Report

Wagerup RSA10 FEL3 - Slope Stability Analysis Report

H374430-0000-2A0-230-0005

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1. Introduction

Alcoa of Australia (Alcoa) operates the Wagerup Alumina Refinery, an integrated bauxite mine and Alumina hydrometallurgical processing operation (Refinery) in the south-west of Western Australia. The Refinery is one of three operating alumina refineries in Western Australia and is located approximately 130 kilometres south of the Perth metropolitan area on the boundary of the Peel and Southwest regions (see Figure 1-1).

Figure 1-1: Location Map

The Wagerup residue facility currently comprises nine Residue Storage Areas (RSAs) designated as RSA2 to RSA9. The site also contains the refinery water storage dams, a cooling pond, runoff water storage ponds (ROWS), a sand lake and two Run-off Collection Ponds (ROCPs), refer to Figure 1-2.

Figure 1-2: Wagerup Refinery Residue Disposal Areas

In August 2024, Alcoa commissioned Hatch Pty Ltd (Hatch) to undertake engineering design for a feasibility study (FEL3 Level) to develop a new residue storage area (RSA10) at the Wagerup Alumina Refinery. The preferred site is located north of the existing ROCP3 and west of RSA7. The proposed RSA10 footprint is approximately 45 ha.

This project report provides the slope stability analysis results for the proposed perimeter Wagerup RSA10 embankment walls. A total of four geotechnical type sections were selected as an input to the slope stability assessment. Two-dimensional (2D) limit equilibrium (LE) stability analysis for both the starter embankment (initial perimeter raise) and ultimate upstream embankment of RSA 10 facility were carried out under this scope. For the ultimate configuration it was assumed that solar dried mud would be placed behind mechanically constructed upstream residue sand embankments to a maximum crest elevation of RL 80 m.

2. Background Information

2.1 Geotechnical Design References

The geotechnical interpretation on the foundation soils were presented in the geotechnical interpretation report (GIR, Hatch Document No. H374430-0000-2A0-230-0004). This report includes a screening level static liquefaction and liquefaction potential assessment for the in-situ foundation soils.

An assessment of the borrow materials used in the construction of the embankments and clay liner is presented in the Borrow Pit Geotechnical Factual and Interpretive Report (H374430-0000-2A0-066-0002).

The geotechnical interpretation on the residue tailings were presented in the residue materials characterisation report (Hatch Document No. H374430-0000-22A-230-0003). 2

Seepage analysis has been completed to assess the phreatic levels within the residue mud presented in Technical Memorandum - RSA10 Seepage Assessment (Hatch Document No. H374430-0000-2A0-249-0003, Rev 1).

2.2 Proposed Embankment Wall Geometry

The proposed RSA10 impoundment will be bounded to the east by the western perimeter of RSA7 and to the south by the northern embankment of ROCP3. The proposed haul roads, heritage boundaries, and drainage channels constrain the footprint to the north and west. The site layout is shown in Drawing No. WG005469 (H374430-0000-220-270-0001) and has been reproduced in Figure 2-1.

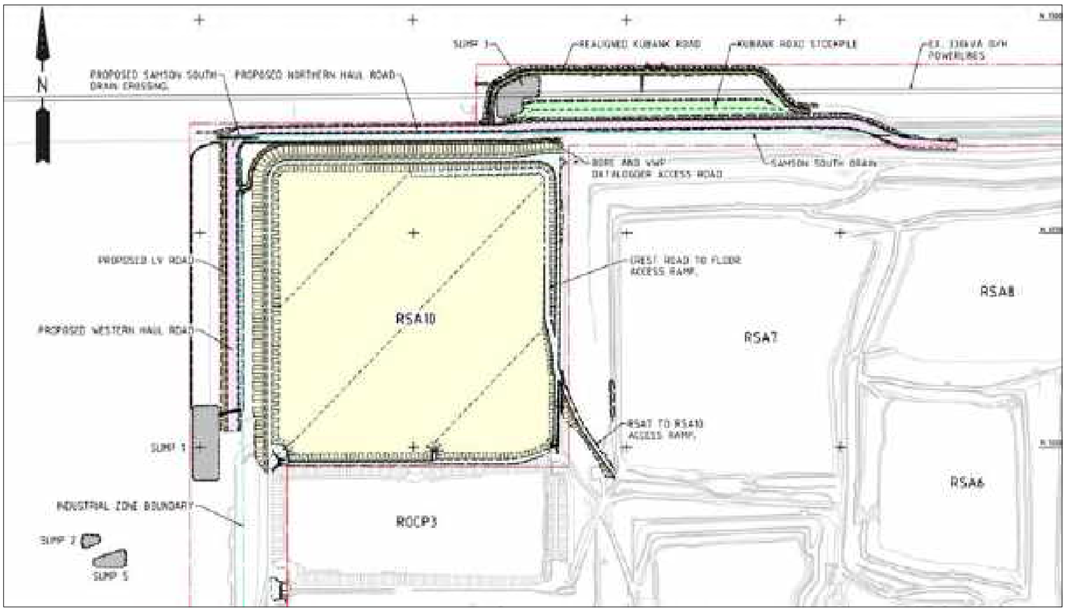

Figure 2-1: General Arrangement for RSA10 (Drawing No. WG005469)

New perimeter embankments will be constructed and raised along the western and northern boundaries of the impoundment in a staged approach. The initial starter embankments will be constructed using locally sourced clayey fill with future upstream raises constructed from residue sand produced as a by-product of the refining process. The final embankment height is estimated to be RL 80 m with a maximum residue beach elevation of RL 78 m. This equates to a maximum residue fill height of approximately 61 m.

Alcoa requires the construction of a composite liner system within the base of the impoundment to prevent process liquor from seeping into the natural groundwater aquifers. The liner system comprises a 500 mm compacted clay liner (CCL) with a textured 2mm thick HDPE geomembrane, which will be overlain by a nominal 1 m sand drainage system to provide sufficient confining stresses to compress the HDPE against the upper CCL surface. The composite liner system and underdrainage network will tie into the top of the starter embankment. Topsoil will be stripped and stockpiled prior to construction of the bulk earthworks and will be used as cover materials for the external batter slopes of the western and northern embankments.

The starter embankment and liner system will be constructed from engineered fill sourced from the borrow pits to an initial elevation ranging from RL 24.4 m in the northeastern corner to RL 22.5 m in the southwestern corner. The design slope profile is 1V:3H for the internal embankment batter (upstream slope). The external batter profile (downstream slope) is 1V:4H including an exterior zone of compacted topsoil. A typical section of the started embankment is presented in Drawing No. WG005481 (H374430-0000-220-273-0101) and has been reproduced in Figure 2-2.

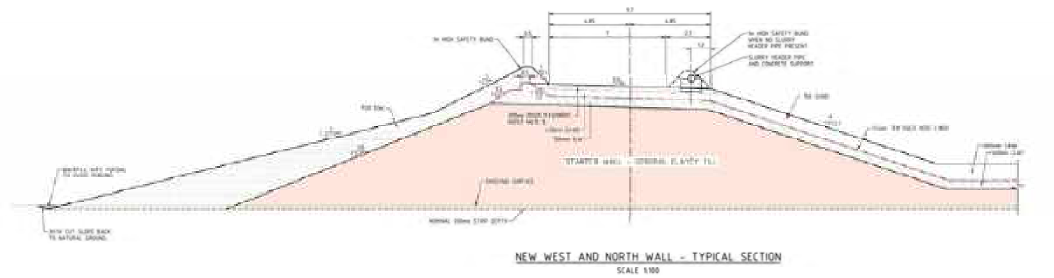

Figure 2-2: Typical Section of New West and North Wall (Drawing No. WG005481)

Thickened residue mud (nominally placed at an initial solids content of 48% w/w) will be deposited from the mudline droppers located at 80 m centres along the perimeter western and northwestern embankments. The residue will be deposited in approximately 600 mm to 800 mm thickness wet layers and then farmed using amphirols and solar dried to achieve an average 68% w/w final solids content layer. The layers will be progressively placed until the maximum freeboard elevation (nominally 1.0 m from inside crest elevation) is reached and then upstream construction will commence.

The mud farming process adopted increases the density and strength of residue through water drainage, solar and wind drying, and compaction under the upstream raise (Li, Hinton, & Navarro, 2024). The conditioned or structural zone, achieved through mud farming, forms a crucial part of the long-term raising strategy and in integral for safe mud disposal.

Perimeter raising along the northern and western embankments will utilise the upstream construction method using mechanical placement of residue sand material, with an average downstream batter slope of 1V:6H. Each raise will have an upstream (internal) batter slope of 1V:4H and be approximately 5 metres in height, with the final raise approximately 7 m high to meet an RL 80 m elevation. The crest width for each raise will be 10 metres. A section showing the upstream raise geometry to the ultimate facility elevation is shown in Figure 2-3.

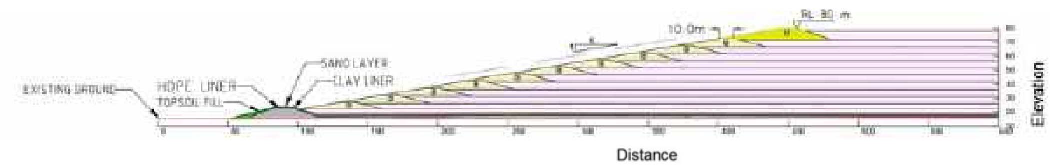

Figure 2-3: Profile of Upstream Raise Construction

2.3 Foundation Geometry

A 3D foundation geotechnical model for the RSA10 site was developed using Leapfrog software, by Seequent. Leapfrog uses spheroidal interpolation of stratigraphy points or polylines to produce 3D surfaces. Due to the relative complexity of the layering within the individual subsurface geological units, the model has been developed based on the general geological units as described in the Geotechnical Interpretive Report (GIR), Hatch Document No. H374430-0000-2A0-230-0004. The foundation units are summarised in Table 2-1.

Table 2-1: Geological Model Strata and Sub-Layers

Geological Formation	Unit	Geotechnical Model Stratum
Not Applicable	Unit 1	Fill
Alluvium	Unit 2	Topsoil
Guildford Formation	Unit 3	Clay
	Unit 4A	Clayey SAND/ Sandy CLAY
	Unit 4B	Potentially Contractive Zone
	Unit 5	Cemented SAND/ CLAY and GRAVEL
Ascot / Yoganup Formation	Unit 6A	SAND with interbedded silts and clays
	Unit 6B	CLAY to Silty CLAY
Leederville Formation	Unit 7	Weathered Siltstone/Conglomerate

Units 5 and 6B are discontinuous sub-units within their respective geological formations. Unit 5 is a highly variable ferruginised zone formed by mineral precipitation within Units 3 and 4. Unit 5 has been ignored in the stability model and has been conservatively assigned the same strength parameters as Unit 4.

Unit 6B represents the interbedded clay layers present within Unit 6A. Unit 6B has been included in the stability model to assess the impact of the fine-grained layer within the Unit 6A Sand. The unit is assigned undrained parameters.

2.4 Summary of Material Parameters

A summary of the strength parameters adopted in the analysis are summarised in Table 2-2. The derivation of these parameters are discussed in the Geotechnical Interpretation Report (Hatch, 2025a) for the foundation units and Geotechnical Residue characterisation (Hatch, 2025c). The residue sand strengths for the upstream raise materials are based on triaxial testing completed to inform critical states soil mechanics parameters (Golder, 2021) where $q = 1.45\ p'$ was determined for the residue sand based on the Cambridge stress path (i.e. $c' = 0$kPa and $\phi' = 36°$).

Table 2-2: Summary of Geotechnical Parameters for Foundation Materials, Construction Materials, and Residue

Unit	Material Description	Unit Weight, γ (kN/m^3)	Effective Strength		Undrained Strength		Post-Peak (Large Strain) Shear Strength
			c' [1]	ϕ' [2]	Minimum Undrained Shear Strength, ($S_{u,min}$, kPa)	Peak Undrained Shear Strength Ratio	
CLAY Liner	CLAY Liner	20	10	22		$S_u/\sigma'_v = 0.22$	$S/\sigma'_v = 0.17$
Interface Shear Strength	Liner Interface Shear Strength (Textured: CLAY)	10	0	19			$\phi' = 16$
M_1	Thickened Residue Mud (Existing)	18.5	0	34		$S_u/\sigma'_v = 0.26$	$S/\sigma'_v = 0.16$
M_2	Thickened Residue Mud (Recent Deposit)	18.5	0	34		$S_u/\sigma'_v = 0.26$	$S/\sigma'_v = 0.15$
M_3	Thickened Residue Mud	18.5	0	34		$S_u/\sigma'_v = 0.30$	$S/\sigma'_v = 0.26$
S_1	Proposed Residue Sand Raises / Basal Underdrainage	19	0	36			$\phi' = 30$
Unit 1A	Engineered Fill	20	5	23		$S_u/\sigma'_v = 0.26$	$S/\sigma'_v = 0.20$
Unit 1B	Embankment	20	5	32			$c'=4$, $\phi' = 26$
Unit 2 [3]	TOPSOIL (Silty/ Clayey SAND/ CLAY)	17	0	26			$\phi' = 21$
Unit 3	CLAY (Guildford Fm)	20	5	23	Capped at drained strength for S_u < 75 kPa	$S_u/\sigma'_v = 0.22$	$S/\sigma'_v = 0.17$
Unit 4A	Clayey SAND/ Sandy CLAY (Guildford Fm)	18	5	32	Capped at drained strength for S_u < 150 kPa	$S_u/\sigma'_v = 0.38$	$S/\sigma'_v = 0.30$
Unit 4B	Contractive Clay Horizon (Guildford Formation)	18	5	32	Capped at drained strength for P'_c = 190 kPa	$S_u/\sigma'_v = 0.30$	$S/\sigma'_v = 0.24$
Unit 5 [4]	Cemented SAND/ CLAY and GRAVEL (Guildford Fm)	21	20	30	Capped at drained strength for S_u < 100 kPa	$S_u/\sigma'_v = 0.38$	$S/\sigma'_v = 0.30$
Unit 6A	SAND (Ascot Fm)	19	0	35			$\phi' = 30$
Unit 6B	Silty/ Clayey layers (Ascot Fm)	18	5	32	Capped at drained strength for S_u < 100 kPa	$S_u/\sigma'_v = 0.35$	$S/\sigma'_v = 0.28$
Unit 7	CLAY/ Weathered SILTSTONE (Leederville Fm)	22	60	33			$c'=46$, $\phi' = 27$.

Notes:
1. Drained cohesion
2. Drained friction angle
3. The material parameters for Unit 2 (Topsoil) have been derived assuming that the material will be loosely dumped along the exterior slopes.
4. Unit 5 is a highly variable cemented zone within Units 3 and 4. The Unit has been ignored in the model. Unit 4 material parameters have been used, where applicable.

N/A - Not Applicable

2.4.1 *Undrained Strength Functions*

The undrained shear strength of the fine-grained foundation soils, namely Unit 3, Unit 4, and Unit 6B, have been assessed from advanced laboratory testing, reported in the FEL3 GIR Hatch Doc No. H374430-0000-2A0-230-0004. A shear function has been developed for these units to assign appropriate strength parameters at lower confining stress. The undrained strength has been capped at the drained effective strength to the minimum shear strength assigned for the unit.

The undrained shear strength (S_u) versus effective stress (σ'_v) relationships for Unit 3, Unit 4A, Unit 4B, and Unit 6B are presented in Figure 2-4. For higher confining stresses, the S_u/σ'_v ratio assigned to the units was used to estimate the undrained strength.

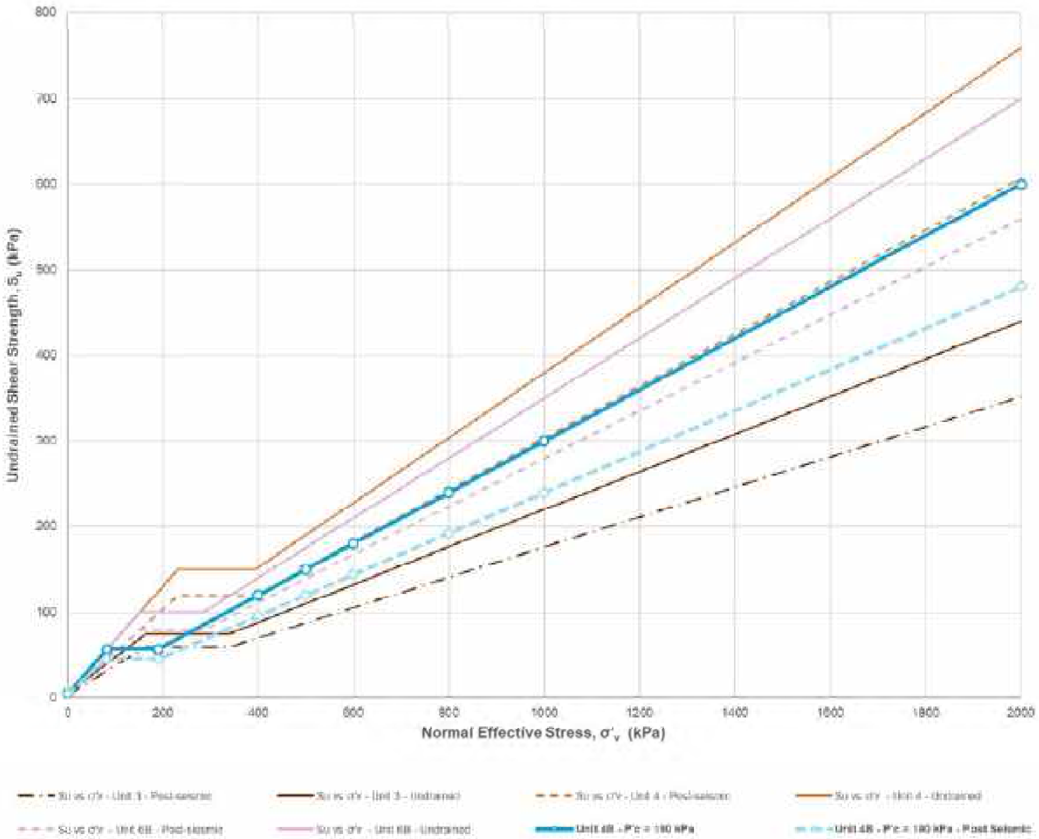

Figure 2-4: Shear- Normal Undrained Strength Functions - Unit 3, Unit 4A, Unit 4B, and Unit 6B

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Based on the relationships derived from Figure 2-4, Unit 3 (shallow Guildford Clay unit) governs stability through the natural foundations.

3. Slope Stability Analysis Methodology and Results

Limit Equilibrium (LE) analysis methods were adopted for the slope stability analysis using Slope/W software, part of the GeoStudio 2023 R2 suite. All analyses were carried out for circular/ noncircular failure surfaces using the Morgenstern-Price method which satisfies both force and moment equilibrium.

3.1 Geotechnical Sections

A total of four geotechnical sections were selected for the stability analysis. These are designated as Section A and Section B (western embankment) and Section C and Section D (northern embankment).

The type sections are presented in plan on Figure 3-1 and in section view within Appendix A.

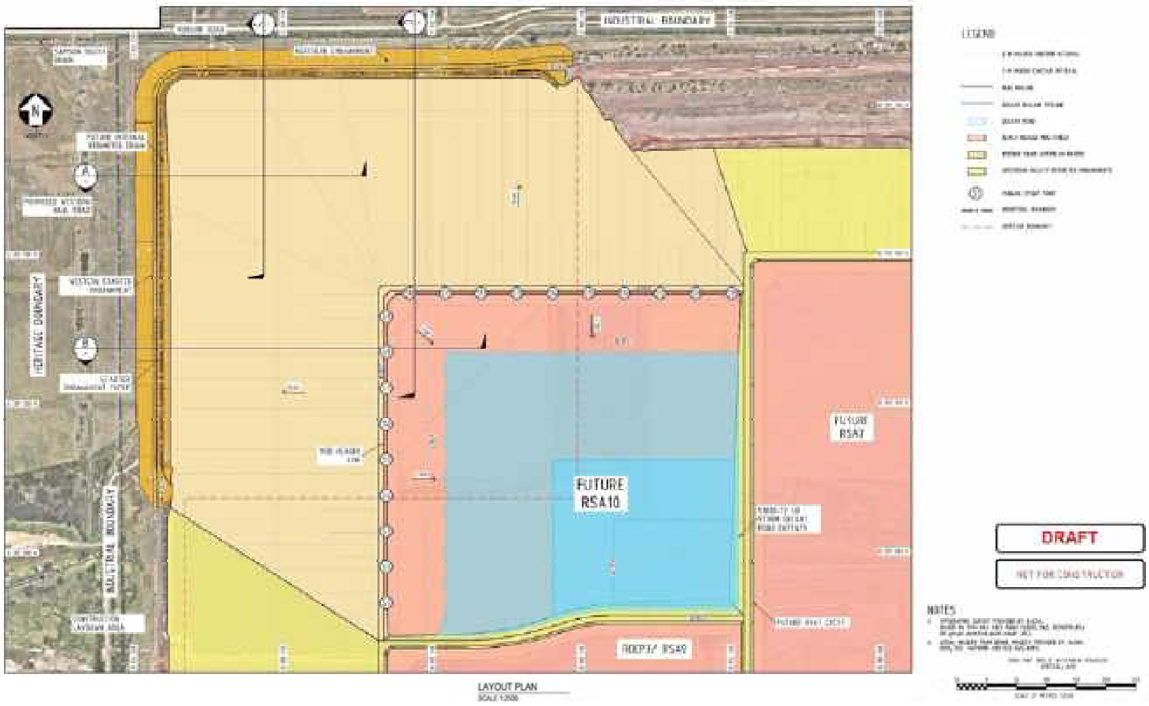


Figure 3-1: RSA10 Layout with Type Section for Stability Analysis

The following embankment configurations were analysed to determine the geotechnical stability factor of safety (FoS) for the design wall profile at the end of starter construction, end of starter embankment residue filling and at the ultimate height of the facility prior to closure:

- **Starter Construction Complete** - An approximately 9.5 m high starter embankment without thickened residue mud deposition but excess pore pressures associated with construction fill placement above the foundations.
- **Starter Embankment Filling Complete** - An approximately 9.5 m high starter embankment with thickened residue mud deposition and reduced excess pore pressures in the foundations.
- **Ultimate Upstream Embankment** - Upstream embankment raises to RL 80 m for containment of thickened residue.

From Figure 3-1 Section A and Section C do not intersect the crest of the final upstream embankment raise at the ultimate height. The final crest height of Section A and Section C will be RL 46 m to RL 52 m respectively, while the final crest height of Section B and Section D will be RL 80 m. The proposed geometry for the analysed sections is presented in Table 3-1.

Table 3-1: RSA10 Section Profile Geometry

Description	Units	Section A / C	Section B / D
Crest Height	m RL	46 / 52	80 / 80
Downstream Slope	H:V	6:1	6:1

3.2 ANCOLD Requirements

The design criteria adopted for assessment of the geotechnical stability analysis were selected from Guidelines on Tailings Dams (ANCOLD 2019). The minimum requirements are presented in Table 3-2.

Table 3-2: Minimum Requirements for Factor of Safety

Loading Condition	Factor of Safety (FoS)
Long-term Drained	1.5
Short-term Undrained	
Potential loss of containment	1.5
No potential loss of containment	1.3
Post Seismic Loading (1)	1.1

(1) ANCOLD recommends a range of 1.0 to 1.2 for minimum Factor of Safety for post-seismic analysis. The selection of the minimum requirement is based on the designer's confidence in the post-seismic strength characterisation of materials from cyclic direct simple shear (CDSS) post monotonic testing.

3.3 Loading Conditions

The following loading conditions were assessed in order to estimate the geotechnical stability factor of safety for the RSA10 perimeter embankments:

- **Long term, Drained** - To assess geotechnical stability for the condition where there is no excess pore water pressure remaining from external loading. Peak effective strengths were adopted for all geotechnical units and represent long termed drained case.
- **Short term, Undrained -** To assess geotechnical stability for the condition where excess pore water pressure is generated due to the placement of fill or residue mud or during the construction starter embankment above clayey foundations or upstream raises above fine-grained residue. Peak undrained strengths were adopted for dilative foundation soils. A B-Bar of 0.5 was applied to the over consolidated clayey foundation soils for the starter embankment only. Conservatively, a B-Bar of 1.0 was applied to clayey construction fill materials and residue mud to account for the excess pore pressure generated from the weight of residue mud, starter embankment, or upstream raises.
- **Post-seismic** - To assess geotechnical stability for the condition where dynamic ground motion induced by earthquake causes either shear strength loss due to cyclic loading and/or excess pore pressure generation due to contractive loose, saturated soils under static loading conditions. Post-peak undrained shear strengths were adopted for all contractive foundations and residue mud. Reduced effective stress parameters were adopted for dilative or unsaturated materials zones.

A surcharge crest loading of 10 kN/m^3 has been applied to the crest for all cases, to account for traffic live loading during construction and operations. The load is uniformly disturbed over the crest width (10 m) at a height of 1 m, approximately equivalent to the largest vehicle traffic loads from a 740 CAT dump truck.

3.4 Phreatic Surfaces within Foundation and Residue Mud

The phreatic condition within the residue mud and sand deposits will be separated from the foundation groundwater system by the installation of a composite liner system comprising a compacted clay liner and HDPE geomembrane, refer Section 2.2. The underdrainage system will manage any hydrostatic heads directly above the floor of the RSA10 facility, which coupled with the composite liner, disconnect the natural groundwater regime from the impoundment phreatic system. As the foundation units and the starter embankment fill materials are disconnected from the residue mud, two phreatic surfaces have been modelled in the analysis.

1. **Phreatic Surface 1 (Groundwater)** - assumed 10 year seasonal high level within the upper superficial formations (Rockwater, 2023). The surface has been applied to the foundation geometry and subgrade units below the clay liner.
2. **Phreatic Surface 2 (Residue Mud Liquor)** - has been adopted from the seepage analysis and is the phreatic surface within the residue units above the composite liner.

3.4.1 Groundwater (Phreatic Surface 1)

In the area of the Wagerup refinery and proposed RSA10, the groundwater level is typically 1 m to 3 m below the ground level depending on the season. Rockwater Hydrogeological Consultants (Rockwater) have developed groundwater contours for the RSA10 site (Rockwater, 2023). The 10-year winter high level represents the worst-case scenario (based on the available data) and has been adopted in the slope stability analysis.

The 10-year winter maximum groundwater level contours for RSA10 range from RL 14 m to RL 16 m AHD. The 10-year Winter high levels are presented in Figure 3-2.

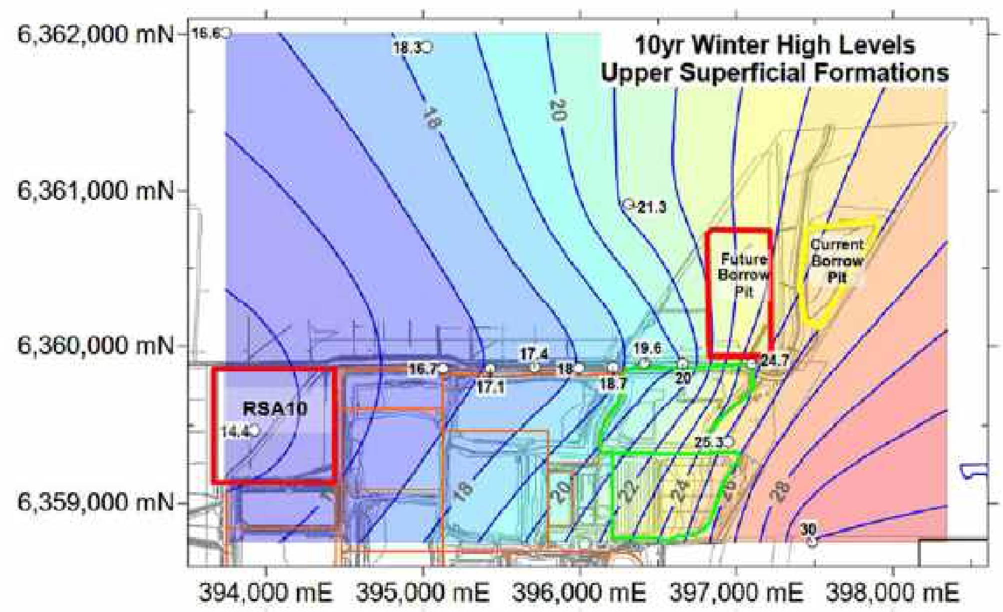


Figure 3-2: 10yr Winter High Groundwater Levels (Rockwater, 2023)

3.4.2 Residue Mud Liquor (Phreatic Surface 2)

A steady state seepage analysis has been performed to assess the phreatic levels within the residue mud as presented in Technical Memorandum - RSA10 Seepage Assessment (Hatch Doc. No. H374430-0000-2A0-249-0003, Rev 2).

The seepage analysis was run under two operating design conditions:

- **Normal Operating Pond:** The residue mud deposition strategy has been designed to push the ultimate decant pond against the southern eastern perimeter of RSA10. During normal operations of RSA10, the pond is expected to be located against the opposite interior embankments to those defined as the ultimate closure slopes for RSA10 (i.e. southeastern corner of the facility with a pond elevation of approximately RL 76.1 m).
- **Maximum Pond Level (1:1,000 - 72 hr Storm):** This is the short-term storm pond level calculated following an extreme storm surge (ESS) corresponding with a 1 in 1,000 (1%) AEP, 72-hour event. Following the peak design flood event the excess water is expected to be transferred from the facility via a gravity decant into the future run off collection pond (ROCP4). The period of clearance of stormwater from the RSA post storm is estimated to take a maximum of 30 days. The decant pond level after the peak design storm is expected to be at RL 77.6 m. Although the short-term nature of the peak design pond is anticipated to be a transient condition, the analysis has assumed a worst design case whereby the ESS pond remains for an extended period, sufficient to result in steady state conditions which reflects a pessimistic operating condition or complete blockage of the decant system.

The stability analysis has been performed adopting the Maximum Decant Pond phreatic surface for Section B and Section D ultimate embankment case. The seepage analysis results for this case are presented in Figure 3-3 for Section B.

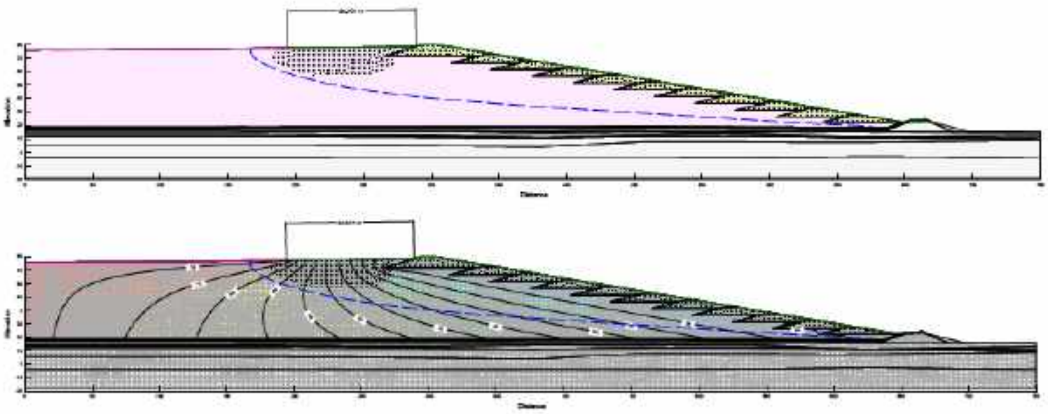


Figure 3-3: Steady State Seepage Analysis Results – Section B – Maximum Pond Level (1:1000 72hr ESS)

A summary of the phreatic surface levels adopted for each loading condition are presented in Table 3-3.

Table 3-3: Phreatic Surface 1 (Groundwater) and Phreatic Surface 2 (Residue Mud) Summary

Loading Condition	Phreatic Surface 1 (Groundwater)	Phreatic Surface 2 (Residue Mud)
Starter Construction Complete	Seasonal 10-year high	N/A
Starter Embankment Filling Complete	Seasonal 10-year high	Top of Residue
Ultimate Upstream Embankment	Seasonal 10-year high	Maximum Decant Pond (1:1,000 ESS)

4. Analysis Results

The stability models for Sections A, B, C and D were evaluated at three construction/ operational stages described below with the results presented in the following tables:

1. Starter embankment end of construction prior to residue filling (upstream and downstream slope failure with no potential loss of containment), refer Table 4-1 with figures in Appendix A.
2. Starter embankment with residue filling to minimum freeboard level (downstream slope failure and potential for loss of containment), refer Table 4-2 with figures in Appendix B.
3. Ultimate height facility without filling behind the final raise (upstream slope failure with no loss of containment) and with residue filling to ultimate height (downstream slope failure with potential for loss of containment), refer to Table 4-3 with figures in Appendix C.

Table 4-1: Summary of End of Construction Starter (Upstream and Downstream Slope Failures) for Slope Stability Analysis Results

Analysis	Target FoS	Calculated FoS							
		Section A		Section B		Section C		Section D	
		U/S Slope	D/S Slope	U/S Slope	D/S Slope	U/S Slope	D/S Slope	U/S Slope	D/S Slope
a. Peak Drained	1.5	2.84	2.23	2.69	2.15	2.86	2.26	2.87	2.37
b. Peak Undrained	1.3[1]	2.10	1.71	2.34	1.88	2.09	1.71	2.23	1.82
c. Post-seismic	1.1	2.16	1.74	2.02	1.69	2.15	1.76	2.20	1.83

Notes:
1. Short-term loading conditions, no potential loss of containment.
N/A - Not Applicable

Table 4-2: Summary of Starter (Downstream Slope Failures) Slope Stability Analysis Results

Analysis	Target FoS	Calculated FoS							
		Section A		Section B		Section C		Section D	
		U/S Slope	D/S Slope	U/S Slope	D/S Slope	U/S Slope	D/S Slope	U/S Slope	D/S Slope
a. Peak Drained	1.5	N/A	2.23	N/A	2.16	N/A	2.26	N/A	2.38
b. Peak Undrained	1.5 [1]	N/A	2.19	N/A	2.13	N/A	2.22	N/A	2.32
c. Post-seismic	1.1	N/A	1.74	N/A	1.69	N/A	1.76	N/A	1.83

Notes:
1. Short-term undrained conditions, potential for loss of containment
N/A – Not Applicable

Table 4-3: Summary of Ultimate Facility (Upstream and Downstream Slope Failures) Slope Stability Analysis Results

Analysis	Target FoS	Calculated FoS							
		Section A		Section B		Section C		Section D	
		U/S Slope [1]	D/S Slope [2]	U/S Slope [1]	D/S Slope [2]	U/S Slope [1]	D/S Slope [2]	U/S Slope [1]	D/S Slope [2]
a. Peak Drained	1.5	3.54	2.62	2.61	2.47	3.57	2.65	3.23	2.68
b. Peak Undrained	1.3 [1] 1.5 [2]	1.82	1.79	1.58	1.66	1.87	1.80	1.83	1.71
c. Post-seismic	1.1	1.50	1.71	1.29	1.15	1.55	1.22	1.50	1.30

Notes:
1. Short-term loading conditions, no potential loss of containment for upstream slope failure.
2. Short-term undrained conditions, potential loss of containment for downstream slope failure.
N/A - Not Applicable

4.1 Impact of Reduced Strength of Residue Mud (Seismic)

Due to the current limited post-peak (large strain) undrained shear strength (S_r/σ'_v) data for the residue mud, a conservative value of 0.15 was adopted for the thickened residue mud. To assess the geotechnical stability of the embankment due to a range of undrained shear strength ratios for future residue mud, sensitivity analysis under post-seismic conditions was undertaken. Only the critical downstream cases were assessed for the ultimate facility.

The post-peak undrained shear strength ratio was reduced until a FoS < 1.0 (i.e. Yield FoS). For each case an evaluation was undertaken to determine what modifications would be required to achieve a satisfactory FoS > 1.1. Two options were assessed to determine their efficacy.

1. **Buttress Construction -** A buttress was proposed using compacted Residue Sand material with a typical crest width of 54 m and downstream batter slope of 1V:5H. An example of the buttress geometry is shown in Figure 4-1.

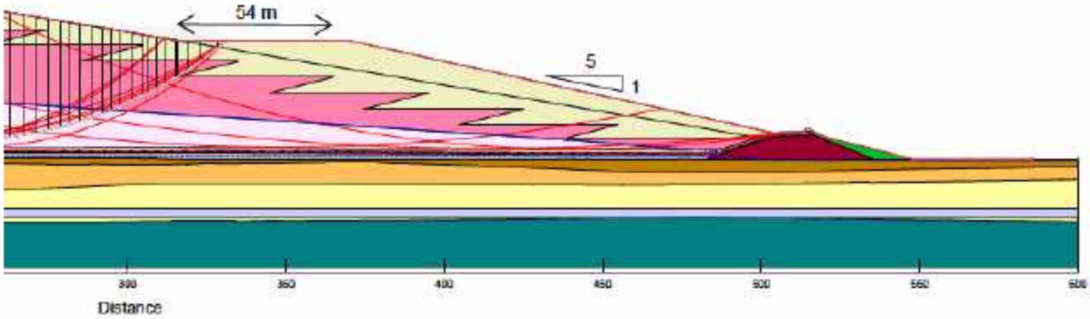


Figure 4-1: Buttress Geometry for Sections B and Section D

2. **Phreatic Surface Reduction** - The phreatic surface within the residue mud was reduced due to effective underdrain dewatering. As the phreatic surface is modelled using a sloping gradient the reduction was measured from the design phreatic surface, as shown in Figure 4-2.

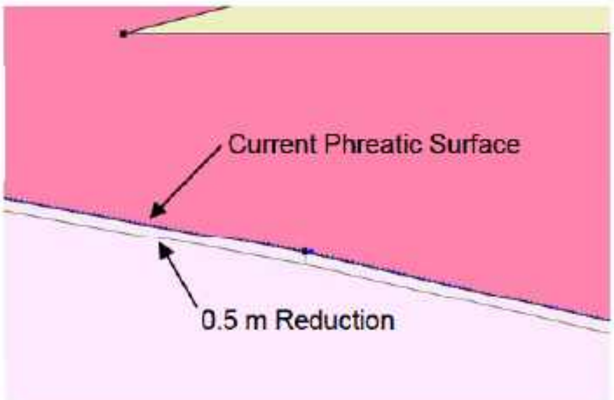


Figure 4-2: Example of 0.5 m Phreatic Surface Reduction

The sensitivity analysis for Sections B and D are presented in Table 4-4 and Table 4-5, respectively.

Table 4-4: Section B Ultimate Facility - Residue Mud Strength Sensitivity Analysis

Thickened Residue Mud Undrained Strength (S_r/σ'_v)	Post-Seismic Case FoS	Buttress Height Required (FoS = 1.1)	Reduction in Phreatic Surface Required (FoS = 1.1)
0.15 [1]	1.15	Not Required	Not Required
0.10	0.98	RL 48.5 m	4.0 m
0.08	0.88	RL 53.0 m	5.0 m
0.05 [2]	0.74	Buttress to RL 50 m and 5.0 m Reduction	

Notes:
1. Design case
2. A combination of buttress and phreatic reduction is required to achieve satisfactory FoS of 1.1

Table 4-5: Section D Ultimate Facility - Residue Mud Strength Sensitivity Analysis

Thickened Reside Mud Undrained Strength (S_r/σ'_v)	Post-Seismic Case FoS	Buttress Height Required (FoS = 1.1)	Reduction in Phreatic Surface Required (FoS = 1.1)
0.15 [1]	1.30	Not Required	Not Required
0.10	1.11	Not Required	Not Required
0.08	1.04	RL 45.0 m	1.0 m
0.05	0.88	RL 55.0 m	3.5 m

Notes:
1. Design case

The results are presented for either a buttress improvement or phreatic reduction. A combination of both solutions could be used to achieve the minimum recommended FoS, requiring a smaller buttress and lesser reduction in the phreatic conditions than presented above.

The results of the sensitivity analysis for Section B and Section D are presented in Appendix D, D.1 and D.2 respectively.

4.2 Impact of Reduced Strength of Foundation Clay (Unit 3)

A shear normal function has been adopted for the critical Unit 3 Foundation Clay layer given this represents the governing foundation unit based on the estimated undrained strengths at high confining stress (refer Figure 2-4). A sensitivity analysis was performed on Section B and D Ultimate Peak Undrained Downstream case to evaluate the impact changes to the strength in this foundation unit have on the overall slope stability. The undrained strength ratio was assessed over a range of values from 0.10 to 0.22 (design case). The design versus sensitivity shear-normal functions adopted are presented in Figure 4-3.

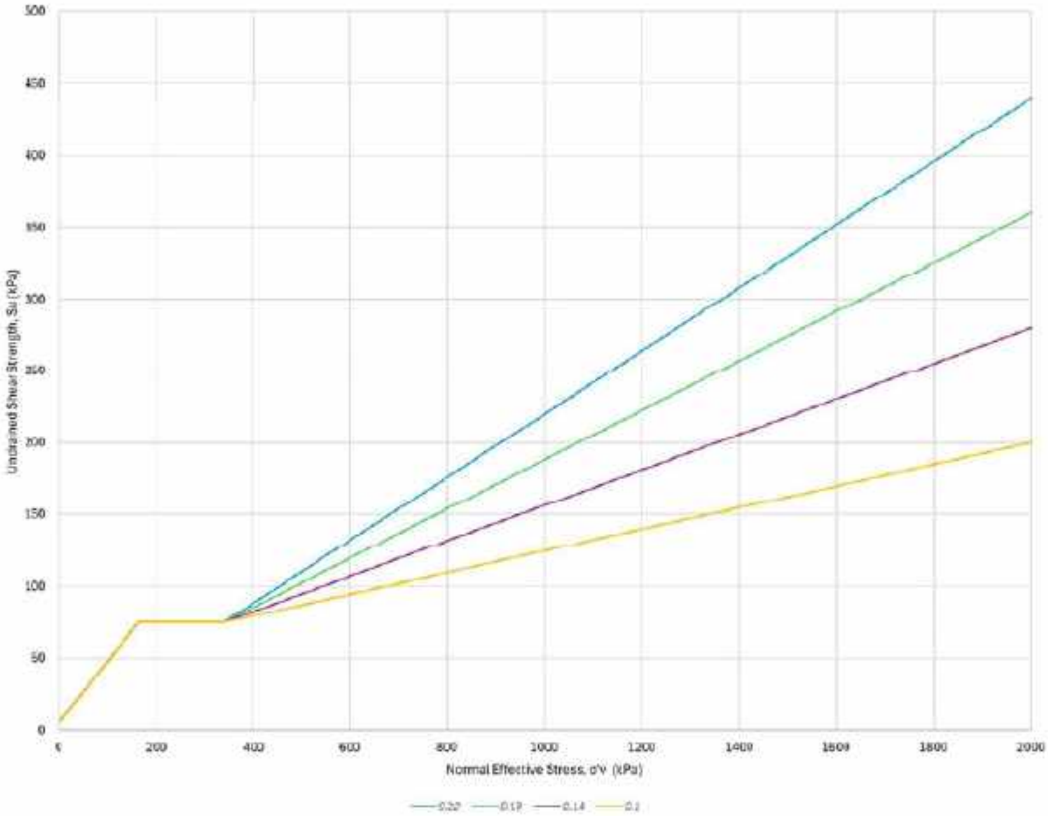


Figure 4-3: Shear Normal Function for Unit 3 - Sensitivity Analysis

To force failure through the foundation, rather than through the overlying residue, a continuous weak surface was defined along the base of Unit 3. Both factors of safety for failure through the residue mud and foundation Unit 3 for Section B and Section D are presented in Table 4-6 and Table 4-7, respectively.

Table 4-6: Section B Ultimate Embankment - Unit 3 Foundation Clay Sensitivity Analysis

Unit 3 Undrained Shear Strength Ratio (S_u/σ'_v)	Failure Surface Slip Plane	
	Foundation Failure [2]	Residue Mud [3]
Shear Normal Function[1] - 0.22	1.65	1.58
Shear Normal Function - 0.18	1.43	
Shear Normal Function - 0.14	1.37	
Shear Normal Function - 0.10	1.29	

Notes:

1. Design case
2. Weak surface defined at the base of Unit 3
3. Weak surface defined at the base of the Residue Mud, above the underdrainage layer

Table 4-7: Section D Ultimate Embankment - Unit 3 Foundation Clay Sensitivity Analysis

Unit 3 Undrained Shear Strength Ratio (S_u/σ'_v)	Failure Surface Slip Plane	
	Foundation Failure	Residue Mud
Shear Normal Function[1] - 0.22	1.69	1.71
Shear Normal Function[1] - 0.18	1.52	
Shear Normal Function[1] - 0.14	1.46	
Shear Normal Function[1] - 0.10	1.38	

Notes:
1. Design case
2. Weak surface defined at the base of Unit 3 to force failure along this unit
3. Weak surface defined at the base of the Residue Mud, above the underdrainage layer

The results show that the Unit 3 clay need to have a S_u/σ'_v ratio of less than approximately 0.2 for section B and 0.22 for section D. The results of the sensitivity analysis for Section B and Section D are presented in Appendix D, D.3 and D.4 respectively.

