Technically Complete, March 11, 2016

APPENDIX III-D.5-2

SLOPE STABILITY ANALYSES

STATE OF TEXAS
JESSE PAUL VARSHO
114074
LICENSED
PROFESSIONAL ENGINEER

3-2-15

This document is released for the purpose of permitting only under the authority of Jesse P. Varsho, P.E. #114074. It is not to be used for bidding or construction. Texas Registered Engineering Firm F-5650

CB&I

Technically Complete, March 11, 2016

CB&I Environmental & Infrastructure	Client Name:	Rancho Viejo Waste Management, LLC		
	Project Name:	Pescadito Environmental Resource Center	Project No.:	148866
	Prepared by:	P. Thomas	Date Prepared:	2/24/2015
	Reviewed by:	Jesse P. Varsho, PE	Date Reviewed:	3/2/2015

TITLE: SLOPE STABILITY ANALYSES

Problem Statement

Determine the factor of safety against slope failure during the construction, operation and closure periods of the landfill under static loading conditions. A factor of safety of 1.5 for static conditions is deemed acceptable (note the site is not located within a seismic hazard zone).

References

The referenced literature cited below is provided in the attached pages. Referenced site specific information is provided within the Application as stated below, and referenced documents specific to this analysis are provided in the attached pages.

1. Computer model SLIDE - 2D Limit Equilibrium Slope Stability Analysis, version 6.0, developed by Rocscience, Inc. was used for the stability analyses (attached pages)
2. Figure No. 1 presents the locations of the critical cross section selected (attached pages).
3. Landfill design specifications for layer types and thicknesses provided in the Summary of Geotechnical Design Parameters (contained in **Appendix III-D.5-1**).
4. Details of landfill systems provided in the Design Drawing Set contained in this Application.
5. SLIDE output plot files (attached pages).

Assumptions

Critical Cross Section

Cross Section A-A' as shown on **Figure No. 1** (see attached pages, **Reference No. 2**) was determined to be the most critical cross section for the global mass stability of the proposed landfill design. Cross Section A-A' is orientated from north to south through the South Unit landfill and is characterized by the following features:

- Peak final landform elevation of approximately 843 ft MSL;
- Final cover sideslopes are 4H:1V with a 6% slope across the plateau;
- Cell excavation slope of 3H:1V; and
- Maximum waste column thickness of 380 ft.

Note, that both the north and south edges of Section A-A' were evaluated for stability, but results for only the most critical edge (i.e., that which yielded the lowest safety factors) — the south edge for global and interim stability stages and the north edge for the cell excavation/development stage, are presented herein.

Landfill Stages Analyzed and Modes of Failure

Stability of the landfill was analyzed for essentially three different landfill stages: complete landfill build-out / final landform, landfill cell excavation / development, and operational at interim waste fill heights. The three landfill stages were analyzed using two modes of failure within the SLIDE model — translational (non-circular / block) failure and rotational (circular) failure. The translational failure mode was used to analyze the stability of the liner system along critical (weak) interfaces; and the rotational failure mode was used to analyze the stability of the waste mass and the foundation.

Stability of Liner System by Translational Failure Mode. The stability of the liner system was evaluated by constraining the failure surfaces (generated by the SLIDE model) to occur within the liner system at the most critical interface. The SLIDE model was used to perform a block search for translational failure surfaces (i.e., non-circular failure surfaces that follow along a weak plane or interface). A constraining boundary was applied through the liner system along the base liner and sideslope liner at approximately mid-height within the SLIDE model. Failure surfaces were then generated through the liner layer, and the most critical failure surface was determined (i.e., lowest factor of safety).

Stability of Waste Mass and Foundation by Rotational Failure Mode. The stability of the waste mass and foundation was evaluated within the SLIDE model using a grid search to find the most critical circular failure surfaces within the waste mass and foundation. The grid search was performed in an iterative manner by the SLIDE model user. Each time the user adjusted / fine-tuned the grid to the point where the model generated the absolute lowest factor of safety.

Failure Conditions

The stability analyses were performed for both short-term and long-term shear strength / static conditions. Long-term shear strength conditions will most likely occur following the complete build-out of the landfill.

Material Properties

The geotechnical parameters used in the slope stability analyses have been discussed in detail in **Reference No. 2**. A summary of the material properties and shear strength parameters used in the stability analyses are presented on the following page on **Table 1**.

Water Table

The water table was conservatively assumed to be at ground surface for the stability calculations and was assumed as follows for the different stability scenarios:

- *Cell Excavation / Development Scenarios* - the water surface is at the bottom of the compacted low permeable soil liner layer along the base liner and sideslope liner; and
- *Complete Build-Out / Final Landform and Interim Waste Scenarios* - the water surface is at the top of the leachate collection system drainage geocomposite, or approximately 1 inch above the compacted low permeable soil liner layer along sideslopes and base.

TITLE: SLOPE STABILITY ANALYSES

Table 1
Summary of Material Unit Weights and Shear Strength

Layer Description	Moist Unit Weight γ_{moist}	Saturated Unit Weight γ_{sat}	Short-Term Shear Strength		Long-Term Shear Strength	
			Cohesion c	Friction Angle φ	Cohesion c'	Friction Angle φ'
Soil Stratum I:						
Beneath Landfill Liner Sideslopes, and outside of Landfill footprint	125 pcf	126 pcf	1,000 psf	0°	250 psf	10°
Soil Stratum II-III- IV:						
Beneath Landfill Base Liner, Sideslope Liner, and areas outside Landfill footprint	129 pcf	132 pcf	2,500 psf	5°	720 psf	13.5°
Landfill Layers:						
Final Cover	129 pcf	132 pcf	720 psf	13.5°	720 psf	13.5°
Waste	65 pcf	65 pcf	0 psf	30°	0 psf	30°
Protective Soil Cover Layer (2-ft) on Base Liner and Sideslope Liner	129 pcf	132 pcf	720 psf	13.5°	720 psf	13.5°
Compacted Low Permeable Soil Liner (3-ft)	129 pcf	132 pcf	720 psf	13.5°	720 psf	13.5°
Critical Geosynthetic Interface along Sideslope Liner	129 pcf	132 pcf	0 psf	8°	0 psf	8°
Critical Geosynthetic Interface along Base Liner	129 pcf	132 pcf	0 psf	14°	0 psf	14°

Analyses

The stability analyses were performed for the following modeled scenarios:

- Global Stability of Complete Build-Out / Final Landform
  - *Stability of Liner System* - evaluated stability of the liner system under short-term and long-term shear strength / static conditions. *(Note that because the liner shear strength parameters are the same for both short- and long-term conditions, the resulting critical failure surface and safety factor are identical for both short- and long-term analyses. The SLIDE output plot file is therefore only presented for the short-term analysis in the attached pages.)*
  - *Stability of Waste and Foundation* - evaluated stability of the waste mass and foundation under short-term and long-term shear strength / static conditions.
- Stability at Interim Waste Fill Height
  - *Stability of Liner System* -- evaluated the stability of the liner system under short-term shear strength / static conditions. *(Note that because the liner shear strength parameters are the same for both short- and long-term conditions, the resulting critical failure surface and safety factor for the long-term conditions would be identical to that of the short-term conditions analysis.)*
  - *Stability of Waste and Foundation* -- evaluated the stability of the waste mass and foundation for short-term shear strength / static conditions.
- Stability of Cell Excavation / Development
  - *Stability of Liner System* -- evaluated the stability of the liner system under short-term shear strength / static conditions. *(Note that because the liner shear strength parameters are the same for both short- and long-term conditions, the resulting critical failure surface and safety factor for the long-term conditions would be identical to that of the short-term conditions analysis.)*
  - *Stability of Foundation* -- evaluated the stability of the foundation under short-term shear strength / static conditions.

