLLECTED FROM LAYER 3	0.10043	3499.77124
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.024404	850.43530
AVERAGE HEAD ON TOP OF LAYER 4	48.000	
MAXIMUM HEAD ON TOP OF LAYER 4	59.760	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	79.6 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.049933	1740.07996
SNOW WATER	20.43	711790.1870

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.4570

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.0580

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 30

LAYER	(INCHES)	(VOL/VOL)
1	4.9857	0.4155
2	10.9679	0.4570
3	5.4840	0.4570
4	0.0000	0.0000
5	5.0151	0.2090
6	175.1986	0.2920
SNOW WATER	0.788	

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**                                                                          **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE               **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                    USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY               **
**                                                                          **
**                                                                          **
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******************************************************************************


PRECIPITATION DATA FILE:    C:\HELP\USER\DATAML.D4
TEMPERATURE DATA FILE:      C:\HELP\USER\DATAML.D7
SOLAR RADIATION DATA FILE:  C:\HELP\USER\DATAML.D13
EVAPOTRANSPIRATION DATA:    C:\HELP\USER\DATAML.D11
SOIL AND DESIGN DATA FILE:  C:\HELP\USER\DATAMLX.D10
OUTPUT DATA FILE:           C:\HELP\USER\ML27X.OUT


TIME:   7:59     DATE:  11/18/2008


******************************************************************************

     TITLE:  Meyers Landfill

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                LAYER  1
                                --------

                  TYPE 1 - VERTICAL PERCOLATION LAYER
                      MATERIAL TEXTURE NUMBER   5
          THICKNESS                    =     12.00   INCHES
          POROSITY                     =      0.4570 VOL/VOL
          FIELD CAPACITY               =      0.1310 VOL/VOL
          WILTING POINT                =      0.0580 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.4570 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  2.01
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.