4.3 Impact of Increased Pore Pressure in Residue Mud

Phreatic Surface 2 (the phreatic level within the residue mud) has been modified to assess the sensitivity on the stability of the Ultimate Embankment. Two 'worst case' scenarios have been modelled based on the seepage analysis and site based observations as outlined below. 2

4.3.1 Case 1 – Saturated/Unsaturated Model Phreatic Surface

During the seepage analysis, Saturated/Unsaturated model parameters were applied to the Residue Mud and Residue Sand layers. The phreatic surface within the Saturated/ Unsaturated material model shows higher pore pressures within the thickened residue mud when compared to the saturated only model. The model is assumed to be conservative due to the simplified model geometry, assumed SWCC material parameters, and simplified boundary conditions.

Nevertheless, this surface has been assessed for Section B and Section D - Ultimate Embankment Height. The results of the analysis are presented below in Table 4-8.

Table 4-8: Summary of Ultimate Facility (Upstream and Downstream Slope Failures) – Case 1 - Saturated/Unsaturated Phreatic Surface

Analysis	Target FoS	Calculated FoS			
		Section B		Section D	
		U/S Slope [1]	D/S Slope [2]	U/S Slope [1]	D/S Slope [2]
a. Peak Drained	1.5	2.61	2.22	3.23	2.32
b. Peak Undrained	1.3 [1.] 1.5 [2.]	1.58	1.51	1.83	1.59
c. Post-seismic	1.1	1.29	***0.99***	1.50	***1.05***

Notes:
1. Short-term loading conditions, no potential loss of containment for upstream slope failure.
2. Short-term undrained conditions, potential loss of containment for downstream slope failure.

N/A - Not Applicable

The analysis shows the post-seismic case governs the stability for the ultimate facility. The risk of a high phreatic coupled with a seismic event is deemed to be a low probability event but nevertheless shows how sensitive the analysis is to the phreatic conditions and effective stresses within the residue mud unit.

4.3.2 Case 2 - Elevated Phreatic Surface 3

During review of the seepage analysis technical memorandum (Hatch, 2025d), Alcoa in agreement with the third-party technical reviewer, KCB (Engineer of Record) requested Hatch carry out a Reasonable Worst-case Scenario (RWCS) analysis to understand the impacts to the stability under a set of plausible but unlikely simultaneous events. Under these conditions the analysis was used to assess how robust the proposed RSA10 facility is to accommodate sudden adverse or operational changes.

The assumed RWCS phreatic surface has been modelled for both the Section B and Section D Ultimate Embankment Cases. The results of the analysis are presented below in Table 4-9.

Table 4-9: Summary of Ultimate Facility (Upstream and Downstream Slope Failures) - Observed Elevated Phreatic Surface - Case 2

Analysis	Target FoS	Calculated FoS			
		Section B		Section D	
		U/S Slope [1]	D/S Slope [2]	U/S Slope [1]	D/S Slope [2]
a. Peak Drained	1.5	2.61	1.99	3.23	2.02
b. Peak Undrained	1.3 [1.] 1.5 [2.]	***0.85***	***1.29***	***1.03***	***1.30***
c. Post-seismic	1.1	***0.96***	***0.83***	***1.06***	***0.84***

Notes:

1. Short-term loading conditions, no potential loss of containment for upstream slope failure.
2. Short-term undrained conditions, potential loss of containment for downstream slope failure.

N/A - Not Applicable

The analysis shows that under extreme adverse conditions, neither peak undrained or post seismic loading cases would meet the recommended minimum factors of safety. The ultimate raise peak undrained downstream case exhibits a FoS less than required (<1.5) for Sections B and D. To meet recommended ANCOLD (2019) FoS requirements, an approximately 43 m wide buttress would be required to a height of RL 53.5 m.

An example of the buttressed case is presented for Section B in Figure 4-4 and in Appendix D.

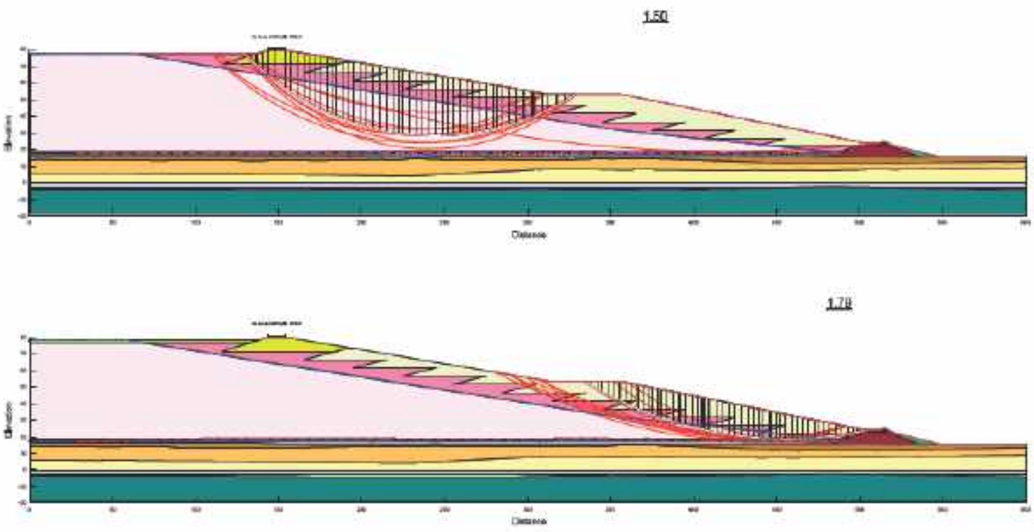


Figure 4-4: Buttress Required for Section B Ultimate Embankment Height - Peak Undrained

Below target FoS (<1.5) were also calculated for the Section B upstream undrained case at the ultimate embankment height. It is recommended that a staged construction approach would be sufficient to achieve the minimum FoS of 1.5. The first stage consists of construction of a 1 m high foundation lift, while the second stage is the construction of the embankment to final height (Figure 4-5). This method demonstrates that a phased construction approach will reduce the effects of pore pressure increase in the case of loading. It should be noted that the two-staged plan is based on an undrained shear strength ratio ($S_u/p' = 0.30$) for the foundation residue mud. However, in practice residue which have been solar dried and amphirol treated typically achieves a higher S_u/p' ratio (greater than 0.3).

It is also good practice to complete a geotechnical inspection or investigation prior to each lift to assess pore pressures and underlying strength of the residue mud via cone penetration testing, installation of vibrating wire piezometers, dynamic cone penetration testing, or shear vanes.

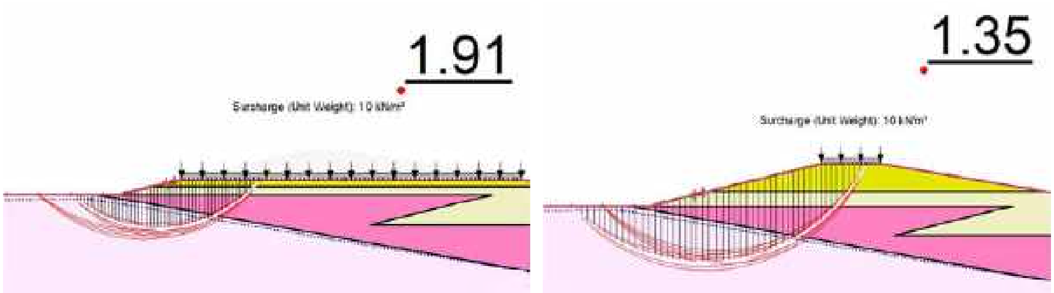


Figure 4-5: Example of Staged Construction Approach

The upstream post-seismic case will be satisfied once residue mud is deposited and buttresses the inside of the upstream lift, as shown in Figure 4-6.

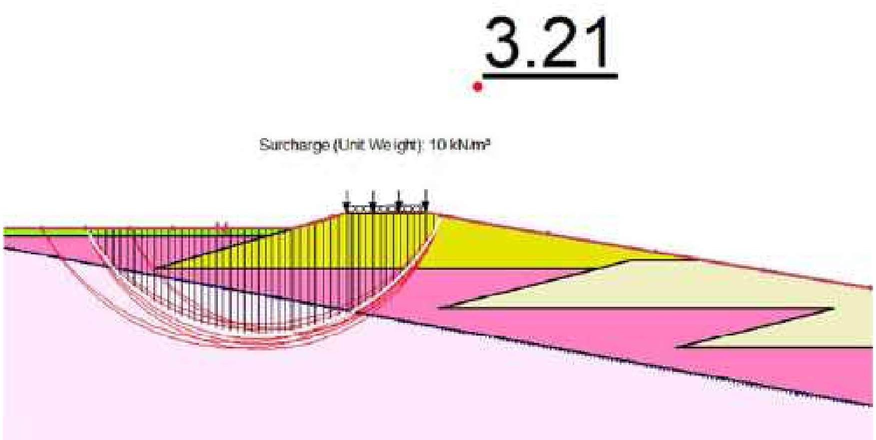


Figure 4-6: Example of Upstream Stability Post Seismic case, Post Filling

The results of the sensitivity analysis for Section B and Section D are presented in Appendix D, D5 and D6 respectively.

4.4 Impact of Potentially Contractive Zone (Unit 4B)

Analysis of CPT data collected during the FEL2.2 geotechnical investigation identified a lens of shallow contractive material within south-western corner of the RSA10 footprint at CPTu24, 25, 26B. Samples collected and tested from adjacent BH06 at this depth have been used to develop the material parameters for Unit 4. To assess the potential that this material undergoes significant strength loss, a further 20% strength reduction has been applied to Unit 4 to develop material parameters for the contractive lens. The shear normal function has been presented in Figure 2-4.

The discontinuous horizon is only present within Section B, as such only Section B Ultimate Embankment Height case has been assessed. The phreatic surface adopted in the model is deemed to be the 'worst case' Case 1 Saturated/Unsaturated surface described in Section 4.3.1.

Table 4-10: Section B Ultimate Embankment - Unit 4B Foundation Clay Sensitivity Analysis

Unit 4B Undrained Shear Strength Ratio (S_u/σ'_v)	Continuous Weak Surface	
	Foundation Failure [1]	Not Applied
Shear Normal Function - 20% Reduction	1.72	1.51
S_u/σ'_v - 0.10	1.47	1.50

Notes:

1. Weak surface defined at the base of Unit 4B, failure surface has been forced along the base using a grid and radius block search method

The results of the analysis indicate that an undrained shear strength ratio (S_u/σ'_v) of 0.1 is required to force the critical failure plane through the contractive lens (Unit 4B) with the governing failure mechanism through the Residue Mud.

An analysis of a slice through the slip surface indicates that the base normal stress along the base of the slices through Unit 4B exhibit confining stresses ranging from 550 kPa to 700 kPa with approximately 80 kPa to 90kPa pore pressure. This is in line with the geotechnical laboratory confining stress range from the testing of Unit 4, which ranged between 200 kPa to 800 kPa with peak undrained shear strengths measured at approximately 200 kPa.

The sensitivity of the undrained strength of the foundation Unit 3 clay is deemed to be a greater risk than failure through the localised horizon of contractive material within Unit 4. The results of the sensitivity analysis for Section B are presented in Appendix D, D.7 respectively.

5. Seismic Deformation Analysis

5.1 General

A simplified seismic deformation analysis has been completed for the RSA10 northern and western embankment at its ultimate height using empirical methods. The analysis provides a possible range of seismic induced deformation of the embankments under the load from the design earthquake. It is suggested that a full dynamic time history-based numerical analysis be carried out in the next phase of the project (FEL4) to better predict the seismic deformation of the RSA10 embankment and potential for lateral spreading along the facility toe.

5.2 Site Seismicity

The Peak Ground Acceleration (PGA) for earthquakes with different return periods have been estimated based on a Probabilistic Seismic Hazard Assessment (PSHA) study performed by AECOM (AECOM, 2021). The PGA values have been summarised in Table 5-1 which were used in the subsequent geotechnical assessment.

Table 5-1: Summary of Site Seismicity

AEP	Mean Magnitude	PGA (g)
1 in 475 (OBE)	5.97	0.034
1 in 5,000 (SEE)	6.14	0.170

5.3 Simplified Deformation Analysis

Simplified seismic deformation analysis methods were adopted for two type sections through the proposed western and northern embankments of RSA10. A minimum of two simplified deformation methodologies (purely empirical database method and Newmark analysis-based empirical methods) were used due to the inherent scatter in results between the methods. For this assessment a total of four different methods were adopted to calculate the seismic deformations at the crest of the RSA10 embankment after construction to the ultimate height. Two geotechnical sections (Section B and Section D) were selected for the seismic deformation analysis (refer to Figure 3-1) by considering the dam geometry and site foundation geotechnical conditions.

Time histories have been adopted from the Pinjarra Ground Motion Report (AECOM, 2021b). The analysis developed time histories for the OBE (1 in 475) and an SEE (1 in 5,000) for the Pinjarra site were applied in lieu of Wagerup specific data. Due to the proximity of the sites (less than 35 km apart and located on the same geological unit), the Pinjarra data is deemed to be representative for this screening level assessment at a FEL3 design definition.

5.3.1 *Swaisgood Method*

Swaisgood examined the embankment behaviour during various seismic events (approximately 70 case histories) and formulated a deformation trend for various embankment types (Swaisgood, 2003). The method is based solely on an empirical database, with the empirical equation formulated to estimate the crest settlement with the input parameters including dam height, dam type, depth of alluvium (or soil horizon) in the foundation, earthquake magnitude, PGA, and the focal distance of the dam to the earthquake. The regression models based on seismic performance data are established and the dam crest settlement can be estimated as:

$$CS = SEF \times RF$$

Where CS is the vertical crest settlement expressed as a percentage of the total dam height plus the alluvium thickness. SEF is the seismic energy factor and RF is the resonance factor. An RF for earthfill dams was considered in this assessment.

These factors are calculated from:

$$SEF = e^{(0.72M+6.28PGA-9.1)}$$

$$RF = 2.0 \times D^{-0.35}$$ for earthfill dams

in which M is the magnitude of the earthquake, PGA is the peak horizontal ground acceleration at the dam site as a fraction of the acceleration due to gravity, and D is the distance between the seismic energy source and dam in kilometres.

For Section B, the seismic induced vertical crest deformation (expressed as settlement) is estimated to be 260 mm (OBE) and 810 mm (SEE).

For Section D, the seismic induced vertical crest deformation (expressed as settlement) is estimated to be 260 mm (OBE) and 810 mm (SEE).

5.3.2 Newmark Method

Newmark introduced a method to estimate earthquake-induced displacements in embankment dams based on the concept that slope movements are initiated when inertia forces on a potentially sliding mass exceed the available yield resistance along the bounding surface of failure (Newmark, 1965). Newmark treated the sliding mass as a rigid body.

While Newmark's method was the first simplified method used in estimating the deformation considering the earthquake motion, several assumptions were made to simplify the computation. Some of these limitations are summarised below:

- Cyclic behaviour of earthquake motion is not considered; method assumes that movement occurs when yield resistance of the block is exceeded by sufficient driving forces due to acceleration applied at the base. In other words, movement is a cumulative for acceleration exceeding the yield acceleration (where the pseudo-static FoS is unity).
- This is a two-step process as yield acceleration needs to be estimated by carrying out a pseudo-static analysis based on Limit Equilibrium (LE) analysis.
- This method assumes that the deformation takes place on a well-defined failure surface; with acceleration along the sliding block remaining constant during shaking.
- The method does not consider the geometrical aspects of earth structures. Shear strength of saturated soils varies (contractive or dilative) during cyclic loading as pore pressure varies during shaking.

- This method does not account for strength loss due to liquefaction and lateral spreading of soils due to deformation exceeding yield strains.

The yield acceleration (K_y) is a term to describe the acceleration of a sliding mass of height, y. It is estimated by finding the average horizontal acceleration coefficient (K_h) using the pseudo-static approach of limit states slope stability analysis software, such as SLOPE/W. The coefficient of horizontal earthquake coefficient (K_h) was iteratively inputted in the SLOPE/W model until a K_h corresponding to a factor of safety of 1.0 was determined, which was then defined as the yield acceleration (K_y). An example of estimating the Newmark-based seismic deformation for Section B is indicated in Figure 5-1. The estimated yield acceleration coefficient (K_y) for Section B is 0.21 g.

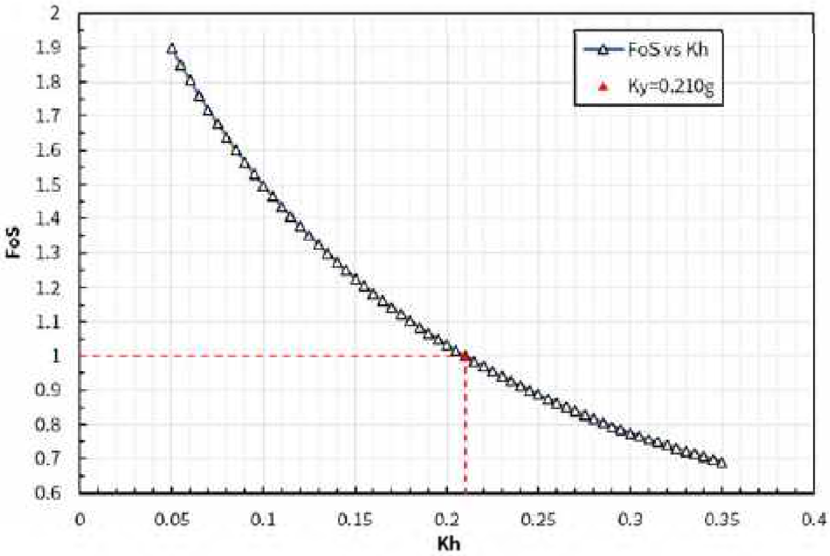


Figure 5-1: Sensitivity Analysis on Horizontal Acceleration Coefficient for Section B

The CC-CHY SEE (CMS#1) time history is shown in Figure 5-2. The time history has been multiplied by a factor of 1.5 from its bedrock-based time history. The site amplification factor is roughly estimated based on the recommendations in relevant standards (refer to AS 1170.4 and ASCE/SEI 7-6). The site-specific amplification factor will be validated using a full time-history-based numerical analysis such as FLAC or Deepsoil in the next phase of the study (FEL4).

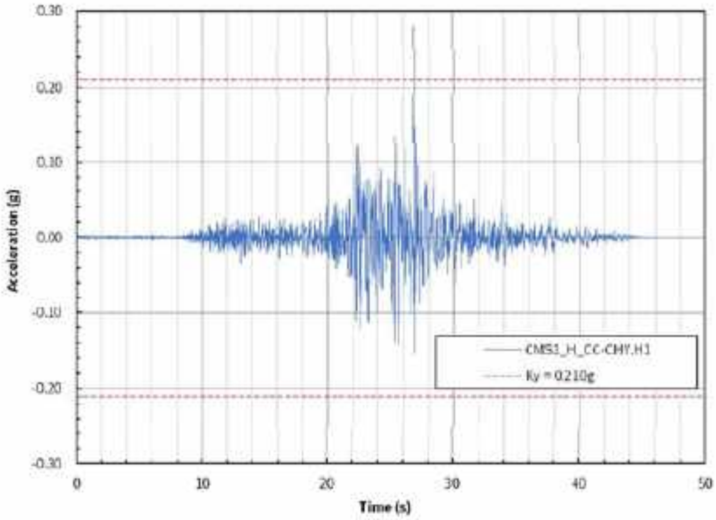
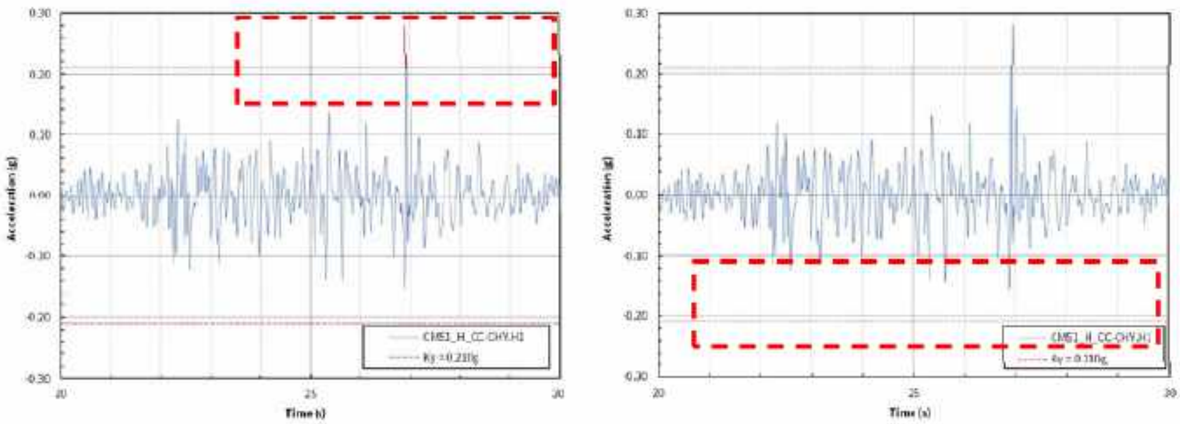


Figure 5-2: CMS1 CC-CHY Time History and K_y for Section B

As presented in Figure 5-3, if the acceleration exceeds the yield acceleration, the dam structure is expected to move, and seismic induced deformation is generated. The deformation can occur in two dimensions corresponding to the direction of the time-history curves. Therefore, the calculation is performed in two directions (0.04 mm or 0 mm, as indicated in Figure 5-3).



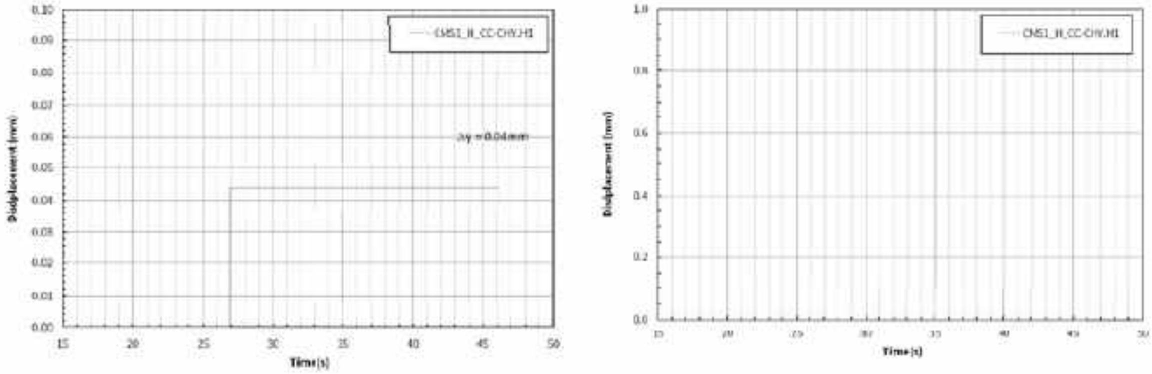


Figure 5-3: Seismic Deformation for CMS1 CC-Chy time History of Section B (Newmark Method)

The K_y value for Section B and D is significantly greater than the PGA from the OBE time histories, therefore no seismic deformation is expected to occur under the OBE seismic events.

A total of three (3) time histories were used to calculate the seismic deformation under the design earthquake load cases. A summary is provided in Table 5-2.

Table 5-2: Summary of Seismic Deformation for RSA10 (Nemark Method)

Case	Section	Newmark Method-based Seismic Deformation (mm)		
		CC_CHY Time History	SPA_JON Time History	WN-VAS.H1 Time History
OBE	Section B	-	-	-
	Section D	-	-	-
SEE	Section B	0.04	0.00	0.02 - 0.04
	Section D	0.04	0.00	0.01 - 0.03

5.3.3 *Makdisi and Seed Method*

Makdisi and Seed modified Newmark's approach by recognising that an embankment dam responds as a flexible structure and introduced a technique to estimate the amplification of the ground motions through the structure propagating upwards through the dam fill to the crest of the dam structure (Seed, 1978). Makdisi and Seed addressed the variability of acceleration along the sliding block, which was considered to be uniform in Newmark's method. Furthermore, this method computes displacements considering dynamic response of the embankment.

Makdisi and Seed computes the variation of permanent displacement with ratios of yield acceleration, peak ground acceleration and earthquake magnitude by subjecting several real and hypothetical dams to several recorded and synthetic earthquake ground motions for the design magnitudes. This procedure requires a good understanding of the natural period of the embankment. While this method is considered a rational approach to estimate the earthquake induced deformations, certain limitations from Newmark's methods remain.

The input parameters and the deformation estimates based on Makdisi and Seed for both the OBE and SEE events are summarised in Table 5-3.

Table 5-3: Summary of Seismic Deformation for RSA10 Embankment (Makdisi and Seed Method)

Case	Section	PGA at Crest (g)	Magnitude	y/h Ratio	K_y (g)	Estimated Displacement (mm)
OBE	Section B	0.05	5.97	1.0	0.210	N/A
	Section D				0.215	N/A
SEE	Section B	0.25	6.14	1.0	0.210	13.0
	Section D				0.215	3.0

5.3.4 *Bray and Macedo Method*

Bray and Macedo proposed a simplified procedure for estimating seismic slope displacements for earth structures or natural slopes subject to earthquakes (Bray & Macedo, 2019). The method is based on a Newmark-type sliding block model that captures the nonlinear dynamic response of the potential sliding mass and the effects of periodic sliding. The method uses the yield coefficient (K_y), the initial fundamental period, and the ground motion's spectral acceleration at a degraded period of the slope as the primary input parameters.

The initial fundamental period (T_s) of the trapezoidal-shaped potential sliding mass is calculated by the formula below:

$$T_s = \frac{4.H}{V_s}$$

Where: H is the average height of the potential sliding mass and V_s is the average shear wave velocity of the sliding mass. An average shear wave velocity of 160 m/s was used in the estimation of the fundamental period. An average sliding height of 27 m was used for the Section B and 32 m for Section D, based on the limit equilibrium failure planes. Based on these inputs, a T_s of 0.57 s and 0.68 s was calculated for Section B and Section D, respectively.

$S_a(1.3T_s)$ represents the ground motion's spectral acceleration at a period of $1.3T_s$ for a shallow crustal earthquake, expressed in percentage of gravity (g). The $S_a(1.3T_s)$ for the OBE and SEE events of both sections are presented in the Site Specific Seismic Hazard Assessment (AECOM, 2021a). A peak ground velocity of 2.4 cm/s for the OBE load and 5.0 cm/sec for the SEE load was adopted (AECOM, 2021a).

The estimated deformation and the relevant parameters based on Bray and Macedo methods for both OBE and SEE events are summarised in Table 5-4. The probability factor of 84% is adopted, which provides an 84% confidence level that the actual displacement is less than or equal to this value and 16% probability that it will be greater.

Table 5-4: Summary of Seismic Deformation for RSA10

Case	Section	K_y (g)	T_s (sec)	S_a (1.3T_s) (g)	$D_{1(P=84\%)}$ (mm)
OBE	Section B	0.210	0.57	0.04	< 5
	Section D	0.215	0.68	0.04	< 5
5SEE	Section B	0.210	0.57	0.18	< 5
	Section D	0.215	0.68	0.18	< 5

5.4 Discussion

The seismic deformation analysis results obtained from four different methods are summarised in Table 5-5 (OBE case) and Table 5-6 (SEE case).

Table 5-5: Summary of Simplified Seismic Deformation for RSA10 Embankment (OBE Cases)

Section	Seismic Deformation (mm)			
	Swasigood Method	Newmark Method	Makdisi and Seed Method	Bray and Macedo Method
Section B	257	N/A	N/A	< 5
Section D	259	N/A	N/A	< 5

Table 5-6: Summary of Simplified Seismic Deformation for RSA10 Embankment (SEE Cases)

Section	Seismic Deformation (mm)			
	Swasigood Method	Newmark Method	Makdisi and Seed Method	Bray and Macedo Method
Section B	809	0.02 - 0.04	13.0	< 5
Section D	813	0.01 - 0.03	3.0	< 5

Based on the geotechnical assessment results, the following observations were made:

- The Swaisgood method predicts much greater displacement than the other methods.
- The Newmark-based empirical methods predict negligible deformation (less than 15 mm) for both Section B and Section D, for both OBE and SEE loading cases.

Based on Hatch's experience, seismic deformation analysis of upstream embankments are geometry dependant and influenced by the key residue properties, not commonly included in the above methods. The Swaisgood method is based on empirical traditional downstream raised dam type geometry and tends to overpredicts the seismic deformation for flatter sloping dams, while the Newmark-based empirical methods underpredict the seismic deformation, particularly for the SEE cases.

The Swaisgood method is the most simplistic method without considering many fundamental aspects of the site seismic loading or construction history and complex material zonation within the RSA. The other methods are all based on derivation or modifications from the original Newmark method, in which the yield acceleration K_y is a major input in determination of earthquake induced settlement. Also, many other important seismic load information cannot be accounted for in Newmark-based methods.

Many recorded seismic deformations in the Swaisgood database were measured from downstream constructed water dams instead of upstream raised tailings facilities. Therefore, the reliability of Swaisgood method in predicting the seismic deformation for a tailing's facilities like the proposed RSA10 is deemed to be unreliable.

Hatch carried out several time history-based numerical analyses (FLAC simulations) to estimate the seismic deformation of upstream raised Alumina tailings facilities in Australia. The seismic deformation for upstream tailings dams is generally less than 10 mm (OBE case) and less than 200 mm (SEE case) if foundation soils and residue materials are not prone to cyclic liquefaction.

It is estimated that the crest PGA at the ultimate embankment height is approximate 0.25 g for the SEE load case. Seismic waves with this level of PGA generally result in some deformation at the embankment crest although these deformations are likely to be within the acceptable tolerance for the structure and unlikely to significantly impact the residual freeboard (less than 0.2% of dam height, refer to Robin Fell, et al. 2018). The dam functionality can therefore be maintained without resulting in complete loss of freeboard and catastrophic overtopping failure.

6. Conclusions

6.1 Critical Residue Failure Mechanism

The stability analysis results for the starter embankment satisfy the ANCOLD minimum guidelines for tailing dams (ANCOLD, 2019). Based on reasonable design assumptions, the ultimate facility FoS meets the ANCOLD minimum guidelines.

The stability of the ultimate height embankment is shown to be heavily influenced by the phreatic surface within the residue mud. Maintaining drained residue mud within the zone 50 m to 100 m upstream of the perimeter is critical to the overall integrity of the facility. Failure to effectively manage the phreatic surface will likely require remedial stability solutions (e.g. buttressing) for the facility to achieve ultimate embankment height. Operations should ensure that the pond location is maintained within the south-eastern corner of the facility to limit potential for saturation of the exterior mud and provide appropriate conditions for desiccation and effective mud farming.

VWP’s will be installed in the residue mud directly upstream of the northern and western perimeter embankments along the four geotechnical type sections to monitor changes within the phreatic conditions and compare these to design assumptions. These instruments will also be utilised to provide Trigger Levels as an input to the RSA10 facility Trigger Action Response Plans (TARPs), which will be developed during the operational phases of the facility. 3

6.2 Post Seismic Analysis

A Factor of Safety for the post-seismic case of 1.1 has been assigned based on the level of confidence in the available data (i.e. pre mud placement). However, with further residue testing and analysis after commencement of operations, confidence in the assigned post-peak (large strain strength) of the residue material may increase and hence any potential remediation can be deferred until full residue characterisation is completed and in-situ field testing performed after the initial residue mud is placed prior and to construction of the first upstream raise. The assigned post-peak (large-strain) strength for the residue mud (S_r/σ'_v) is considered to be conservative based on the current historical materials database and recent residue characterisation testing (Hatch, 2025c). A more detailed cyclic assessment will be completed as part of ongoing residue mud testing, which will allow for better estimation of the long-term performance of the facility.

6.3 Foundation Failure Mechanism

The RSA10 FEL3 stability assessment has been performed by modelling the Unit 4B and Unit 6B lenses as continuous layers to conservatively model the foundation stability. Strength parameters have been developed based on the available geotechnical data as presented in the GIR (Hatch, 2025a). Sensitivity cases have been performed on Unit 3 and Unit 4B to assess the influence of reduced strength on the stability of the facility. Additional investigation of foundation soils is proposed for the FEL4 study to further assess the extent and strength properties of the potentially contractive clay units.

During operations, monitoring should be carried out to confirm the effectiveness of the underdrainage systems and to update this analysis based on actual field data. Vibrating Wire Piezometers (VWPs) will be installed beneath the underdrainage system in the subgrade to monitor pore pressures below the liner system and provide a key input to the foundation clay performance. Twin monitoring wells have been constructed around the perimeter of RSA10 to monitor the groundwater levels in the foundation soils which will also be used as a check on the VWP results. Inclinometers will be installed at each geotechnical section to measure potential for horizontal movements in the foundation clay units.

6.4 Sensitivity Analysis

Sensitivity cases were carried out to assess potential impacts to the FoS resulting from uncertainty in the post seismic shear strength ratio of the residue mud, changes to phreatic conditions within the residue mud and reduced strength through continuous clay lenses in the foundations. To ensure satisfactory factors of safety under lower case sensitivity assumptions, particularly for the ultimate embankment post-seismic case, a buttress may be required, or the phreatic level may require active management to maintain levels below the current design case. A combination of a smaller buttress with a smaller reduction to phreatic levels in the zone directly upstream of the future embankment raises may also be implemented as an alternate solution if the most pessimistic sensitivity assumptions occur during operations.

During operations of RSA10, the pore pressures within the upstream residue mud, perimeter residue sand embankment and natural clayey foundations will be monitored to confirm predicted performance. If required, remedial works such as buttress construction would commence to maintain the stability design criteria. 3

6.5 Seismic Deformation

Seismic deformation of the RSA10 ultimate dam configuration has been analysed using four different empirical methods. Due to the complex geometry and material properties of the residue and foundation soils, these simplified methods tend to either over-estimate (Swaisgood method) or under-estimate the probable earthquake induced deformations (Newmark method, Makdisi and Seed method, Bray and Macedo method).

The Swaisgood method predicts orders of magnitude larger seismic deformation than the other three methods for both the OBE and SEE loading cases. The Newmark-based methods predict negligible deformation (less than 15 mm for all load cases) for the RSA10 at the ultimate embankment height.

Based on Hatch's experiences undertaking similar seismic deformation analysis for Alumina tailings facilities in Western Australia, a reasonable estimate of deformation likely falls between these two methods. To better define the final residual freeboard requirements for closure, it is recommended that a full time-history dynamic analysis be carried out in the next phase of the project. At this stage of the design, a minimum 0.5 m dry freeboard limit will be maintained from the maximum mud level to the final embankment crest to accommodate the predicted seismic induced settlements.

This report has been independently reviewed by the Alcoa Engineer of Record for Wagerup. The completed comments register is included in Appendix E.

7. References

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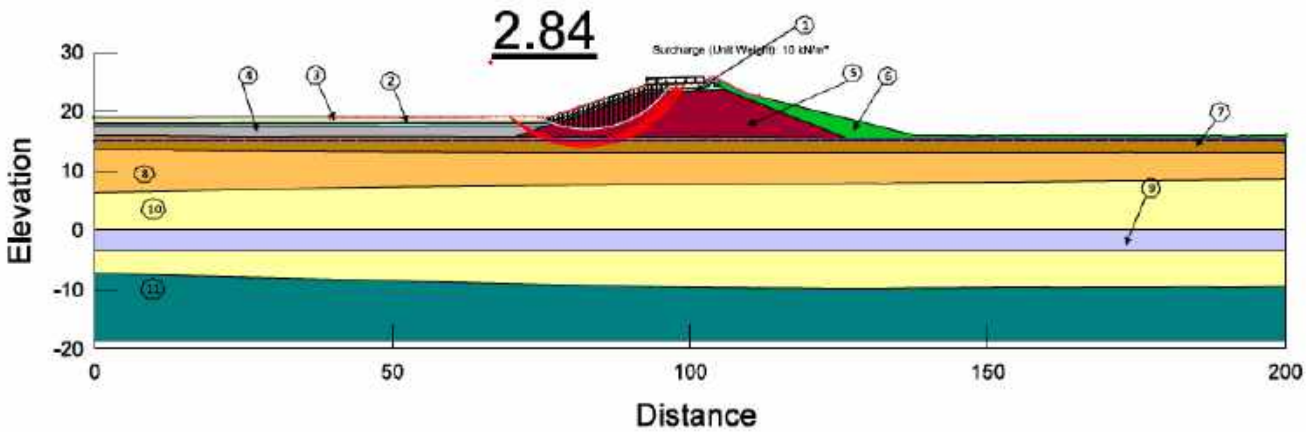
Appendix A
Starter Embankment Stability Analysis - Prior to Residue Filling

A.1 Section A - Starter Embankment - Prior to Residue Filling

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	1	0	No
3	01 - Proposed Residue Sand Raises	Mohr-Columb	16	0	36	1	0	No
4	Unit 1A - Engineered FILL	Mohr-Columb	20	5	23	1	0	No
5	Unit 1B - Embankment	Mohr-Columb	20	5	32	1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
7	Unit 3 - CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
9	Unit 6B - Silty/clayey Layer (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Columb	19	0	35	1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No



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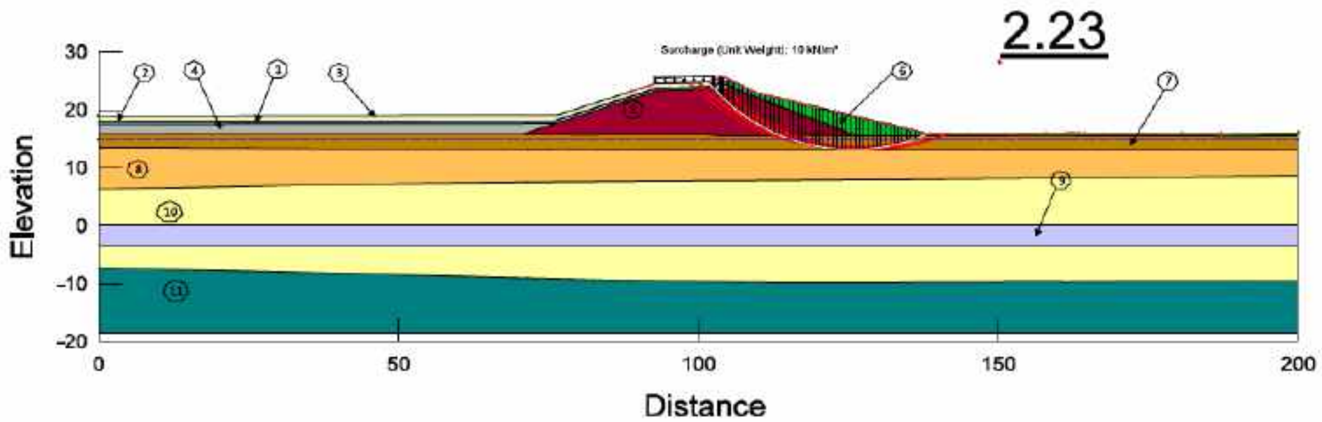
Ref	H374430-0000-2A0-230-0005.xlsx	Stability Analysis Section A - Peak Drained - Upstream		Wagerup RSA10	
By	MN	SC	21-Jul-25	Figure	A1.1
Revision	1	21-Jul-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	1	0	No
3	81 - Proposed Residue Sand Raises	Mohr-Columb	19	0	36	1	0	No
4	Unit 1A - Engineered FILL	Mohr-Columb	20	5	23	1	0	No
5	Unit 1B - Embankment	Mohr-Columb	20	5	32	1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
7	Unit 3 - CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
9	Unit 6B - Silty/Clayey Layer (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Columb	19	0	35	1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No



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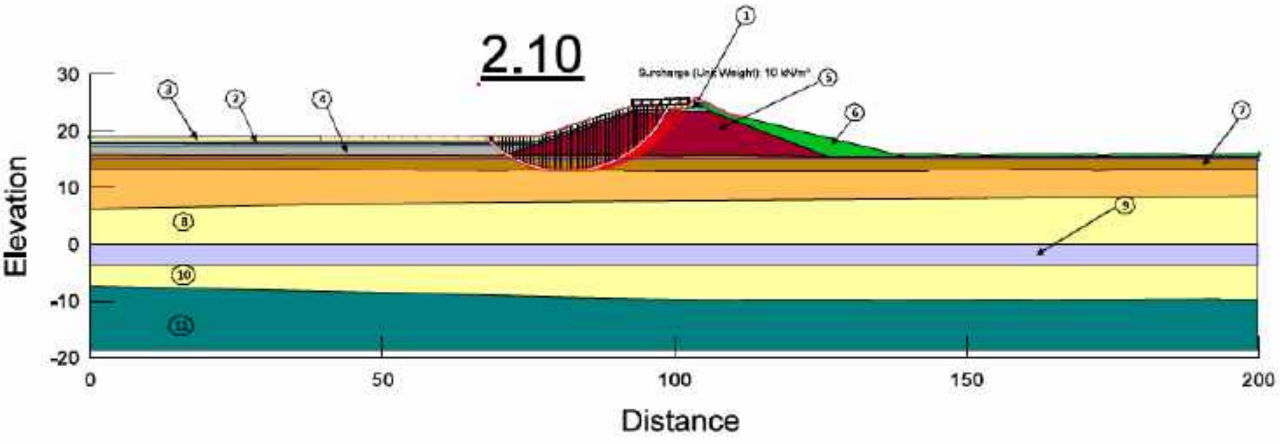
By	MN	SC / 21-Jul-25			Figure A1.2
Revision	1	21-Jul-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	Yes
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				1	0	No
3	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	Yes
4	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	0	Yes
5	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	Yes
6	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	Yes
7	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
8	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 6B - Silty/clayey Layer	Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	19	0	35				1	0	No
11	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



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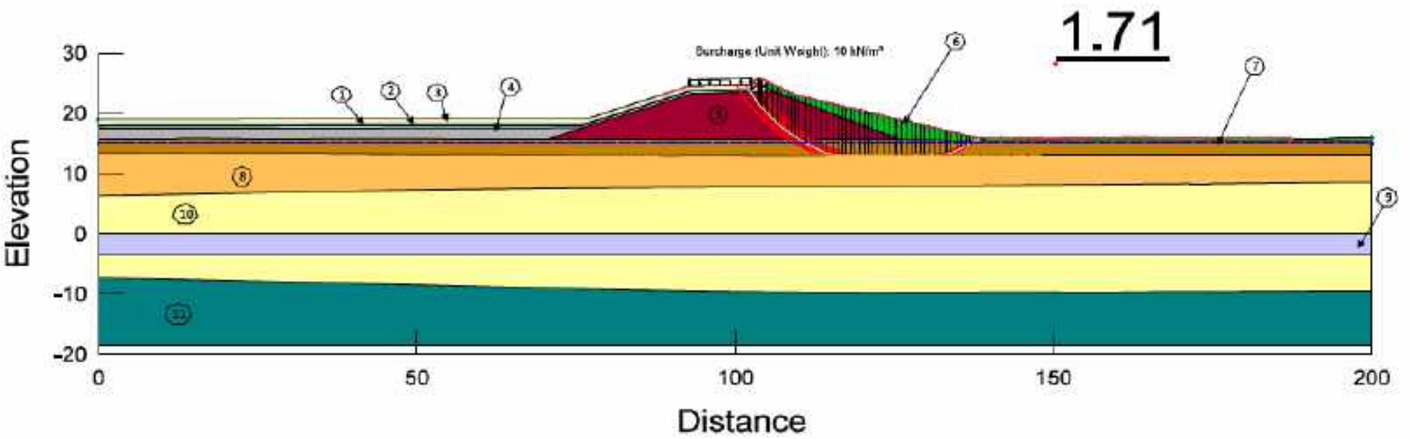
By	MN	SO	21-Jul-25	
Revision	1	21-Jul-25		Figure A1.3

HATCH

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	Yes
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				1	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	Yes
4	Unit 1A - Engineered FILL	SHANSEP	20			0	0.25		1	0	Yes
5	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	Yes
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	Yes
7	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 6B - Silty/clayey Layer (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6A - SAND	Mohr-Columb	19	0	35				1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



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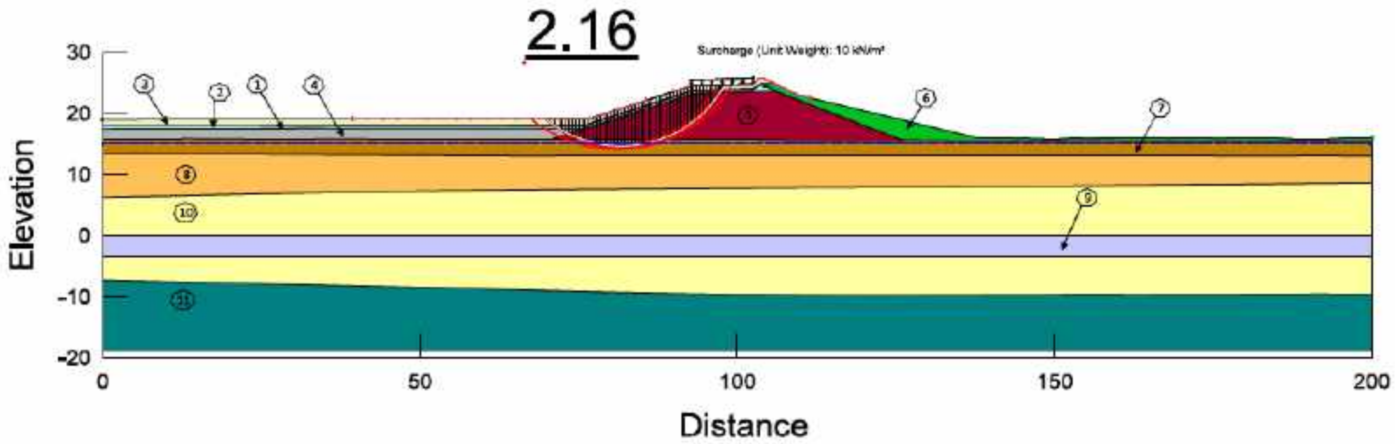
By	MN	SO	21-Jul-25			Figure A1.4
Revision	1	21-Jul-25				