Limit Equilibrium Analysis Methods

The limit equilibrium analysis methods used in the SLIDE model analyses included the following three methods:

- Bishop Simplified - the Bishop Simplified method uses the method of slices to determine the stability of the slide mass. It satisfies vertical force equilibrium for each slice as well as overall horizontal force equilibrium for the entire slide mass (i.e., all slices). It assumes zero interslice shear forces.
- Janbu Corrected - the Janbu Corrected method uses the method of slices to determine the stability of the slide mass, satisfying vertical force equilibrium for each slice and horizontal force equilibrium for the entire slide mass (i.e., all slices). It also accounts for interslice shear forces in the analysis.
- GLE / Morgenstern-Price - the GLE (Generalized Limit Equilibrium) / Morgenstern-Price method uses the method of slices to determine the stability of the slide mass. It satisfies vertical force equilibrium for each slice as well as overall horizontal force equilibrium for the entire slide mass (i.e., all slices). It also accounts for interslice shear forces in the analysis.

The lowest factor of safety from the three methods used (i.e., Bishop, Janbu, GLE / Morgenstern-Price) is reported on the SLIDE plot for each modeled scenario (attached pages) and on the summary table on the following page. All of the modeled scenarios are graphically presented on the SLIDE plots provided in the attached pages.

Results

Results of the stability analyses are summarized on **Table 2** below. The following results demonstrate that the proposed landfill development meets and/or exceeds the recommended safety factor of 1.5, and complies with the regulatory requirements of Title 30 Texas Administrative Code (TAC) §330.337. SLIDE output plot files are provided in the attached pages.

Table 2
Slope Stability Summary
Stability Section A-A'

Scenario	Safety Factor	
	Short-Term Conditions	Long-Term Conditions
Complete Build- Out / Final Landform:		
Global Stability of Liner System - Block *(orientation North to South / left to right)*	2.041 *(bishop)*	2.041 *(bishop)*
Global Stability of Waste & Foundation - Circular *(orientation North to South / left to right)*	2.008 *(janbu)*	2.382 (janbu)
Excavated / Partially Lined Cell w/ 100-ft Length of Sideslope Liner Installed, Complete Base Liner Installed, and 35-ft High Lift of Waste Fill Placed at 3H:1V Slope:		
Stability of Liner System - Block *(orientation North to South / left to right)*	1.767 *(bishop)*	*same*
Stability of Waste & Foundation - Circular *(orientation North to South / left to right)*	1.536 *(janbu)*	*n/a*
Excavated / Developed Cell w/ Complete Liner System Installed, & 100-ft High Waste Fill Lift Placed (at 3H:1V Slope with 75-ft Wide Benching):		
Stability of Liner System - Block *(orientation North to South / left to right)*	1.605 *(bishop)*	*same*
Stability of Waste & Foundation - Circular *(orientation North to South / left to right)*	1.959 *(janbu)*	*n/a*
Interim Waste Fill Height of 2 Cells with 3H:1V Waste Slope and 75-ft Wide Benching (Maximum Elevation - 824 ft MSL):		
Stability of Liner System - Block *(orientation North to South / left to right)*	1.535 *(bishop)*	*same*

Reference No. 1

SLIDE - 2D Limit Equilibrium
Slope Stability Program

Technically Complete, March 11, 2016

Slide 6.0

Slope Stability & Groundwater Software

rocscience *software tools for rock and soil*

Slide 6.0 is a comprehensive 2D limit equilibrium slope stability analysis program for all types of soil and rock slopes, embankments, earth dams and retaining walls. Slide includes probabilistic analysis, support design and finite element groundwater seepage analysis.

Slope Stability

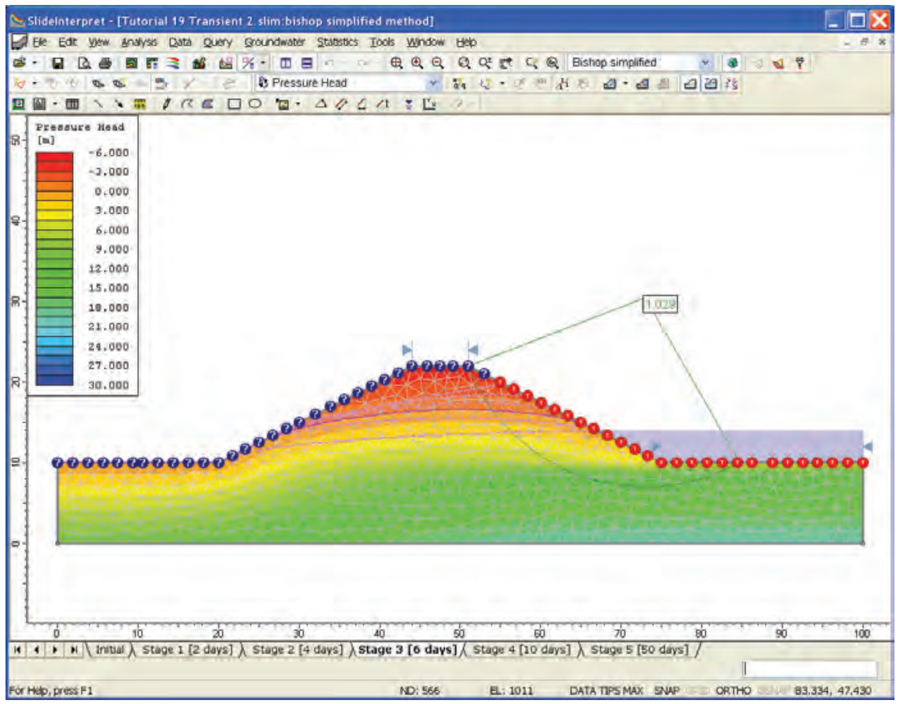
Slide offers no less than 17 different material strength models for rock and soil including Mohr-Coulomb, Anisotropic and Generalized Hoek-Brown. Support types include tieback, end anchored, soil nail, micro pile and geotextile. State of the art modeling capabilities allow you to create and edit complex slope models very easily. Advanced search algorithms simplify the task of finding the critical slip surface with the lowest safety factor.

FE Groundwater

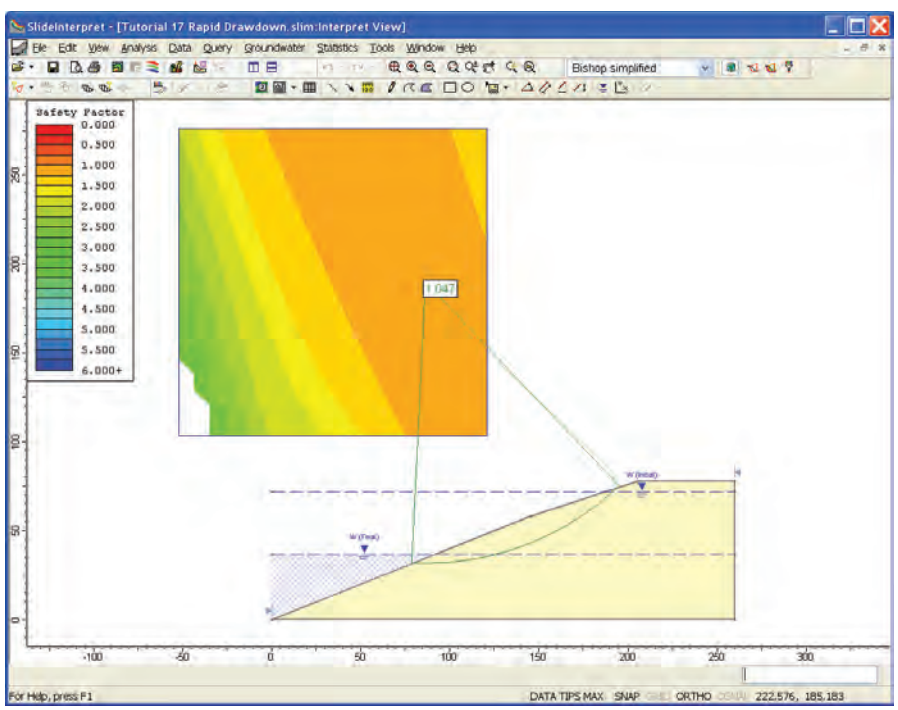
Groundwater pore pressure can be determined using steady state or transient finite element seepage analysis – flows, pressures and gradients are calculated based on user defined hydraulic boundary conditions. Seepage analysis is fully integrated with the slope stability analysis or can be used as a standalone module. For transient groundwater analysis, the safety factor can be calculated at each time stage.