                                LAYER  2
                                --------

                  TYPE 1 - VERTICAL PERCOLATION LAYER
                      MATERIAL TEXTURE NUMBER   5
          THICKNESS                    =     24.00   INCHES
          POROSITY                     =      0.4570 VOL/VOL
          FIELD CAPACITY               =      0.1310 VOL/VOL
          WILTING POINT                =      0.0580 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.2248 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC
```

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 20

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0175	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	10.0000000000	CM/SEC
SLOPE	=	6.00	PERCENT
DRAINAGE LENGTH	=	200.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	2.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	4 - POOR	

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 5

THICKNESS	=	24.00	INCHES
POROSITY	=	0.4570	VOL/VOL
FIELD CAPACITY	=	0.1310	VOL/VOL
WILTING POINT	=	0.0580	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1310	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 6

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	600.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 5 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 6.% AND A SLOPE LENGTH OF 200. FEET.

SCS RUNOFF CURVE NUMBER	=	78.20	
FRACTION OF AREA ALLOWING RUNOFF	=	70.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	9.600	ACRES
EVAPORATIVE ZONE DEPTH	=	18.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	7.068	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	8.226	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.044	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	189.206	INCHES
TOTAL INITIAL WATER	=	189.206	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM RENO NEVADA

STATION LATITUDE	=	38.50 DEGREES
MAXIMUM LEAF AREA INDEX	=	1.20
START OF GROWING SEASON (JULIAN DATE)	=	129
END OF GROWING SEASON (JULIAN DATE)	=	281
EVAPORATIVE ZONE DEPTH	=	18.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	6.40 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	60.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	43.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	40.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	59.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR RENO NEVADA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
7.81	6.09	4.52	3.52	1.78	1.07
0.33	0.98	0.78	2.64	5.74	7.11

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR RENO NEVADA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
32.20	37.40	40.60	46.40	54.60	62.40
69.50	66.90	60.20	50.30	39.70	32.50

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR RENO NEVADA AND STATION LATITUDE = 38.53 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	30.56	1064955.000	100.00
RUNOFF	3.906	136121.422	12.78
EVAPOTRANSPIRATION	9.984	347919.969	32.67
DRAINAGE COLLECTED FROM LAYER 3	16.6662	580785.375	54.54
PERC./LEAKAGE THROUGH LAYER 4	0.002947	102.709	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0028		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	0.004	128.149	0.01
SOIL WATER AT START OF YEAR	190.778	6648223.500	
SOIL WATER AT END OF YEAR	190.781	6648351.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.125	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	56.20	1958457.750	100.00
RUNOFF	13.360	465553.437	23.77
EVAPOTRANSPIRATION	14.803	515868.062	26.34
DRAINAGE COLLECTED FROM LAYER 3	14.2538	496715.812	25.36
PERC./LEAKAGE THROUGH LAYER 4	0.006459	225.096	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0219		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	13.783	480319.969	24.53
SOIL WATER AT START OF YEAR	190.781	6648351.500	
SOIL WATER AT END OF YEAR	187.164	6522291.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	17.401	606380.250	30.96
ANNUAL WATER BUDGET BALANCE	0.0000	0.465	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.62	1659461.750	100.00
RUNOFF	21.239	740131.250	44.60
EVAPOTRANSPIRATION	10.841	377775.594	22.76
DRAINAGE COLLECTED FROM LAYER 3	19.1356	666839.000	40.18
PERC./LEAKAGE THROUGH LAYER 4	0.007705	268.510	0.02
AVG. HEAD ON TOP OF LAYER 4	0.0264		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-3.595	-125284.258	-7.55
SOIL WATER AT START OF YEAR	187.164	6522291.500	
SOIL WATER AT END OF YEAR	185.351	6459109.000	
SNOW WATER AT START OF YEAR	17.401	606380.250	36.54
SNOW WATER AT END OF YEAR	15.619	544278.187	32.80
ANNUAL WATER BUDGET BALANCE	0.0000	0.299	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.51	1376844.750	100.00
RUNOFF	24.832	865335.562	62.85
EVAPOTRANSPIRATION	8.685	302662.437	21.98
DRAINAGE COLLECTED FROM LAYER 3	16.1379	562375.062	40.85
PERC./LEAKAGE THROUGH LAYER 4	0.006247	217.700	0.02
AVG. HEAD ON TOP OF LAYER 4	0.0203		
PERC./LEAKAGE THROUGH LAYER 6	0.023934	834.054	0.06
CHANGE IN WATER STORAGE	-10.169	-354362.687	-25.74
SOIL WATER AT START OF YEAR	185.351	6459109.000	
SOIL WATER AT END OF YEAR	188.312	6562284.500	
SNOW WATER AT START OF YEAR	15.619	544278.187	39.53
SNOW WATER AT END OF YEAR	2.489	86740.187	6.30
ANNUAL WATER BUDGET BALANCE	0.0000	0.301	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.65	1521115.120	100.00
RUNOFF	9.937	346296.781	22.77
EVAPOTRANSPIRATION	15.930	555120.687	36.49
DRAINAGE COLLECTED FROM LAYER 3	21.3176	742874.750	48.84
PERC./LEAKAGE THROUGH LAYER 4	0.005173	180.267	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0135		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-3.535	-123177.023	-8.10
SOIL WATER AT START OF YEAR	188.312	6562284.500	
SOIL WATER AT END OF YEAR	187.266	6525847.500	
SNOW WATER AT START OF YEAR	2.489	86740.187	5.70
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.008	0.00

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ANNUAL TOTALS FOR YEAR 6

	INCHES	CU. FEET	PERCENT
PRECIPITATION	29.32	1021743.500	100.00
RUNOFF	6.515	227046.094	22.22
EVAPOTRANSPIRATION	13.236	461242.437	45.14
DRAINAGE COLLECTED FROM LAYER 3	10.2027	355542.531	34.80
PERC./LEAKAGE THROUGH LAYER 4	0.003099	108.008	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0084		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-0.634	-22087.816	-2.16
SOIL WATER AT START OF YEAR	187.266	6525847.500	
SOIL WATER AT END OF YEAR	185.828	6475722.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.805	28037.561	2.74
ANNUAL WATER BUDGET BALANCE	0.0000	0.287	0.00

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ANNUAL TOTALS FOR YEAR 7

	INCHES	CU. FEET	PERCENT
PRECIPITATION	42.21	1470933.870	100.00
RUNOFF	2.613	91051.156	6.19
EVAPOTRANSPIRATION	12.286	428152.469	29.11
DRAINAGE COLLECTED FROM LAYER 3	18.3358	638966.875	43.44
PERC./LEAKAGE THROUGH LAYER 4	0.003208	111.777	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0030		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	8.975	312763.094	21.26
SOIL WATER AT START OF YEAR	185.828	6475722.500	
SOIL WATER AT END OF YEAR	188.780	6578592.000	
SNOW WATER AT START OF YEAR	0.805	28037.561	1.91
SNOW WATER AT END OF YEAR	6.828	237931.094	16.18
ANNUAL WATER BUDGET BALANCE	0.0000	0.287	0.00

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ANNUAL TOTALS FOR YEAR 8

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.52	1307497.370	100.00
RUNOFF	3.546	123579.141	9.45
EVAPOTRANSPIRATION	12.600	439082.250	33.58
DRAINAGE COLLECTED FROM LAYER 3	25.9998	906042.125	69.30
PERC./LEAKAGE THROUGH LAYER 4	0.007147	249.074	0.02
AVG. HEAD ON TOP OF LAYER 4	0.0193		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-4.626	-161206.281	-12.33
SOIL WATER AT START OF YEAR	188.780	6578592.000	
SOIL WATER AT END OF YEAR	188.951	6584559.500	
SNOW WATER AT START OF YEAR	6.828	237931.094	18.20
SNOW WATER AT END OF YEAR	2.030	70757.133	5.41
ANNUAL WATER BUDGET BALANCE	0.0000	0.191	0.00

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ANNUAL TOTALS FOR YEAR 9

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.01	1498812.370	100.00
RUNOFF	7.881	274635.125	18.32
EVAPOTRANSPIRATION	15.881	553427.375	36.92
DRAINAGE COLLECTED FROM LAYER 3	24.0726	838883.375	55.97
PERC./LEAKAGE THROUGH LAYER 4	0.006850	238.695	0.02
AVG. HEAD ON TOP OF LAYER 4	0.0181		
PERC./LEAKAGE THROUGH LAYER 6	0.023937	834.170	0.06
CHANGE IN WATER STORAGE	-4.849	-168967.594	-11.27
SOIL WATER AT START OF YEAR	188.951	6584559.500	
SOIL WATER AT END OF YEAR	186.133	6486349.000	
SNOW WATER AT START OF YEAR	2.030	70757.133	4.72
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.081	0.00

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ANNUAL TOTALS FOR YEAR 10

	INCHES	CU. FEET	PERCENT
PRECIPITATION	34.64	1207134.870	100.00
RUNOFF	12.168	424033.156	35.13
EVAPOTRANSPIRATION	10.083	351385.031	29.11
DRAINAGE COLLECTED FROM LAYER 3	12.6701	441528.937	36.58
PERC./LEAKAGE THROUGH LAYER 4	0.005096	177.593	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0179		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-0.282	-9812.167	-0.81
SOIL WATER AT START OF YEAR	186.133	6486349.000	
SOIL WATER AT END OF YEAR	185.851	6476537.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.066	0.00

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ANNUAL TOTALS FOR YEAR 11

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51.59	1797808.370	100.00
RUNOFF	10.767	375194.531	20.87
EVAPOTRANSPIRATION	12.915	450073.219	25.03
DRAINAGE COLLECTED FROM LAYER 3	23.9531	834716.500	46.43
PERC./LEAKAGE THROUGH LAYER 4	0.007427	258.802	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0252		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	3.955	137824.516	7.67
SOIL WATER AT START OF YEAR	185.851	6476537.000	
SOIL WATER AT END OF YEAR	187.676	6540134.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	2.130	74227.016	4.13
ANNUAL WATER BUDGET BALANCE	0.0000	-0.299	0.00

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ANNUAL TOTALS FOR YEAR 12

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.38	1511706.250	100.00
RUNOFF	11.517	401337.406	26.55
EVAPOTRANSPIRATION	12.771	445037.344	29.44
DRAINAGE COLLECTED FROM LAYER 3	17.2074	599642.562	39.67
PERC./LEAKAGE THROUGH LAYER 4	0.006458	225.032	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0206		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	1.885	65688.727	4.35
SOIL WATER AT START OF YEAR	187.676	6540134.500	
SOIL WATER AT END OF YEAR	186.849	6511313.000	
SNOW WATER AT START OF YEAR	2.130	74227.016	4.91
SNOW WATER AT END OF YEAR	4.842	168737.016	11.16
ANNUAL WATER BUDGET BALANCE	0.0000	0.199	0.00

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ANNUAL TOTALS FOR YEAR 13

	INCHES	CU. FEET	PERCENT
PRECIPITATION	32.84	1144408.370	100.00
RUNOFF	9.015	314163.344	27.45
EVAPOTRANSPIRATION	11.410	397620.969	34.74
DRAINAGE COLLECTED FROM LAYER 3	13.0077	453291.500	39.61
PERC./LEAKAGE THROUGH LAYER 4	0.006506	226.738	0.02
AVG. HEAD ON TOP OF LAYER 4	0.0234		
PERC./LEAKAGE THROUGH LAYER 6	0.023944	834.400	0.07
CHANGE IN WATER STORAGE	-0.617	-21501.320	-1.88
SOIL WATER AT START OF YEAR	186.849	6511313.000	
SOIL WATER AT END OF YEAR	186.915	6513626.500	
SNOW WATER AT START OF YEAR	4.842	168737.016	14.74
SNOW WATER AT END OF YEAR	4.159	144922.109	12.66
ANNUAL WATER BUDGET BALANCE	0.0000	-0.484	0.00

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ANNUAL TOTALS FOR YEAR 14

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.45	1339905.870	100.00
RUNOFF	5.077	176909.391	13.20
EVAPOTRANSPIRATION	12.702	442625.187	33.03
DRAINAGE COLLECTED FROM LAYER 3	13.6762	476587.687	35.57
PERC./LEAKAGE THROUGH LAYER 4	0.002616	91.177	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0022		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	6.996	243783.359	18.19
SOIL WATER AT START OF YEAR	186.915	6513626.500	
SOIL WATER AT END OF YEAR	188.717	6576418.500	
SNOW WATER AT START OF YEAR	4.159	144922.109	10.82
SNOW WATER AT END OF YEAR	9.352	325913.562	24.32
ANNUAL WATER BUDGET BALANCE	0.0000	0.199	0.00

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ANNUAL TOTALS FOR YEAR 15

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.50	1341648.120	100.00
RUNOFF	19.782	689376.062	51.38
EVAPOTRANSPIRATION	10.238	356763.812	26.59
DRAINAGE COLLECTED FROM LAYER 3	19.3261	673474.937	50.20
PERC./LEAKAGE THROUGH LAYER 4	0.009270	323.030	0.02
AVG. HEAD ON TOP OF LAYER 4	0.0341		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-10.846	-377967.000	-28.17
SOIL WATER AT START OF YEAR	188.717	6576418.500	
SOIL WATER AT END OF YEAR	187.224	6524365.000	
SNOW WATER AT START OF YEAR	9.352	325913.562	24.29
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.399	0.00

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ANNUAL TOTALS FOR YEAR 16

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.66	1730551.620	100.00
RUNOFF	6.566	228807.703	13.22
EVAPOTRANSPIRATION	13.898	484320.250	27.99
DRAINAGE COLLECTED FROM LAYER 3	14.1492	493071.000	28.49
PERC./LEAKAGE THROUGH LAYER 4	0.003790	132.070	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0082		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	15.047	524353.375	30.30
SOIL WATER AT START OF YEAR	187.224	6524365.000	
SOIL WATER AT END OF YEAR	186.706	6506319.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	15.565	542399.562	31.34
ANNUAL WATER BUDGET BALANCE	0.0000	-0.698	0.00

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ANNUAL TOTALS FOR YEAR 17

	INCHES	CU. FEET	PERCENT
PRECIPITATION	23.33	813003.937	100.00
RUNOFF	8.996	313494.094	38.56
EVAPOTRANSPIRATION	10.288	358529.625	44.10
DRAINAGE COLLECTED FROM LAYER 3	15.1723	528725.875	65.03
PERC./LEAKAGE THROUGH LAYER 4	0.006754	235.347	0.03
AVG. HEAD ON TOP OF LAYER 4	0.0240		
PERC./LEAKAGE THROUGH LAYER 6	0.023960	834.962	0.10
CHANGE IN WATER STORAGE	-11.151	-388580.937	-47.80
SOIL WATER AT START OF YEAR	186.706	6506319.000	
SOIL WATER AT END OF YEAR	187.167	6522399.500	
SNOW WATER AT START OF YEAR	15.565	542399.562	66.72
SNOW WATER AT END OF YEAR	3.953	137738.312	16.94
ANNUAL WATER BUDGET BALANCE	0.0000	0.324	0.00

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ANNUAL TOTALS FOR YEAR 18

	INCHES	CU. FEET	PERCENT
PRECIPITATION	31.28	1090045.750	100.00
RUNOFF	6.448	224707.250	20.61
EVAPOTRANSPIRATION	12.164	423879.812	38.89
DRAINAGE COLLECTED FROM LAYER 3	15.7069	547353.812	50.21
PERC./LEAKAGE THROUGH LAYER 4	0.004930	171.789	0.02
AVG. HEAD ON TOP OF LAYER 4	0.0133		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-3.039	-105895.164	-9.71
SOIL WATER AT START OF YEAR	187.167	6522399.500	
SOIL WATER AT END OF YEAR	188.081	6554242.500	
SNOW WATER AT START OF YEAR	3.953	137738.312	12.64
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.025	0.00

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ANNUAL TOTALS FOR YEAR 19

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.47	1549690.750	100.00
RUNOFF	8.108	282559.750	18.23
EVAPOTRANSPIRATION	10.781	375696.125	24.24
DRAINAGE COLLECTED FROM LAYER 3	20.6475	719523.812	46.43
PERC./LEAKAGE THROUGH LAYER 4	0.003575	124.570	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0034		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	4.933	171910.906	11.09
SOIL WATER AT START OF YEAR	188.081	6554242.500	
SOIL WATER AT END OF YEAR	188.763	6578020.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	4.251	148133.156	9.56
ANNUAL WATER BUDGET BALANCE	0.0000	0.233	0.00

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ANNUAL TOTALS FOR YEAR 20

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.22	1297042.620	100.00
RUNOFF	9.900	345002.156	26.60
EVAPOTRANSPIRATION	12.571	438085.219	33.78
DRAINAGE COLLECTED FROM LAYER 3	20.4922	714111.187	55.06
PERC./LEAKAGE THROUGH LAYER 4	0.008796	306.536	0.02
AVG. HEAD ON TOP OF LAYER 4	0.0333		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-5.744	-200155.250	-15.43
SOIL WATER AT START OF YEAR	188.763	6578020.000	
SOIL WATER AT END OF YEAR	187.270	6525998.000	
SNOW WATER AT START OF YEAR	4.251	148133.156	11.42
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.631	0.00

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ANNUAL TOTALS FOR YEAR 21

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.69	1696749.120	100.00
RUNOFF	2.922	101822.594	6.00
EVAPOTRANSPIRATION	12.916	450098.250	26.53
DRAINAGE COLLECTED FROM LAYER 3	26.0409	907472.500	53.48
PERC./LEAKAGE THROUGH LAYER 4	0.004103	142.980	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0042		
PERC./LEAKAGE THROUGH LAYER 6	0.023960	834.948	0.05
CHANGE IN WATER STORAGE	6.787	236520.672	13.94
SOIL WATER AT START OF YEAR	187.270	6525998.000	
SOIL WATER AT END OF YEAR	189.734	6611855.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	4.323	150663.547	8.88
ANNUAL WATER BUDGET BALANCE	0.0000	0.206	0.00

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ANNUAL TOTALS FOR YEAR 22

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.60	1623917.000	100.00
RUNOFF	3.948	137584.328	8.47
EVAPOTRANSPIRATION	14.308	498611.906	30.70
DRAINAGE COLLECTED FROM LAYER 3	27.4725	957362.000	58.95
PERC./LEAKAGE THROUGH LAYER 4	0.006716	234.027	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0165		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	0.871	30359.117	1.87
SOIL WATER AT START OF YEAR	189.734	6611855.500	
SOIL WATER AT END OF YEAR	187.858	6546493.000	
SNOW WATER AT START OF YEAR	4.323	150663.547	9.28
SNOW WATER AT END OF YEAR	7.070	246385.000	15.17
ANNUAL WATER BUDGET BALANCE	0.0000	-0.382	0.00

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ANNUAL TOTALS FOR YEAR 23

	INCHES	CU. FEET	PERCENT
PRECIPITATION	25.57	891063.500	100.00
RUNOFF	8.885	309610.562	34.75
EVAPOTRANSPIRATION	9.657	336516.125	37.77
DRAINAGE COLLECTED FROM LAYER 3	17.3248	603733.062	67.75
PERC./LEAKAGE THROUGH LAYER 4	0.007672	267.367	0.03
AVG. HEAD ON TOP OF LAYER 4	0.0304		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-10.296	-358795.562	-40.27
SOIL WATER AT START OF YEAR	187.858	6546493.000	
SOIL WATER AT END OF YEAR	184.633	6434082.500	
SNOW WATER AT START OF YEAR	7.070	246385.000	27.65
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.665	0.00

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ANNUAL TOTALS FOR YEAR 24

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.62	1310981.750	100.00
RUNOFF	7.765	270581.062	20.64
EVAPOTRANSPIRATION	10.291	358634.937	27.36
DRAINAGE COLLECTED FROM LAYER 3	14.1743	493946.469	37.68
PERC./LEAKAGE THROUGH LAYER 4	0.009464	329.808	0.03
AVG. HEAD ON TOP OF LAYER 4	0.0384		
PERC./LEAKAGE THROUGH LAYER 6	0.023963	835.054	0.06
CHANGE IN WATER STORAGE	5.366	186984.203	14.26
SOIL WATER AT START OF YEAR	184.633	6434082.500	
SOIL WATER AT END OF YEAR	189.274	6595824.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.724	25242.166	1.93
ANNUAL WATER BUDGET BALANCE	0.0000	0.091	0.00

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ANNUAL TOTALS FOR YEAR 25

	INCHES	CU. FEET	PERCENT
PRECIPITATION	61.20	2132697.500	100.00
RUNOFF	7.357	256391.516	12.02
EVAPOTRANSPIRATION	19.530	680565.000	31.91
DRAINAGE COLLECTED FROM LAYER 3	30.1762	1051579.500	49.31
PERC./LEAKAGE THROUGH LAYER 4	0.009894	344.794	0.02
AVG. HEAD ON TOP OF LAYER 4	0.0334		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	4.137	144162.469	6.76
SOIL WATER AT START OF YEAR	189.274	6595824.500	
SOIL WATER AT END OF YEAR	187.562	6536178.500	
SNOW WATER AT START OF YEAR	0.724	25242.166	1.18
SNOW WATER AT END OF YEAR	6.573	229050.781	10.74
ANNUAL WATER BUDGET BALANCE	0.0000	-0.964	0.00

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ANNUAL TOTALS FOR YEAR 26

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.60	1310284.870	100.00
RUNOFF	15.855	552510.500	42.17
EVAPOTRANSPIRATION	13.236	461245.844	35.20
DRAINAGE COLLECTED FROM LAYER 3	16.4556	573443.187	43.76
PERC./LEAKAGE THROUGH LAYER 4	0.007818	272.426	0.02
AVG. HEAD ON TOP OF LAYER 4	0.0306		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-7.946	-276914.687	-21.13
SOIL WATER AT START OF YEAR	187.562	6536178.500	
SOIL WATER AT END OF YEAR	186.189	6488314.500	
SNOW WATER AT START OF YEAR	6.573	229050.781	17.48
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.116	0.00

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ANNUAL TOTALS FOR YEAR 27

	INCHES	CU. FEET	PERCENT
PRECIPITATION	53.95	1880049.870	100.00
RUNOFF	4.223	147151.797	7.83
EVAPOTRANSPIRATION	11.945	416246.750	22.14
DRAINAGE COLLECTED FROM LAYER 3	36.2681	1263871.250	67.23
PERC./LEAKAGE THROUGH LAYER 4	0.007829	272.839	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0205		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	1.515	52780.879	2.81
SOIL WATER AT START OF YEAR	186.189	6488314.500	
SOIL WATER AT END OF YEAR	187.704	6541095.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.798	0.00

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ANNUAL TOTALS FOR YEAR 28

	INCHES	CU. FEET	PERCENT
PRECIPITATION	50.61	1763657.750	100.00
RUNOFF	15.793	550352.437	31.21
EVAPOTRANSPIRATION	8.311	289620.375	16.42
DRAINAGE COLLECTED FROM LAYER 3	20.4642	713137.812	40.44
PERC./LEAKAGE THROUGH LAYER 4	0.007471	260.359	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0263		
PERC./LEAKAGE THROUGH LAYER 6	0.023937	834.168	0.05
CHANGE IN WATER STORAGE	6.018	209711.937	11.89
SOIL WATER AT START OF YEAR	187.704	6541095.000	
SOIL WATER AT END OF YEAR	185.345	6458895.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	8.377	291912.312	16.55
ANNUAL WATER BUDGET BALANCE	0.0000	1.027	0.00

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ANNUAL TOTALS FOR YEAR 29

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.89	1599174.870	100.00
RUNOFF	16.735	583193.000	36.47
EVAPOTRANSPIRATION	12.580	438395.875	27.41
DRAINAGE COLLECTED FROM LAYER 3	21.6651	754984.187	47.21
PERC./LEAKAGE THROUGH LAYER 4	0.007667	267.188	0.02
AVG. HEAD ON TOP OF LAYER 4	0.0275		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-5.091	-177398.516	-11.09
SOIL WATER AT START OF YEAR	185.345	6458895.000	
SOIL WATER AT END OF YEAR	187.519	6534661.000	
SNOW WATER AT START OF YEAR	8.377	291912.312	18.25
SNOW WATER AT END OF YEAR	1.112	38747.453	2.42
ANNUAL WATER BUDGET BALANCE	0.0000	0.420	0.00

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ANNUAL TOTALS FOR YEAR 30

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.11	1676537.370	100.00
RUNOFF	5.544	193203.172	11.52
EVAPOTRANSPIRATION	16.889	588543.687	35.10
DRAINAGE COLLECTED FROM LAYER 3	24.7757	863382.125	51.50
PERC./LEAKAGE THROUGH LAYER 4	0.004082	142.251	0.01
AVG. HEAD ON TOP OF LAYER 4	0.0054		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	0.901	31409.014	1.87
SOIL WATER AT START OF YEAR	187.519	6534661.000	
SOIL WATER AT END OF YEAR	188.744	6577367.000	
SNOW WATER AT START OF YEAR	1.112	38747.453	2.31
SNOW WATER AT END OF YEAR	0.788	27450.434	1.64
ANNUAL WATER BUDGET BALANCE	0.0000	-0.594	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 30

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	8.44	5.19	4.69	4.18	1.79	0.66
	0.32	1.04	0.86	1.82	5.00	7.70
STD. DEVIATIONS	4.07	4.48	3.29	3.35	1.55	0.67
	0.36	1.24	1.26	1.87	4.50	6.01
RUNOFF						
TOTALS	2.308	4.661	1.441	0.296	0.040	0.000
	0.000	0.003	0.009	0.081	0.442	0.425
STD. DEVIATIONS	2.802	4.692	2.402	0.528	0.097	0.000
	0.000	0.010	0.041	0.198	0.721	0.729
EVAPOTRANSPIRATION						
TOTALS	0.648	0.788	1.887	1.848	1.479	1.226
	1.040	0.600	0.574	0.633	0.968	0.768
STD. DEVIATIONS	0.207	0.490	0.512	0.757	0.941	0.517
	0.445	0.763	0.707	0.593	0.394	0.219
LATERAL DRAINAGE COLLECTED FROM LAYER 3						
TOTALS	1.9541	3.6165	4.9848	2.3777	0.9669	0.4784
	0.2913	0.2333	0.2236	0.3468	1.8655	2.2259
STD. DEVIATIONS	2.8095	2.4303	2.8232	1.5353	0.6981	0.3294
	0.1014	0.0869	0.1520	0.4875	2.1716	2.7860
PERCOLATION/LEAKAGE THROUGH LAYER 4						
TOTALS	0.0005	0.0017	0.0020	0.0004	0.0002	0.0001
	0.0001	0.0001	0.0001	0.0001	0.0004	0.0004
STD. DEVIATIONS	0.0010	0.0021	0.0023	0.0002	0.0001	0.0001
	0.0000	0.0000	0.0000	0.0001	0.0006	0.0006
PERCOLATION/LEAKAGE THROUGH LAYER 6						
TOTALS	0.0008	0.0000	0.0008	0.0016	0.0008	0.0000
	0.0000	0.0008	0.0000	0.0000	0.0000	0.0008
STD. DEVIATIONS	0.0044	0.0000	0.0044	0.0061	0.0044	0.0000
	0.0000	0.0044	0.0000	0.0000	0.0000	0.0044

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 4						
AVERAGES	0.0166	0.0904	0.0915	0.0053	0.0018	0.0009
	0.0006	0.0004	0.0004	0.0007	0.0109	0.0095
STD. DEVIATIONS	0.0482	0.1344	0.1350	0.0053	0.0013	0.0006
	0.0002	0.0002	0.0003	0.0009	0.0280	0.0289

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AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 30

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.69 (9.045)	1452929.5	100.00
RUNOFF	9.707 (5.6595)	338257.81	23.281
EVAPOTRANSPIRATION	12.458 (2.4811)	434124.94	29.879
LATERAL DRAINAGE COLLECTED FROM LAYER 3	19.56493 (5.84368)	681798.750	46.92580
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00623 (0.00208)	216.952	0.01493
AVERAGE HEAD ON TOP OF LAYER 4	0.019 (0.011)		
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.00559 (0.01030)	194.725	0.01340
CHANGE IN WATER STORAGE	-0.042 (6.8865)	-1446.86	-0.100

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 30

	(INCHES)	(CU. FT.)
PRECIPITATION	9.01	313980.500
RUNOFF	7.091	247122.5160
DRAINAGE COLLECTED FROM LAYER 3	2.80349	97696.10940
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.006062	211.24265
AVERAGE HEAD ON TOP OF LAYER 4	11.177	
MAXIMUM HEAD ON TOP OF LAYER 4	14.919	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	37.2 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.023637	823.69885
SNOW WATER	20.43	711790.1870

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.4570

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.0580

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 30

LAYER	(INCHES)	(VOL/VOL)
1	2.5377	0.2115
2	6.2805	0.2617
3	0.0130	0.0652
4	0.0000	0.0000
5	3.1440	0.1310
6	175.1973	0.2920
SNOW WATER	0.788	

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**                                                                           **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE                **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                 **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                    **
**                    USAE WATERWAYS EXPERIMENT STATION                      **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY               **
**                                                                           **
**                                                                           **
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PRECIPITATION DATA FILE:    C:\HELP\USER\DATAML.D4
TEMPERATURE DATA FILE:      C:\HELP\USER\DATAML.D7
SOLAR RADIATION DATA FILE:  C:\HELP\USER\DATAML.D13
EVAPOTRANSPIRATION DATA:    C:\HELP\USER\DATAML.D11
SOIL AND DESIGN DATA FILE:  C:\HELP\USER\datamlz.D10
OUTPUT DATA FILE:           C:\HELP\USER\ml30.OUT


TIME:  11:24     DATE:  10/23/2008


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     TITLE:  Meyers Landfill

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                LAYER  1
                                --------

                  TYPE 1 - VERTICAL PERCOLATION LAYER
                      MATERIAL TEXTURE NUMBER   5
          THICKNESS                    =     12.00   INCHES
          POROSITY                     =      0.4570 VOL/VOL
          FIELD CAPACITY               =      0.1310 VOL/VOL
          WILTING POINT                =      0.0580 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.4570 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  2.01
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.


                                LAYER  2
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                  TYPE 1 - VERTICAL PERCOLATION LAYER
                      MATERIAL TEXTURE NUMBER   5
          THICKNESS                    =     24.00   INCHES
          POROSITY                     =      0.4570 VOL/VOL
          FIELD CAPACITY               =      0.1310 VOL/VOL
          WILTING POINT                =      0.0580 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.2220 VOL/VOL
          EFFECTIVE SAT. HYD. COND.    =  0.100000005000E-02 CM/SEC
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LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 20

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1189	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	10.0000000000	CM/SEC

LAYER 4

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 5

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4570	VOL/VOL
FIELD CAPACITY	=	0.1310	VOL/VOL
WILTING POINT	=	0.0580	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1928	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC
SLOPE	=	25.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 5

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	2.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	4 - POOR	

LAYER 6

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 5

THICKNESS	=	24.00	INCHES
POROSITY	=	0.4570	VOL/VOL
FIELD CAPACITY	=	0.1310	VOL/VOL
WILTING POINT	=	0.0580	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1505	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 7

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	600.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 5 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 25.% AND A SLOPE LENGTH OF 100. FEET.

SCS RUNOFF CURVE NUMBER	=	79.90	
FRACTION OF AREA ALLOWING RUNOFF	=	70.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	9.600	ACRES
EVAPORATIVE ZONE DEPTH	=	18.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	7.013	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	8.226	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.044	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	191.943	INCHES
TOTAL INITIAL WATER	=	191.943	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM RENO NEVADA

STATION LATITUDE	=	38.50 DEGREES
MAXIMUM LEAF AREA INDEX	=	1.20
START OF GROWING SEASON (JULIAN DATE)	=	129
END OF GROWING SEASON (JULIAN DATE)	=	281
EVAPORATIVE ZONE DEPTH	=	18.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	6.40 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	60.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	43.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	40.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	59.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR RENO NEVADA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
7.81	6.09	4.52	3.52	1.78	1.07
0.33	0.98	0.78	2.64	5.74	7.11

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR RENO NEVADA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
32.20	37.40	40.60	46.40	54.60	62.40
69.50	66.90	60.20	50.30	39.70	32.50

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR RENO NEVADA AND STATION LATITUDE = 38.53 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	30.56	1064955.000	100.00
RUNOFF	4.093	142638.250	13.39
EVAPOTRANSPIRATION	10.059	350519.781	32.91
DRAINAGE COLLECTED FROM LAYER 4	15.6495	545352.687	51.21
PERC./LEAKAGE THROUGH LAYER 5	0.762066	26556.467	2.49
AVG. HEAD ON TOP OF LAYER 5	3.2685		
PERC./LEAKAGE THROUGH LAYER 7	0.434601	15144.979	1.42
CHANGE IN WATER STORAGE	0.324	11299.439	1.06
SOIL WATER AT START OF YEAR	193.515	6743609.000	
SOIL WATER AT END OF YEAR	193.839	6754908.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.091	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	56.20	1958457.750	100.00
RUNOFF	13.401	467002.625	23.85
EVAPOTRANSPIRATION	15.416	537218.000	27.43
DRAINAGE COLLECTED FROM LAYER 4	13.3325	464610.281	23.72
PERC./LEAKAGE THROUGH LAYER 5	0.483033	16832.721	0.86
AVG. HEAD ON TOP OF LAYER 5	1.7409		
PERC./LEAKAGE THROUGH LAYER 7	0.522502	18208.148	0.93
CHANGE IN WATER STORAGE	13.528	471418.656	24.07
SOIL WATER AT START OF YEAR	193.839	6754908.500	
SOIL WATER AT END OF YEAR	189.966	6619946.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	17.401	606380.250	30.96
ANNUAL WATER BUDGET BALANCE	0.0000	0.000	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.62	1659461.750	100.00
RUNOFF	21.283	741659.812	44.69
EVAPOTRANSPIRATION	11.452	399088.531	24.05
DRAINAGE COLLECTED FROM LAYER 4	18.3273	638668.687	38.49
PERC./LEAKAGE THROUGH LAYER 5	0.659602	22985.809	1.39
AVG. HEAD ON TOP OF LAYER 5	2.7493		
PERC./LEAKAGE THROUGH LAYER 7	0.693882	24180.398	1.46
CHANGE IN WATER STORAGE	-4.136	-144135.453	-8.69
SOIL WATER AT START OF YEAR	189.966	6619946.500	
SOIL WATER AT END OF YEAR	187.612	6537913.500	
SNOW WATER AT START OF YEAR	17.401	606380.250	36.54
SNOW WATER AT END OF YEAR	15.619	544278.187	32.80
ANNUAL WATER BUDGET BALANCE	0.0000	-0.164	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.51	1376844.750	100.00
RUNOFF	25.122	875450.875	63.58
EVAPOTRANSPIRATION	8.996	313488.750	22.77
DRAINAGE COLLECTED FROM LAYER 4	14.2606	496951.844	36.09
PERC./LEAKAGE THROUGH LAYER 5	0.511471	17823.738	1.29
AVG. HEAD ON TOP OF LAYER 5	1.9742		
PERC./LEAKAGE THROUGH LAYER 7	0.427469	14896.453	1.08
CHANGE IN WATER STORAGE	-9.296	-323944.062	-23.53
SOIL WATER AT START OF YEAR	187.612	6537913.500	
SOIL WATER AT END OF YEAR	191.446	6671507.500	
SNOW WATER AT START OF YEAR	15.619	544278.187	39.53
SNOW WATER AT END OF YEAR	2.489	86740.187	6.30
ANNUAL WATER BUDGET BALANCE	0.0000	0.918	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.65	1521115.120	100.00
RUNOFF	10.582	368768.687	24.24
EVAPOTRANSPIRATION	16.414	571987.562	37.60
DRAINAGE COLLECTED FROM LAYER 4	19.2058	669284.375	44.00
PERC./LEAKAGE THROUGH LAYER 5	0.693255	24158.547	1.59
AVG. HEAD ON TOP OF LAYER 5	2.8871		
PERC./LEAKAGE THROUGH LAYER 7	0.619913	21602.721	1.42
CHANGE IN WATER STORAGE	-3.172	-110527.500	-7.27
SOIL WATER AT START OF YEAR	191.446	6671507.500	
SOIL WATER AT END OF YEAR	190.763	6647720.000	
SNOW WATER AT START OF YEAR	2.489	86740.187	5.70
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.677	0.00

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ANNUAL TOTALS FOR YEAR 6

	INCHES	CU. FEET	PERCENT
PRECIPITATION	29.32	1021743.500	100.00
RUNOFF	6.564	228757.109	22.39
EVAPOTRANSPIRATION	13.687	476966.812	46.68
DRAINAGE COLLECTED FROM LAYER 4	10.2640	357680.969	35.01
PERC./LEAKAGE THROUGH LAYER 5	0.530258	18478.422	1.81
AVG. HEAD ON TOP OF LAYER 5	2.1262		
PERC./LEAKAGE THROUGH LAYER 7	0.669006	23313.516	2.28
CHANGE IN WATER STORAGE	-1.865	-64974.637	-6.36
SOIL WATER AT START OF YEAR	190.763	6647720.000	
SOIL WATER AT END OF YEAR	188.094	6554707.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.805	28037.561	2.74
ANNUAL WATER BUDGET BALANCE	0.0000	-0.243	0.00

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ANNUAL TOTALS FOR YEAR 7

	INCHES	CU. FEET	PERCENT
PRECIPITATION	42.21	1470933.870	100.00
RUNOFF	2.879	100312.242	6.82
EVAPOTRANSPIRATION	12.481	434953.844	29.57
DRAINAGE COLLECTED FROM LAYER 4	16.4300	572553.562	38.92
PERC./LEAKAGE THROUGH LAYER 5	0.627325	21861.025	1.49
AVG. HEAD ON TOP OF LAYER 5	2.5170		
PERC./LEAKAGE THROUGH LAYER 7	0.558590	19465.740	1.32
CHANGE IN WATER STORAGE	9.861	343649.125	23.36
SOIL WATER AT START OF YEAR	188.094	6554707.500	
SOIL WATER AT END OF YEAR	191.932	6688463.500	
SNOW WATER AT START OF YEAR	0.805	28037.561	1.91
SNOW WATER AT END OF YEAR	6.828	237931.094	16.18
ANNUAL WATER BUDGET BALANCE	0.0000	-0.609	0.00

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ANNUAL TOTALS FOR YEAR 8

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.52	1307497.370	100.00
RUNOFF	3.697	128820.141	9.85
EVAPOTRANSPIRATION	12.691	442269.812	33.83
DRAINAGE COLLECTED FROM LAYER 4	24.4954	853614.625	65.29
PERC./LEAKAGE THROUGH LAYER 5	0.787154	27430.738	2.10
AVG. HEAD ON TOP OF LAYER 5	3.2197		
PERC./LEAKAGE THROUGH LAYER 7	0.714373	24894.477	1.90
CHANGE IN WATER STORAGE	-4.078	-142102.516	-10.87
SOIL WATER AT START OF YEAR	191.932	6688463.500	
SOIL WATER AT END OF YEAR	192.652	6713535.000	
SNOW WATER AT START OF YEAR	6.828	237931.094	18.20
SNOW WATER AT END OF YEAR	2.030	70757.133	5.41
ANNUAL WATER BUDGET BALANCE	0.0000	0.854	0.00

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ANNUAL TOTALS FOR YEAR 9

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.01	1498812.370	100.00
RUNOFF	8.208	286037.531	19.08
EVAPOTRANSPIRATION	16.694	581749.625	38.81
DRAINAGE COLLECTED FROM LAYER 4	22.6701	790006.250	52.71
PERC./LEAKAGE THROUGH LAYER 5	0.898322	31304.715	2.09
AVG. HEAD ON TOP OF LAYER 5	3.8300		
PERC./LEAKAGE THROUGH LAYER 7	0.799745	27869.520	1.86
CHANGE IN WATER STORAGE	-5.362	-186849.953	-12.47
SOIL WATER AT START OF YEAR	192.652	6713535.000	
SOIL WATER AT END OF YEAR	189.321	6597442.000	
SNOW WATER AT START OF YEAR	2.030	70757.133	4.72
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.609	0.00

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ANNUAL TOTALS FOR YEAR 10

	INCHES	CU. FEET	PERCENT
PRECIPITATION	34.64	1207134.870	100.00
RUNOFF	12.391	431813.156	35.77
EVAPOTRANSPIRATION	10.142	353444.000	29.28
DRAINAGE COLLECTED FROM LAYER 4	12.1729	424201.562	35.14
PERC./LEAKAGE THROUGH LAYER 5	0.549980	19165.693	1.59
AVG. HEAD ON TOP OF LAYER 5	2.1896		
PERC./LEAKAGE THROUGH LAYER 7	0.767352	26740.697	2.22
CHANGE IN WATER STORAGE	-0.834	-29064.816	-2.41
SOIL WATER AT START OF YEAR	189.321	6597442.000	
SOIL WATER AT END OF YEAR	188.486	6568377.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.289	0.00

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ANNUAL TOTALS FOR YEAR 11

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51.59	1797808.370	100.00
RUNOFF	11.125	387675.000	21.56
EVAPOTRANSPIRATION	12.944	451058.312	25.09
DRAINAGE COLLECTED FROM LAYER 4	21.0647	734062.312	40.83
PERC./LEAKAGE THROUGH LAYER 5	0.637951	22231.320	1.24
AVG. HEAD ON TOP OF LAYER 5	2.5559		
PERC./LEAKAGE THROUGH LAYER 7	0.451387	15729.952	0.87
CHANGE IN WATER STORAGE	6.006	209283.234	11.64
SOIL WATER AT START OF YEAR	188.486	6568377.000	
SOIL WATER AT END OF YEAR	192.362	6703433.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	2.130	74227.016	4.13
ANNUAL WATER BUDGET BALANCE	0.0000	-0.369	0.00

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ANNUAL TOTALS FOR YEAR 12

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.38	1511706.250	100.00
RUNOFF	11.653	406099.125	26.86
EVAPOTRANSPIRATION	12.933	450697.312	29.81
DRAINAGE COLLECTED FROM LAYER 4	17.6831	616220.312	40.76
PERC./LEAKAGE THROUGH LAYER 5	0.641539	22356.361	1.48
AVG. HEAD ON TOP OF LAYER 5	2.4423		
PERC./LEAKAGE THROUGH LAYER 7	0.693528	24168.074	1.60
CHANGE IN WATER STORAGE	0.417	14521.143	0.96
SOIL WATER AT START OF YEAR	192.362	6703433.500	
SOIL WATER AT END OF YEAR	190.067	6623444.500	
SNOW WATER AT START OF YEAR	2.130	74227.016	4.91
SNOW WATER AT END OF YEAR	4.842	168737.016	11.16
ANNUAL WATER BUDGET BALANCE	0.0000	0.295	0.00

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ANNUAL TOTALS FOR YEAR 13

	INCHES	CU. FEET	PERCENT
PRECIPITATION	32.84	1144408.370	100.00
RUNOFF	9.007	313859.781	27.43
EVAPOTRANSPIRATION	12.243	426649.281	37.28
DRAINAGE COLLECTED FROM LAYER 4	12.3661	430933.562	37.66
PERC./LEAKAGE THROUGH LAYER 5	0.444247	15481.111	1.35
AVG. HEAD ON TOP OF LAYER 5	1.6691		
PERC./LEAKAGE THROUGH LAYER 7	0.623941	21743.109	1.90
CHANGE IN WATER STORAGE	-1.400	-48777.371	-4.26
SOIL WATER AT START OF YEAR	190.067	6623444.500	
SOIL WATER AT END OF YEAR	189.350	6598482.000	
SNOW WATER AT START OF YEAR	4.842	168737.016	14.74
SNOW WATER AT END OF YEAR	4.159	144922.109	12.66
ANNUAL WATER BUDGET BALANCE	0.0000	0.052	0.00

ANNUAL TOTALS FOR YEAR 14

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.45	1339905.870	100.00
RUNOFF	5.469	190567.437	14.22
EVAPOTRANSPIRATION	13.250	461740.875	34.46
DRAINAGE COLLECTED FROM LAYER 4	10.0004	348495.406	26.01
PERC./LEAKAGE THROUGH LAYER 5	0.531917	18536.250	1.38
AVG. HEAD ON TOP OF LAYER 5	2.0563		
PERC./LEAKAGE THROUGH LAYER 7	0.403320	14054.903	1.05
CHANGE IN WATER STORAGE	9.328	325047.312	24.26
SOIL WATER AT START OF YEAR	189.350	6598482.000	
SOIL WATER AT END OF YEAR	193.484	6742538.000	
SNOW WATER AT START OF YEAR	4.159	144922.109	10.82
SNOW WATER AT END OF YEAR	9.352	325913.562	24.32
ANNUAL WATER BUDGET BALANCE	0.0000	-0.113	0.00

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ANNUAL TOTALS FOR YEAR 15

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.50	1341648.120	100.00
RUNOFF	19.875	692587.937	51.62
EVAPOTRANSPIRATION	10.709	373194.344	27.82
DRAINAGE COLLECTED FROM LAYER 4	18.5911	647861.000	48.29
PERC./LEAKAGE THROUGH LAYER 5	0.669936	23345.937	1.74
AVG. HEAD ON TOP OF LAYER 5	2.7322		
PERC./LEAKAGE THROUGH LAYER 7	0.729764	25430.807	1.90
CHANGE IN WATER STORAGE	-11.405	-397427.031	-29.62
SOIL WATER AT START OF YEAR	193.484	6742538.000	
SOIL WATER AT END OF YEAR	191.432	6671024.500	
SNOW WATER AT START OF YEAR	9.352	325913.562	24.29
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	1.140	0.00

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ANNUAL TOTALS FOR YEAR 16

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.66	1730551.620	100.00
RUNOFF	6.855	238876.156	13.80
EVAPOTRANSPIRATION	14.309	498634.375	28.81
DRAINAGE COLLECTED FROM LAYER 4	14.1033	491473.562	28.40
PERC./LEAKAGE THROUGH LAYER 5	0.714826	24910.270	1.44
AVG. HEAD ON TOP OF LAYER 5	2.8799		
PERC./LEAKAGE THROUGH LAYER 7	0.678436	23642.148	1.37
CHANGE IN WATER STORAGE	13.715	477926.281	27.62
SOIL WATER AT START OF YEAR	191.432	6671024.500	
SOIL WATER AT END OF YEAR	189.582	6606551.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	15.565	542399.562	31.34
ANNUAL WATER BUDGET BALANCE	0.0000	-0.864	0.00

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ANNUAL TOTALS FOR YEAR 17

	INCHES	CU. FEET	PERCENT
PRECIPITATION	23.33	813003.937	100.00
RUNOFF	9.061	315744.906	38.84
EVAPOTRANSPIRATION	10.493	365670.156	44.98
DRAINAGE COLLECTED FROM LAYER 4	14.5905	508450.187	62.54
PERC./LEAKAGE THROUGH LAYER 5	0.526753	18356.301	2.26
AVG. HEAD ON TOP OF LAYER 5	2.1245		
PERC./LEAKAGE THROUGH LAYER 7	0.627395	21863.457	2.69
CHANGE IN WATER STORAGE	-11.442	-398725.437	-49.04
SOIL WATER AT START OF YEAR	189.582	6606551.000	
SOIL WATER AT END OF YEAR	189.752	6612487.000	
SNOW WATER AT START OF YEAR	15.565	542399.562	66.72
SNOW WATER AT END OF YEAR	3.953	137738.312	16.94
ANNUAL WATER BUDGET BALANCE	0.0000	0.650	0.00

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ANNUAL TOTALS FOR YEAR 18

	INCHES	CU. FEET	PERCENT
PRECIPITATION	31.28	1090045.750	100.00
RUNOFF	6.616	230542.562	21.15
EVAPOTRANSPIRATION	12.629	440080.812	40.37
DRAINAGE COLLECTED FROM LAYER 4	13.2758	462634.375	42.44
PERC./LEAKAGE THROUGH LAYER 5	0.676065	23559.510	2.16
AVG. HEAD ON TOP OF LAYER 5	2.7175		
PERC./LEAKAGE THROUGH LAYER 7	0.520535	18139.613	1.66
CHANGE IN WATER STORAGE	-1.761	-61351.977	-5.63
SOIL WATER AT START OF YEAR	189.752	6612487.000	
SOIL WATER AT END OF YEAR	191.944	6688873.500	
SNOW WATER AT START OF YEAR	3.953	137738.312	12.64
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.316	0.00

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ANNUAL TOTALS FOR YEAR 19

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.47	1549690.750	100.00
RUNOFF	8.380	292029.562	18.84
EVAPOTRANSPIRATION	10.909	380162.156	24.53
DRAINAGE COLLECTED FROM LAYER 4	18.8048	655308.312	42.29
PERC./LEAKAGE THROUGH LAYER 5	0.911206	31753.707	2.05
AVG. HEAD ON TOP OF LAYER 5	3.8796		
PERC./LEAKAGE THROUGH LAYER 7	0.753488	26257.545	1.69
CHANGE IN WATER STORAGE	5.622	195932.703	12.64
SOIL WATER AT START OF YEAR	191.944	6688873.500	
SOIL WATER AT END OF YEAR	193.316	6736673.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	4.251	148133.156	9.56
ANNUAL WATER BUDGET BALANCE	0.0000	0.557	0.00

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ANNUAL TOTALS FOR YEAR 20

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.22	1297042.620	100.00
RUNOFF	9.985	347958.500	26.83
EVAPOTRANSPIRATION	12.746	444180.531	34.25
DRAINAGE COLLECTED FROM LAYER 4	20.9331	729476.375	56.24
PERC./LEAKAGE THROUGH LAYER 5	0.641415	22352.020	1.72
AVG. HEAD ON TOP OF LAYER 5	2.5319		
PERC./LEAKAGE THROUGH LAYER 7	0.868465	30264.268	2.33
CHANGE IN WATER STORAGE	-7.313	-254837.078	-19.65
SOIL WATER AT START OF YEAR	193.316	6736673.000	
SOIL WATER AT END OF YEAR	190.254	6629969.000	
SNOW WATER AT START OF YEAR	4.251	148133.156	11.42
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.116	0.00

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ANNUAL TOTALS FOR YEAR 21

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.69	1696749.120	100.00
RUNOFF	3.375	117616.875	6.93
EVAPOTRANSPIRATION	13.773	479972.000	28.29
DRAINAGE COLLECTED FROM LAYER 4	24.0556	838290.437	49.41
PERC./LEAKAGE THROUGH LAYER 5	0.657344	22907.107	1.35
AVG. HEAD ON TOP OF LAYER 5	2.6824		
PERC./LEAKAGE THROUGH LAYER 7	0.659457	22980.750	1.35
CHANGE IN WATER STORAGE	6.826	237889.375	14.02
SOIL WATER AT START OF YEAR	190.254	6629969.000	
SOIL WATER AT END OF YEAR	192.757	6717194.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	4.323	150663.547	8.88
ANNUAL WATER BUDGET BALANCE	0.0000	-0.249	0.00

ANNUAL TOTALS FOR YEAR 22

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.60	1623917.000	100.00
RUNOFF	4.290	149504.766	9.21
EVAPOTRANSPIRATION	14.514	505768.344	31.14
DRAINAGE COLLECTED FROM LAYER 4	25.5777	891331.187	54.89
PERC./LEAKAGE THROUGH LAYER 5	0.822946	28678.016	1.77
AVG. HEAD ON TOP OF LAYER 5	3.4203		
PERC./LEAKAGE THROUGH LAYER 7	0.719432	25070.764	1.54
CHANGE IN WATER STORAGE	1.499	52241.746	3.22
SOIL WATER AT START OF YEAR	192.757	6717194.500	
SOIL WATER AT END OF YEAR	191.509	6673715.000	
SNOW WATER AT START OF YEAR	4.323	150663.547	9.28
SNOW WATER AT END OF YEAR	7.070	246385.000	15.17
ANNUAL WATER BUDGET BALANCE	0.0000	0.166	0.00

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ANNUAL TOTALS FOR YEAR 23

	INCHES	CU. FEET	PERCENT
PRECIPITATION	25.57	891063.500	100.00
RUNOFF	8.935	311362.062	34.94
EVAPOTRANSPIRATION	10.012	348881.187	39.15
DRAINAGE COLLECTED FROM LAYER 4	17.6873	616368.312	69.17
PERC./LEAKAGE THROUGH LAYER 5	0.494149	17220.111	1.93
AVG. HEAD ON TOP OF LAYER 5	1.9156		
PERC./LEAKAGE THROUGH LAYER 7	0.676901	23588.645	2.65
CHANGE IN WATER STORAGE	-11.741	-409136.812	-45.92
SOIL WATER AT START OF YEAR	191.509	6673715.000	
SOIL WATER AT END OF YEAR	186.839	6510963.000	
SNOW WATER AT START OF YEAR	7.070	246385.000	27.65
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.131	0.00

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ANNUAL TOTALS FOR YEAR 24

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.62	1310981.750	100.00
RUNOFF	8.022	279560.562	21.32
EVAPOTRANSPIRATION	10.717	373480.312	28.49
DRAINAGE COLLECTED FROM LAYER 4	12.4387	433465.187	33.06
PERC./LEAKAGE THROUGH LAYER 5	0.362208	12622.210	0.96
AVG. HEAD ON TOP OF LAYER 5	1.3252		
PERC./LEAKAGE THROUGH LAYER 7	0.380902	13273.678	1.01
CHANGE IN WATER STORAGE	6.061	211202.219	16.11
SOIL WATER AT START OF YEAR	186.839	6510963.000	
SOIL WATER AT END OF YEAR	192.175	6696923.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.724	25242.166	1.93
ANNUAL WATER BUDGET BALANCE	0.0000	-0.143	0.00

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ANNUAL TOTALS FOR YEAR 25

	INCHES	CU. FEET	PERCENT
PRECIPITATION	61.20	2132697.500	100.00
RUNOFF	7.766	270625.437	12.69
EVAPOTRANSPIRATION	20.194	703715.625	33.00
DRAINAGE COLLECTED FROM LAYER 4	27.3745	953946.500	44.73
PERC./LEAKAGE THROUGH LAYER 5	0.945972	32965.238	1.55
AVG. HEAD ON TOP OF LAYER 5	3.9912		
PERC./LEAKAGE THROUGH LAYER 7	0.686883	23936.492	1.12
CHANGE IN WATER STORAGE	5.179	180474.344	8.46
SOIL WATER AT START OF YEAR	192.175	6696923.500	
SOIL WATER AT END OF YEAR	191.506	6673589.000	
SNOW WATER AT START OF YEAR	0.724	25242.166	1.18
SNOW WATER AT END OF YEAR	6.573	229050.781	10.74
ANNUAL WATER BUDGET BALANCE	0.0000	-0.791	0.00

ANNUAL TOTALS FOR YEAR 26

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.60	1310284.870	100.00
RUNOFF	15.954	555964.437	42.43
EVAPOTRANSPIRATION	13.452	468792.406	35.78
DRAINAGE COLLECTED FROM LAYER 4	16.0983	560995.000	42.81
PERC./LEAKAGE THROUGH LAYER 5	0.616684	21490.209	1.64
AVG. HEAD ON TOP OF LAYER 5	2.3723		
PERC./LEAKAGE THROUGH LAYER 7	0.754007	26275.629	2.01
CHANGE IN WATER STORAGE	-8.659	-301742.094	-23.03
SOIL WATER AT START OF YEAR	191.506	6673589.000	
SOIL WATER AT END OF YEAR	189.420	6600897.500	
SNOW WATER AT START OF YEAR	6.573	229050.781	17.48
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.428	0.00

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ANNUAL TOTALS FOR YEAR 27

	INCHES	CU. FEET	PERCENT
PRECIPITATION	53.95	1880049.870	100.00
RUNOFF	4.629	161300.359	8.58
EVAPOTRANSPIRATION	12.710	442914.250	23.56
DRAINAGE COLLECTED FROM LAYER 4	31.7531	1106531.370	58.86
PERC./LEAKAGE THROUGH LAYER 5	0.757888	26410.889	1.40
AVG. HEAD ON TOP OF LAYER 5	3.2167		
PERC./LEAKAGE THROUGH LAYER 7	0.656658	22883.217	1.22
CHANGE IN WATER STORAGE	4.202	146420.531	7.79
SOIL WATER AT START OF YEAR	189.420	6600897.500	
SOIL WATER AT END OF YEAR	193.621	6747318.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.108	0.00

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ANNUAL TOTALS FOR YEAR 28

	INCHES	CU. FEET	PERCENT
PRECIPITATION	50.61	1763657.750	100.00
RUNOFF	15.803	550694.812	31.22
EVAPOTRANSPIRATION	8.419	293392.281	16.64
DRAINAGE COLLECTED FROM LAYER 4	23.1165	805564.437	45.68
PERC./LEAKAGE THROUGH LAYER 5	0.641967	22371.273	1.27
AVG. HEAD ON TOP OF LAYER 5	2.6805		
PERC./LEAKAGE THROUGH LAYER 7	0.842263	29351.178	1.66
CHANGE IN WATER STORAGE	2.429	84654.539	4.80
SOIL WATER AT START OF YEAR	193.621	6747318.000	
SOIL WATER AT END OF YEAR	187.674	6540060.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	8.377	291912.312	16.55
ANNUAL WATER BUDGET BALANCE	0.0000	0.577	0.00

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ANNUAL TOTALS FOR YEAR 29

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.89	1599174.870	100.00
RUNOFF	16.873	587994.312	36.77
EVAPOTRANSPIRATION	13.068	455384.531	28.48
DRAINAGE COLLECTED FROM LAYER 4	19.2205	669796.000	41.88
PERC./LEAKAGE THROUGH LAYER 5	0.543467	18938.730	1.18
AVG. HEAD ON TOP OF LAYER 5	2.1511		
PERC./LEAKAGE THROUGH LAYER 7	0.452345	15763.310	0.99
CHANGE IN WATER STORAGE	-3.724	-129763.273	-8.11
SOIL WATER AT START OF YEAR	187.674	6540060.500	
SOIL WATER AT END OF YEAR	191.215	6663462.000	
SNOW WATER AT START OF YEAR	8.377	291912.312	18.25
SNOW WATER AT END OF YEAR	1.112	38747.453	2.42
ANNUAL WATER BUDGET BALANCE	0.0000	0.093	0.00

ANNUAL TOTALS FOR YEAR 30

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.11	1676537.370	100.00
RUNOFF	5.645	196717.187	11.73
EVAPOTRANSPIRATION	18.205	634391.125	37.84
DRAINAGE COLLECTED FROM LAYER 4	20.7834	724258.500	43.20
PERC./LEAKAGE THROUGH LAYER 5	0.697019	24289.725	1.45
AVG. HEAD ON TOP OF LAYER 5	2.8375		
PERC./LEAKAGE THROUGH LAYER 7	0.647011	22547.029	1.34
CHANGE IN WATER STORAGE	2.830	98623.930	5.88
SOIL WATER AT START OF YEAR	191.215	6663462.000	
SOIL WATER AT END OF YEAR	194.369	6773383.000	
SNOW WATER AT START OF YEAR	1.112	38747.453	2.31
SNOW WATER AT END OF YEAR	0.788	27450.434	1.64
ANNUAL WATER BUDGET BALANCE	0.0000	-0.357	0.00

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 30

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	8.44	5.19	4.69	4.18	1.79	0.66
	0.32	1.04	0.86	1.82	5.00	7.70
STD. DEVIATIONS	4.07	4.48	3.29	3.35	1.55	0.67
	0.36	1.24	1.26	1.87	4.50	6.01
RUNOFF						
TOTALS	2.317	4.677	1.463	0.336	0.049	0.000
	0.000	0.004	0.013	0.105	0.507	0.445
STD. DEVIATIONS	2.801	4.683	2.400	0.577	0.114	0.000
	0.000	0.016	0.061	0.247	0.820	0.744
EVAPOTRANSPIRATION						
TOTALS	0.652	0.785	1.898	1.853	1.480	1.222
	1.073	0.756	0.673	0.698	1.004	0.781
STD. DEVIATIONS	0.216	0.489	0.514	0.759	0.943	0.519
	0.473	0.909	0.798	0.604	0.385	0.220
LATERAL DRAINAGE COLLECTED FROM LAYER 4						
TOTALS	1.7622	2.8373	4.9765	2.3651	1.5261	0.8269
	0.4476	0.2673	0.1524	0.1594	0.9107	1.9794
STD. DEVIATIONS	2.3022	2.2538	2.5200	1.1981	0.7348	0.3834
	0.1827	0.0850	0.0351	0.2127	1.5140	2.3914
PERCOLATION/LEAKAGE THROUGH LAYER 5						
TOTALS	0.0653	0.0778	0.1147	0.0957	0.0770	0.0471
	0.0295	0.0199	0.0129	0.0126	0.0314	0.0641
STD. DEVIATIONS	0.0425	0.0434	0.0251	0.0243	0.0298	0.0172
	0.0093	0.0049	0.0023	0.0107	0.0305	0.0457
PERCOLATION/LEAKAGE THROUGH LAYER 7						
TOTALS	0.0292	0.0300	0.0317	0.0220	0.0355	0.0558
	0.0710	0.0881	0.0715	0.0743	0.0700	0.0555
STD. DEVIATIONS	0.0193	0.0205	0.0261	0.0207	0.0451	0.0465
	0.0424	0.0323	0.0279	0.0229	0.0282	0.0253

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 5						
AVERAGES	3.1565	4.3958	6.0457	5.0063	3.6905	2.0664
	1.0823	0.6465	0.3807	0.3855	1.4821	3.1355
STD. DEVIATIONS	2.4163	2.8288	1.5795	1.5503	1.7770	0.9581
	0.4417	0.2057	0.0876	0.5143	1.7138	2.5644

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 30

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.69 (9.045)	1452929.5	100.00
RUNOFF	9.918 (5.6089)	345618.06	23.788
EVAPOTRANSPIRATION	12.875 (2.6416)	448681.50	30.881
LATERAL DRAINAGE COLLECTED FROM LAYER 4	18.21088 (5.27491)	634612.937	43.67817
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.64793 (0.13935)	22579.139	1.55404
AVERAGE HEAD ON TOP OF LAYER 5	2.623 (0.657)		
PERCOLATION/LEAKAGE THROUGH LAYER 7	0.63445 (0.13247)	22109.373	1.52171
CHANGE IN WATER STORAGE	0.055 (7.1354)	1907.48	0.131

PEAK DAILY VALUES FOR YEARS 1 THROUGH 30

	(INCHES)	(CU. FT.)
PRECIPITATION	9.01	313980.500
RUNOFF	7.089	247053.4840
DRAINAGE COLLECTED FROM LAYER 4	6.13572	213817.65600
PERCOLATION/LEAKAGE THROUGH LAYER 5	0.007360	256.48965
AVERAGE HEAD ON TOP OF LAYER 5	14.215	
MAXIMUM HEAD ON TOP OF LAYER 5	6.087	
LOCATION OF MAXIMUM HEAD IN LAYER 4 (DISTANCE FROM DRAIN)	0.4 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 7	0.047925	1670.09888
SNOW WATER	20.43	711790.1870

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4570
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0580

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

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FINAL WATER STORAGE AT END OF YEAR 30

LAYER	(INCHES)	(VOL/VOL)
1	2.4755	0.2063
2	6.1386	0.2558
3	0.0497	0.2483
4	4.9352	0.4113
5	0.0000	0.0000
6	4.0096	0.1671
7	175.1888	0.2920
SNOW WATER	0.788	

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**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE                **
**                HELP MODEL VERSION 3.07  (1 NOVEMBER 1997)                 **
**                   DEVELOPED BY ENVIRONMENTAL LABORATORY                   **
**                     USAE WATERWAYS EXPERIMENT STATION                     **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY               **
**                                                                           **
**                                                                           **
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PRECIPITATION DATA FILE:    C:\HELP\USER\DATAML.D4
TEMPERATURE DATA FILE:      C:\HELP\USER\DATAML.D7
SOLAR RADIATION DATA FILE:  C:\HELP\USER\DATAML.D13
EVAPOTRANSPIRATION DATA:    C:\HELP\USER\DATAML.D11
SOIL AND DESIGN DATA FILE:  C:\HELP\USER\DATAMLXX.D10
OUTPUT DATA FILE:           C:\HELP\USER\MLXX.OUT


TIME:  11:53     DATE:  11/18/2008


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     TITLE:  Meyers Landfill

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                LAYER  1
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                    TYPE 1 - VERTICAL PERCOLATION LAYER
                        MATERIAL TEXTURE NUMBER   5
          THICKNESS                     =     12.00   INCHES
          POROSITY                      =      0.4570 VOL/VOL
          FIELD CAPACITY                =      0.1310 VOL/VOL
          WILTING POINT                 =      0.0580 VOL/VOL
          INITIAL SOIL WATER CONTENT    =      0.3525 VOL/VOL
          EFFECTIVE SAT. HYD. COND.     =  0.100000005000E-02 CM/SEC
        NOTE:  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  2.01
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.



                                LAYER  2
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                    TYPE 1 - VERTICAL PERCOLATION LAYER
                        MATERIAL TEXTURE NUMBER   5
          THICKNESS                     =     24.00   INCHES
          POROSITY                      =      0.4570 VOL/VOL
          FIELD CAPACITY                =      0.1310 VOL/VOL
          WILTING POINT                 =      0.0580 VOL/VOL
          INITIAL SOIL WATER CONTENT    =      0.1721 VOL/VOL
          EFFECTIVE SAT. HYD. COND.     =  0.100000005000E-02 CM/SEC
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LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 20

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0109	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	10.0000000000	CM/SEC
SLOPE	=	25.00	PERCENT
DRAINAGE LENGTH	=	100.0	FEET

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 36

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.399999993000E-12	CM/SEC
FML PINHOLE DENSITY	=	2.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	4 - POOR	

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 5

THICKNESS	=	24.00	INCHES
POROSITY	=	0.4570	VOL/VOL
FIELD CAPACITY	=	0.1310	VOL/VOL
WILTING POINT	=	0.0580	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1310	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

LAYER 6

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	600.00	INCHES
POROSITY	=	0.6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2920	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 5 WITH A POOR STAND OF GRASS, A SURFACE SLOPE OF 25.% AND A SLOPE LENGTH OF 100. FEET.

SCS RUNOFF CURVE NUMBER	=	79.90	
FRACTION OF AREA ALLOWING RUNOFF	=	70.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	9.600	ACRES
EVAPORATIVE ZONE DEPTH	=	18.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	4.578	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	8.226	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	1.044	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	186.683	INCHES
TOTAL INITIAL WATER	=	186.683	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM RENO NEVADA

STATION LATITUDE	=	38.50 DEGREES
MAXIMUM LEAF AREA INDEX	=	1.20
START OF GROWING SEASON (JULIAN DATE)	=	129
END OF GROWING SEASON (JULIAN DATE)	=	281
EVAPORATIVE ZONE DEPTH	=	18.0 INCHES
AVERAGE ANNUAL WIND SPEED	=	6.40 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	60.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	43.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	40.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	59.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR RENO NEVADA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
7.81	6.09	4.52	3.52	1.78	1.07
0.33	0.98	0.78	2.64	5.74	7.11

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR RENO NEVADA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
32.20	37.40	40.60	46.40	54.60	62.40
69.50	66.90	60.20	50.30	39.70	32.50

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR RENO NEVADA AND STATION LATITUDE = 38.53 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	30.56	1064955.000	100.00
RUNOFF	3.392	118214.781	11.10
EVAPOTRANSPIRATION	7.382	257243.031	24.16
DRAINAGE COLLECTED FROM LAYER 3	19.7906	689661.500	64.76
PERC./LEAKAGE THROUGH LAYER 4	0.000723	25.201	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0004		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-0.005	-164.839	-0.02
SOIL WATER AT START OF YEAR	188.255	6560308.000	
SOIL WATER AT END OF YEAR	188.250	6560143.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.548	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	56.20	1958457.750	100.00
RUNOFF	12.276	427786.937	21.84
EVAPOTRANSPIRATION	7.643	266336.969	13.60
DRAINAGE COLLECTED FROM LAYER 3	22.1633	772347.875	39.44
PERC./LEAKAGE THROUGH LAYER 4	0.000783	27.298	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0005		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	14.118	491985.750	25.12
SOIL WATER AT START OF YEAR	188.250	6560143.000	
SOIL WATER AT END OF YEAR	184.968	6445748.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	17.401	606380.250	30.96
ANNUAL WATER BUDGET BALANCE	0.0000	0.183	0.00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.62	1659461.750	100.00
RUNOFF	20.478	713622.875	43.00
EVAPOTRANSPIRATION	7.353	256248.391	15.44
DRAINAGE COLLECTED FROM LAYER 3	21.4354	746979.937	45.01
PERC./LEAKAGE THROUGH LAYER 4	0.000732	25.522	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0004		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-1.647	-57389.254	-3.46
SOIL WATER AT START OF YEAR	184.968	6445748.500	
SOIL WATER AT END OF YEAR	185.103	6450461.500	
SNOW WATER AT START OF YEAR	17.401	606380.250	36.54
SNOW WATER AT END OF YEAR	15.619	544278.187	32.80
ANNUAL WATER BUDGET BALANCE	0.0000	-0.100	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.51	1376844.750	100.00
RUNOFF	24.216	843885.125	61.29
EVAPOTRANSPIRATION	4.912	171160.656	12.43
DRAINAGE COLLECTED FROM LAYER 3	21.9963	766527.625	55.67
PERC./LEAKAGE THROUGH LAYER 4	0.000749	26.092	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0005		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-11.614	-404728.937	-29.40
SOIL WATER AT START OF YEAR	185.103	6450461.500	
SOIL WATER AT END OF YEAR	186.618	6503270.500	
SNOW WATER AT START OF YEAR	15.619	544278.187	39.53
SNOW WATER AT END OF YEAR	2.489	86740.187	6.30
ANNUAL WATER BUDGET BALANCE	0.0000	0.291	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.65	1521115.120	100.00
RUNOFF	9.332	325210.594	21.38
EVAPOTRANSPIRATION	8.933	311306.406	20.47
DRAINAGE COLLECTED FROM LAYER 3	27.8958	972112.687	63.91
PERC./LEAKAGE THROUGH LAYER 4	0.000964	33.589	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0006		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-2.511	-87514.398	-5.75
SOIL WATER AT START OF YEAR	186.618	6503270.500	
SOIL WATER AT END OF YEAR	186.596	6502496.500	
SNOW WATER AT START OF YEAR	2.489	86740.187	5.70
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.058	0.00

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ANNUAL TOTALS FOR YEAR 6

	INCHES	CU. FEET	PERCENT
PRECIPITATION	29.32	1021743.500	100.00
RUNOFF	6.318	220179.562	21.55
EVAPOTRANSPIRATION	5.799	202082.094	19.78
DRAINAGE COLLECTED FROM LAYER 3	18.3011	637755.000	62.42
PERC./LEAKAGE THROUGH LAYER 4	0.000703	24.498	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0004		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-1.098	-38272.867	-3.75
SOIL WATER AT START OF YEAR	186.596	6502496.500	
SOIL WATER AT END OF YEAR	184.693	6436186.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.805	28037.561	2.74
ANNUAL WATER BUDGET BALANCE	0.0000	-0.278	0.00

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ANNUAL TOTALS FOR YEAR 7

	INCHES	CU. FEET	PERCENT
PRECIPITATION	42.21	1470933.870	100.00
RUNOFF	2.267	78994.445	5.37
EVAPOTRANSPIRATION	8.158	284281.750	19.33
DRAINAGE COLLECTED FROM LAYER 3	25.0113	871593.187	59.25
PERC./LEAKAGE THROUGH LAYER 4	0.000858	29.887	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0005		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	6.774	236064.625	16.05
SOIL WATER AT START OF YEAR	184.693	6436186.000	
SOIL WATER AT END OF YEAR	185.444	6462357.000	
SNOW WATER AT START OF YEAR	0.805	28037.561	1.91
SNOW WATER AT END OF YEAR	6.828	237931.094	16.18
ANNUAL WATER BUDGET BALANCE	0.0000	-0.170	0.00

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ANNUAL TOTALS FOR YEAR 8

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.52	1307497.370	100.00
RUNOFF	2.566	89432.422	6.84
EVAPOTRANSPIRATION	8.268	288116.781	22.04
DRAINAGE COLLECTED FROM LAYER 3	29.7357	1036228.940	79.25
PERC./LEAKAGE THROUGH LAYER 4	0.000956	33.316	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0006		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-3.050	-106281.422	-8.13
SOIL WATER AT START OF YEAR	185.444	6462357.000	
SOIL WATER AT END OF YEAR	187.191	6523249.500	
SNOW WATER AT START OF YEAR	6.828	237931.094	18.20
SNOW WATER AT END OF YEAR	2.030	70757.133	5.41
ANNUAL WATER BUDGET BALANCE	0.0000	0.706	0.00

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ANNUAL TOTALS FOR YEAR 9

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.01	1498812.370	100.00
RUNOFF	7.233	252048.437	16.82
EVAPOTRANSPIRATION	7.195	250732.641	16.73
DRAINAGE COLLECTED FROM LAYER 3	33.2386	1158297.120	77.28
PERC./LEAKAGE THROUGH LAYER 4	0.001061	36.989	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0007		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-4.656	-162265.562	-10.83
SOIL WATER AT START OF YEAR	187.191	6523249.500	
SOIL WATER AT END OF YEAR	184.566	6431741.000	
SNOW WATER AT START OF YEAR	2.030	70757.133	4.72
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.258	0.00

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ANNUAL TOTALS FOR YEAR 10

	INCHES	CU. FEET	PERCENT
PRECIPITATION	34.64	1207134.870	100.00
RUNOFF	11.885	414159.531	34.31
EVAPOTRANSPIRATION	6.745	235055.109	19.47
DRAINAGE COLLECTED FROM LAYER 3	16.0948	560870.625	46.46
PERC./LEAKAGE THROUGH LAYER 4	0.000612	21.311	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0003		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-0.085	-2950.616	-0.24
SOIL WATER AT START OF YEAR	184.566	6431741.000	
SOIL WATER AT END OF YEAR	184.481	6428790.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.216	0.00

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ANNUAL TOTALS FOR YEAR 11

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51.59	1797808.370	100.00
RUNOFF	9.735	339259.406	18.87
EVAPOTRANSPIRATION	8.972	312657.656	17.39
DRAINAGE COLLECTED FROM LAYER 3	30.0210	1046172.190	58.19
PERC./LEAKAGE THROUGH LAYER 4	0.000947	33.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0006		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	2.862	99719.078	5.55
SOIL WATER AT START OF YEAR	184.481	6428790.500	
SOIL WATER AT END OF YEAR	185.212	6454282.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	2.130	74227.016	4.13
ANNUAL WATER BUDGET BALANCE	0.0000	0.100	0.00

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ANNUAL TOTALS FOR YEAR 12

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.38	1511706.250	100.00
RUNOFF	10.508	366183.094	24.22
EVAPOTRANSPIRATION	7.730	269367.000	17.82
DRAINAGE COLLECTED FROM LAYER 3	22.9222	798793.812	52.84
PERC./LEAKAGE THROUGH LAYER 4	0.000795	27.703	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0005		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	2.220	77362.508	5.12
SOIL WATER AT START OF YEAR	185.212	6454282.500	
SOIL WATER AT END OF YEAR	184.720	6437135.000	
SNOW WATER AT START OF YEAR	2.130	74227.016	4.91
SNOW WATER AT END OF YEAR	4.842	168737.016	11.16
ANNUAL WATER BUDGET BALANCE	0.0000	-0.183	0.00

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ANNUAL TOTALS FOR YEAR 13

	INCHES	CU. FEET	PERCENT
PRECIPITATION	32.84	1144408.370	100.00
RUNOFF	7.576	264005.312	23.07
EVAPOTRANSPIRATION	5.401	188207.062	16.45
DRAINAGE COLLECTED FROM LAYER 3	19.8720	692499.250	60.51
PERC./LEAKAGE THROUGH LAYER 4	0.000747	26.033	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0004		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-0.009	-303.573	-0.03
SOIL WATER AT START OF YEAR	184.720	6437135.000	
SOIL WATER AT END OF YEAR	185.395	6460646.500	
SNOW WATER AT START OF YEAR	4.842	168737.016	14.74
SNOW WATER AT END OF YEAR	4.159	144922.109	12.66
ANNUAL WATER BUDGET BALANCE	0.0000	0.299	0.00

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ANNUAL TOTALS FOR YEAR 14

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.45	1339905.870	100.00
RUNOFF	4.386	152837.875	11.41
EVAPOTRANSPIRATION	7.556	263325.844	19.65
DRAINAGE COLLECTED FROM LAYER 3	19.8452	691564.062	51.61
PERC./LEAKAGE THROUGH LAYER 4	0.000749	26.101	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0004		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	6.663	232178.172	17.33
SOIL WATER AT START OF YEAR	185.395	6460646.500	
SOIL WATER AT END OF YEAR	186.864	6511833.000	
SNOW WATER AT START OF YEAR	4.159	144922.109	10.82
SNOW WATER AT END OF YEAR	9.352	325913.562	24.32
ANNUAL WATER BUDGET BALANCE	0.0000	-0.150	0.00

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ANNUAL TOTALS FOR YEAR 15

	INCHES	CU. FEET	PERCENT
PRECIPITATION	38.50	1341648.120	100.00
RUNOFF	19.092	665334.500	49.59
EVAPOTRANSPIRATION	5.887	205148.094	15.29
DRAINAGE COLLECTED FROM LAYER 3	24.8234	865044.375	64.48
PERC./LEAKAGE THROUGH LAYER 4	0.000821	28.593	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0005		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-11.303	-393878.750	-29.36
SOIL WATER AT START OF YEAR	186.864	6511833.000	
SOIL WATER AT END OF YEAR	184.914	6443868.000	
SNOW WATER AT START OF YEAR	9.352	325913.562	24.29
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.033	0.00

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ANNUAL TOTALS FOR YEAR 16

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.66	1730551.620	100.00
RUNOFF	5.203	181324.922	10.48
EVAPOTRANSPIRATION	7.637	266136.375	15.38
DRAINAGE COLLECTED FROM LAYER 3	20.3273	708365.812	40.93
PERC./LEAKAGE THROUGH LAYER 4	0.000759	26.436	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0004		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	16.492	574724.437	33.21
SOIL WATER AT START OF YEAR	184.914	6443868.000	
SOIL WATER AT END OF YEAR	185.841	6476193.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	15.565	542399.562	31.34
ANNUAL WATER BUDGET BALANCE	0.0000	0.083	0.00

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ANNUAL TOTALS FOR YEAR 17

	INCHES	CU. FEET	PERCENT
PRECIPITATION	23.33	813003.937	100.00
RUNOFF	8.233	286910.781	35.29
EVAPOTRANSPIRATION	7.778	271040.500	33.34
DRAINAGE COLLECTED FROM LAYER 3	19.7659	688802.937	84.72
PERC./LEAKAGE THROUGH LAYER 4	0.000689	24.018	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0004		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-12.447	-433749.969	-53.35
SOIL WATER AT START OF YEAR	185.841	6476193.000	
SOIL WATER AT END OF YEAR	185.006	6447104.000	
SNOW WATER AT START OF YEAR	15.565	542399.562	66.72
SNOW WATER AT END OF YEAR	3.953	137738.312	16.94
ANNUAL WATER BUDGET BALANCE	0.0000	-0.324	0.00

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ANNUAL TOTALS FOR YEAR 18

	INCHES	CU. FEET	PERCENT
PRECIPITATION	31.28	1090045.750	100.00
RUNOFF	4.926	171644.594	15.75
EVAPOTRANSPIRATION	8.786	306169.094	28.09
DRAINAGE COLLECTED FROM LAYER 3	20.5737	716951.500	65.77
PERC./LEAKAGE THROUGH LAYER 4	0.000759	26.446	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0004		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-3.005	-104720.023	-9.61
SOIL WATER AT START OF YEAR	185.006	6447104.000	
SOIL WATER AT END OF YEAR	185.954	6480122.500	
SNOW WATER AT START OF YEAR	3.953	137738.312	12.64
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.507	0.00

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ANNUAL TOTALS FOR YEAR 19

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.47	1549690.750	100.00
RUNOFF	7.173	249971.391	16.13
EVAPOTRANSPIRATION	9.880	344294.781	22.22
DRAINAGE COLLECTED FROM LAYER 3	20.7873	724396.000	46.74
PERC./LEAKAGE THROUGH LAYER 4	0.000741	25.830	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0004		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	6.630	231028.500	14.91
SOIL WATER AT START OF YEAR	185.954	6480122.500	
SOIL WATER AT END OF YEAR	188.333	6563018.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	4.251	148133.156	9.56
ANNUAL WATER BUDGET BALANCE	0.0000	0.150	0.00

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ANNUAL TOTALS FOR YEAR 20

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.22	1297042.620	100.00
RUNOFF	9.762	340199.406	26.23
EVAPOTRANSPIRATION	6.681	232825.219	17.95
DRAINAGE COLLECTED FROM LAYER 3	27.7672	967631.875	74.60
PERC./LEAKAGE THROUGH LAYER 4	0.000893	31.108	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0006		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-6.991	-243614.219	-18.78
SOIL WATER AT START OF YEAR	188.333	6563018.000	
SOIL WATER AT END OF YEAR	185.593	6467536.500	
SNOW WATER AT START OF YEAR	4.251	148133.156	11.42
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.366	0.00

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ANNUAL TOTALS FOR YEAR 21

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.69	1696749.120	100.00
RUNOFF	2.440	85017.102	5.01
EVAPOTRANSPIRATION	5.878	204849.969	12.07
DRAINAGE COLLECTED FROM LAYER 3	33.1886	1156557.750	68.16
PERC./LEAKAGE THROUGH LAYER 4	0.001060	36.952	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0007		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	7.183	250325.141	14.75
SOIL WATER AT START OF YEAR	185.593	6467536.500	
SOIL WATER AT END OF YEAR	188.453	6567198.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	4.323	150663.547	8.88
ANNUAL WATER BUDGET BALANCE	0.0000	-0.831	0.00

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ANNUAL TOTALS FOR YEAR 22

	INCHES	CU. FEET	PERCENT
PRECIPITATION	46.60	1623917.000	100.00
RUNOFF	3.536	123223.742	7.59
EVAPOTRANSPIRATION	6.663	232183.547	14.30
DRAINAGE COLLECTED FROM LAYER 3	35.9130	1251496.000	77.07
PERC./LEAKAGE THROUGH LAYER 4	0.001115	38.865	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0007		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	0.488	17014.080	1.05
SOIL WATER AT START OF YEAR	188.453	6567198.500	
SOIL WATER AT END OF YEAR	186.194	6488491.000	
SNOW WATER AT START OF YEAR	4.323	150663.547	9.28
SNOW WATER AT END OF YEAR	7.070	246385.000	15.17
ANNUAL WATER BUDGET BALANCE	0.0000	-0.366	0.00

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ANNUAL TOTALS FOR YEAR 23

	INCHES	CU. FEET	PERCENT
PRECIPITATION	25.57	891063.500	100.00
RUNOFF	8.567	298556.750	33.51
EVAPOTRANSPIRATION	7.129	248442.844	27.88
DRAINAGE COLLECTED FROM LAYER 3	18.6703	650623.750	73.02
PERC./LEAKAGE THROUGH LAYER 4	0.000663	23.114	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0004		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-8.797	-306560.250	-34.40
SOIL WATER AT START OF YEAR	186.194	6488491.000	
SOIL WATER AT END OF YEAR	184.467	6428315.500	
SNOW WATER AT START OF YEAR	7.070	246385.000	27.65
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.415	0.00

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ANNUAL TOTALS FOR YEAR 24

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.62	1310981.750	100.00
RUNOFF	6.304	219675.484	16.76
EVAPOTRANSPIRATION	7.270	253350.875	19.33
DRAINAGE COLLECTED FROM LAYER 3	20.1196	701128.250	53.48
PERC./LEAKAGE THROUGH LAYER 4	0.000699	24.352	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0004		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	3.926	136827.453	10.44
SOIL WATER AT START OF YEAR	184.467	6428315.500	
SOIL WATER AT END OF YEAR	187.669	6539901.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.724	25242.166	1.93
ANNUAL WATER BUDGET BALANCE	0.0000	-0.282	0.00

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ANNUAL TOTALS FOR YEAR 25

	INCHES	CU. FEET	PERCENT
PRECIPITATION	61.20	2132697.500	100.00
RUNOFF	7.268	253258.031	11.88
EVAPOTRANSPIRATION	11.344	395322.281	18.54
DRAINAGE COLLECTED FROM LAYER 3	39.6384	1381319.000	64.77
PERC./LEAKAGE THROUGH LAYER 4	0.001225	42.697	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0008		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	2.950	102798.016	4.82
SOIL WATER AT START OF YEAR	187.669	6539901.000	
SOIL WATER AT END OF YEAR	184.771	6438890.500	
SNOW WATER AT START OF YEAR	0.724	25242.166	1.18
SNOW WATER AT END OF YEAR	6.573	229050.781	10.74
ANNUAL WATER BUDGET BALANCE	0.0000	0.216	0.00

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ANNUAL TOTALS FOR YEAR 26

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.60	1310284.870	100.00
RUNOFF	14.758	514294.937	39.25
EVAPOTRANSPIRATION	7.509	261657.297	19.97
DRAINAGE COLLECTED FROM LAYER 3	22.1643	772381.187	58.95
PERC./LEAKAGE THROUGH LAYER 4	0.000775	27.003	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0005		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-6.831	-238048.328	-18.17
SOIL WATER AT START OF YEAR	184.771	6438890.500	
SOIL WATER AT END OF YEAR	184.513	6429893.000	
SNOW WATER AT START OF YEAR	6.573	229050.781	17.48
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.150	0.00

****

****

ANNUAL TOTALS FOR YEAR 27

	INCHES	CU. FEET	PERCENT
PRECIPITATION	53.95	1880049.870	100.00
RUNOFF	3.140	109405.328	5.82
EVAPOTRANSPIRATION	4.169	145268.562	7.73
DRAINAGE COLLECTED FROM LAYER 3	44.5109	1551114.370	82.50
PERC./LEAKAGE THROUGH LAYER 4	0.001259	43.883	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0009		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	2.131	74260.445	3.95
SOIL WATER AT START OF YEAR	184.513	6429893.000	
SOIL WATER AT END OF YEAR	186.644	6504153.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	1.113	0.00

****

****

ANNUAL TOTALS FOR YEAR 28

	INCHES	CU. FEET	PERCENT
PRECIPITATION	50.61	1763657.750	100.00
RUNOFF	15.227	530619.812	30.09
EVAPOTRANSPIRATION	6.400	223033.562	12.65
DRAINAGE COLLECTED FROM LAYER 3	22.3089	777422.125	44.08
PERC./LEAKAGE THROUGH LAYER 4	0.000768	26.772	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0005		
PERC./LEAKAGE THROUGH LAYER 6	0.023962	835.036	0.05
CHANGE IN WATER STORAGE	6.650	231746.641	13.14
SOIL WATER AT START OF YEAR	186.644	6504153.500	
SOIL WATER AT END OF YEAR	184.917	6443987.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	8.377	291912.312	16.55
ANNUAL WATER BUDGET BALANCE	0.0000	0.608	0.00

****

****

ANNUAL TOTALS FOR YEAR 29

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.89	1599174.870	100.00
RUNOFF	15.498	540074.375	33.77
EVAPOTRANSPIRATION	7.387	257434.516	16.10
DRAINAGE COLLECTED FROM LAYER 3	30.0254	1046326.560	65.43
PERC./LEAKAGE THROUGH LAYER 4	0.000923	32.157	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0006		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-7.021	-244660.766	-15.30
SOIL WATER AT START OF YEAR	184.917	6443987.500	
SOIL WATER AT END OF YEAR	185.161	6452491.500	
SNOW WATER AT START OF YEAR	8.377	291912.312	18.25
SNOW WATER AT END OF YEAR	1.112	38747.453	2.42
ANNUAL WATER BUDGET BALANCE	0.0000	0.237	0.00

****

****

ANNUAL TOTALS FOR YEAR 30

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.11	1676537.370	100.00
RUNOFF	4.172	145379.156	8.67
EVAPOTRANSPIRATION	7.815	272339.781	16.24
DRAINAGE COLLECTED FROM LAYER 3	35.3417	1231585.870	73.46
PERC./LEAKAGE THROUGH LAYER 4	0.001109	38.634	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0007		
PERC./LEAKAGE THROUGH LAYER 6	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	0.781	27232.742	1.62
SOIL WATER AT START OF YEAR	185.161	6452491.500	
SOIL WATER AT END OF YEAR	186.267	6491021.500	
SNOW WATER AT START OF YEAR	1.112	38747.453	2.31
SNOW WATER AT END OF YEAR	0.788	27450.434	1.64
ANNUAL WATER BUDGET BALANCE	0.0000	-0.212	0.00

****

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 30

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	8.44	5.19	4.69	4.18	1.79	0.66
	0.32	1.04	0.86	1.82	5.00	7.70
STD. DEVIATIONS	4.07	4.48	3.29	3.35	1.55	0.67
	0.36	1.24	1.26	1.87	4.50	6.01
RUNOFF						
TOTALS	2.071	4.381	1.404	0.252	0.035	0.000
	0.000	0.003	0.009	0.078	0.357	0.325
STD. DEVIATIONS	2.675	4.611	2.348	0.466	0.097	0.000
	0.000	0.015	0.047	0.173	0.636	0.566
EVAPOTRANSPIRATION						
TOTALS	0.569	0.793	1.842	1.658	0.897	0.312
	0.056	0.064	0.078	0.138	0.372	0.562
STD. DEVIATIONS	0.207	0.489	0.569	0.758	0.688	0.362
	0.138	0.100	0.178	0.218	0.383	0.283
LATERAL DRAINAGE COLLECTED FROM LAYER 3						
TOTALS	1.9175	3.2248	4.8074	3.1595	1.8768	0.8512
	0.5082	0.7383	0.9075	1.4441	3.4078	2.6318
STD. DEVIATIONS	2.6863	2.3974	2.7976	2.0323	1.2260	0.4452
	0.2742	0.7371	1.0147	1.3156	2.4744	2.7451
PERCOLATION/LEAKAGE THROUGH LAYER 4						
TOTALS	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000
	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001
STD. DEVIATIONS	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001
PERCOLATION/LEAKAGE THROUGH LAYER 6						
TOTALS	0.0000	0.0000	0.0000	0.0008	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0044	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 4						
AVERAGES	0.0005	0.0009	0.0012	0.0008	0.0005	0.0002
	0.0001	0.0002	0.0002	0.0003	0.0009	0.0006
STD. DEVIATIONS	0.0006	0.0006	0.0007	0.0005	0.0003	0.0001
	0.0001	0.0002	0.0003	0.0003	0.0006	0.0007

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 30

	INCHES		CU. FEET	PERCENT
PRECIPITATION	41.69	(9.045)	1452929.5	100.00
RUNOFF	8.916	(5.6611)	310690.34	21.384
EVAPOTRANSPIRATION	7.342	(1.4464)	255853.98	17.610
LATERAL DRAINAGE COLLECTED FROM LAYER 3	25.47497	(7.05187)	887751.875	61.10082
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.00085	(0.00017)	29.780	0.00205
AVERAGE HEAD ON TOP OF LAYER 4	0.001	(0.000)		
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.00080	(0.00437)	27.835	0.00192
CHANGE IN WATER STORAGE	-0.040	(7.0319)	-1394.54	-0.096

PEAK DAILY VALUES FOR YEARS 1 THROUGH 30

	(INCHES)	(CU. FT.)
PRECIPITATION	9.01	313980.500
RUNOFF	7.013	244395.8120
DRAINAGE COLLECTED FROM LAYER 3	3.30365	115125.46100
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000051	1.76683
AVERAGE HEAD ON TOP OF LAYER 4	0.025	
MAXIMUM HEAD ON TOP OF LAYER 4	0.048	
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	0.0 FEET	
PERCOLATION/LEAKAGE THROUGH LAYER 6	0.023636	823.68005
SNOW WATER	20.43	711790.1870

MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4570
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0580

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

****

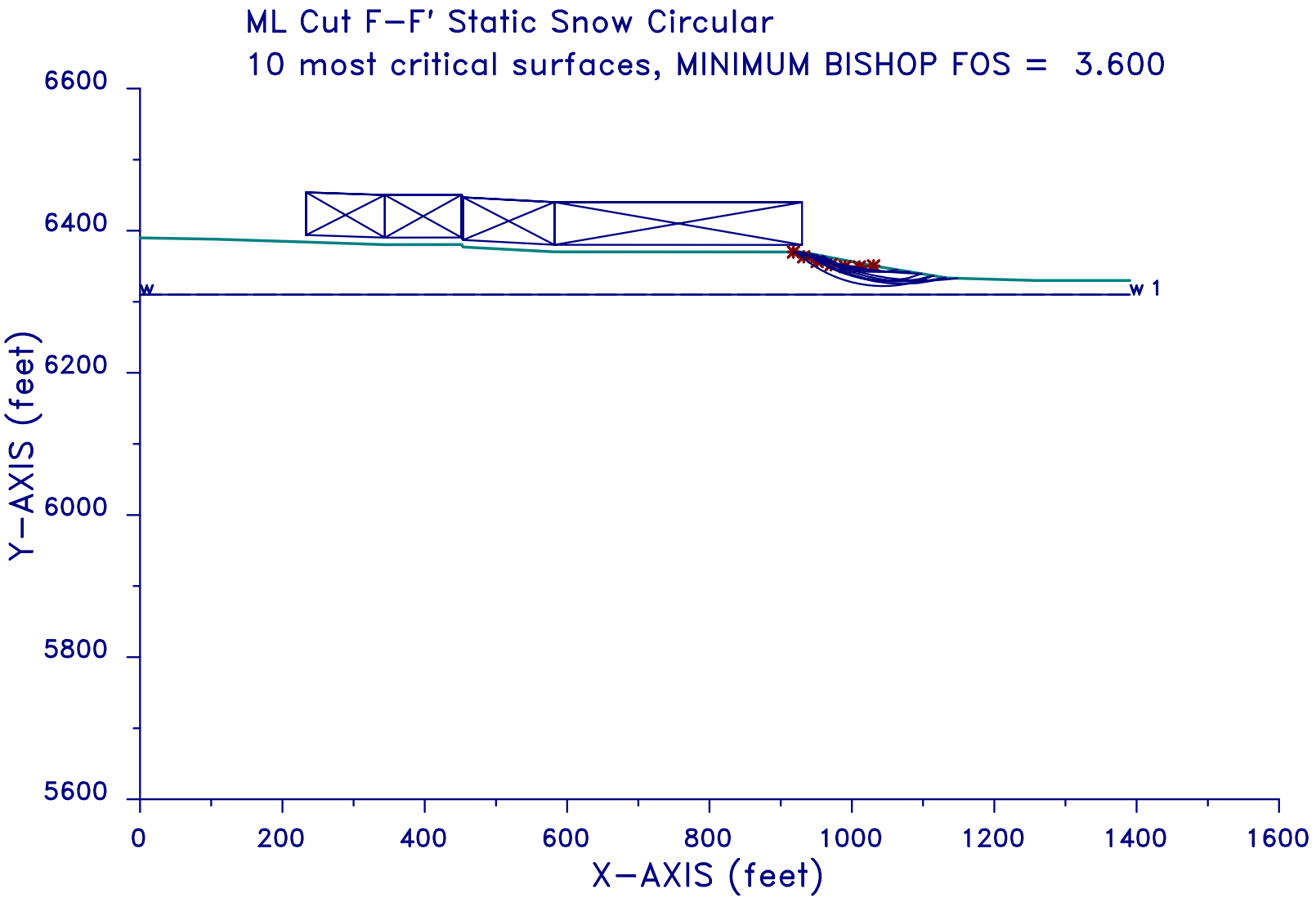
FINAL WATER STORAGE AT END OF YEAR 30

LAYER	(INCHES)	(VOL/VOL)
1	1.5127	0.1261
2	4.8568	0.2024
3	0.0029	0.0145
4	0.0000	0.0000
5	3.1438	0.1310
6	175.1786	0.2920
SNOW WATER	0.788	

****
****

Attachment D2. XSTABL Output

MLCUTSSC 10-24-08 11:18



XSTABL File: MLCUTSSC 10-24-08   11:18