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				1	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	No
4	Unit 1A – Engineered FILL	SHANSEP	20			0	0.2		1	0	No
5	Unit 1B – Embankmnet	Mohr-Coulomb	20	4	28				1	0	No
6	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
7	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0	No
8	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
9	Unit 6B – Silty/clayey Layer (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Columb	19	0	35				1	0	No
11	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



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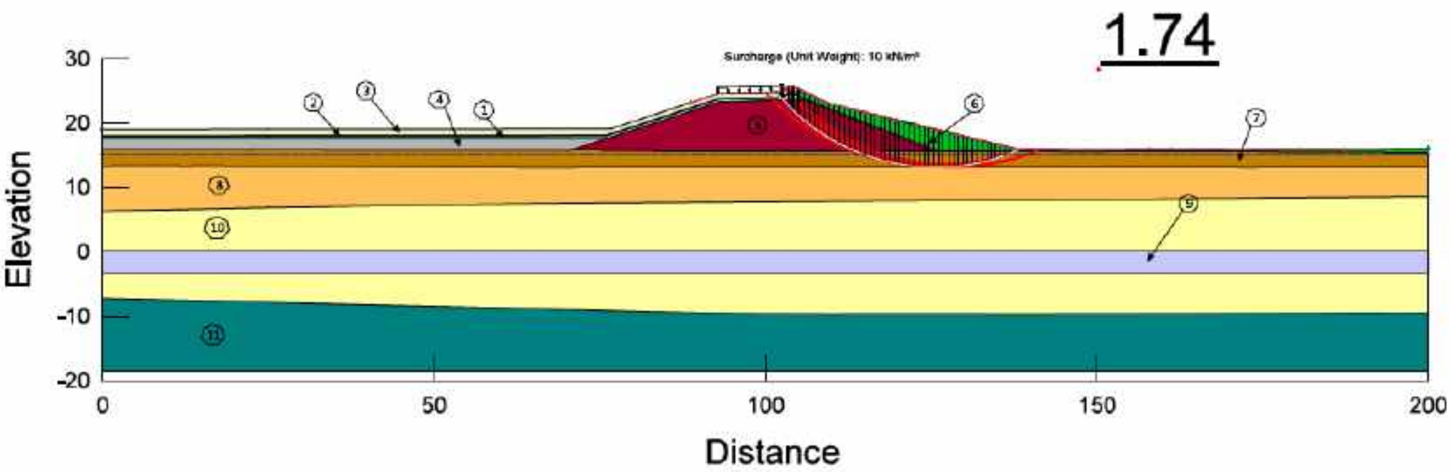
By	MN	SC	21-Jul-25			
Revision	1		21-Jul-25			Figure A1.5

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				1	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	No
4	Unit 1A - Engineered FILL	SHANSEP	20			0	0.2		1	0	No
5	Unit 1B - Embankmnet	Mohr-Coulomb	20	4	25				1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
7	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
9	Unit 6B - Silty/clayey Layer (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
10	Unit 6A - SAND	Mohr-Columb	19	0	35				1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



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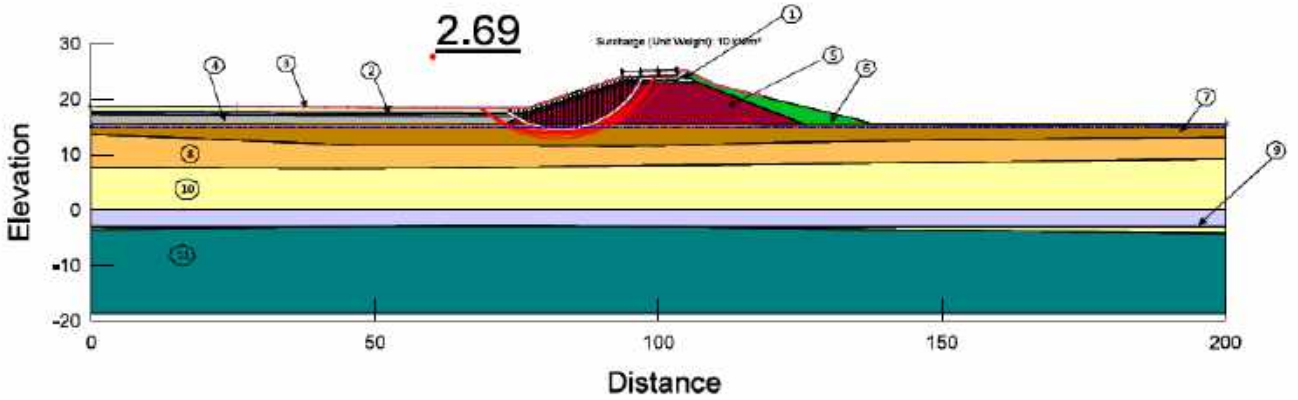
By	MN / SO / 21-Jul-25			
Revision	1 / 21-Jul-25			Figure A1.6

A.2 Section B - Starter Embankment - Prior to Residue Filling

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	1	0	No
3	81 - Proposed Residue Sand Raises	Mohr-Columb	19	0	36	1	0	No
4	Unit 1A - Engineered FILL	Mohr-Columb	20	5	23	1	0	No
5	Unit 1B - Embankment	Mohr-Columb	20	5	32	1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
7	Unit 3 - CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
9	Unit 6B - Silty/Clayey Layer (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Columb	19	0	35	1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No



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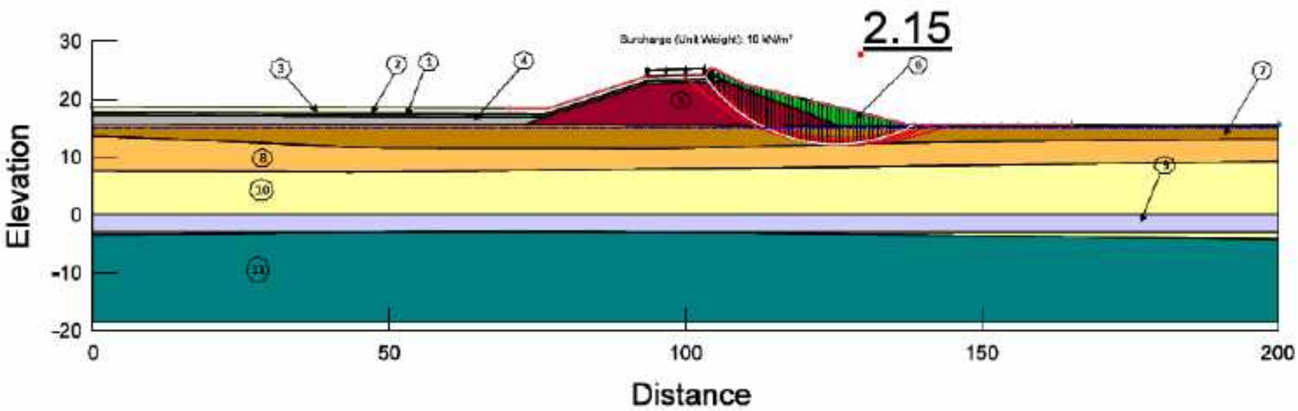
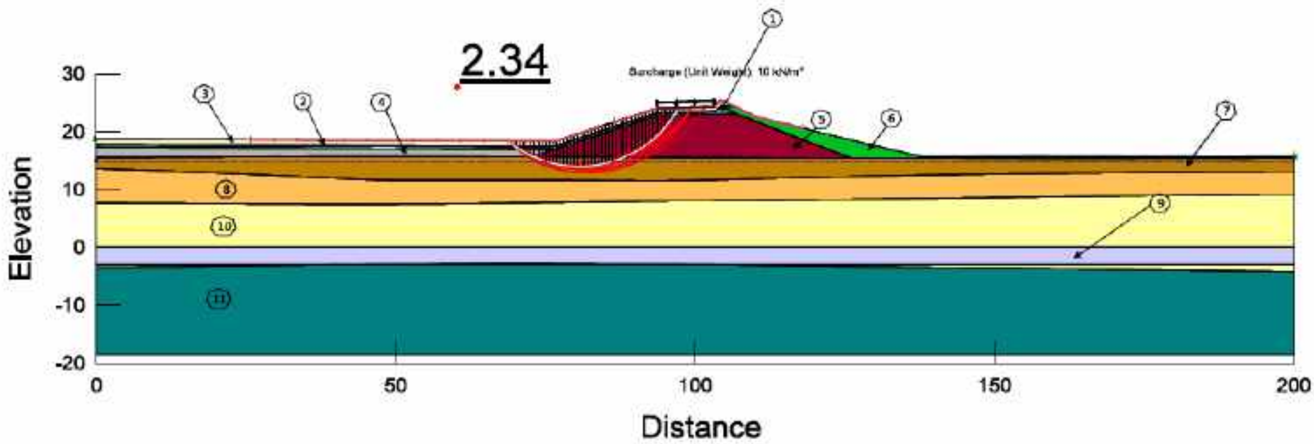
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section B - Peak Drained - Upstream		Wagerup RSA10
By	MN	SC	21-Jul-25			
Revision		1	21-Jul-25			Figure A2.1

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	1	0	No
3	81 - Proposed Residue Sand Raises	Mohr-Columb	18	0	36	1	0	No
4	Unit 1A - Engineered FILL	Mohr-Columb	20	5	23	1	0	No
5	Unit 1B - Embankment	Mohr-Columb	20	5	32	1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
7	Unit 3 - CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
9	Unit 6B - Silty/Clayey Layer (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Columb	19	0	35	1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No



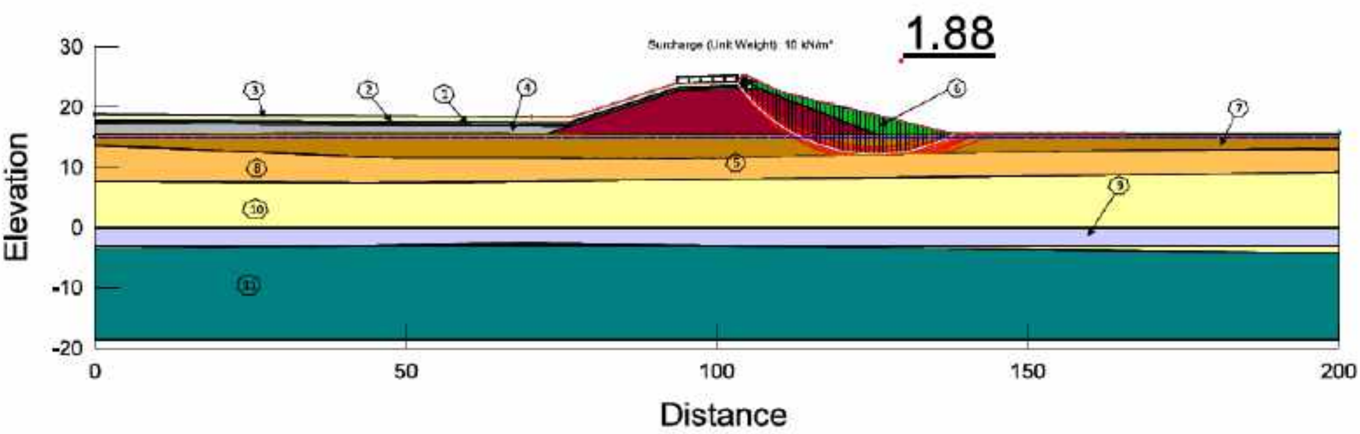
Job number		H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xlsx			Stability Analysis Section B - Peak Drained - Downstream		Wagerup RSA10
By	MN	SC	21-Jul-25			
Revision		1	21-Jul-25			Figure A2.2

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	Yes
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				1	0	No
3	01 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	Yes
4	Unit 1A - Engineered FILL	SHANSEP	20			0	0.25		1	0	Yes
5	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	Yes
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	Yes
7	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 6B - Silty/clayey Layer (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Columb	19	0	36				1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section B - Peak Undrained - Upstream		Wagerup RSA10
By	MN / SO / 21-Jul-25			
Revision	1 / 21-Jul-25			Figure A2.3

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	Yes
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				1	0	No
3	01 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	Yes
4	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	0	Yes
5	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	Yes
6	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	Yes
7	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
8	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 6B - Silty/clayey Layer (Ascot Fm)	Mohr-Columb	18	5	32	0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6A - SAND	Mohr-Columb	19	0	36				1	0	No
11	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



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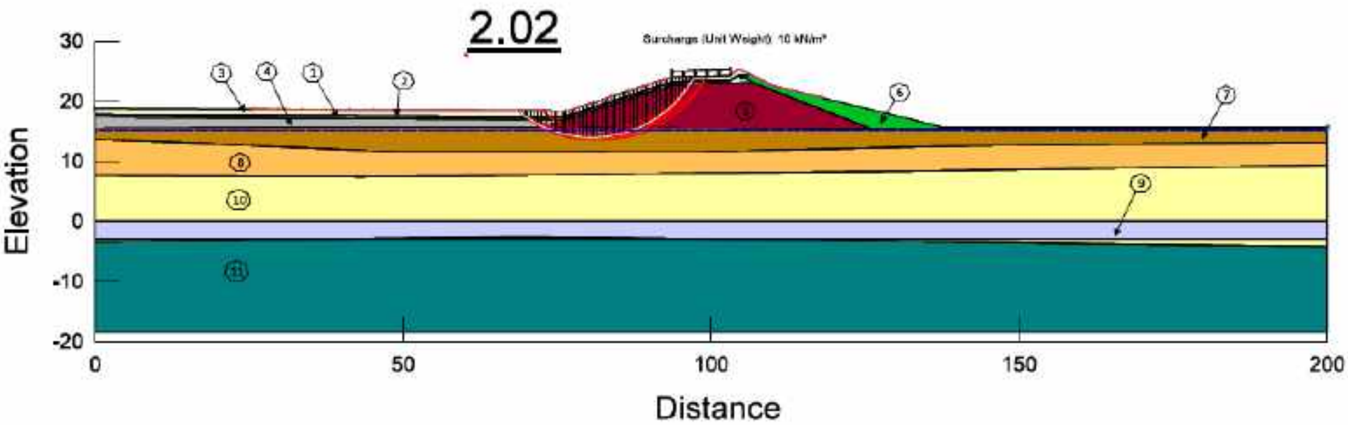
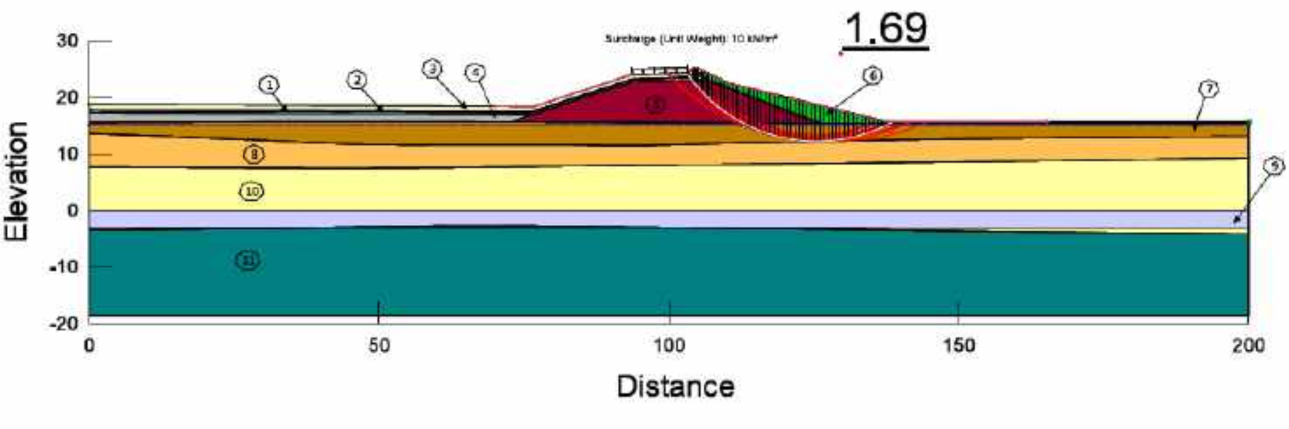
By	MN / SC / 21-Jul-25			Figure A2.4
Revision	1 / 21-Jul-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				1	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	No
4	Unit 1A - Engineered FILL	SHANSEP	20			0	0.2		1	0	No
5	Unit 1B - Embankmnet	Mohr-Coulomb	20	4	26				1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
7	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
9	Unit 6B - Silty/clayey Layer (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Columb	19	0	36				1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	46	27				1	0	No



Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.slz			Stability Analysis Section B - Post-seismic - Upstream		Wagerup RSA10
By	MN	SC	21-Jul-25			
Revision		1	21-Jul-25			Figure A2.5

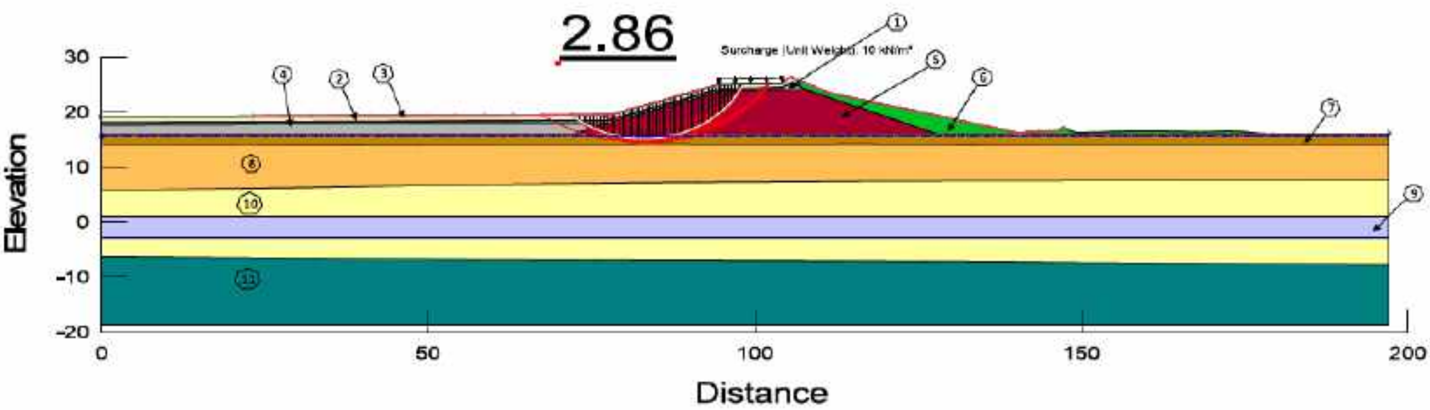
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				1	0	No
3	91 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	No
4	Unit 1A - Engineered FILL	SHANSEP	20			0	0.2		1	0	No
5	Unit 1B - Embankmnet	Mohr-Coulomb	20	4	25				1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
7	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
9	Unit 6B - Silty/clayey Layer (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Columb	19	0	35				1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section B - Post-seismic - Downstream		Wagerup RSA10
By	MN / SC / 21-Jul-25			Figure A2.6
Revision	1 / 21-Jul-25			

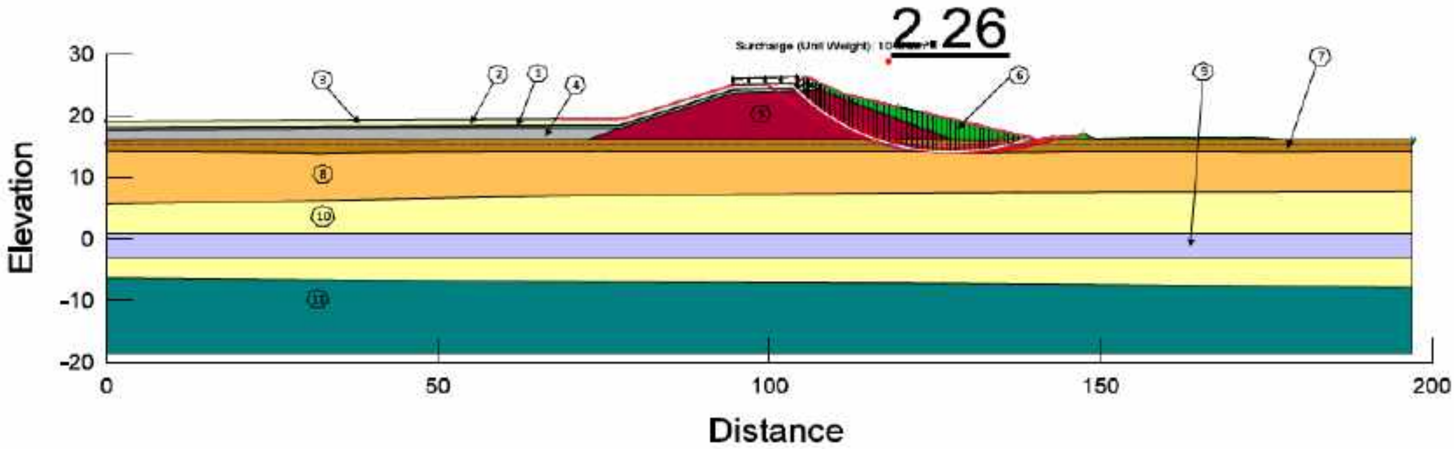
A.3 Section C - Starter Embankment - Prior to Residue Filling

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Coulomb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10	1	0	No
3	01 - Proposed Residue Sand Raises	Mohr-Coulomb	18	0	36	1	0	No
4	Unit 1A - Engineered FILL	Mohr-Coulomb	20	5	23	1	0	No
5	Unit 1B - Embankment	Mohr-Coulomb	20	5	32	1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	26	1	0	No
7	Unit 3 - CLAY (Guildford Fm)	Mohr-Coulomb	20	5	23	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Coulomb	18	5	32	1	0	No
9	Unit 6B - Silty/Clayey Layer (Ascot Fm)	Mohr-Coulomb	18	5	32	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Coulomb	19	0	35	1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33	1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.slx		Stability Analysis Section C - Peak Drained - Upstream		Wagerup RSA10
By	MN	SC	21-Jul-25		Figure A3.1
Revision	1	21-Jul-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Coulomb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10	1	0	No
3	01 - Proposed Residue Sand Raises	Mohr-Coulomb	18	0	36	1	0	No
4	Unit 1A - Engineered FILL	Mohr-Coulomb	20	5	23	1	0	No
5	Unit 1B - Embankment	Mohr-Coulomb	20	5	32	1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	26	1	0	No
7	Unit 3 - CLAY (Guildford Fm)	Mohr-Coulomb	20	5	23	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Coulomb	18	5	32	1	0	No
9	Unit 6B - Silty/Clayey Layer (Ascot Fm)	Mohr-Coulomb	18	5	32	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Coulomb	19	0	35	1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33	1	0	No



Job number	H374430		
Ref	H374430-0000-2A0-230-0005.xlsx		
By	MN	SO	21-Jul-25
Revision	1		21-Jul-25

Wagerup RSA10 FEL3

Stability Analysis

Section C - Peak Drained - Downstream

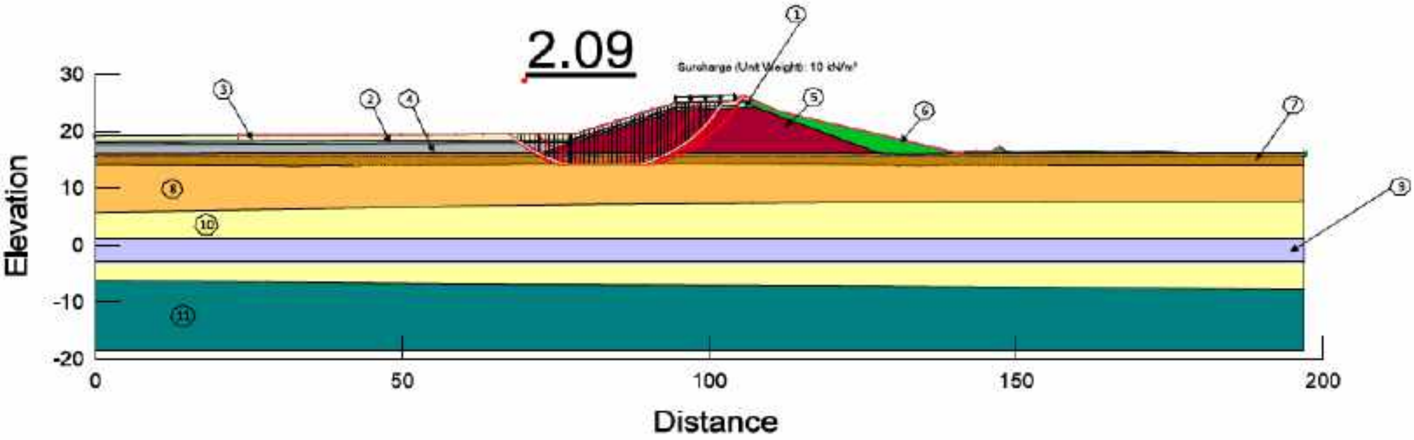
HATCH

Alcoa of Australia Limited

Wagerup RSA10

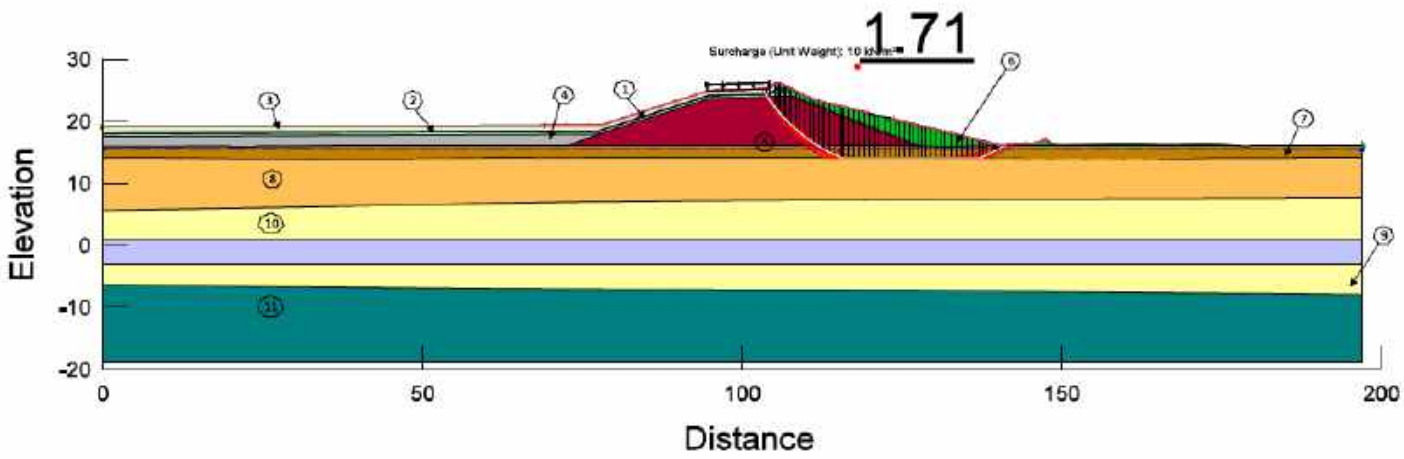
Figure A3.2

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	Yes
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				1	0	No
3	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	Yes
4	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	0	Yes
5	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	Yes
6	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	Yes
7	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
8	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 6B – Silty/clayey Layer (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	19	0	35				1	0	No
11	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section C – Peak Undrained – Upstream		Wagerup RSA10
By	MN	SC	21-Jul-25			Figure A3.3
Revision	1	21-Jul-25				

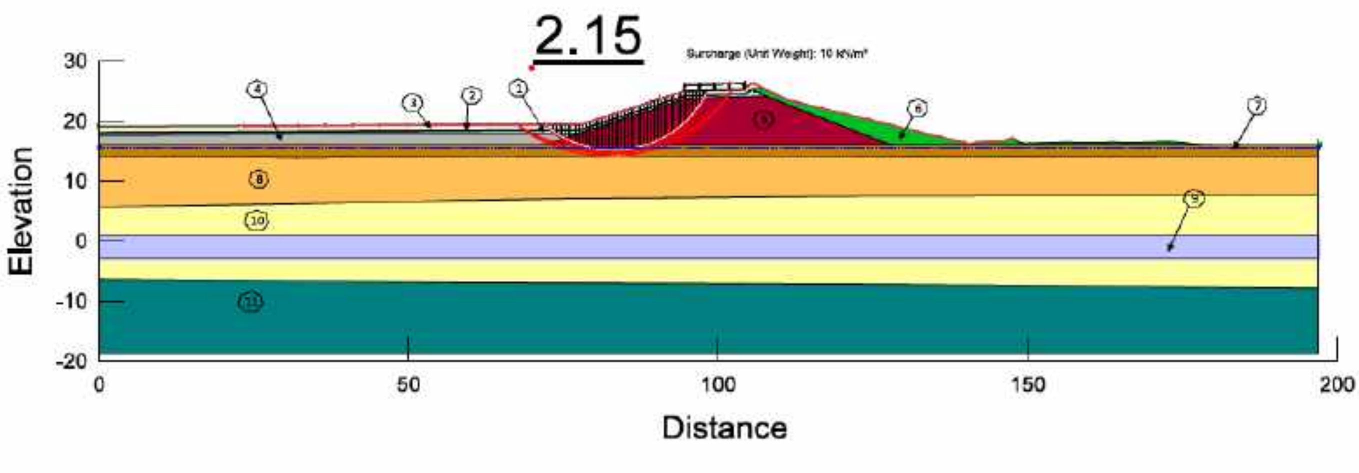
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	Yes
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				1	0	No
3	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	Yes
4	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	0	Yes
5	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	Yes
6	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	Yes
7	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
8	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 6B – Silty/clayey Layer (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	19	0	35				1	0	No
11	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section C – Peak Undrained - Downstream		Wagerup RSA10
By	MN / SC / 21-Jul-25			Figure A3.4
Revision	1 / 21-Jul-25			

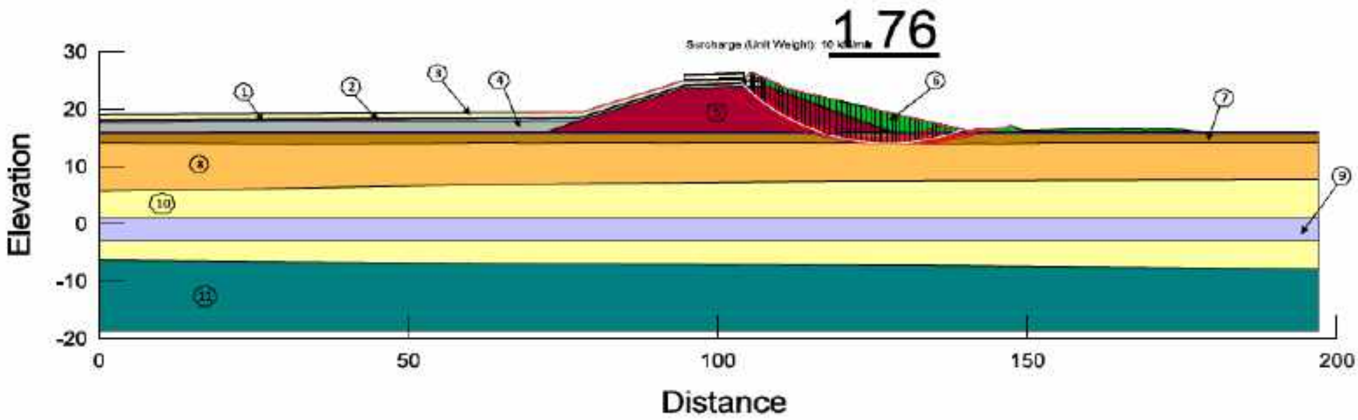
A3.4

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				1	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	No
4	Unit 1A - Engineered FILL	SHANSEP	20			0	0,2		1	0	No
5	Unit 1B - Embankmnet	Mohr-Coulomb	20	4	26				1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
7	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
9	Unit 6B - Silty/clayey Layer (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Columb	19	0	35				1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	46	27				1	0	No



Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A9-230-0005.xlsx	Stability Analysis Section C - Post-seismic - Upstream		Wagerup RSA10
By	MN / SC / 21-Jul-25			
Revision	1 / 21-Jul-25			Figure A3,5

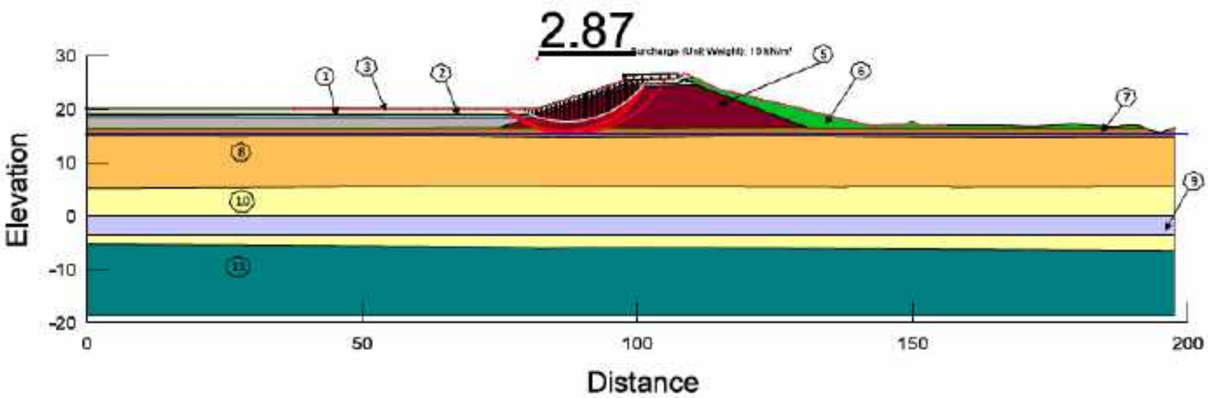
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				1	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	No
4	Unit 1A - Engineered FILL	SHANSEP	20			0	0,2		1	0	No
5	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
7	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
9	Unit 6B - Silty/clayey Layer (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Columb	19	0	35				1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section C - Post-seismic - Downstream		Wagerup RSA10
By	MN / SC / 21-Jul-25			Figure A3.6
Revision	1 / 21-Jul-25			

A.4 Section D - Starter Embankment - Prior to Residue Filling

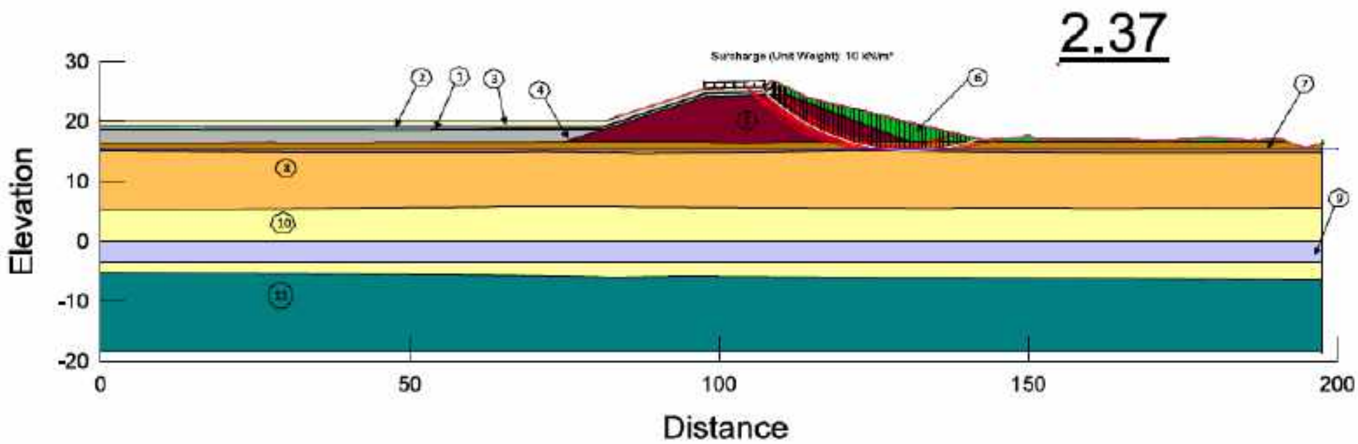
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Coulomb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10	1	0	No
3	81 - Proposed Residue Sand Raises	Mohr-Coulomb	18	0	36	1	0	No
4	Unit 1A - Engineered FILL	Mohr-Coulomb	20	5	23	1	0	No
5	Unit 1B - Embankment	Mohr-Coulomb	20	5	32	1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	26	1	0	No
7	Unit 3 - CLAY (Guildford Fm)	Mohr-Coulomb	20	5	23	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Coulomb	18	5	32	1	0	No
9	Unit 6B - Silty/Clayey Layer (Ascot Fm)	Mohr-Coulomb	18	5	32	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Coulomb	19	0	35	1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33	1	0	No



Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section D - Peak Drained - Upstream		Wagerup RSA10
By	MN	SC	21-Jul-25			Figure A4.1
Revision	1		21-Jul-25			

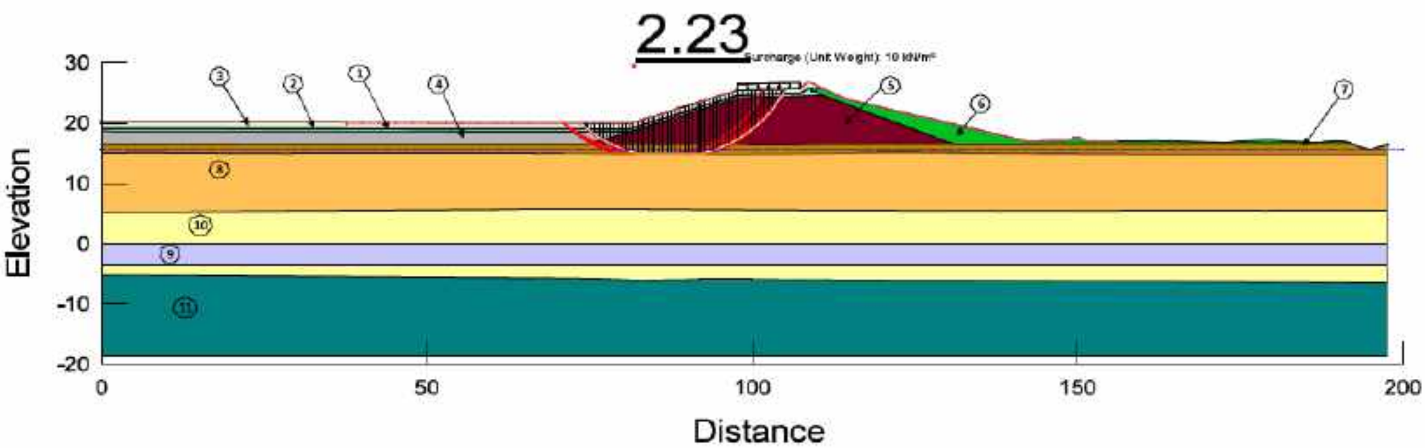
A4.1

Color	Name	Material Model	Unit Weight (kN/m^3)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	1	0	No
3	81 - Proposed Residue Sand Raises	Mohr-Columb	19	0	36	1	0	No
4	Unit 1A - Engineered FILL	Mohr-Columb	20	5	23	1	0	No
5	Unit 1B - Embankment	Mohr-Columb	20	5	32	1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
7	Unit 3 - CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
9	Unit 6B - Silty/Clayey Layer (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Columb	19	0	35	1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No



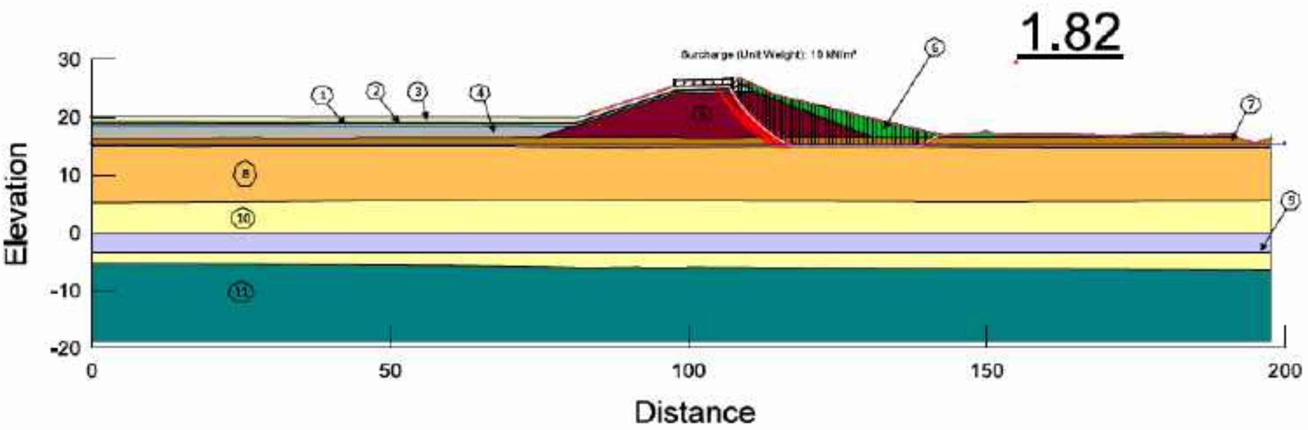
Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.jlx		Stability Analysis Section D - Peak Drained - Downstream		Wagerup RSA10
By	MN	SO	21-Jul-25		
Revision	1	21-Jul-25			Figure A4.2

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	Yes
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				1	0	No
3	91 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	Yes
4	Unit 1A - Engineered FILL	SHANSEP	20			0	0.25		1	0	Yes
5	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	Yes
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	Yes
7	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 6B - Silty/clayey Layer (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6A - SAND	Mohr-Columb	19	0	35				1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



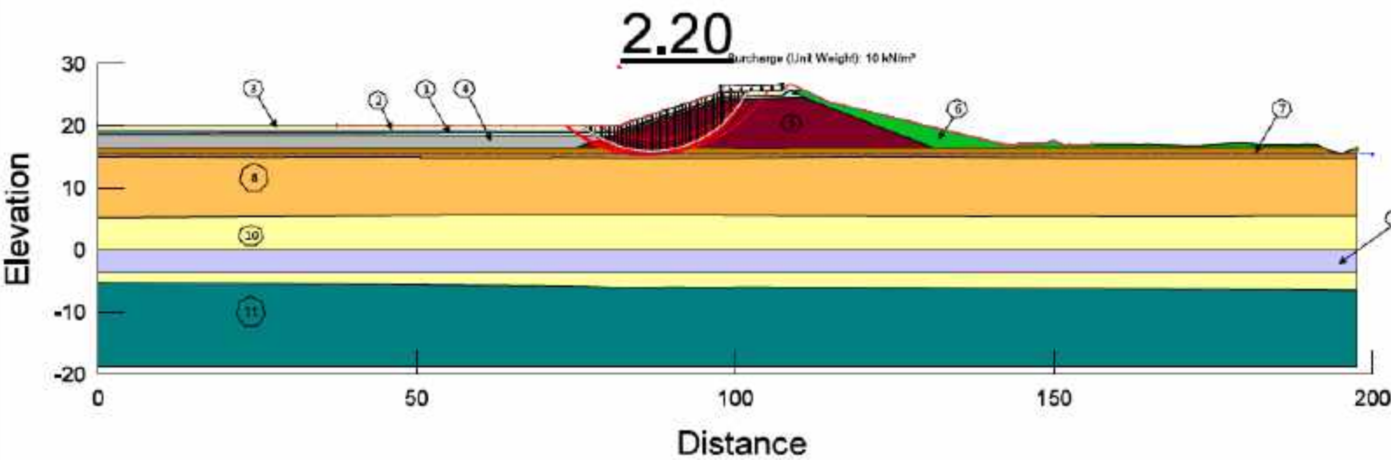
Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D - Peak Undrained (Short Term) - Upstream		Wagerup RSA10
By	MN	SO	21-Jul-25		
Revision	1	21-Jul-25			Figure A4.3

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	Yes
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				1	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	Yes
4	Unit 1A - Engineered FILL	SHANSEP	20			0	0.25		1	0	Yes
5	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	Yes
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	Yes
7	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 6B - Silty/clayey Layer (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Columb	19	0	35				1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