Probabilistic Analysis

In *Slide* 6.0 probabilistic analysis, you may assign statistical distributions to almost any input parameters, including material properties, support properties, loads, and water table location. The probability of failure/reliability index is calculated, and provides an objective measure of the risk of failure associated with a slope design. Sensitivity analysis allows you to determine the effect of individual variables on the safety factor of the slope.



Multi-stage time dependent transient groundwater seepage analysis of earth dam under drawdown conditions. Minimum safety factor slip surface at intermediate drawdown level.



Rapid drawdown analysis of embankment dam using the Duncan, Wright, Wong 3-stage method (1990), showing critical slip circle for drawdown state.

Slide 6.0
Technical Specifications

Technically Complete, March 11, 2016

rocscience *software tools for rock and soil*

Modeling

- interactive geometry entry
- grid/vertex/object snapping
- interactive zoom and pan
- view vertex coordinates
- DXF import / export
- multiple materials
- unlimited undo/redo
- right-click editing shortcuts
- one-click material assignment

Surface Types

- circular surfaces
- non-circular surfaces
- composite surfaces
- tension cracks

Search Methods

- grid search
- slope search
- auto-refine search
- block search
- path search
- simulated annealing
- non-circular surface optimization

Analysis Methods

- Bishop simplified
- Corps of Engineers #1
- Corps of Engineers #2
- GLE/Morgenstern-Price
- Janbu simplified
- Janbu corrected
- Lowe-Karafiath
- Ordinary/Fellenius
- Spencer
- Eurocode 7 design standard

Strength Models

- Mohr-Coulomb
- Undrained
- Anisotropic Strength
- Shear/normal function
- Hoek-Brown
- Generalized Hoek-Brown
- Vertical Stress Ratio
- Barton-Bandis
- Power Curve
- Hyperbolic
- Discrete Function
- Drained-Undrained
- Generalized Anisotropic
- Unsaturated shear strength

Pore Pressure Definition

- finite element groundwater seepage analysis
- phreatic surfaces
- piezometric surfaces
- Ru coefficients
- pore pressure grids - total head, pressure head, pore pressure
- choose grid interpolation method
- calculate excess pore pressure using B-bar method
- rapid drawdown analysis

Finite Element Groundwater Seepage Analysis

- multi-stage transient groundwater seepage
- steady state seepage
- saturated/unsaturated
- constant or time dependent boundary conditions
- one-click automatic meshing
- mapped meshing
- show mesh quality
- discharge sections
- view groundwater and slope stability results simultaneously

Rapid Drawdown Methods

- Duncan, Wright, Wong 3 stage
- Army Corps Engineering 2 stage
- Lowe and Karafiath
- Effective stress using B-bar

Probabilistic Analysis

- Monte Carlo or Latin Hypercube simulation
- use any input parameters as random variables
- distributions - Normal, Uniform, Triangular, Beta, Exponential, Lognormal, Gamma
- probability of failure
- reliability index
- critical probabilistic surface
- histogram, cumulative and scatter plots
- sensitivity analysis

Loading

- line loads
- distributed loads
- seismic load

Support

- end-anchored bolts
- grouted tiebacks
- soil nails
- geotextiles
- piles and micropiles
- user-defined support model
- active vs. passive anchors
- easily define/edit patterns
- back analysis - compute required support force for safety factor

Data Interpretation

- plot slip surface data
- plot slice data
- plot results directly on slip surface
- filter slip surfaces
- plot safety factor vs. time for transient analysis
- contour groundwater results (total head, pressure head, pore pressure)
- plot factor of safety along slope
- support force diagrams
- interactive data tips
- annotation and dimensioning tool kit
- save display options, drawings, annotations
- print models at scale
- export to Excel
- export image files

Price & Licensing

Slide 6.0 is sold as single licenses, which are purchased outright, for $2495 US ($2495 CDN).

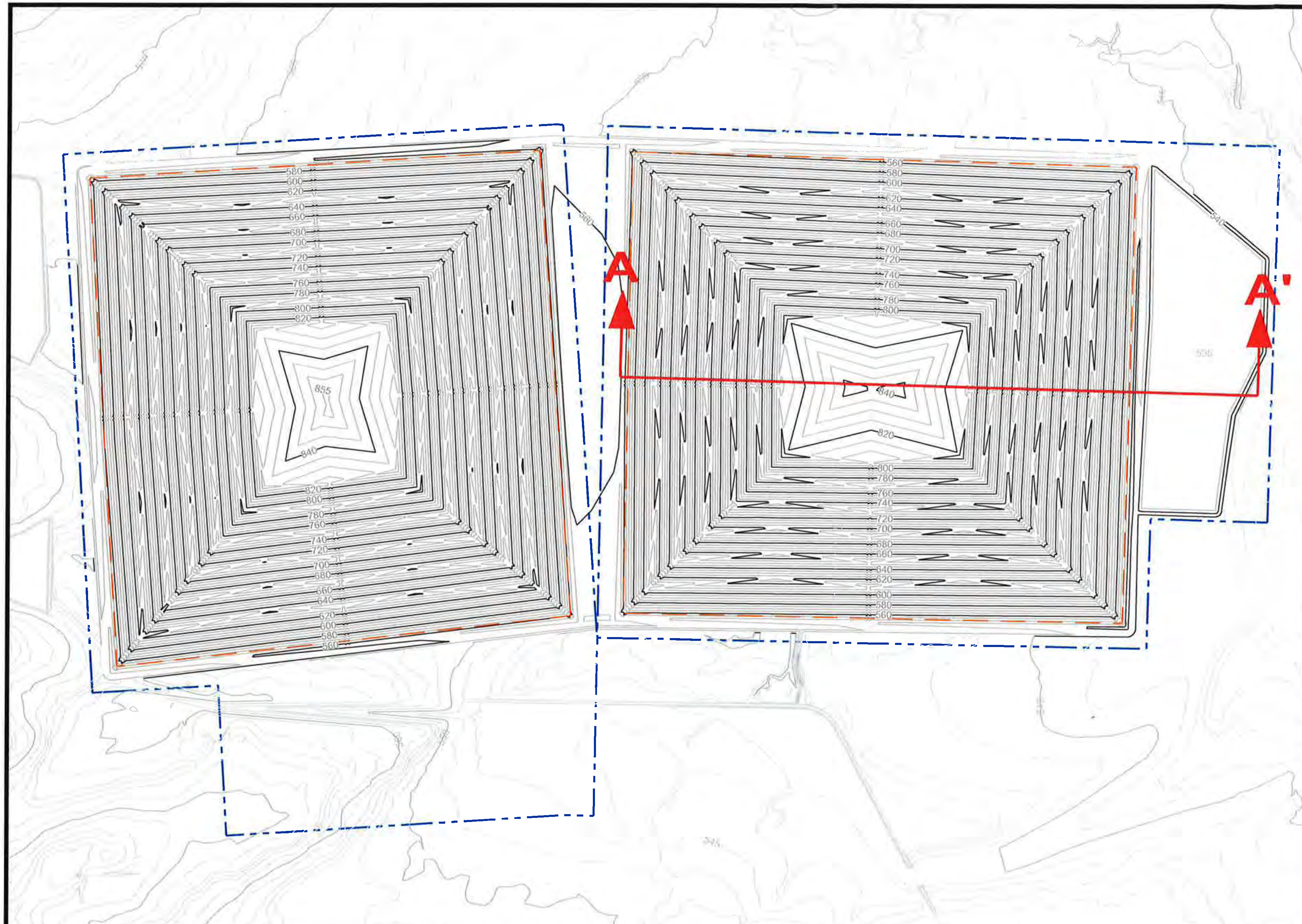
Flexible Licenses are also available; they are sold as a yearly subscription, with price based on the number of concurrent users. Please contact: software@rocscience.com for more information.