```
*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2005      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
*          All Rights Reserved          *
*                                       *
*  Ver. 5.207                96 - 1972  *
*****************************************
```

Problem Description : ML Cut F-F' Static Snow Circular

SEGMENT BOUNDARY COORDINATES
---

12 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	6390.0	105.6	6388.0	1
2	105.6	6388.0	233.5	6384.0	1
3	233.5	6384.0	343.8	6380.3	1
4	343.8	6380.3	451.5	6380.5	1
5	451.5	6380.5	453.8	6377.0	1
6	453.8	6377.0	582.6	6370.2	1
7	582.6	6370.2	930.0	6370.0	1
8	930.0	6370.0	1033.6	6350.0	1
9	1033.6	6350.0	1134.6	6333.6	1
10	1134.6	6333.6	1258.9	6330.0	1
11	1258.9	6330.0	1370.8	6330.0	1
12	1370.8	6330.0	1390.6	6330.0	1

1 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	6310.0	1390.6	6310.0	2

ISOTROPIC Soil Parameters
---

2 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	105.0	115.0	50.0	30.00	.000	.0	0
2	115.0	115.0	50.0	30.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 2 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	6310.00
2	1390.60	6310.00

BOUNDARY LOADS
---

3 load(s) specified

Load No.	x-left (ft)	x-right (ft)	Intensity (psf)	Direction (deg)
1	233.0	453.0	84.0	.0
2	453.0	582.0	84.0	.0
3	582.0	930.0	84.0	.0

NOTE - Intensity is specified as a uniformly distributed force acting on a HORIZONTALLY projected surface.

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally spaced along the ground surface between x = 980.0 ft
and x = 1300.0 ft

Each surface terminates between x = 700.0 ft
and x = 1100.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = .0 ft

20.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

****
** Factor of safety calculation for surface # 372 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 25.4424 **
** This will be ignored for final summary of results **
****

Circular surface (FOS= 25.4424) is defined by: xcenter = 858.26
ycenter = 6481.96 Init. Pt. = 996.84 Seg. Length = 20.00

****
** Factor of safety calculation for surface # 383 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 21.7061 **
** This will be ignored for final summary of results **
****

Circular surface (FOS= 21.7061) is defined by: xcenter = 876.91
ycenter = 6546.42 Init. Pt. = 980.00 Seg. Length = 20.00

****
** Factor of safety calculation for surface # 387 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 23.1078 **
** This will be ignored for final summary of results **
****

Circular surface (FOS= 23.1078) is defined by: xcenter = 870.11
ycenter = 6637.70 Init. Pt. = 980.00 Seg. Length = 20.00

****
** Factor of safety calculation for surface # 389 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 25.4209 **
** This will be ignored for final summary of results **
****

Circular surface (FOS= 25.4209) is defined by: xcenter = 862.06
ycenter = 6705.68 Init. Pt. = 980.00 Seg. Length = 20.00

****
** Factor of safety calculation for surface # 393 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 27.9163 **
** This will be ignored for final summary of results **
****

Circular surface (FOS= 27.9163) is defined by: xcenter = 867.41
ycenter = 6480.73 Init. Pt. = 980.00 Seg. Length = 20.00

****
** Factor of safety calculation for surface # 394 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 33.3326 **
** This will be ignored for final summary of results **
****

Circular surface (FOS= 33.3326) is defined by: xcenter = 851.03
ycenter = 6517.02 Init. Pt. = 980.00 Seg. Length = 20.00

****
** Factor of safety calculation for surface # 395 **
** failed to converge within FIFTY iterations **
** **
** The last calculated value of the FOS was 27.9293 **
** This will be ignored for final summary of results **
****

Circular surface (FOS= 27.9293) is defined by: xcenter = 871.99
ycenter = 6456.12 Init. Pt. = 980.00 Seg. Length = 20.00

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 7 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	1030.53	6350.59
2	1010.59	6349.05
3	990.59	6349.55
4	970.76	6352.11
5	951.29	6356.69
6	932.39	6363.25
7	917.92	6370.01

**** Simplified BISHOP FOS = 3.600 ****

****
** Out of the 400 surfaces generated and analyzed by XSTABL, **
** 7 surfaces were found to have MISLEADING FOS values. **
****

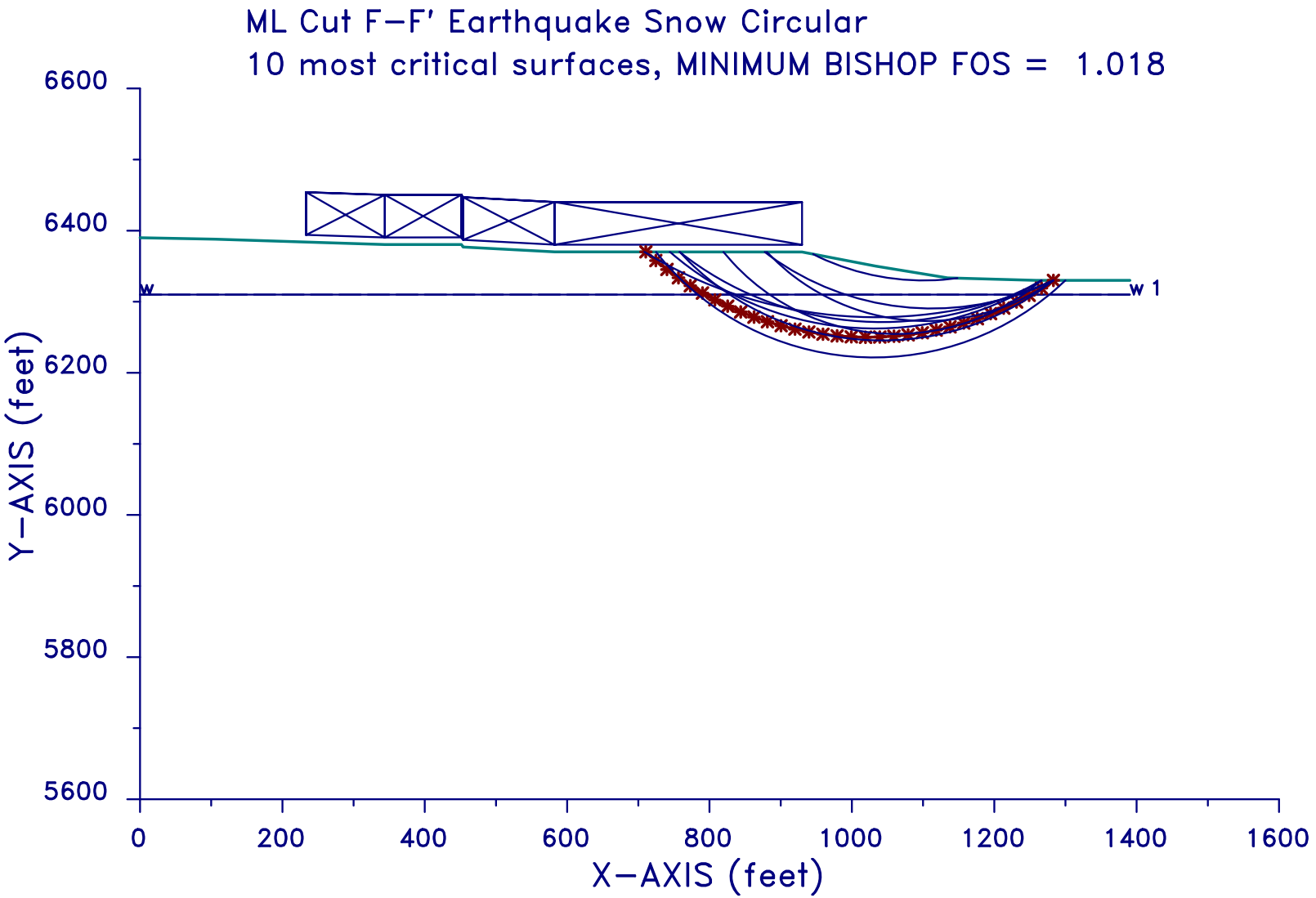
The following is a summary of the TEN most critical surfaces

Problem Description : ML Cut F-F' Static Snow Circular

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	3.600	1005.53	6543.50	194.51	1030.53	917.92	1.019E+07
2.	3.612	1061.69	6679.14	337.40	1081.05	926.64	2.152E+07
3.	3.713	1056.86	6534.98	206.44	1114.74	934.29	3.379E+07
4.	3.723	1035.25	6478.96	137.02	1064.21	961.40	6.446E+06
5.	3.748	1080.25	6574.09	245.43	1131.58	950.42	3.331E+07
6.	3.757	1100.89	6674.75	344.84	1148.42	945.69	4.152E+07
7.	3.758	1112.86	6976.92	637.53	1097.89	917.79	3.974E+07
8.	3.767	1070.42	6542.52	217.22	1131.58	941.36	3.911E+07
9.	3.830	1043.83	6500.25	178.15	1114.74	922.65	4.411E+07
10.	3.904	1047.83	6462.99	133.20	1097.89	958.76	1.634E+07

* * * END OF FILE * * *

MLCUTESC 10-24-08 11:14



XSTABL File: MLCUTESC 10-24-08   11:14

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*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2005      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
*          All Rights Reserved          *
*                                       *
*  Ver. 5.207                96 - 1972  *
*****************************************
```

Problem Description : ML Cut F-F' Earthquake Snow Circular

SEGMENT BOUNDARY COORDINATES
---

12 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	6390.0	105.6	6388.0	1
2	105.6	6388.0	233.5	6384.0	1
3	233.5	6384.0	343.8	6380.3	1
4	343.8	6380.3	451.5	6380.5	1
5	451.5	6380.5	453.8	6377.0	1
6	453.8	6377.0	582.6	6370.2	1
7	582.6	6370.2	930.0	6370.0	1
8	930.0	6370.0	1033.6	6350.0	1
9	1033.6	6350.0	1134.6	6333.6	1
10	1134.6	6333.6	1258.9	6330.0	1
11	1258.9	6330.0	1370.8	6330.0	1
12	1370.8	6330.0	1390.6	6330.0	1

1 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	6310.0	1390.6	6310.0	2

ISOTROPIC Soil Parameters
---

2 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	105.0	115.0	50.0	30.00	.000	.0	0
2	115.0	115.0	50.0	30.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 2 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	6310.00
2	1390.60	6310.00

A horizontal earthquake loading coefficient
of .410 has been assigned

A vertical earthquake loading coefficient
of .000 has been assigned

BOUNDARY LOADS
---

3 load(s) specified

Load No.	x-left (ft)	x-right (ft)	Intensity (psf)	Direction (deg)
1	233.0	453.0	84.0	.0
2	453.0	582.0	84.0	.0
3	582.0	930.0	84.0	.0

NOTE - Intensity is specified as a uniformly distributed
force acting on a HORIZONTALLY projected surface.

A critical failure surface searching method, using a random
technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally spaced along the ground surface between x = 980.0 ft
and x = 1300.0 ft

Each surface terminates between x = 700.0 ft
and x = 1100.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = .0 ft

20.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface is specified by 32 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	1283.16	6330.00
2	1266.36	6319.14
3	1249.11	6309.02
4	1231.45	6299.64
5	1213.39	6291.04
6	1194.99	6283.22
7	1176.26	6276.20
8	1157.25	6269.98
9	1137.99	6264.60
10	1118.51	6260.04
11	1098.86	6256.33
12	1079.07	6253.47
13	1059.17	6251.46
14	1039.20	6250.31

15	1019.20	6250.02
16	999.21	6250.58
17	979.26	6252.01
18	959.39	6254.30
19	939.64	6257.43
20	920.04	6261.42
21	900.63	6266.24
22	881.45	6271.89
23	862.52	6278.37
24	843.89	6285.65
25	825.60	6293.72
26	807.66	6302.58
27	790.13	6312.19
28	773.02	6322.56
29	756.38	6333.65
30	740.23	6345.44
31	724.60	6357.92
32	710.58	6370.13

**** Simplified BISHOP FOS = 1.018 ****

The following is a summary of the TEN most critical surfaces

Problem Description : ML Cut F-F' Earthquake Snow Circular

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.018	1022.42	6714.93	464.92	1283.16	710.58	9.172E+08
2.	1.029	1032.28	6701.11	438.74	1266.32	744.40	7.113E+08
3.	1.031	1042.18	6631.75	386.16	1283.16	758.14	7.159E+08
4.	1.032	1041.97	6729.73	458.38	1266.32	757.89	6.592E+08
5.	1.039	1104.72	6580.04	307.18	1283.16	880.61	3.075E+08
6.	1.044	1034.53	6901.26	623.02	1283.16	708.60	9.552E+08
7.	1.051	1030.59	6610.56	388.97	1300.00	725.05	9.506E+08
8.	1.052	1112.76	6678.36	387.80	1283.16	877.65	3.073E+08
9.	1.054	1100.89	6674.75	344.84	1148.42	945.69	3.906E+07
10.	1.054	1062.50	6568.07	313.40	1266.32	819.58	4.546E+08

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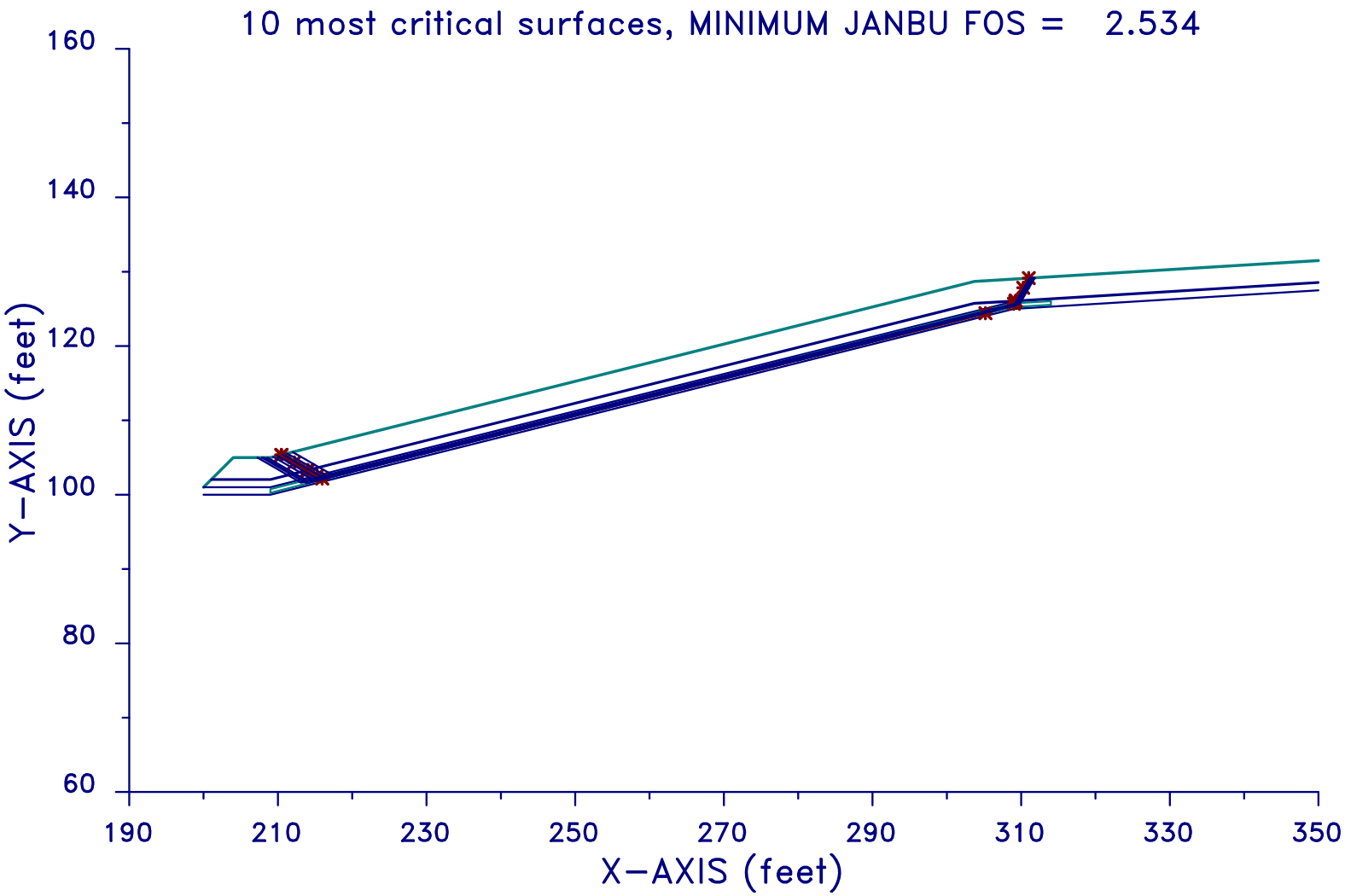
MEYVS01 11-26-08 12:41



XSTABL File: MEYVS01 11-26-08 12:41

```
*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2005      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
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*                                       *
*  Ver. 5.207                96 - 1972  *
*****************************************
```

Problem Description :

SEGMENT BOUNDARY COORDINATES

---

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	101.0	204.0	105.0	1
2	204.0	105.0	209.0	105.0	1
3	209.0	105.0	303.7	128.7	1
4	303.7	128.7	350.0	131.5	1

13 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	201.1	102.1	209.0	102.1	3
2	209.0	102.1	303.7	125.8	3
3	303.7	125.8	309.0	126.1	3
4	309.0	126.1	350.0	128.6	2
5	201.0	102.0	209.0	102.0	1
6	209.0	102.0	303.7	125.7	1
7	303.7	125.7	309.0	126.0	1
8	200.0	101.0	209.0	101.0	3
9	209.0	101.0	309.0	126.0	3
10	309.0	126.0	350.0	128.5	3
11	200.0	100.0	209.0	100.0	1
12	209.0	100.0	309.0	125.0	1
13	309.0	125.0	350.0	127.5	1

ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	125.0	.0	30.00	.000	.0	0
2	60.0	60.0	.0	20.00	.000	.0	0
3	60.0	60.0	.0	30.00	.000	.0	0

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

200 trial surfaces will be generated and analyzed.

3 boxes specified for generation of central block base

Length of line segments for active and passive portions of sliding block is 2.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	209.0	100.5	220.0	103.3	.5
2	280.0	118.3	308.9	125.5	.5
3	309.0	125.5	314.0	125.8	.5

****

ERROR # 38

****

The program calculated a point for the PASSIVE wedge that is outside the defined slope geometry. The analysis will continue, but the user should adjust the search box or slope geometry to allow a passive wedge to be formed from all points within first box.

****

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined
are displayed below - the most critical first

Failure surface No. 1 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.46	105.36
2	210.50	105.34
3	212.23	104.34
4	213.96	103.34
5	214.08	103.27
6	215.29	102.57
7	215.97	102.18
8	305.20	124.42
9	309.03	125.70
10	309.21	126.01
11	309.28	126.12
12	310.28	127.85
13	311.03	129.14

** Corrected JANBU FOS = 2.534 ** (Fo factor = 1.012)

Failure surface No. 2 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	208.58	105.00
2	208.75	104.90
3	210.48	103.90
4	212.21	102.90
5	212.34	102.83
6	213.54	102.14
7	213.86	101.95
8	292.77	121.68
9	309.02	125.43
10	309.36	126.02
11	309.43	126.13
12	310.43	127.86
13	311.18	129.15

** Corrected JANBU FOS = 2.536 ** (Fo factor = 1.012)

Failure surface No. 3 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.99	105.75
2	212.03	105.73
3	213.76	104.73
4	215.50	103.73
5	215.62	103.66
6	216.83	102.96
7	217.22	102.73
8	302.14	123.86
9	309.07	125.55
10	309.34	126.02
11	309.42	126.13
12	310.42	127.86
13	311.16	129.15

** Corrected JANBU FOS = 2.538 ** (Fo factor = 1.012)

Failure surface No. 4 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	208.10	105.00
2	208.41	104.82
3	210.14	103.82
4	211.88	102.82
5	212.00	102.75
6	213.21	102.05
7	213.61	101.82
8	307.28	125.23
9	309.15	125.39
10	309.52	126.03
11	309.59	126.14
12	310.59	127.87
13	311.34	129.16

** Corrected JANBU FOS = 2.538 ** (Fo factor = 1.012)

Failure surface No. 5 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.24	105.56
2	211.28	105.54
3	213.01	104.54
4	214.75	103.54
5	214.87	103.47
6	216.08	102.77

7	216.43	102.57
8	291.47	121.01
9	309.07	125.45
10	309.40	126.02
11	309.48	126.13
12	310.48	127.86
13	311.22	129.15

** Corrected JANBU FOS = 2.539 ** (Fo factor = 1.012)

Failure surface No. 6 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.86	105.00
2	208.24	104.78
3	209.97	103.78
4	211.71	102.78
5	211.83	102.71
6	213.04	102.01
7	213.87	101.53
8	289.81	120.55
9	309.66	125.78
10	309.82	126.05
11	309.89	126.15
12	310.89	127.89
13	311.64	129.18

** Corrected JANBU FOS = 2.540 ** (Fo factor = 1.013)

Failure surface No. 7 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.93	105.23
2	209.97	105.21
3	211.71	104.21
4	213.44	103.21
5	213.56	103.14
6	214.77	102.44
7	215.52	102.01
8	306.20	124.90
9	309.58	125.74
10	309.75	126.05
11	309.83	126.15
12	310.83	127.88
13	311.57	129.18

** Corrected JANBU FOS = 2.540 ** (Fo factor = 1.012)

Failure surface No. 8 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.25	105.00
2	207.82	104.67
3	209.55	103.67
4	211.28	102.67
5	211.40	102.60
6	212.61	101.90
7	213.11	101.61
8	287.58	120.02
9	309.23	125.52
10	309.53	126.03
11	309.60	126.14
12	310.60	127.87
13	311.35	129.16

** Corrected JANBU FOS = 2.542 ** (Fo factor = 1.013)

Failure surface No. 9 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.37	105.09
2	209.41	105.07
3	211.15	104.07
4	212.88	103.07
5	213.00	103.00
6	214.21	102.30
7	214.92	101.89
8	281.09	118.69
9	309.50	125.63
10	309.74	126.04
11	309.81	126.15
12	310.81	127.88
13	311.56	129.18

** Corrected JANBU FOS = 2.543 ** (Fo factor = 1.012)

Failure surface No.10 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.66	105.42
2	210.70	105.39
3	212.43	104.39
4	214.16	103.39
5	214.28	103.32
6	215.49	102.62
7	215.92	102.38
8	302.59	124.02
9	309.81	125.70
10	310.02	126.06

11	310.10	126.17
12	311.10	127.90
13	311.84	129.19

** Corrected JANBU FOS = 2.543 ** (Fo factor = 1.012)

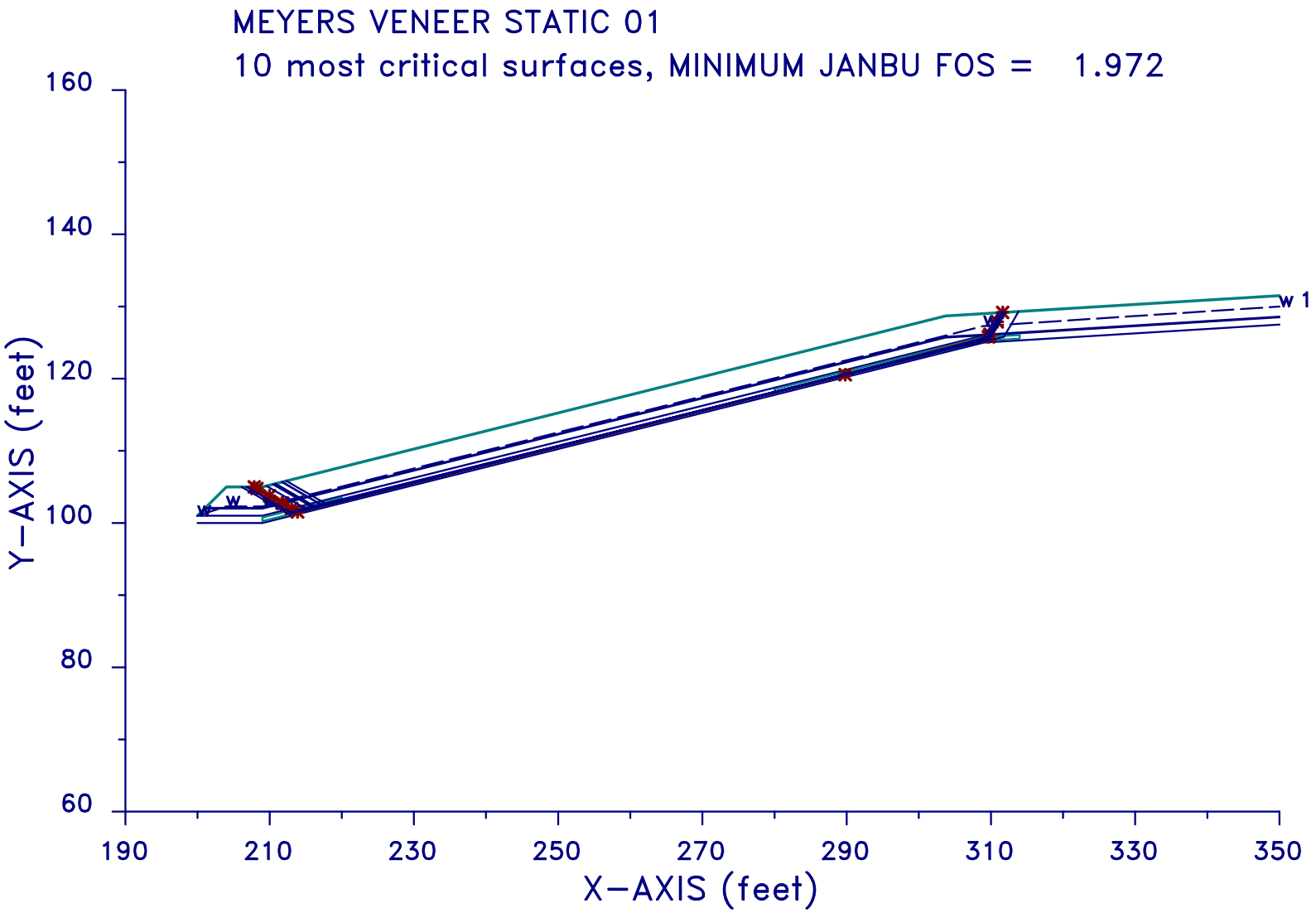
The following is a summary of the TEN most critical surfaces

