Appendix F11

KSM Open Pit Design Review

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Project No: 0683-013-30

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Dear Mr. Smolik,

Re: KSM Project 2012 Pre-Feasibility Study Update - Open Pit Design Review

Seabridge Gold Inc. (Seabridge) is undertaking a Pre-Feasibility Study Update (PFSU) for the KSM Project in northwestern British Columbia. As part of the PFSU, open pit layouts for the Mitchell, Sulphurets, and Kerr zones were revised by Moose Mountain Technical Services (MMTS) to reflect updated resource models. Geotechnical slope design parameters previously provided by BGC Engineering Inc. (BGC, 2011a; 2011b; 2011c) were used for these revisions. The updated open pits have been reviewed by BGC to confirm compliance with the geotechnical open pit slope designs, and to check the overall stability of the slopes through specified design cross sections for the ultimate phase of each open pit. This letter report summarizes the results of our review.

1.0 PROJECT BACKGROUND

The Kerr-Sulphurets-Mitchell (KSM) Project comprises four large copper and gold zones located approximately 65 km north of Stewart, B.C. BGC has contributed to a Scoping-level Study in 2009 (BGC, 2009), a Pre-Feasibility Study (PFS) in 2010 (BGC, 2010a, 2010b, 2010c), and a PFSU in 2011. As part of the 2011 PFSU, BGC provided geotechnical open pit slope designs (BGC, 2011a; 2011b; 2011c) based on data collected from geotechnical drilling, photogrammetry, laboratory testing, and field mapping. A further PFSU is currently underway and expected to be complete by June, 2012.

The current PFSU mine plan includes four zones that are to be mined using a combination of block cave and open pit mining methods. The Mitchell zone will be mined by a combination of open pit and block caving methods, the Sulphurets and Kerr zones will be mined by open pit, and the Iron Cap zone will be mined by block caving. The Iron Cap zone is not discussed further in this letter report.

2.0 CURRENT SCOPE OF WORK

To confirm that the MMTS open pits conform with the open pit slope designs provided by BGC (2011a, 2011b, 2011c) the geometries of the Mitchell, Sulphurets, and Kerr pit slopes prepared by MMTS were reviewed and geotechnical stability analyses of the overall slopes of the proposed pit (Appendix A) were conducted. Analysis models were constructed using the latest 3D geological model available from Seabridge and geotechnical parameters previously estimated by BGC (2010; 2011b; 2011c) were applied to the rock mass. A minimum design factor of safety (FOS) of 1.3 against overall slope failure is required for overall stability, consistent with that previously adopted for the project. The FOS calculated by limit equilibrium – method of slices analyses for all overall slopes of the proposed ultimate open pits must meet or exceed this FOS for the open pit design by MMTS to be considered acceptable.

BGC has analyzed twelve overall slope sections (Table 1) in the current work, including: seven cross sections of the Mitchell Open Pit (Drawing 1); the north and northwest walls of the Sulphurets Open Pit (Drawing 2); and the west, south, and east walls of the Kerr Open Pit (Drawing 3). The analyses were completed with “unmitigated” water tables which were progressively modified through an iterative process to identify the pore pressure conditions that must be achieved for the slopes to meet the design FOS. The slope stability requirements for depressurization were used to guide the dewatering methods (i.e. vertical wells and/or adit and dewatering gallery) that were simulated in the 3D hydrogeological model (BGC, 2012). Tables 2, 3, and 4 summarize the depressurization requirements for each open pit and the methods proposed to achieve them. In all cases, a minimum setback of 50 m for the water table from the final slope face is required to depressurize potential instabilities due to geological structures at the bench or inter-ramp slope scales.

The analyses summarized in Appendix A pertain specifically to the overall slope scale; inter-ramp / interberm and bench scale analyses have been described in the previous pit slope design reports (BGC, 2011a; 2011b; 2011c). The overall angle of the pit slope may be controlled by factors including: the bench configuration, the inter-ramp slope stability, the number of ramps included in the slope design, or the stability of the overall slope. Where the estimated FOS for the overall slopes are higher than the minimum of 1.3 required for geotechnical slope stability, one or more of the other factors previously noted is controlling the overall slope configuration. The controls on the overall slope geometry for each section analyzed are provided in Table 1.

3.0 MITCHELL OPEN PIT

3.1. Overview

The Mitchell zone is the largest deposit of the KSM project. The target zone is located in the Mitchell Creek Valley, immediately downstream of the Mitchell Glacier (Drawing 1). The proposed Mitchell ultimate (final phase) open pit geometry has changed significantly from the last stage of study due to the addition of a block cave below the ultimate pit. The total mined height of the north wall has been reduced from 1,650 m to 1,200 m. Consequently, the heights of the other final walls have also been reduced (Drawing 1).

3.2. Geometry Validation

An initial review was completed for the M685 ultimate pit, as provided in the file "Mitchell pit phases MMTS.dxf" to BGC by MMTS on January 11, 2012. The review identified two sectors in the southeast and southwest corners of the pit where the design inter-ramp / interberm slope angles were exceeded; BGC communicated the results of this review to MMTS by email on January 19, 2012. Based on this review, MMTS developed an updated M685 ultimate pit and provided the file "m685 ultimate pit.dxf" to BGC on February 2, 2012. Our review of the updated M685 (Drawing 1) ultimate pit indicates that it meets all of BGC's slope design geometry requirements (BGC, 2011a).

3.3. Overall Slope Stability

The overall slope stability of the slopes of the ultimate pit was analyzed for seven cross sections (Table 1). Slopes analyzed include the north and south walls (Section A), the southeast wall (Section B), the southeast wall (Section C) through the Snowfield Landslide, the east wall under the Mitchell Glacier (Section D), the northwest wall (Section E), the west wall (Section F), and the southwest wall (Section G). The analysis cross sections are based on the 3D geological model provided by Seabridge and the rock mass properties previously estimated by BGC (2010). The slope geometry and the global minimum FOS failure surface for the overall slope scale for each section are shown in Appendix A.

The FOS for the North portion of Section A is 1.3, assuming a water table set back 150 m from the pit face in Doman I and 200 m in Domain II. As a result of the reduction in the ultimate wall height of the north slope of the Mitchell pit, the minimum water table setback in Domain II required to achieve the design FOS has been significantly reduced from the 350 m previously estimated for the previous pit geometry. The configuration of the overall slope of the north wall is controlled by the requirement to limit the potential for instability of the overall slope.

The overall FOS for the South portion of Section A is 1.5, assuming a water table set back 50 m from the pit face to depressurize the inter-ramp scale slopes can be achieved. The configuration of the overall slope of the south wall is controlled by the requirement to limit the potential for inter-ramp slope scale instabilities related to geological structures.

The overall FOS for Sections B to G ranges from 1.3 to 3.1, assuming the water table is set back 50 m from the pit face. The overall slope configurations of these sections are controlled by requirements to limit inter-ramp scale slope instability or the bench geometry. A 50 m set back of the water table is required so that geological structures which could cause inter-ramp scale slope instabilities are adequately depressurized.

4.0 SULPHURETS OPEN PIT

4.1. Overview

The Sulphurets zone is located near the top of the Mitchell-Sulphurets ridge, directly south of the Mitchell zone, and upslope of Sulphurets Lake. The maximum slope heights of the proposed ultimate pit reach approximately 600 m. The footprint and geometry of the proposed Sulphurets pit has only changed slightly from the open pit from the 2011 PFSU (Drawing 2).

4.2. Geometry Validation

The initial review of the S682 ultimate pit provided to BGC on February 15, 2012, “KSM - Sulphurets Ultimate Pit S682.dxf” identified two sectors of the pit where the recommended inter-ramp / interberm slope angles were exceeded: design sectors SFW-269 and SFW-146. In addition, Domain SFW-090 contained a 60 m high unbenched slope forming a “quadruple bench”. BGC communicated the results of this review to MMTS by email on February 20, 2012. Based on this review, MMTS developed an updated ultimate pit, “Sulphurets series 9 ultimate 21Feb2012.dxf” which was provided to BGC on February 21, 2012. This updated ultimate pit (Drawing 2) meets all of the geometrical requirements included in BGC’s geotechnical slope design recommendations (BGC, 2011b).