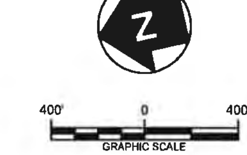
www.rocscience.com

Reference No. 2

Figure 1 - Stability Section Location

Technically Complete, March 11, 2016





LEGEND

FACILITY BOUNDARY
WASTE BOUNDARY

NOTES

1. EXISTING CONTOURS DEVELOPED FROM SITE AERIAL TOPOGRAPHIC SURVEY BY DALLAS AERIAL SURVEYS ON FEBRUARY 15, 2010.
2. BOUNDARY AND IMPROVEMENT SURVEY DEVELOPED BY MEIJA ENGINEERING COMPANY ON APRIL 9, 2010 AND MAY 9, 201.
3. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.

STATE OF TEXAS
JESSE PAUL VARSHO
114074
LICENSED
PROFESSIONAL ENGINEER
3-2-15

REV. NO.	DATE	DESCRIPTION

CB&I Environmental & Infrastructure, Inc.
TBPE FIRM F-5650

THIS DOCUMENT IS RELEASED FOR PERMITTING ONLY UNDER THE AUTHORITY OF JESSE P. VARSHO, P.E. #114074. IT IS NOT TO BE USED IN BIDDING OR CONSTRUCTION. TEXAS REGISTERED ENGINEERING FIRM F-5650

PESCADITO ENVIRONMENTAL RESOURCE CENTER
WEBB COUNTY, TEXAS
MSW 2374

SLOPE STABILITY CROSS SECTION LOCATION

PROJ. NO.:	148866
DESIGNED BY:	–
DRAWN BY:	MTE
CHECKED BY:	PCT
APPROVED BY:	MWO
DATE:	MARCH 2015
FIGURE NO.	1

1 OF 1 SHEETS

Reference No. 5

SLIDE Output Plots

Technically Complete, March 11, 2016

SLOPE STABILITY
SOUTH UNIT - SECTION A-A'

GLOBAL STABILITY ANALYSIS

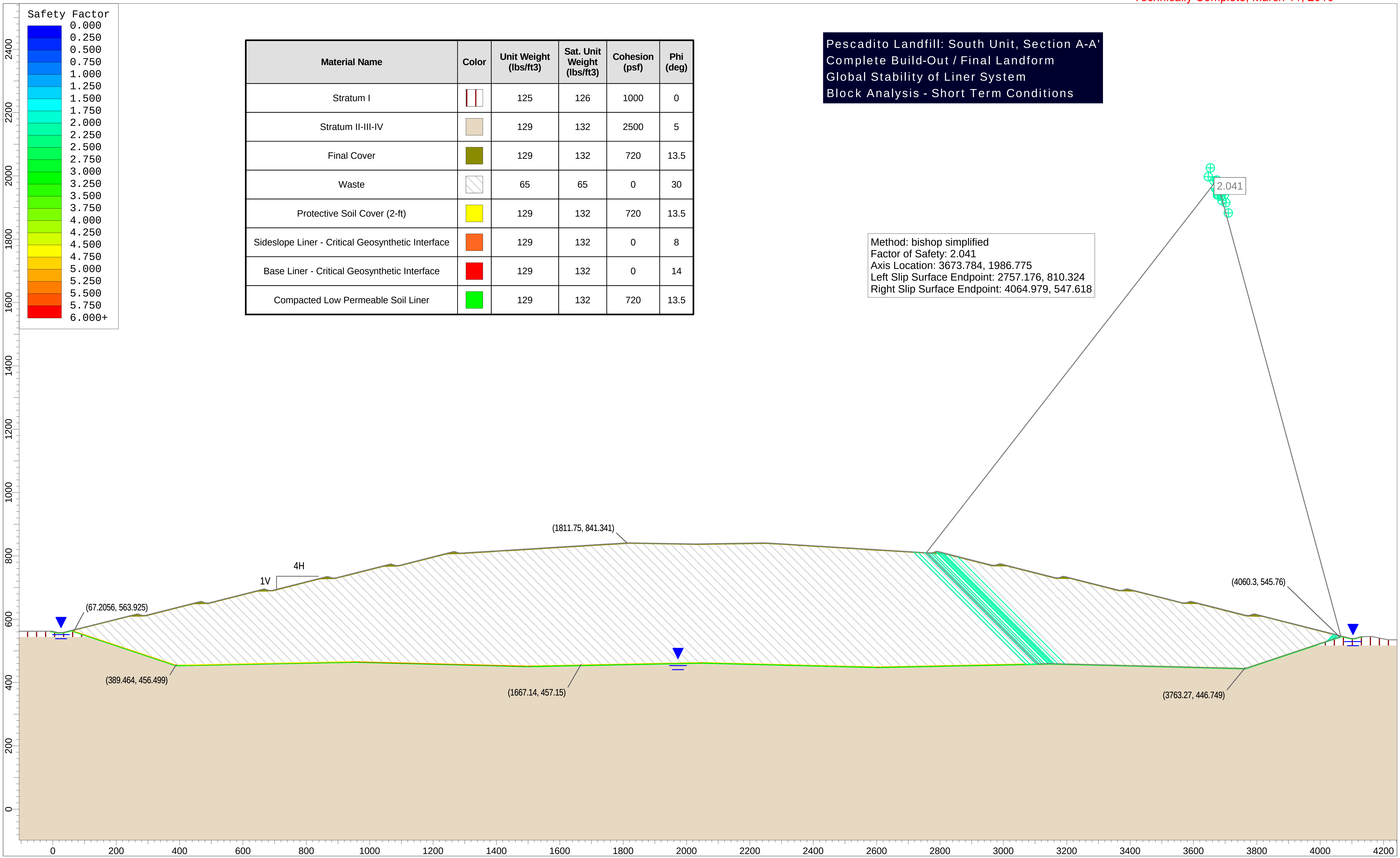
COMPLETE BUILD-OUT / FINAL LANDFORM
BLOCK ANALYSIS OF LINER SYSTEM
(TRANSLATIONAL SLOPE FAILURE)

Technically Complete, March 11, 2016

Pescadito Landfill: South Unit, Section A-A'
Complete Build-Out / Final Landform
Global Stability of Liner System
Block Analysis - Short Term Conditions

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Stratum I		125	126	1000	0
Stratum II-III-IV		129	132	2500	5
Final Cover		129	132	720	13.5
Waste		65	65	0	30
Protective Soil Cover (2-ft)		129	132	720	13.5
Sideslope Liner - Critical Geosynthetic Interface		129	132	0	8
Base Liner - Critical Geosynthetic Interface		129	132	0	14
Compacted Low Permeable Soil Liner		129	132	720	13.5

Method: bishop simplified
Factor of Safety: 2.041
Axis Location: 3673.784, 1986.775
Left Slip Surface Endpoint: 2757.176, 810.324
Right Slip Surface Endpoint: 4064.979, 547.618