Problem Description :

	Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	2.534	1.012	210.46	311.03	2.804E+04
2.	2.536	1.012	208.58	311.18	2.760E+04
3.	2.538	1.012	211.99	311.16	2.695E+04
4.	2.538	1.012	208.10	311.34	2.790E+04
5.	2.539	1.012	211.24	311.22	2.748E+04
6.	2.540	1.013	207.86	311.64	2.901E+04
7.	2.540	1.012	209.93	311.57	2.807E+04
8.	2.542	1.013	207.25	311.35	2.873E+04
9.	2.543	1.012	209.37	311.56	2.802E+04
10.	2.543	1.012	210.66	311.84	2.745E+04

* * * END OF FILE * * *

MEYVS02X 11-18-08 22:16



XSTABL File: MEYVS02X 11-18-08   22:16

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*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2005      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
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*                                       *
*  Ver. 5.207                 96 - 1972 *
*****************************************
```

Problem Description : MEYERS VENEER STATIC 01

SEGMENT BOUNDARY COORDINATES
---

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	101.0	204.0	105.0	1
2	204.0	105.0	209.0	105.0	1
3	209.0	105.0	303.7	128.7	1
4	303.7	128.7	350.0	131.5	1

13 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	201.1	102.1	209.0	102.1	3
2	209.0	102.1	303.7	125.8	3
3	303.7	125.8	309.0	126.1	3
4	309.0	126.1	350.0	128.6	2
5	201.0	102.0	209.0	102.0	1
6	209.0	102.0	303.7	125.7	1
7	303.7	125.7	309.0	126.0	1
8	200.0	101.0	209.0	101.0	3
9	209.0	101.0	309.0	126.0	3
10	309.0	126.0	350.0	128.5	3
11	200.0	100.0	209.0	100.0	1
12	209.0	100.0	309.0	125.0	1
13	309.0	125.0	350.0	127.5	1

ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	125.0	.0	30.00	.000	.0	1
2	60.0	60.0	.0	20.00	.000	.0	1
3	60.0	60.0	.0	30.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	200.00	101.00
2	204.00	102.30
3	209.00	102.30
4	309.00	127.30
5	350.00	130.00

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

200 trial surfaces will be generated and analyzed.

3 boxes specified for generation of central block base

Length of line segments for active and passive portions of sliding block is 2.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	209.0	100.5	220.0	103.3	.5
2	280.0	118.3	308.9	125.5	.5
3	309.0	125.5	314.0	125.8	.5

****

ERROR # 38

****

The program calculated a point for the PASSIVE wedge that is outside the defined slope geometry. The analysis will continue, but the user should adjust the search box or slope geometry to allow a passive wedge to be formed from all points within first box.

****

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined are displayed below - the most critical first

Failure surface No. 1 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.86	105.00
2	208.24	104.78
3	209.97	103.78
4	211.71	102.78
5	211.83	102.71
6	213.04	102.01
7	213.87	101.53
8	289.81	120.55
9	309.66	125.78
10	309.82	126.05
11	309.89	126.15
12	310.89	127.89
13	311.64	129.18

** Corrected JANBU FOS = 1.972 ** (Fo factor = 1.013)

Failure surface No. 2 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.46	105.36
2	210.50	105.34
3	212.23	104.34
4	213.96	103.34
5	214.08	103.27
6	215.29	102.57
7	215.97	102.18
8	305.20	124.42
9	309.03	125.70
10	309.21	126.01
11	309.28	126.12
12	310.28	127.85
13	311.03	129.14

** Corrected JANBU FOS = 1.979 ** (Fo factor = 1.012)

Failure surface No. 3 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.77	105.44
2	210.81	105.42
3	212.54	104.42
4	214.27	103.42
5	214.39	103.35
6	215.60	102.65
7	216.32	102.24
8	283.09	118.90
9	309.55	125.56
10	309.83	126.05
11	309.91	126.16
12	310.91	127.89
13	311.65	129.18

** Corrected JANBU FOS = 1.984 ** (Fo factor = 1.012)

Failure surface No. 4 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.55	105.14
2	209.59	105.11
3	211.32	104.11
4	213.05	103.11
5	213.17	103.04
6	214.38	102.35
7	214.93	102.03

8	301.19	123.34
9	309.78	125.64
10	310.02	126.06
11	310.10	126.17
12	311.10	127.90
13	311.84	129.19

** Corrected JANBU FOS = 1.986 ** (Fo factor = 1.012)

Failure surface No. 5 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	206.12	105.00
2	207.03	104.47
3	208.76	103.47
4	210.50	102.47
5	210.62	102.40
6	211.83	101.71
7	212.65	101.23
8	301.30	123.43
9	309.19	125.27
10	309.63	126.04
11	309.71	126.14
12	310.71	127.88
13	311.45	129.17

** Corrected JANBU FOS = 1.987 ** (Fo factor = 1.014)

Failure surface No. 6 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.80	105.45
2	210.84	105.43
3	212.57	104.43
4	214.30	103.43
5	214.43	103.36
6	215.64	102.66
7	216.49	102.17
8	308.25	125.31
9	309.85	125.66
10	310.09	126.07
11	310.16	126.17
12	311.16	127.90
13	311.91	129.20

** Corrected JANBU FOS = 1.989 ** (Fo factor = 1.013)

Failure surface No. 7 specified by 13 coordinate points

Point	x-surf	y-surf

Point No.	x-surf (ft)	y-surf (ft)
1	212.33	105.83
2	212.37	105.81
3	214.10	104.81
4	215.83	103.81
5	215.95	103.74
6	217.16	103.04
7	218.01	102.55
8	305.92	124.70
9	310.02	125.77
10	310.19	126.07
11	310.26	126.18
12	311.26	127.91
13	312.01	129.20

** Corrected JANBU FOS = 1.989 ** (Fo factor = 1.013)

Failure surface No. 8 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	206.76	105.00
2	207.48	104.59
3	209.21	103.59
4	210.94	102.59
5	211.06	102.52
6	212.27	101.82
7	212.86	101.48
8	302.08	123.57
9	309.37	125.48
10	309.69	126.04
11	309.76	126.15
12	310.76	127.88
13	311.51	129.17

** Corrected JANBU FOS = 1.990 ** (Fo factor = 1.013)

Failure surface No. 9 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.73	105.68
2	211.77	105.66
3	213.51	104.66
4	215.24	103.66
5	215.36	103.59
6	216.57	102.89
7	217.24	102.50
8	284.54	119.27
9	309.64	125.57
10	309.92	126.06
11	309.99	126.16

12	310.99	127.89
13	311.74	129.19

** Corrected JANBU FOS = 1.992 ** (Fo factor = 1.012)

Failure surface No.10 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.72	105.68
2	211.76	105.66
3	213.49	104.66
4	215.22	103.66
5	215.35	103.59
6	216.56	102.89
7	217.38	102.41
8	305.39	124.44
9	311.78	125.78
10	312.02	126.18
11	312.09	126.29
12	313.09	128.02
13	313.84	129.31

** Corrected JANBU FOS = 1.996 ** (Fo factor = 1.012)

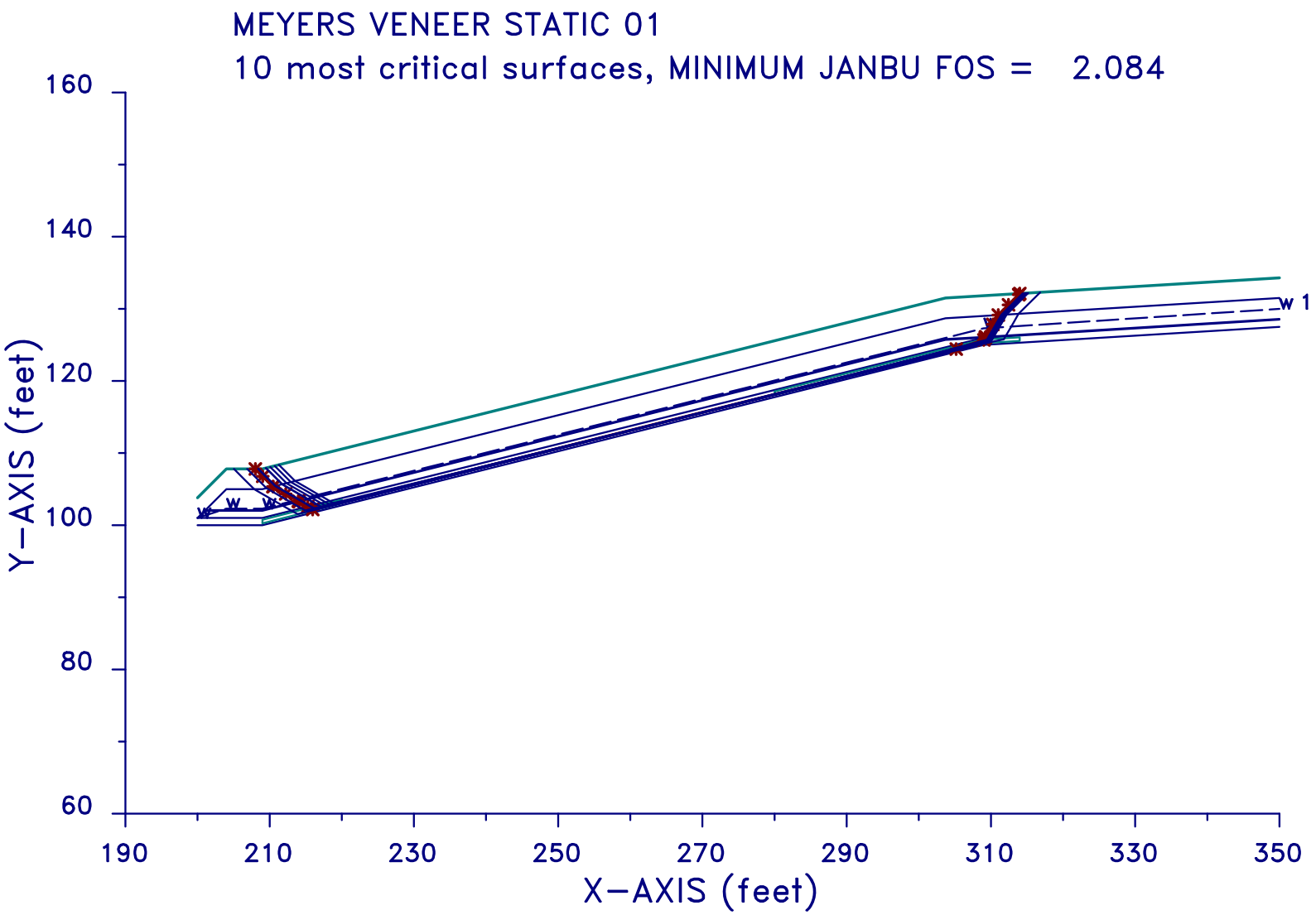
The following is a summary of the TEN most critical surfaces

Problem Description : MEYERS VENEER STATIC 01

	Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	1.972	1.013	207.86	311.64	2.275E+04
2.	1.979	1.012	210.46	311.03	2.213E+04
3.	1.984	1.012	210.77	311.65	2.217E+04
4.	1.986	1.012	209.55	311.84	2.246E+04
5.	1.987	1.014	206.12	311.45	2.308E+04
6.	1.989	1.013	210.80	311.91	2.222E+04
7.	1.989	1.013	212.33	312.01	2.189E+04
8.	1.990	1.013	206.76	311.51	2.293E+04
9.	1.992	1.012	211.73	311.74	2.197E+04
10.	1.996	1.012	211.72	313.84	2.232E+04

* * * END OF FILE * * *

MEYVP01Y 11-18-08 23:18



XSTABL File: MEYVP01Y 11-18-08   23:18

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*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2005      *
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*        Moscow, ID 83843, U.S.A.       *
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*  Ver. 5.207                 96 - 1972 *
*****************************************
```

Problem Description : MEYERS VENEER STATIC 01

SEGMENT BOUNDARY COORDINATES
---

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	103.8	204.0	107.8	4
2	204.0	107.8	209.0	107.8	4
3	209.0	107.8	303.7	131.5	4
4	303.7	131.5	350.0	134.3	4

19 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	201.1	102.1	204.0	105.0	1
2	204.0	105.0	209.0	105.0	1
3	209.0	105.0	303.7	128.7	1
4	303.7	128.7	350.0	131.5	1
5	201.0	102.0	201.1	102.1	3
6	201.1	102.1	209.0	102.1	3
7	209.0	102.1	303.7	125.8	3
8	303.7	125.8	309.0	126.1	3
9	309.0	126.1	350.0	128.6	2
10	200.0	101.0	201.0	102.0	1
11	201.0	102.0	209.0	102.0	1
12	209.0	102.0	303.7	125.7	1

13	303.7	125.7	309.0	126.0	1
14	200.0	101.0	209.0	101.0	3
15	209.0	101.0	309.0	126.0	3
16	309.0	126.0	350.0	128.5	3
17	200.0	100.0	209.0	100.0	1
18	209.0	100.0	309.0	125.0	1
19	309.0	125.0	350.0	127.5	1

ISOTROPIC Soil Parameters
---

4 Soil unit(s) specified

Soil Unit	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	125.0	.0	30.00	.000	.0	1
2	60.0	60.0	.0	20.00	.000	.0	1
3	60.0	60.0	.0	30.00	.000	.0	1
4	30.0	30.0	.0	.00	.000	.0	0

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	200.00	101.00
2	204.00	102.30
3	209.00	102.30
4	309.00	127.30
5	350.00	130.00

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

200 trial surfaces will be generated and analyzed.

3 boxes specified for generation of central block base

Length of line segments for active and passive portions of sliding block is 2.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	209.0	100.5	220.0	103.3	.5
2	280.0	118.3	308.9	125.5	.5
3	309.0	125.5	314.0	125.8	.5

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined are displayed below - the most critical first

Failure surface No. 1 specified by 18 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	208.02	107.80
2	209.04	106.78
3	210.46	105.36
4	210.50	105.34
5	212.23	104.34
6	213.96	103.34
7	214.08	103.27
8	215.29	102.57
9	215.97	102.18
10	305.20	124.42
11	309.03	125.70
12	309.21	126.01
13	309.28	126.12
14	310.28	127.85
15	311.03	129.14
16	312.44	130.56
17	313.86	131.97
18	314.01	132.12

** Corrected JANBU FOS = 2.084 ** (Fo factor = 1.019)

Failure surface No. 2 specified by 18 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	205.06	107.80
2	206.44	106.41
3	207.86	105.00
4	208.24	104.78
5	209.97	103.78
6	211.71	102.78
7	211.83	102.71
8	213.04	102.01
9	213.87	101.53
10	289.81	120.55
11	309.66	125.78
12	309.82	126.05
13	309.89	126.15
14	310.89	127.89
15	311.64	129.18
16	313.05	130.59
17	314.46	132.01
18	314.62	132.16

** Corrected JANBU FOS = 2.088 ** (Fo factor = 1.020)

Failure surface No. 3 specified by 18 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	208.41	107.80
2	209.35	106.86
3	210.77	105.44
4	210.81	105.42
5	212.54	104.42
6	214.27	103.42
7	214.39	103.35
8	215.60	102.65
9	216.32	102.24
10	283.09	118.90
11	309.55	125.56
12	309.83	126.05
13	309.91	126.16
14	310.91	127.89
15	311.65	129.18
16	313.07	130.60
17	314.48	132.01
18	314.63	132.16

** Corrected JANBU FOS = 2.091 ** (Fo factor = 1.019)

Failure surface No. 4 specified by 18 coordinate points

Point	x-surf	y-surf

Point No.	x-surf (ft)	y-surf (ft)
1	206.88	107.80
2	208.13	106.55
3	209.55	105.14
4	209.59	105.11
5	211.32	104.11
6	213.05	103.11
7	213.17	103.04
8	214.38	102.35
9	214.93	102.03
10	301.19	123.34
11	309.78	125.64
12	310.02	126.06
13	310.10	126.17
14	311.10	127.90
15	311.84	129.19
16	313.26	130.61
17	314.67	132.02
18	314.82	132.17

** Corrected JANBU FOS = 2.095 ** (Fo factor = 1.019)

Failure surface No. 5 specified by 18 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	208.45	107.80
2	209.39	106.86
3	210.80	105.45
4	210.84	105.43
5	212.57	104.43
6	214.30	103.43
7	214.43	103.36
8	215.64	102.66
9	216.49	102.17
10	308.25	125.31
11	309.85	125.66
12	310.09	126.07
13	310.16	126.17
14	311.16	127.90
15	311.91	129.20
16	313.32	130.61
17	314.73	132.02
18	314.89	132.18

** Corrected JANBU FOS = 2.095 ** (Fo factor = 1.019)

Failure surface No. 6 specified by 18 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.09	108.07

2	210.91	107.25
3	212.33	105.83
4	212.37	105.81
5	214.10	104.81
6	215.83	103.81
7	215.95	103.74
8	217.16	103.04
9	218.01	102.55
10	305.92	124.70
11	310.02	125.77
12	310.19	126.07
13	310.26	126.18
14	311.26	127.91
15	312.01	129.20
16	313.42	130.62
17	314.84	132.03
18	314.99	132.18

** Corrected JANBU FOS = 2.096 ** (Fo factor = 1.019)

Failure surface No. 7 specified by 18 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.49	107.92
2	210.32	107.10
3	211.73	105.68
4	211.77	105.66
5	213.51	104.66
6	215.24	103.66
7	215.36	103.59
8	216.57	102.89
9	217.24	102.50
10	284.54	119.27
11	309.64	125.57
12	309.92	126.06
13	309.99	126.16
14	310.99	127.89
15	311.74	129.19
16	313.15	130.60
17	314.57	132.01
18	314.72	132.17

** Corrected JANBU FOS = 2.097 ** (Fo factor = 1.018)

Failure surface No. 8 specified by 18 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.70	108.22
2	211.52	107.40
3	212.94	105.98
4	212.98	105.96

5	214.71	104.96
6	216.44	103.96
7	216.56	103.89
8	217.77	103.19
9	218.24	102.93
10	282.02	118.56
11	309.98	125.41
12	310.37	126.08
13	310.44	126.19
14	311.44	127.92
15	312.19	129.21
16	313.60	130.63
17	315.01	132.04
18	315.17	132.19

** Corrected JANBU FOS = 2.103 ** (Fo factor = 1.018)

Failure surface No. 9 specified by 18 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.28	108.37
2	212.11	107.55
3	213.52	106.13
4	213.56	106.11
5	215.29	105.11
6	217.03	104.11
7	217.15	104.04
8	218.36	103.34
9	218.96	102.99
10	304.80	124.31
11	309.20	125.30
12	309.62	126.04
13	309.70	126.14
14	310.70	127.87
15	311.44	129.17
16	312.86	130.58
17	314.27	132.00
18	314.42	132.15

** Corrected JANBU FOS = 2.104 ** (Fo factor = 1.019)

Failure surface No.10 specified by 18 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.48	107.92
2	210.31	107.09
3	211.72	105.68
4	211.76	105.66
5	213.49	104.66
6	215.22	103.66
7	215.35	103.59

8	216.56	102.89
9	217.38	102.41
10	305.39	124.44
11	311.78	125.78
12	312.02	126.18
13	312.09	126.29
14	313.09	128.02
15	313.84	129.31
16	315.25	130.73
17	316.67	132.14
18	316.82	132.29

** Corrected JANBU FOS = 2.105 ** (Fo factor = 1.018)

The following is a summary of the TEN most critical surfaces

Problem Description : MEYERS VENEER STATIC 01

	Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	2.084	1.019	208.02	314.01	2.703E+04
2.	2.088	1.020	205.06	314.62	2.782E+04
3.	2.091	1.019	208.41	314.63	2.709E+04
4.	2.095	1.019	206.88	314.82	2.744E+04
5.	2.095	1.019	208.45	314.89	2.715E+04
6.	2.096	1.019	210.09	314.99	2.675E+04
7.	2.097	1.018	209.49	314.72	2.685E+04
8.	2.103	1.018	210.70	315.17	2.660E+04
9.	2.104	1.019	211.28	314.42	2.631E+04
10.	2.105	1.018	209.48	316.82	2.730E+04

* * * END OF FILE * * *

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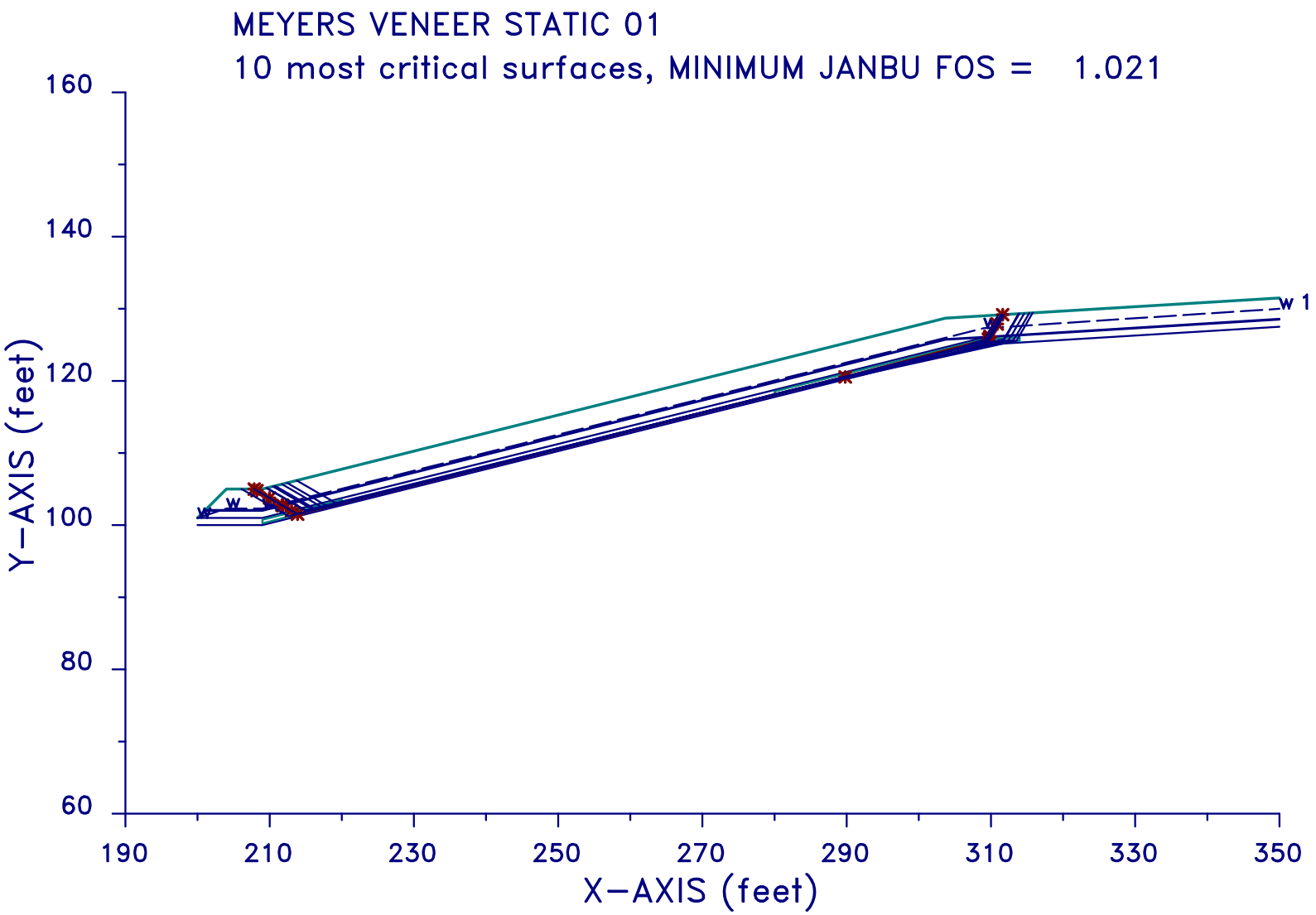

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*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2005      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
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*                                       *
*  Ver. 5.207                 96 - 1972 *
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```

Problem Description : MEYERS VENEER STATIC 01

SEGMENT BOUNDARY COORDINATES

---

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	101.0	204.0	105.0	1
2	204.0	105.0	209.0	105.0	1
3	209.0	105.0	303.7	128.7	1
4	303.7	128.7	350.0	131.5	1

13 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	201.1	102.1	209.0	102.1	3
2	209.0	102.1	303.7	125.8	3
3	303.7	125.8	309.0	126.1	3
4	309.0	126.1	350.0	128.6	2
5	201.0	102.0	209.0	102.0	1
6	209.0	102.0	303.7	125.7	1
7	303.7	125.7	309.0	126.0	1
8	200.0	101.0	209.0	101.0	3
9	209.0	101.0	309.0	126.0	3
10	309.0	126.0	350.0	128.5	3
11	200.0	100.0	209.0	100.0	1
12	209.0	100.0	309.0	125.0	1

13	309.0	125.0	350.0	127.5	1

ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	125.0	.0	30.00	.000	.0	1
2	60.0	60.0	.0	20.00	.000	.0	1
3	60.0	60.0	.0	30.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	200.00	101.00
2	204.00	102.30
3	209.00	102.30
4	309.00	127.30
5	350.00	130.00

A horizontal earthquake loading coefficient
of .200 has been assigned

A vertical earthquake loading coefficient
of .000 has been assigned

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

200 trial surfaces will be generated and analyzed.

3 boxes specified for generation of central block base

Length of line segments for active and passive portions of sliding block is 2.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	209.0	100.5	220.0	103.3	.5
2	280.0	118.3	308.9	125.5	.5
3	309.0	125.5	314.0	125.8	.5

****

ERROR # 38

****

The program calculated a point for the PASSIVE wedge that is outside the defined slope geometry. The analysis will continue, but the user should adjust the search box or slope geometry to allow a passive wedge to be formed from all points within first box.

****

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined are displayed below - the most critical first

Failure surface No. 1 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.86	105.00
2	208.24	104.78
3	209.97	103.78
4	211.71	102.78
5	211.83	102.71
6	213.04	102.01
7	213.87	101.53
8	289.81	120.55
9	309.66	125.78

10	309.82	126.05
11	309.89	126.15
12	310.89	127.89
13	311.64	129.18

** Corrected JANBU FOS = 1.021 ** (Fo factor = 1.013)

Failure surface No. 2 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.84	105.00
2	208.23	104.77
3	209.96	103.77
4	211.70	102.77
5	211.82	102.70
6	213.03	102.01
7	213.83	101.54
8	290.26	120.61
9	313.17	125.70
10	313.50	126.27
11	313.57	126.38
12	314.57	128.11
13	315.32	129.40

** Corrected JANBU FOS = 1.022 ** (Fo factor = 1.012)

Failure surface No. 3 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.61	105.15
2	209.65	105.13
3	211.38	104.13
4	213.12	103.13
5	213.24	103.06
6	214.45	102.36
7	215.17	101.94
8	283.52	118.98
9	313.56	125.59
10	313.97	126.30
11	314.04	126.41
12	315.04	128.14
13	315.79	129.43

** Corrected JANBU FOS = 1.024 ** (Fo factor = 1.012)

Failure surface No. 4 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)

1	213.75	106.19
2	213.79	106.17
3	215.53	105.17
4	217.26	104.17
5	217.38	104.10
6	218.59	103.40
7	219.40	102.93
8	283.80	119.02
9	311.73	125.51
10	312.12	126.19
11	312.19	126.29
12	313.19	128.03
13	313.94	129.32

** Corrected JANBU FOS = 1.024 ** (Fo factor = 1.013)

Failure surface No. 5 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	212.42	105.86
2	212.46	105.83
3	214.19	104.83
4	215.93	103.83
5	216.05	103.76
6	217.26	103.06
7	218.11	102.57
8	284.25	119.17
9	312.47	125.67
10	312.80	126.23
11	312.87	126.34
12	313.87	128.07
13	314.62	129.36

** Corrected JANBU FOS = 1.025 ** (Fo factor = 1.012)

Failure surface No. 6 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.46	105.36
2	210.50	105.34
3	212.23	104.34
4	213.96	103.34
5	214.08	103.27
6	215.29	102.57
7	215.97	102.18
8	305.20	124.42
9	309.03	125.70
10	309.21	126.01
11	309.28	126.12
12	310.28	127.85
13	311.03	129.14

** Corrected JANBU FOS = 1.025 ** (Fo factor = 1.012)

Failure surface No. 7 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.55	105.14
2	209.59	105.11
3	211.32	104.11
4	213.05	103.11
5	213.17	103.04
6	214.38	102.35
7	214.93	102.03
8	301.19	123.34
9	309.78	125.64
10	310.02	126.06
11	310.10	126.17
12	311.10	127.90
13	311.84	129.19

** Corrected JANBU FOS = 1.026 ** (Fo factor = 1.012)

Failure surface No. 8 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.72	105.68
2	211.76	105.66
3	213.49	104.66
4	215.22	103.66
5	215.35	103.59
6	216.56	102.89
7	217.38	102.41
8	305.39	124.44
9	311.78	125.78
10	312.02	126.18
11	312.09	126.29
12	313.09	128.02
13	313.84	129.31

** Corrected JANBU FOS = 1.026 ** (Fo factor = 1.012)

Failure surface No. 9 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	206.12	105.00
2	207.03	104.47
3	208.76	103.47
4	210.50	102.47

5	210.62	102.40
6	211.83	101.71
7	212.65	101.23
8	301.30	123.43
9	309.19	125.27
10	309.63	126.04
11	309.71	126.14
12	310.71	127.88
13	311.45	129.17

** Corrected JANBU FOS = 1.026 ** (Fo factor = 1.014)

Failure surface No.10 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.77	105.44
2	210.81	105.42
3	212.54	104.42
4	214.27	103.42
5	214.39	103.35
6	215.60	102.65
7	216.32	102.24
8	283.09	118.90
9	309.55	125.56
10	309.83	126.05
11	309.91	126.16
12	310.91	127.89
13	311.65	129.18

** Corrected JANBU FOS = 1.026 ** (Fo factor = 1.012)

The following is a summary of the TEN most critical surfaces

Problem Description : MEYERS VENEER STATIC 01

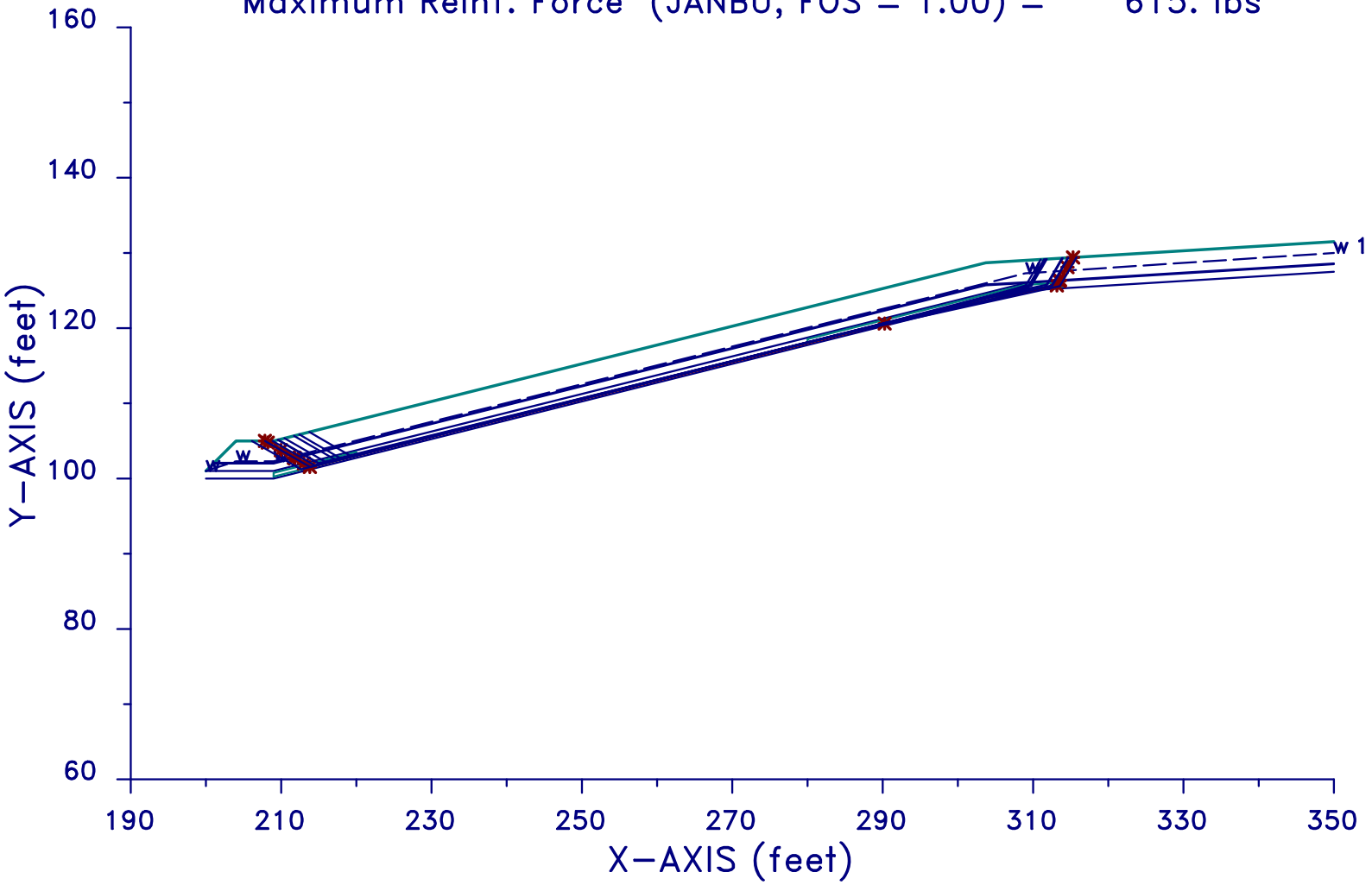
	Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	1.021	1.013	207.86	311.64	2.167E+04
2.	1.022	1.012	207.84	315.32	2.230E+04
3.	1.024	1.012	209.61	315.79	2.214E+04
4.	1.024	1.013	213.75	313.94	2.089E+04
5.	1.025	1.012	212.42	314.62	2.128E+04
6.	1.025	1.012	210.46	311.03	2.107E+04
7.	1.026	1.012	209.55	311.84	2.138E+04
8.	1.026	1.012	211.72	313.84	2.127E+04
9.	1.026	1.014	206.12	311.45	2.200E+04
10.	1.026	1.012	210.77	311.65	2.112E+04

* * * END OF FILE * * *

MEYVQ03R 11-18-08 11:23

MEYERS VENEER STATIC 01

Maximum Reinf. Force (JANBU, FOS = 1.00) = 615. lbs



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*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2005      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
*          All Rights Reserved          *
*                                       *
*  Ver. 5.207                 96 - 1972 *
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```

Problem Description : MEYERS VENEER STATIC 01

SEGMENT BOUNDARY COORDINATES
---

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	101.0	204.0	105.0	1
2	204.0	105.0	209.0	105.0	1
3	209.0	105.0	303.7	128.7	1
4	303.7	128.7	350.0	131.5	1

13 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	201.1	102.1	209.0	102.1	3
2	209.0	102.1	303.7	125.8	3
3	303.7	125.8	309.0	126.1	3
4	309.0	126.1	350.0	128.6	2
5	201.0	102.0	209.0	102.0	1
6	209.0	102.0	303.7	125.7	1
7	303.7	125.7	309.0	126.0	1
8	200.0	101.0	209.0	101.0	3
9	209.0	101.0	309.0	126.0	3
10	309.0	126.0	350.0	128.5	3
11	200.0	100.0	209.0	100.0	1
12	209.0	100.0	309.0	125.0	1
13	309.0	125.0	350.0	127.5	1

ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	125.0	.0	30.00	.000	.0	1
2	60.0	60.0	.0	20.00	.000	.0	1
3	60.0	60.0	.0	30.00	.000	.0	1

REINFORCED SLOPE ANALYSIS

The analysis will be performed to determine the critical surface that requires the largest amount of reinforcing force to satisfy:

Minimum (required) FOS = 1.000
Resultant at Elevation = 128.00 feet

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	200.00	101.00
2	204.00	102.30
3	209.00	102.30
4	309.00	127.30
5	350.00	130.00

A horizontal earthquake loading coefficient

of .220 has been assigned

A vertical earthquake loading coefficient
of .000 has been assigned

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

200 trial surfaces will be generated and analyzed.

3 boxes specified for generation of central block base

Length of line segments for active and passive portions of sliding block is 2.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	209.0	100.5	220.0	103.3	.5
2	280.0	118.3	308.9	125.5	.5
3	309.0	125.5	314.0	125.8	.5

****

ERROR # 38

****

The program calculated a point for the PASSIVE wedge that is outside the defined slope geometry. The analysis will continue, but the user should adjust the search box or slope geometry to allow a passive wedge to be formed from all points within first box.