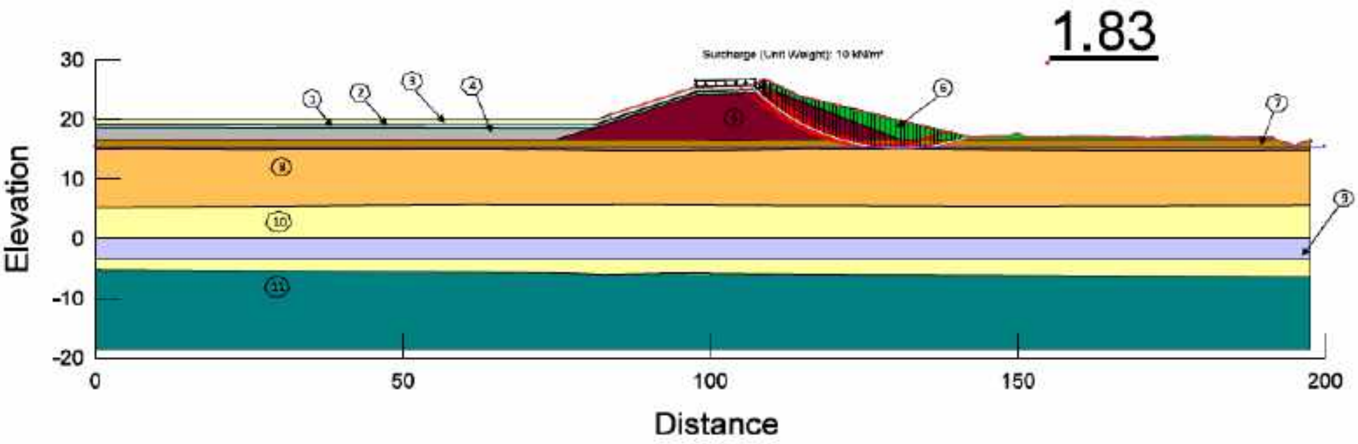
Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.ab		Stability Analysis Section D - Peak Undrained (Short Term) - Downstream		Wagerup RSA10
By	MN	SO	21-Jul-25		Figure A4.4
Revision	1	21-Jul-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	15				1	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	No
4	Unit 1A - Engineered FILL	SHANSEP	20			0	0.2		1	0	No
5	Unit 1B - Embankmnet	Mohr-Coulomb	20	4	25				1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
7	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
9	Unit 6B - Silty/clayey Layer (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Columb	19	0	35				1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	46	27				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited	
Ref	H374430-0000-2A9-230-0005.xls		Stability Analysis Section D - Post-seismic - Upstream		Wagerup RSA10	
By	MN	SC	21-Jul-25		Figure	A4.5
Revision	1	21-Jul-25				

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				1	0	No
3	91 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				1	0	No
4	Unit 1A - Engineered FILL	SHANSEP	20			0	0.2		1	0	No
5	Unit 1B - Embankmnet	Mohr-Coulomb	20	4	25				1	0	No
6	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
7	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0	No
8	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
9	Unit 6B - Silty/clayey Layer (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0	No
10	Unit 6A - SAND (Ascot Fm)	Mohr-Columb	19	0	35				1	0	No
11	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

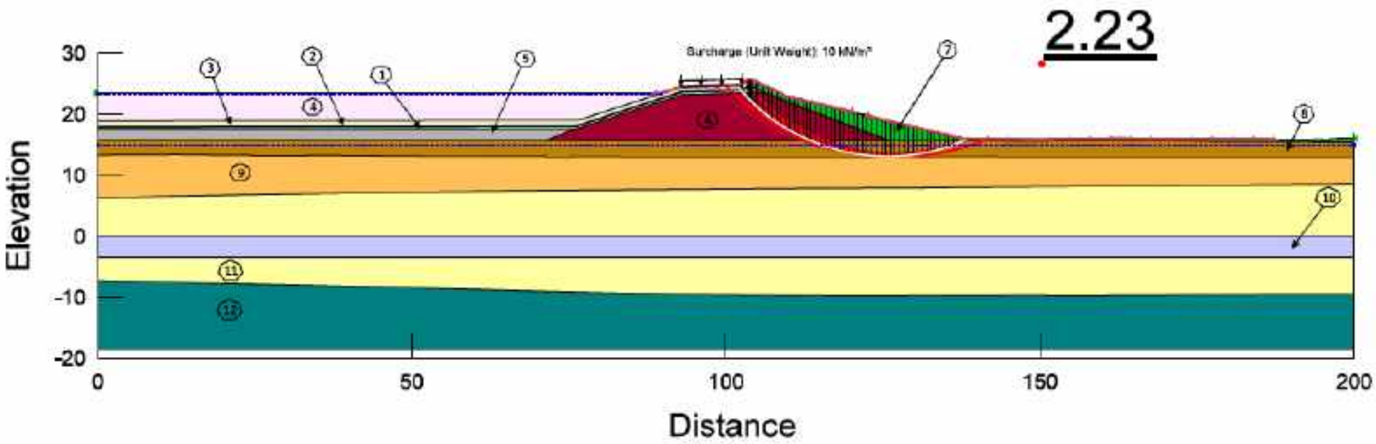


Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section D - Post-seismic - Downstream		Wagerup RSA10
By	MN	SO	21-Jul-25			
Revision		1	21-Jul-25			Figure A4.6

Appendix B
Starter Embankment - Residue to Minimum Freeboard

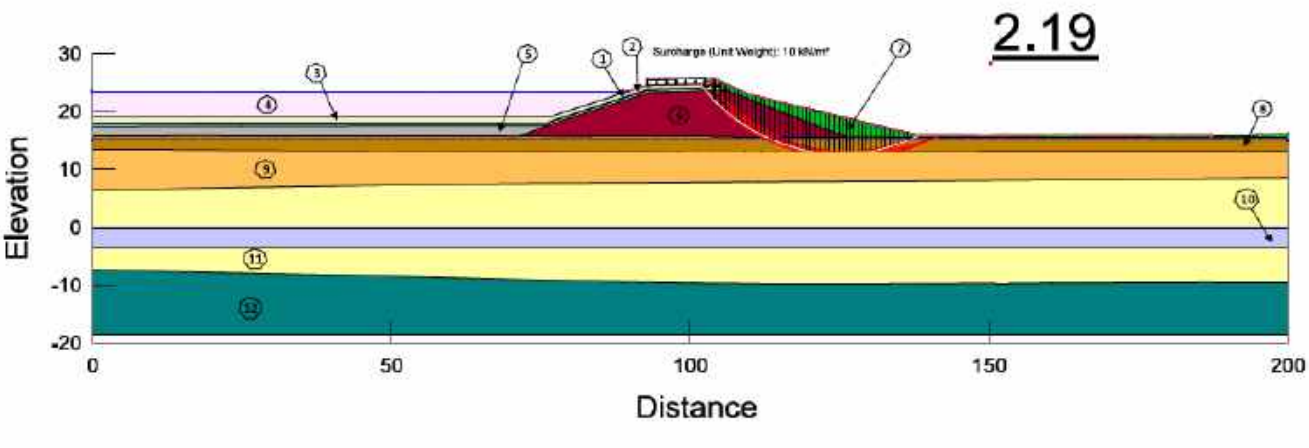
B.1 Section A - Starter Embankment - Filled to Minimum Freeboard

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Coulomb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10	2	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30	2	0	No
4	M1 - Thickened Residue Mud	Mohr-Coulomb	16.5	0	34	2	0	No
5	Unit 1A - Engineered FILL	Mohr-Coulomb	20	5	25	1	0	No
6	Unit 1B - Embankment	Mohr-Coulomb	20	5	32	2	0	No
7	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	25	2	0	No
8	Unit 3 - CLAY (Guildford Fm)	Mohr-Coulomb	20	5	23	1	0	No
9	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Coulomb	18	5	32	1	0	No
10	Unit 6B - Silty/Clayey Layers (Ascot Fm)	Mohr-Coulomb	18	5	32	1	0	No
11	Unit 6A - SAND (Ascot Fm)	Mohr-Coulomb	18	5	32	1	0	No
12	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33	1	0	No



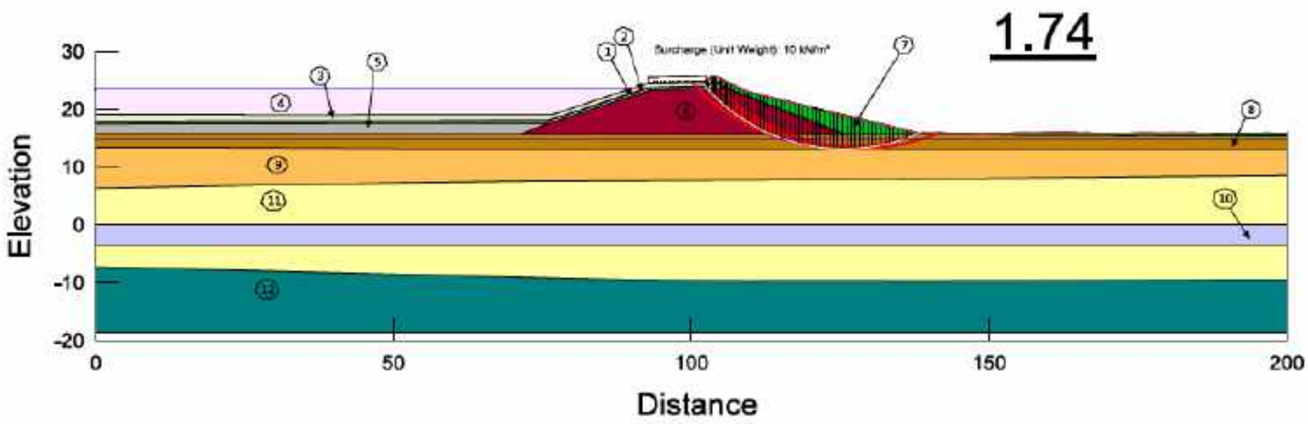
Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited	
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section A - Peak Drained - Downstream		Wagerup RSA10	
By	MN	SC	21-Jul-25		Figure	B1.1
Revision	1	21-Jul-25				

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
4	M1 - Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	Unit 1A - Engineered FILL	SHANSEP	20			0	0.25		1	1	No
6	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				2	0	No
7	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	25				2	0	No
8	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
11	Unit 6A - SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
12	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section A - Peak Undrained - Downstream		Wagerup RSA10
By MN	SC 21-Jul-25			
Revision	1 21-Jul-25			Figure B1.2

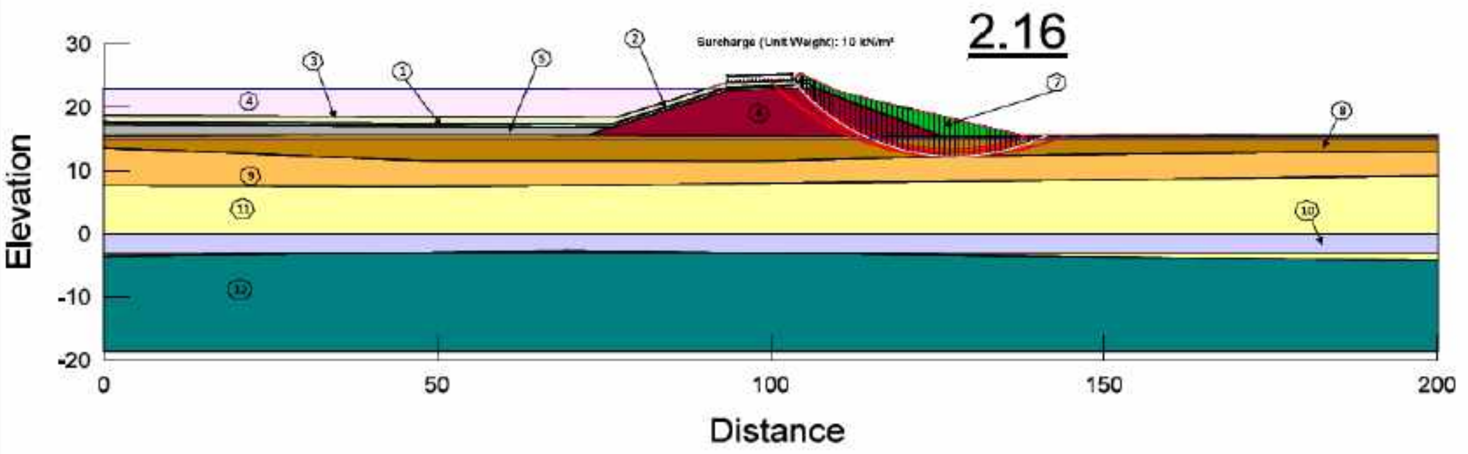
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
4	M1 - Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	Unit 1A - Engineered FILL	SHANSEP	20			0	0.25		1	1	No
6	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				2	0	No
7	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	25				2	0	No
8	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
11	Unit 6A - SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
12	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374450	Wagerup RSA10 FEL3		Alcoa of Australia Limited
Ref	H374450-0000-2A0-230-0005.xls	Stability Analysis Section C - Post-seismic - Downstream	HATCH	Wagerup RSA10
By	MN / SC / 21-Jul-25			Figure B1.3
Revision	1 / 21-Jul-25			

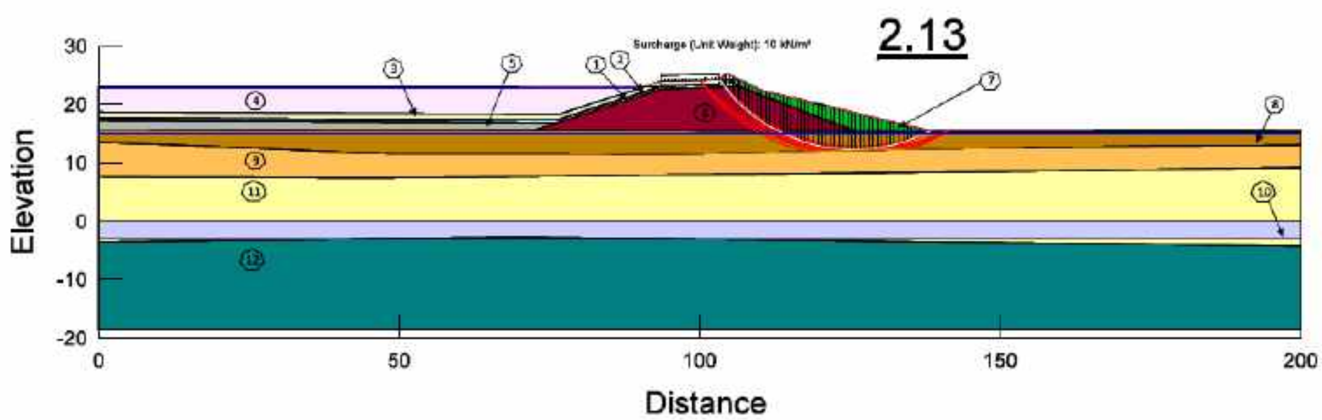
B.2 Section B - Starter Embankment - Filled to Minimum Freeboard

Color	Name	Material Model	Unit Weight (kN/m^3)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Coulomb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10	2	0	No
3	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30	2	0	No
4	M1 – Thickened Residue Mud	Mohr-Coulomb	16.5	0	34	2	0	No
5	Unit 1A – Engineered FILL	Mohr-Coulomb	20	5	25	1	0	No
6	Unit 1B – Embankment	Mohr-Coulomb	20	5	32	2	0	No
7	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	25	2	0	No
8	Unit 3 – CLAY (Guildford Fm)	Mohr-Coulomb	20	5	23	1	0	No
9	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Coulomb	18	5	32	1	0	No
10	Unit 6B – Silty/Clayey Layers (Ascot Fm)	Mohr-Coulomb	16	5	32	1	0	No
11	Unit 5A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35	1	0	No
12	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33	1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited	
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B – Peak Drained – Downstream		Wagerup RSA10	
By	MN	SC	21-Jul-25			
Revision	1	21-Jul-25			Figure	B2.1

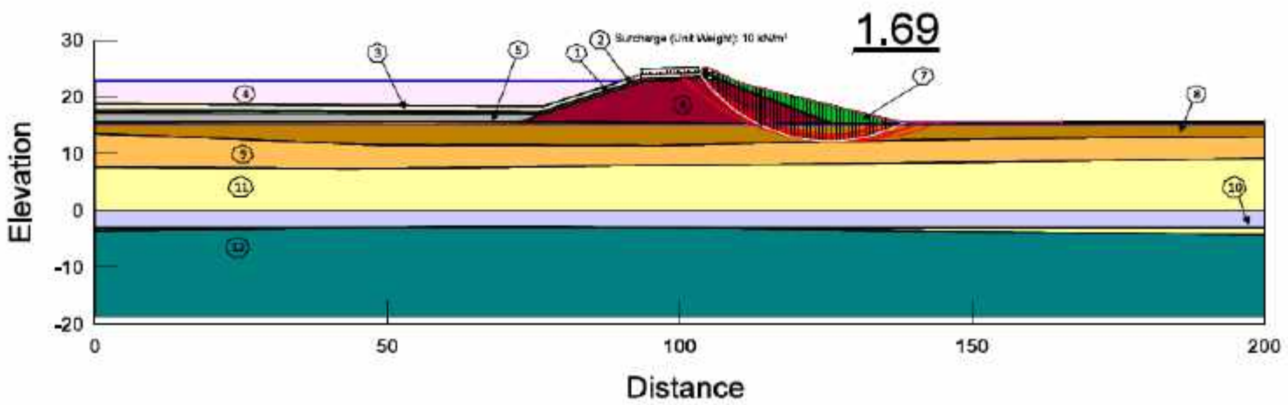
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
4	M1 - Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	Unit 1A - Engineered FILL	SHANSEP	20			0	0.25		1	1	No
6	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				2	0	No
7	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	25				2	0	No
8	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
11	Unit 9A - SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
12	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B - Peak Undrained - Downstream	Wagerup RSA10
By	MN	SC	21-Jul-25	
Revision	1	21-Jul-25		Figure B2.2

HATCH

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
4	M1 - Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	Unit 1A - Engineered FILL	SHANSEP	20			0	0.25		1	1	No
6	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				2	0	No
7	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	25				2	0	No
8	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
11	Unit 9A - SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
12	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No

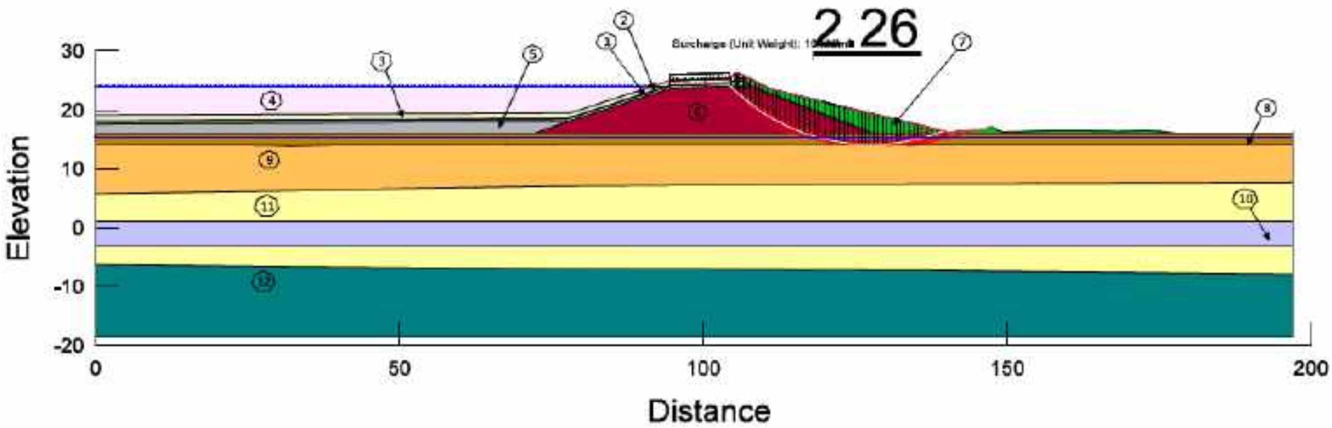


Job number	H374430		Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B - Post-seismic - Downstream	Wagerup RSA10
By	MN	SC	21-Jul-25	
Revision	1	21-Jul-25		Figure B2.3

HATCH

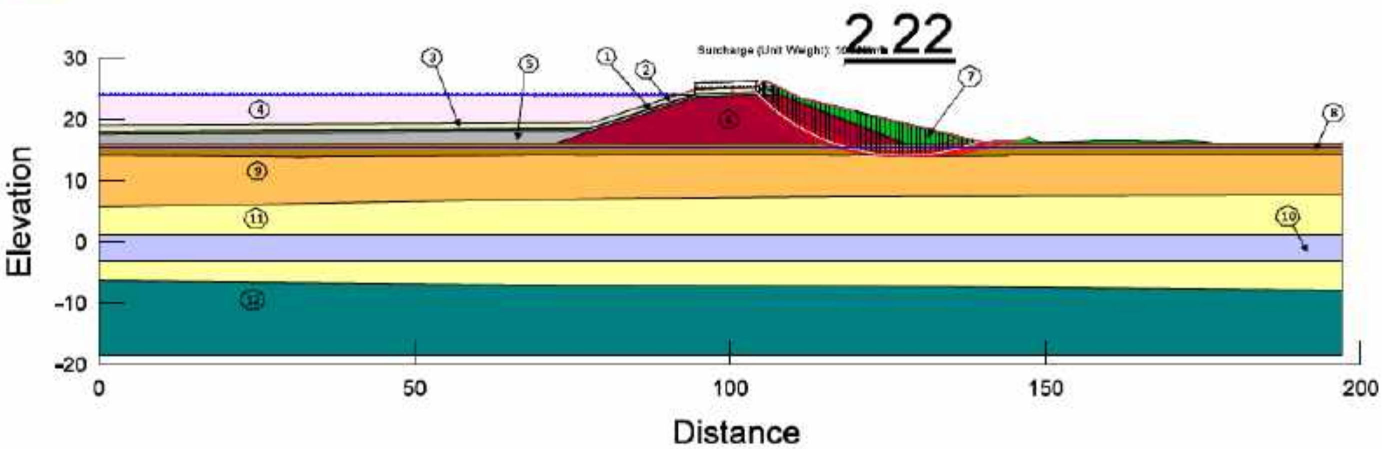
B.3 Section C - Starter Embankment - Filled to Minimum Freeboard

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Coulomb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10	2	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	18	0	30	2	0	No
4	M1 - Thickened Residue Mud	Mohr-Coulomb	16.5	0	34	2	0	No
5	Unit 1A - Engineered FILL	Mohr-Coulomb	20	5	25	1	0	No
6	Unit 1B - Embankment	Mohr-Coulomb	20	5	32	2	0	No
7	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	25	2	0	No
8	Unit 3 - CLAY (Guildford Fm)	Mohr-Coulomb	20	5	23	1	0	No
9	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Coulomb	18	5	32	1	0	No
10	Unit 6B - Silty/Clayey Layers (Ascot Fm)	Mohr-Coulomb	18	5	32	1	0	No
11	Unit 9A - SAND (Ascot Fm)	Mohr-Coulomb	18	0	35	1	0	No
12	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33	1	0	No



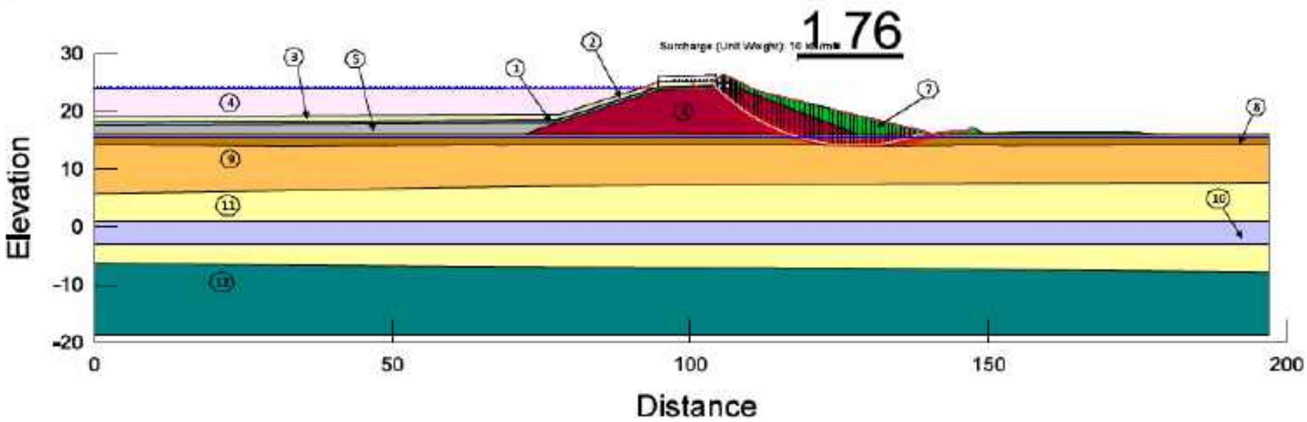
Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section C - Peak Drained - Downstream		Wagerup RSA10
By	MN / SC / 21-Jul-25			Figure B3.1
Revision	1 / 21-Jul-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
4	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
6	Unit 1B – Embankment	Mohr-Coulomb	20	5	32				2	0	No
7	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	25				2	0	No
8	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
11	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
12	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section C – Peak Undrained – Downstream		Wagerup RSA10
By	MN	SO	21-Jul-25			Figure B3.2
Revision	1	21-Jul-25				

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
4	M1 - Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	Unit 1A - Engineered FILL	SHANSEP	20			0	0.25		1	1	No
6	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				2	0	No
7	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	25				2	0	No
8	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
11	Unit 9A - SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
12	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No

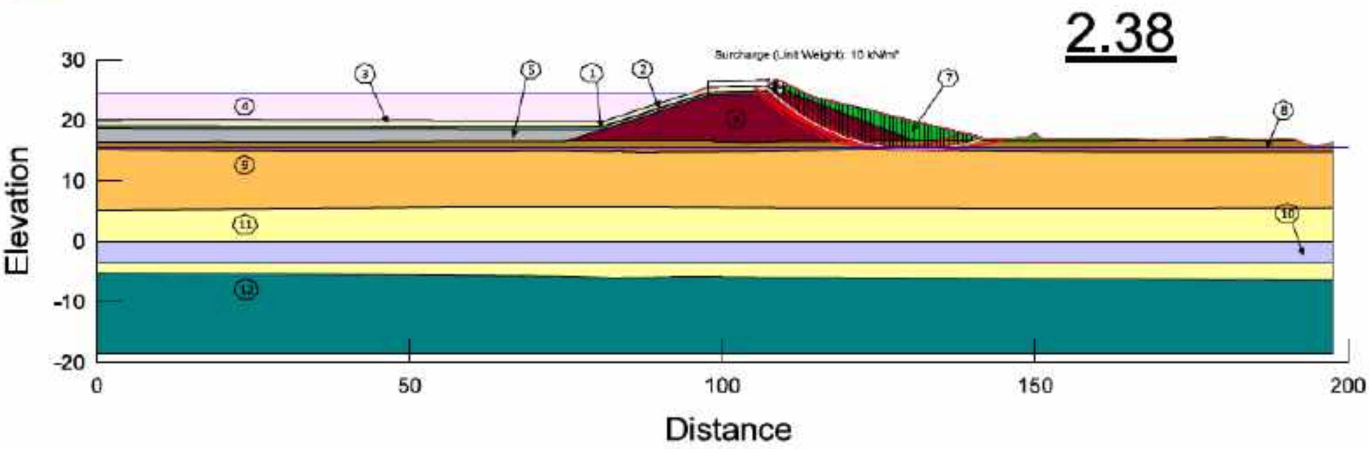


Job number	H374430			Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xlsx			Stability Analysis Section C - Post-seismic - Downstream	Wagerup RSA10
By	MN	SC	21-Jul-25		
Revision	1		21-Jul-25		Figure B3.3

HATCH

B.4 Section D - Starter Embankment - Filled to Minimum Freeboard

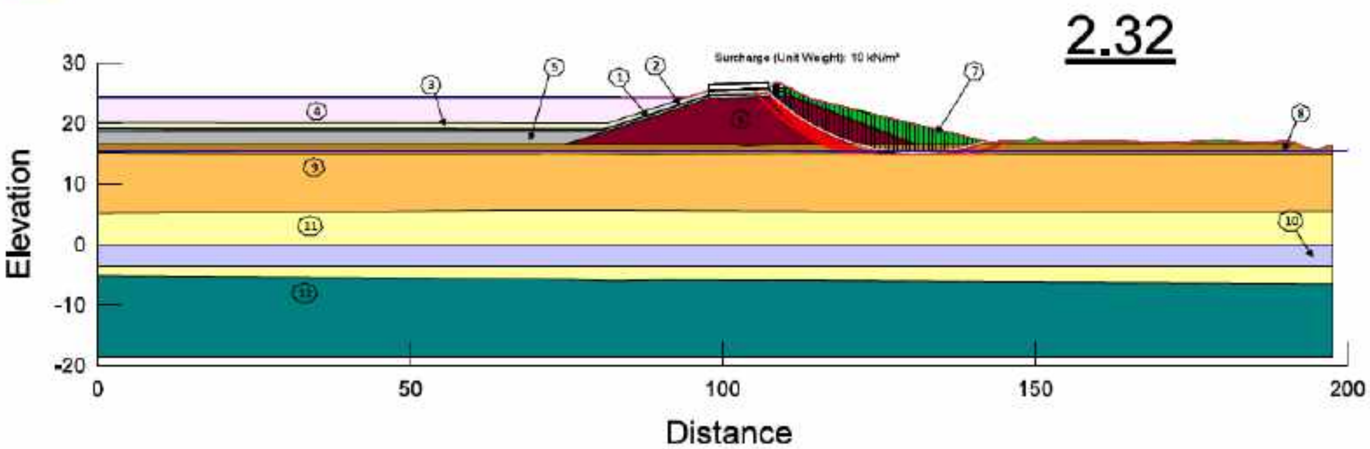
Color	Name	Material Model	Unit Weight (kN/m^3)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Coulomb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10	2	0	No
3	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30	2	0	No
4	M1 – Thickened Residue Mud	Mohr-Coulomb	16.5	0	34	2	0	No
5	Unit 1A – Engineered FILL	Mohr-Coulomb	20	5	25	1	0	No
6	Unit 1B – Embankment	Mohr-Coulomb	20	5	32	2	0	No
7	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	25	2	0	No
8	Unit 3 – CLAY (Guildford Fm)	Mohr-Coulomb	20	5	23	1	0	No
9	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Coulomb	18	5	32	1	0	No
10	Unit 6B – Silty/Clayey Layers (Ascot Fm)	Mohr-Coulomb	16	5	32	1	0	No
11	Unit 9A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35	1	0	No
12	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33	1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D – Peak Undrained – Downstream		Wagerup RSA10
By	MN	SC	21-Jul-25		
Revision	1	21-Jul-25			Figure B4.1

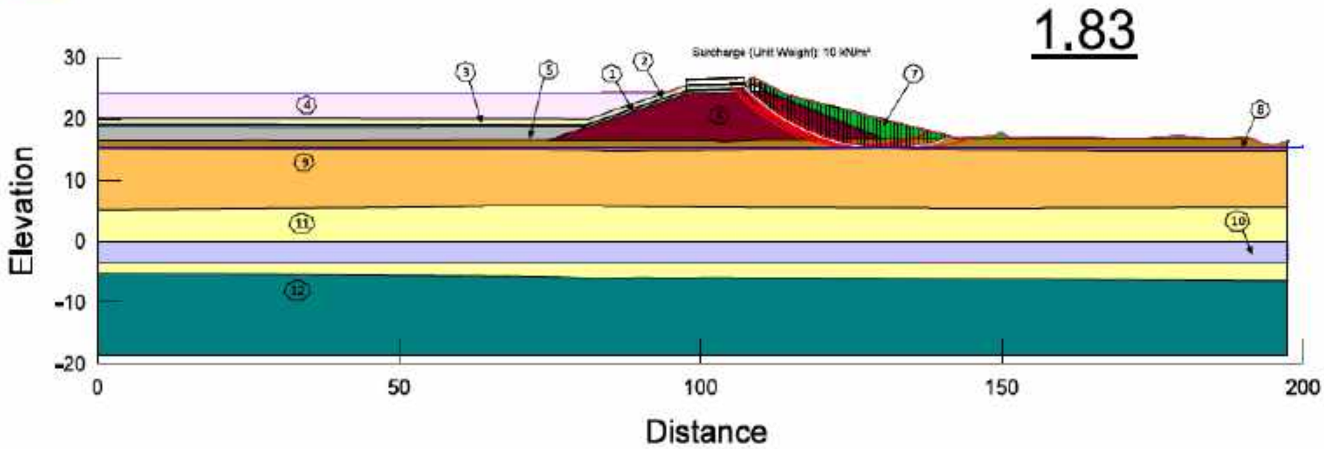
B4.1

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	18	0	37				2	0	No
4	M1 - Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	Unit 1A - Engineered FILL	SHANSEP	20			0	0.25		1	1	No
6	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				2	0	No
7	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	25				2	0	No
8	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0.5	No
9	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
10	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0.5	No
11	Unit 6A - SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
12	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section D - Peak Undrained - Downstream		Wagerup RSA10
By	MN / SC / 21-Jul-25			Figure B4.2
Revision	1 / 21-Jul-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	18	0	37				2	0	No
4	M1 - Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	Yes
5	Unit 1A - Engineered FILL	SHANSEP	20			0	0,25		1	1	No
6	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				2	0	No
7	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Coulomb	17	0	25				2	0	No
8	Unit 3 - CLAY (Guildford Fm)	SHANSEP	20			0		Shear Strength vs Normal Effective	1	0,5	No
9	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0,5	No
10	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear Strength vs Normal Effective	1	0,5	No
11	Unit 9A - SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
12	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No

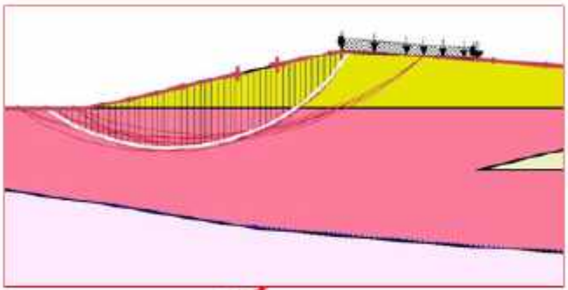


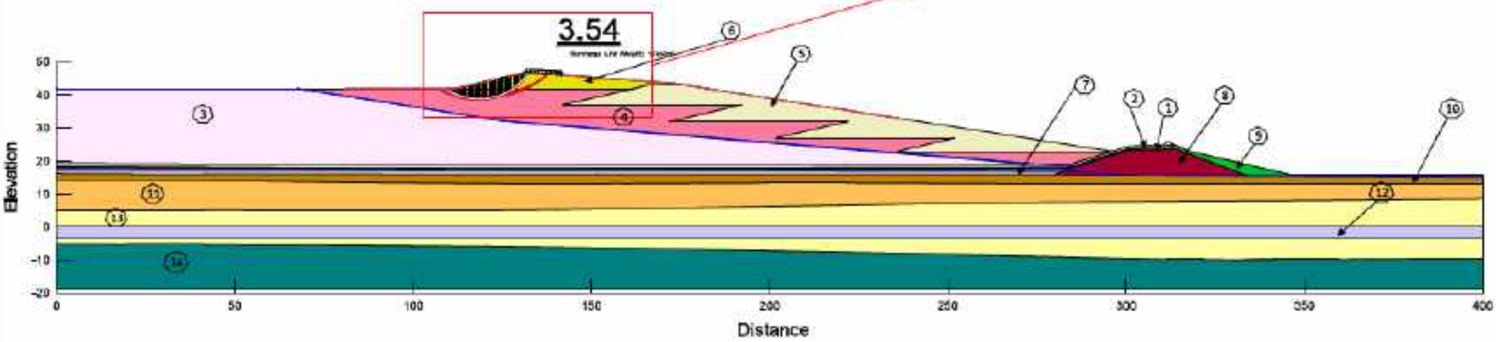
Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section D - Post-seismic - Downstream		Wagerup RSA10
By	MN / SC / 21-Jul-25			Figure B4.3
Revision	1 / 21-Jul-25			

Appendix C
Ultimate Embankment Stability Analysis Results

C.1 Section A - Ultimate Embankment

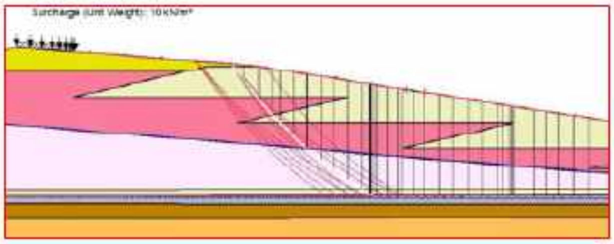
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
4	M3 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
5	S1 - Proposed Residue Sand Raises	Mohr-Columb	18	0	36	2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Columb	19	0	36	2	0	No
7	Unit 1A - Engineered FILL	Mohr-Columb	20	5	23	1	0	No
8	Unit 1B – Embankment	Mohr-Columb	20	5	30	1	0	No
9	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
10	Unit 3 – CLAY (Guildford Fm)	Mohr-Columb	20	5	29	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
12	Unit 6B – Silty/Clayey layers (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	19	0	35	1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No

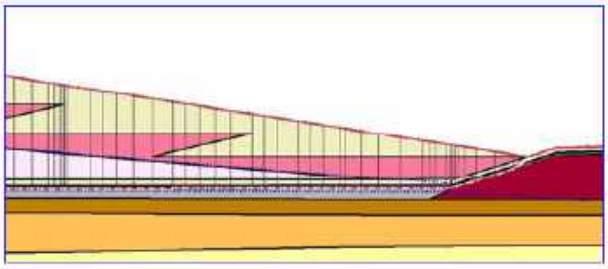


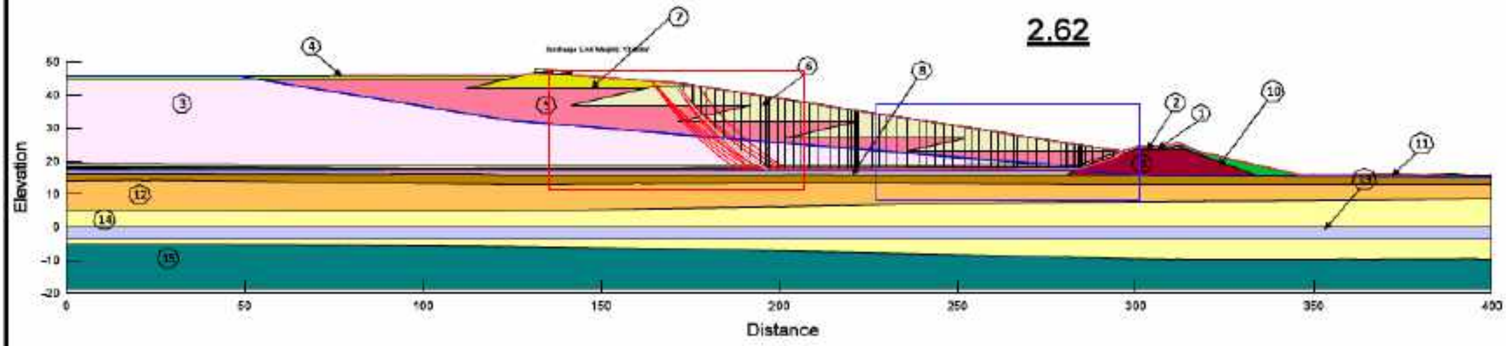


Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xlsx	Stability Analysis Section A - Peak Drained - Upstream		Wagerup RSA10
By	MN / SC / 02-Sep-25			
Revision	2 / 02-Sep-25			Figure C1.1

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
4	M2 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
5	M3 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Columb	18	0	36	2	0	No
7	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Columb	18	0	36	2	0	No
8	Unit 1A – Engineered FILL	Mohr-Columb	20	5	23	1	0	No
9	Unit 1B – Embankment	Mohr-Columb	20	5	32	1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
11	Unit 3 – CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
13	Unit 6B – Silty/Clayey layers (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	18	0	35	1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No

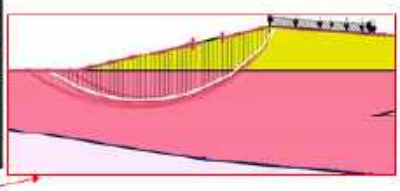


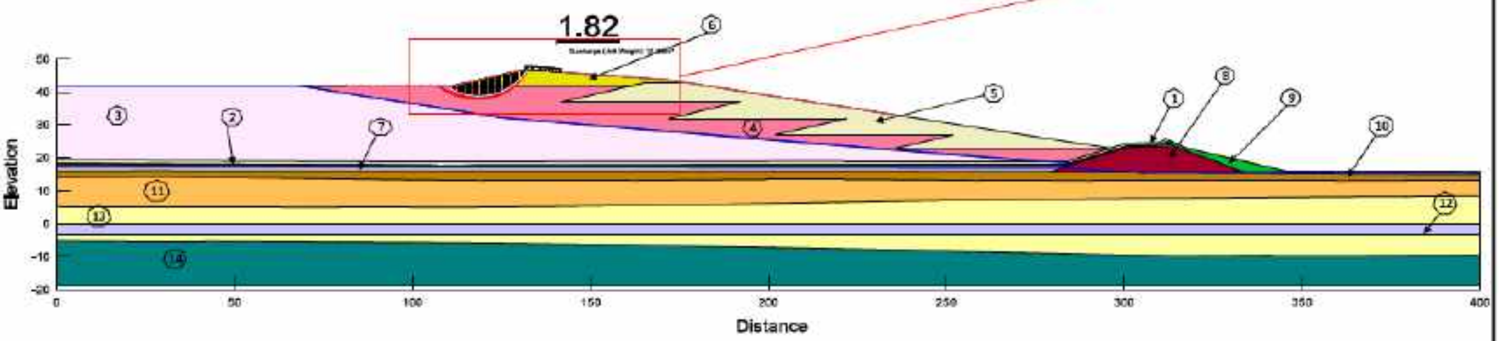




Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xlsx			Stability Analysis Section A – Peak Drained – Downstream		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision	2		02-Sep-25			Figure C1.2

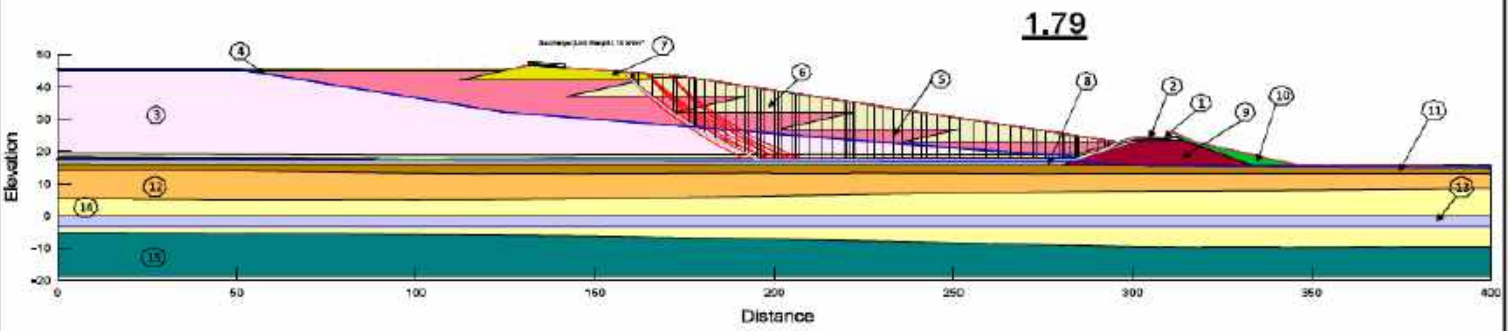
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	18	0	36				2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	18	0	36				2	0	Yes
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
8	Unit 1B – Embankment	Mohr-Coulomb	20	5	32				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	28				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	35				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	35				1	0	No