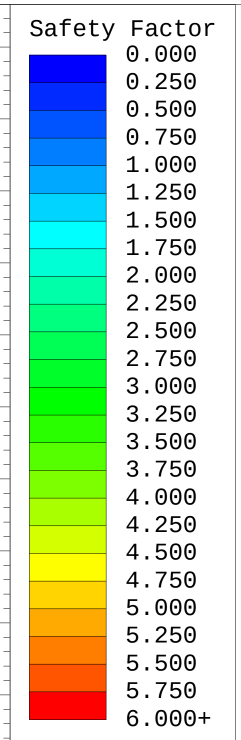


SLOPE STABILITY
SOUTH UNIT - SECTION A-A’

GLOBAL STABILITY ANALYSIS

COMPLETE BUILD-OUT / FINAL LANDFORM
CIRCULAR ANALYSIS OF WASTE AND FOUNDATION
(ROTATIONAL SLOPE FAILURE)

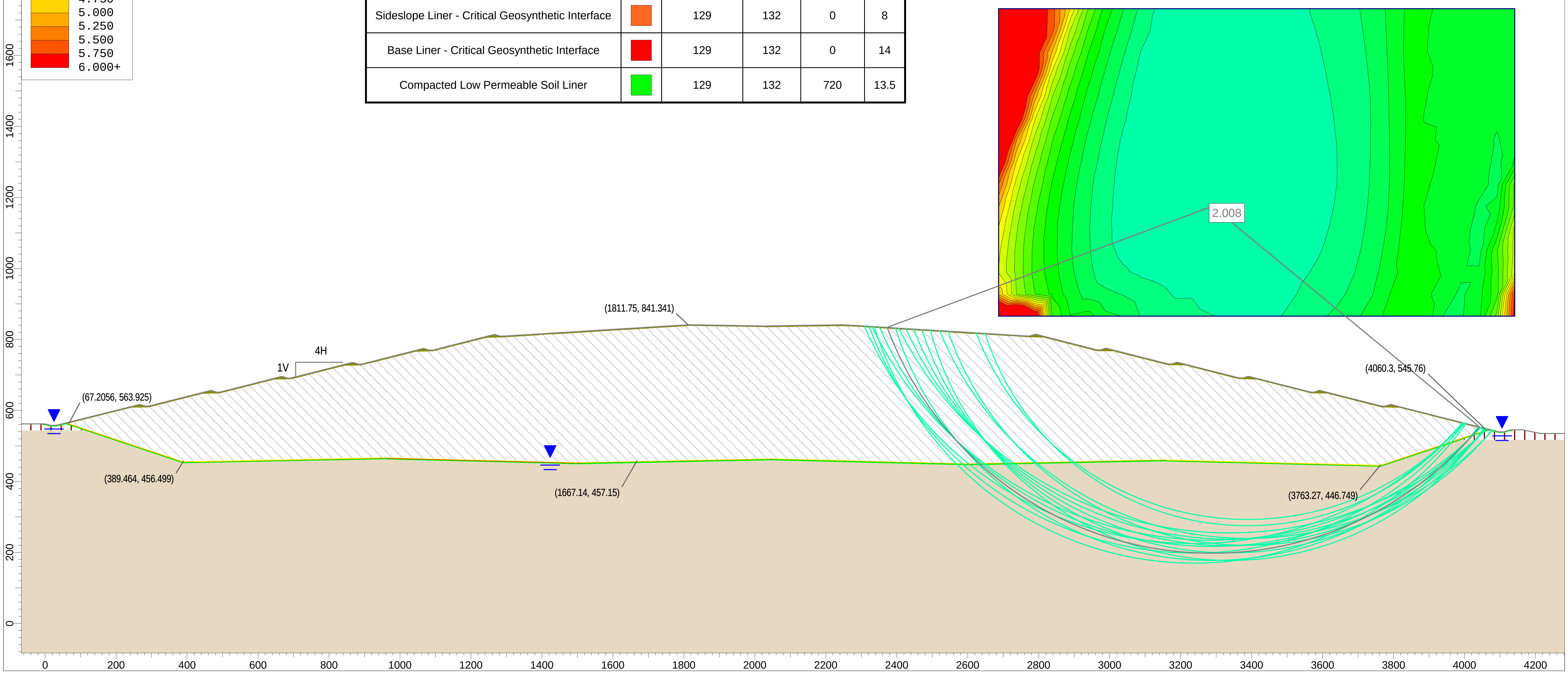
Technically Complete, March 11, 2016



Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Stratum I		125	126	1000	0
Stratum II-III-IV		129	132	2500	5
Final Cover		129	132	720	13.5
Waste		65	65	0	30
Protective Soil Cover (2-ft)		129	132	720	13.5
Sideslope Liner - Critical Geosynthetic Interface		129	132	0	8
Base Liner - Critical Geosynthetic Interface		129	132	0	14
Compacted Low Permeable Soil Liner		129	132	720	13.5

Pescadito Landfill: South Unit, Section A-A'
Complete Build-Out / Final Landform
Global Stability of Waste and Foundation
Circular Analysis - Short Term Conditions

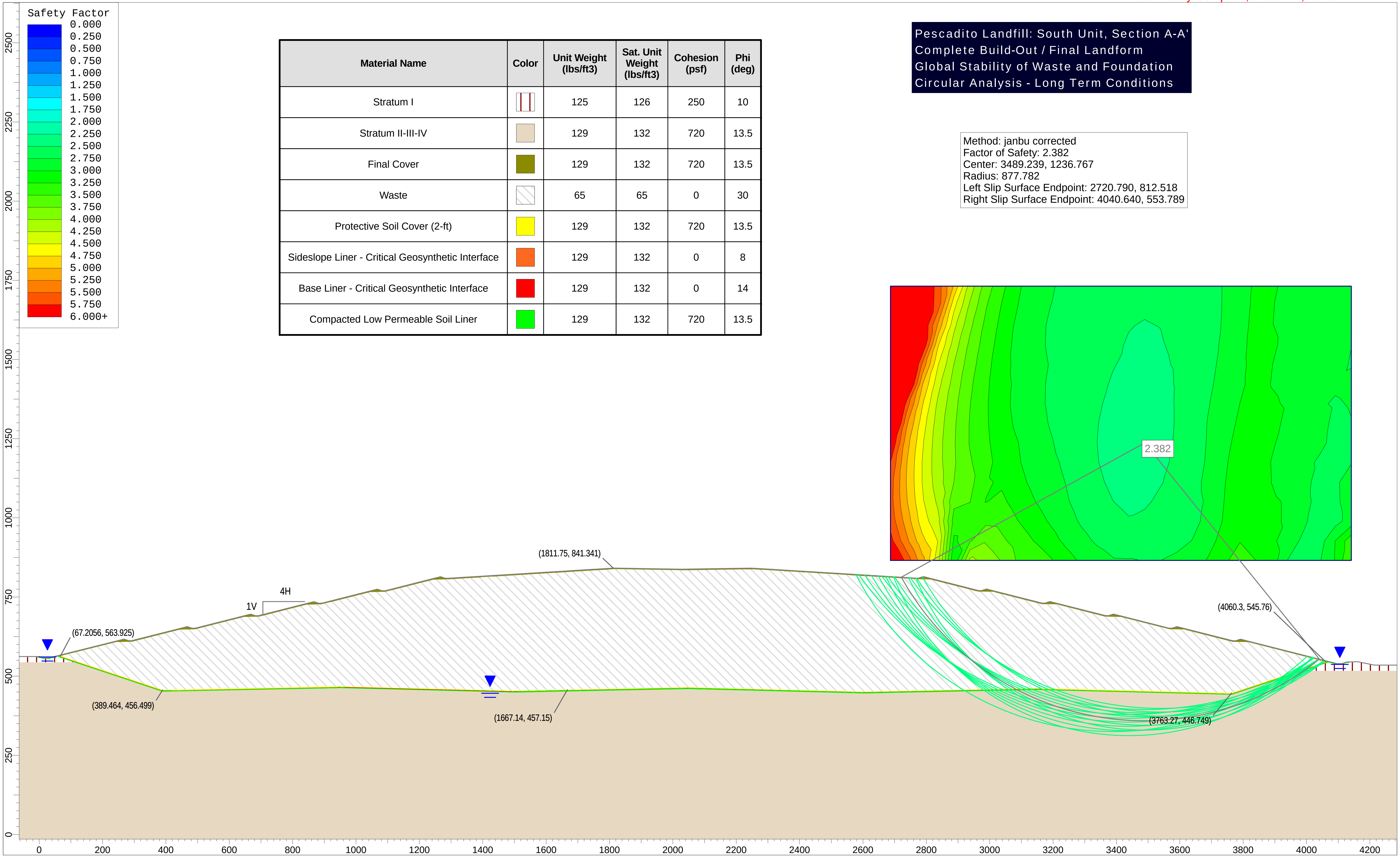
Method: janbu corrected
Factor of Safety: 2.008
Center: 3288.624, 1174.913
Radius: 977.218
Left Slip Surface Endpoint: 2372.878, 833.791
Right Slip Surface Endpoint: 4042.634, 553.284