****

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined are displayed below - the most critical first

Failure surface No. 1 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.84	105.00
2	208.23	104.77
3	209.96	103.77
4	211.70	102.77
5	211.82	102.70
6	213.03	102.01
7	213.83	101.54
8	290.26	120.61
9	313.17	125.70
10	313.50	126.27
11	313.57	126.38
12	314.57	128.11
13	315.32	129.40

****
** Maximum Required Reinforcement Force = 6.1485E+02 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 2 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.86	105.00
2	208.24	104.78
3	209.97	103.78
4	211.71	102.78
5	211.83	102.71
6	213.04	102.01
7	213.87	101.53
8	289.81	120.55
9	309.66	125.78
10	309.82	126.05
11	309.89	126.15
12	310.89	127.89
13	311.64	129.18

****
** Maximum Required Reinforcement Force = 5.9610E+02 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 3 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.61	105.15
2	209.65	105.13
3	211.38	104.13

4	213.12	103.13
5	213.24	103.06
6	214.45	102.36
7	215.17	101.94
8	283.52	118.98
9	313.56	125.59
10	313.97	126.30
11	314.04	126.41
12	315.04	128.14
13	315.79	129.43

****
** Maximum Required Reinforcement Force = 5.6940E+02 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 4 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	213.75	106.19
2	213.79	106.17
3	215.53	105.17
4	217.26	104.17
5	217.38	104.10
6	218.59	103.40
7	219.40	102.93
8	283.80	119.02
9	311.73	125.51
10	312.12	126.19
11	312.19	126.29
12	313.19	128.03
13	313.94	129.32

****
** Maximum Required Reinforcement Force = 5.3202E+02 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 5 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	212.42	105.86
2	212.46	105.83
3	214.19	104.83
4	215.93	103.83
5	216.05	103.76
6	217.26	103.06
7	218.11	102.57
8	284.25	119.17
9	312.47	125.67
10	312.80	126.23
11	312.87	126.34
12	313.87	128.07

13	314.62	129.36

****
** Maximum Required Reinforcement Force = 5.2249E+02 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 6 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	206.12	105.00
2	207.03	104.47
3	208.76	103.47
4	210.50	102.47
5	210.62	102.40
6	211.83	101.71
7	212.65	101.23
8	301.30	123.43
9	309.19	125.27
10	309.63	126.04
11	309.71	126.14
12	310.71	127.88
13	311.45	129.17

****
** Maximum Required Reinforcement Force = 4.9756E+02 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 7 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.46	105.36
2	210.50	105.34
3	212.23	104.34
4	213.96	103.34
5	214.08	103.27
6	215.29	102.57
7	215.97	102.18
8	305.20	124.42
9	309.03	125.70
10	309.21	126.01
11	309.28	126.12
12	310.28	127.85
13	311.03	129.14

****
** Maximum Required Reinforcement Force = 4.8678E+02 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 8 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.72	105.68
2	211.76	105.66
3	213.49	104.66
4	215.22	103.66
5	215.35	103.59
6	216.56	102.89
7	217.38	102.41
8	305.39	124.44
9	311.78	125.78
10	312.02	126.18
11	312.09	126.29
12	313.09	128.02
13	313.84	129.31

****
** Maximum Required Reinforcement Force = 4.8548E+02 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 9 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	208.86	105.00
2	208.94	104.95
3	210.68	103.95
4	212.41	102.95
5	212.53	102.88
6	213.74	102.18
7	214.45	101.77
8	303.71	123.98
9	312.54	125.64
10	312.88	126.24
11	312.96	126.34
12	313.96	128.07
13	314.70	129.37

****
** Maximum Required Reinforcement Force = 4.8459E+02 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No.10 specified by 13 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.55	105.14
2	209.59	105.11
3	211.32	104.11
4	213.05	103.11
5	213.17	103.04
6	214.38	102.35

7	214.93	102.03
8	301.19	123.34
9	309.78	125.64
10	310.02	126.06
11	310.10	126.17
12	311.10	127.90
13	311.84	129.19

****
** Maximum Required Reinforcement Force = 4.8390E+02 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

The following is a summary of the TEN most critical surfaces

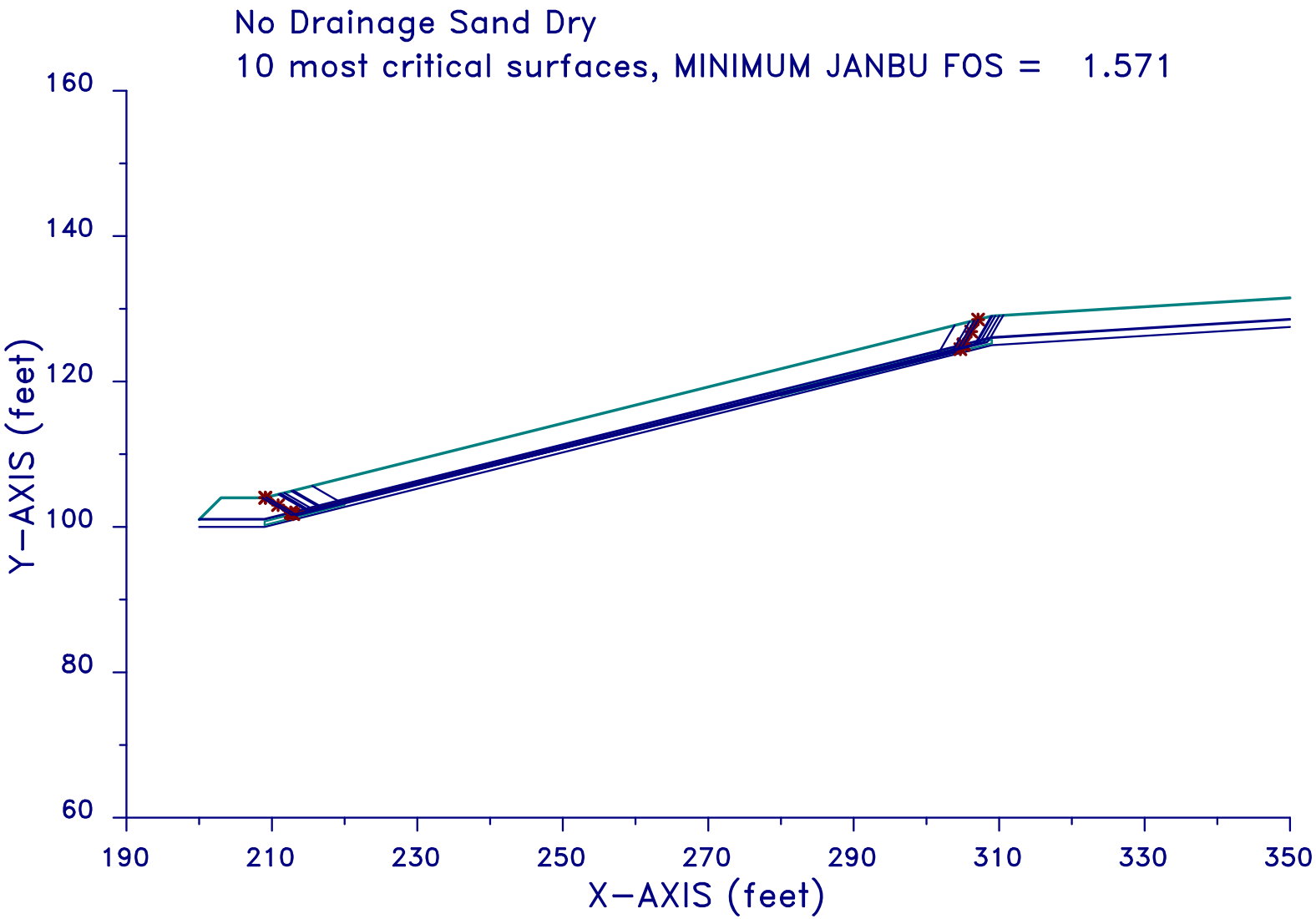
Problem Description : MEYERS VENEER STATIC 01

REINFORCING FORCES calculated for minimum FOS = 1.000 and reinforcing force resultant at elevation = 128.00 feet

	Reinforcing Force (lb)	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	615.	1.012	207.84	315.32	2.227E+04
2.	596.	1.013	207.86	311.64	2.161E+04
3.	569.	1.012	209.61	315.79	2.206E+04
4.	532.	1.013	213.75	313.94	2.079E+04
5.	522.	1.012	212.42	314.62	2.116E+04
6.	498.	1.014	206.12	311.45	2.184E+04
7.	487.	1.012	210.46	311.03	2.091E+04
8.	485.	1.012	211.72	313.84	2.111E+04
9.	485.	1.012	208.86	314.70	2.182E+04
10.	484.	1.012	209.55	311.84	2.121E+04

* * * END OF FILE * * *

MEYNSDRY 11-18-08 14:48



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*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2005      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
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*                                       *
*  Ver. 5.207                96 - 1972  *
*****************************************
```

Problem Description : No Drainage Sand Dry

SEGMENT BOUNDARY COORDINATES
---

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	101.0	203.0	104.0	1
2	203.0	104.0	209.0	104.0	1
3	209.0	104.0	309.0	129.0	1
4	309.0	129.0	350.0	131.5	1

9 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.1	101.1	209.0	101.1	2
2	209.0	101.1	309.0	126.1	2
3	309.0	126.1	350.0	128.6	2
4	200.0	101.0	209.0	101.0	3
5	209.0	101.0	309.0	126.0	3
6	309.0	126.0	350.0	128.5	3
7	200.0	100.0	209.0	100.0	1
8	209.0	100.0	309.0	125.0	1
9	309.0	125.0	350.0	127.5	1

ISOTROPIC Soil Parameters

---

3 Soil unit(s) specified

Soil Unit	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	125.0	.0	30.00	.000	.0	0
2	60.0	60.0	.0	20.00	.000	.0	1
3	60.0	60.0	.0	20.00	.000	.0	1

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

200 trial surfaces will be generated and analyzed.

2 boxes specified for generation of central block base

Length of line segments for active and passive portions of sliding block is 2.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	209.0	100.5	220.0	103.3	.5
2	280.0	118.3	309.0	125.5	.5

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined are displayed below - the most critical first

Failure surface No. 1 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)

1	209.08	104.02
2	209.12	104.00
3	210.85	103.00
4	212.58	102.00
5	212.69	101.92
6	212.94	101.74
7	304.67	124.45
8	305.07	125.02
9	305.16	125.14
10	306.16	126.87
11	307.11	128.53

** Corrected JANBU FOS = 1.571 ** (Fo factor = 1.010)

Failure surface No. 2 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.23	104.06
2	209.27	104.03
3	211.01	103.03
4	212.74	102.03
5	212.84	101.96
6	213.40	101.57
7	306.59	125.09
8	306.85	125.46
9	306.93	125.58
10	307.93	127.32
11	308.89	128.97

** Corrected JANBU FOS = 1.571 ** (Fo factor = 1.010)

Failure surface No. 3 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.15	104.54
2	211.19	104.51
3	212.92	103.51
4	214.66	102.51
5	214.76	102.44
6	215.21	102.13
7	306.73	125.09
8	307.03	125.51
9	307.11	125.63
10	308.11	127.36
11	309.06	129.00

** Corrected JANBU FOS = 1.572 ** (Fo factor = 1.010)

Failure surface No. 4 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	212.70	104.92
2	212.74	104.90
3	214.47	103.90
4	216.20	102.90
5	216.31	102.83
6	216.65	102.59
7	307.83	125.35
8	308.13	125.78
9	308.21	125.90
10	309.21	127.64
11	310.04	129.06

** Corrected JANBU FOS = 1.573 ** (Fo factor = 1.009)

Failure surface No. 5 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.73	104.68
2	211.77	104.66
3	213.50	103.66
4	215.23	102.66
5	215.34	102.58
6	215.60	102.40
7	308.35	125.40
8	308.73	125.93
9	308.81	126.05
10	309.81	127.79
11	310.57	129.10

** Corrected JANBU FOS = 1.573 ** (Fo factor = 1.009)

Failure surface No. 6 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	212.95	104.99
2	212.99	104.96
3	214.73	103.96
4	216.46	102.96
5	216.56	102.89
6	216.79	102.73
7	304.84	124.65
8	305.09	125.02
9	305.18	125.14
10	306.18	126.88
11	307.14	128.53

** Corrected JANBU FOS = 1.574 ** (Fo factor = 1.010)

Failure surface No. 7 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	208.68	104.00
2	208.82	103.92
3	210.55	102.92
4	212.28	101.92
5	212.39	101.85
6	212.69	101.64
7	303.89	123.99
8	304.52	124.88
9	304.60	125.00
10	305.60	126.73
11	306.56	128.39

** Corrected JANBU FOS = 1.575 ** (Fo factor = 1.011)

Failure surface No. 8 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.24	104.56
2	211.28	104.54
3	213.01	103.54
4	214.74	102.54
5	214.85	102.46
6	215.10	102.29
7	301.55	123.79
8	301.84	124.21
9	301.93	124.33
10	302.93	126.06
11	303.88	127.72

** Corrected JANBU FOS = 1.576 ** (Fo factor = 1.010)

Failure surface No. 9 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.92	104.48
2	210.96	104.46
3	212.70	103.46
4	214.43	102.46
5	214.53	102.38
6	214.92	102.11
7	303.44	124.06
8	303.90	124.72
9	303.98	124.85
10	304.98	126.58
11	305.94	128.24

** Corrected JANBU FOS = 1.577 ** (Fo factor = 1.010)

Failure surface No.10 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	215.55	105.64
2	215.59	105.61
3	217.32	104.61
4	219.05	103.61
5	219.16	103.54
6	219.58	103.24
7	307.24	125.25
8	307.50	125.63
9	307.59	125.75
10	308.59	127.48
11	309.48	129.03

** Corrected JANBU FOS = 1.577 ** (Fo factor = 1.010)

The following is a summary of the TEN most critical surfaces

Problem Description : No Drainage Sand Dry

	Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	1.571	1.010	209.08	307.11	1.311E+04
2.	1.571	1.010	209.23	308.89	1.347E+04
3.	1.572	1.010	211.15	309.06	1.317E+04
4.	1.573	1.009	212.70	310.04	1.300E+04
5.	1.573	1.009	211.73	310.57	1.321E+04
6.	1.574	1.010	212.95	307.14	1.242E+04
7.	1.575	1.011	208.68	306.56	1.339E+04
8.	1.576	1.010	211.24	303.88	1.227E+04
9.	1.577	1.010	210.92	305.94	1.291E+04
10.	1.577	1.010	215.55	309.48	1.258E+04

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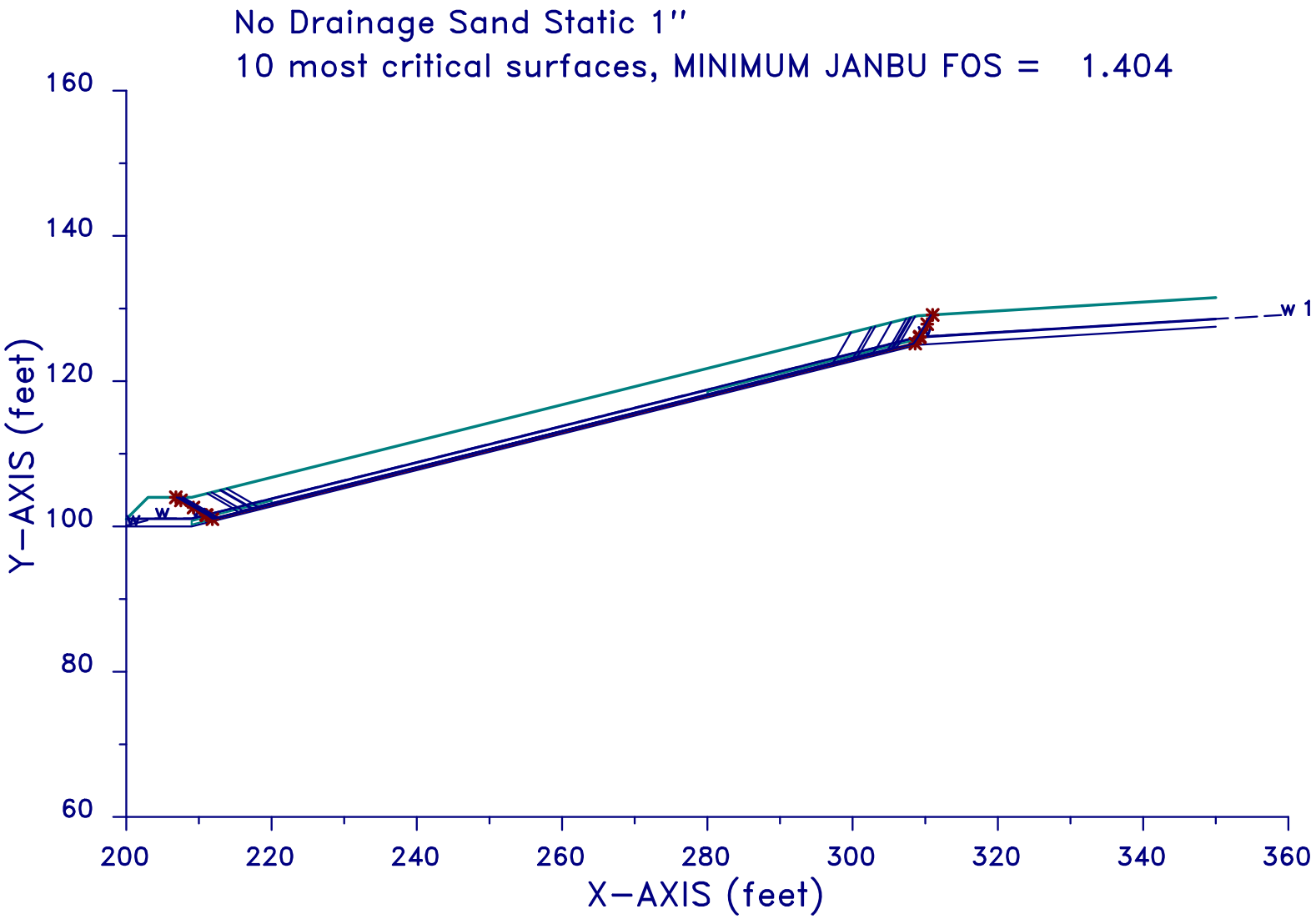

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*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2005      *
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*                                       *
*  Ver. 5.207                96 - 1972  *
*****************************************
```

Problem Description : No Drainage Sand Static 1"

SEGMENT BOUNDARY COORDINATES
---

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	101.0	203.0	104.0	1
2	203.0	104.0	209.0	104.0	1
3	209.0	104.0	309.0	129.0	1
4	309.0	129.0	350.0	131.5	1

9 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.1	101.1	209.0	101.1	2
2	209.0	101.1	309.0	126.1	2
3	309.0	126.1	350.0	128.6	2
4	200.0	101.0	209.0	101.0	3
5	209.0	101.0	309.0	126.0	3
6	309.0	126.0	350.0	128.5	3
7	200.0	100.0	209.0	100.0	1
8	209.0	100.0	309.0	125.0	1
9	309.0	125.0	350.0	127.5	1

ISOTROPIC Soil Parameters

---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	125.0	.0	30.00	.000	.0	0
2	60.0	60.0	.0	20.00	.000	.0	1
3	60.0	60.0	.0	20.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	200.00	100.10
2	204.00	101.10
3	209.00	101.10
4	309.00	126.10
5	359.00	129.10

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

200 trial surfaces will be generated and analyzed.

2 boxes specified for generation of central block base

Length of line segments for active and passive portions of sliding block is 2.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	209.0	100.5	220.0	103.3	.5
2	280.0	118.3	309.0	125.5	.5

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined are displayed below - the most critical first

Failure surface No. 1 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	206.83	104.00
2	207.53	103.60
3	209.26	102.60
4	210.99	101.60
5	211.09	101.52
6	211.86	100.99
7	308.63	125.18
8	309.21	126.01
9	309.28	126.12
10	310.28	127.85
11	311.02	129.12

** Corrected JANBU FOS = 1.404 ** (Fo factor = 1.011)

Failure surface No. 2 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	213.05	105.01
2	213.09	104.99
3	214.83	103.99
4	216.56	102.99
5	216.66	102.92
6	217.38	102.41
7	305.47	124.44
8	306.05	125.26
9	306.13	125.38
10	307.13	127.12
11	308.09	128.77

** Corrected JANBU FOS = 1.405 ** (Fo factor = 1.011)

Failure surface No. 3 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.74	104.00
2	208.17	103.76
3	209.90	102.76
4	211.63	101.76
5	211.73	101.68
6	212.47	101.17
7	299.94	123.03
8	300.53	123.88
9	300.61	124.00
10	301.61	125.74
11	302.57	127.39

** Corrected JANBU FOS = 1.407 ** (Fo factor = 1.012)

Failure surface No. 4 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.15	104.54
2	211.19	104.51
3	212.92	103.51
4	214.65	102.51
5	214.76	102.44
6	215.41	101.99
7	308.37	125.16
8	308.96	125.99
9	309.04	126.10
10	310.04	127.83
11	310.77	129.11

** Corrected JANBU FOS = 1.409 ** (Fo factor = 1.010)

Failure surface No. 5 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	213.84	105.21
2	213.88	105.19
3	215.61	104.19
4	217.35	103.19
5	217.45	103.11
6	218.04	102.70
7	304.74	124.23
8	305.35	125.09
9	305.43	125.21
10	306.43	126.94
11	307.39	128.60

** Corrected JANBU FOS = 1.415 ** (Fo factor = 1.011)

Failure surface No. 6 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.77	104.69
2	211.81	104.67
3	213.54	103.67
4	215.27	102.67
5	215.38	102.59
6	215.97	102.18
7	305.28	124.42
8	305.84	125.21
9	305.92	125.33
10	306.92	127.06
11	307.88	128.72

** Corrected JANBU FOS = 1.418 ** (Fo factor = 1.011)

Failure surface No. 7 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	206.96	104.00
2	207.61	103.62
3	209.35	102.62
4	211.08	101.62
5	211.18	101.55
6	211.87	101.06
7	300.51	123.21
8	301.08	124.02
9	301.16	124.14
10	302.16	125.87
11	303.12	127.53

** Corrected JANBU FOS = 1.418 ** (Fo factor = 1.012)

Failure surface No. 8 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	212.92	104.98
2	212.96	104.96
3	214.69	103.96
4	216.42	102.96
5	216.53	102.88
6	217.23	102.39
7	306.10	124.74
8	306.55	125.39
9	306.64	125.51

10	307.64	127.24
11	308.59	128.90

** Corrected JANBU FOS = 1.419 ** (Fo factor = 1.011)

Failure surface No. 9 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.25	104.00
2	207.82	103.67
3	209.55	102.67
4	211.28	101.67
5	211.39	101.60
6	212.15	101.07
7	297.20	122.42
8	297.74	123.18
9	297.82	123.31
10	298.82	125.04
11	299.78	126.69

** Corrected JANBU FOS = 1.419 ** (Fo factor = 1.012)

Failure surface No.10 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.82	104.00
2	208.22	103.77
3	209.95	102.77
4	211.68	101.77
5	211.79	101.70
6	212.54	101.17
7	302.85	123.96
8	303.28	124.57
9	303.37	124.69
10	304.37	126.42
11	305.32	128.08

** Corrected JANBU FOS = 1.420 ** (Fo factor = 1.011)

The following is a summary of the TEN most critical surfaces

Problem Description : No Drainage Sand Static 1"

Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)

1.	1.404	1.011	206.83	311.02	1.294E+04
2.	1.405	1.011	213.05	308.09	1.185E+04
3.	1.407	1.012	207.74	302.57	1.180E+04
4.	1.409	1.010	211.15	310.77	1.241E+04
5.	1.415	1.011	213.84	307.39	1.166E+04
6.	1.418	1.011	211.77	307.88	1.198E+04
7.	1.418	1.012	206.96	303.12	1.195E+04
8.	1.419	1.011	212.92	308.59	1.193E+04
9.	1.419	1.012	207.25	299.78	1.151E+04
10.	1.420	1.011	207.82	305.32	1.212E+04

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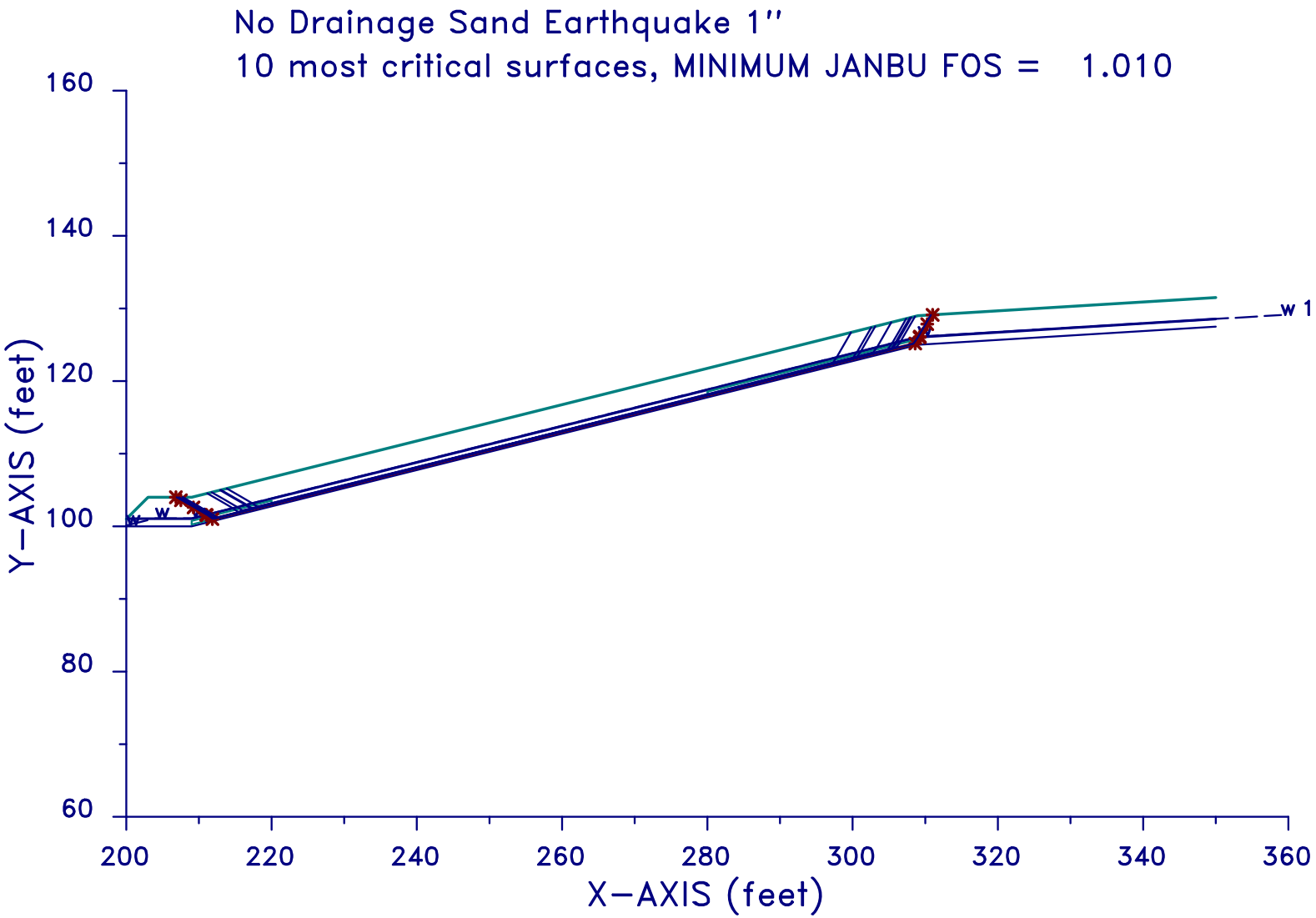

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*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
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Problem Description : No Drainage Sand Earthquake 1"

SEGMENT BOUNDARY COORDINATES
---

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	101.0	203.0	104.0	1
2	203.0	104.0	209.0	104.0	1
3	209.0	104.0	309.0	129.0	1
4	309.0	129.0	350.0	131.5	1

9 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.1	101.1	209.0	101.1	2
2	209.0	101.1	309.0	126.1	2
3	309.0	126.1	350.0	128.6	2
4	200.0	101.0	209.0	101.0	3
5	209.0	101.0	309.0	126.0	3
6	309.0	126.0	350.0	128.5	3
7	200.0	100.0	209.0	100.0	1
8	209.0	100.0	309.0	125.0	1
9	309.0	125.0	350.0	127.5	1

ISOTROPIC Soil Parameters

---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	125.0	.0	30.00	.000	.0	0
2	60.0	60.0	.0	20.00	.000	.0	1
3	60.0	60.0	.0	20.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	200.00	100.10
2	204.00	101.10
3	209.00	101.10
4	309.00	126.10
5	359.00	129.10

A horizontal earthquake loading coefficient
of .090 has been assigned

A vertical earthquake loading coefficient
of .000 has been assigned

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

200 trial surfaces will be generated and analyzed.

2 boxes specified for generation of central block base

Length of line segments for active and passive portions of sliding block is 2.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	209.0	100.5	220.0	103.3	.5
2	280.0	118.3	309.0	125.5	.5

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined are displayed below - the most critical first

Failure surface No. 1 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	206.83	104.00
2	207.53	103.60
3	209.26	102.60
4	210.99	101.60
5	211.09	101.52
6	211.86	100.99
7	308.63	125.18
8	309.21	126.01
9	309.28	126.12
10	310.28	127.85
11	311.02	129.12

** Corrected JANBU FOS = 1.010 ** (Fo factor = 1.011)

Failure surface No. 2 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	213.05	105.01
2	213.09	104.99
3	214.83	103.99
4	216.56	102.99
5	216.66	102.92
6	217.38	102.41
7	305.47	124.44

8	306.05	125.26
9	306.13	125.38
10	307.13	127.12
11	308.09	128.77

** Corrected JANBU FOS = 1.014 ** (Fo factor = 1.011)

Failure surface No. 3 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.15	104.54
2	211.19	104.51
3	212.92	103.51
4	214.65	102.51
5	214.76	102.44
6	215.41	101.99
7	308.37	125.16
8	308.96	125.99
9	309.04	126.10
10	310.04	127.83
11	310.77	129.11

** Corrected JANBU FOS = 1.015 ** (Fo factor = 1.010)

Failure surface No. 4 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.74	104.00
2	208.17	103.76
3	209.90	102.76
4	211.63	101.76
5	211.73	101.68
6	212.47	101.17
7	299.94	123.03
8	300.53	123.88
9	300.61	124.00
10	301.61	125.74
11	302.57	127.39

** Corrected JANBU FOS = 1.015 ** (Fo factor = 1.012)

Failure surface No. 5 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	213.84	105.21
2	213.88	105.19
3	215.61	104.19
4	217.35	103.19

5	217.45	103.11
6	218.04	102.70
7	304.74	124.23
8	305.35	125.09
9	305.43	125.21
10	306.43	126.94
11	307.39	128.60

** Corrected JANBU FOS = 1.021 ** (Fo factor = 1.011)

Failure surface No. 6 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.77	104.69
2	211.81	104.67
3	213.54	103.67
4	215.27	102.67
5	215.38	102.59
6	215.97	102.18
7	305.28	124.42
8	305.84	125.21
9	305.92	125.33
10	306.92	127.06
11	307.88	128.72

** Corrected JANBU FOS = 1.023 ** (Fo factor = 1.011)

Failure surface No. 7 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	206.96	104.00
2	207.61	103.62
3	209.35	102.62
4	211.08	101.62
5	211.18	101.55
6	211.87	101.06
7	300.51	123.21
8	301.08	124.02
9	301.16	124.14
10	302.16	125.87
11	303.12	127.53

** Corrected JANBU FOS = 1.023 ** (Fo factor = 1.012)

Failure surface No. 8 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.25	104.00

2	207.82	103.67
3	209.55	102.67
4	211.28	101.67
5	211.39	101.60
6	212.15	101.07
7	297.20	122.42
8	297.74	123.18
9	297.82	123.31
10	298.82	125.04
11	299.78	126.69

** Corrected JANBU FOS = 1.024 ** (Fo factor = 1.012)

Failure surface No. 9 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	212.92	104.98
2	212.96	104.96
3	214.69	103.96
4	216.42	102.96
5	216.53	102.88
6	217.23	102.39
7	306.10	124.74
8	306.55	125.39
9	306.64	125.51
10	307.64	127.24
11	308.59	128.90

** Corrected JANBU FOS = 1.024 ** (Fo factor = 1.011)

Failure surface No.10 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.82	104.00
2	208.22	103.77
3	209.95	102.77
4	211.68	101.77
5	211.79	101.70
6	212.54	101.17
7	302.85	123.96
8	303.28	124.57
9	303.37	124.69
10	304.37	126.42
11	305.32	128.08

** Corrected JANBU FOS = 1.024 ** (Fo factor = 1.011)

The following is a summary of the TEN most critical surfaces

Problem Description : No Drainage Sand Earthquake 1"

	Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	1.010	1.011	206.83	311.02	1.272E+04
2.	1.014	1.011	213.05	308.09	1.165E+04
3.	1.015	1.010	211.15	310.77	1.220E+04
4.	1.015	1.012	207.74	302.57	1.160E+04
5.	1.021	1.011	213.84	307.39	1.146E+04
6.	1.023	1.011	211.77	307.88	1.177E+04
7.	1.023	1.012	206.96	303.12	1.175E+04
8.	1.024	1.012	207.25	299.78	1.132E+04
9.	1.024	1.011	212.92	308.59	1.172E+04
10.	1.024	1.011	207.82	305.32	1.192E+04

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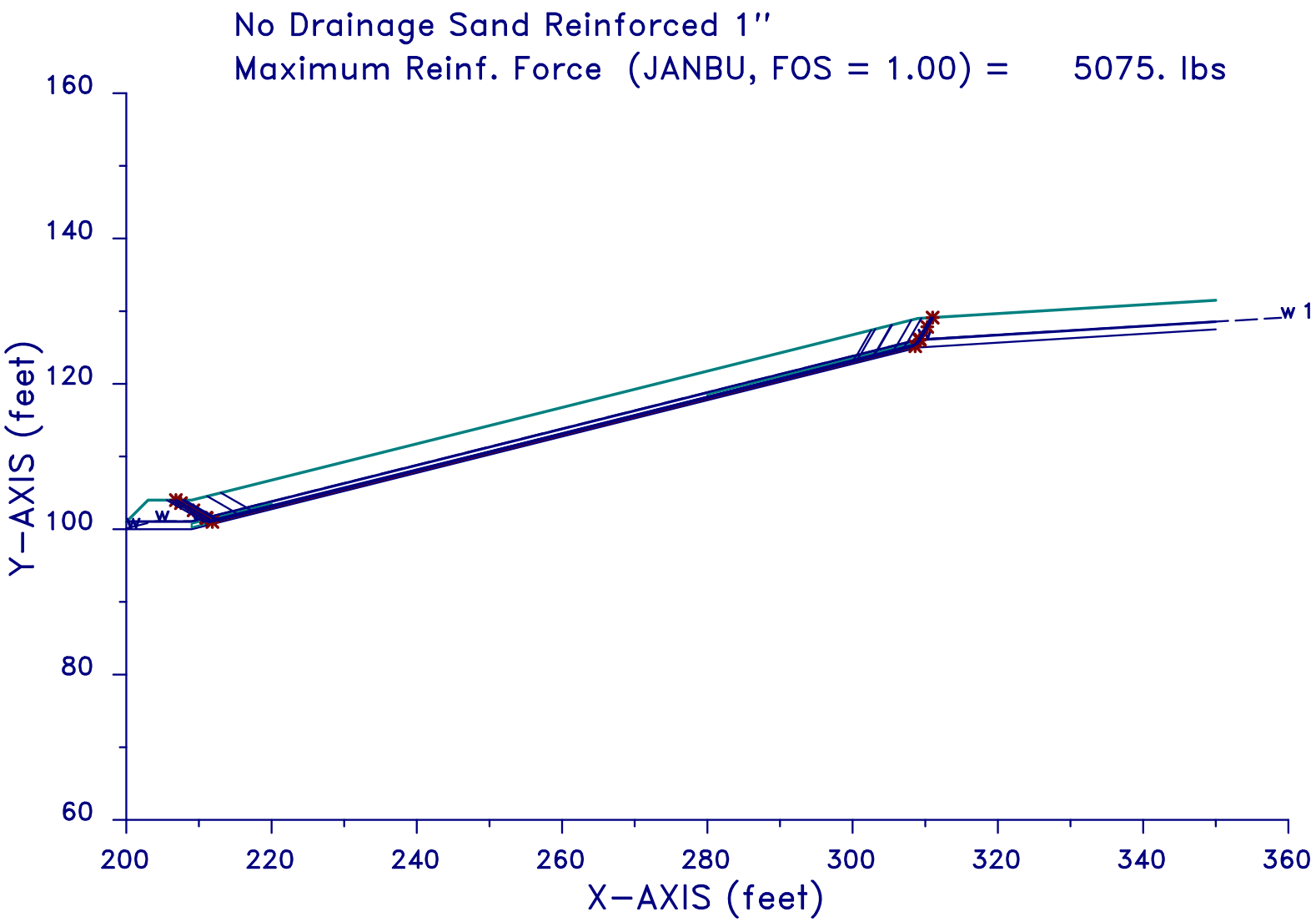