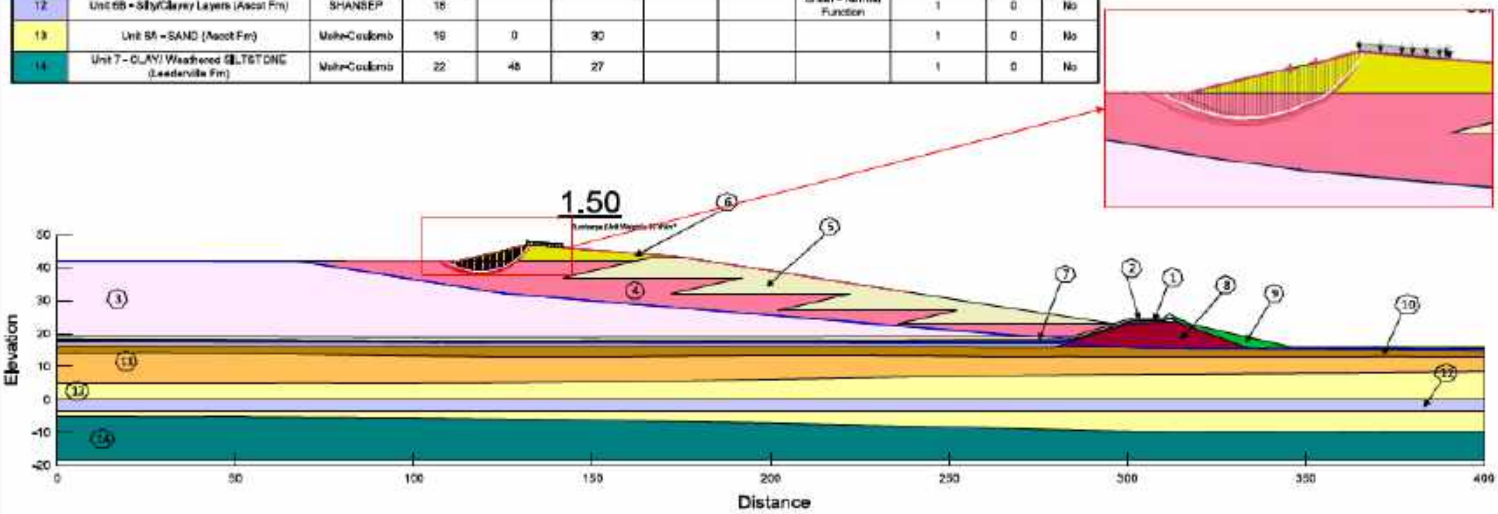
Job number	H374430	Wagerup RSA10 FEL3		Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section A – Peak Undrained – Upstream	HATCH	Wagerup RSA10
By	MN / SC / 02-Sep-25			
Revision	2 / 02-Sep-25			Figure C1,3

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



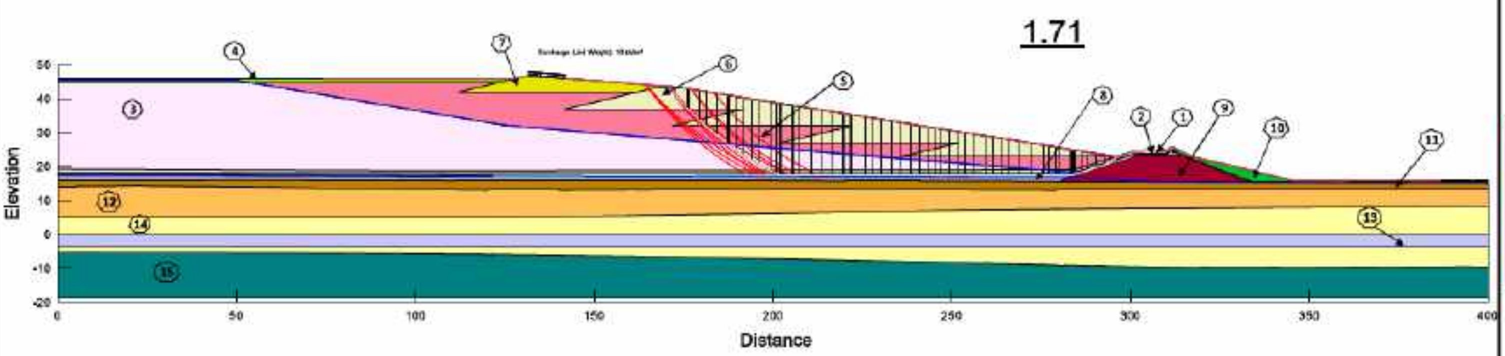
Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section A – Peak Undrained – Downstream		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision	2		02-Sep-25			Figure C1.4

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,16		2	0	No
4	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	0	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
6	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0,20		1	0	No
8	Unit 1B - Embankment	Mohr-Coulomb	20	4	28				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	30				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section A – Post-seismic – Upstream		Wagerup RSA10
By	MN / SC / 02-Sep-25			Figure C1.5
Revision	2 / 02-Sep-25			

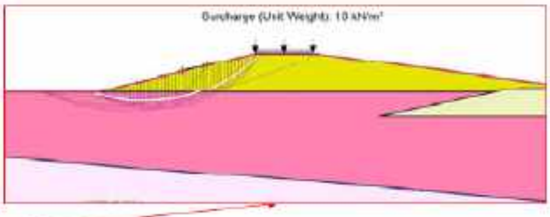
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

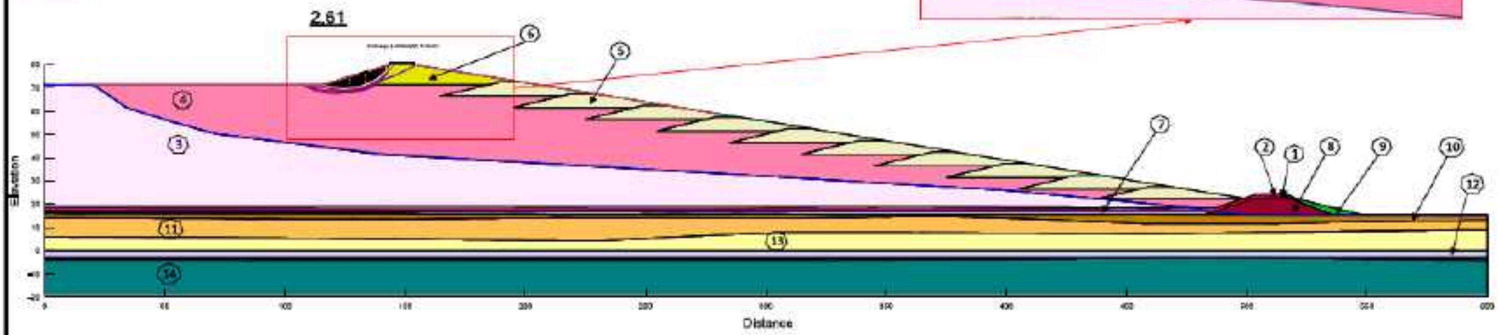


Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section A - Post-seismic - Downstream		Wagerup RSA10
By	MN	SC	02-Sep-25		Figure C1.6
Revision	2	02-Sep-25			

C.2 Section B - Ultimate Embankment

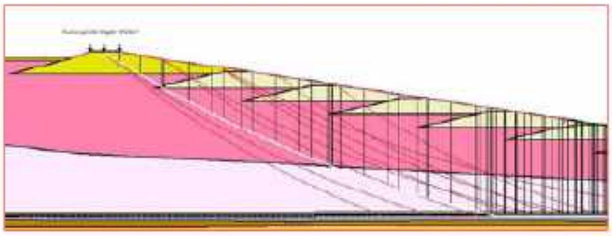
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
4	M3 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
5	S1 - Proposed Residue Sand Raises	Mohr-Columb	18	0	36	2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Columb	19	0	36	2	0	No
7	Unit 1A - Engineered FILL	Mohr-Columb	20	5	23	1	0	No
8	Unit 1B – Embankment	Mohr-Columb	20	5	32	1	0	No
9	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
10	Unit 3 – CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
12	Unit 6B – Silty/Clayey layers (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	18	0	35	1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No

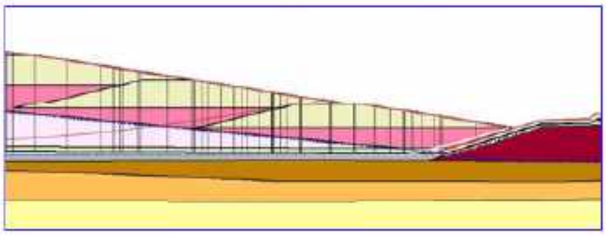


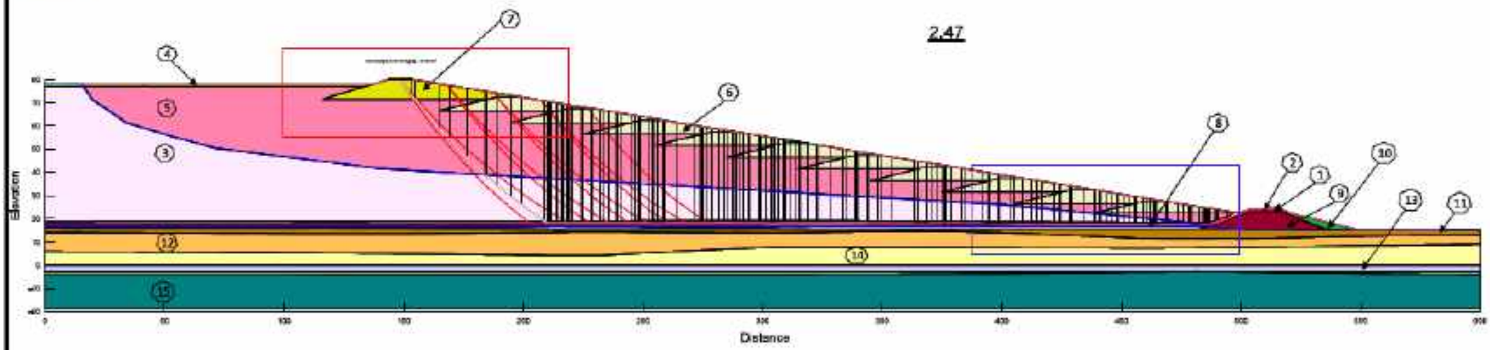


Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xlsx	Stability Analysis Section B - Peak Drained - Upstream		Wagerup RSA10
By MN	SC 02-Sep-25			
Revision	2 02-Sep-25			Figure C2.1

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Coulomb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Coulomb	16.5	0	34	2	0	No
4	M2 – Thickened Residue Mud	Mohr-Coulomb	16.5	0	04	2	0	No
5	M3 – Thickened Residue Mud	Mohr-Coulomb	16.5	0	34	2	0	No
6	S1 - Proposed Residue Sand Raises	Mohr-Coulomb	18	0	36	2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	18	0	36	2	0	No
8	Unit 1A - Engineered FILL	Mohr-Coulomb	20	5	23	1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32	1	0	No
10	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26	1	0	No
11	Unit 3 - CLAY (Guildford Fm)	Mohr-Coulomb	20	5	23	1	0	No
12	Unit 4 - Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Coulomb	18	5	32	1	0	No
13	Unit 6B - Silty/Clayey layers (Ascot Fm)	Mohr-Coulomb	18	5	32	1	0	No
14	Unit 6A - SAND (Ascot Fm)	Mohr-Coulomb	18	0	35	1	0	No
15	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33	1	0	No

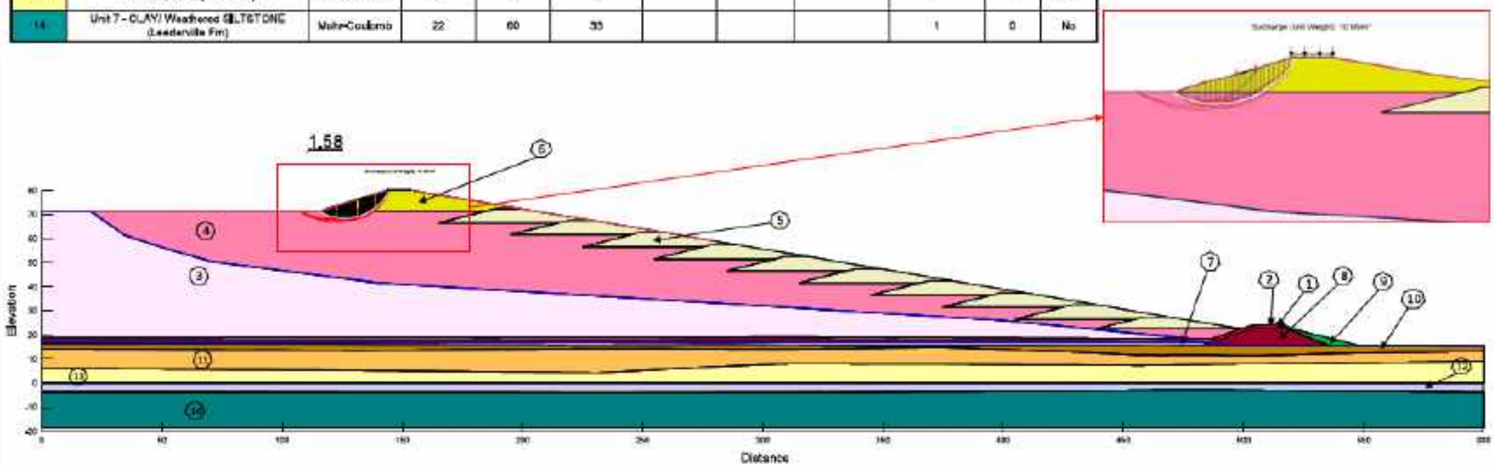






Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited	
Ref	H374430-0000-2A0-230-0005.xlsx		Stability Analysis Section B – Peak Drained – Downstream		Wagerup RSA10	
By	MN	SC	02-Sep-25		Figure	C2.2
Revision	2	02-Sep-25				

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	18	0	36				2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	18	0	36				2	0	Yes
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
8	Unit 1B – Embankment	Mohr-Coulomb	20	5	32				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	35				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430			Wagerup RSA10 FEL3
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section B – Peak Undrained – Upstream
By	MN	SC	02-Sep-25	
Revision		2	02-Sep-25	

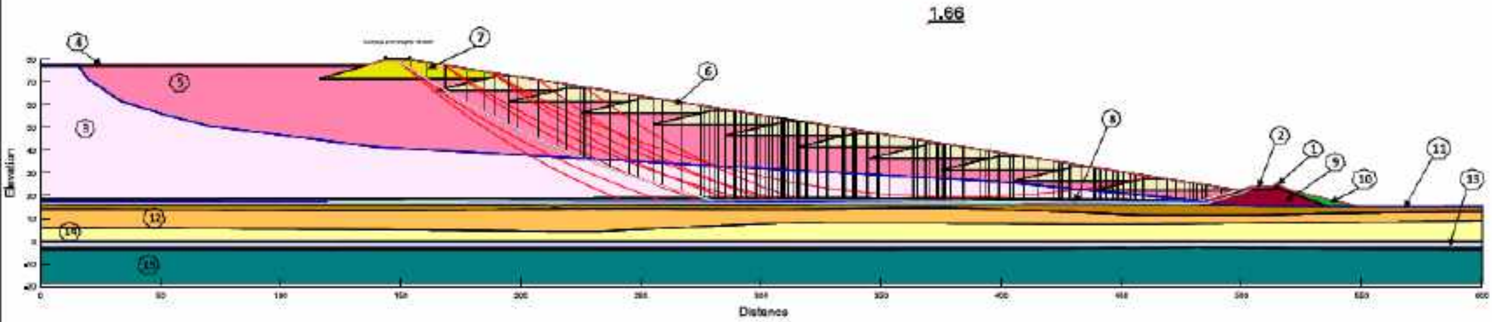
HATCH

Alcoa of Australia Limited

Wagerup RSA10

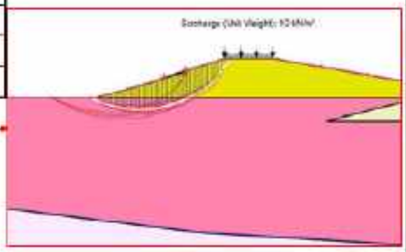
Figure C2.3

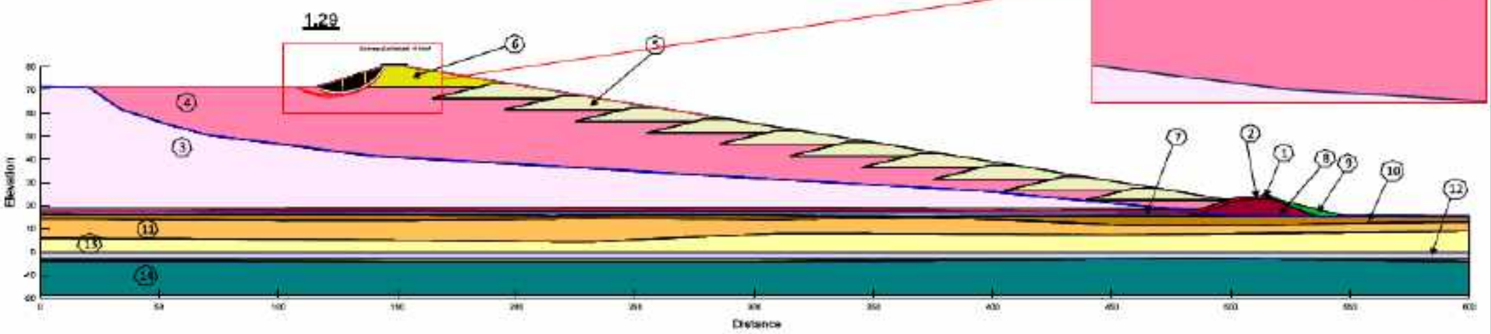
Color	Name	Material Model	Unit Weight (kN/m^3)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	20	0	37				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	20	0	37				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section B – Peak Undrained – Downstream		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision		2	02-Sep-25			Figure C2.4

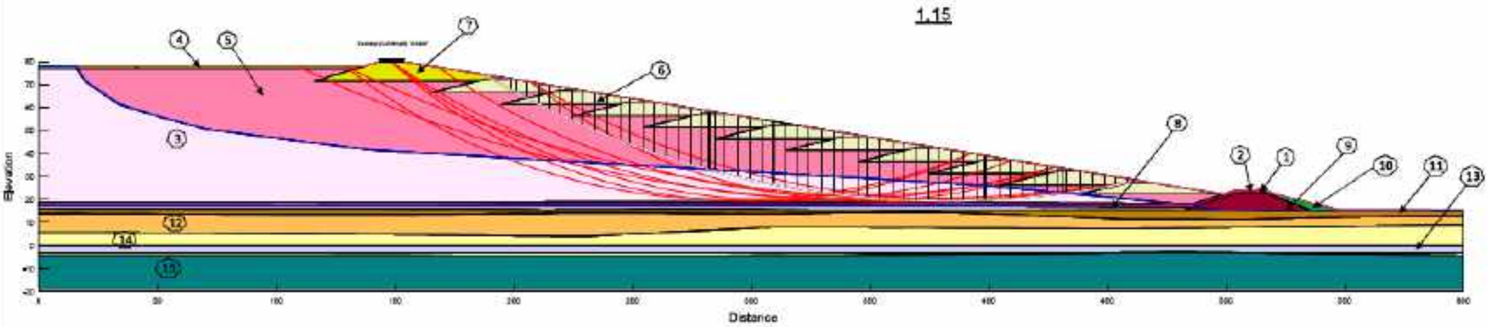
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,16		2	0	No
4	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	0	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
6	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0,20		1	0	No
8	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	30				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No





Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section B - Post-seismic - Upstream		Wagerup RSA10
By	MN	SC	02-Sep-25			Figure C2,5
Revision	2		02-Sep-25			

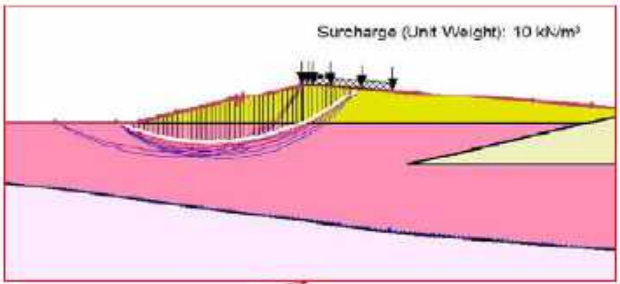
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,16		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16,5			0	0,16		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0,20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

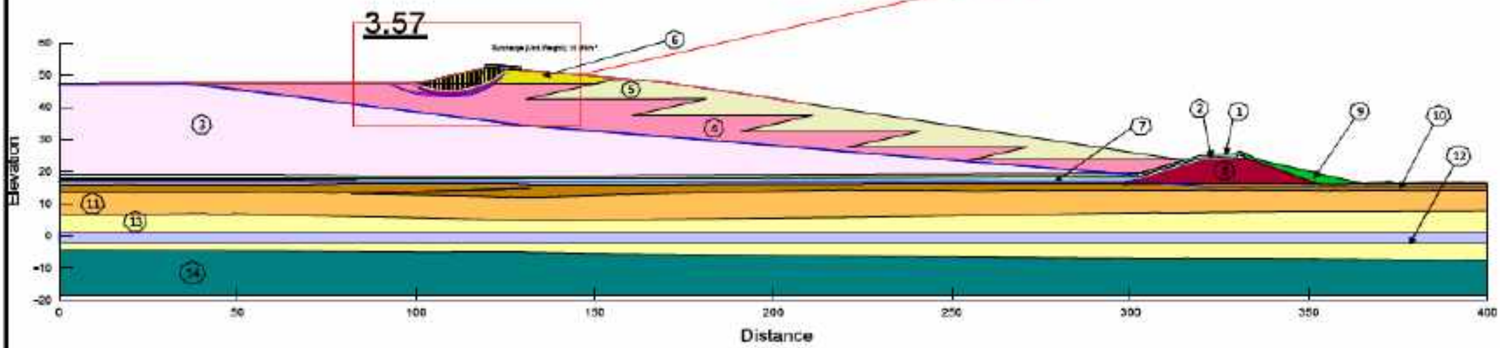


Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B – Post-seismic – Downstream		Wagerup RSA10
By	MN	SC	02-Sep-25			Figure C2,6
Revision	2	02-Sep-25				

C.3 Section C - Ultimate Embankment

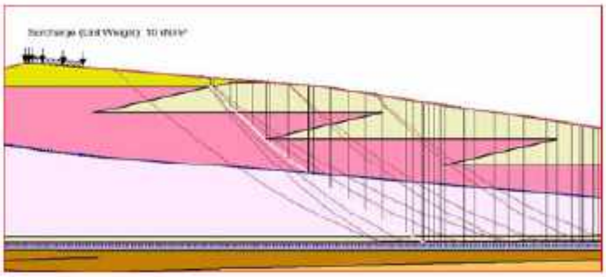
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Columb	16,5	0	34	2	0	No
4	M3 – Thickened Residue Mud	Mohr-Columb	16,5	0	34	2	0	No
5	S1 - Proposed Residue Sand Raises	Mohr-Columb	18	0	36	2	0	No
6	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Columb	19	0	36	2	0	No
7	Unit 1A - Engineered FILL	Mohr-Columb	20	5	23	1	0	No
8	Unit 1B - Embankment	Mohr-Columb	20	5	30	1	0	No
9	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
10	Unit 3 – CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
12	Unit 6B - Silty/Clayey layers (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	19	0	35	1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No

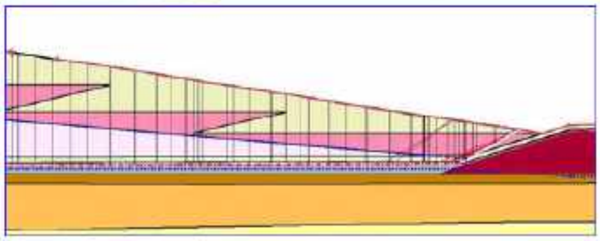


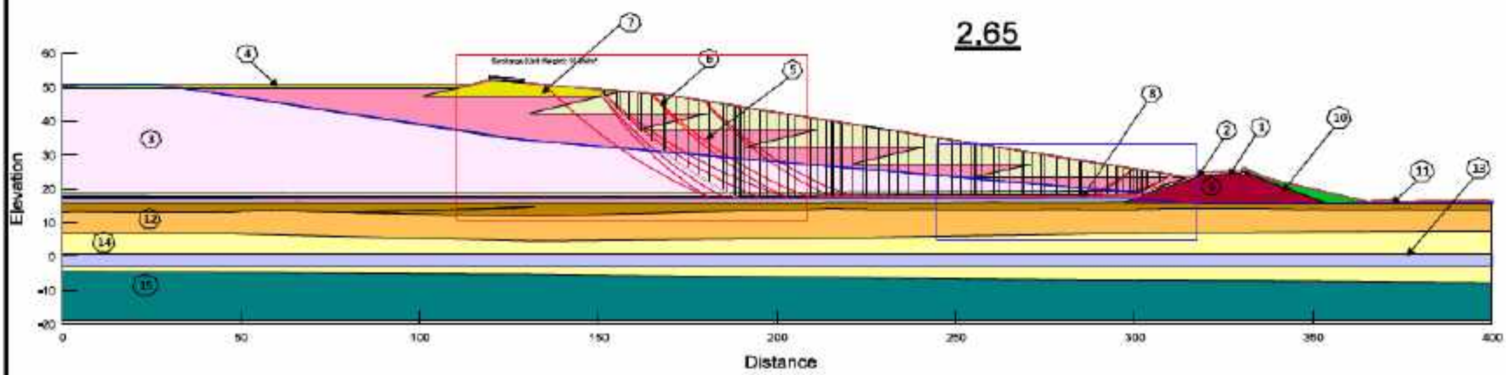


Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section C - Peak Drained - Upstream		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision		2	02-Sep-25			Figure C3.1

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
4	M2 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
5	M3 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Columb	18	0	36	2	0	No
7	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Columb	18	0	36	2	0	No
8	Unit 1A – Engineered FILL	Mohr-Columb	20	5	23	1	0	No
9	Unit 1B – Embankment	Mohr-Columb	20	5	32	1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
11	Unit 3 – CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
13	Unit 6B – Silty/Clayey layers (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	18	0	35	1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No

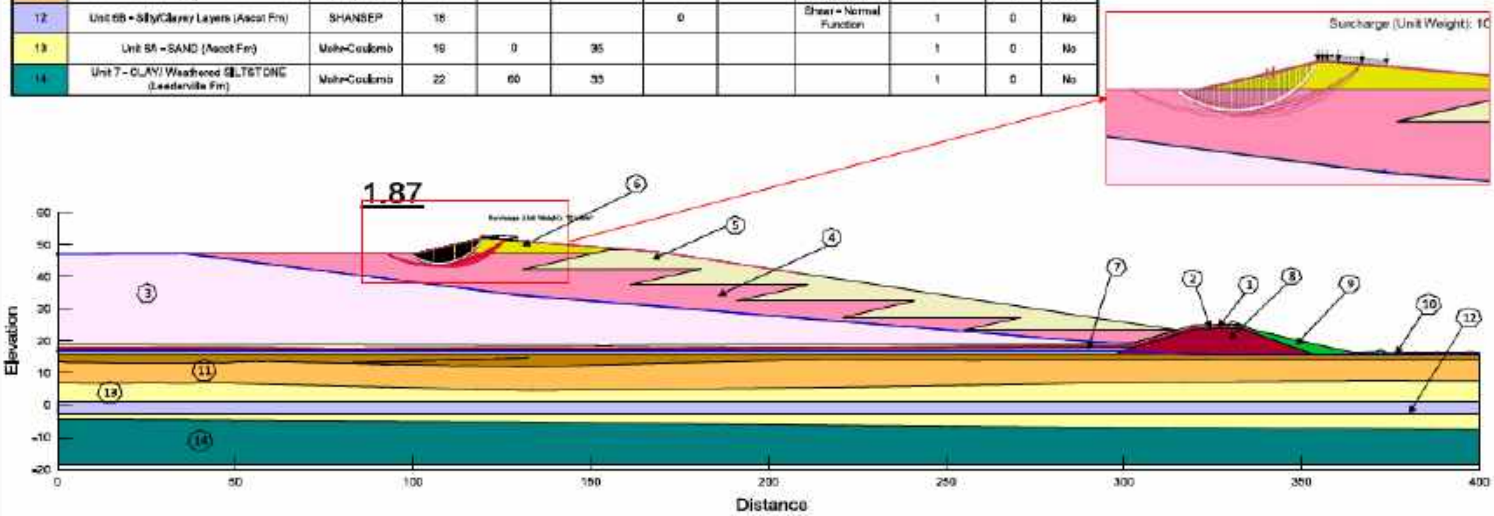






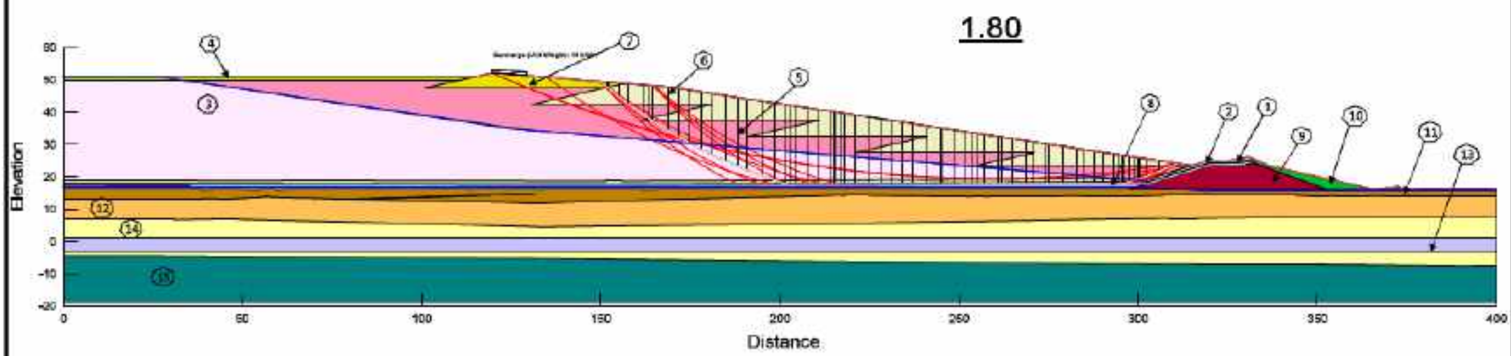
Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xlsx	Stability Analysis Section C – Peak Drained – Downstream		Wagerup RSA10
By	MN / SC / 02-Sep-25			Figure C3.2
Revision	2 / 02-Sep-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
6	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
8	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	35				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	35				1	0	No



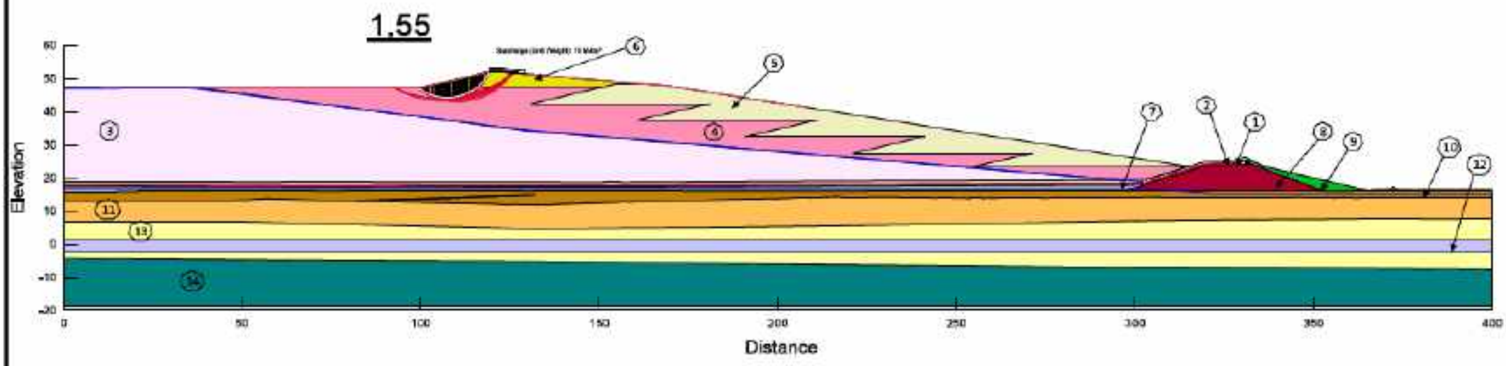
Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited	
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section C – Peak Undrained – Upstream		Wagerup RSA10	
By	MN	SO	02-Sep-25		Figure	C3,3
Revision	2		02-Sep-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



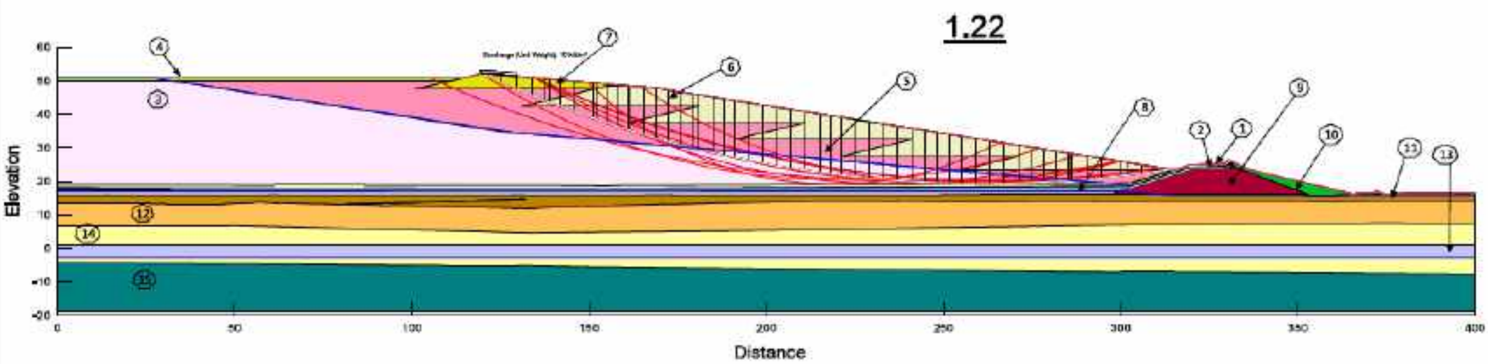
Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section C – Peak Undrained – Downstream		Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2	02-Sep-25			Figure C3.4

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,16		2	0	No
4	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	0	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	18	0	30				2	0	No
6	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	18	0	30				2	0	No
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0,20		1	0	No
8	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section C - Post-seismic - Upstream		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision		2	02-Sep-25			Figure C3,5

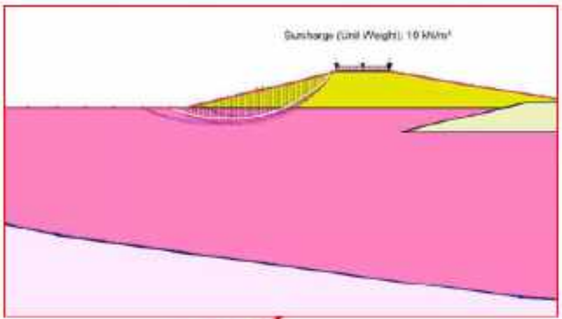
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B – Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

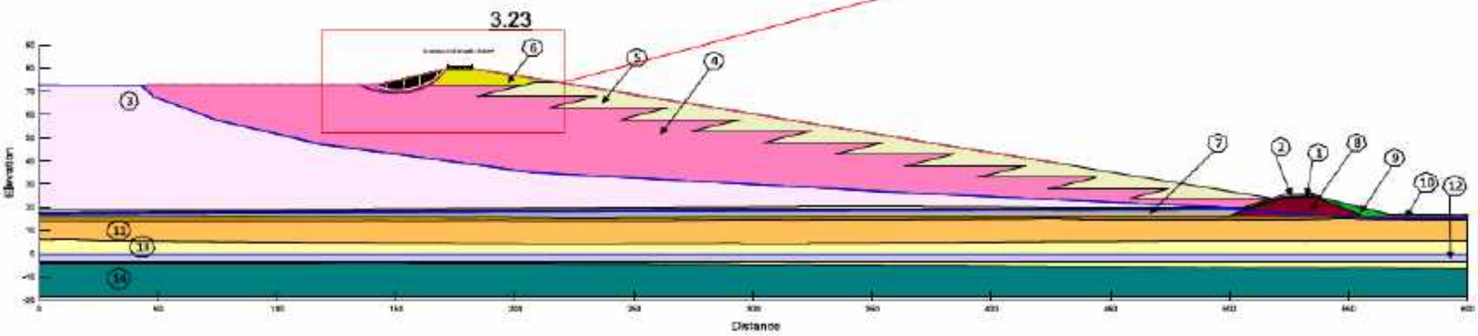


Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section C – Post-seismic – Downstream		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision	2		02-Sep-25			Figure C3.6

C.4 Section D - Ultimate Embankment

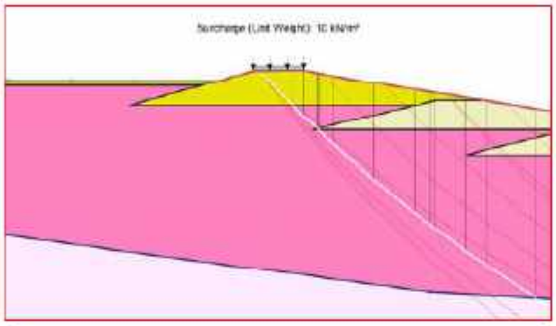
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
4	M3 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
5	S1 - Proposed Residue Sand Raises	Mohr-Columb	18	0	36	2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Columb	18	0	36	2	0	No
7	Unit 1A - Engineered FILL	Mohr-Columb	20	5	23	1	0	No
8	Unit 1B - Embankment	Mohr-Columb	20	5	32	1	0	No
9	Unit 2 - TOPSOIL (Silty/ Clayey SAND/ CLAY) - Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
10	Unit 3 – CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
12	Unit 6B – Silty/Clayey layers (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	16	0	35	1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No

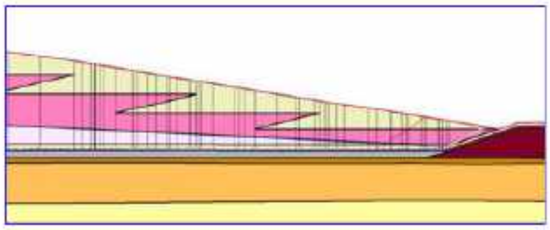


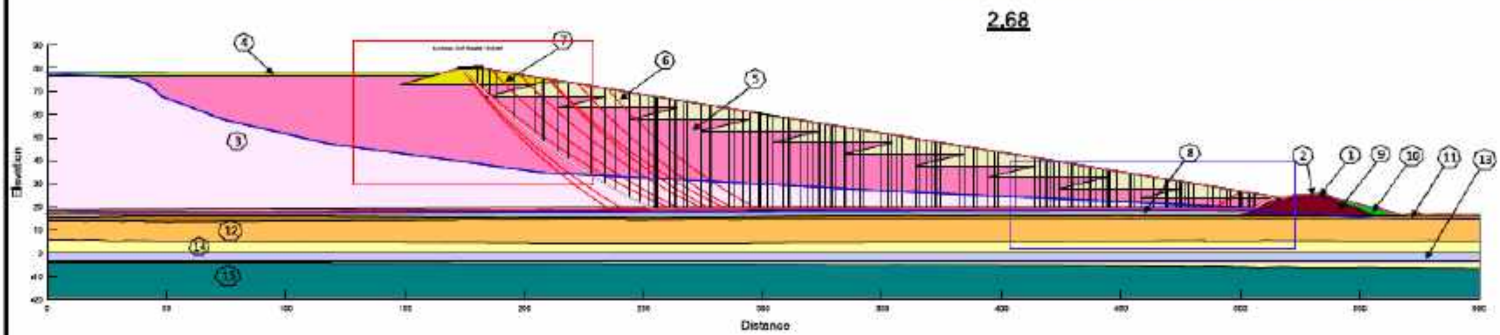


Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section D - Peak Drained - Upstream		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision		2	02-Sep-25			Figure C4.1

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Coulomb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Coulomb	16.5	0	34	2	0	No
4	M2 – Thickened Residue Mud	Mohr-Coulomb	16.5	0	34	2	0	No
5	M3 – Thickened Residue Mud	Mohr-Coulomb	16.5	0	34	2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	18	0	36	2	0	No
7	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	18	0	36	2	0	No
8	Unit 1A – Engineered FILL	Mohr-Coulomb	20	5	23	1	0	No
9	Unit 1B – Embankment	Mohr-Coulomb	20	5	32	1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26	1	0	No
11	Unit 3 – CLAY (Guildford Fm)	Mohr-Coulomb	20	5	23	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Coulomb	18	5	32	1	0	No
13	Unit 6B – Silty/Clayey layers (Ascot Fm)	Mohr-Coulomb	18	5	32	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35	1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33	1	0	No



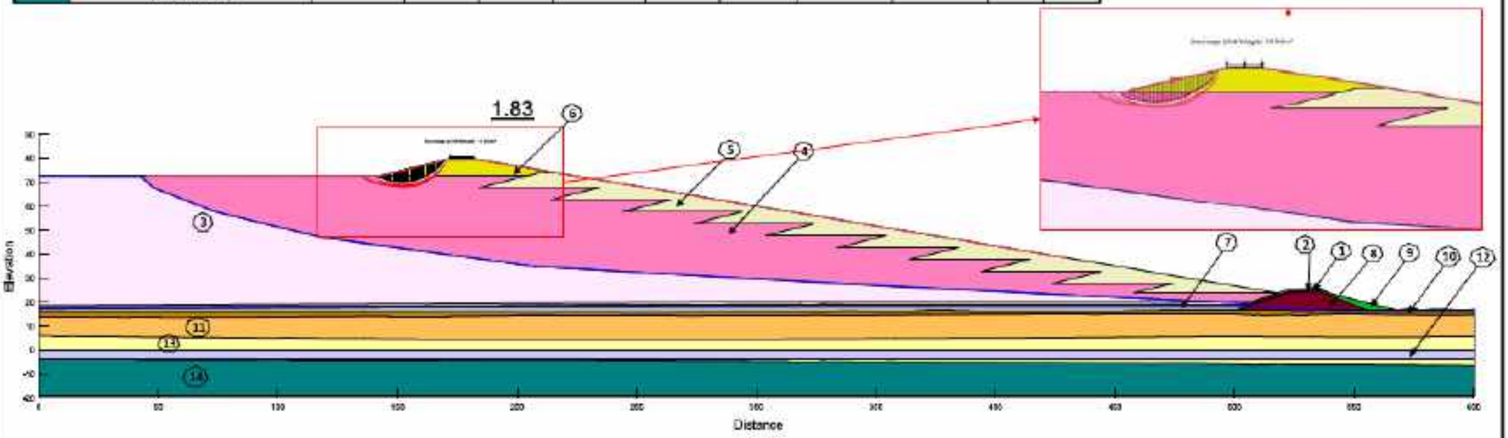




Job number	H374430		Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D – Peak Drained – Downstream	Wagerup RSA10
By	MN	SC	02-Sep-25	
Revision	2	02-Sep-25		Figure C4.2

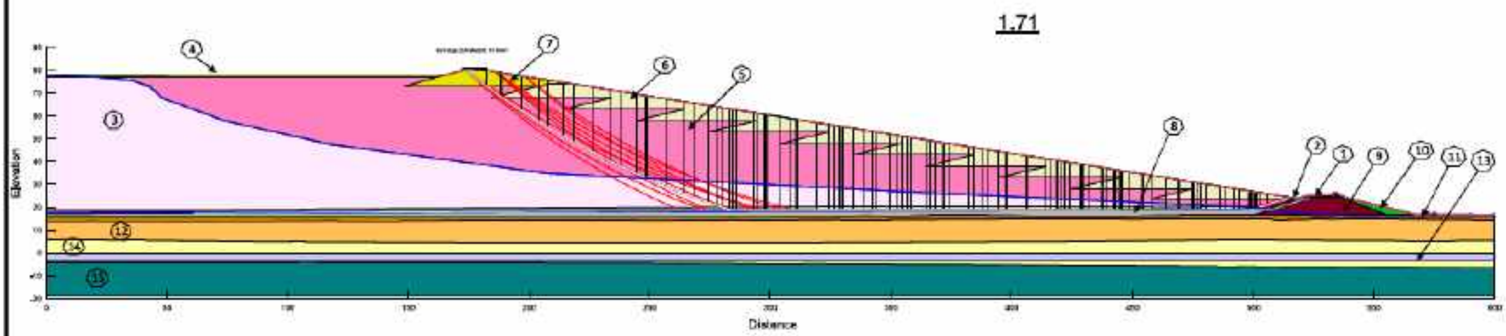
HATCH

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
8	Unit 1B – Embankment	Mohr-Coulomb	20	5	32				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	19	0	35				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



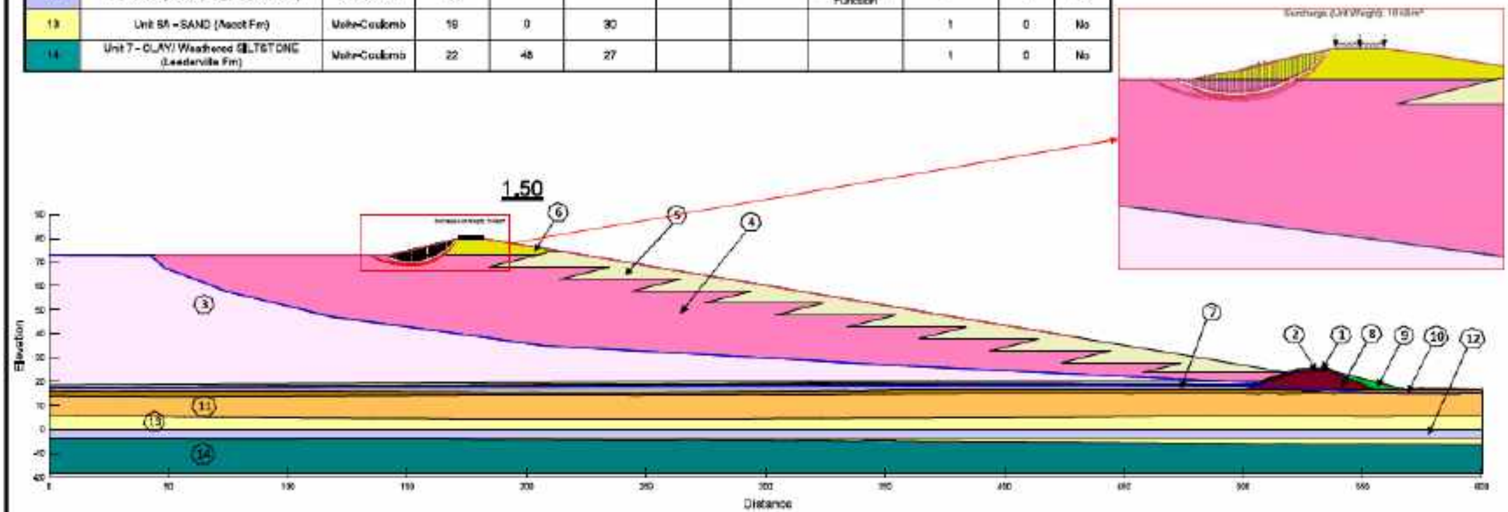
Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section D – Peak Undrained – Upstream		Wagerup RSA10
By	MN / SC / 02-Sep-25			
Revision	2 / 02-Sep-25			Figure C4.3