Pescadito Landfill: South Unit, Section A-A'
Complete Build-Out / Final Landform
Global Stability of Waste and Foundation
Circular Analysis - Long Term Conditions

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Stratum I		125	126	250	10
Stratum II-III-IV		129	132	720	13.5
Final Cover		129	132	720	13.5
Waste		65	65	0	30
Protective Soil Cover (2-ft)		129	132	720	13.5
Sideslope Liner - Critical Geosynthetic Interface		129	132	0	8
Base Liner - Critical Geosynthetic Interface		129	132	0	14
Compacted Low Permeable Soil Liner		129	132	720	13.5

Method: janbu corrected
Factor of Safety: 2.382
Center: 3489.239, 1236.767
Radius: 877.782
Left Slip Surface Endpoint: 2720.790, 812.518
Right Slip Surface Endpoint: 4040.640, 553.789



SLOPE STABILITY
SOUTH UNIT - SECTION A-A'

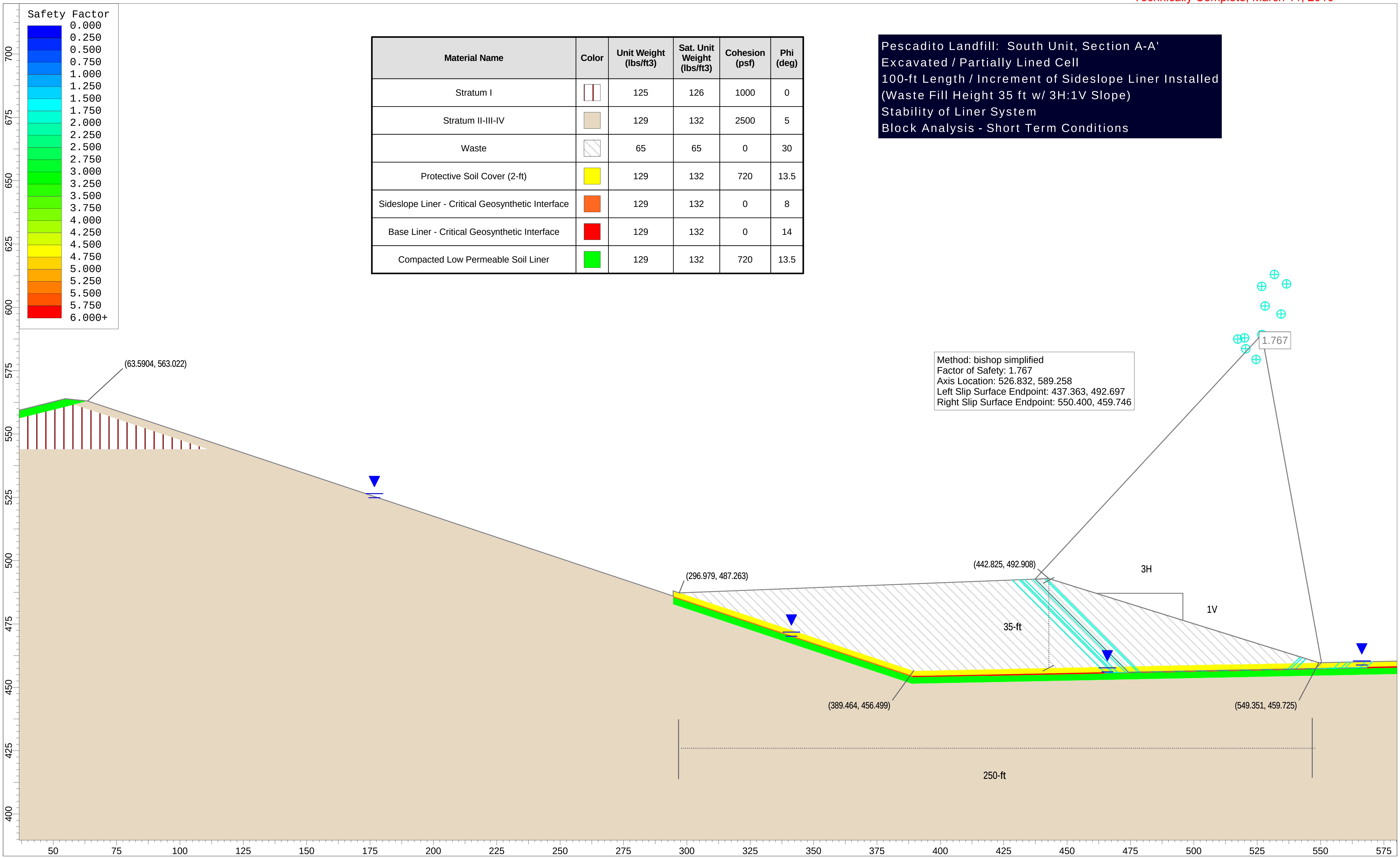
STABILITY OF EXCAVATED / PARTIALLY LINED CELL
w/ 100-FT LENGTH OF SIDESLOPE LINER INSTALLED
& 35-FT HIGH LIFT OF WASTE FILL PLACED AT 3H:1V SLOPE

BLOCK ANALYSIS OF LINER SYSTEM
(TRANSLATIONAL SLOPE FAILURE)

Technically Complete, March 11, 2016

Pescadito Landfill: South Unit, Section A-A'
Excavated / Partially Lined Cell
100-ft Length / Increment of Sideslope Liner Installed
(Waste Fill Height 35 ft w/ 3H:1V Slope)
Stability of Liner System
Block Analysis - Short Term Conditions

Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Stratum I		125	126	1000	0
Stratum II-III-IV		129	132	2500	5
Waste		65	65	0	30
Protective Soil Cover (2-ft)		129	132	720	13.5
Sideslope Liner - Critical Geosynthetic Interface		129	132	0	8
Base Liner - Critical Geosynthetic Interface		129	132	0	14
Compacted Low Permeable Soil Liner		129	132	720	13.5