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*****************************************
*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
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*****************************************
```

Problem Description : No Drainage Sand Reinforced 1"

SEGMENT BOUNDARY COORDINATES
---

4 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	101.0	203.0	104.0	1
2	203.0	104.0	209.0	104.0	1
3	209.0	104.0	309.0	129.0	1
4	309.0	129.0	350.0	131.5	1

9 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.1	101.1	209.0	101.1	2
2	209.0	101.1	309.0	126.1	2
3	309.0	126.1	350.0	128.6	2
4	200.0	101.0	209.0	101.0	3
5	209.0	101.0	309.0	126.0	3
6	309.0	126.0	350.0	128.5	3
7	200.0	100.0	209.0	100.0	1
8	209.0	100.0	309.0	125.0	1
9	309.0	125.0	350.0	127.5	1

ISOTROPIC Soil Parameters

---

3 Soil unit(s) specified

Soil Unit	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	125.0	.0	30.00	.000	.0	0
2	60.0	60.0	.0	20.00	.000	.0	1
3	60.0	60.0	.0	20.00	.000	.0	1

REINFORCED SLOPE ANALYSIS

The analysis will be performed to determine the critical surface that requires the largest amount of reinforcing force to satisfy:

Minimum (required) FOS = 1.000
Resultant at Elevation = 128.00 feet

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 5 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	200.00	100.10
2	204.00	101.10
3	209.00	101.10
4	309.00	126.10
5	359.00	129.10

A horizontal earthquake loading coefficient
of .220 has been assigned

A vertical earthquake loading coefficient
of .000 has been assigned

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

200 trial surfaces will be generated and analyzed.

2 boxes specified for generation of central block base

Length of line segments for active and passive portions of sliding block is 2.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	209.0	100.5	220.0	103.3	.5
2	280.0	118.3	309.0	125.5	.5

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined are displayed below - the most critical first

Failure surface No. 1 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	206.83	104.00
2	207.53	103.60
3	209.26	102.60
4	210.99	101.60
5	211.09	101.52
6	211.86	100.99
7	308.63	125.18
8	309.21	126.01
9	309.28	126.12
10	310.28	127.85
11	311.02	129.12

****
** Maximum Required Reinforcement Force = 5.0751E+03 (lb) **

** Corrected JANBU FOS = 1.000   (for above reinforcement)   **
****

Failure surface No. 2 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.15	104.54
2	211.19	104.51
3	212.92	103.51
4	214.65	102.51
5	214.76	102.44
6	215.41	101.99
7	308.37	125.16
8	308.96	125.99
9	309.04	126.10
10	310.04	127.83
11	310.77	129.11

****
** Maximum Required Reinforcement Force = 4.7646E+03 (lb)   **
** Corrected JANBU FOS = 1.000   (for above reinforcement)   **
****

Failure surface No. 3 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	208.07	104.00
2	208.39	103.81
3	210.12	102.81
4	211.86	101.81
5	211.96	101.74
6	212.67	101.25
7	308.94	125.50
8	309.30	126.02
9	309.38	126.12
10	310.38	127.86
11	311.11	129.13

****
** Maximum Required Reinforcement Force = 4.7353E+03 (lb)   **
** Corrected JANBU FOS = 1.000   (for above reinforcement)   **
****

Failure surface No. 4 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	205.59	104.00
2	206.66	103.38
3	208.39	102.38
4	210.13	101.38
5	210.23	101.31

6	210.69	100.98
7	306.85	124.72
8	307.48	125.62
9	307.56	125.74
10	308.56	127.47
11	309.46	129.03

****
** Maximum Required Reinforcement Force = 4.6359E+03 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 5 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	206.75	104.00
2	207.47	103.58
3	209.20	102.58
4	210.94	101.58
5	211.04	101.51
6	211.66	101.07
7	308.65	125.44
8	309.04	126.00
9	309.12	126.11
10	310.12	127.84
11	310.85	129.11

****
** Maximum Required Reinforcement Force = 4.5960E+03 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 6 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	213.05	105.01
2	213.09	104.99
3	214.83	103.99
4	216.56	102.99
5	216.66	102.92
6	217.38	102.41
7	305.47	124.44
8	306.05	125.26
9	306.13	125.38
10	307.13	127.12
11	308.09	128.77

****
** Maximum Required Reinforcement Force = 4.5629E+03 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 7 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.74	104.00
2	208.17	103.76
3	209.90	102.76
4	211.63	101.76
5	211.73	101.68
6	212.47	101.17
7	299.94	123.03
8	300.53	123.88
9	300.61	124.00
10	301.61	125.74
11	302.57	127.39

****
** Maximum Required Reinforcement Force = 4.5327E+03 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 8 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	206.16	104.00
2	207.06	103.48
3	208.79	102.48
4	210.52	101.48
5	210.63	101.41
6	211.31	100.93
7	302.89	123.87
8	303.40	124.60
9	303.49	124.72
10	304.49	126.45
11	305.44	128.11

****
** Maximum Required Reinforcement Force = 4.4976E+03 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 9 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	207.82	104.00
2	208.22	103.77
3	209.95	102.77
4	211.68	101.77
5	211.79	101.70
6	212.54	101.17
7	302.85	123.96
8	303.28	124.57
9	303.37	124.69

10	304.37	126.42
11	305.32	128.08

****
** Maximum Required Reinforcement Force = 4.4957E+03 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No.10 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	206.96	104.00
2	207.61	103.62
3	209.35	102.62
4	211.08	101.62
5	211.18	101.55
6	211.87	101.06
7	300.51	123.21
8	301.08	124.02
9	301.16	124.14
10	302.16	125.87
11	303.12	127.53

****
** Maximum Required Reinforcement Force = 4.4770E+03 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

The following is a summary of the TEN most critical surfaces

Problem Description : No Drainage Sand Reinforced 1"

REINFORCING FORCES calculated for minimum FOS = 1.000 and reinforcing force resultant at elevation = 128.00 feet

	Reinforcing Force (lb)	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	5075.	1.011	206.83	311.02	1.734E+04
2.	4765.	1.010	211.15	310.77	1.651E+04
3.	4735.	1.010	208.07	311.11	1.686E+04
4.	4636.	1.011	205.59	309.46	1.686E+04
5.	4596.	1.011	206.75	310.85	1.683E+04
6.	4563.	1.011	213.05	308.09	1.576E+04
7.	4533.	1.012	207.74	302.57	1.569E+04
8.	4498.	1.012	206.16	305.44	1.618E+04
9.	4496.	1.011	207.82	305.32	1.596E+04
10.	4477.	1.012	206.96	303.12	1.578E+04

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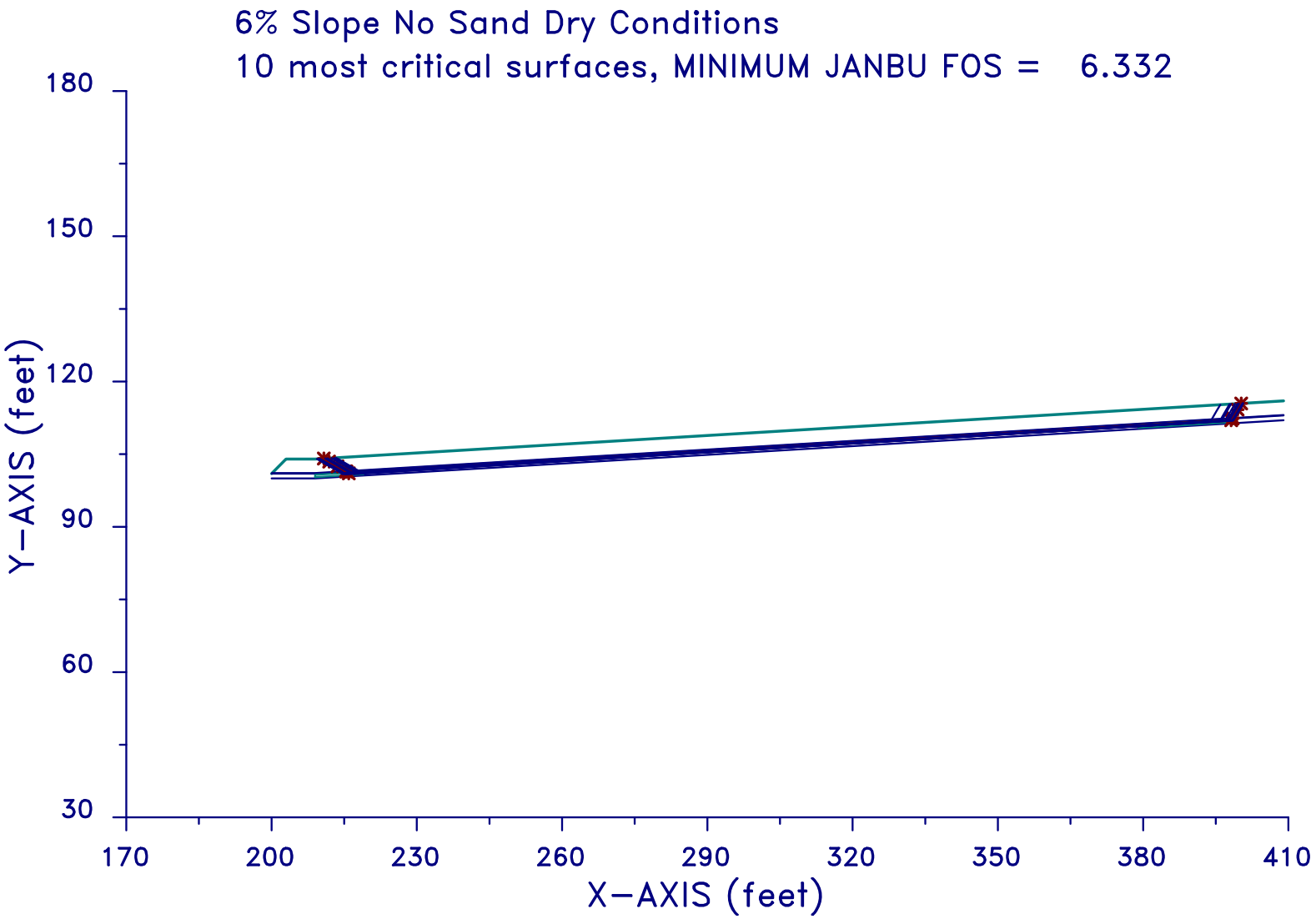

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*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
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Problem Description : 6% Slope No Sand Dry Conditions

SEGMENT BOUNDARY COORDINATES
---

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	101.0	203.0	104.0	1
2	203.0	104.0	209.0	104.0	1
3	209.0	104.0	409.0	116.0	1

6 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.1	101.1	209.0	101.1	2
2	209.0	101.1	409.0	113.1	2
3	200.0	101.0	209.0	101.0	3
4	209.0	101.0	409.0	113.0	3
5	200.0	100.0	209.0	100.0	1
6	209.0	100.0	409.0	112.0	1

ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Constant (psf)	Water Surface No.
1	120.0	125.0	.0	30.00	.000	.0	0
2	60.0	60.0	.0	20.00	.000	.0	1
3	60.0	60.0	.0	20.00	.000	.0	1

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

200 trial surfaces will be generated and analyzed.

2 boxes specified for generation of central block base

Length of line segments for active and passive portions of sliding block is 2.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	209.0	100.5	219.0	101.1	.5
2	379.0	110.7	399.0	111.9	.5

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined are displayed below - the most critical first

Failure surface No. 1 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.80	104.11
2	211.88	103.48
3	213.62	102.48
4	215.35	101.48

5	215.48	101.39
6	215.95	101.06
7	398.19	112.00
8	398.45	112.37
9	398.53	112.47
10	399.53	114.20
11	400.26	115.48

** Corrected JANBU FOS = 6.332 ** (Fo factor = 1.005)

Failure surface No. 2 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.95	104.06
2	211.04	103.43
3	212.77	102.43
4	214.50	101.43
5	214.63	101.34
6	215.00	101.08
7	398.55	111.93
8	398.88	112.39
9	398.95	112.50
10	399.95	114.23
11	400.68	115.50

** Corrected JANBU FOS = 6.333 ** (Fo factor = 1.005)

Failure surface No. 3 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.37	104.02
2	210.45	103.39
3	212.18	102.39
4	213.92	101.39
5	214.05	101.30
6	214.65	100.88
7	397.44	111.95
8	397.69	112.32
9	397.77	112.43
10	398.77	114.16
11	399.50	115.43

** Corrected JANBU FOS = 6.333 ** (Fo factor = 1.005)

Failure surface No. 4 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.07	104.12

2	212.15	103.50
3	213.89	102.50
4	215.62	101.50
5	215.75	101.41
6	216.09	101.17
7	396.13	111.92
8	396.36	112.24
9	396.43	112.35
10	397.43	114.08
11	398.16	115.35

** Corrected JANBU FOS = 6.333 ** (Fo factor = 1.005)

Failure surface No. 5 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.51	104.03
2	210.60	103.40
3	212.33	102.40
4	214.06	101.40
5	214.19	101.31
6	214.55	101.07
7	393.86	111.73
8	394.12	112.11
9	394.20	112.21
10	395.20	113.94
11	395.93	115.22

** Corrected JANBU FOS = 6.336 ** (Fo factor = 1.005)

Failure surface No. 6 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	212.99	104.24
2	214.08	103.61
3	215.81	102.61
4	217.54	101.61
5	217.67	101.52
6	218.21	101.14
7	398.41	111.96
8	398.71	112.38
9	398.78	112.49
10	399.78	114.22
11	400.52	115.49

** Corrected JANBU FOS = 6.337 ** (Fo factor = 1.005)

Failure surface No. 7 specified by 11 coordinate points

Point	x-surf	y-surf

No.	(ft)	(ft)
1	213.35	104.26
2	214.43	103.63
3	216.16	102.63
4	217.90	101.63
5	218.03	101.54
6	218.62	101.13
7	397.79	112.01
8	398.01	112.34
9	398.09	112.45
10	399.09	114.18
11	399.82	115.45

** Corrected JANBU FOS = 6.337 ** (Fo factor = 1.006)

Failure surface No. 8 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.53	104.15
2	212.62	103.52
3	214.35	102.52
4	216.08	101.52
5	216.21	101.43
6	217.02	100.87
7	396.95	111.97
8	397.17	112.29
9	397.25	112.39
10	398.25	114.13
11	398.98	115.40

** Corrected JANBU FOS = 6.338 ** (Fo factor = 1.006)

Failure surface No. 9 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	212.37	104.20
2	213.45	103.57
3	215.18	102.57
4	216.92	101.57
5	217.05	101.48
6	217.82	100.94
7	398.52	111.98
8	398.80	112.39
9	398.88	112.49
10	399.88	114.22
11	400.61	115.50

** Corrected JANBU FOS = 6.339 ** (Fo factor = 1.006)

Failure surface No.10 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.83	104.05
2	210.92	103.42
3	212.65	102.42
4	214.38	101.42
5	214.51	101.33
6	215.20	100.85
7	395.72	111.77
8	396.03	112.22
9	396.11	112.33
10	397.11	114.06
11	397.84	115.33

** Corrected JANBU FOS = 6.339 ** (Fo factor = 1.006)

The following is a summary of the TEN most critical surfaces

Problem Description : 6% Slope No Sand Dry Conditions

	Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	6.332	1.005	210.80	400.26	2.589E+04
2.	6.333	1.005	209.95	400.68	2.608E+04
3.	6.333	1.005	209.37	399.50	2.617E+04
4.	6.333	1.005	211.07	398.16	2.527E+04
5.	6.336	1.005	209.51	395.93	2.529E+04
6.	6.337	1.005	212.99	400.52	2.583E+04
7.	6.337	1.006	213.35	399.82	2.558E+04
8.	6.338	1.006	211.53	398.98	2.602E+04
9.	6.339	1.006	212.37	400.61	2.625E+04
10.	6.339	1.006	209.83	397.84	2.617E+04

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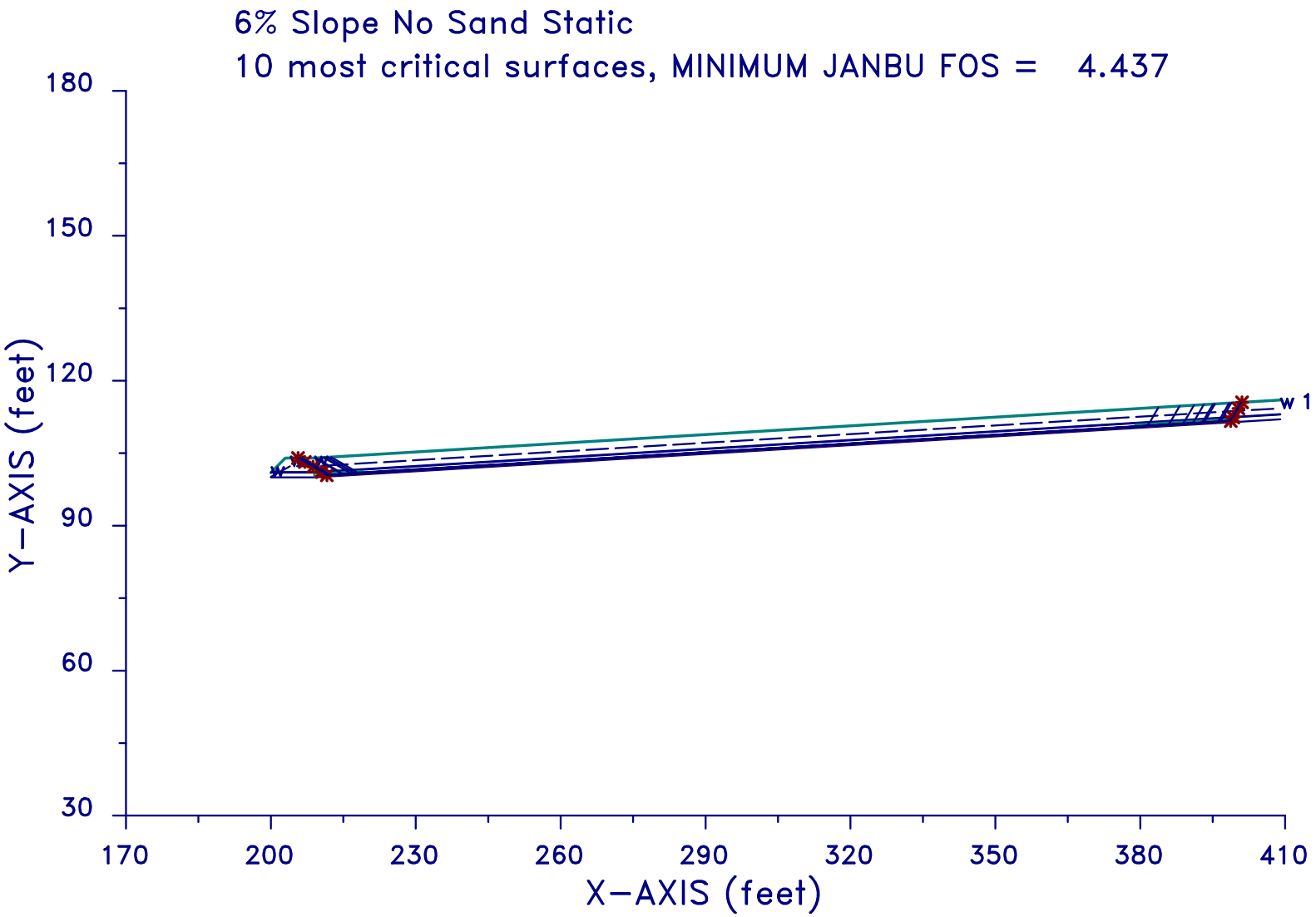

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*              X S T A B L              *
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*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
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*****************************************
```

Problem Description : 6% Slope No Sand Static

SEGMENT BOUNDARY COORDINATES
---

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	101.0	203.0	104.0	1
2	203.0	104.0	209.0	104.0	1
3	209.0	104.0	409.0	116.0	1

6 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.1	101.1	209.0	101.1	2
2	209.0	101.1	409.0	113.1	2
3	200.0	101.0	209.0	101.0	3
4	209.0	101.0	409.0	113.0	3
5	200.0	100.0	209.0	100.0	1
6	209.0	100.0	409.0	112.0	1

ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Constant (psf)	Water Surface No.
1	120.0	125.0	.0	30.00	.000	.0	0
2	60.0	60.0	.0	20.00	.000	.0	1
3	60.0	60.0	.0	20.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 4 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	200.00	100.10
2	204.00	102.30
3	209.00	102.30
4	409.00	114.30

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

200 trial surfaces will be generated and analyzed.

2 boxes specified for generation of central block base

Length of line segments for active and passive portions of sliding block is 2.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	209.0	100.5	219.0	101.1	.5
2	379.0	110.7	399.0	111.9	.5

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined are displayed below - the most critical first

Failure surface No. 1 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	205.63	104.00
2	207.03	103.19
3	208.76	102.19
4	210.50	101.19
5	210.63	101.10
6	211.60	100.42
7	398.74	111.66
8	399.28	112.42
9	399.35	112.52
10	400.35	114.25
11	401.08	115.52

** Corrected JANBU FOS = 4.437 ** (Fo factor = 1.006)

Failure surface No. 2 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.99	104.12
2	212.07	103.49
3	213.81	102.49
4	215.54	101.49
5	215.67	101.40
6	216.62	100.74
7	396.57	111.57
8	397.07	112.28
9	397.14	112.39
10	398.14	114.12
11	398.88	115.39

** Corrected JANBU FOS = 4.437 ** (Fo factor = 1.006)

Failure surface No. 3 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)

1	206.28	104.00
2	207.62	103.22
3	209.35	102.22
4	211.08	101.22
5	211.21	101.13
6	212.15	100.47
7	392.75	111.31
8	393.27	112.06
9	393.34	112.16
10	394.34	113.89
11	395.08	115.16

** Corrected JANBU FOS = 4.448 ** (Fo factor = 1.006)

Failure surface No. 4 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	212.47	104.21
2	213.56	103.58
3	215.29	102.58
4	217.02	101.58
5	217.15	101.49
6	218.03	100.87
7	385.80	110.86
8	386.35	111.64
9	386.42	111.75
10	387.42	113.48
11	388.16	114.75

** Corrected JANBU FOS = 4.455 ** (Fo factor = 1.006)

Failure surface No. 5 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.29	104.02
2	210.38	103.39
3	212.11	102.39
4	213.84	101.39
5	213.98	101.30
6	214.82	100.70
7	398.57	111.69
8	399.07	112.40
9	399.14	112.51
10	400.14	114.24
11	400.88	115.51

** Corrected JANBU FOS = 4.455 ** (Fo factor = 1.006)

Failure surface No. 6 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.75	104.16
2	212.83	103.54
3	214.56	102.54
4	216.30	101.54
5	216.43	101.45
6	217.22	100.89
7	396.06	111.51
8	396.59	112.26
9	396.66	112.36
10	397.66	114.09
11	398.40	115.36

** Corrected JANBU FOS = 4.468 ** (Fo factor = 1.006)

Failure surface No. 7 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	205.93	104.00
2	207.30	103.21
3	209.03	102.21
4	210.76	101.21
5	210.90	101.11
6	211.86	100.44
7	390.86	111.26
8	391.34	111.94
9	391.41	112.04
10	392.41	113.78
11	393.15	115.05

** Corrected JANBU FOS = 4.471 ** (Fo factor = 1.006)

Failure surface No. 8 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	205.74	104.00
2	207.14	103.20
3	208.87	102.20
4	210.60	101.20
5	210.73	101.10
6	211.61	100.49
7	393.14	111.36
8	393.65	112.08
9	393.72	112.18
10	394.72	113.92
11	395.45	115.19

** Corrected JANBU FOS = 4.480 ** (Fo factor = 1.006)

Failure surface No. 9 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.10	104.01
2	210.19	103.38
3	211.92	102.38
4	213.65	101.38
5	213.78	101.29
6	214.61	100.71
7	381.44	110.65
8	381.95	111.38
9	382.02	111.48
10	383.02	113.21
11	383.76	114.49

** Corrected JANBU FOS = 4.485 ** (Fo factor = 1.006)

Failure surface No.10 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.96	104.12
2	212.05	103.49
3	213.78	102.49
4	215.51	101.49
5	215.64	101.40
6	216.40	100.87
7	388.80	111.07
8	389.32	111.82
9	389.40	111.92
10	390.40	113.66
11	391.13	114.93

** Corrected JANBU FOS = 4.487 ** (Fo factor = 1.006)

The following is a summary of the TEN most critical surfaces

Problem Description : 6% Slope No Sand Static

	Modified JANBU FOS	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	4.437	1.006	205.63	401.08	1.956E+04
2.	4.437	1.006	210.99	398.88	1.882E+04
3.	4.448	1.006	206.28	395.08	1.890E+04
4.	4.455	1.006	212.47	388.16	1.762E+04
5.	4.455	1.006	209.29	400.88	1.919E+04

6.	4.468	1.006	211.75	398.40	1.870E+04
7.	4.471	1.006	205.93	393.15	1.875E+04
8.	4.480	1.006	205.74	395.45	1.899E+04
9.	4.485	1.006	209.10	383.76	1.752E+04
10.	4.487	1.006	210.96	391.13	1.806E+04

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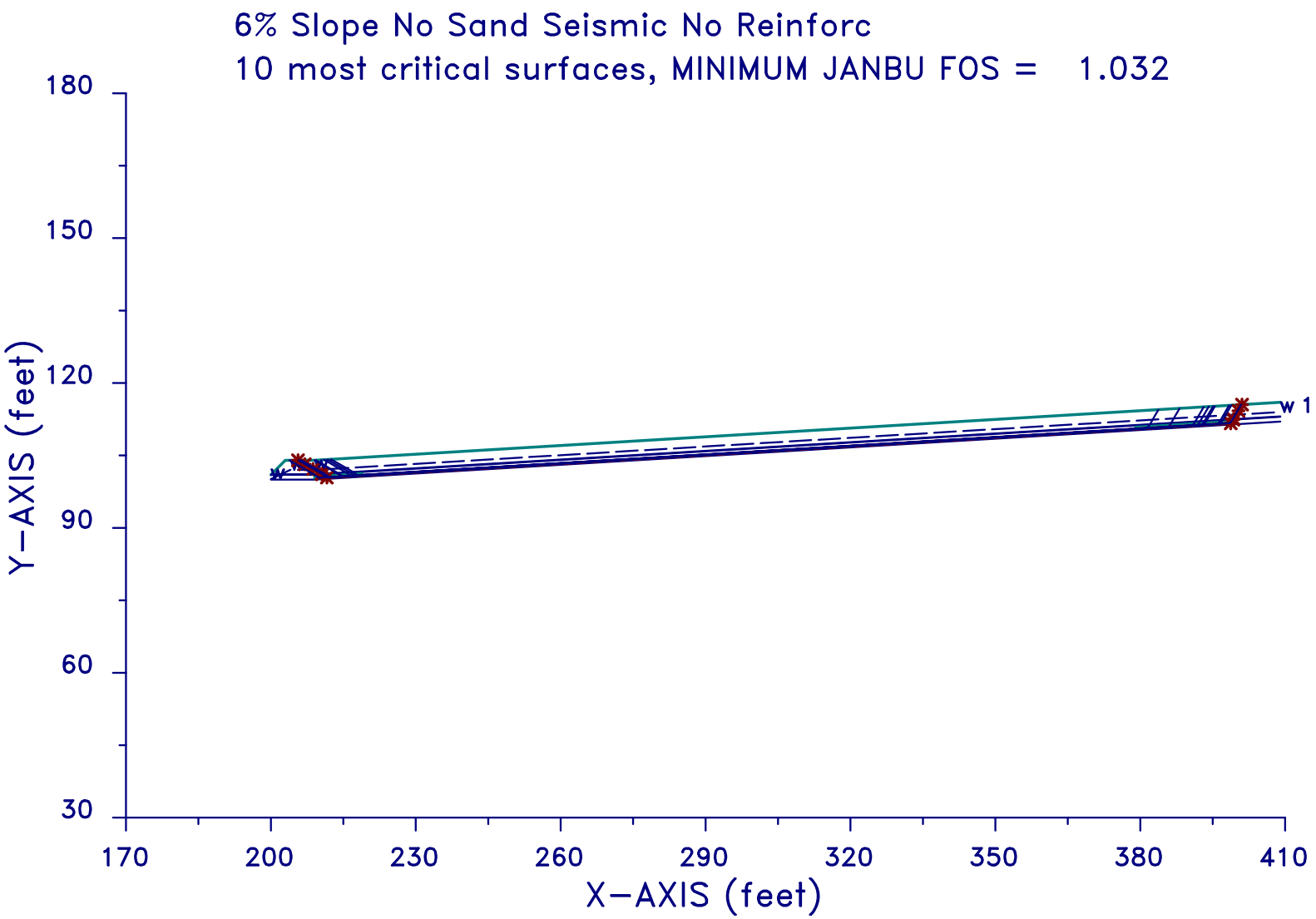

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*        Slope Stability Analysis       *
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Problem Description : 6% Slope No Sand Seismic No Reinforc

SEGMENT BOUNDARY COORDINATES

---

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	101.0	203.0	104.0	1
2	203.0	104.0	209.0	104.0	1
3	209.0	104.0	409.0	116.0	1

6 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.1	101.1	209.0	101.1	2
2	209.0	101.1	409.0	113.1	2
3	200.0	101.0	209.0	101.0	3
4	209.0	101.0	409.0	113.0	3
5	200.0	100.0	209.0	100.0	1
6	209.0	100.0	409.0	112.0	1

ISOTROPIC Soil Parameters

---

3 Soil unit(s) specified

Soil Unit	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	125.0	.0	30.00	.000	.0	0
2	60.0	60.0	.0	20.00	.000	.0	1
3	60.0	60.0	.0	20.00	.000	.0	1

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 4 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	200.00	100.10
2	204.00	102.00
3	209.00	102.00
4	409.00	114.00

A horizontal earthquake loading coefficient
of .210 has been assigned

A vertical earthquake loading coefficient
of .000 has been assigned

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

200 trial surfaces will be generated and analyzed.

2 boxes specified for generation of central block base

Length of line segments for active and passive portions of

sliding block is 2.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	209.0	100.5	219.0	101.1	.5
2	379.0	110.7	399.0	111.9	.5

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined are displayed below - the most critical first

Failure surface No. 1 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	205.63	104.00
2	207.03	103.19
3	208.76	102.19
4	210.50	101.19
5	210.63	101.10
6	211.60	100.42
7	398.74	111.66
8	399.28	112.42
9	399.35	112.52
10	400.35	114.25
11	401.08	115.52

** Corrected JANBU FOS = 1.032 ** (Fo factor = 1.006)

Failure surface No. 2 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.99	104.12
2	212.07	103.49
3	213.81	102.49
4	215.54	101.49
5	215.67	101.40
6	216.62	100.74
7	396.57	111.57
8	397.07	112.28
9	397.14	112.39
10	398.14	114.12
11	398.88	115.39

** Corrected JANBU FOS = 1.035 ** (Fo factor = 1.006)

Failure surface No. 3 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	206.28	104.00
2	207.62	103.22
3	209.35	102.22
4	211.08	101.22
5	211.21	101.13
6	212.15	100.47
7	392.75	111.31
8	393.27	112.06
9	393.34	112.16
10	394.34	113.89
11	395.08	115.16

** Corrected JANBU FOS = 1.036 ** (Fo factor = 1.006)

Failure surface No. 4 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	212.47	104.21
2	213.56	103.58
3	215.29	102.58
4	217.02	101.58
5	217.15	101.49
6	218.03	100.87
7	385.80	110.86
8	386.35	111.64
9	386.42	111.75
10	387.42	113.48
11	388.16	114.75

** Corrected JANBU FOS = 1.039 ** (Fo factor = 1.006)

Failure surface No. 5 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.29	104.02
2	210.38	103.39
3	212.11	102.39
4	213.84	101.39
5	213.98	101.30
6	214.82	100.70
7	398.57	111.69
8	399.07	112.40
9	399.14	112.51

10	400.14	114.24
11	400.88	115.51

** Corrected JANBU FOS = 1.040 ** (Fo factor = 1.006)

Failure surface No. 6 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	205.93	104.00
2	207.30	103.21
3	209.03	102.21
4	210.76	101.21
5	210.90	101.11
6	211.86	100.44
7	390.86	111.26
8	391.34	111.94
9	391.41	112.04
10	392.41	113.78
11	393.15	115.05

** Corrected JANBU FOS = 1.040 ** (Fo factor = 1.006)

Failure surface No. 7 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	205.74	104.00
2	207.14	103.20
3	208.87	102.20
4	210.60	101.20
5	210.73	101.10
6	211.61	100.49
7	393.14	111.36
8	393.65	112.08
9	393.72	112.18
10	394.72	113.92
11	395.45	115.19

** Corrected JANBU FOS = 1.042 ** (Fo factor = 1.006)

Failure surface No. 8 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.75	104.16
2	212.83	103.54
3	214.56	102.54
4	216.30	101.54
5	216.43	101.45
6	217.22	100.89

7	396.06	111.51
8	396.59	112.26
9	396.66	112.36
10	397.66	114.09
11	398.40	115.36

** Corrected JANBU FOS = 1.042 ** (Fo factor = 1.006)

Failure surface No. 9 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	203.85	104.00
2	205.41	103.10
3	207.14	102.10
4	208.87	101.10
5	209.02	101.00
6	209.90	100.38
7	391.87	111.28
8	392.37	112.00
9	392.44	112.11
10	393.44	113.84
11	394.18	115.11

** Corrected JANBU FOS = 1.045 ** (Fo factor = 1.006)

Failure surface No.10 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.10	104.01
2	210.19	103.38
3	211.92	102.38
4	213.65	101.38
5	213.78	101.29
6	214.61	100.71
7	381.44	110.65
8	381.95	111.38
9	382.02	111.48
10	383.02	113.21
11	383.76	114.49

** Corrected JANBU FOS = 1.046 ** (Fo factor = 1.006)

The following is a summary of the TEN most critical surfaces

Problem Description : 6% Slope No Sand Seismic No Reinforc

Modified	Correction	Initial	Terminal	Available

	JANBU FOS	Factor	x-coord (ft)	x-coord (ft)	Strength (lb)
1.	1.032	1.006	205.63	401.08	2.065E+04
2.	1.035	1.006	210.99	398.88	1.986E+04
3.	1.036	1.006	206.28	395.08	1.996E+04
4.	1.039	1.006	212.47	388.16	1.860E+04
5.	1.040	1.006	209.29	400.88	2.025E+04
6.	1.040	1.006	205.93	393.15	1.980E+04
7.	1.042	1.006	205.74	395.45	2.006E+04
8.	1.042	1.006	211.75	398.40	1.974E+04
9.	1.045	1.006	203.85	394.18	2.015E+04
10.	1.046	1.006	209.10	383.76	1.849E+04

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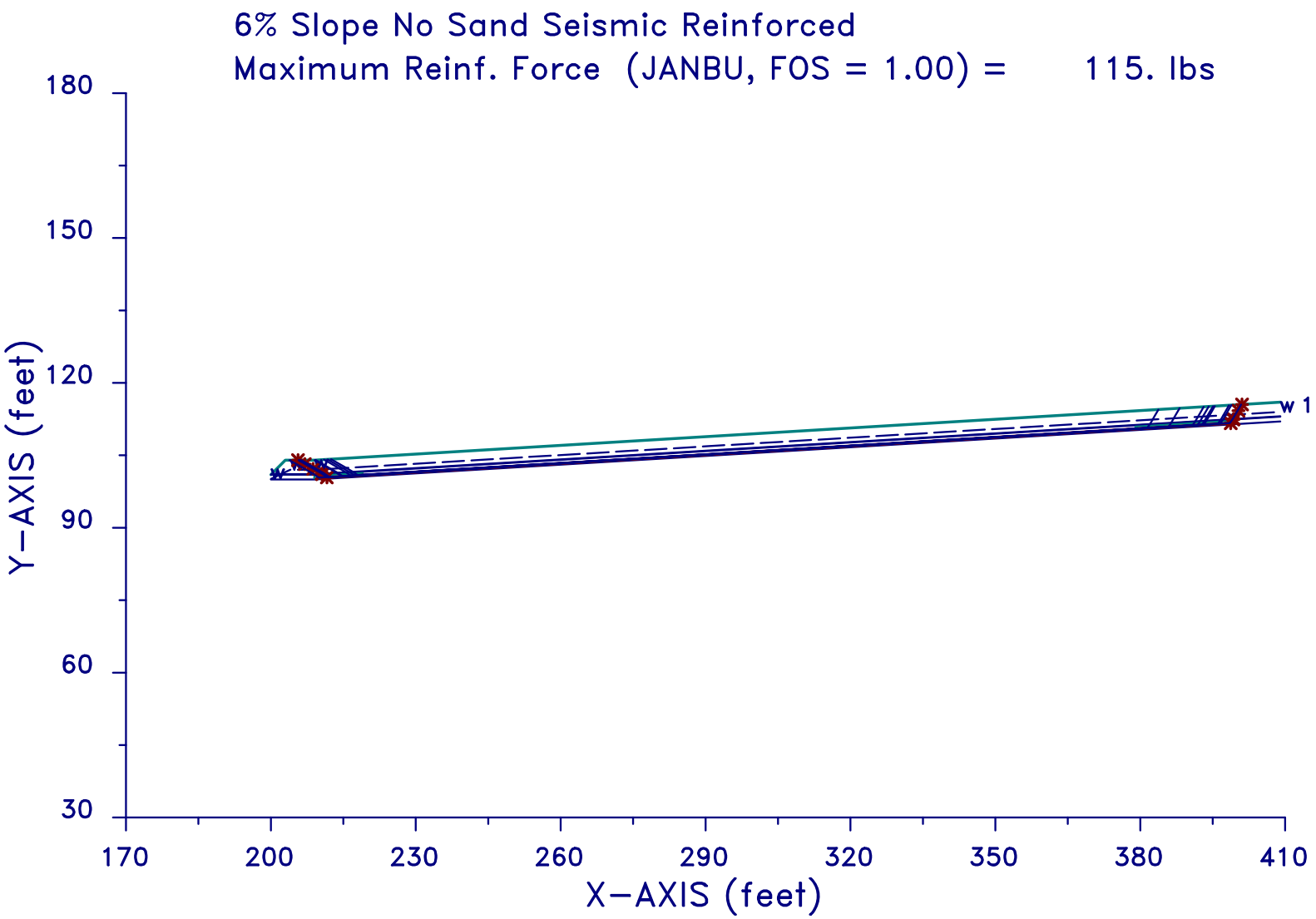

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*              X S T A B L              *
*                                       *
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*                using the              *
*            Method of Slices           *
*                                       *
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```

Problem Description : 6% Slope No Sand Seismic Reinforced

SEGMENT BOUNDARY COORDINATES
---

3 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.0	101.0	203.0	104.0	1
2	203.0	104.0	209.0	104.0	1
3	209.0	104.0	409.0	116.0	1

6 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	200.1	101.1	209.0	101.1	2
2	209.0	101.1	409.0	113.1	2
3	200.0	101.0	209.0	101.0	3
4	209.0	101.0	409.0	113.0	3
5	200.0	100.0	209.0	100.0	1
6	209.0	100.0	409.0	112.0	1

ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	120.0	125.0	.0	30.00	.000	.0	0
2	60.0	60.0	.0	20.00	.000	.0	1
3	60.0	60.0	.0	20.00	.000	.0	1

REINFORCED SLOPE ANALYSIS

The analysis will be performed to determine the critical surface that requires the largest amount of reinforcing force to satisfy:

Minimum (required) FOS = 1.000
Resultant at Elevation = 115.00 feet

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 4 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	200.00	100.10
2	204.00	102.00
3	209.00	102.00
4	409.00	114.00

A horizontal earthquake loading coefficient of .220 has been assigned

A vertical earthquake loading coefficient of .000 has been assigned

A critical failure surface searching method, using a random technique for generating sliding BLOCK surfaces, has been specified.

The active and passive portions of the sliding surfaces are generated according to the Rankine theory.

200 trial surfaces will be generated and analyzed.

2 boxes specified for generation of central block base

Length of line segments for active and passive portions of sliding block is 2.0 ft

Box no.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Width (ft)
1	209.0	100.5	219.0	101.1	.5
2	379.0	110.7	399.0	111.9	.5

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED JANBU METHOD * * * * *

The 10 most critical of all the failure surfaces examined are displayed below - the most critical first

Failure surface No. 1 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	205.63	104.00
2	207.03	103.19
3	208.76	102.19
4	210.50	101.19
5	210.63	101.10
6	211.60	100.42
7	398.74	111.66
8	399.28	112.42
9	399.35	112.52
10	400.35	114.25
11	401.08	115.52

****
** Maximum Required Reinforcement Force = 1.1540E+02 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 2 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	210.99	104.12
2	212.07	103.49
3	213.81	102.49
4	215.54	101.49
5	215.67	101.40
6	216.62	100.74
7	396.57	111.57
8	397.07	112.28
9	397.14	112.39
10	398.14	114.12
11	398.88	115.39

****
** Maximum Required Reinforcement Force = 3.7062E+01 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 3 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	206.28	104.00
2	207.62	103.22
3	209.35	102.22
4	211.08	101.22
5	211.21	101.13
6	212.15	100.47
7	392.75	111.31
8	393.27	112.06
9	393.34	112.16
10	394.34	113.89
11	395.08	115.16

****
** Maximum Required Reinforcement Force = 3.6868E+01 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 4 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	212.47	104.21
2	213.56	103.58
3	215.29	102.58
4	217.02	101.58
5	217.15	101.49
6	218.03	100.87
7	385.80	110.86

8	386.35	111.64
9	386.42	111.75
10	387.42	113.48
11	388.16	114.75

****
** Maximum Required Reinforcement Force =-3.5608E+01 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 5 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.29	104.02
2	210.38	103.39
3	212.11	102.39
4	213.84	101.39
5	213.98	101.30
6	214.82	100.70
7	398.57	111.69
8	399.07	112.40
9	399.14	112.51
10	400.14	114.24
11	400.88	115.51

****
** Maximum Required Reinforcement Force =-4.3589E+01 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 6 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	205.93	104.00
2	207.30	103.21
3	209.03	102.21
4	210.76	101.21
5	210.90	101.11
6	211.86	100.44
7	390.86	111.26
8	391.34	111.94
9	391.41	112.04
10	392.41	113.78
11	393.15	115.05

****
** Maximum Required Reinforcement Force =-5.1878E+01 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 7 specified by 11 coordinate points

Point	x-surf	y-surf

Point No.	x-surf (ft)	y-surf (ft)
1	205.74	104.00
2	207.14	103.20
3	208.87	102.20
4	210.60	101.20
5	210.73	101.10
6	211.61	100.49
7	393.14	111.36
8	393.65	112.08
9	393.72	112.18
10	394.72	113.92
11	395.45	115.19

****
** Maximum Required Reinforcement Force =-8.3786E+01 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 8 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	211.75	104.16
2	212.83	103.54
3	214.56	102.54
4	216.30	101.54
5	216.43	101.45
6	217.22	100.89
7	396.06	111.51
8	396.59	112.26
9	396.66	112.36
10	397.66	114.09
11	398.40	115.36

****
** Maximum Required Reinforcement Force =-9.6017E+01 (lb) **
** Corrected JANBU FOS = 1.000 (for above reinforcement) **
****

Failure surface No. 9 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	203.85	104.00
2	205.41	103.10
3	207.14	102.10
4	208.87	101.10
5	209.02	101.00
6	209.90	100.38
7	391.87	111.28
8	392.37	112.00
9	392.44	112.11
10	393.44	113.84
11	394.18	115.11

```
**********************************************************************
**  Maximum Required Reinforcement Force =-1.4796E+02  (lb)     **
**  Corrected JANBU FOS =  1.000   (for above reinforcement)    **
**********************************************************************
```

Failure surface No.10 specified by 11 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	209.10	104.01
2	210.19	103.38
3	211.92	102.38
4	213.65	101.38
5	213.78	101.29
6	214.61	100.71
7	381.44	110.65
8	381.95	111.38
9	382.02	111.48
10	383.02	113.21
11	383.76	114.49

```
**********************************************************************
**  Maximum Required Reinforcement Force =-1.6016E+02  (lb)     **
**  Corrected JANBU FOS =  1.000   (for above reinforcement)    **
**********************************************************************
```

The following is a summary of the TEN most critical surfaces

Problem Description : 6% Slope No Sand Seismic Reinforced

REINFORCING FORCES calculated for minimum FOS = 1.000 and
reinforcing force resultant at elevation = 115.00 feet

	Reinforcing Force (lb)	Correction Factor	Initial x-coord (ft)	Terminal x-coord (ft)	Available Strength (lb)
1.	115.	1.006	205.63	401.08	2.059E+04
2.	37.	1.006	210.99	398.88	1.973E+04
3.	37.	1.006	206.28	395.08	1.982E+04
4.	-36.	1.006	212.47	388.16	1.839E+04
5.	-44.	1.006	209.29	400.88	2.003E+04
6.	-52.	1.006	205.93	393.15	1.957E+04
7.	-84.	1.006	205.74	395.45	1.980E+04
8.	-96.	1.006	211.75	398.40	1.947E+04
9.	-148.	1.006	203.85	394.18	1.983E+04
10.	-160.	1.006	209.10	383.76	1.816E+04

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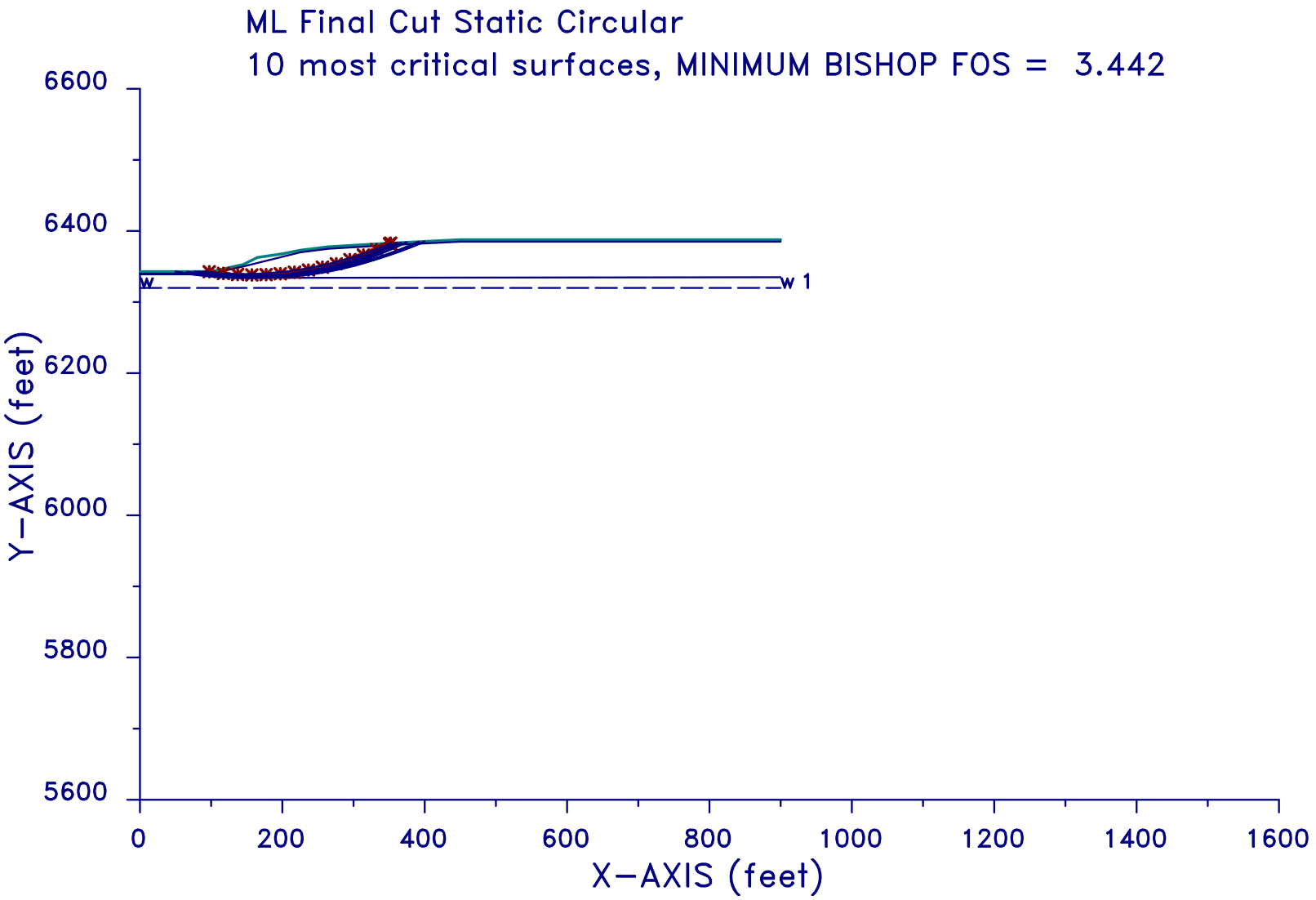

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*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
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*  Ver. 5.207                96 - 1972  *
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```

Problem Description : ML Final Cut Static Circular

SEGMENT BOUNDARY COORDINATES
---

9 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	6342.8	100.0	6342.8	3
2	100.0	6342.8	145.0	6352.8	3
3	145.0	6352.8	165.0	6362.8	3
4	165.0	6362.8	200.0	6367.8	3
5	200.0	6367.8	225.0	6372.8	3
6	225.0	6372.8	265.0	6377.8	3
7	265.0	6377.8	350.0	6382.8	3
8	350.0	6382.8	450.0	6387.8	3
9	450.0	6387.8	900.0	6387.8	3

14 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	6340.0	100.0	6340.0	2
2	100.0	6340.0	145.0	6350.0	2
3	145.0	6350.0	165.0	6355.0	2
4	165.0	6355.0	185.0	6360.0	2
5	185.0	6360.0	205.0	6365.0	2
6	205.0	6365.0	225.0	6370.0	2
7	225.0	6370.0	265.0	6375.0	2

8	265.0	6375.0	350.0	6380.0	2
9	350.0	6380.0	450.0	6385.0	2
10	450.0	6385.0	900.0	6385.0	2
11	.0	6339.0	100.0	6339.0	1
12	100.0	6339.0	131.5	6334.0	1
13	131.5	6334.0	150.0	6334.0	1
14	150.0	6334.0	900.0	6335.0	1

ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	105.0	115.0	50.0	30.00	.000	.0	0
2	65.0	65.0	200.0	20.00	.000	.0	0
3	30.0	30.0	.0	.00	.000	.0	0

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 2 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	6320.00
2	900.00	6320.00

-- WARNING ----------
Water surface number 1 has been defined but is not used by any soil unit. The analysis will IGNORE water surface # 1. Please make sure that this assumption is consistent with your subsurface model.