4.3. Overall Slope Stability

Assessments of the updated open pit design included analyses of the overall slope stability for two walls of the ultimate pit (Table 1): the northwest wall (Section H) and the north wall (Section I). The analysis models were constructed using the latest 3D geological model provided by Seabridge and the rock mass properties previously estimated by BGC (2011b). The slope geometry and the global minimum FOS failure surface for the overall slope scale for each section is shown in Appendix A.

The overall FOS for Section H is 1.6, assuming the water table is set back 50 m from the pit face. The overall FOS for Section I is 1.4, assuming the water table is set back 50 m from the pit face. The configuration of the overall slope on both sections is determined by the requirement to limit instability due to geological structures at the inter-ramp slope scale. The 50 m set back of the water table is required to depressurize the controlling geological structures. The overall slope geometry and the global minimum failure surface for each section are shown in Appendix A.

5.0 KERR OPEN PIT

5.1. Overview

The Kerr zone is located at the top of the south slope of the Sulphurets Valley, south of the Sulphurets zone and upslope from Sulphurets Lake and the Sulphurets Glacier. A landslide has developed in the highly altered rocks below the Kerr zone. The maximum proposed slope heights for the open pit are approximately 600 m. The footprint and geometry of the proposed 2012 PFSU Kerr Open Pit are very similar to the 2011 PFSU open pit design (Drawing 3).

5.2. Geometry Validation

A review of the open pit was completed for the K691 ultimate pit (Drawing 3), "K691.dxf" provided to BGC on February 28, 2012. BGC confirmed that the slope design criteria developed by BGC (2011c) were followed. BGC communicated the results of this review to MMTS by email on March 5, 2012.

5.3. Overall Slope Stability

The overall slope stability in the Kerr pit was checked for cross sections through three walls (Table 1): the west wall (Section J), the south wall of the pit containing the "KALT" geotechnical unit (Section K), and the southeast wall (Section L). Each analysis cross section was constructed using the 3D geological model provided by Seabridge and rock mass properties previously estimated by BGC (2011c). The slope geometry and the global minimum FOS failure surface for the overall slope scale for each section is shown in Appendix A.

The overall slope FOS for Section J is 1.7, assuming the water table is set back 50 m from the pit face. The configuration of the overall slope is dictated by a combination of bench geometry and the requirement to limit the potential for instability at the inter-ramp slope scale due to adverse geological structures. The overall FOS for Section K is 1.3, assuming the water table is set back 50 m from the pit face. The angle of the overall slope on Section K is limited by the quality of the rock mass and the requirement to achieve the design FOS. The overall FOS for Section L is 2.3, assuming the water table is set back 50 m from the pit face. This overall slope configuration on this section is controlled by the requirement to limit the potential for instability on the inter-ramp scale due to adverse geological structures.

6.0 SUMMARY

BGC has reviewed the ultimate Mitchell, Sulphurets, and Kerr open pits (pit designs M685, S692, and K691, respectively) provided by MMTS to verify that the geotechnical open pit slope design recommendations (BGC, 2011a; 2011b; 2011c) were followed. BGC has confirmed that the design criteria were applied correctly in the design of the provided ultimate open pits. The stability of the overall slopes was analyzed using the limit-equilibrium method of slices along selected critical cross sections through the three proposed pits. In all cases, the minimum design FOS of 1.3 for overall slope stability was met assuming pore pressure conditions similar to those simulated in the 2011 PFSU assessments.

7.0 CLOSURE

BGC Engineering Inc. (BGC) prepared this document for the account of Seabridge Gold Inc. The material in it reflects the judgment of BGC staff in light of the information available to BGC at the time of document preparation. Any use which a third party makes of this document or any reliance on decisions to be based on it is the responsibility of such third parties. BGC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this document.

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We appreciate the continued opportunity to work with Seabridge on their world-class KSM Project. We trust the above satisfies your requirements at this time. Should you have any questions or comments, please do not hesitate to contact us.

Yours sincerely,

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REFERENCES

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BGC Engineering Inc. 2011a. KSM PFSU – Mitchell Pit Slope Parameter Addendum and Confirmation – Final Report, June 15, 2011.

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BGC Engineering Inc. 2011c. KSM PFSU – Kerr Zone Open Pit Slope Design – Final Report, June 15, 2011.

BGC Engineering Inc., 2010a. KSM Project – Mitchell Zone – Open Pit Slope Design. Final Report, April 16, 2010.

BGC Engineering Inc., 2010b. KSM Project – Sulphurets Zone: Preliminary Open Pit Slope Design – Final Report, April 16, 2010.

BGC Engineering Inc., 2010c. KSM Project – Kerr Zone: Preliminary Open Pit Slope Design – Final Report, April 16, 2010.

BGC Engineering Inc. 2009. BGC Project Memorandum: PEA-Update Open Pit Slope Design Criteria – Mitchell Deposit, April 30, 2009.

TABLES

Table 1. Overall Slope Stability Analyses Summary

Open Pit	Cross Section	Case	Overall Slope Factor of Safety	Overall Slope Configuration Control
Mitchell	A	North highwall, Watertable 150 m back from pitface in Domain I and 200 m back from pitface in Domain II.	1.3	Rockmass stability
		South highwall, Watertable 50 m from the pitface.	1.5	Rockmass stability and Benchstack (B1-P)
	B	Southeast highwall, Watertable 50 m back from the pitface.	1.3	Benchstack (B2-P)
	C	Southeast highwall through SF landslide, Watertable 50 m back from the pitface.	1.6	Benchstack (Bench Geometry)
	D	East highwall through Mitchell glacier, Watertable 50 m back from pitface.	2.5	Benchstack (A1-B3)
	E	Northwest highwall, Watertable 50 m back from the pit face.	1.5	Benchstack (B1-B30 and Rockmass stability
	F	West highwall, Watertable 50 m back from the pitface.	3.1	Benchstack (B1-B3)
	G	Southwest highwall, Watertable 50 m back from the pitface.	1.5	Benchstack (B1-B3, B1-D1) and Rockmass stability
Sulphurets	H	Northwest highwall, Watertable 50 m back from the pit face.	1.6	Benchstack (F1-T)
	I	North highwall, Watertable 50 m back from the pit face.	1.4	Benchstack (FO-T)
Kerr	J	Highwall in KVOL unit with bedding anisotropy, KALT unit in the toe of the slope, Watertable 50 m back from the pit face.	1.7	Benchstack (Bench Geometry and B1-Bed4)
	K	Wall developed entirely in KALT unit, excavated shallowly due to strength of material, Watertable 50 m back from the pit face.	1.3	Rockmass stability
	L	Intermediate Wall dipping northwest in KVOL with KALT in the toe, Watertable 50 m back from pit face.	2.3	Benchstack (H1-T)