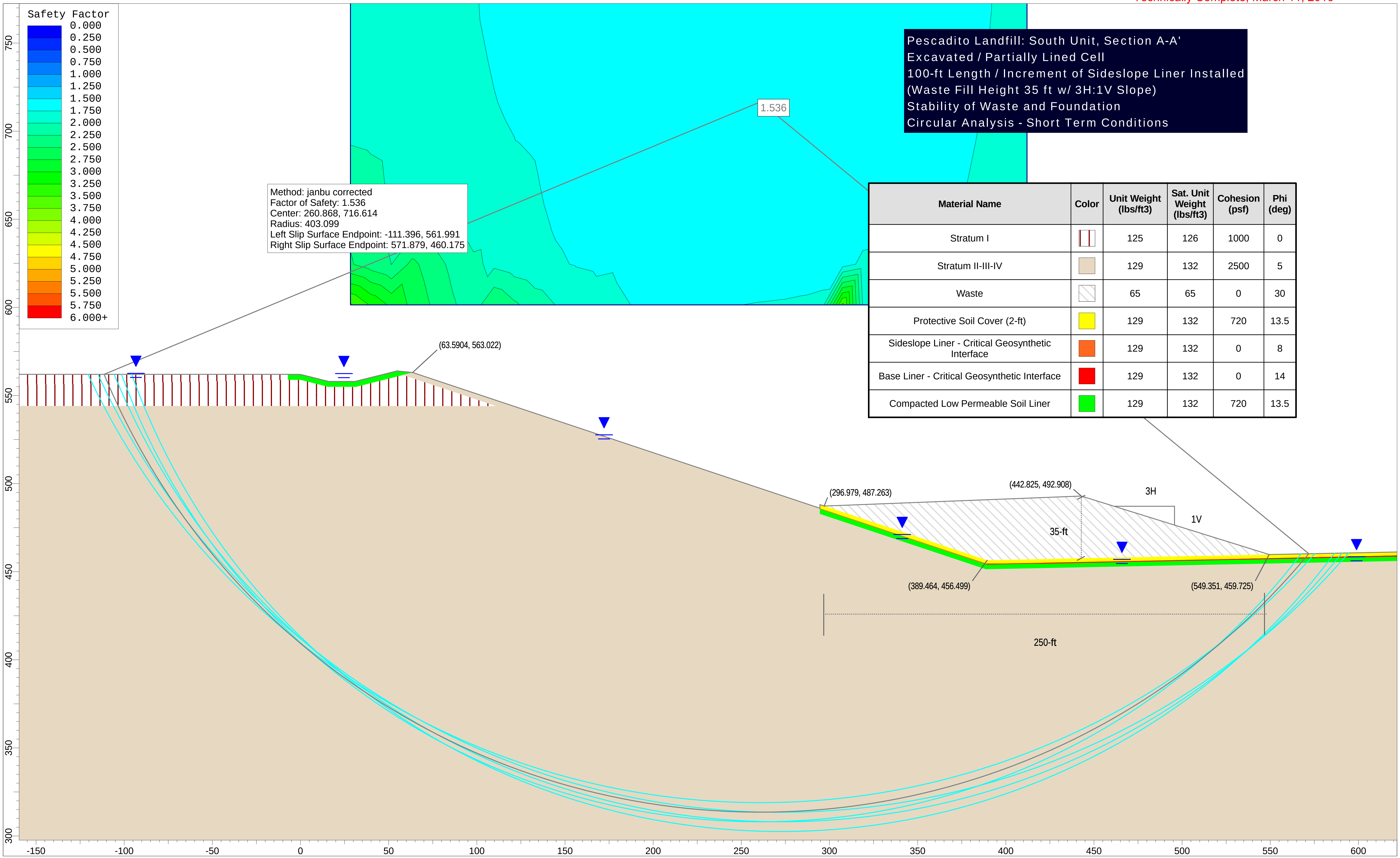


SLOPE STABILITY
SOUTH UNIT - SECTION A-A'

STABILITY OF EXCAVATED / PARTIALLY LINED CELL
w/ 100-FT LENGTH OF SIDESLOPE LINER INSTALLED
& 35-FT HIGH WASTE FILL LIFT PLACED (AT 3H:1V SLOPE)

CIRCULAR ANALYSIS OF WASTE AND FOUNDATION
(ROTATIONAL SLOPE FAILURE)

Technically Complete, March 11, 2016



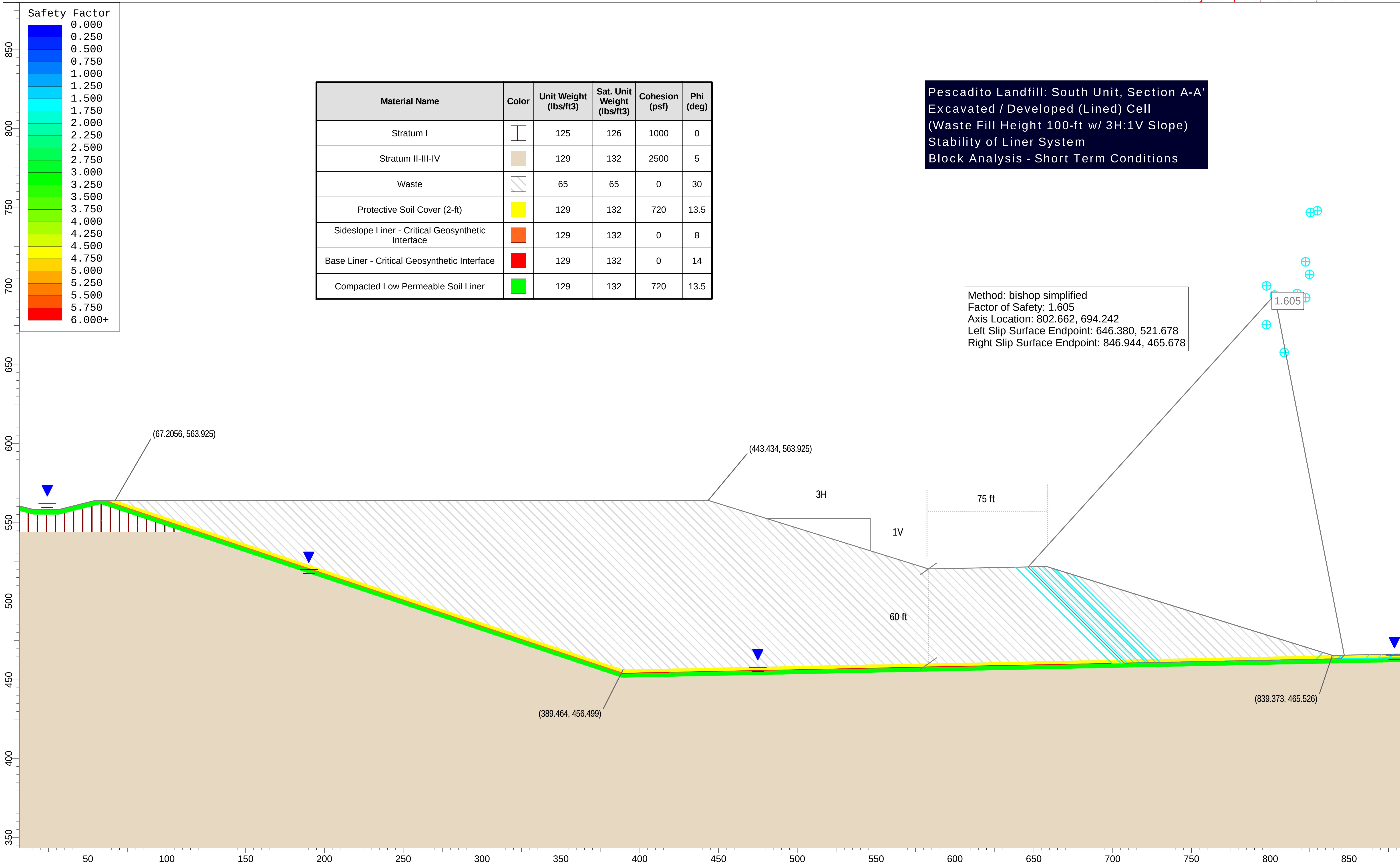
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Stratum I		125	126	1000	0
Stratum II-III-IV		129	132	2500	5
Waste		65	65	0	30
Protective Soil Cover (2-ft)		129	132	720	13.5
Sideslope Liner - Critical Geosynthetic Interface		129	132	0	8
Base Liner - Critical Geosynthetic Interface		129	132	0	14
Compacted Low Permeable Soil Liner		129	132	720	13.5