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally spaced along the ground surface between x = 50.0 ft
and x = 150.0 ft

Each surface terminates between x = 350.0 ft
and x = 500.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = .0 ft

20.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface is specified by 15 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	97.37	6342.80
2	117.22	6340.40
3	137.17	6338.91
4	157.16	6338.33
5	177.16	6338.66
6	197.12	6339.91
7	217.00	6342.07
8	236.76	6345.14
9	256.37	6349.10
10	275.77	6353.96
11	294.93	6359.70
12	313.80	6366.31

13	332.36	6373.77
14	350.55	6382.08
15	352.18	6382.91

**** Simplified BISHOP FOS = 3.442 ****

The following is a summary of the TEN most critical surfaces

Problem Description : ML Final Cut Static Circular

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	3.442	159.82	6775.95	437.63	97.37	352.18	6.606E+07
2.	3.451	151.19	6844.25	508.67	65.79	366.71	9.011E+07
3.	3.463	164.58	6799.47	465.12	76.32	373.32	8.936E+07
4.	3.469	140.19	6869.38	534.25	50.00	362.07	9.381E+07
5.	3.498	141.81	6873.29	533.90	81.58	352.95	7.578E+07
6.	3.564	147.65	6874.34	540.43	50.00	374.82	1.071E+08
7.	3.615	173.07	6835.78	501.40	81.58	392.34	1.052E+08
8.	3.636	163.95	6883.13	547.40	76.32	390.38	1.088E+08
9.	3.714	165.80	6915.93	580.08	76.32	399.85	1.200E+08
10.	3.717	168.92	6881.57	544.22	92.11	391.02	1.036E+08

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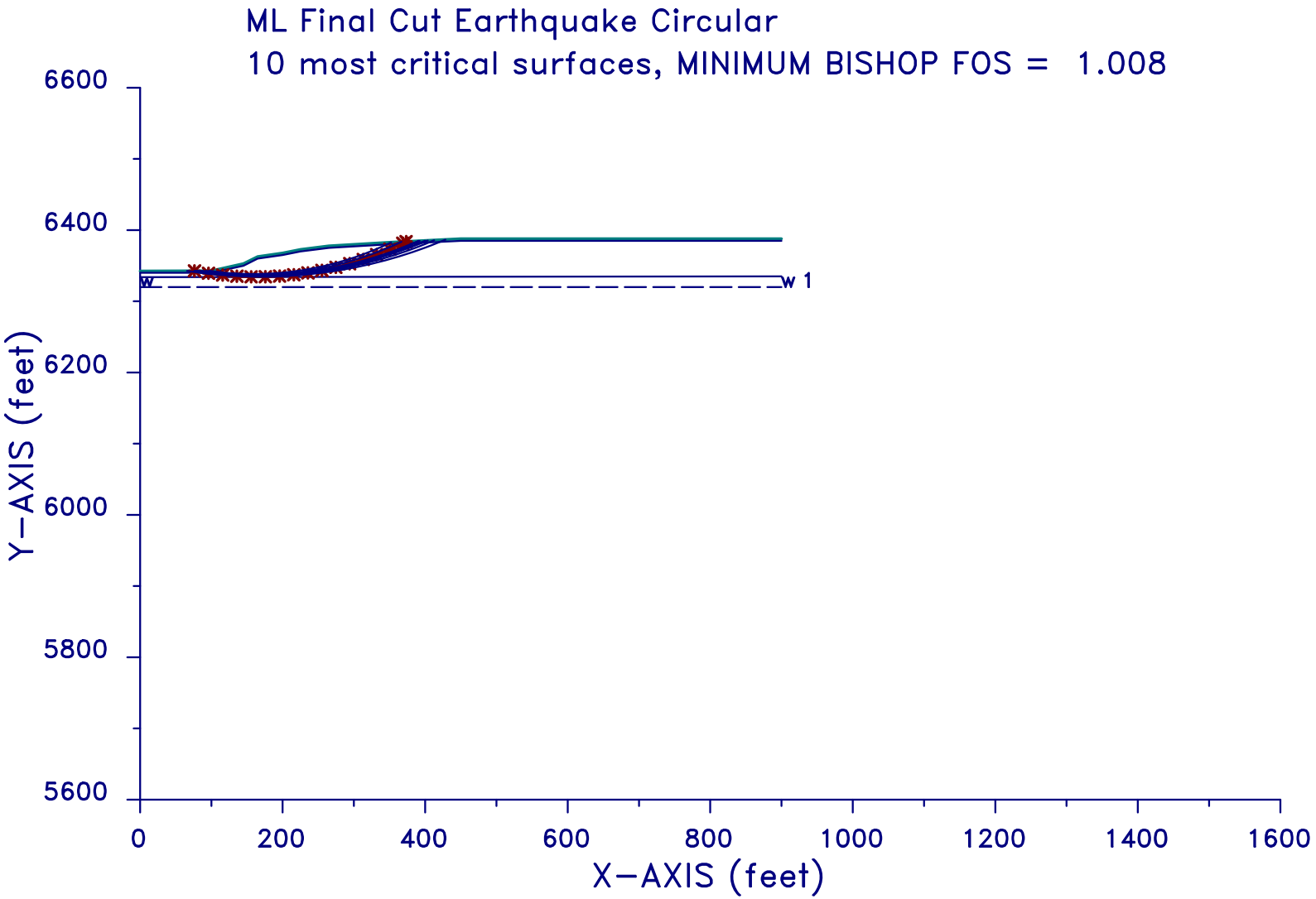
MLSIES 10-27-08 9:22



XSTABL File: MLSIES 10-31-08 11:32

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*              X S T A B L              *
*                                       *
*        Slope Stability Analysis       *
*                using the              *
*            Method of Slices           *
*                                       *
*        Copyright (C) 1992 - 2005      *
*   Interactive Software Designs, Inc.  *
*        Moscow, ID 83843, U.S.A.       *
*                                       *
*          All Rights Reserved          *
*                                       *
*  Ver. 5.207                96 - 1972  *
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```

Problem Description : ML Final Cut Static Circular

SEGMENT BOUNDARY COORDINATES

---

9 SURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	6342.8	100.0	6342.8	3
2	100.0	6342.8	145.0	6352.8	3
3	145.0	6352.8	165.0	6362.8	3
4	165.0	6362.8	200.0	6367.8	3
5	200.0	6367.8	225.0	6372.8	3
6	225.0	6372.8	265.0	6377.8	3
7	265.0	6377.8	350.0	6382.8	3
8	350.0	6382.8	450.0	6387.8	3
9	450.0	6387.8	900.0	6387.8	3

14 SUBSURFACE boundary segments

Segment No.	x-left (ft)	y-left (ft)	x-right (ft)	y-right (ft)	Soil Unit Below Segment
1	.0	6340.0	100.0	6340.0	2
2	100.0	6340.0	145.0	6350.0	2
3	145.0	6350.0	165.0	6355.0	2
4	165.0	6355.0	185.0	6360.0	2
5	185.0	6360.0	205.0	6365.0	2
6	205.0	6365.0	225.0	6370.0	2
7	225.0	6370.0	265.0	6375.0	2

8	265.0	6375.0	350.0	6380.0	2
9	350.0	6380.0	450.0	6385.0	2
10	450.0	6385.0	900.0	6385.0	2
11	.0	6339.0	100.0	6339.0	1
12	100.0	6339.0	131.5	6334.0	1
13	131.5	6334.0	150.0	6334.0	1
14	150.0	6334.0	900.0	6335.0	1

ISOTROPIC Soil Parameters
---

3 Soil unit(s) specified

Soil Unit No.	Unit Weight Moist (pcf)	Unit Weight Sat. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Parameter Ru	Pore Pressure Constant (psf)	Water Surface No.
1	105.0	115.0	50.0	30.00	.000	.0	0
2	65.0	65.0	200.0	20.00	.000	.0	0
3	30.0	30.0	.0	.00	.000	.0	0

1 Water surface(s) have been specified

Unit weight of water = 62.40 (pcf)

Water Surface No. 1 specified by 2 coordinate points

****
PHREATIC SURFACE,
****

Point No.	x-water (ft)	y-water (ft)
1	.00	6320.00
2	900.00	6320.00

-- WARNING ----------
Water surface number 1 has been defined but is not used by any soil unit. The analysis will IGNORE water surface # 1. Please make sure that this assumption is consistent with your subsurface model.

A horizontal earthquake loading coefficient
of .360 has been assigned

A vertical earthquake loading coefficient
of .000 has been assigned

A critical failure surface searching method, using a random technique for generating CIRCULAR surfaces has been specified.

400 trial surfaces will be generated and analyzed.

20 Surfaces initiate from each of 20 points equally spaced along the ground surface between x = 50.0 ft
and x = 150.0 ft

Each surface terminates between x = 350.0 ft
and x = 500.0 ft

Unless further limitations were imposed, the minimum elevation at which a surface extends is y = .0 ft

20.0 ft line segments define each trial failure surface.

ANGULAR RESTRICTIONS

The first segment of each failure surface will be inclined within the angular range defined by :

Lower angular limit := -45.0 degrees
Upper angular limit := (slope angle - 5.0) degrees

****
-- WARNING -- WARNING -- WARNING -- WARNING -- (# 48)
****
Negative effective stresses were calculated at the base of a slice. This warning is usually reported for cases where slices have low self weight and a relatively high "c" shear strength parameter. In such cases, this effect can only be eliminated by reducing the "c" value.
****

USER SELECTED option for unrestricted values of strength

Factors of safety have been calculated by the :

* * * * * SIMPLIFIED BISHOP METHOD * * * * *

The most critical circular failure surface
is specified by 17 coordinate points

Point No.	x-surf (ft)	y-surf (ft)
1	76.32	6342.80
2	96.03	6339.43
3	115.87	6336.91
4	135.80	6335.24
5	155.78	6334.43
6	175.78	6334.49
7	195.76	6335.40
8	215.68	6337.17
9	235.51	6339.80
10	255.21	6343.28
11	274.73	6347.60
12	294.06	6352.76
13	313.14	6358.74
14	331.95	6365.54
15	350.45	6373.15
16	368.60	6381.54
17	373.32	6383.97

**** Simplified BISHOP FOS = 1.006 ****

The following is a summary of the TEN most critical surfaces

Problem Description : ML Final Cut Static Circular

	FOS (BISHOP)	Circle Center x-coord (ft)	Circle Center y-coord (ft)	Radius (ft)	Initial x-coord (ft)	Terminal x-coord (ft)	Resisting Moment (ft-lb)
1.	1.006	164.58	6799.47	465.12	76.32	373.32	8.618E+07
2.	1.007	173.07	6835.78	501.40	81.58	392.34	1.016E+08
3.	1.016	151.19	6844.25	508.67	65.79	366.71	8.688E+07
4.	1.019	163.95	6883.13	547.40	76.32	390.38	1.051E+08
5.	1.021	175.80	6979.21	644.14	76.32	428.50	1.491E+08
6.	1.021	165.80	6915.93	580.08	76.32	399.85	1.159E+08
7.	1.025	174.65	6932.53	596.23	86.84	412.63	1.249E+08
8.	1.025	140.19	6869.38	534.25	50.00	362.07	9.053E+07
9.	1.025	147.65	6874.34	540.43	50.00	374.82	1.035E+08
10.	1.030	168.92	6881.57	544.22	92.11	391.02	1.001E+08

* * * END OF FILE * * *

Attachment D3. Direct Shear Laboratory Tests

Vector Engineering Inc.
143E Spring Hill Drive, Grass Valley, CA 95945 (530)272-2448
Laboratory Services

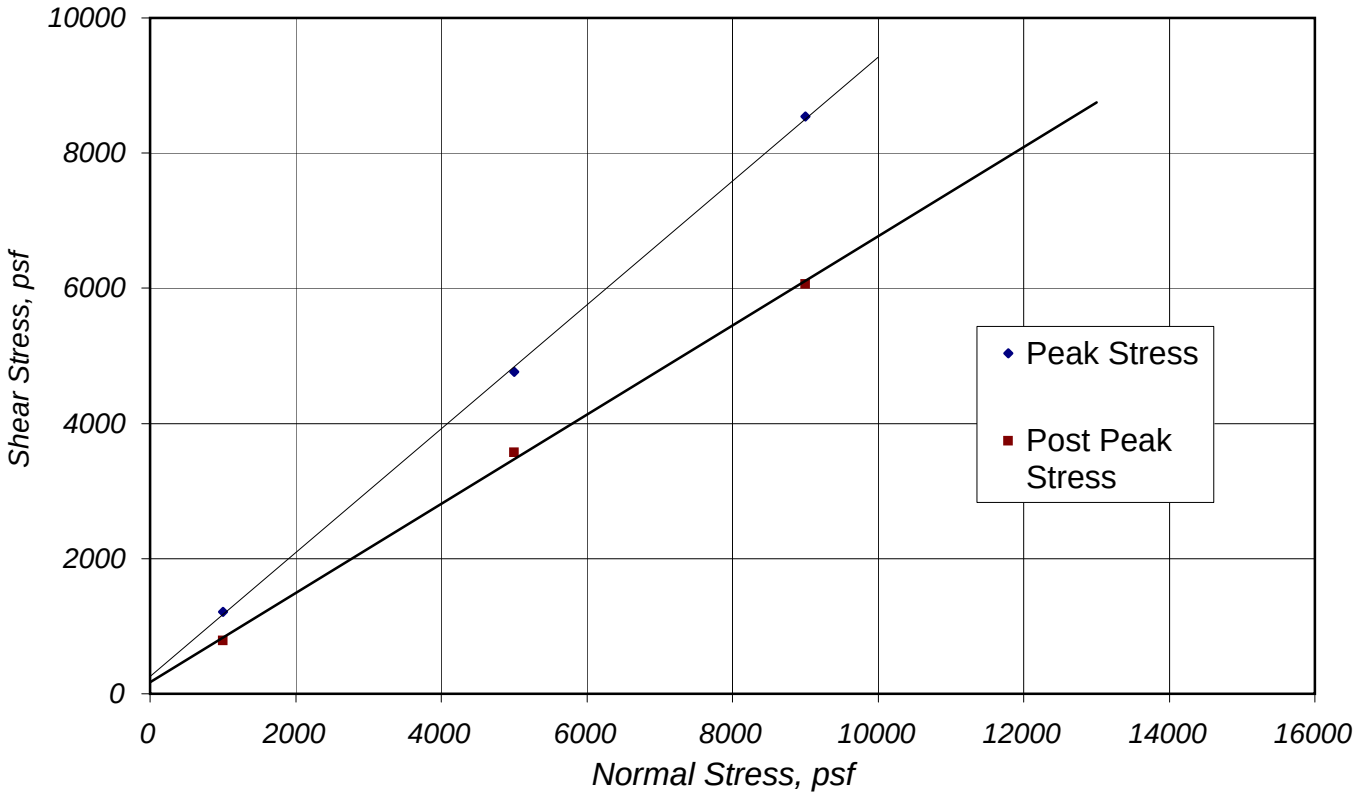
DIRECT SHEAR REPORT

ASTM D- 3080, Consolidated - Drained Test

Client / Project Name:	Project No. :	Lab Log:
ERRG / Meyers Landfill, # 28-072	71713.01	2589T

Sample :	Soil Description:	Report Date:
ML-SB-01V (Rec'd 7/25)	Brownish Gray Sand	August 20, 2008

STRENGTH ENVELOPE



		Peak	Post Peak
Coefficient of Friction	:	0.916	0.660
Friction Angle	:	42.5	33.4
Cohesion, psf:	:	260	170

Point No.	Normal Stress psf	Shear Stress Peak psf	Shear Stress Post-Peak psf		Initial Water Content %	Initial Dry Density pcf	Final Water Content %	Final Dry Density pcf
1	1000	1208	782		18.5	110.9	21.4	111.5
2	5000	4767	3568		18.8	109.2	20.8	111.7
3	9000	8539	6063		18.3	110.9	20.5	114.2
4								
5								
6								

Horizontal Displacement Rate, in. / min. : 0.02 *Sample Diameter, in.:* 2.43

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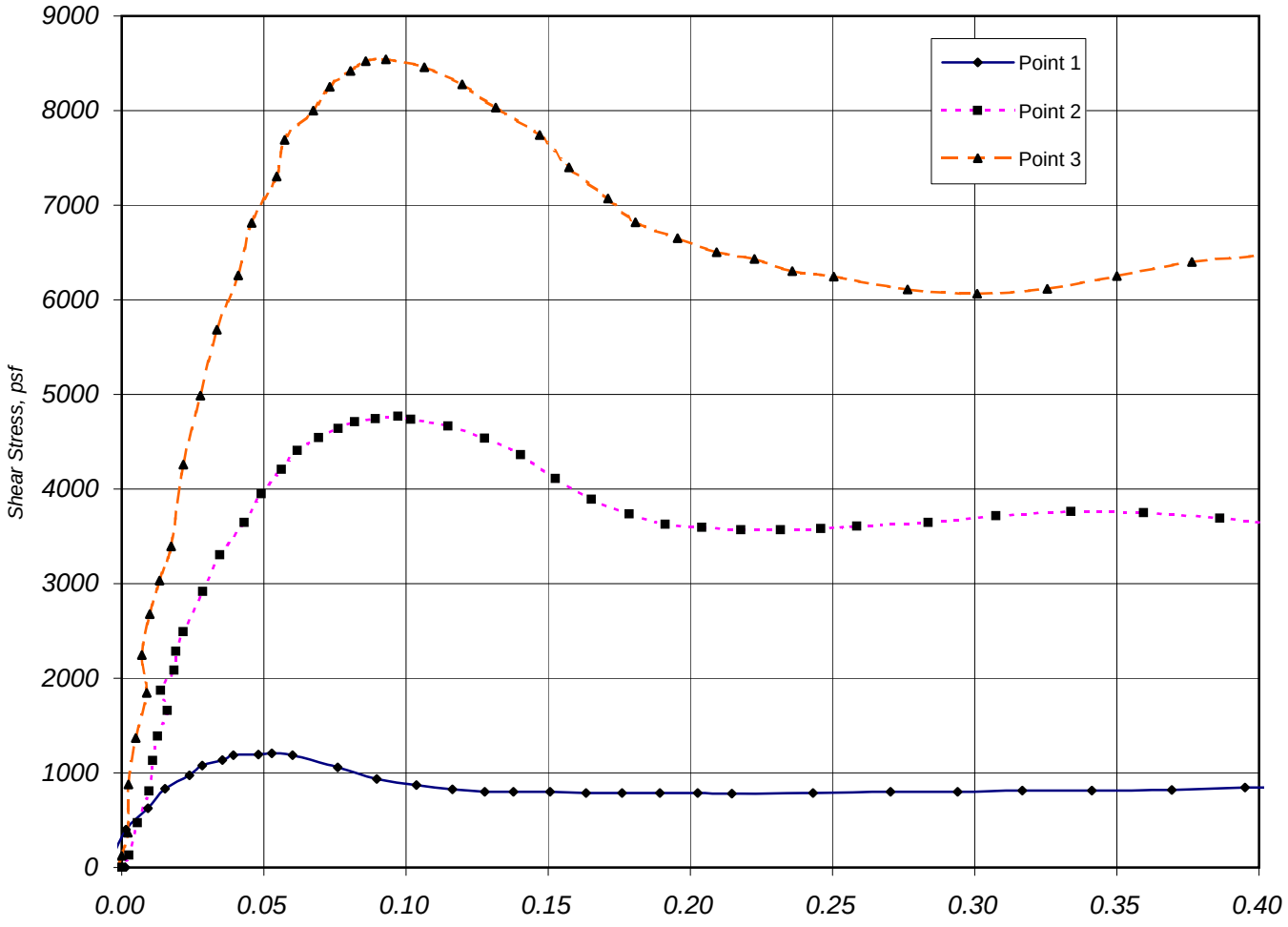
Laboratory Services

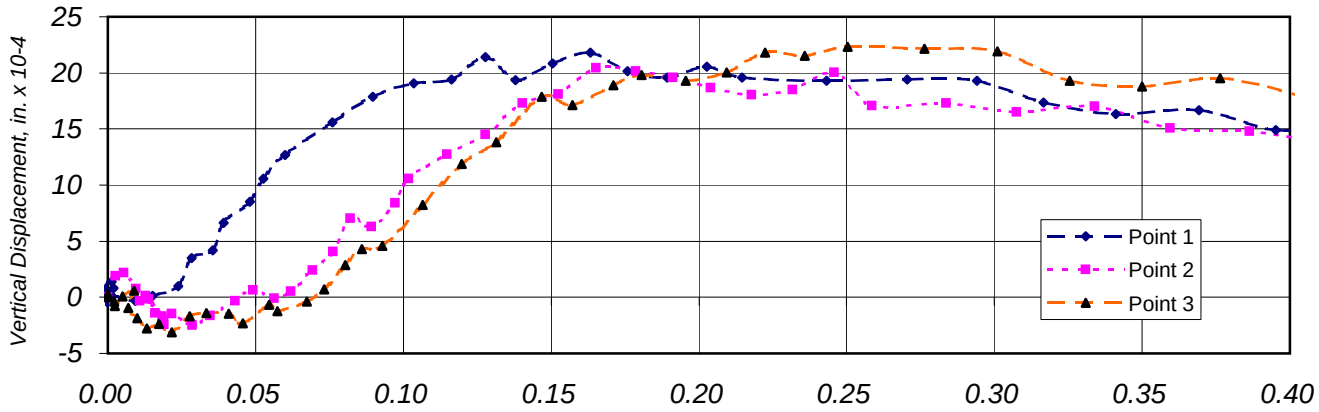
DIRECT SHEAR REPORT

ASTM D- 3080, Consolidated - Drained Test

Client / Project Name.	Project No. :	Lab Log:
ERRG / Meyers Landfill, # 28-072	71713.01	2589T

Sample :	Soil Description.	Report Date:
ML-SB-01V (Rec'd 7/25)	Brownish Gray Sand	August 20, 2008





NORMAL STRESSES, psf :	Point - 1	1000	Point - 2	5000	Point - 3	9000

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Laboratory Services

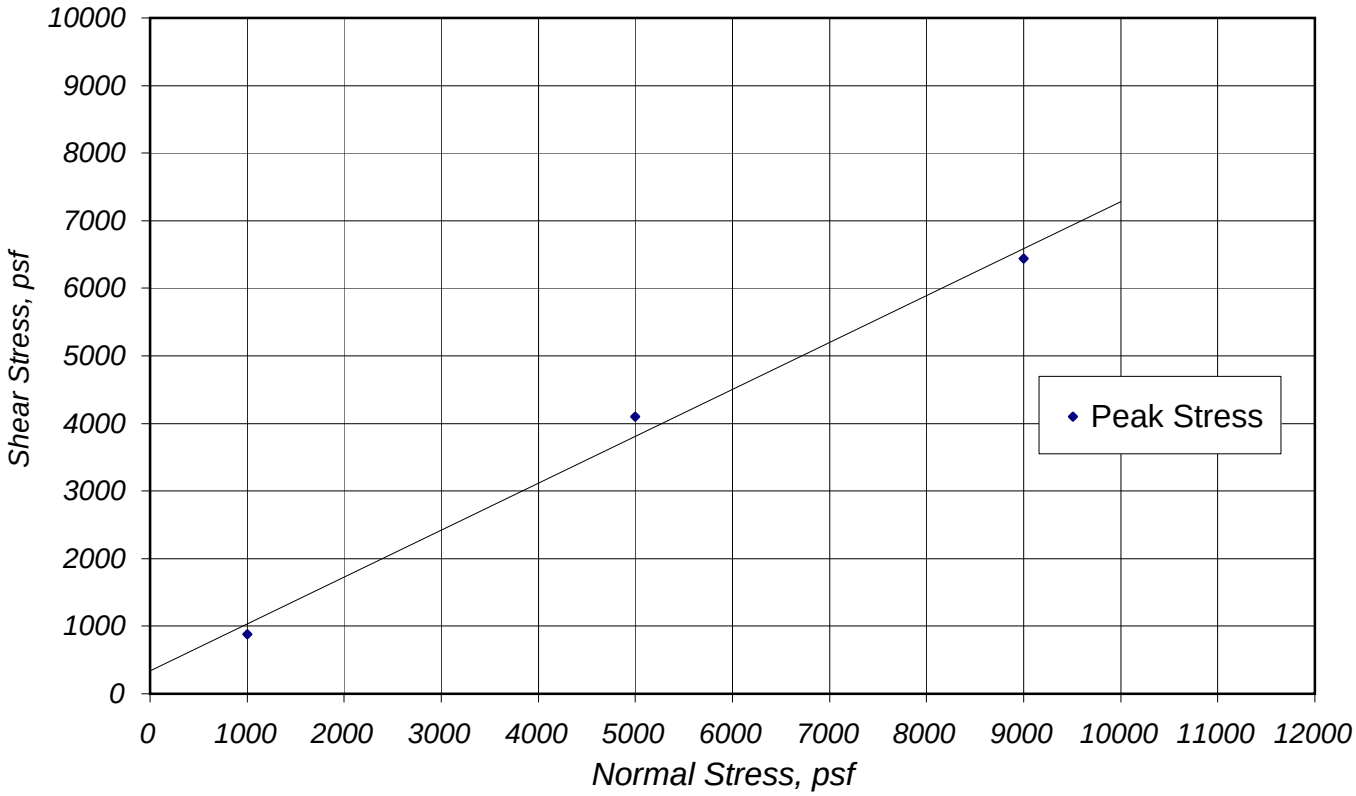
DIRECT SHEAR REPORT

ASTM D- 3080, Consolidated - Drained Test

Client / Project Name:	Project No. :	Lab Log:
ERRG / Meyers Landfill, # 28-072	71713.01	2589V

Sample :	Soil Description:	Report Date:
ML-SB-02D (Rec'd 7/25)	Dk. Brn. Sand w/ Silt and Gravel	August 20, 2008

STRENGTH ENVELOPE



		Peak*
Coefficient of Friction	:	0.694
Friction Angle	:	34.8
Cohesion, psf:	:	340.0

Point No.	Normal Stress psf	Shear Stress Peak* psf	Shear Stress Post-Peak psf		Initial Water Content %	Initial Dry Density pcf	Final Water Content %	Final Dry Density pcf
1	1000	885			10.9	95.5	25.3	98.5
2	5000	4100			10.2	99.0	21.1	104.6
3	9000	6439			11.1	98.2	20.5	104.5

*Peak Shear values taken at or near .19 inches.

Horizontal Displacement Rate, in. / min. : 0.02 *Sample Diameter, in.:* 2.43

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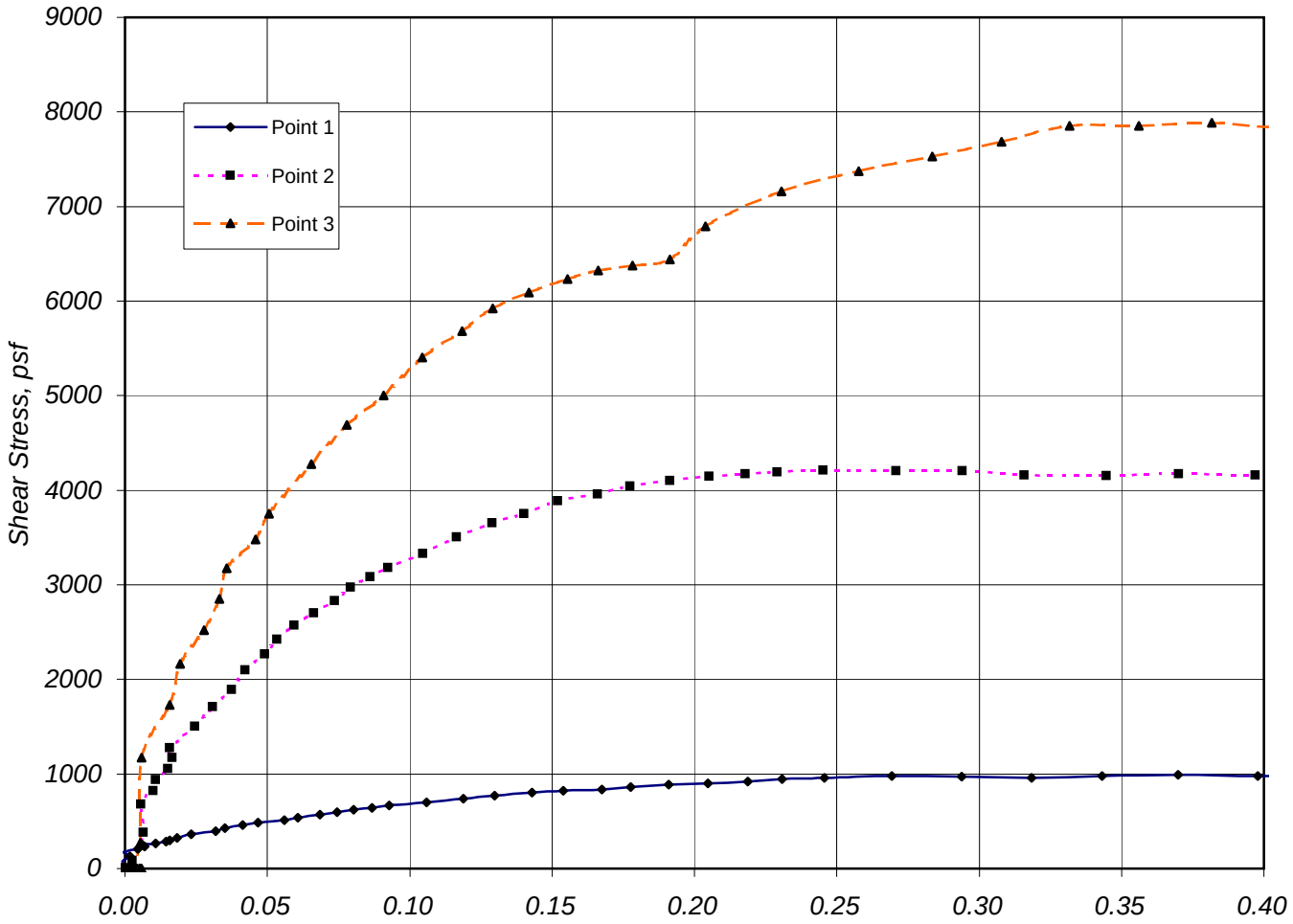
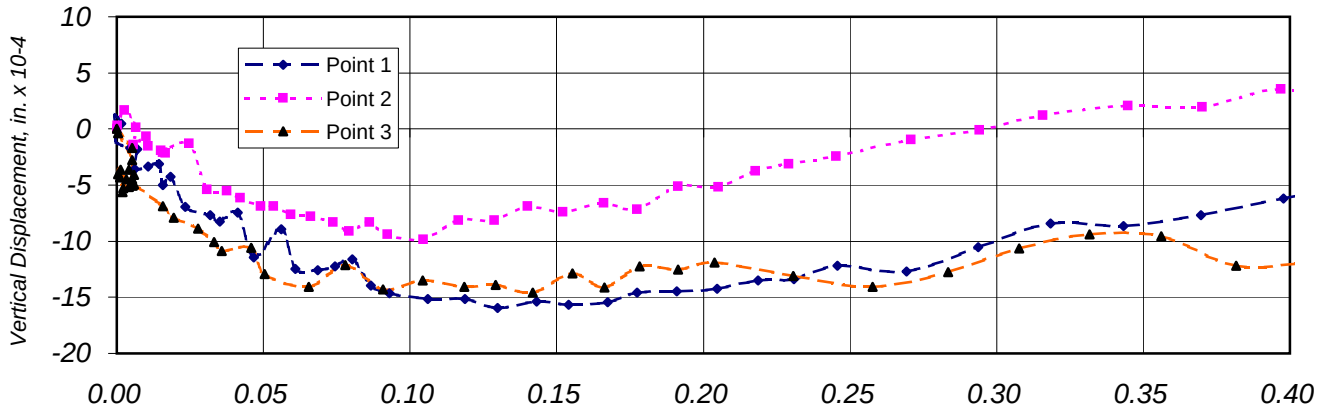
DIRECT SHEAR REPORT

ASTM D- 3080, Consolidated - Drained Test

Client / Project Name.	Project No. :	Lab Log:
ERRG / Meyers Landfill, # 28-072	71713.01	2589V

Sample :	Soil Description.	Report Date:
ML-SB-02D (Rec'd 7/25)	Dk. Brn. Sand w/ Silt and Gravel	August 20, 2008





NORMAL STRESSES, psf :	Point - 1	1000	Point - 2	5000	Point - 3	9000

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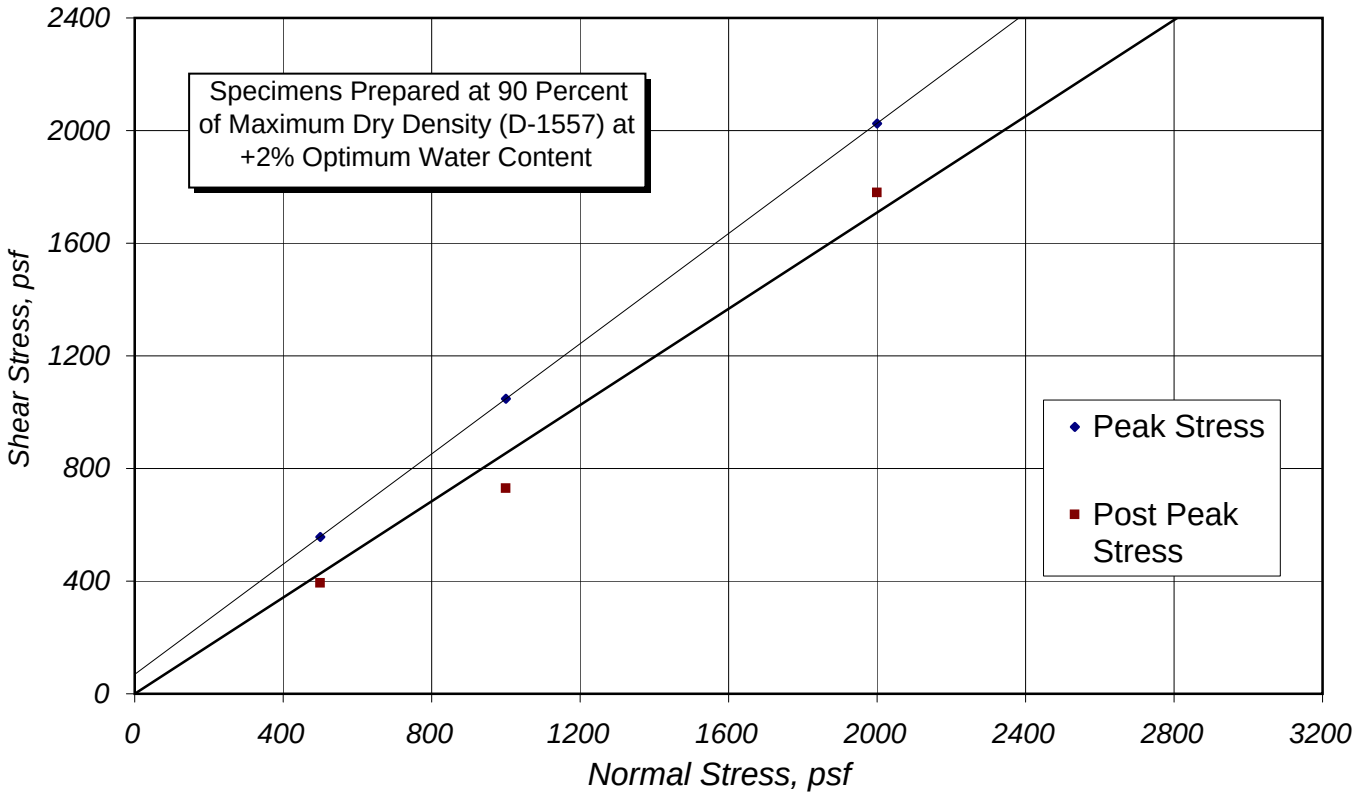
DIRECT SHEAR REPORT

ASTM D- 3080, Consolidated - Drained Test

Client / Project Name:	Project No. :	Lab Log:
ERRG / Meyers Landfill, # 28-072	071713.01	2589AR

Sample :	Soil Description:	Report Date:
ML-TP-01B / 02C Combined (Rec'd 7/25)	Well Graded Sand w/ Silt (SW-SM)	September 12, 2008

STRENGTH ENVELOPE



		Peak	Post Peak
Coefficient of Friction	:	0.978	0.842
Friction Angle	:	44.4	40.1
Cohesion, psf:	:	70	0

Note: Intercept changed to "0" for post peak

Point No.	Normal Stress	Shear Stress Peak	Shear Stress Post-Peak		Initial Water Content	Initial Dry Density	Final Water Content	Final Dry Density
	psf	psf			%	pcf	%	pcf
1	500	557	393		13.6	105.1	18.0	105.7
2	1000	1048	729		13.3	105.3	18.6	106.7
3	2000	2025	1780		13.9	104.5	17.8	106.6