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



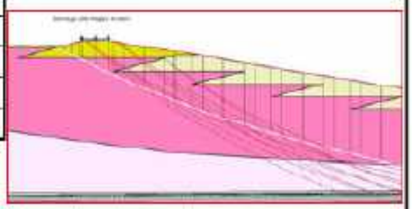
Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited	
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D - Peak Undrained - Downstream		Wagerup RSA10	
By	MN	SC	02-Sep-25		Figure	C4.4
Revision	2	02-Sep-25				

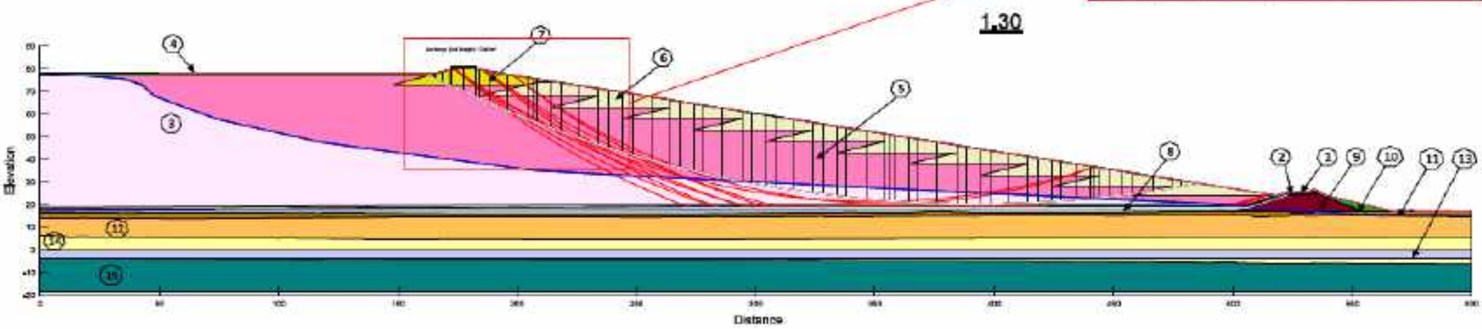
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,16		2	0	No
4	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	0	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0,20		1	0	No
8	Unit 1B – Embankment	Mohr-Coulomb	20	4	26				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	30				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section D - Post-seismic - Upstream		Wagerup RSA10
By	MN / SC / 02-Sep-25			Figure C4.5
Revision	2 / 02-Sep-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,16		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16,5			0	0,16		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0,20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



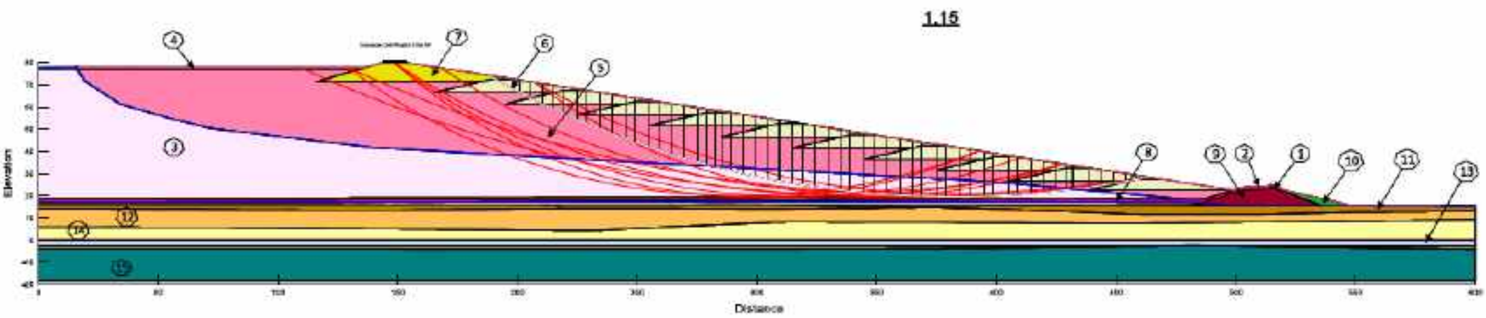


Job number	H374450		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374450-0000-2A0-230-0005.slz		Stability Analysis Section D - Post-seismic - Downstream		Wagerup RSA10
By	MN	SC	02-Sep-25			Figure C4,6
Revision	2	02-Sep-25				

Appendix D
Sensitivity Analysis

D.1 Section B Ultimate Embankment - Post-seismic Residue Strength

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430			Wagerup RSA10 FEL3
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section B – Post-seismic – Downstream (Design Case)
By	MN	SC	02-Sep-25	
Revision	2		02-Sep-25	

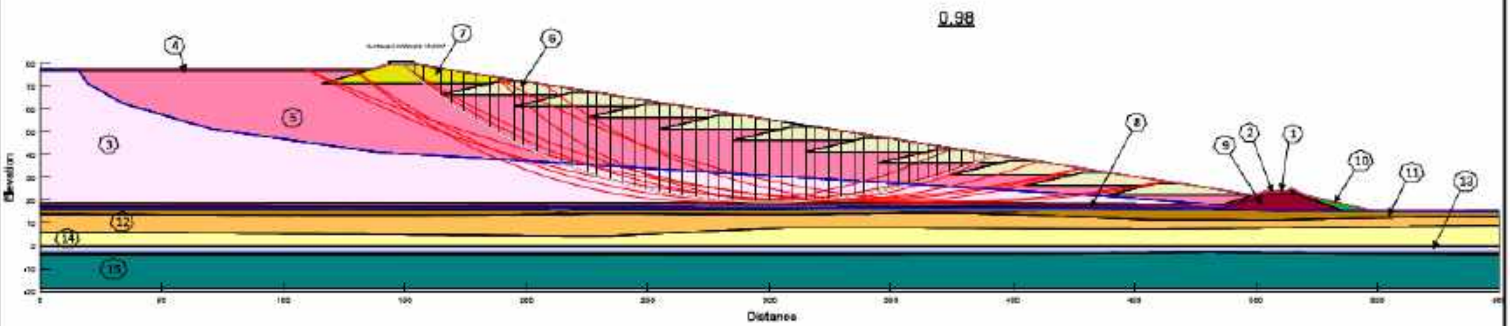
HATCH

Alcoa of Australia Limited

Wagerup RSA10

Figure D1.1

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.10		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.10		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



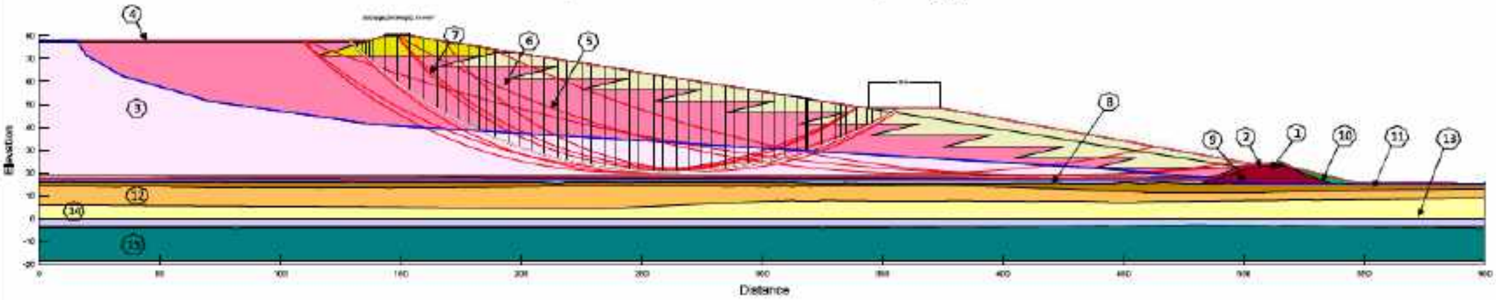
Job number	H374430			Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section B - Post-seismic - Downstream (Su/p = 0.10)	Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision		2	02-Sep-25		Figure D1.2

HATCH

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.10		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.10		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

Buttress Construction to RL 48.5 m

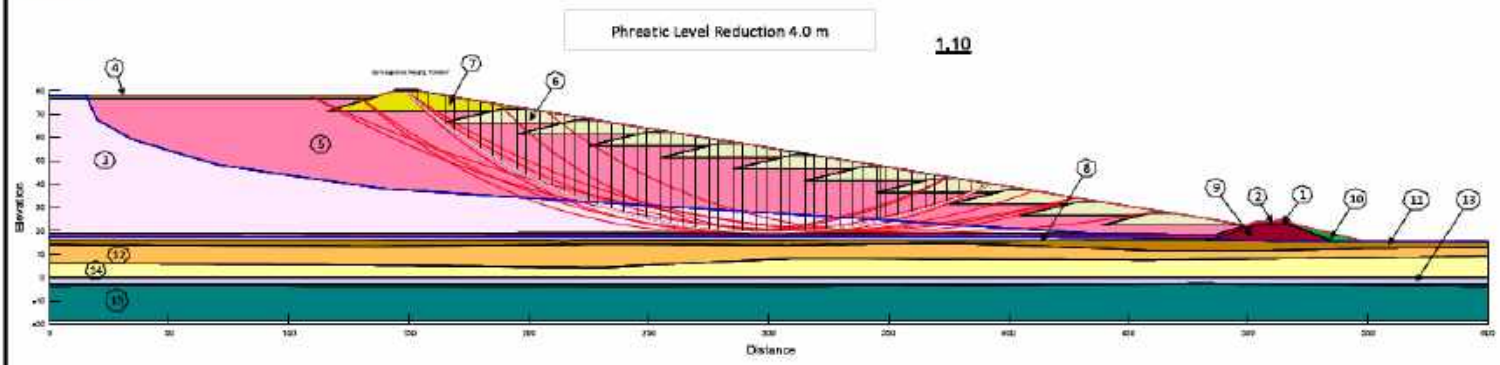
1.10



Job number	H374430		Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B - Post-seismic - Downstream (Su/p = 0.10)	Wagerup RSA10
By	MN	SC	02-Sep-25	
Revision	2	02-Sep-25		Figure D1.3

HATCH

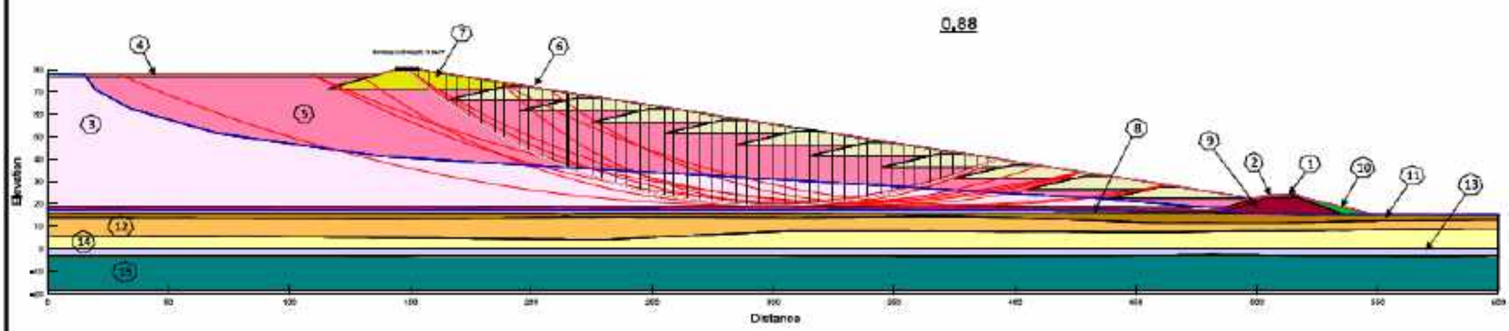
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.10		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.10		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B – Post-seismic – Downstream (Su/p = 0.10)	Wagerup RSA10
By	MN	SC	02-Sep-25	
Revision	2	02-Sep-25		Figure D1.4

HATCH

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.08		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.08		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

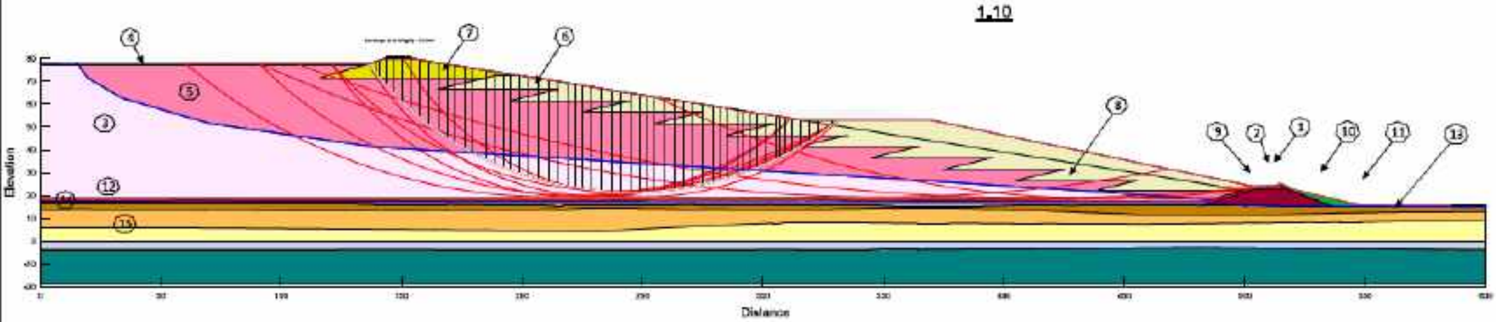


Job number	H374430		Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B - Post-seismic - Downstream (Su/p = 0.08)	Wagerup RSA10
By	MN	SC	02-Sep-25	
Revision	2	02-Sep-25		Figure D1.5

HATCH

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.08		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.08		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

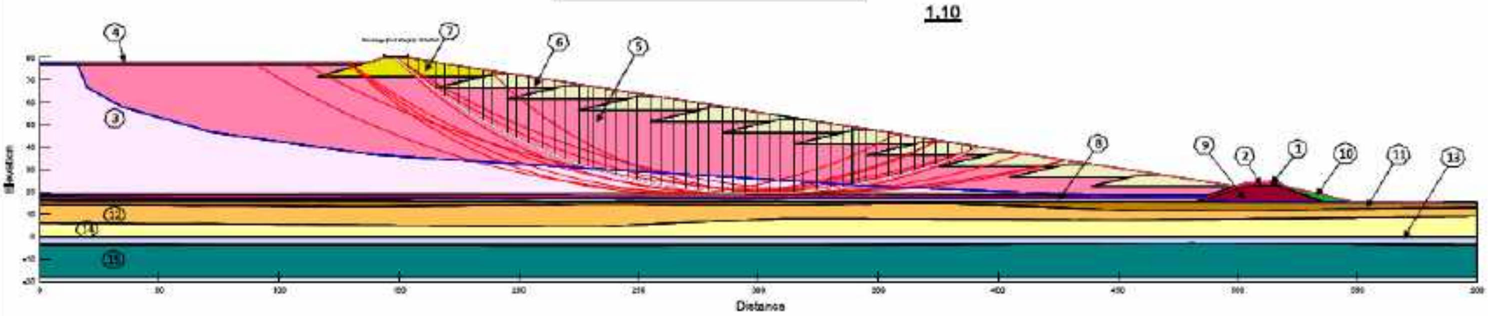
Buttress Construction to RL 53.0 m



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B - Post-seismic - Downstream (Su/p = 0.08)		Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2	02-Sep-25			Figure D1.6

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.08		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.08		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

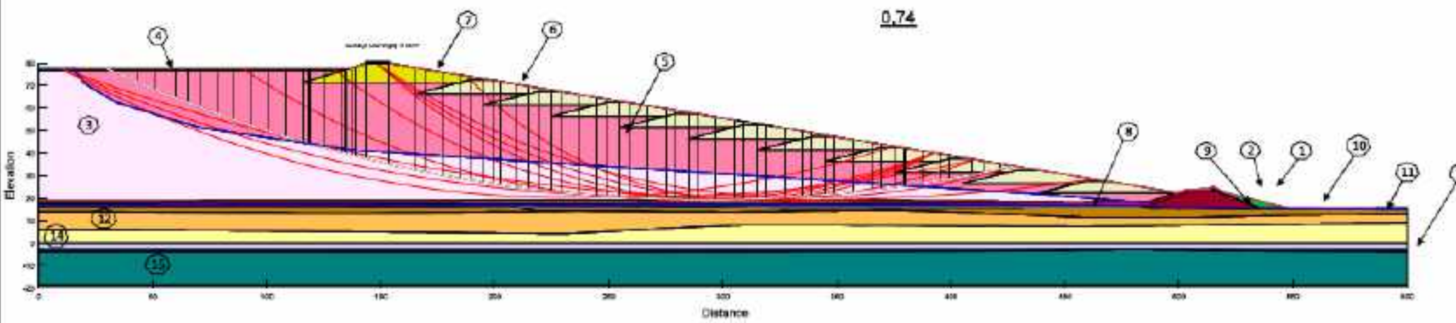
Phreatic Level Reduction 5.5 m



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B - Post-seismic - Downstream (Su/p = 0.08)		Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2	02-Sep-25			Figure D1.7

D1.7

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.05		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.05		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430			Wagerup RSA10 FEL3
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section B - Post-seismic - Downstream (Su/p = 0.05)
By	MN	SO	08-Jul-25	
Revision		1	08-Jul-25	

HATCH

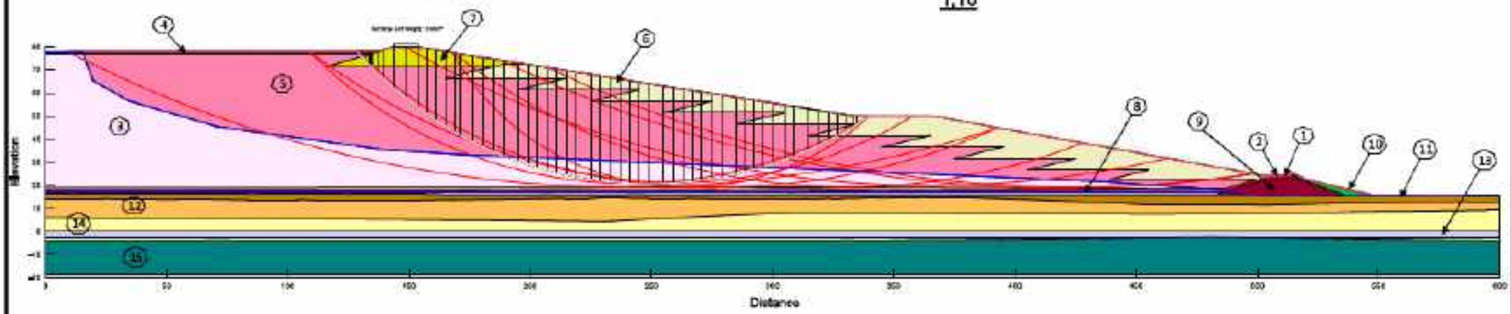
Alcoa of Australia Limited

Wagerup RSA10

Figure D1.8

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.05		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.05		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B – Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

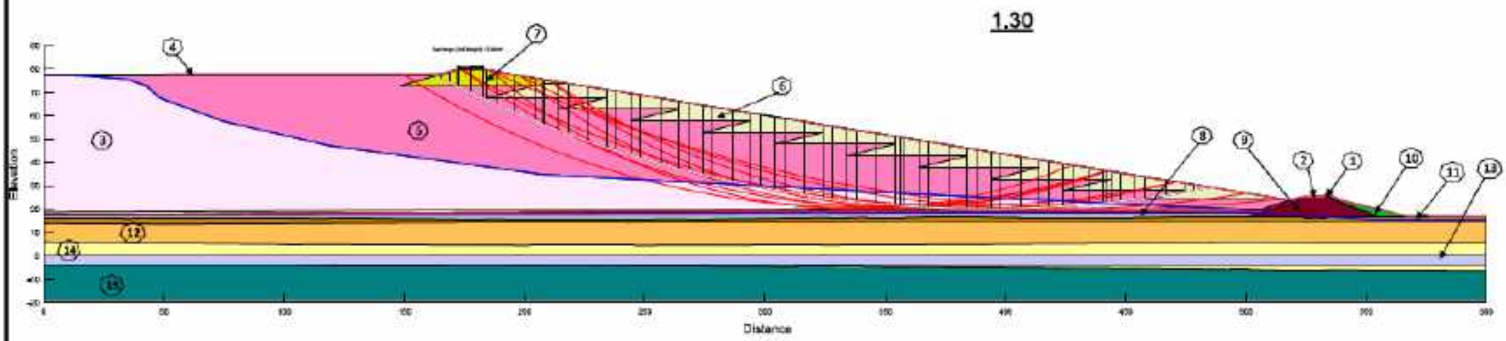
Buttress Construction to RL 50 m &
5.0 m Reduction in Phreatic Surface



Job number		H374450		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374450-0000-2A0-230-0005.xls			Stability Analysis Section B – Post-seismic – Downstream (Su/p = 0.05)		Wagerup RSA10
By	MN	SC	08-Jul-25			Figure D1.9
Revision		1	08-Jul-25			

D.2 Section D Ultimate Embankment - Post-seismic Residue Strength

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430			Wagerup RSA10 FEL3
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section D - Post-seismic - Downstream (Design Case)
By	MN	SC	02-Sep-25	
Revision	2		02-Sep-25	

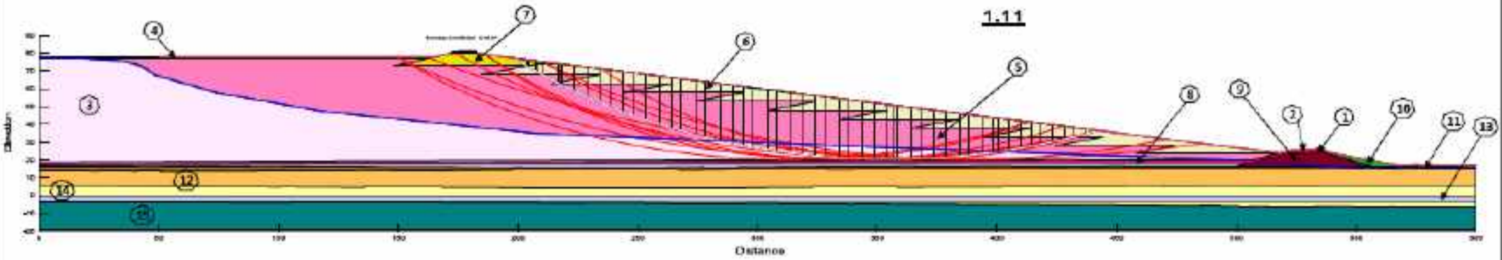
HATCH

Alcoa of Australia Limited

Wagerup RSA10

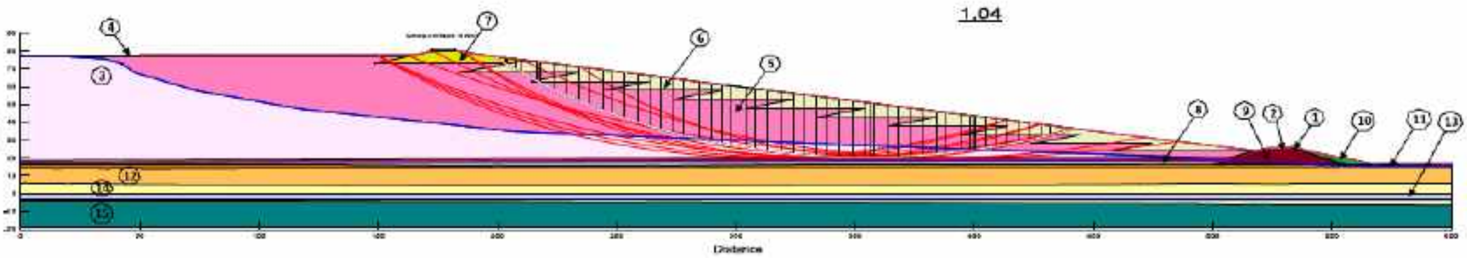
Figure D2.1

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.10		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.10		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D – Post-seismic – Downstream (Su/p – 0.10)		Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2	02-Sep-25			Figure D2.2

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.08		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.08		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374450			Wagerup RSA10 FEL3
Ref	H374450-0000-2A0-230-0005.xls			Stability Analysis Section D – Post-seismic – Downstream (Su/p = 0.08)
By	MN	SC	02-Sep-25	
Revision	2		02-Sep-25	

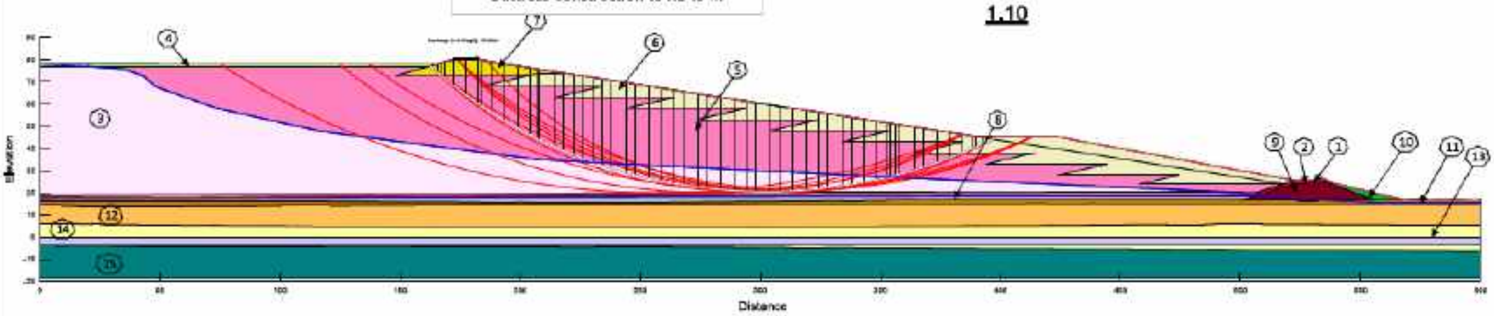
HATCH

Alcoa of Australia Limited

Wagerup RSA10

Figure D2.3

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,08		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16,5			0	0,08		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0,20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

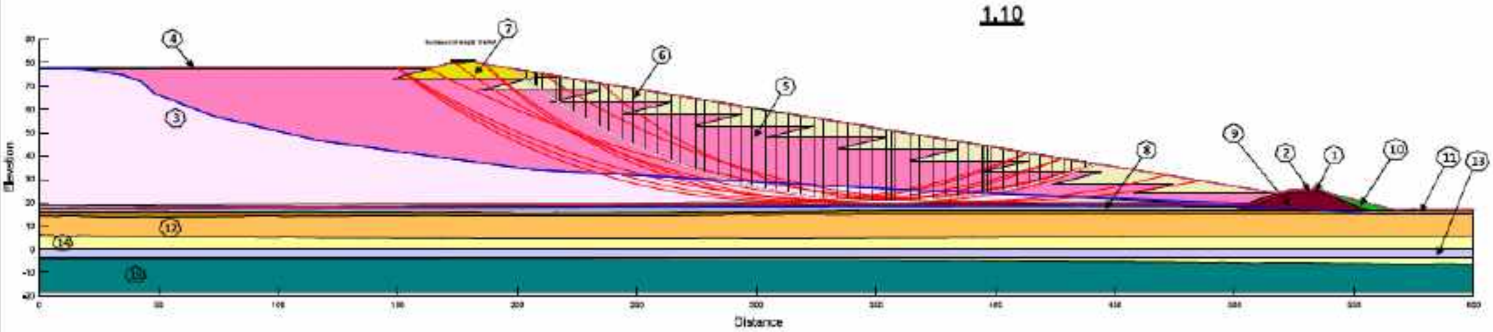


Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D - Post-seismic - Downstream (Su/p = 0.08)		Wagerup RSA10
By	MN	SC	02-Sep-25		Figure D2.4
Revision	2	02-Sep-25			

D2.4 | [illegible]

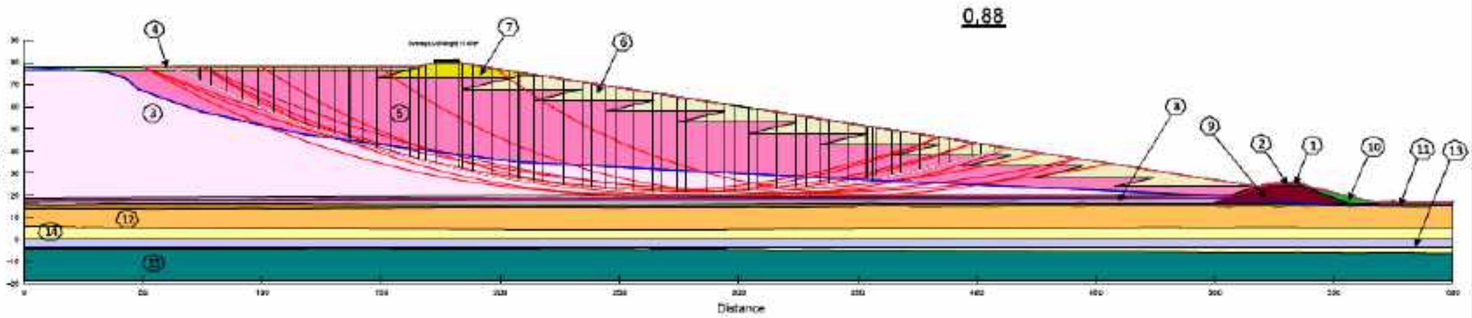
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,08		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16,5			0	0,08		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0,20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

Phreatic Level Reduction 1.0 m



Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section D – Post-seismic – Downstream (Su/p – 0.08)		Wagerup RSA10
By	MN	SC	02-Sep-25			Figure D2.5
Revision		2	02-Sep-25			

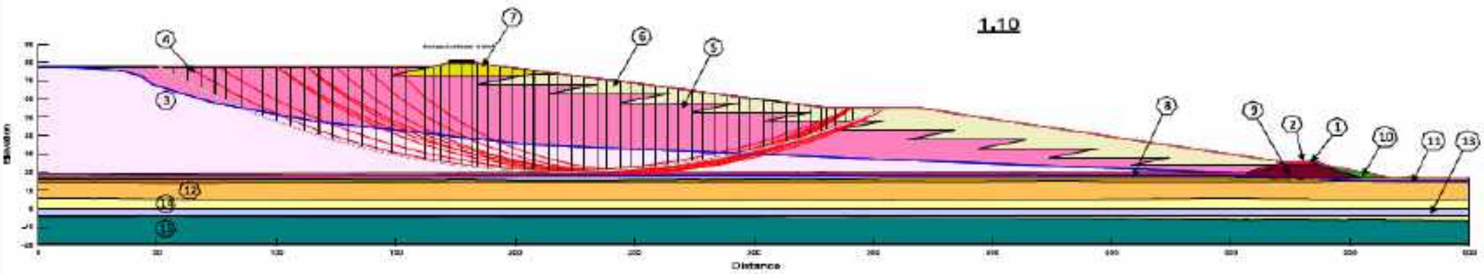
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.05		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.05		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section D – Post-seismic – Downstream (Su/p = 0.05)		Wagerup RSA10
By	MN / SC / 02-Sep-25			Figure D2.6
Revision	2 / 02-Sep-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.05		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.05		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

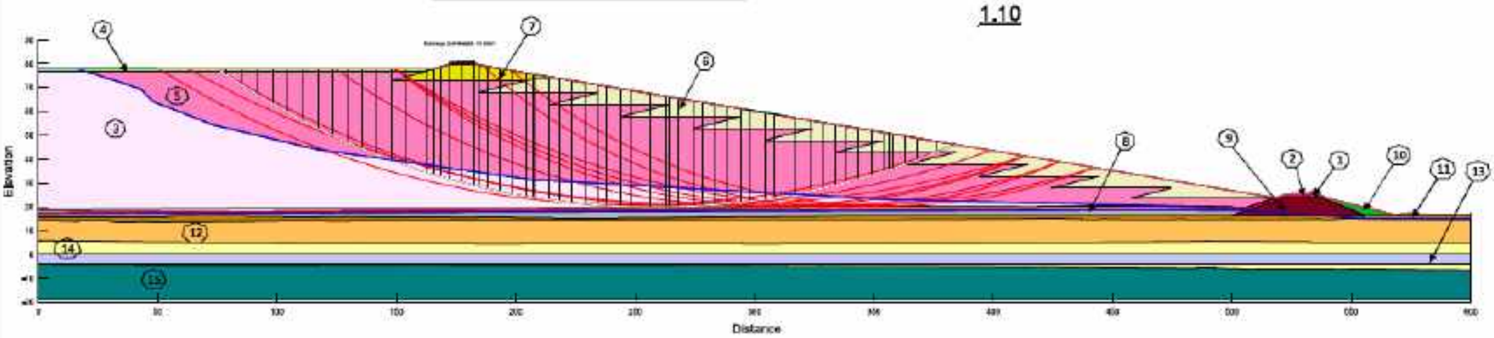
Buttress Construction to RL 55 m



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D – Post-seismic – Downstream (Su/p – 0.05)		Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2	02-Sep-25			Figure D2.7

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.05		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.05		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

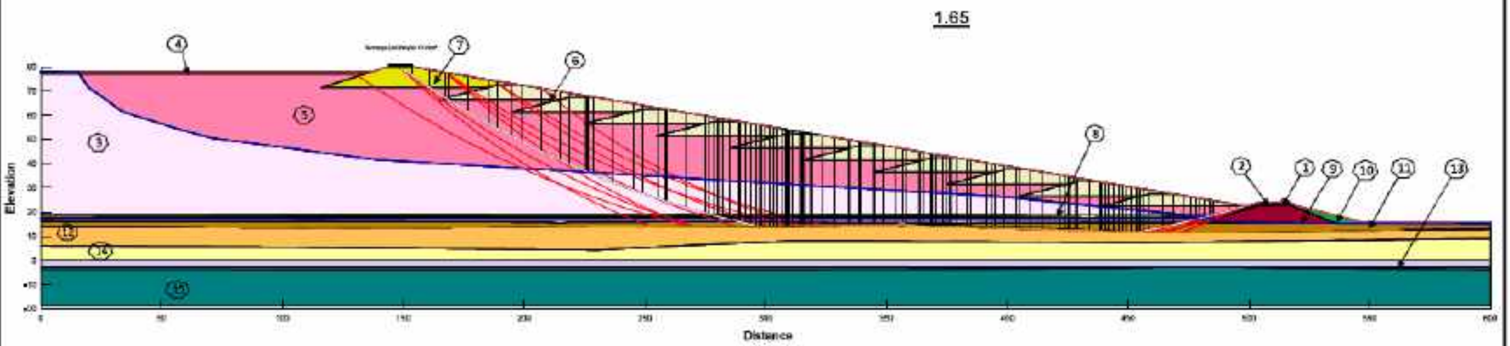
Phreatic Level Reduction 3.5 m



Job number	H374450			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374450-0000-2A0-230-0005.xls			Stability Analysis Section D – Post-seismic – Downstream (Su/p – 0.05)		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision	2		02-Sep-25			Figure D2.8

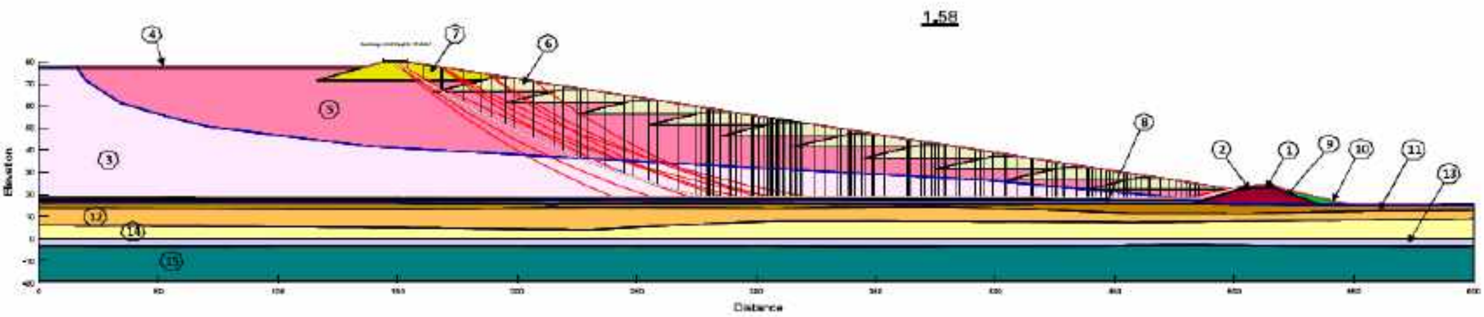
D.3 Section B Ultimate Embankment - Foundation Clay Undrained Strength

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



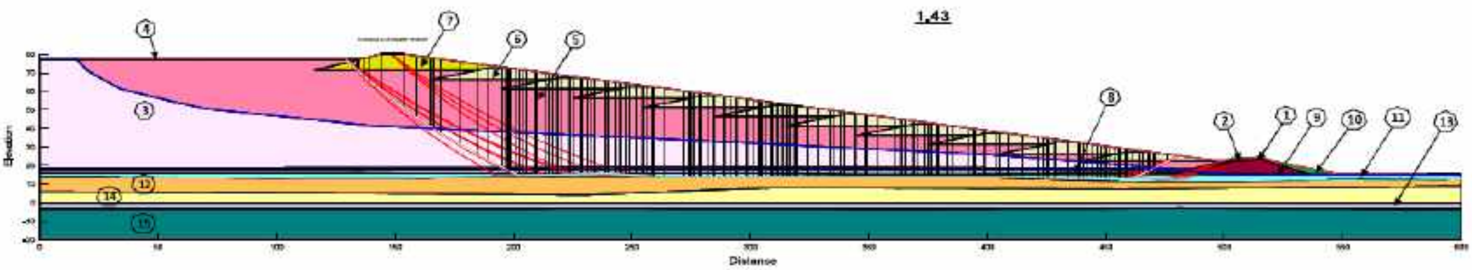
Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B – Peak Undrained – Downstream Unit 3 – Su/p – 0.22 – Foundation Failure		Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2	02-Sep-25			Figure D3.1

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



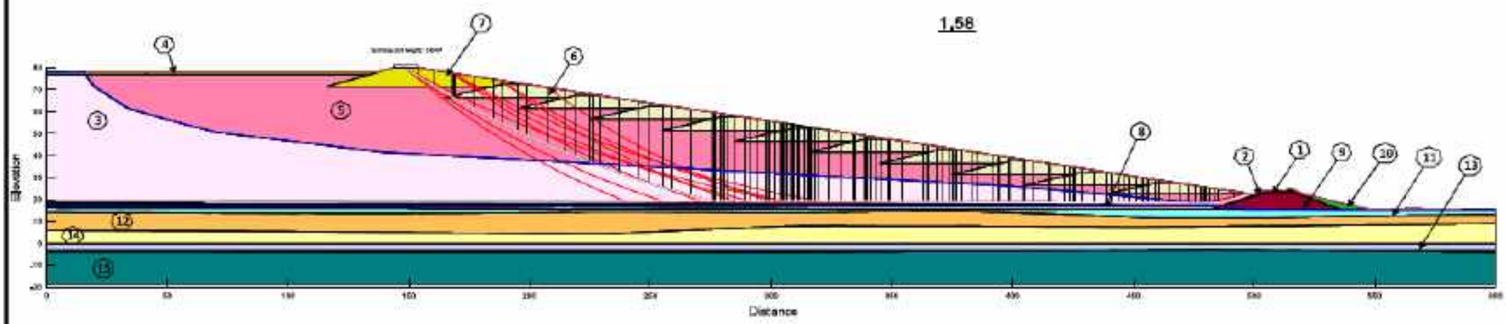
Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section B – Peak Undrained – Downstream Unit 3 – Su/p – 0.22 – Residue Failure		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision	2		02-Sep-25			Figure D3.2

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm) – 0,18	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



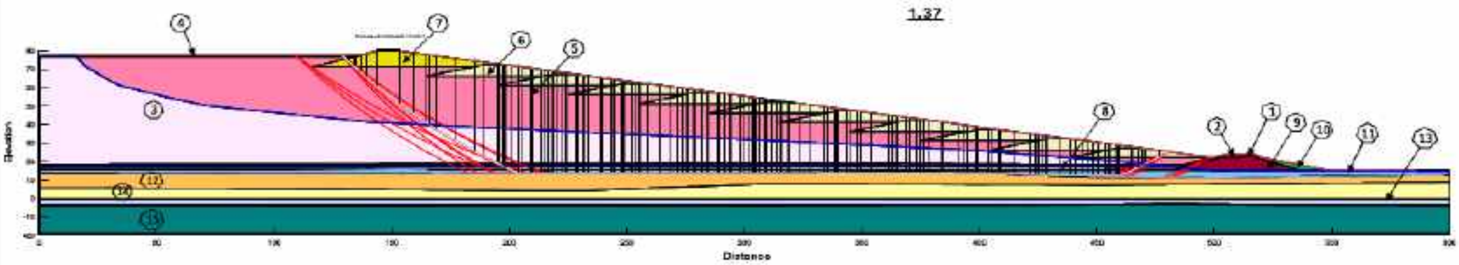
Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section B – Peak Undrained – Downstream Unit 3 – Sulp – 0.18 – Foundation Failure		Wagerup RSA10
By	MN / SC / 02-Sep-25			Figure D3,3
Revision	2 / 02-Sep-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm) – 0,18	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



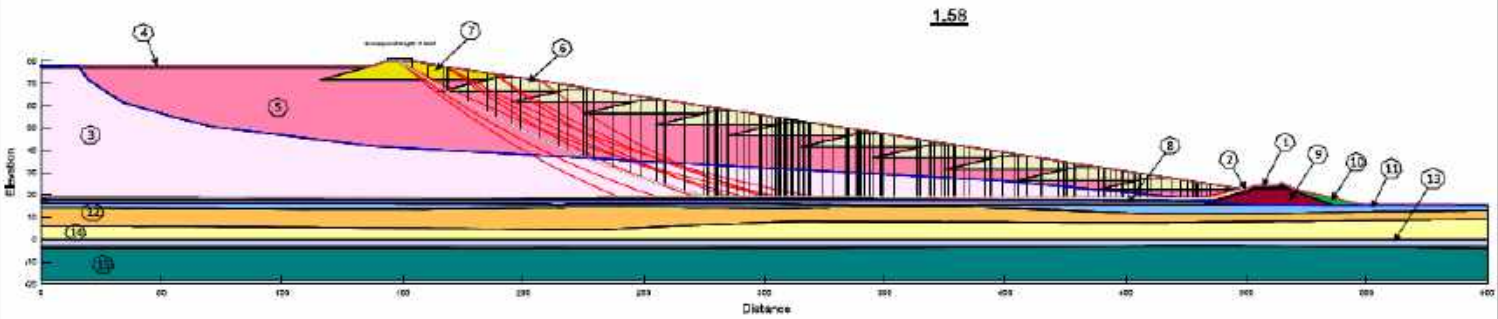
Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B – Peak Undrained – Downstream Unit 3 – Sulp – 0,18 – Residue Failure		Wagerup RSA10
By	MN	SC	02-Sep-25		Figure D3,4
Revision	2	02-Sep-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B – Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm) – 0.14	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 5 – Cemented SAND / CLAY and GRAVEL (Guildford Fm)	SHANSEP	21			0		Shear – Normal Function	1	0	No
14	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B – Peak Undrained – Downstream Unit 3 – Su/p – 0.14 – Foundation Failure		Wagerup RSA10
By	MN	SC	02-Sep-25		Figure D3.5
Revision	2	02-Sep-25			