Table 2: Mitchell Pit Dewatering Requirements

Geotechnical Domain	Design Sector(s)	Expected Max Slope Height (m)	Dewatering Assumption: Bench	Dewatering Assumption: Inter-ramp / Interberm	Dewatering Assumption: Overall Slope	Min Oa Horizontal Setback to WT[1] (m)	Pre-Mining Conditions	Unmitigated EOL Watertable	Min Horizontal Drain Length (m)[2]	Vertical Wells[3]	Other / Comments
I	I-173	1100	Structures Depressurized	Structures Depressurized, Partially Depressurized Rock mass	Partially Saturated (50% of potential failure mass saturated)	**50**	In valley bottom watertable is generally at surface, and above is a subdued replica of topography approximately 50 m bgs at the crest of the proposed pit	The unmitigated watertable essentially parallels the pit slope in this domain with little to no set-back.	150	Y	
	I-220	1100				**50**	Watertable is at surface in the valley bottom, 100 m bgs at the crest of the proposed pit and a subdued replica of topography in between.	The unmitigated watertable essentially parallels the pit slope in this domain with little to no set-back.	150	Y	
	I-240	500				**50**	Watertable is at surface in the valley bottom, 50 m bgs at the crest of the proposed pit and a subdued replica of topography in between.	The unmitigated watertable essentially parallels the pit slope in this domain with little to no set-back.	150	Y	
	I-275	500				**50**	Watertable is approximately at ground surface for this entire sector, approx paralleling the creek / glacier	The unmitigated watertable essentially parallels the pit slope in this domain with little to no set-back.	150	Y	
	I-338	1200				**150**	Watertable is approx 75 m below ground surface at the crest of the proposed pit, at surface at the current valley bottom, and undulates between surface and 100 m bgs over the existing slope	The unmitigated watertable essentially parallels the pit slope in this domain with little to no set-back.	300	Y	A Dewatering Adit and Drainage Gallery are proposed to assist with depressurization of this slope and to function as a back up system for the Mitchell Diversion Tunnel
	I-028	1200				**150**	Watertable is approx 50 bgs at the crest of the proposed pit, at surface at the current valley bottom, and undulates between those points to a max bgs depth of 100 m	The unmitigated watertable essentially parallels the pit slope in this domain with little to no set-back.	300	N	A Dewatering Adit and Drainage Gallery are proposed to assist with depressurization of this slope and to function as a back up system for the Mitchell Diversion Tunnel
	I-078	550				**50**	Watertable is approximately at ground surface for this entire sector, approx paralleling the creek / glacier	The unmitigated watertable essentially parallels the pit slope in this domain with little to no set-back.	150	Y	
	I-125	700				**50**	In valley bottom watertable is basically at surface, and above is a subdued replica of topography approximately 50 m bgs at the crest of the proposed pit	The unmitigated watertable essentially parallels the pit slope in this domain with little to no set-back.	150	Y	
II	II-325	700			Partially depressurized (25% of potential failure mass saturated)	**200**	Watertable is approx 75 m below ground surface at the crest of the proposed pit, at surface at the current valley bottom, and undulates between surface and 100 m bgs over the existing slope	The unmitigated watertable parallels the pit slope with very little set back for approximately half of the domain, then the set back gradually increases to approximately 250 m behind the pit face	100	N	A Dewatering Adit and Drainage Gallery are proposed to assist with depressurization of this slope and to function as a back up system for the Mitchell Diversion Tunnel
	II-035	500				**50**	Watertable is approx 50 bgs at the crest of the proposed pit, at surface at the current valley bottom, and undulates between those points to a max bgs depth of 100 m	The unmitigated watertable at the base of this domain is approximately at the pit face then slopes back to approximately 150 m behind the pit face	100	Y	
III	III-138	450			Partially Saturated (50% of potential failure mass saturated)	**50**	Subdued replica of topography the groundwater table is approx 50 m bgs	The unmitigated watertable essentially parallels the pit slope in this domain with little to no set-back.	100	Y	
	III-189	450				**50**	Subdued replica of topography the groundwater table is approx 50 m bgs	The unmigitaged watertable at the base of this domain is approximately at the pit face, follows the pit face for approximately 150 m of elevation and gradually slopes back to approx 150 m behind the pit at the height of slope.	100	Y	
IV	IV-200	360			Partially depressurized (25% of potential failure mass saturated)	**50**	Watertable is at surface in the valley bottom, 100 m bgs at the crest of the proposed pit and a subdued replica of topography in between.	The unmitigated watertable in this domain is parallel to the pit wall approximately 150 m behind the face.	100	N	
	IV-240	300				**50**	Watertable is at surface in the valley bottom, 100 m bgs at the crest of the proposed pit and a subdued replica of topography in between.	The unmitigated watertable in this domain is parallel to the pit wall approximately 150 m behind the face.	100	N	
	IV-003	250				**350**	Watertable is approx 75 m below ground surface at the crest of the proposed pit, at surface at the current valley bottom, and undulates between surface and 100 m bgs over the existing slope	The unmitigated watertable in this domain parallels the pit face approximately 150 m into the slope.	100	N	

Notes:
1. Setback to water estimated from mid-slope of slide analyses assuming 50% of failure mass is saturated.
2. Horizontal drain lengths have been estimated considering a 50% effective length.
3. Vertical wells have been modeled based on a nominal spacing, placement has not been optimized for pit phasing at this stage of study.

Table 3: Sulphurets Pit Dewatering Requirements

Geotechnical Domain	Design Sector(s)	Expected Max Slope Height (m)	Depressurization Assumption: Bench	Depressurization Assumption: Inter-ramp / Interberm	Depressurization Assumption: Overall Slope	Min Oa Setback to WT[1] (m)	Pre-Mining Conditions	Unmitigated EOL Watertable	Min Horizontal Drain Length (m)[2]	Vertical Wells[3]	Other / Comments
SHW-V	SHW-323	420	Structures Depressurized	Structures Depressurized, Partially Depressurized Rock mass	Partially Saturated (50% of potential failure mass saturated)	**50**	Watertable is approx 100 m below ground surface at the ridge crest of the proposed pit, and follows topography to ~50 m below at the downhill crest of the pit	At the base of this design sector the watertable is approximately at the pit wall, and slopes back into the wall to a maximum elevation of 1450 masl	100	Y	
	SHW-028	120				**80**	Watertable is approx 50 m below ground surface, subdued replica of topography	This sector is mostly dry based on the 3d model, the watertable reaches a maximum elevation of 1450 m just above the base of it.	160	N	
SFW-C	SFW-C-265	270				**50**	Watertable is approx 50 m below ground surface, subdued replica of topography	In this sector the watertable is near to the pit face	100	N	
	SFW-C-333	500				**50**	Watertable is approx 70 m below ground surface at the crest of the proposed pit, and follows topography	In this sector the watertable is approximately at the pit face	100	Y	
	SFW-C-015	500				**50**	Watertable is approx 100 m below ground surface at the ridge crest of the proposed pit, and follows topography to ~50 m below at the downhill crest of the pit	In this sector the pit walls are mostly dry	100	Y	
	SFW-C-045	400				**50**	Watertable is approx 50 m below ground surface, subdued replica of topography	In this sector the watertable is near to the pit face	100	N	
	SFW-C-070	250				**50**	Watertable is approx 50 m below ground surface, subdued replica of topography	In this sector the watertable is near to the pit face	100	N	
SFW-V	SFW-190	150				**50**	Watertable is approx 50 m below ground surface, subdued replica of topography	In this sector the pit walls are mostly dry	100	Y	
	SFW-222	150				**50**	Watertable is approx 50 m below ground surface, subdued replica of topography	In this sector the pit walls are mostly dry	100	N	
	SFW-269	150				**50**	Watertable is approx 70 m below ground surface at the crest of the proposed pit, and follows topography	In this sector the watertable is approximately at the pit face	100	Y	
	SFW-333	150				**50**	Watertable is approx 100 m below ground surface at the ridge crest of the proposed pit, and follows topography to ~50 m below at the downhill crest of the pit	In this sector the watertable is approximately at the pit face	100	Y	
	SFW-033	400				**50**	Watertable is approx 50 m below ground surface, subdued replica of topography	In this sector the watertable is approximately at the pit face	100	Y	
	SFW-090	600				**50**	Watertable is approx 50 m below ground surface, subdued replica of topography	In this sector the watertable is approximately at the pit face at the base of the pit and slopes back gradually to approximately 100 m behind the pit wall	100	Y	
	SFW-146	150				**50**	Watertable is approx 50 m below ground surface, subdued replica of topography	In this sector the watertable is approximately at the pit face	100	N	