SLOPE STABILITY
SOUTH UNIT - SECTION A-A'

STABILITY OF EXCAVATED / DEVELOPED CELL
w/ COMPLETE LINER SYSTEM INSTALLED
& 100-FT HIGH WASTE FILL LIFT PLACED (AT 3H:1V SLOPE)

BLOCK ANALYSIS OF LINER SYSTEM
(TRANSLATIONAL SLOPE FAILURE)

Technically Complete, March 11, 2016

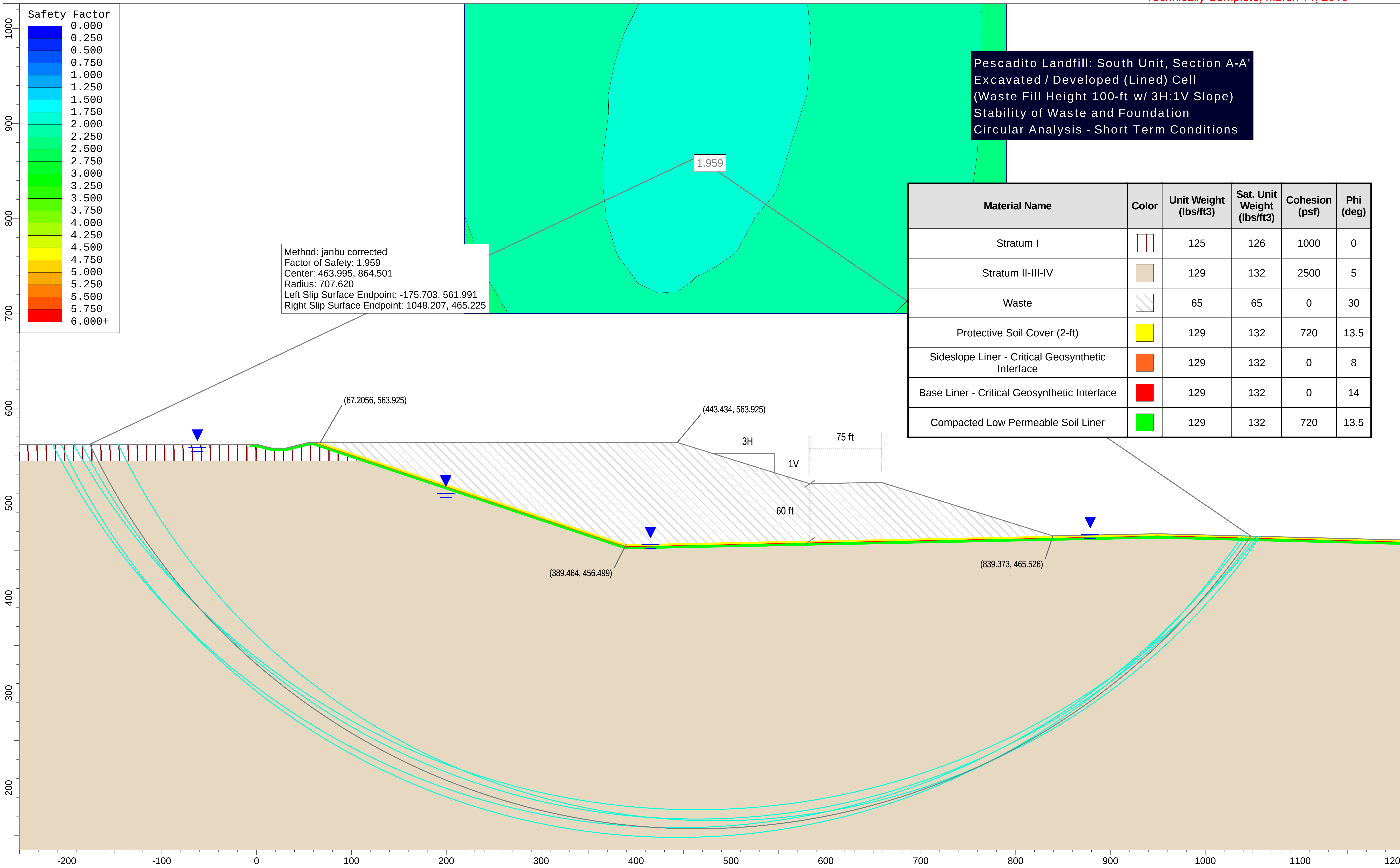


Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Stratum I		125	126	1000	0
Stratum II-III-IV		129	132	2500	5
Waste		65	65	0	30
Protective Soil Cover (2-ft)		129	132	720	13.5
Sideslope Liner - Critical Geosynthetic Interface		129	132	0	8
Base Liner - Critical Geosynthetic Interface		129	132	0	14
Compacted Low Permeable Soil Liner		129	132	720	13.5

SLOPE STABILITY
SOUTH UNIT - SECTION A-A’

STABILITY OF EXCAVATED / DEVELOPED CELL
w/ COMPLETE LINER SYSTEM INSTALLED
& 100-FT HIGH WASTE FILL LIFT PLACED (AT 3H:1V SLOPE)

CIRCULAR ANALYSIS OF WASTE AND FOUNDATION
(ROTATIONAL SLOPE FAILURE)



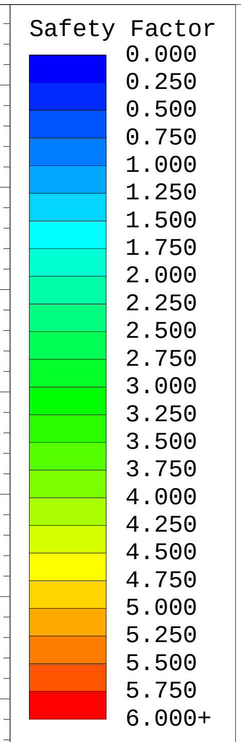
Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Stratum I		125	126	1000	0
Stratum II-III-IV		129	132	2500	5
Waste		65	65	0	30
Protective Soil Cover (2-ft)		129	132	720	13.5
Sideslope Liner - Critical Geosynthetic Interface		129	132	0	8
Base Liner - Critical Geosynthetic Interface		129	132	0	14
Compacted Low Permeable Soil Liner		129	132	720	13.5

SLOPE STABILITY
SOUTH UNIT - SECTION A-A’

INTERIM WASTE STABILITY
OF 2 CELLS DEVELOPED / FILLED

BLOCK ANALYSIS OF LINER SYSTEM
(TRANSLATIONAL SLOPE FAILURE)

Technically Complete, March 11, 2016



Material Name	Color	Unit Weight (lbs/ft3)	Sat. Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
Stratum I		125	126	1000	0
Stratum II-III-IV		129	132	2500	5
Final Cover		129	132	720	13.5
Waste		65	65	0	30
Protective Soil Cover (2-ft)		129	132	720	13.5
Sideslope Liner - Critical Geosynthetic Interface		129	132	0	8
Base Liner - Critical Geosynthetic Interface		129	132	0	14
Compacted Low Permeable Soil Liner		129	132	720	13.5

Pescadito Landfill: South Unit, Section A-A'
Interim Waste Fill Height (2- Cells)
Stability of Liner System
Block Analysis - Short Term Conditions

Method: bishop simplified
Factor of Safety: 1.535
Axis Location: 2976.047, 709.818
Left Slip Surface Endpoint: 2806.289, 518.877
Right Slip Surface Endpoint: 3026.946, 459.447