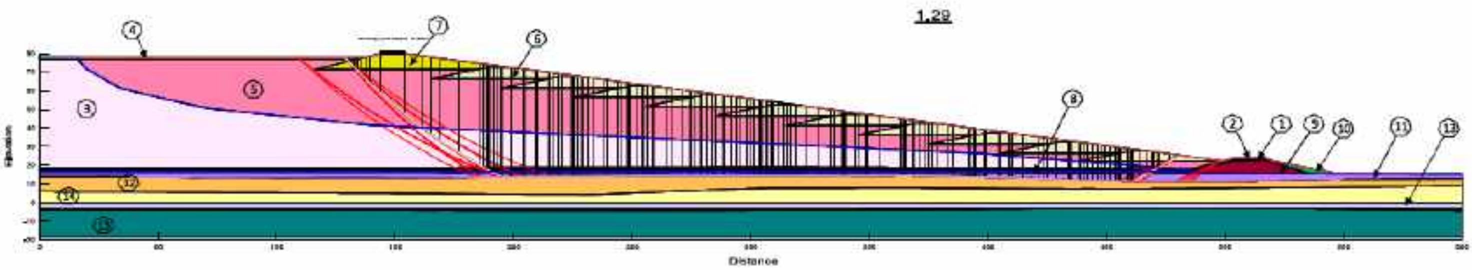
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm) – 0.14	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 5 - Cemented SAND / CLAY and GRAVEL (Guildford Fm)	SHANSEP	21			0		Shear – Normal Function	1	0	No
14	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B – Peak Undrained – Downstream Unit 3 – Su/p - 0.14 – Residue Failure	Wagerup RSA10
By	MN	SC	02-Sep-25	
Revision	2	02-Sep-25		Figure D3.6

HATCH

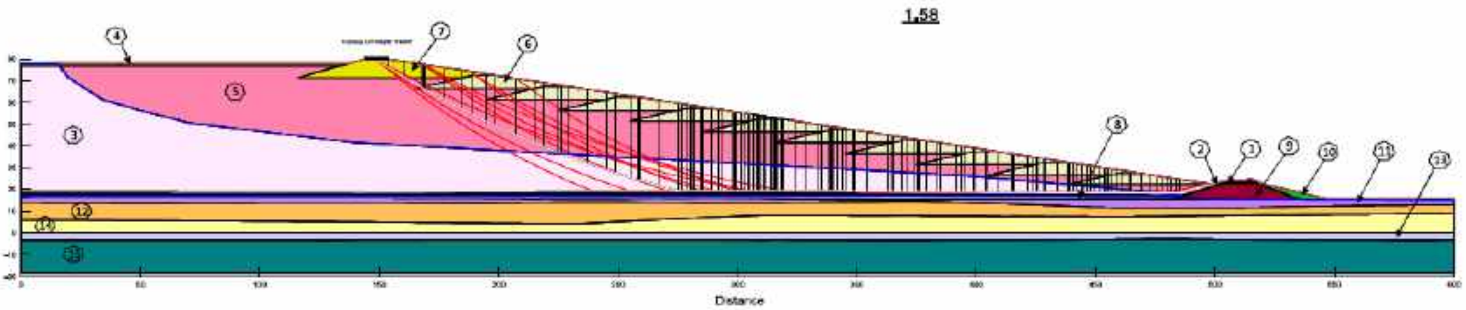
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm) – 0.10	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 5 - Cemented SAND / CLAY and GRAVEL (Guildford Fm)	SHANSEP	21			0		Shear – Normal Function	1	0	No
14	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374450			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374450-0000-2A0-230-0005.xls			Stability Analysis Section B - Peak Undrained - Downstream Unit 3 - Su/p - 0.10 - Foundation Failure		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision		2	02-Sep-25			Figure D3.7

D3.7

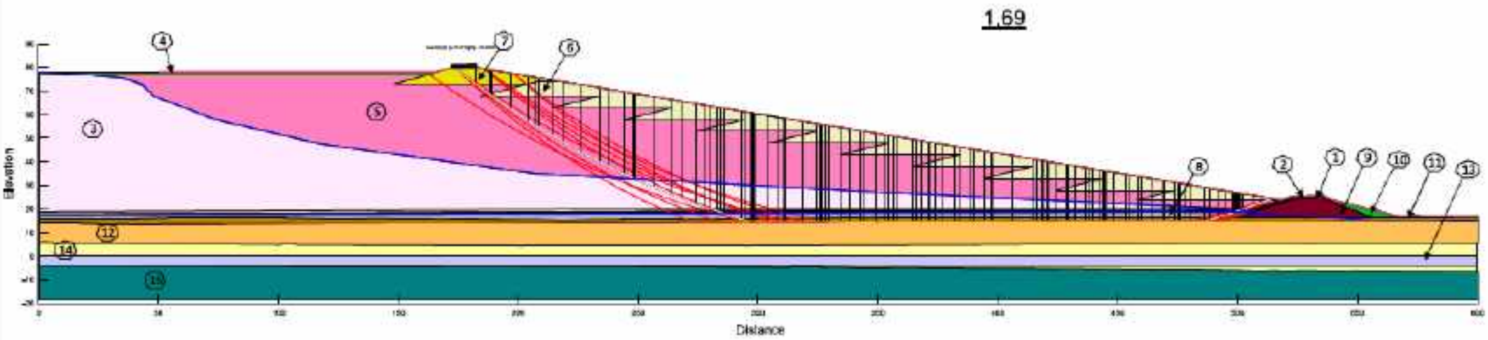
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
9	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm) – 0,10	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 5 - Cemented SAND / CLAY and GRAVEL (Guildford Fm)	SHANSEP	21			0		Shear – Normal Function	1	0	No
14	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B – Peak Undrained – Downstream Unit 3 – Su/p - 0.10 – Residue Failure		Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2	02-Sep-25			Figure D3,8

D.4 Section D Ultimate Embankment - Foundation Clay Undrained Strength

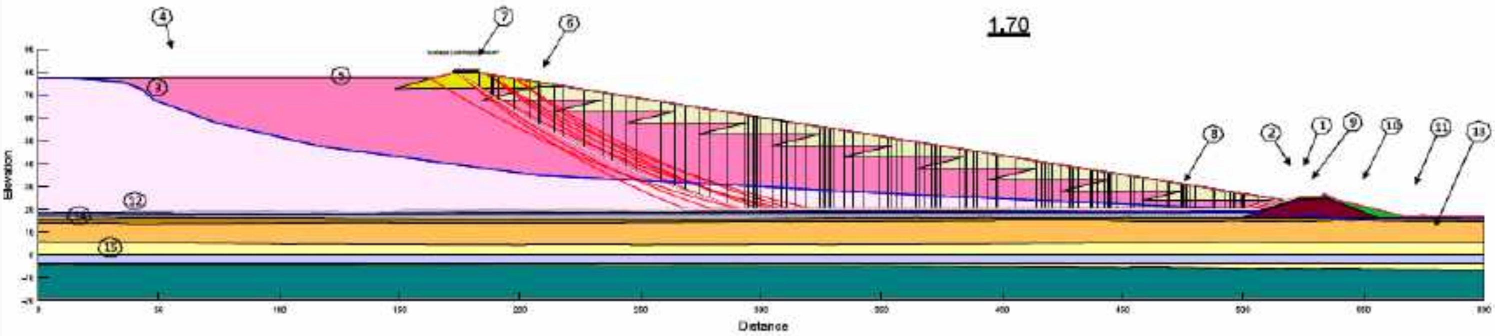
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430			Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xlsx			Stability Analysis Section D - Peak Undrained - Downstream Unit 3 - Su/p - 0.22 - Foundation Failure	Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2		02-Sep-25		Figure D4.1

HATCH

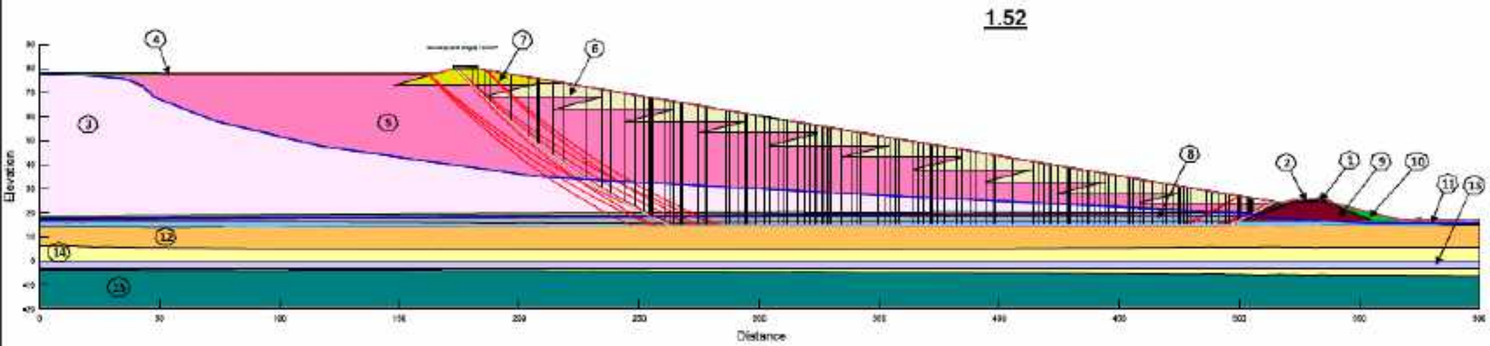
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D – Peak Undrained – Downstream Unit 3 – Sulp – 0.22 – Residue Failure	Wagerup RSA10
By	MN	SC	02-Sep-25	
Revision	2	02-Sep-25		Figure D4.2

HATCH

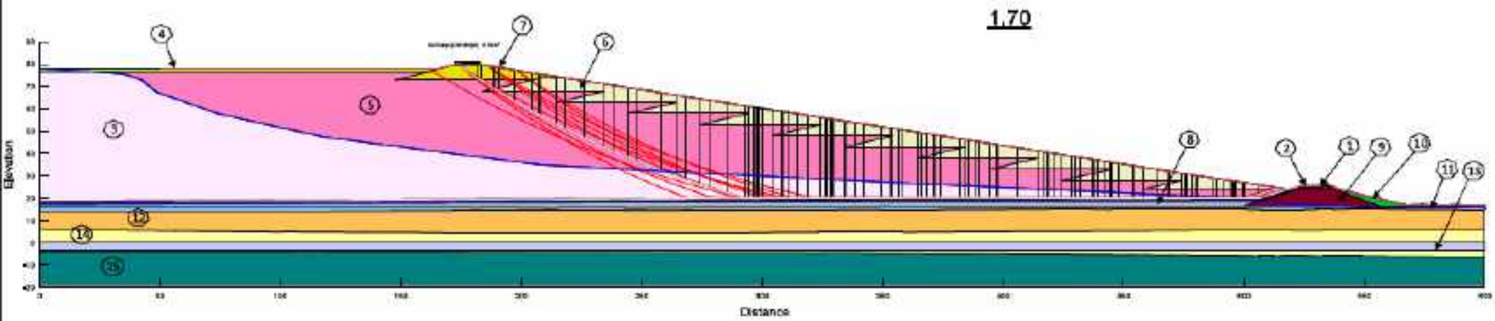
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430			Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section D - Peak Undrained - Downstream Unit 3 - Su/p - 0.18 - Foundation Failure	Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2		02-Sep-25		Figure D4.3

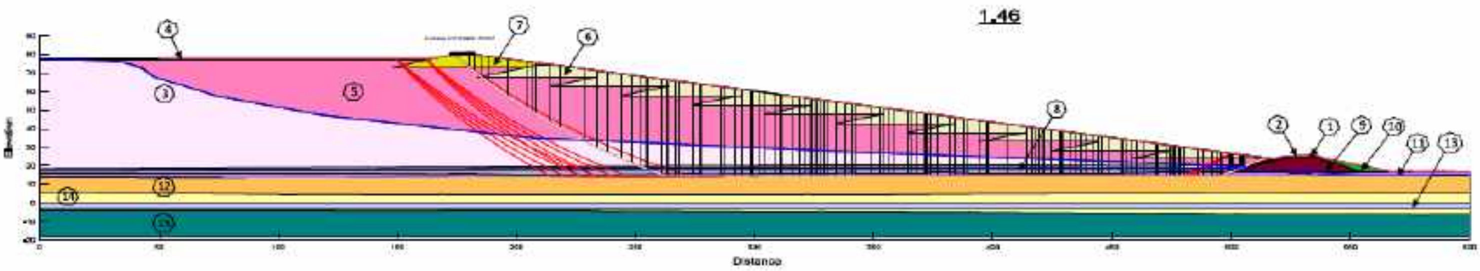
HATCH

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section D – Peak Undrained – Downstream Unit 3 – Sulp – 0.18 – Residue Failure		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision	2		02-Sep-25			Figure D4.4

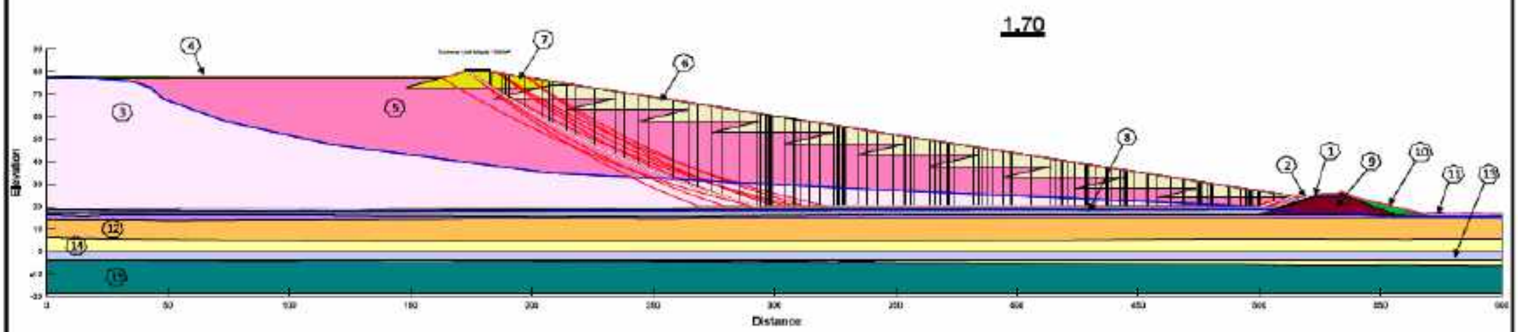
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	28				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430			Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section D - Peak Undrained - Downstream Unit 3 - Su/p - 0.14 - Foundation Failure	Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2		02-Sep-25		Figure D4,5

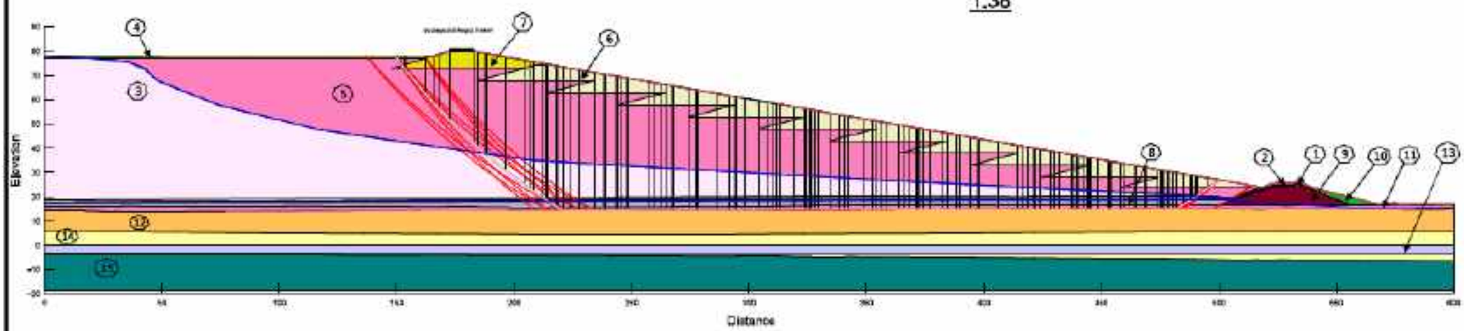
HATCH

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section D – Peak Undrained – Downstream Unit 3 – Sulp – 0.14 – Residue Failure		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision	2		02-Sep-25			Figure D4,6

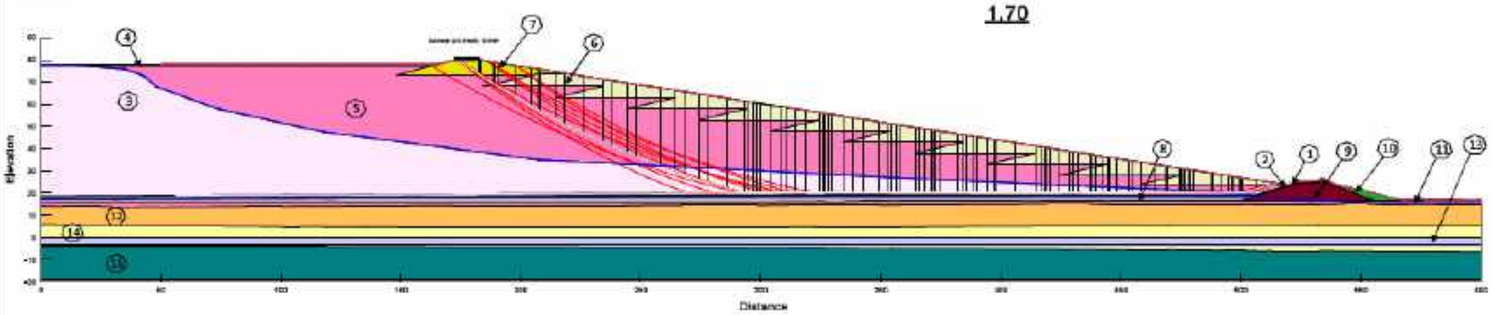
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis		Wagerup RSA10
By	MN / SC / 02-Sep-25	Section D – Peak Undrained – Downstream Unit		
Revision	2 / 02-Sep-25	3 – Su/p – 0.10 – Foundation Failure		Figure D4.7

D4.7

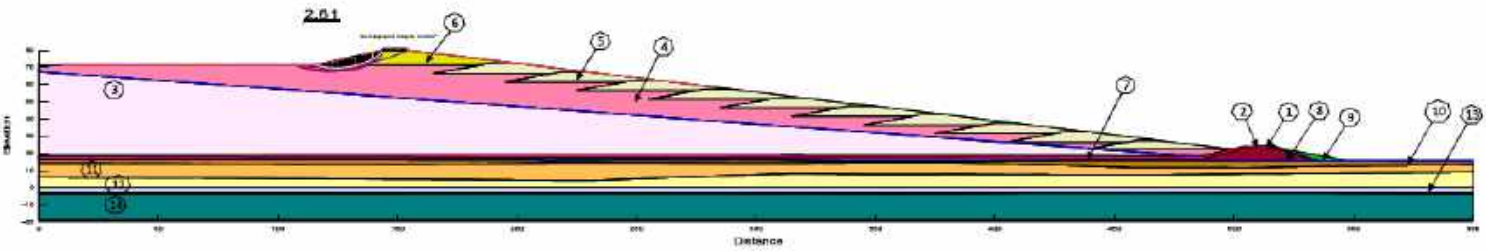
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
9	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis		Wagerup RSA10
By	MN	SC	02-Sep-25	Section D – Peak Undrained – Downstream Unit		
Revision	2	02-Sep-25	3 – Sulp – 0.10 – Residue Failure		Figure D4.8

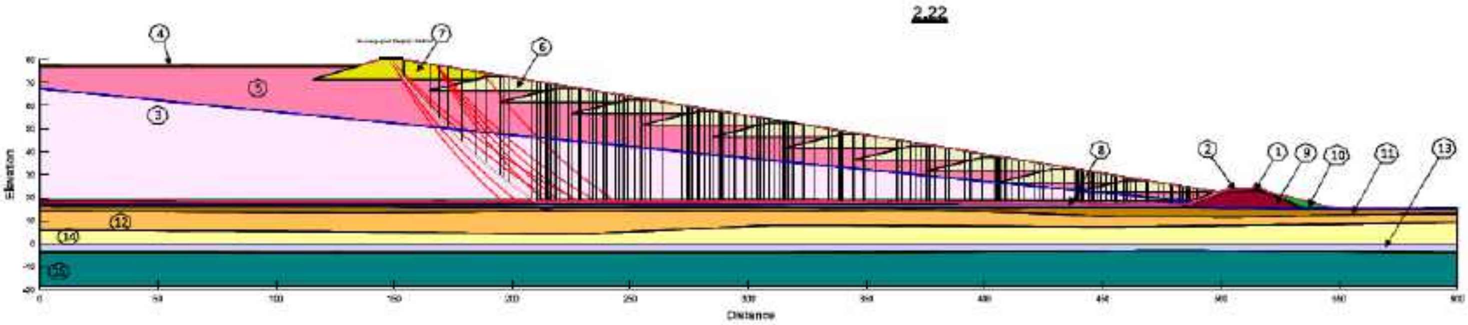
D.5 Section B Ultimate Embankment - Phreatic in Residue Mud

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
4	M3 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
5	S1 – Proposed Residue Sand Raises	Mohr-Columb	19	0	36	2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Columb	19	0	36	2	0	No
7	Unit 1A – Engineered FILL	Mohr-Columb	20	5	23	1	0	No
8	Unit 1B – Embankment	Mohr-Columb	20	5	32	1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
10	Unit 3 – CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
12	Unit 6B – Silty/Clayey layers (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	19	0	35	1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	35	1	0	No



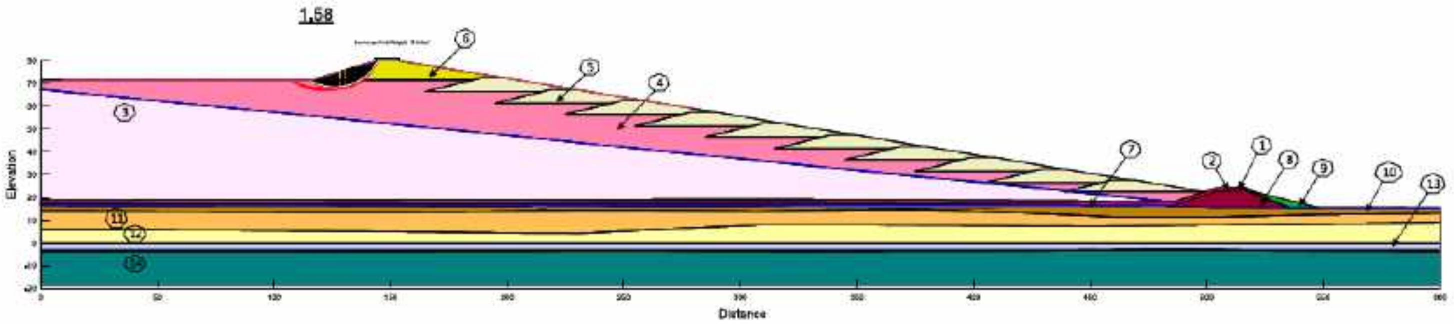
Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B 80m Raise – Upstream – Peak Drained (Sat/Unsat Phreatic Surface)		Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2	02-Sep-25			Figure D5.1

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
4	M2 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
5	M3 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Columb	19	0	36	2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Columb	19	0	36	2	0	No
8	Unit 1A – Engineered FILL	Mohr-Columb	20	5	23	1	0	No
9	Unit 1B - Embankment	Mohr-Columb	20	5	32	1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
11	Unit 3 – CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
13	Unit 6B - Silty/Clayey layers (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	18	0	35	1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No



Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section B 80m Raise – Downstream – Peak Drained (Sat/Unsat Phreatic Surface)		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision	2		02-Sep-25			Figure D5.2

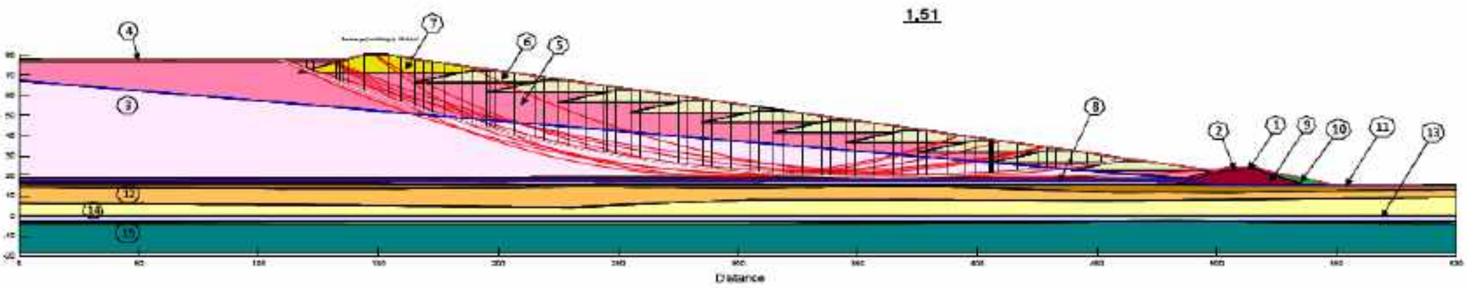
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
8	Unit 1B – Embankment	Mohr-Coulomb	20	5	32				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	35				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	35				1	0	No



Job number	H374450		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited	
Ref	H374450-0000-2A0-230-0005.xls		Stability Analysis Section B 80m Raise – Upstream – Peak Undrained (Sat/Unsat Phreatic Surface)		Wagerup RSA10	
By	MN	SC	02-Sep-25		Figure	D5.3
Revision	2	02-Sep-25				

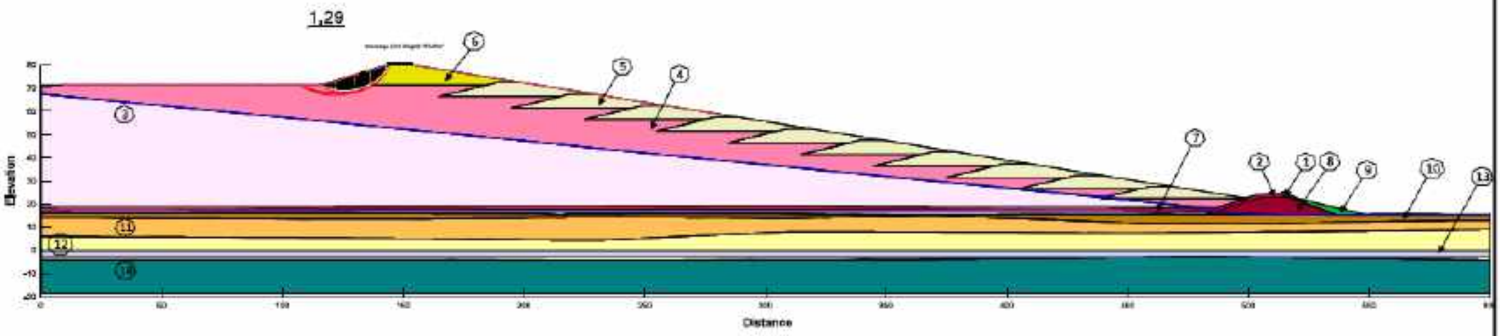
D5.3

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374450		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited	
Ref	H374450-0000-2A0-230-0005.xls		Stability Analysis Section B 80m Raise – Downstream – Peak Undrained (Sat/Unsat Phreatic Surface)		Wagerup RSA10	
By	MN	SC	02-Sep-25		Figure	D5.4
Revision	2	02-Sep-25				

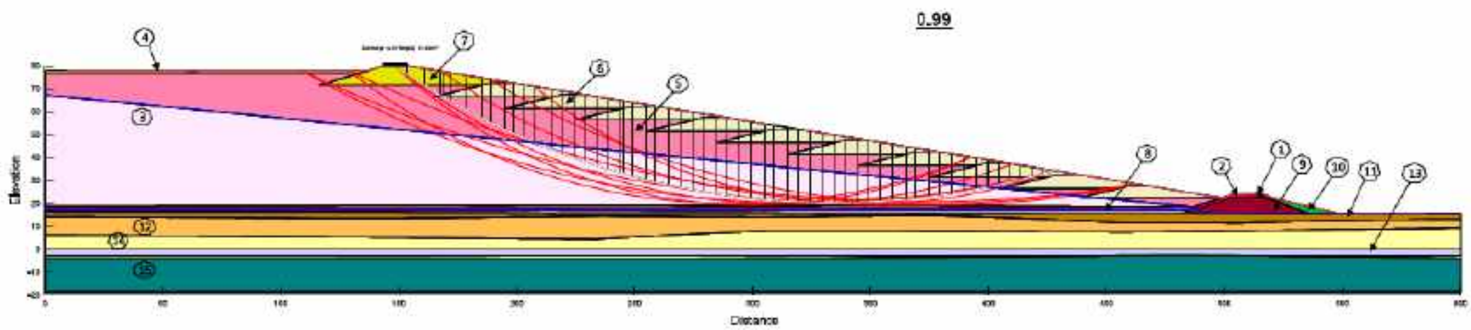
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,16		2	0	No
4	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	0	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0,20		1	0	No
8	Unit 1B – Embankment	Mohr-Coulomb	20	4	26				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	30				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430			Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xlsx			Stability Analysis Section B 60m Raise – Upstream – Post Seismic (Sat/Unsat Phreatic Surface)	Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2		02-Sep-25		Figure D5,5

HATCH

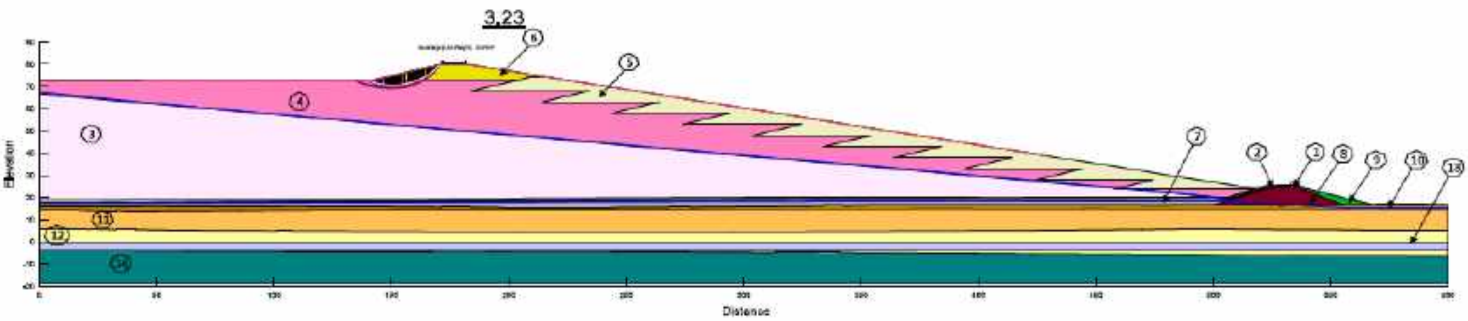
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0000.pls		Stability Analysis Section B 80m Raise - Downstream (Sat/Unsat Phreatic Surface) - Post Seismic (Sat/Unsat Phreatic Surface)		Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2	02-Sep-25			Figure D5.6

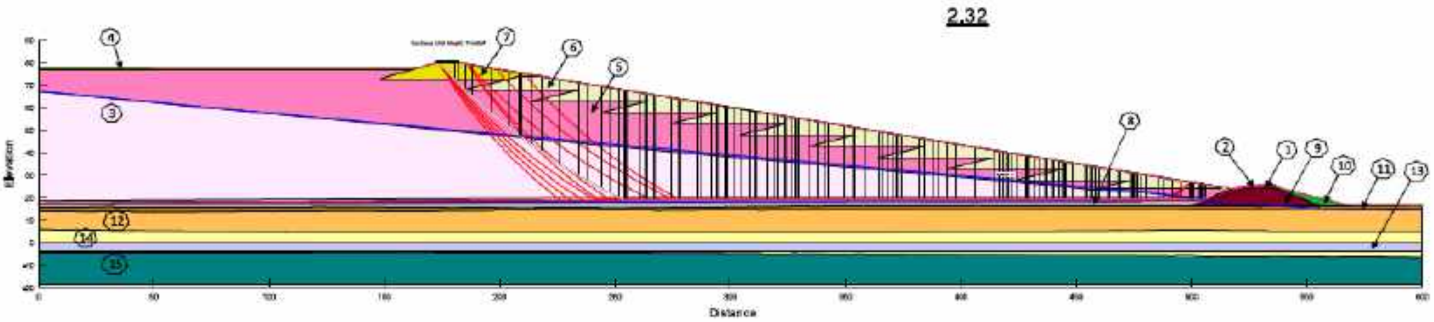
D.6 Section D Ultimate Embankment - Phreatic in Residue Mud

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
4	M3 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
5	S1 – Proposed Residue Sand Raises	Mohr-Columb	18	0	36	2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Columb	18	0	36	2	0	No
7	Unit 1A – Engineered FILL	Mohr-Columb	20	5	23	1	0	No
8	Unit 1B – Embankment	Mohr-Columb	20	5	32	1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Columb	17	0	28	1	0	No
10	Unit 3 – CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
12	Unit 6B – Silty/Clayey layers (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	18	0	35	1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No



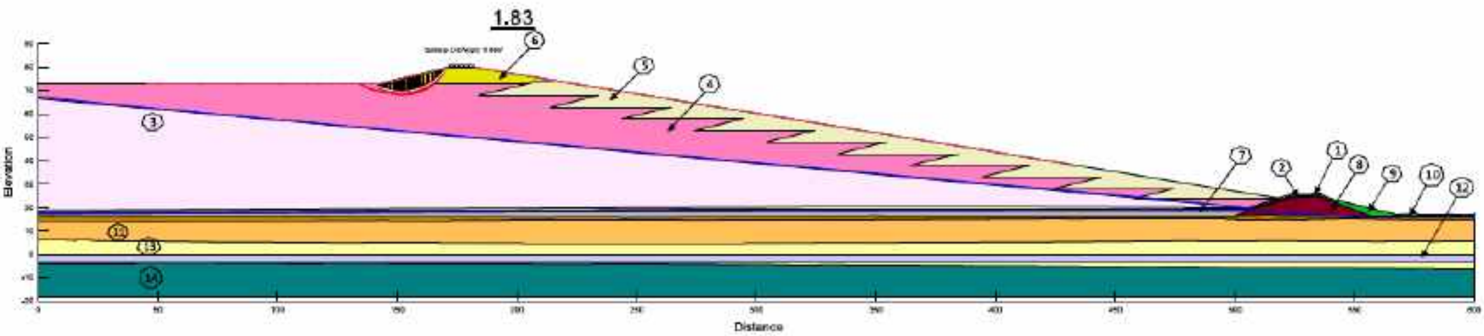
Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section D 80m Raise – Peak Drained – Sat/Unsat Phreatic Surface		Wagerup RSA10
By	MN / SC / 02-Sep-25			
Revision	2 / 02-Sep-25			Figure D6.1

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
4	M2 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
5	M3 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Columb	19	0	36	2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Columb	19	0	36	2	0	No
8	Unit 1A – Engineered FILL	Mohr-Columb	20	5	23	1	0	No
9	Unit 1B - Embankment	Mohr-Columb	20	5	32	1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
11	Unit 3 – CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
13	Unit 6B - Silty/Clayey layers (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	18	0	35	1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No



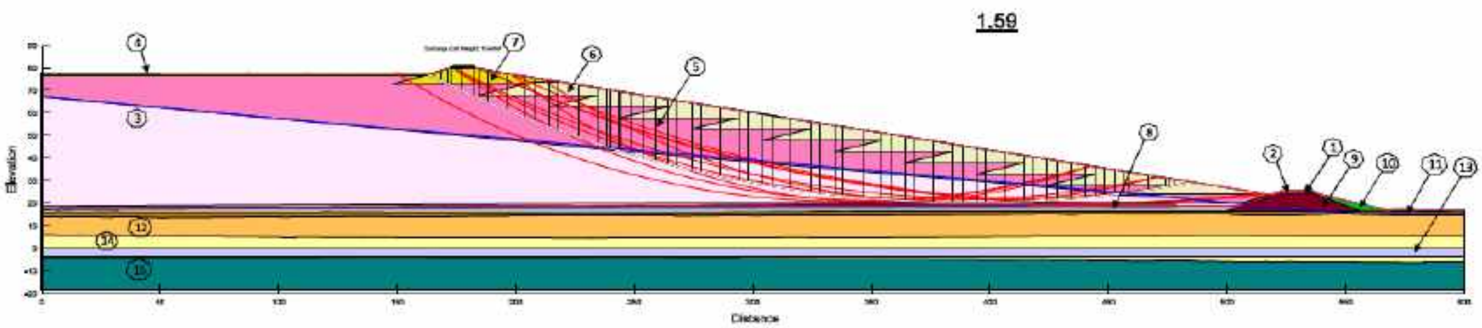
Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D 80m Raise – Peak Drained (Sat/Unsaturated Phreatic Surface)		Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2		02-Sep-25		Figure D6.2

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	18	0	36				2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	18	0	36				2	0	Yes
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
8	Unit 1B – Embankment	Mohr-Coulomb	20	5	32				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6A – SAND with Silty/Clayey layers	Mohr-Coulomb	18	0	35				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



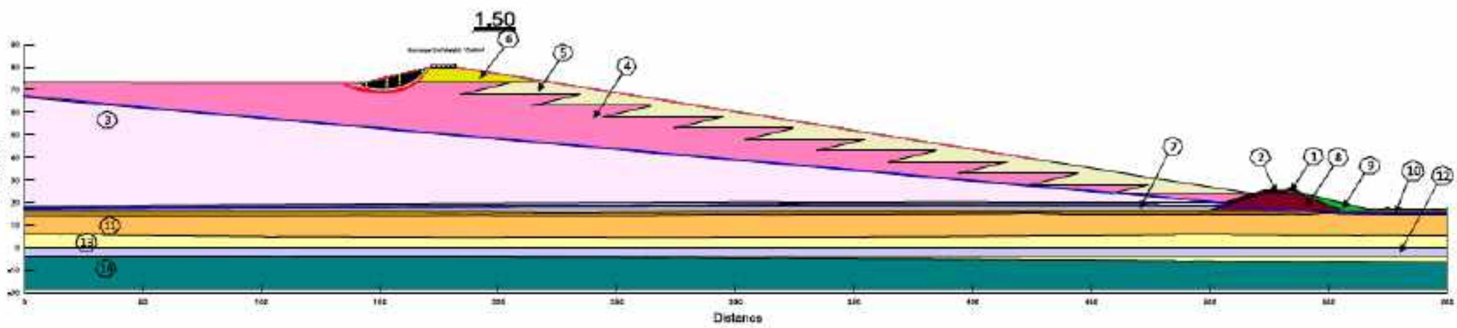
Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D 80m Raise – Peak Undrained – Sat/Unsat Phreatic Surface		Wagerup RSA10
By	MN	SC	03-Sep-25		
Revision	2	03-Sep-25			Figure D6.3

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



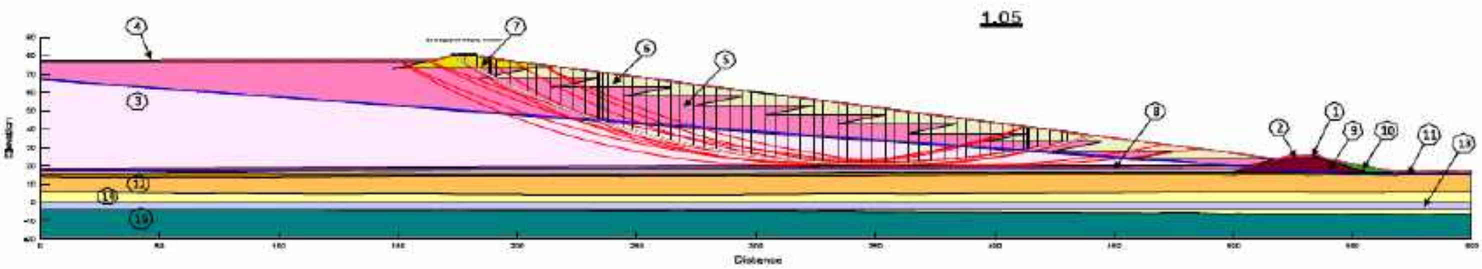
Job number		H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section D 80m Raise – Surface – Peak Undrained (Sat/Unsat Phreatic Surface)		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision		2	02-Sep-25			Figure D6.4

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
4	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	0	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
8	Unit 1B – Embankment	Mohr-Coulomb	20	4	28				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 8A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430		Wagerup RSA10 FEL3		Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D 80m Raise – Post Seismic – Sat/Unsat Phreatic Surface	HATCH	Wagerup RSA10
By	MN	SC	03-Sep-25		
Revision	2	03-Sep-25			Figure D6.5

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

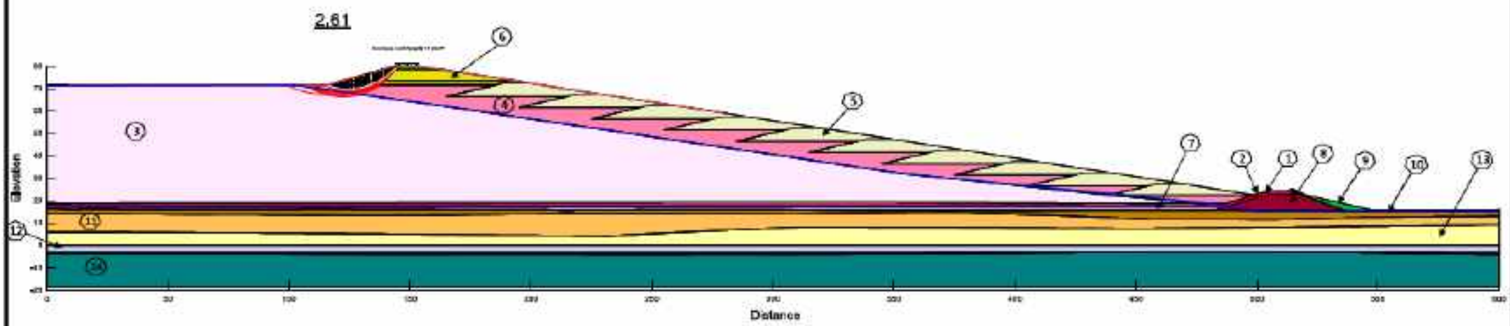


Job number	H374430		Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D 80m Raise - Post Seismic - Sat/Unsat Phreatic Surface	Wagerup RSA10
By	MN	SC	02-Sep-25	
Revision	2	02-Sep-25		Figure D6.6

HATCH

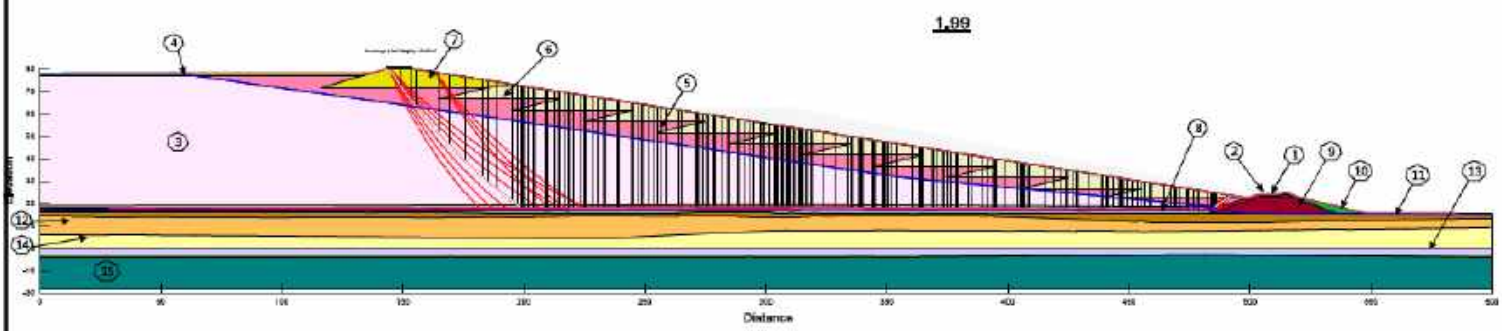
D.7 Section B Ultimate Embankment - Elevated Phreatic Surface (Case 2)

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
4	M3 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
5	S1 – Proposed Residue Sand Raises	Mohr-Columb	18	0	36	2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Columb	18	0	36	2	0	No
7	Unit 1A – Engineered FILL	Mohr-Columb	20	5	23	1	0	No
8	Unit 1B – Embankment	Mohr-Columb	20	5	32	1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
10	Unit 3 – CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
12	Unit 6B – Silty/Clayey layers (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	18	0	35	1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited	
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B 80m Raise – Peak Drained – Elevated Phreatic Surface		Wagerup RSA10	
By	MN	SC	02-Sep-25			
Revision	2	02-Sep-25			Figure	D7.1

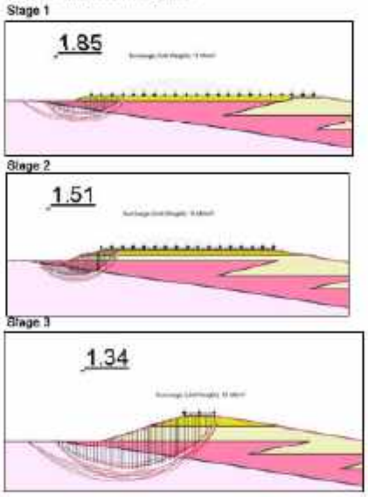
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
4	M2 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
5	M3 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Columb	19	0	36	2	0	No
7	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Columb	19	0	36	2	0	No
8	Unit 1A – Engineered FILL	Mohr-Columb	20	5	23	1	0	No
9	Unit 1B – Embankment	Mohr-Columb	20	5	32	1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
11	Unit 3 – CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
13	Unit 6B – Silty/Clayey layers (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	18	0	35	1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No