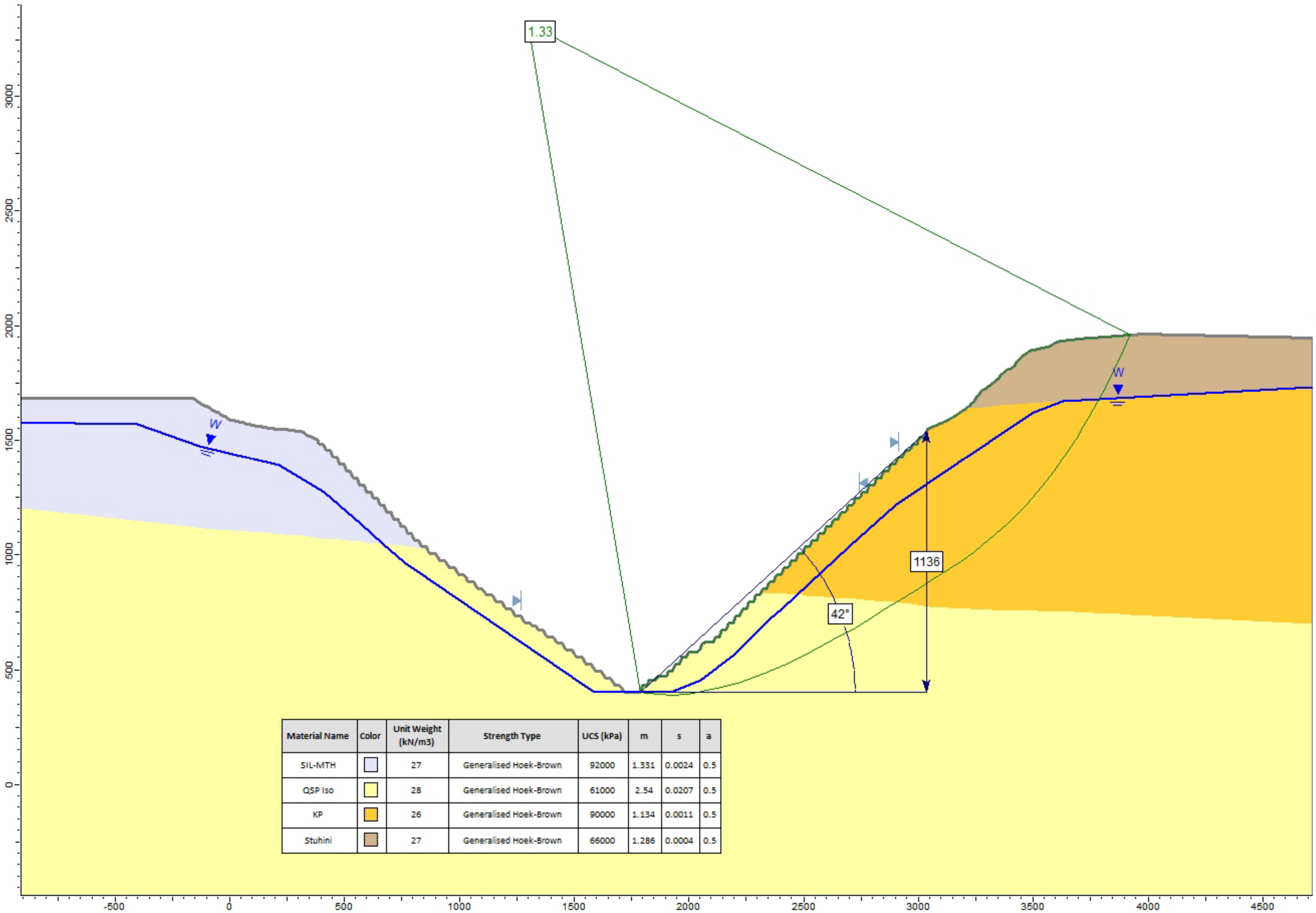
Notes:
1. Setback to water estimated from mid-slope of slide analyses assuming 50% of failure mass is saturated. Where setback is greater than 50 m, critical structures requiring depressurization exist.
2. Horizontal drain lengths have been estimated assuming a 50% effective length.
3. Vertical wells have been modeled based on a nominal spacing, placement has not been optimized for pit phasing at this stage of study.

Table 4: Kerr Pit Dewatering Requirements

Geotechnical Domain	Design Sector(s)	Expected Max Slope Height (m)	Depressurization Assumptions				Pre-Mining Conditions	Unmitigated EOL Watertable	Min Horizontal Drain Length (m)[2]	Vertical Wells[3]	Other / Comments
			Bench	Inter-ramp / Interberm	Overall Slope	Min Oa Setback to WT[1] (m)					
KVOL	KVOL-236	600	Structures Depressurized	Structures Depressurized, Partially Saturated Rock mass	Partially Saturated (50% of failed mass saturated)	**50**	Watertable 100 m below surface at top of slope, at the base of this design sector the watertable is at surface	The watertable in this sector is approximately at the pit wall.	100	Y	
	KVOL-065	450				**50**	Watertable 100 m below the surface for this sector	The watertable in this sector dips back into the slope to a maximum set back of 150 m	100	Y	
	KVOL-126	600				**60**	Watertable 100 m below surface at top of slope, at the base of this design sector the watertable is at surface	The watertable in this sector is approximately at the pit face below the top 150 m, which are nearly dry based on the 3d model	120	Y	
	KVOL-160	600				**70**	Watertable 100 m below surface at top of slope, at the base of this design sector the watertable is at surface	The watertable in this sector is approximately at the pit face below the top 150 m, which are nearly dry based on the 3d model	140	Y	
KALT	KALT-180	420		Structures Depressurized, Partially Depressurized Rock mass	Partially Depressurized (25% of failed mass saturated)	**50**	Watertable 100 m below surface at top of slope, at the base of this design sector the watertable is at surface	The watertable in this sector is approximately at the pit wall.	100	Y	
	KALT-000	120				**50**	Watertable 100 m below the surface for this sector	The watertable in this sector is approximately at the pit wall.	100	Y	

Notes:
1. Setback to water estimated from mid-slope of slide analyses assuming 50% of failure mass is saturated. Where setback is greater than 50 m, critical structures requiring depressurization exist.
2. Horizontal drain lengths have been estimated assuming a 50% effective length.
3. Vertical wells have been modeled based on a nominal spacing, placement has not been optimized for pit phasing at this stage of study.

APPENDIX A
OVERALL SLOPE STABILITY ANALYSIS



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QSP Iso		28	Generalised Hoek-Brown	61000	2.54	0.0207	0.5
KP		26	Generalised Hoek-Brown	90000	1.134	0.0011	0.5
Stuhini		27	Generalised Hoek-Brown	66000	1.286	0.0004	0.5