Horizontal Displacement Rate, in. / min. : 0.017 *Sample Diameter, in.:* 2.50

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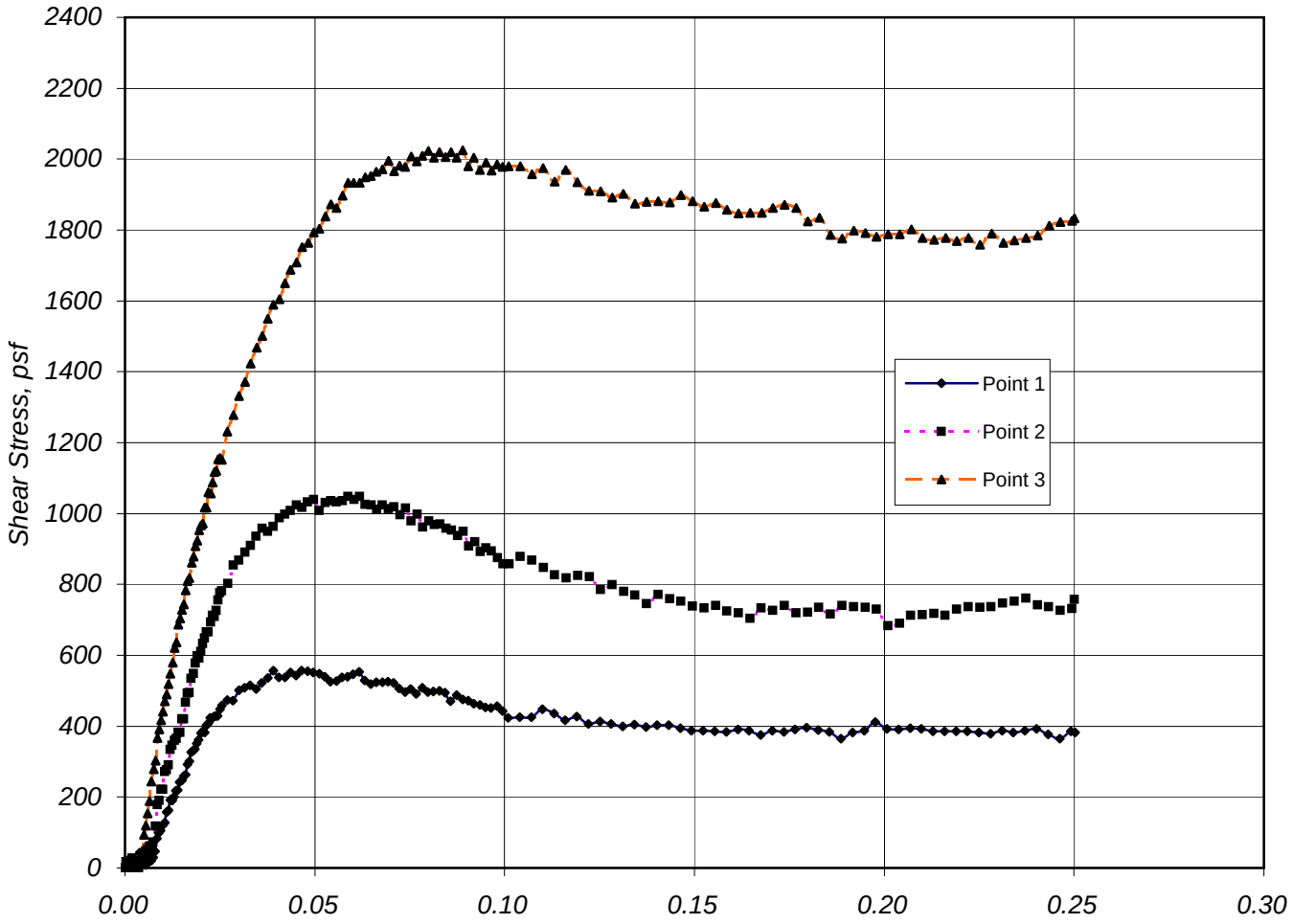
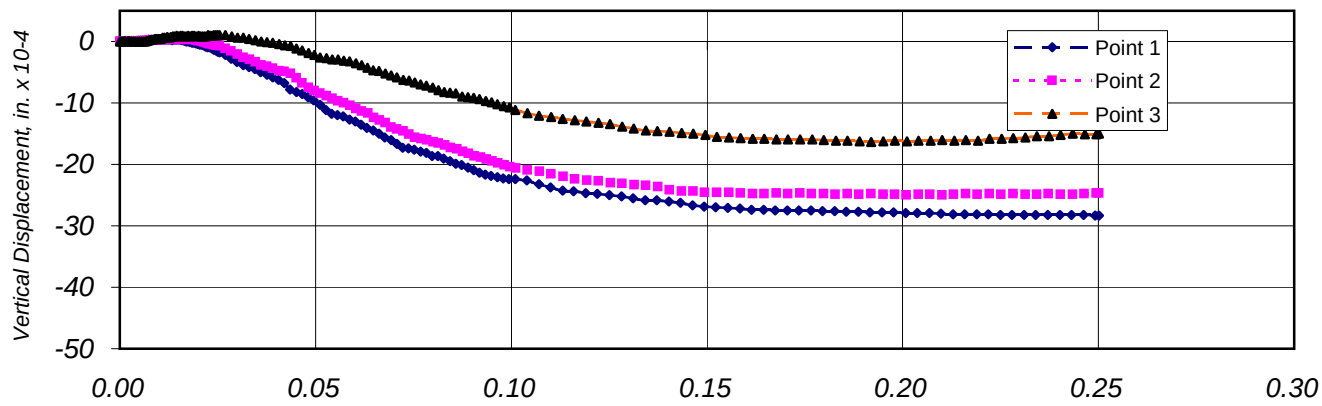
DIRECT SHEAR REPORT

ASTM D- 3080, Consolidated - Drained Test

Client / Project Name.	Project No. :	Lab Log:
ERRG / Meyers Landfill, # 28-072	071713.01	2589AR

Sample :	Soil Description.	Report Date:
ML-TP-01B / 02C Combined (Rec'd 7/25)	Well Graded Sand w/ Silt (SW-SM)	September 12, 2008





NORMAL STRESSES, psf :	Point - 1	500	Point - 2	1000	Point - 3	2000

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LABORATORY SERVICES

LARGE SCALE DIRECT SHEAR REPORT

Test Method D-5321-B

Report Date: September 22, 2008

Client Name: ERRG | Project Name: **MEYERS LANDFILL, # 28-072** | Project No: 071713.01

Superstrate:	⇦	Drain Gravel		
Material 1:	⇦	ML-TP-01B & ML-TP-02C Mix (Well Graded Sand w/ Silt)	LSN: 2589A	Remolded
Material 2:	⇨	GSE Ultraflex 60 mil LLDPE Tex. / Tex. Roll#104111149	LSN: APT	Clamped
Substrate:	⇨	ML-TP-01B & ML-TP-02C Mix (Well Graded Sand w/ Silt)	LSN: 2589A	Remolded

PEAK STRENGTH

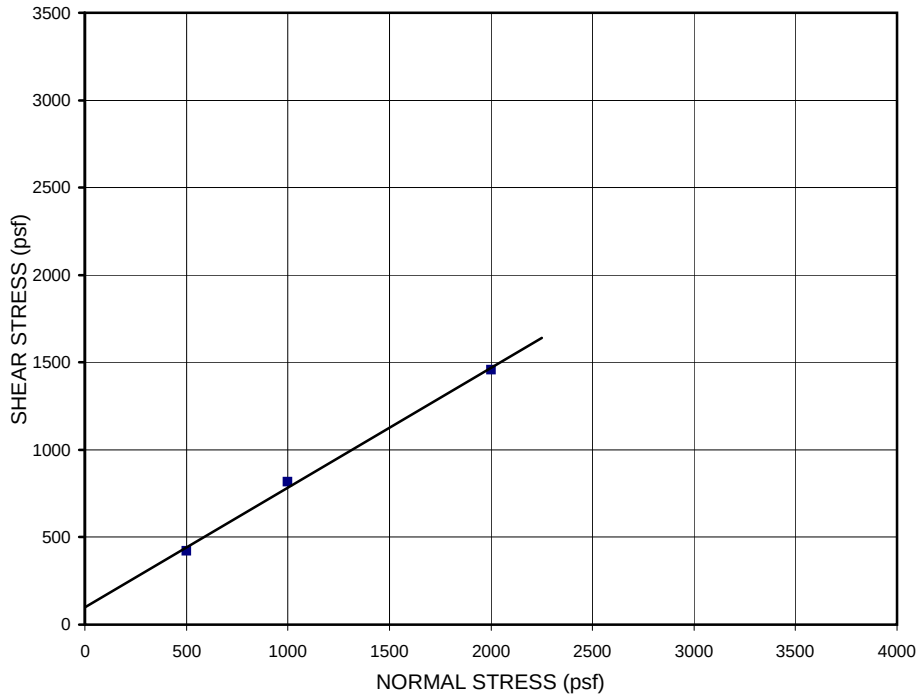
Test Point	Normal Stress		Shear Stress	Secant Friction Angle
	psi	psf	psf	
1.	3.5	500	420	40
2.	6.9	1000	820	39
3.	13.9	2000	1460	36

Adhesion: 100 psf

Friction Angle: 34 degrees

Coefficient of Friction: 0.68

NOTE: GRAPH NOT TO SCALE



STRENGTH ENVELOPE
(at 3.0 in. displacement)

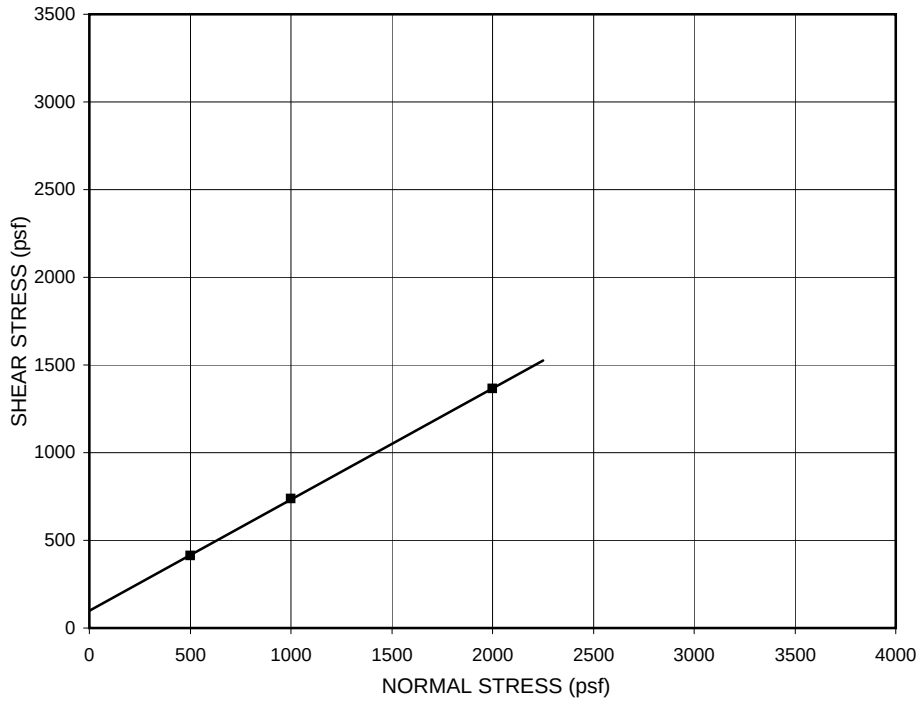
Test Point	Normal Stress		Shear Stress	Secant Friction Angle
	psi	psf	psf	
1.	3.5	500	410	39
2.	6.9	1000	740	37
3.	13.9	2000	1360	34

Adhesion: 100 psf

Friction Angle: 32 degrees

Coefficient of Friction: 0.63

NOTE: GRAPH NOT TO SCALE



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LABORATORY SERVICES

LARGE SCALE DIRECT SHEAR REPORT

Test Method D-5321-B

Report Date: September 22, 2008
Project No: 071713.01

Client Name: ERRG
Project Name: **MEYERS LANDFILL, # 28-072**

Superstrate:	⇦	Drain Gravel		
Material 1:	⇦	ML-TP-01B & ML-TP-02C Mix (Well Graded Sand w/ Silt)	LSN: 2589A	Remolded
Material 2:	⇨	GSE Ultraflex 60 mil LLDPE Tex. / Tex. Roll#104111149	LSN: APT	Clamped
Substrate:	⇨	ML-TP-01B & ML-TP-02C Mix (Well Graded Sand w/ Silt)	LSN: 2589A	Remolded

DISPLACEMENT vs. SHEAR STRESS

Test Point	Normal Stress	
	psi	psf
1.	3.5	500
2.	6.9	1000
3.	13.9	2000

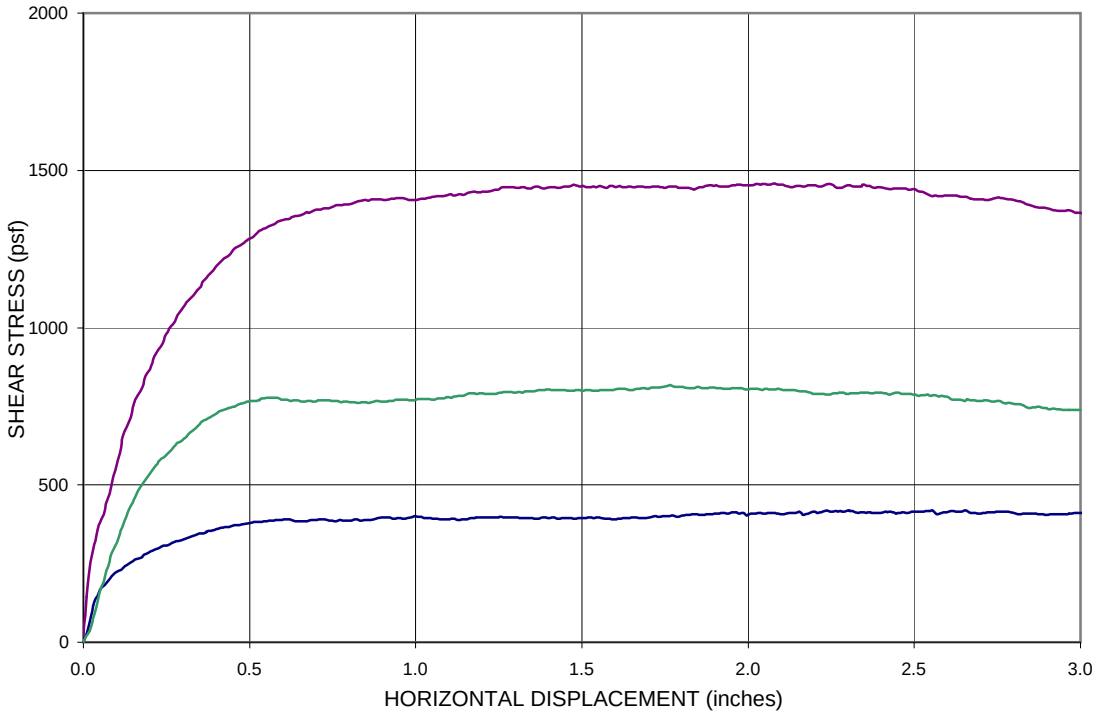
MOISTURE DATA:

(Soil)

Initial Water Content: 14.2%

Initial Dry Density: 98.9 pcf

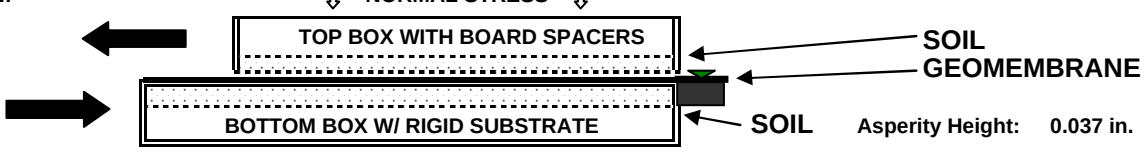
Final Water Content:(%)
1) 17.9 2) 16.3 3) 16.9



STANDARD CONDITIONS: ***SHEAR DISPLACEMENT RATE: 0.04 in/min***

1. The "gap" between shear boxes was set at 80 mil (2.0 mm)
2. The test specimens were flooded during testing unless otherwise noted.
3. High Normal Stresses, >5psi (35 kPa) was applied using air pressure.
4. Low Normal Stresses, <5psi (35 kPa) was applied using dead weights.
5. The tests were terminated after 3.0"(75 mm) of displacement unless otherwise noted.
6. Tests were performed in general accordance with ASTM procedure D-5321 using a Brainard-Killman LG-112 direct shear machine with an effective area of 12" x 12" (300 x300 mm).

TEST ORIENTATION:



SPECIAL TEST NOTES:

1. Each specimen of geomembrane was cut to 14" x 20" and clamped to the lower shear box.
2. The test soil was placed in the upper (85%) and lower (90%) shear boxes to the specified dry density and water content.
3. Each test specimen was consolidated for 1 hour at the specified normal stress, then sheared.
4. The test was performed in a "wet" or "flooded" condition.
5. Shearing occurred at the interface of the soil and geomembrane specimens.
6. The Friction Angle and Adhesion (or Cohesion) results given here are based on a mathematically determined best fit line.
7. Further interpretation should be conducted by a qualified professional experienced in geosynthetic and geotechnical engineering.

Vector Engineering, Inc.

143E Spring Hill Dr., Grass Valley, CA, 530-272-2448

LABORATORY SERVICES

Photo Log

Client :	Project No:	Lab Sample Number:
ERRG	071713.01	**2589A**

Project Name:	Description:	Report Date:
Meyers Landfill, #28-072	Large Scale Direct Shear Test Setup	September 29, 2008

Lower box showing placed sand.

Lower box with placed geomembrane.

Top box with placed sand.

Vector Engineering, Inc.

143E Spring Hill Dr., Grass Valley, CA, 530-272-2448

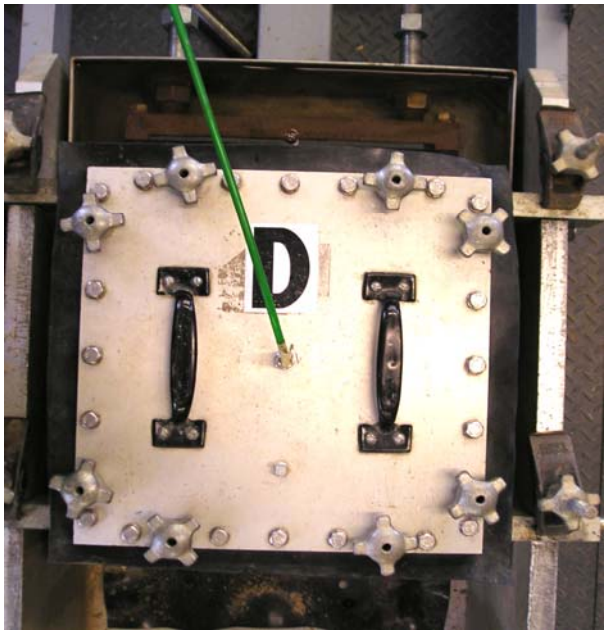
LABORATORY SERVICES

Photo Log

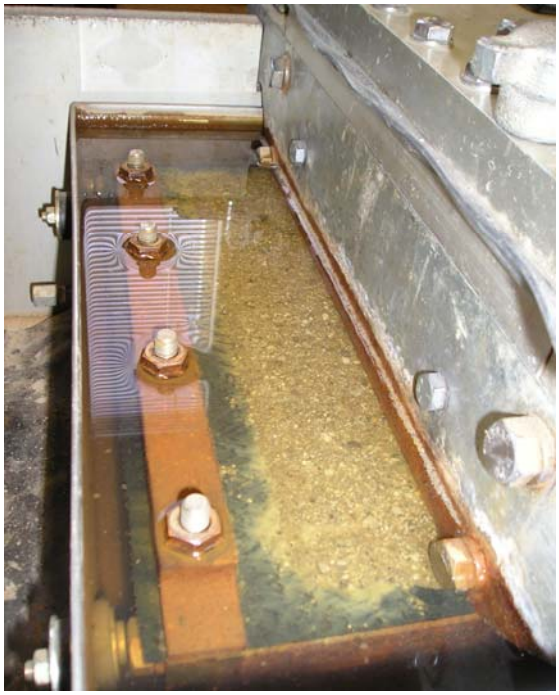
Client :	Project No:	Lab Sample Number:
ERRG	071713.01	**2589A**

Project Name:	Description:	Report Date:
Meyers Landfill, #28-072	Large Scale Direct Shear Test Setup	September 29, 2008

Test set up using weights for normal load.



Test set up using air pressure for normal load.



Completed test showing sand and geomembrane.
Flooded box.

Completed test showing sand and geomembrane.
Drained, FML sample taken out of box, no top box.

Vector Engineering Inc.

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LABORATORY SERVICES

LARGE SCALE DIRECT SHEAR REPORT

Test Method D-5321-B

Report Date: October 21, 2008

Client Name: ERRG Project Name: **MEYERS LANDFILL, #28-072** Project No: 071713.01

Superstrate: ⇦ Drain Gravel

Material 1: ⇦ ML-TP-01B & ML-TP-02C Mix (Well Graded Sand w/ Silt) LSN: 2589A Remolded

Material 2: ⇨ GSE PermaNet UL Geocomposite (Double sided 6 oz.) Roll# 131244854 LSN: APZ Clamped

Substrate: ⇨ ML-TP-01B & ML-TP-02C Mix (Well Graded Sand w/ Silt) LSN: 2589A Remolded

PEAK STRENGTH

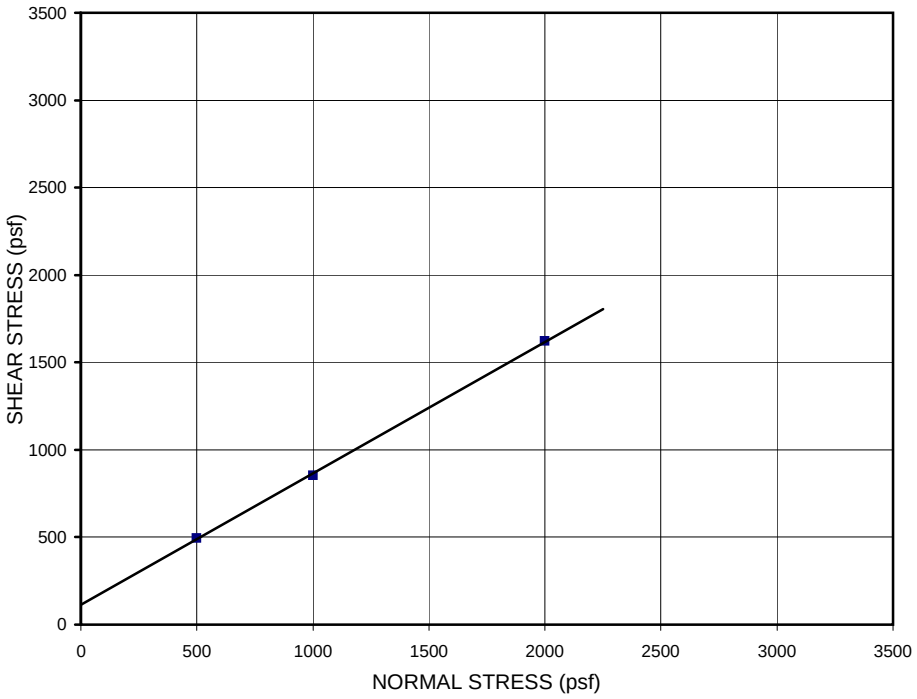
Test Point	Normal Stress		Shear Stress	Secant Friction Angle
	psi	psf	psf	Angle
1.	3.5	500	500	45
2.	6.9	1000	850	40
3.	13.9	2000	1620	39

Adhesion: 110 psf

Friction Angle: 37 degrees

Coefficient of Friction: 0.75

NOTE: GRAPH NOT TO SCALE



STRENGTH ENVELOPE

(at 3.0 in. displacement)

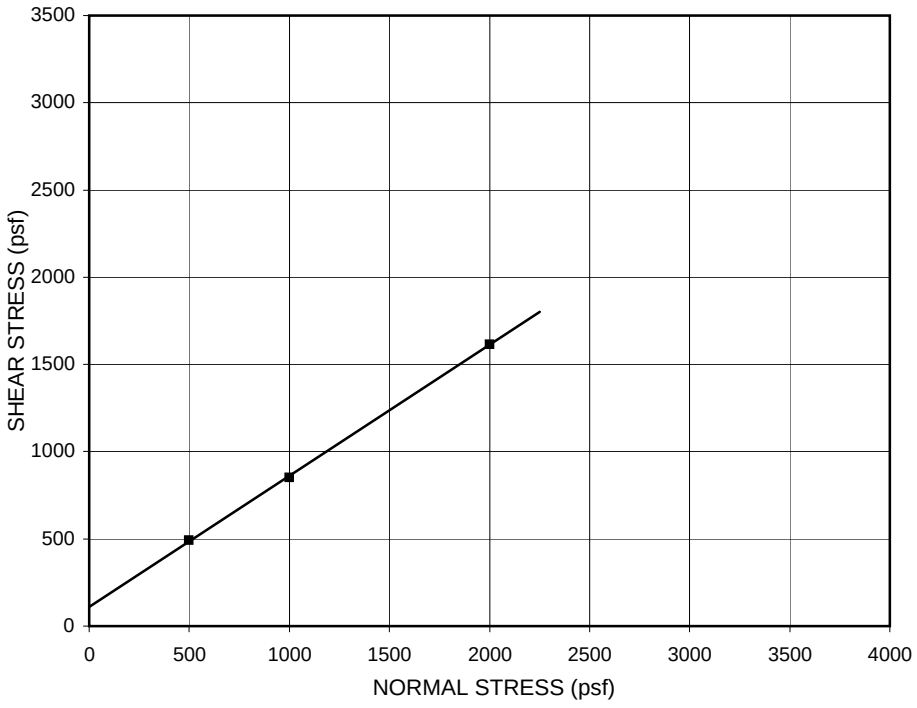
Test Point	Normal Stress		Shear Stress	Secant Friction Angle
	psi	psf	psf	Angle
1.	3.5	500	490	44
2.	6.9	1000	850	40
3.	13.9	2000	1620	39

Adhesion: 110 psf

Friction Angle: 37 degrees

Coefficient of Friction: 0.75

NOTE: GRAPH NOT TO SCALE



Vector Engineering Inc.
143E Spring Hill Drive, Grass Valley, CA 95945 (530) 272-2448
LABORATORY SERVICES

LARGE SCALE DIRECT SHEAR REPORT

Test Method D-5321-B

Report Date: October 21, 2008

Client Name: ERRG Project Name: **MEYERS LANDFILL, #28-072** Project No: 071713.01

Superstrate:	⇦	Drain Gravel		
Material 1:	⇦	ML-TP-01B & ML-TP-02C Mix (Well Graded Sand w/ Silt)	LSN: 2589A	Remolded
Material 2:	⇨	GSE PermaNet UL Geocomposite (Double sided 6 oz.) Roll# 131244854	LSN: APZ	Clamped
Substrate:	⇨	ML-TP-01B & ML-TP-02C Mix (Well Graded Sand w/ Silt)	LSN: 2589A	Remolded

DISPLACEMENT vs. SHEAR STRESS

Test Point	Normal Stress	
	psi	psf
1.	3.5	500
2.	6.9	1000
3.	13.9	2000

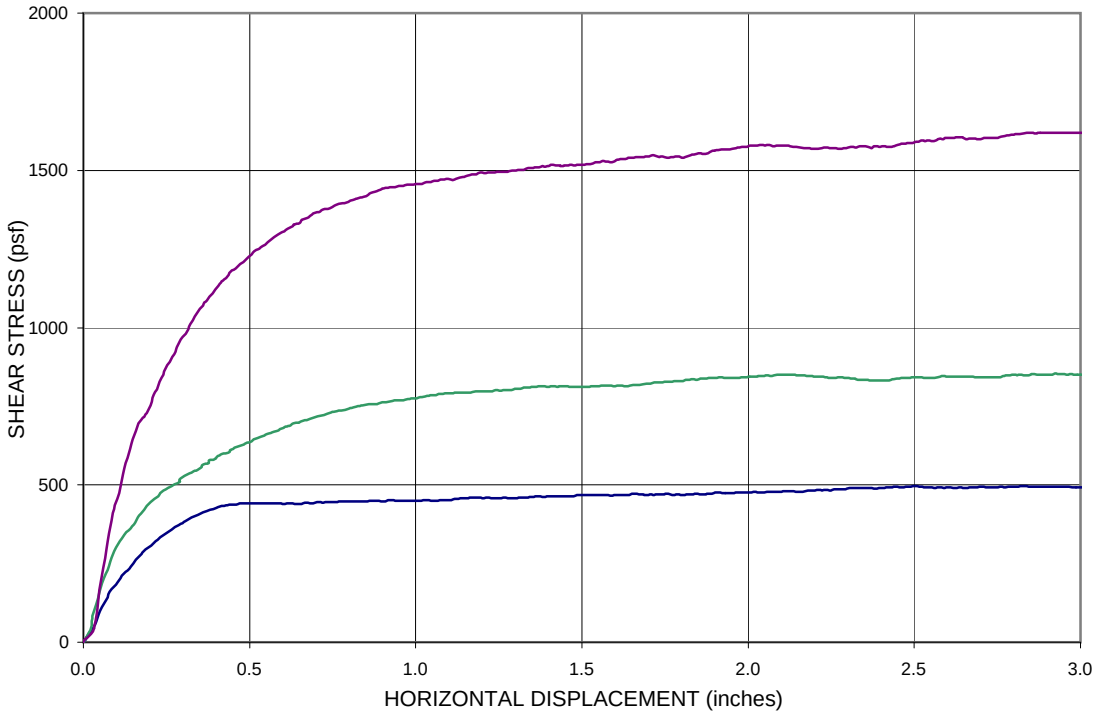
MOISTURE DATA:

(soil)

Initial Water Content: 14.2%

Initial Dry Density: 98.9 pcf

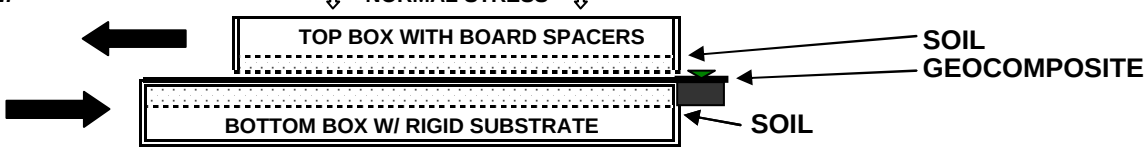
Final Water Content:(%) 1) 18 2) 17.8 3) 17.2



STANDARD CONDITIONS: ***SHEAR DISPLACEMENT RATE: 0.04 in/min***

1. The "gap" between shear boxes was set at 80 mil (2.0 mm)
2. The test specimens were flooded during testing unless otherwise noted.
3. High Normal Stresses, >5psi (35 kPa) was applied using air pressure.
4. Low Normal Stresses, <5psi (35 kPa) was applied using dead weights.
5. The tests were terminated after 3.0"(75 mm) of displacement unless otherwise noted.
6. Tests were performed in general accordance with ASTM procedure D-5321 using a Brainard-Killman LG-112 direct shear machine with an effective area of 12" x 12" (300 x300 mm).

TEST ORIENTATION:



SPECIAL TEST NOTES:

1. Each specimen of geocomposite was cut to 14" x 20" and clamped to the lower shear box.
2. The test soil was placed in the upper (85%) and lower (90%) shear boxes to the specified dry density and water content.
3. Each test specimen was consolidated for 1 hour at the specified normal stress, then sheared.
4. The test was performed in a "wet" or "flooded" condition.
5. Shearing occurred at the interface of the soil and geocomposite specimens.
6. The Friction Angle and Adhesion (or Cohesion) results given here are based on a mathematically determined best fit line.
7. Further interpretation should be conducted by a qualified professional experienced in geosynthetic and geotechnical engineering.

Vector Engineering Inc.

143E Spring Hill Drive, Grass Valley, CA 95945 (530) 272-2448

LABORATORY SERVICES

LARGE SCALE DIRECT SHEAR REPORT

Test Method D-5321A

Report Date: November 13, 2008

Client Name: ERRG Project Name: **MEYERS LANDFILL, #28-072** Project No: 071713.01

Superstrate: ⇦ PVC Board

Material 1: ⇦ GSE Ultraflex 60 mil LLDPE Tex. / Tex. Roll#104111149 LSN: APT Clamped

Material 2: ⇨ GSE PermaNet UL Geocomposite (Double sided 6 oz.) Roll# 131244854 LSN: APZ Clamped

Substrate: ⇨ Concrete Board

PEAK STRENGTH

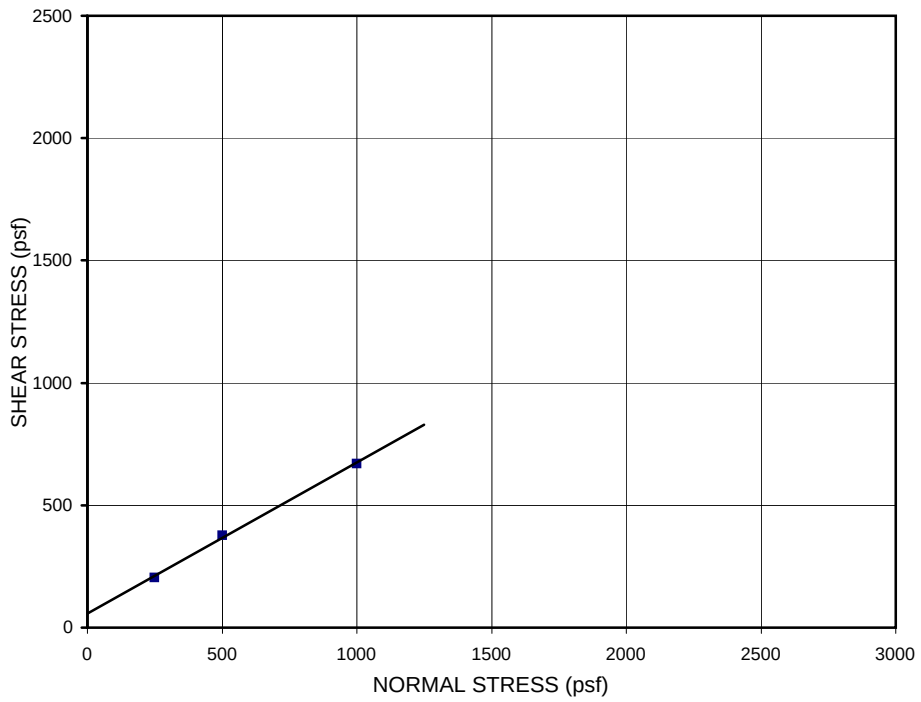
Test Point	Normal Stress		Shear Stress	Secant Friction Angle
	psi	psf	psf	
1.	1.7	250	200	39
2.	3.5	500	380	37
3.	6.9	1000	670	34

Adhesion: 60 psf

Friction Angle: 32 degrees

Coefficient of Friction: 0.62

NOTE: GRAPH NOT TO SCALE



STRENGTH ENVELOPE

(at 3.0 in. displacement)

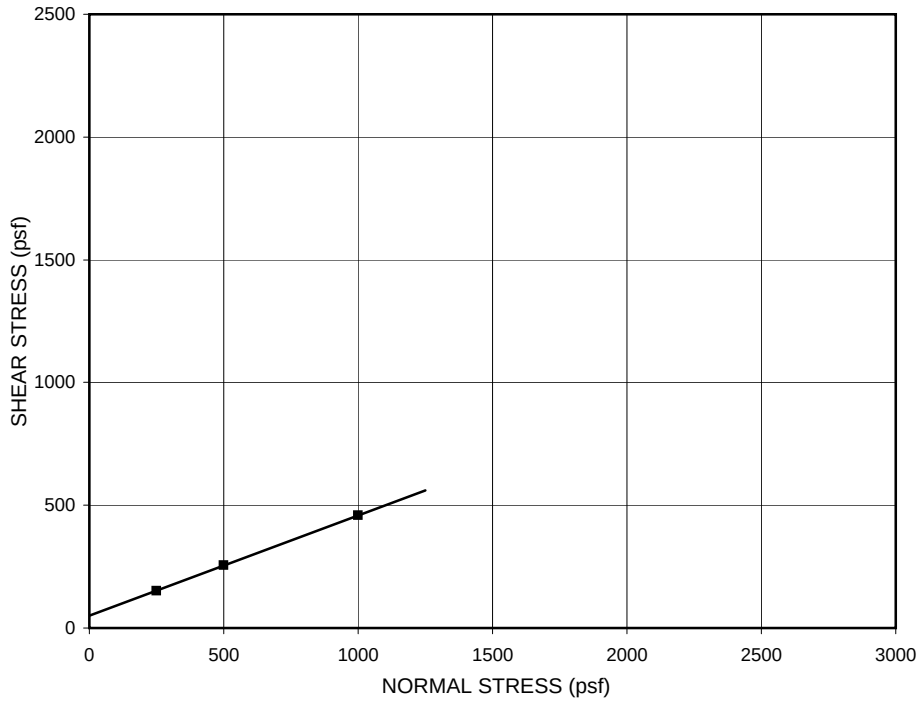
Test Point	Normal Stress		Shear Stress	Secant Friction Angle
	psi	psf	psf	
1.	1.7	250	150	31
2.	3.5	500	260	27
3.	6.9	1000	460	25

Adhesion: 50 psf

Friction Angle: 22 degrees

Coefficient of Friction: 0.41

NOTE: GRAPH NOT TO SCALE



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LARGE SCALE DIRECT SHEAR REPORT

Test Method D-5321A

Report Date: November 13, 2008

Client Name: ERRG Project Name: **MEYERS LANDFILL, #28-072** Project No: 071713.01

Superstrate: ⇦ PVC Board

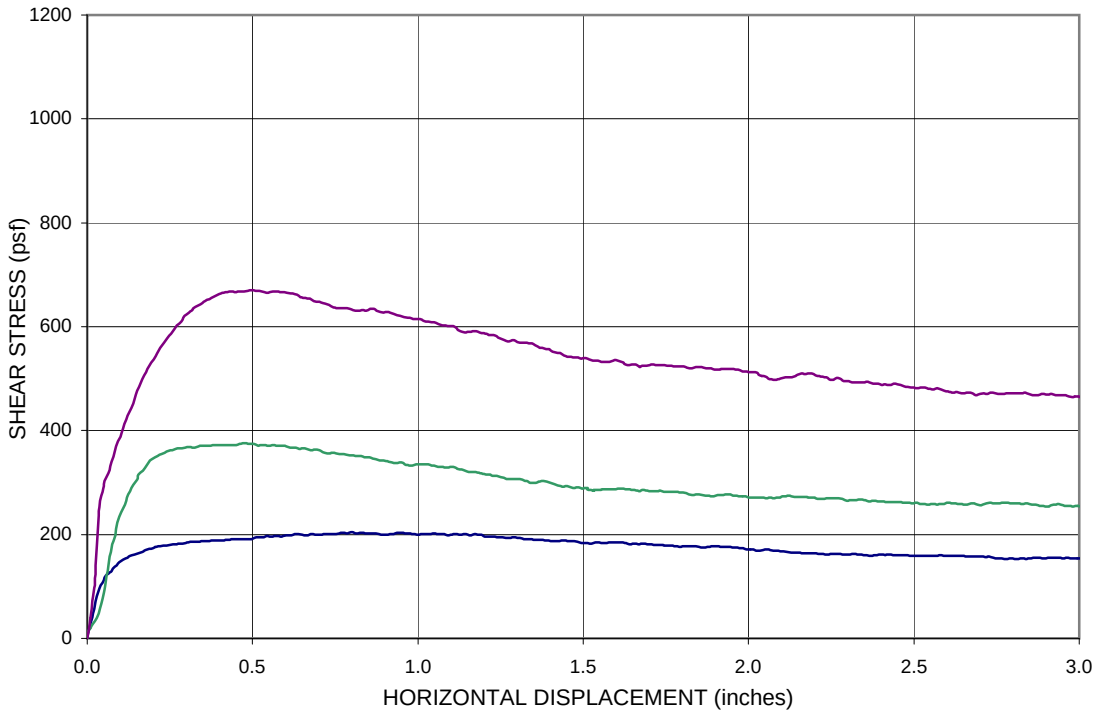
Material 1: ⇦ GSE Ultraflex 60 mil LLDPE Tex. / Tex. Roll#104111149 LSN: APT Clamped

Material 2: ⇨ GSE PermaNet UL Geocomposite (Double sided 6 oz.) Roll# 131244854 LSN: APZ Clamped

Substrate: ⇨ Concrete Board

DISPLACEMENT vs. SHEAR STRESS

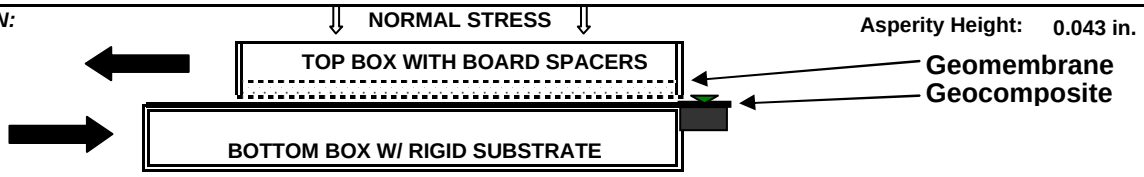
Test Point	Normal Stress	
	psi	psf
1.	1.7	250
2.	3.5	500
3.	6.9	1000



STANDARD CONDITIONS: ***SHEAR DISPLACEMENT RATE: 0.04 in/min***

1. The "gap" between shear boxes was set at 80 mil (2.0 mm)
2. The test specimens were flooded during testing unless otherwise noted.
3. High Normal Stresses, >5psi (35 kPa) was applied using air pressure.
4. Low Normal Stresses, <5psi (35 kPa) was applied using dead weights.
5. The tests were terminated after 3.0"(75 mm) of displacement unless otherwise noted.
6. Tests were performed in general accordance with ASTM procedure D-5321 using a Brainard-Killman LG-112 direct shear machine with an effective area of 12" x 12" (300 x300 mm).

TEST ORIENTATION:



SPECIAL TEST NOTES:

1. Each specimen of geocomposite was cut to 14" x 20" and clamped to the lower shear box.
2. Each specimen of geomembrane was cut to 12" x 16" and clamped to the upper shear box.
3. Each test specimen was consolidated for 15 min at the specified normal stress, then sheared.
4. The test was performed in a "wet" or "flooded" condition.
5. Shearing occurred at the interface of the geomembrane and geocomposite specimens.
6. The Friction Angle and Adhesion (or Cohesion) results given here are based on a mathematically determined best fit line.
7. Further interpretation should be conducted by a qualified professional experienced in geosynthetic and geotechnical engineering.