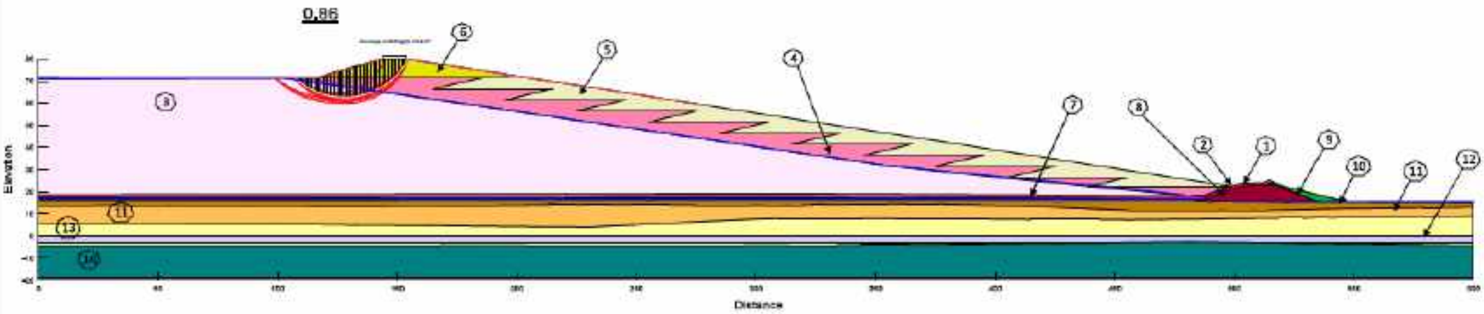


Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0006.xls		Stability Analysis Section B 80m Raise - Peak Drained - Elevated Phreatic Surface		Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2	02-Sep-25			Figure D7.2

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
8	Unit 1B – Embankment	Mohr-Coulomb	20	5	32				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	28				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	19	0	35				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No

Staged Construction Sequence

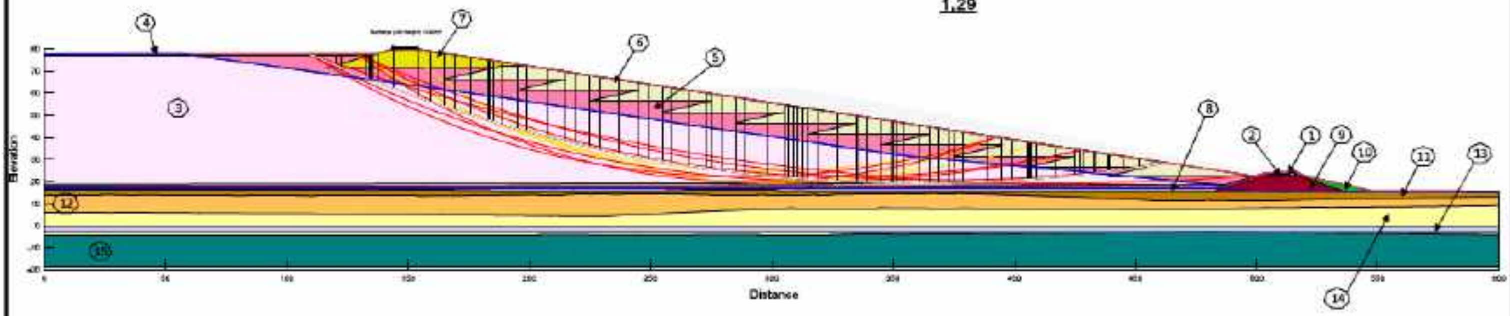




Job number	H374430			Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section B 80m Raise – Peak Undrained – Elevated Phreatic Surface	Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2		02-Sep-25		Figure D7.3

HATCH

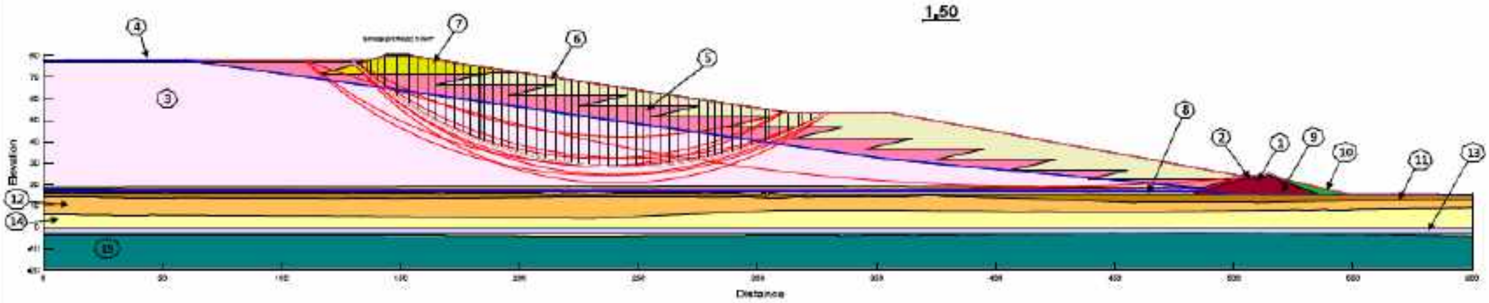
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374450	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374450-0000-2A0-230-0005.xls	Stability Analysis Section B 80m Raise – Peak Undrained – Elevated Phreatic Surface		Wagerup RSA10
By	MN / SC / 02-Sep-25			Figure D7.4
Revision	2 / 02-Sep-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No

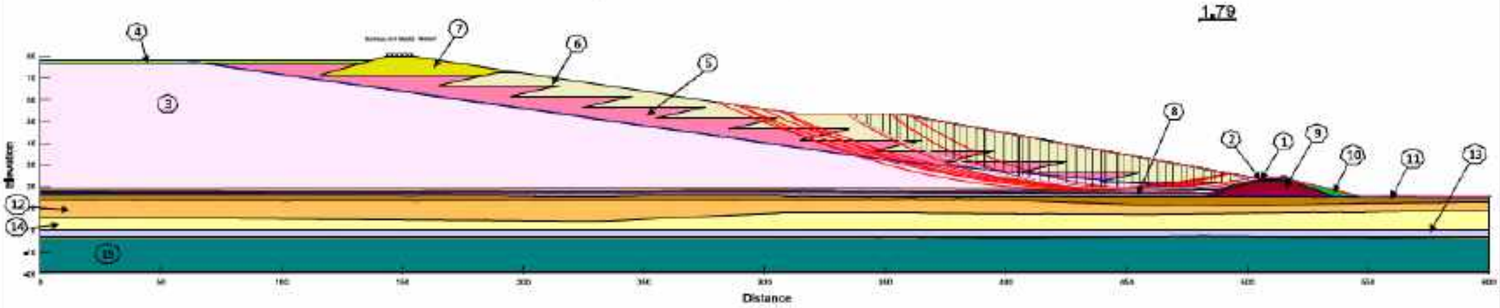
Buttress to RL 53.50 m



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B 80m Raise – Peak Undrained – Elevated Phreatic Surface		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision	2		02-Sep-25		Figure	D7,5

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No

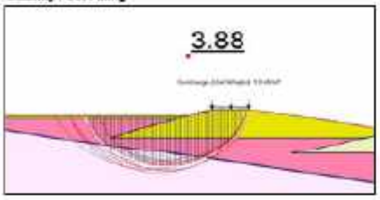
Buttress to RL 53.50 m

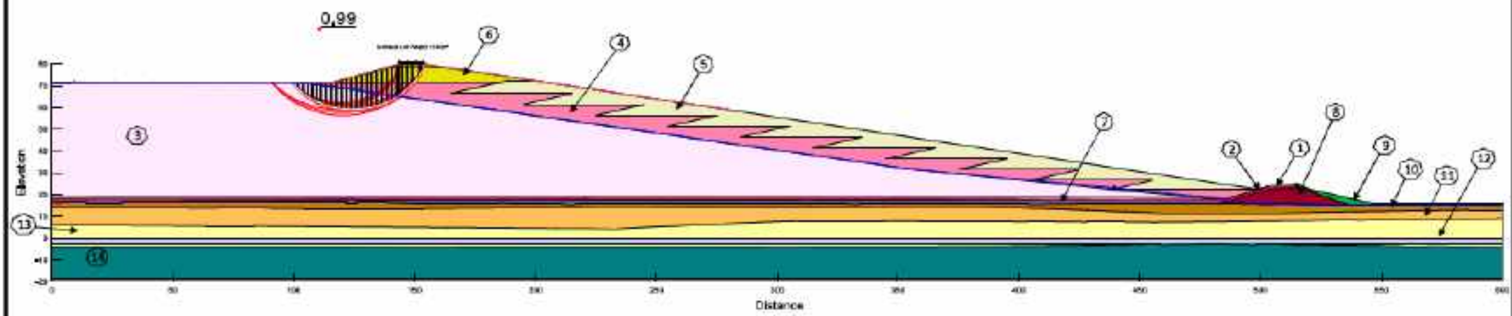


Job number	H374430	Wagerup RSA10 FEL3		Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section B 80m Raise - Peak Undrained - Elevated Phreatic Surface	HATCH	Wagerup RSA10
By	MN / SC / 02-Sep-25			
Revision	2 / 02-Sep-25			Figure D7.6

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,16		2	0	No
4	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,25		2	0	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0,20		1	0	No
8	Unit 1B – Embankment	Mohr-Coulomb	20	4	26				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	30				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

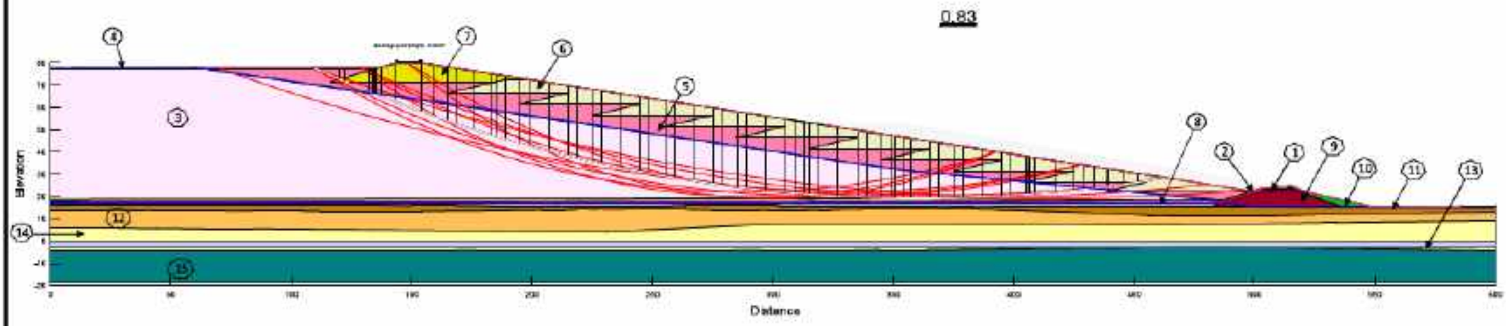
Stability Post Filling





Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section B 80m Raise – Post-Seismic – Elevated Phreatic Surface		Wagerup RSA10
By	MN / SC / 02-Sep-25			
Revision	2 / 02-Sep-25			Figure D7.7

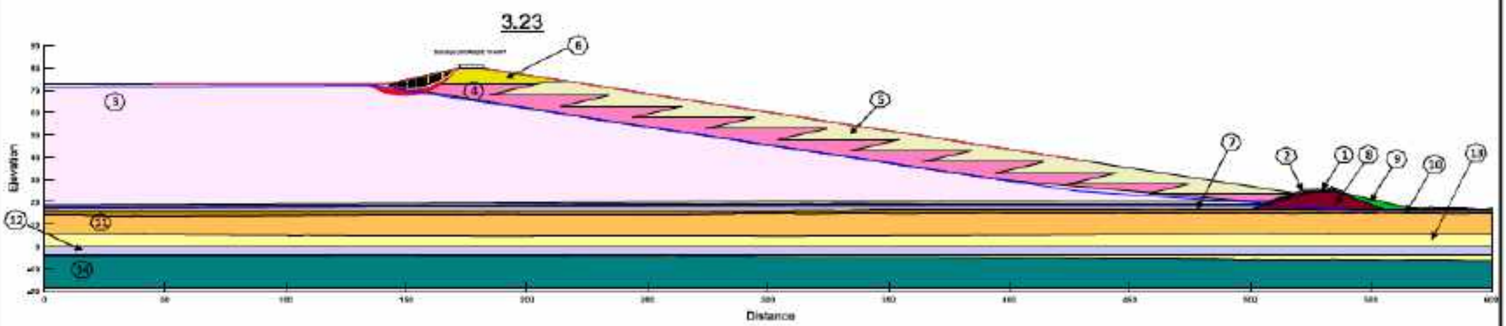
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	30				2	0	No
7	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	30				2	0	No
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
9	Unit 1B – Embankment	Mohr-Coulomb	20	4	26				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	30				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B 80m Raise – Post-Seismic – Elevated Phreatic Surface		Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2	02-Sep-25			Figure D7.8

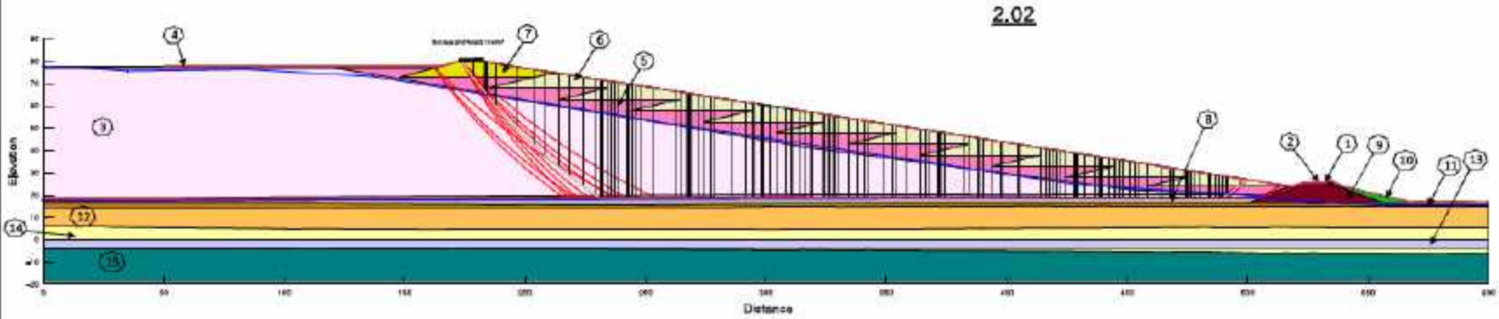
D.8 Section D Ultimate Embankment - Elevated Phreatic Surface (Case 2)

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Columb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Columb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
4	M3 – Thickened Residue Mud	Mohr-Columb	16.5	0	34	2	0	No
5	S1 – Proposed Residue Sand Raises	Mohr-Columb	19	0	36	2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Columb	19	0	36	2	0	No
7	Unit 1A – Engineered FILL	Mohr-Columb	20	5	23	1	0	No
8	Unit 1B – Embankment	Mohr-Columb	20	5	32	1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Columb	17	0	26	1	0	No
10	Unit 3 – CLAY (Guildford Fm)	Mohr-Columb	20	5	23	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Columb	18	5	32	1	0	No
12	Unit 6B – Silty/Clayey layers (Ascot Fm)	Mohr-Columb	18	5	32	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Columb	18	0	35	1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Columb	22	60	33	1	0	No



Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section D 80m Raise – Peak Drained - Elevated Phreatic Surface		Wagerup RSA10
By	MN / SC / 03-Sep-25			
Revision	2 / 03-Sep-25			Figure D8.1

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	Mohr-Coulomb	20	10	22	1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10	2	0	No
3	M1 – Thickened Residue Mud	Mohr-Coulomb	16.5	0	34	2	0	No
4	M2 – Thickened Residue Mud	Mohr-Coulomb	16.5	0	34	2	0	No
5	M3 – Thickened Residue Mud	Mohr-Coulomb	16.5	0	34	2	0	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36	2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36	2	0	No
8	Unit 1A – Engineered FILL	Mohr-Coulomb	20	5	23	1	0	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32	1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26	1	0	No
11	Unit 3 – CLAY (Guildford Fm)	Mohr-Coulomb	20	5	23	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	Mohr-Coulomb	18	5	32	1	0	No
13	Unit 6B - Silty/Clayey layers (Ascot Fm)	Mohr-Coulomb	18	5	32	1	0	No
14	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	18	0	35	1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33	1	0	No



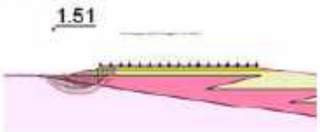
Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section D 80m Raise - Peak Drained - Elevated Phreatic Surface		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision	2		02-Sep-25			Figure D8.2

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
8	Unit 1B – Embankment	Mohr-Coulomb	20	5	32				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	19	0	35				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No

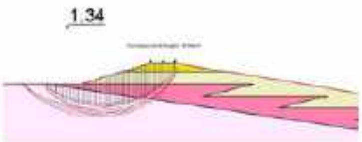
Staged Construction Sequence

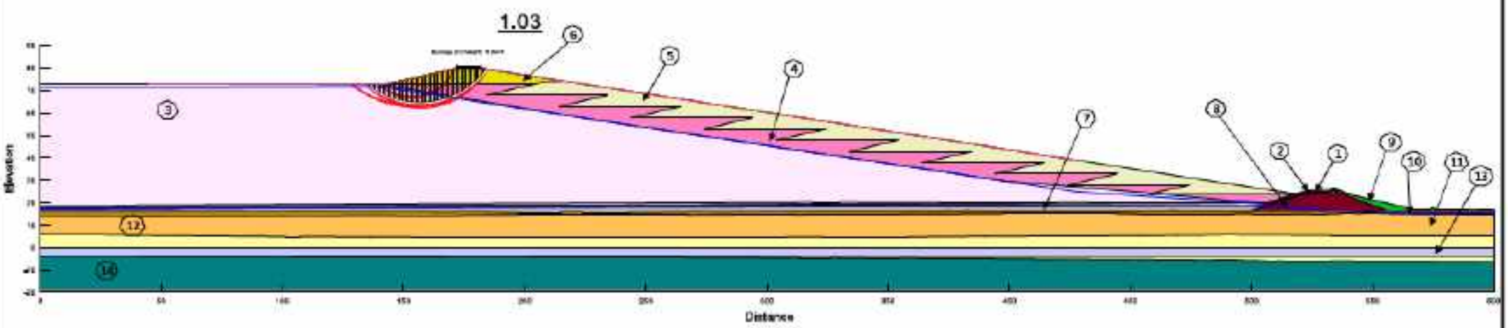
Stage 1

Stage 2



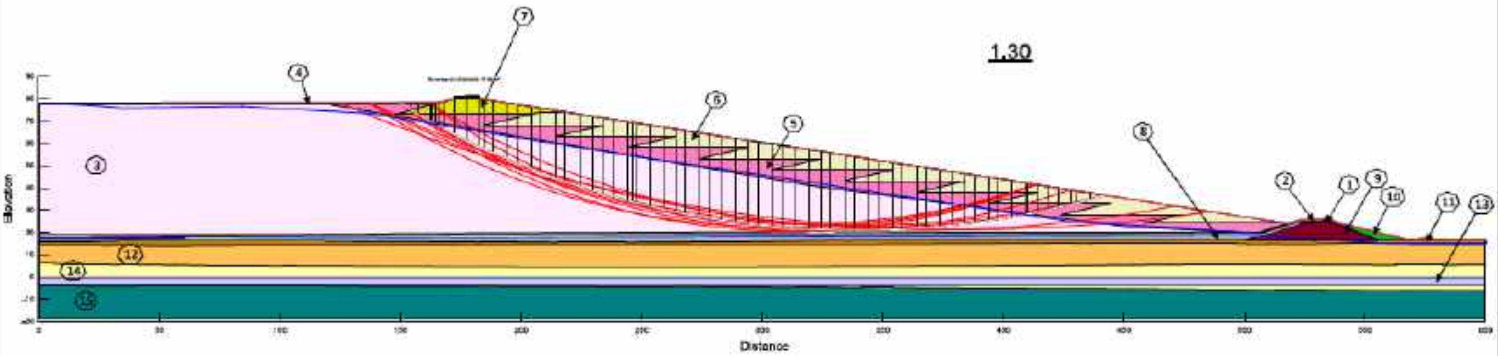
Stage 3





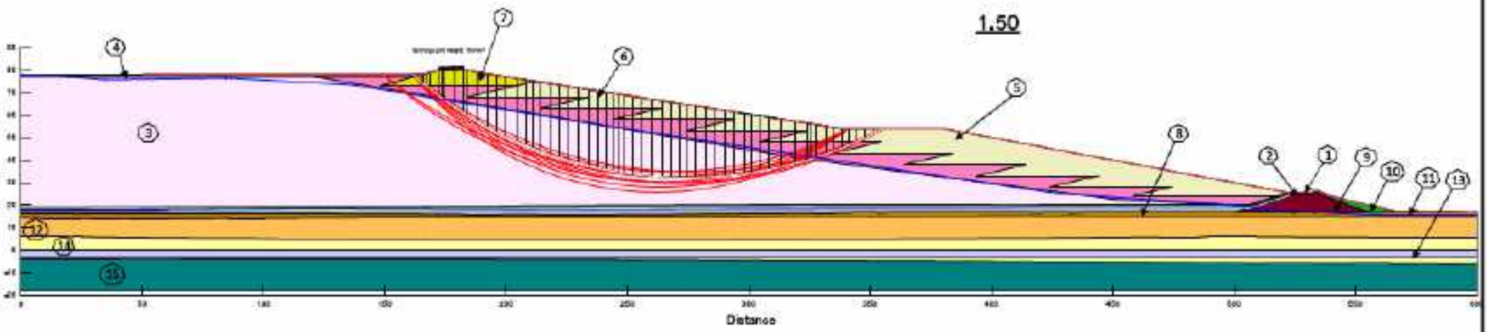
Job number	H374430	Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls	Stability Analysis Section D 80m Raise – Peak Undrained – Elevated Phreatic Surface		Wagerup RSA10
By	MN / SC / 02-Sep-25			
Revision	2 / 02-Sep-25			Figure D8.3

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D 80m Raise – Peak Undrained – Elevated Phreatic Surface		Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2	02-Sep-25			Figure D8.4

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
9	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No

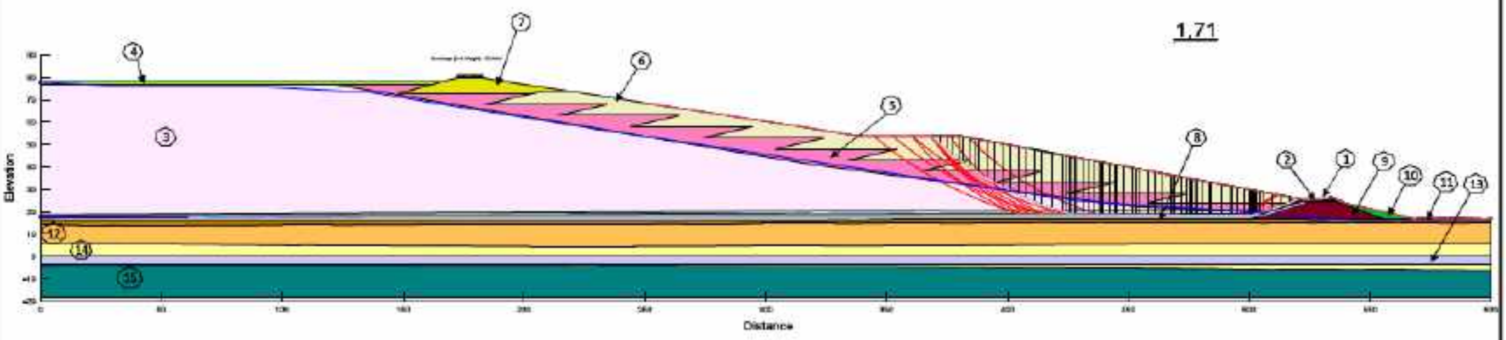


Job number		H374430		Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section D 80m Raise – Peak Undrained – Elevated Phreatic Surface	Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision		2	02-Sep-25		Figure D8,5

HATCH

D8,5

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 6B - Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6 – SAND with Silty/Clayey layers	Mohr-Coulomb	18	0	35				1	0	No
15	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No

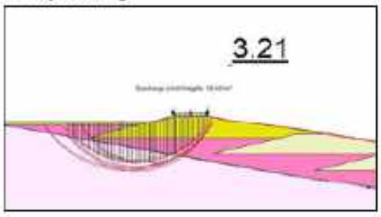


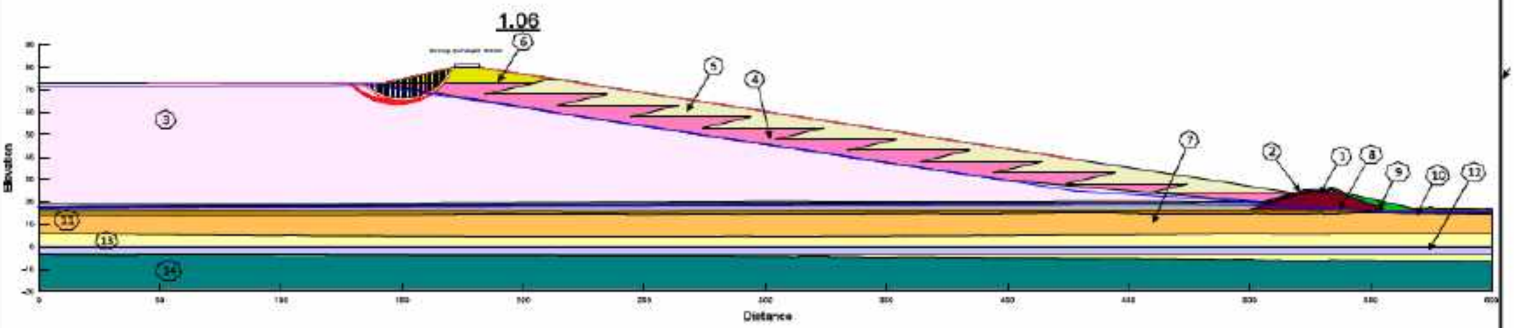
Job number	H374430		Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D 80m Raise – Peak Undrained – Elevated Phreatic Surface	Wagerup RSA10
By	MN	SC	02-Sep-25	
Revision	2	02-Sep-25		Figure D8.6

HATCH

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.16		2	0	No
4	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.25		2	0	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	18	0	30				2	0	No
6	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	18	0	30				2	0	No
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0.20		1	0	No
8	Unit 1B - Embankment	Mohr-Coulomb	20	4	26				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	30				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No

Stability Post Filling

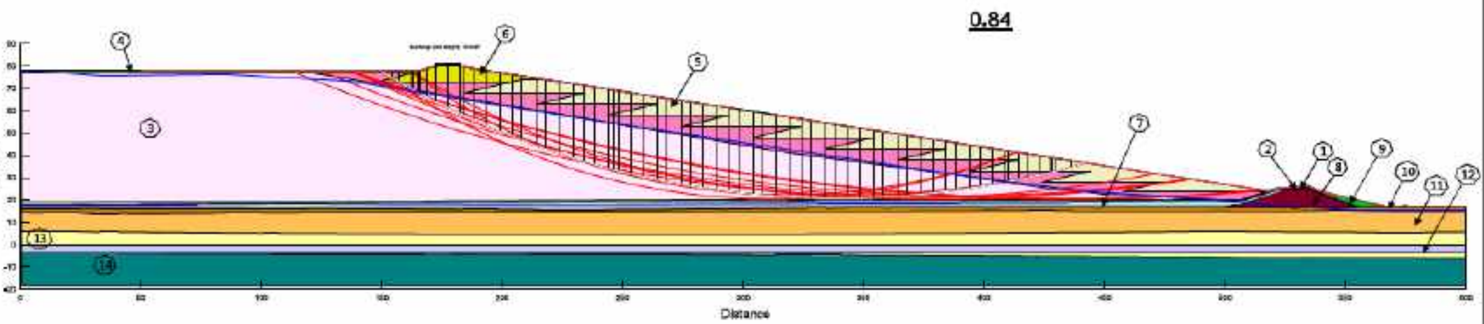




Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited	
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section D 80m Raise – Post-Seismic – Elevated Phreatic Surface		Wagerup RSA10	
By	MN	SC	02-Sep-25			
Revision	2	02-Sep-25			Figure	D8.7

D8.7

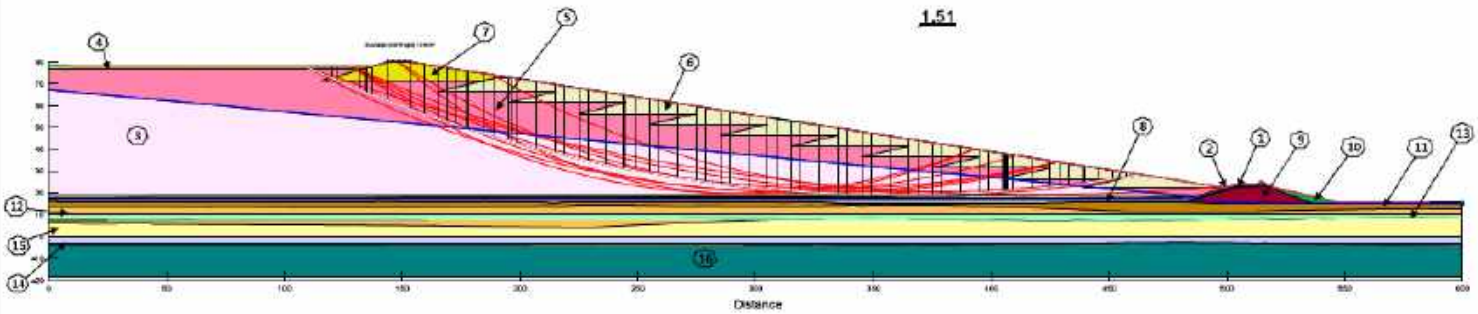
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,17		1	0	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	16				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,16		2	0	No
4	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	0	No
5	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	18	0	30				2	0	No
6	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	18	0	30				2	0	No
7	Unit 1A – Engineered FILL	SHANSEP	20			0	0,20		1	0	No
8	Unit 1B – Embankment	Mohr-Coulomb	20	4	28				1	0	No
9	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	21				1	0	No
10	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20					Shear – Normal Function	1	0	No
11	Unit 4 – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
12	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18					Shear – Normal Function	1	0	No
13	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	30				1	0	No
14	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	48	27				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section B 80m Raise – Post-Seismic – Elevated Phreatic Surface		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision	2		02-Sep-25			Figure D8,6

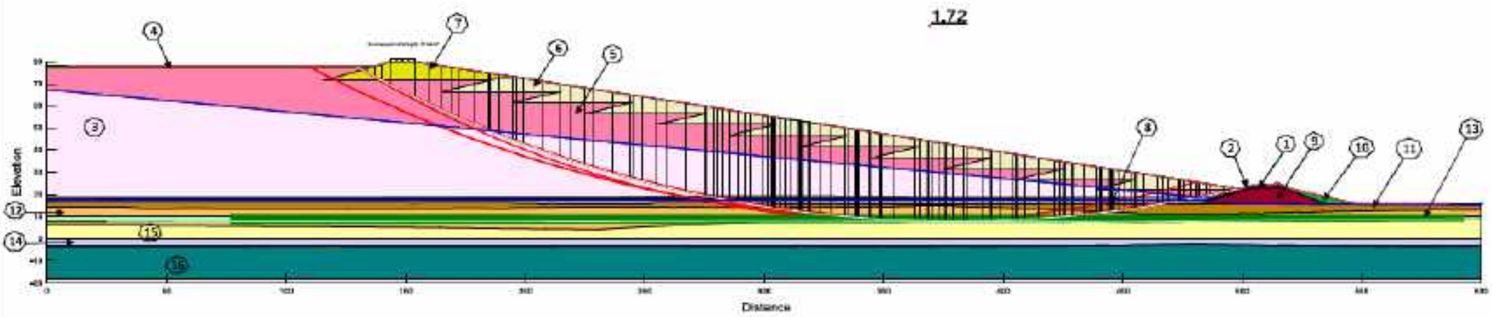
D.9 Section B Ultimate Embankment – Unit 4B Sensitivity

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4A – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 4B – Potentially Contractive Zone (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
15	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	35				1	0	No
16	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



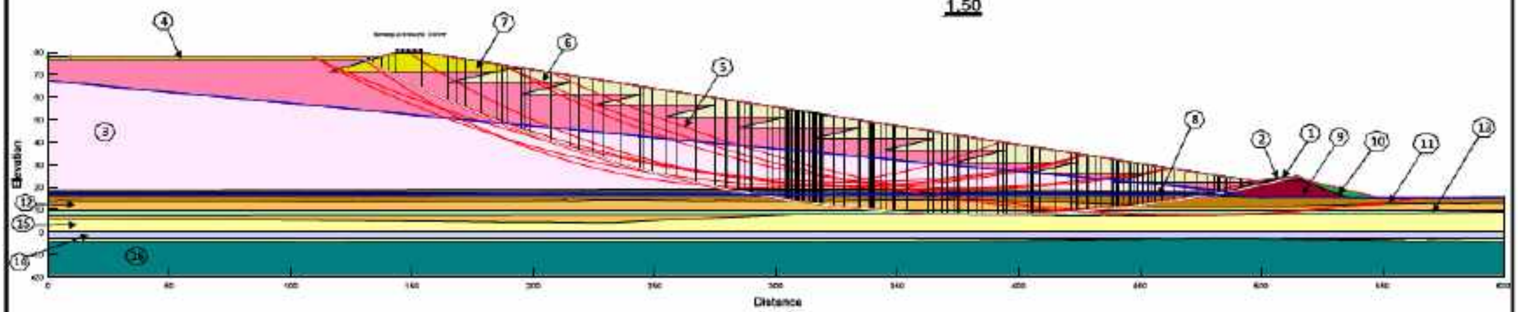
Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited	
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section B 80m Raise – Downstream – Peak Undrained – Unit 4B – 20% Reduction	Wagerup RSA10	
By	MN	SC	02-Sep-25		Figure	D9.1
Revision	2		02-Sep-25			

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4A – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 4B – Potentially Contractive Zone (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
14	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
15	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	35				1	0	No
16	Unit 7 - CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



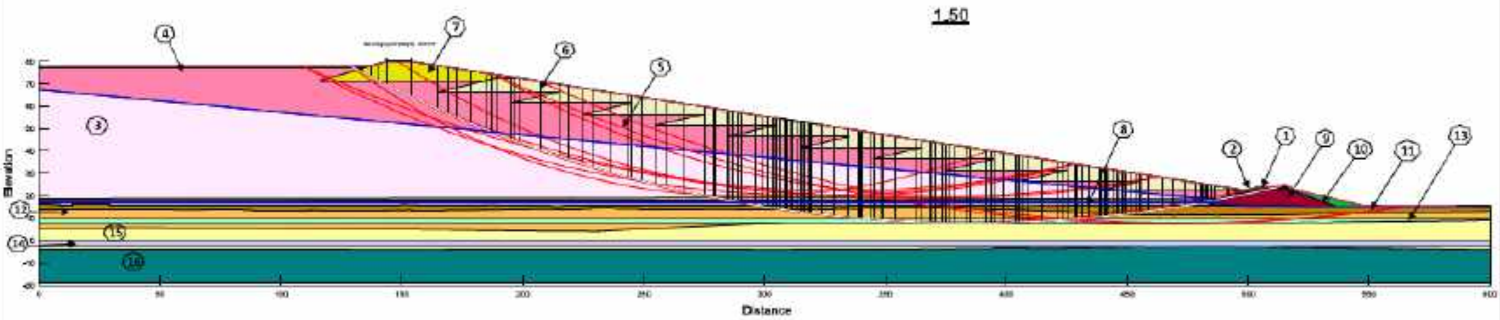
Job number	H374430			Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls			Stability Analysis Section B 80m Raise – Downstream – Peak Undrained – Unit 4B – 20% Reduction		Wagerup RSA10
By	MN	SC	02-Sep-25			
Revision	2		02-Sep-25			Figure D9.2

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
9	Unit 1B - Embankmnet	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4A – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 4B – Potentially Contractive Zone (Guildford Fm)	SHANSEP	18			0	0,1		1	0	No
14	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
15	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	35				1	0	No
16	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	HATCH	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B 80m Raise – Downstream – Peak Undrained – Unit 4B – Su/p – 0.1		Wagerup RSA10
By	MN	SC	02-Sep-25		Figure D9,3
Revision	2	02-Sep-25			

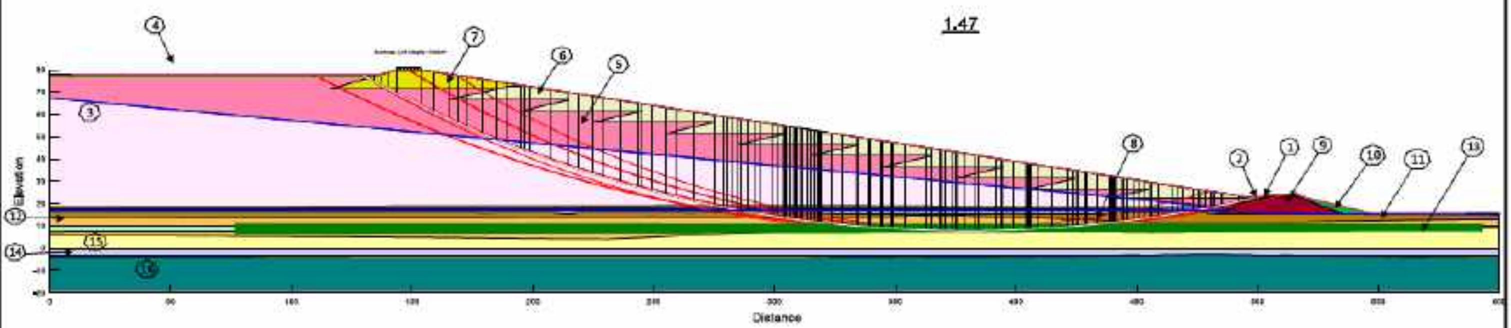
Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0,22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16,5			0	0,26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16,5			0	0,30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 - Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0,25		1	1	No
9	Unit 1B - Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4A – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 4B – Potentially Contractive Zone (Guildford Fm)	SHANSEP	18			0	0,1		1	0	No
14	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
15	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	35				1	0	No
16	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374450			Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374450-0000-2A0-230-0005.xls			Stability Analysis Section B 80m Raise – Downstream – Peak Undrained – Unit 4B – Su/p – 0.1	Wagerup RSA10
By	MN	SC	02-Sep-25		
Revision	2		02-Sep-25		Figure D9.4

HATCH

Color	Name	Material Model	Unit Weight (kN/m³)	Effective Cohesion (kPa)	Effective Friction Angle (°)	Minimum Shear Strength (kPa)	Tau/Sigma Ratio	Strength Function	Piezometric Line	B-bar	Add Weight
1	CLAY Liner	SHANSEP	20			0	0.22		1	1	No
2	Interface Shear Strength	Mohr-Coulomb	10	0	10				2	0	No
3	M1 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	No
4	M2 – Thickened Residue Mud	SHANSEP	16.5			0	0.26		2	1	Yes
5	M3 – Thickened Residue Mud	SHANSEP	16.5			0	0.30		2	1	No
6	S1 – Proposed Residue Sand Raises	Mohr-Coulomb	19	0	36				2	0	No
7	S1 – Proposed Residue Sand Raises (Current Raise)	Mohr-Coulomb	19	0	36				2	0	Yes
8	Unit 1A – Engineered FILL	SHANSEP	20			0	0.25		1	1	No
9	Unit 1B – Embankment	Mohr-Coulomb	20	5	32				1	0	No
10	Unit 2 – TOPSOIL (Silty/ Clayey SAND/ CLAY) – Loosely Dumped	Mohr-Coulomb	17	0	26				1	0	No
11	Unit 3 – CLAY (Guildford Fm)	SHANSEP	20			0		Shear – Normal Function	1	0	No
12	Unit 4A – Clayey SAND/ Sandy CLAY (Guildford Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
13	Unit 4B – Potentially Contractive Zone (Guildford Fm)	SHANSEP	18			0	0.1		1	0	No
14	Unit 6B – Silty/Clayey Layers (Ascot Fm)	SHANSEP	18			0		Shear – Normal Function	1	0	No
15	Unit 6A – SAND (Ascot Fm)	Mohr-Coulomb	19	0	35				1	0	No
16	Unit 7 – CLAY/ Weathered SILTSTONE (Leederville Fm)	Mohr-Coulomb	22	60	33				1	0	No



Job number	H374430		Wagerup RSA10 FEL3	Alcoa of Australia Limited
Ref	H374430-0000-2A0-230-0005.xls		Stability Analysis Section B 80m Raise – Downstream – Peak Undrained – Unit 4B – Su/p – 0.1	Wagerup RSA10
By	MN	SC	02-Sep-25	
Revision	2		02-Sep-25	Figure D9.5

HATCH

Appendix E
Comments Register

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

Item #	Date	Ref. Section	Page	[illegible]	Reviewer's comment	[illegible]	Designer's Response	Designer Response (Revision 1)	Reviewer's response	Open/Closed
1	[illegible]	1.1	[illegible]	[illegible]	Residue Materials Characterisation Report is required (in progress pending receipt of final laboratory results).		[illegible]	[illegible]		[illegible]
2	[illegible]	1.1	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
3	[illegible]	1.1	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	1.1	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
7	[illegible]	1.1	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
8	[illegible]	1.1	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
9	[illegible]	1.1 Table 2-3	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
10	[illegible]	1.1 Table 2-3	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
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14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]

Item #	Date	Ref. Section	Page	Reviewer	Reviewer's comment	Assign to	Designer's Response (Date [illegible])	Designer's Response (Revision 1)	Reviewer's response	Open/Closed
31	22/05/2025	Appendix B		[illegible]	B.1 Section A: Only Undrained parameters are presented. Figure B1.2 mentions Section D Peak Undrained, not Post Seismic. B.2 Section B: Only Undrained parameters are presented. Figure B2.2 mentions Peak Undrained, not Post-Seismic. B.3 Section C: Only Undrained parameters are presented. Figure B3.2 mentions Peak Undrained, not Post-Seismic. B.4 Section D: Figure B4.1 [illegible] Drained. Figure B4.2 shows Undrained parameters [illegible], not Post-Seismic.		Appendix figures to be updated. [illegible]	Appendix figures will be updated.		Closed
32	22/05/2025	Appendix C		[illegible]	The [illegible] embankment geometry has very different crest RL depending on location. Section A [illegible] RL 38 m, Section B RL 36 m, Section C RL 35 m and Section D 36 m. There is lack of discussion on geometry difference. Sections B and D have a small [illegible]?		Noted. Will include discussion on differing section geometry [illegible]	Section A and Section C do not intersect the crest of the embankment at the ultimate height. This has been included in different section geometries under Section 2.[illegible]		Closed
33	22/05/2025	Appendix C		[illegible]	How was phreatic surface [illegible]? Other [illegible] operational data suggested it is not realistic.		Will include text on the basis of assumption for phreatic surface 1 and 2	[illegible]		Closed
35	22/05/2025	Appendix C		[illegible]	Downstream scenarios adopt a shallow [illegible], including post seismic parameters which would mean it is saturated but no influence on the phreatic surface.		The undrained shear strength was adopted for [illegible] the [illegible] for conservative consideration.	[illegible]		
36	22/05/2025	Appendix B and C		[illegible]	Clay unit defined with a Shear / Normal function, but no explanation or definition about the function adopted.		It is a [illegible] shear strength to the [illegible] strength. Will include text on shear normal function adopted.	[illegible]		Closed
38	22/05/2025	[illegible]	[illegible]	[illegible]	An assessment of earthquake induced damage (e.g. settlement) should be performed to validate the design freeboard at a current level of detail verification. The ANCOLD guidelines, "Design of Dams for Earthquakes" recommends a staged approach to deformation analyses. The [illegible] approach recommends the estimation of deformations using one or more of the available screening/simplified methods. If the calculated deformations are [illegible], further analyses are required. Further analyses should first utilise one of the simplified methods, and only proceed to detailed numerical analyses if the results of the simplified methods are unacceptable. Earthquake induced deformations using empirical screening methods can include Swaisgood (2003) and [illegible] (2003).		[illegible] will provide the seismic deformation analysis based on the suggested empirical methods and reference. [illegible] analysis as a reference for comparison with simplified methods.	A simplified seismic deformation analysis has been included in Section [illegible] [illegible]		Closed
39	18/05/2025	Figure 5.2	[illegible]	[illegible]	[illegible] storage facilities are [illegible] and [illegible]			[illegible]		Closed
40	18/05/2025	Table 3-1	[illegible]	[illegible]	[illegible]			[illegible]		Closed
41	18/05/2025	Table 4-1	[illegible]	[illegible]	[illegible]			[illegible]		Closed