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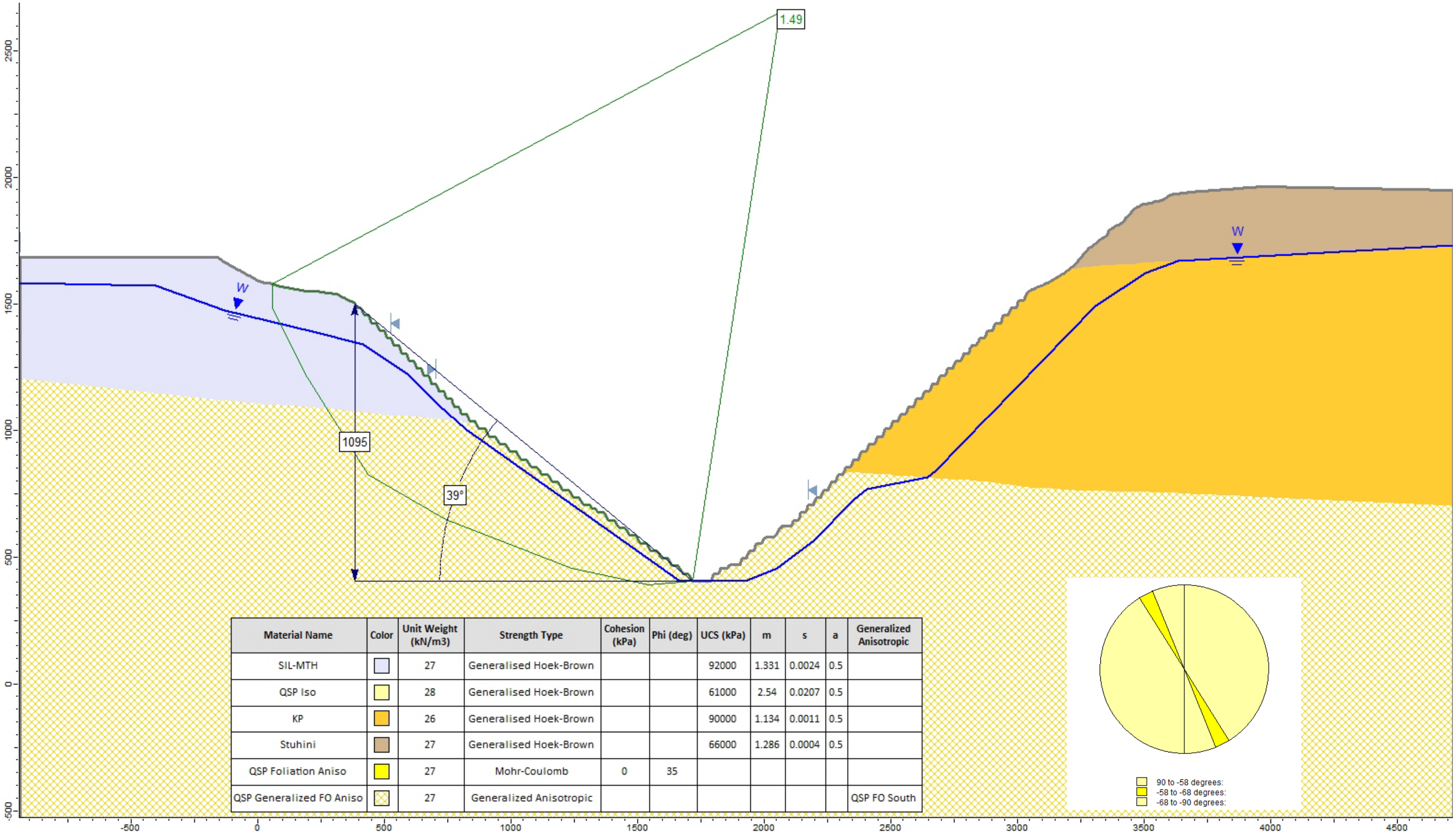
REPORT TITLE:
KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
OPEN PIT DESIGN REVIEW

FIGURE TITLE:
MITCEHLL PIT - SECTION A NORTH

CLIENT:
SEABRIDGE GOLD INC

PROJECT No.:
0638-013-30

FIGURE No.:
A-1



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	UCS (kPa)	m	s	a	Generalized Anisotropic
SIL-MTH		27	Generalised Hoek-Brown			92000	1.331	0.0024	0.5	
QSP Iso		28	Generalised Hoek-Brown			61000	2.54	0.0207	0.5	
KP		26	Generalised Hoek-Brown			90000	1.134	0.0011	0.5	
Stuhini		27	Generalised Hoek-Brown			66000	1.286	0.0004	0.5	
QSP Foliation Aniso		27	Mohr-Coulomb	0	35					
QSP Generalized FO Aniso		27	Generalized Anisotropic							QSP FO South

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REPORT TITLE:
KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
OPEN PIT DESIGN REVIEW

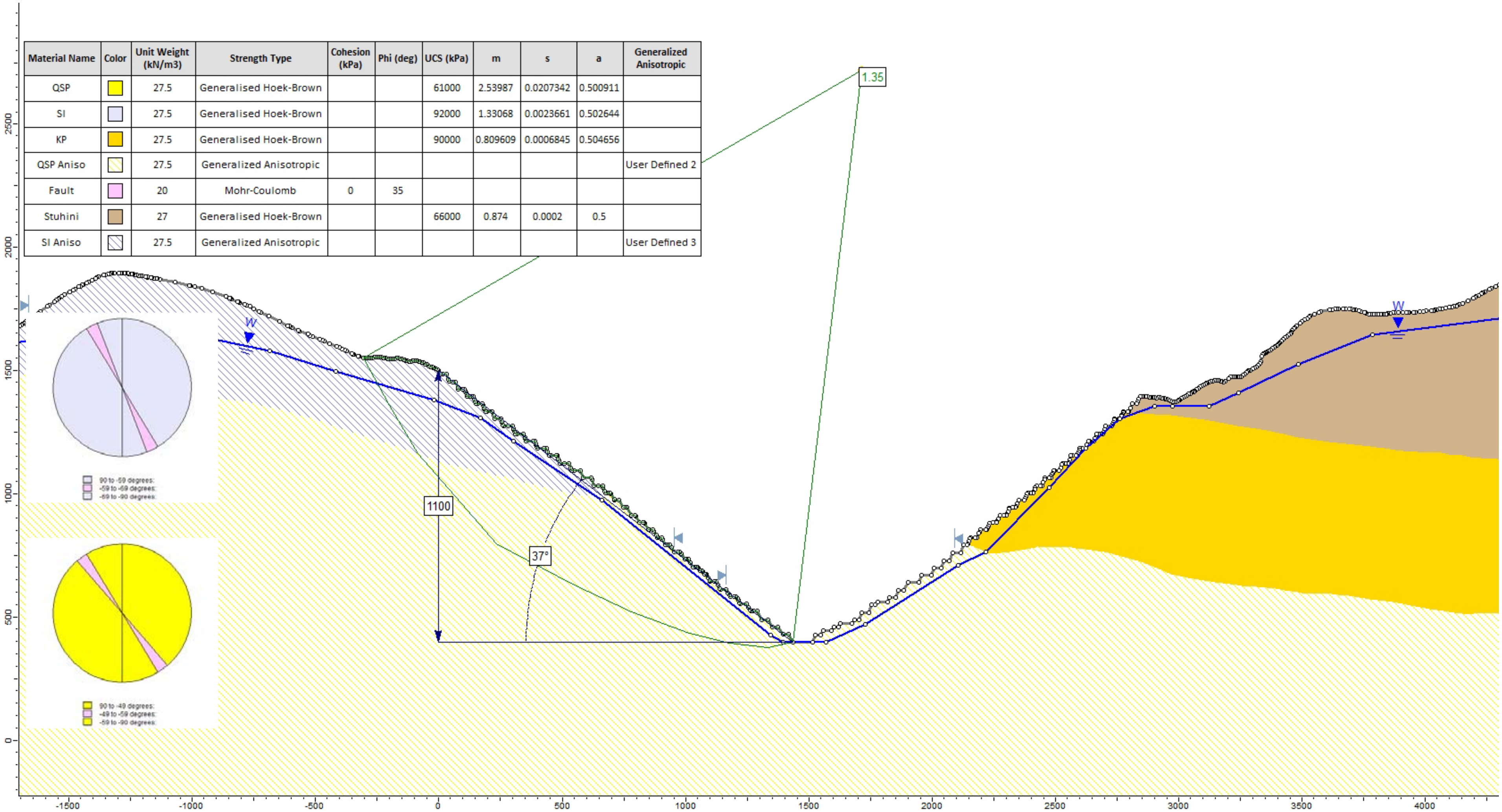
FIGURE TITLE:
MITCEHLL PIT - SECTION A SOUTH

CLIENT:
SEABRIDGE GOLD INC.

PROJECT No.:
0638-013-30

FIGURE No.:
A-2

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	UCS (kPa)	m	s	a	Generalized Anisotropic
QSP		27.5	Generalised Hoek-Brown			61000	2.53987	0.0207342	0.500911	
SI		27.5	Generalised Hoek-Brown			92000	1.33068	0.0023661	0.502644	
KP		27.5	Generalised Hoek-Brown			90000	0.809609	0.0006845	0.504656	
QSP Aniso		27.5	Generalized Anisotropic							User Defined 2
Fault		20	Mohr-Coulomb	0	35					
Stuhini		27	Generalised Hoek-Brown			66000	0.874	0.0002	0.5	
SI Aniso		27.5	Generalized Anisotropic							User Defined 3



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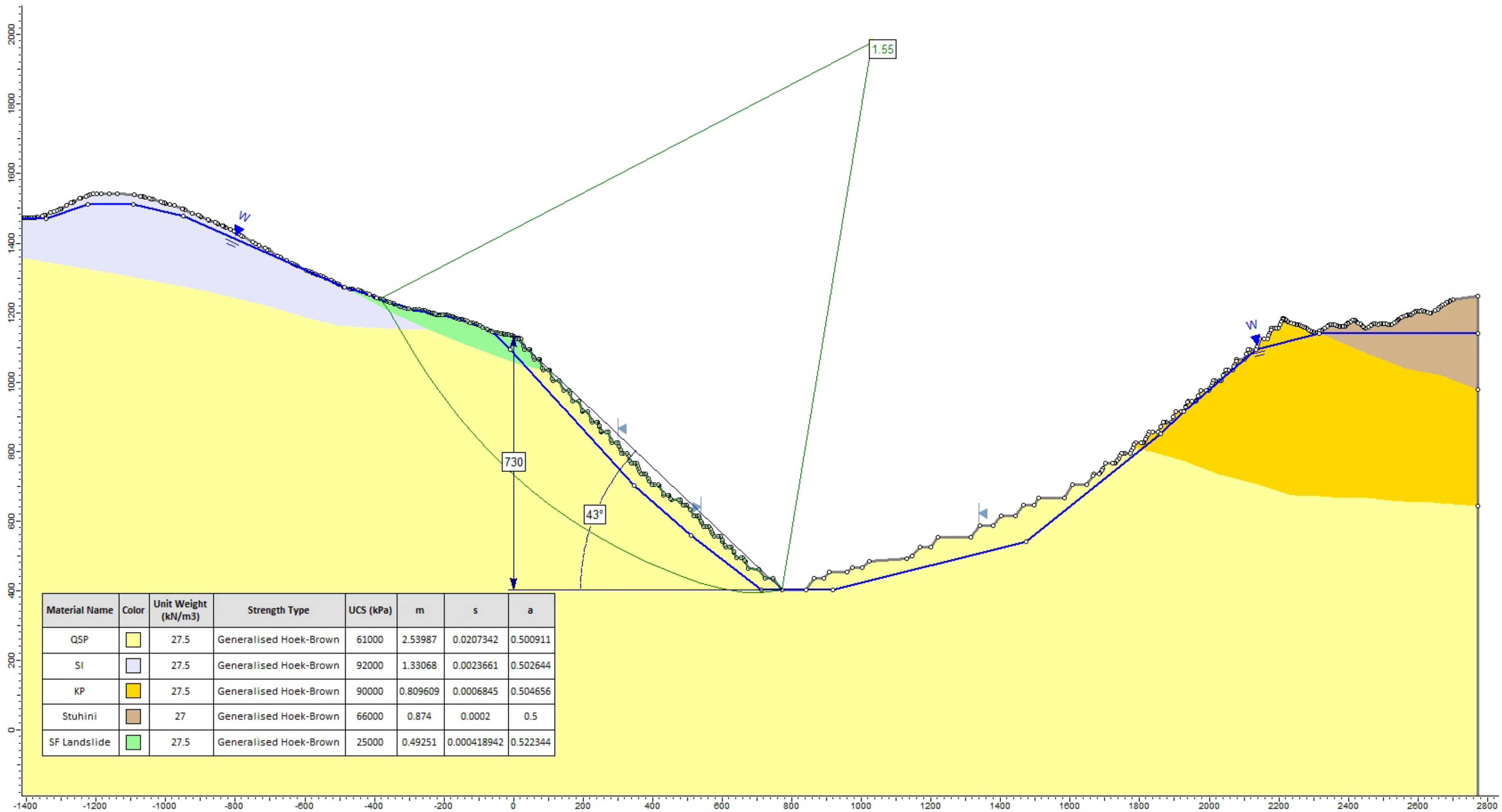
REPORT TITLE:
KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
OPEN PIT DESIGN REVIEW

FIGURE TITLE:
MITCEHLL PIT - SECTION B

CLIENT:
SEABRIDGE GOLD INC.

PROJECT No.: 0638-013-30

FIGURE No.: A-3



Material Name	Color	Unit Weight (kN/m3)	Strength Type	UCS (kPa)	m	s	a
QSP		27.5	Generalised Hoek-Brown	61000	2.53987	0.0207342	0.500911
SI		27.5	Generalised Hoek-Brown	92000	1.33068	0.0023661	0.502644
KP		27.5	Generalised Hoek-Brown	90000	0.809609	0.0006845	0.504656
Stuhini		27	Generalised Hoek-Brown	66000	0.874	0.0002	0.5
SF Landslide		27.5	Generalised Hoek-Brown	25000	0.49251	0.000418942	0.522344

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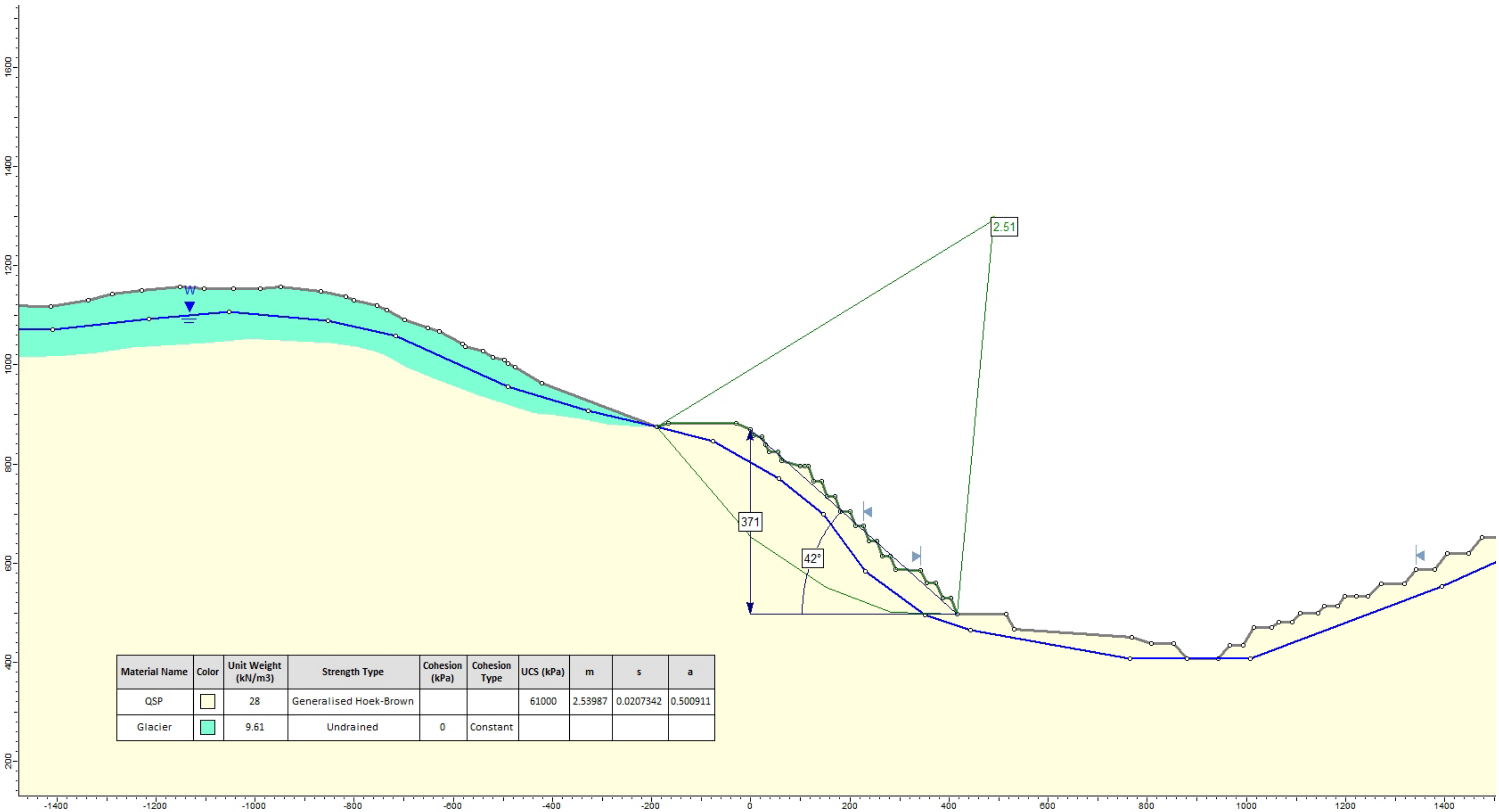
REPORT TITLE:
KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
OPEN PIT DESIGN REVIEW

FIGURE TITLE:
MITCEHLL PIT – SECTION C

CLIENT:
SEABRIDGE GOLD INC.

PROJECT No.:
0638-013-30

FIGURE No.:
A-4



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Cohesion Type	UCS (kPa)	m	s	a
QSP		28	Generalised Hoek-Brown			61000	2.53987	0.0207342	0.500911
Glacier		9.61	Undrained	0	Constant				

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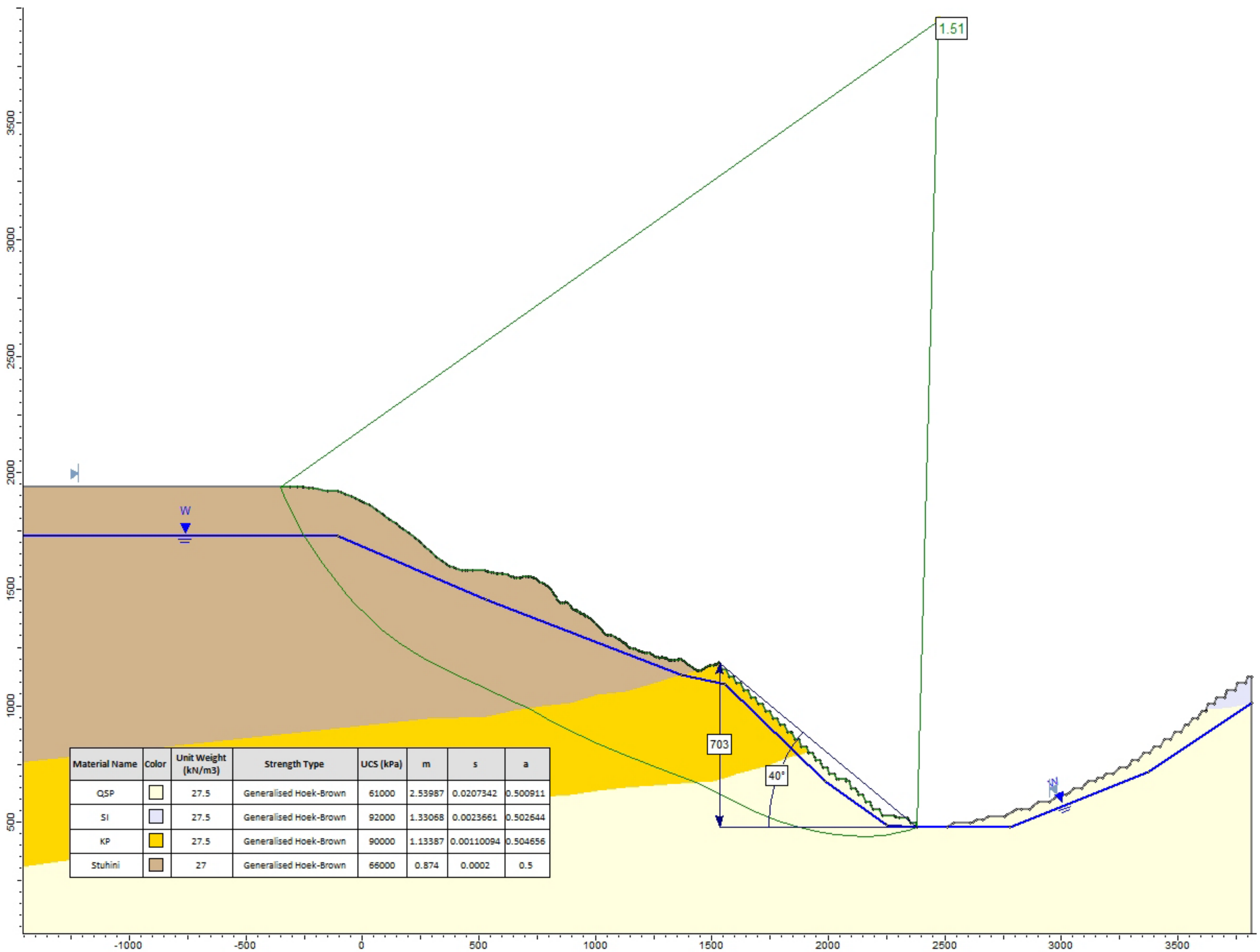
REPORT TITLE:
KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
OPEN PIT DESIGN REVIEW

FIGURE TITLE:
MITCEHLL PIT – SECTION D

CLIENT:
SEABRIDGE GOLD INC.

PROJECT No.:
0638-013-30

FIGURE No.:
A-5



Material Name	Color	Unit Weight (kN/m3)	Strength Type	UCS (kPa)	m	s	a
QSP		27.5	Generalised Hoek-Brown	61000	2.53987	0.0207342	0.500911
SI		27.5	Generalised Hoek-Brown	92000	1.33068	0.0023661	0.502644
KP		27.5	Generalised Hoek-Brown	90000	1.13387	0.00110094	0.504656
Stuhini		27	Generalised Hoek-Brown	66000	0.874	0.0002	0.5

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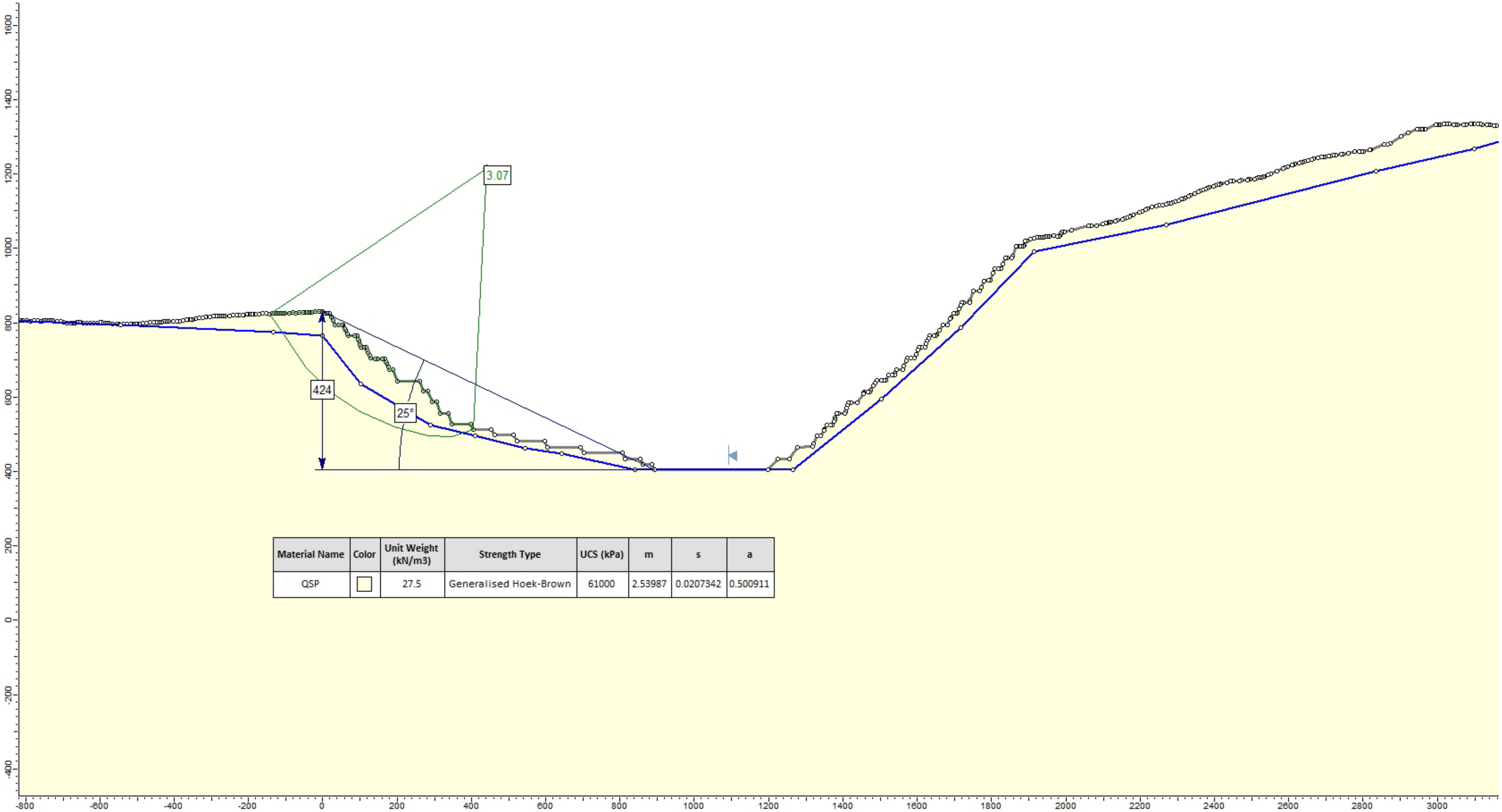
REPORT TITLE:
KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
OPEN PIT DESIGN REVIEW

FIGURE TITLE:
MITCEHLL PIT – SECTION E

CLIENT:
SEABRIDGE GOLD INC.

PROJECT No.:
0638-013-30

FIGURE No.:
A-6



Material Name	Color	Unit Weight (kN/m3)	Strength Type	UCS (kPa)	m	s	a
QSP		27.5	Generalised Hoek-Brown	61000	2.53987	0.0207342	0.500911

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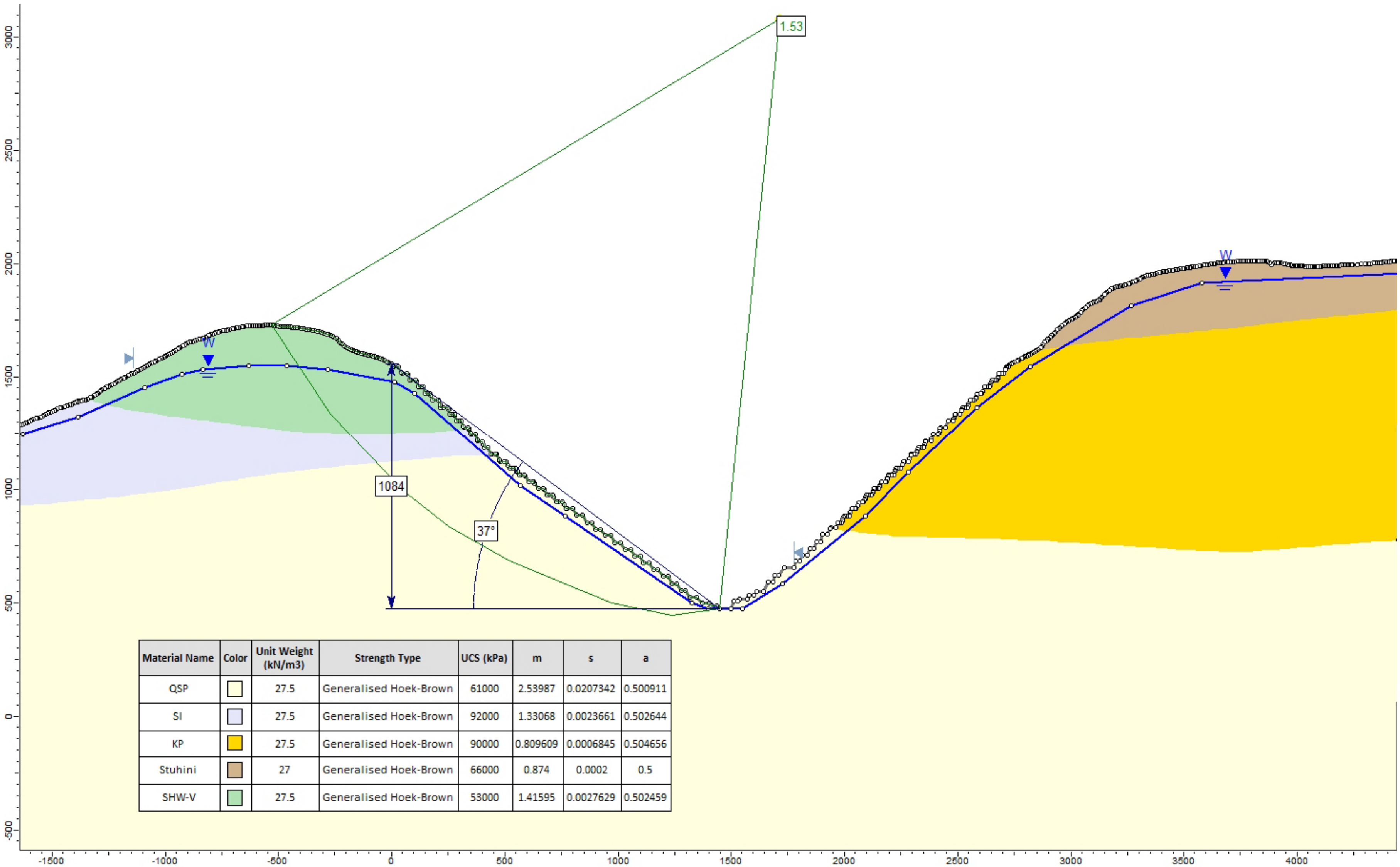
REPORT TITLE:
KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
OPEN PIT DESIGN REVIEW

FIGURE TITLE:
MITCEHLL PIT – SECTION F

CLIENT:
SEABRIDGE GOLD INC.

PROJECT No.:
0638-013-30

FIGURE No.:
A-7



Material Name	Color	Unit Weight (kN/m3)	Strength Type	UCS (kPa)	m	s	a
QSP		27.5	Generalised Hoek-Brown	61000	2.53987	0.0207342	0.500911
SI		27.5	Generalised Hoek-Brown	92000	1.33068	0.0023661	0.502644
KP		27.5	Generalised Hoek-Brown	90000	0.809609	0.0006845	0.504656
Stuhini		27	Generalised Hoek-Brown	66000	0.874	0.0002	0.5
SHW-V		27.5	Generalised Hoek-Brown	53000	1.41595	0.0027629	0.502459

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REPORT TITLE:
KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
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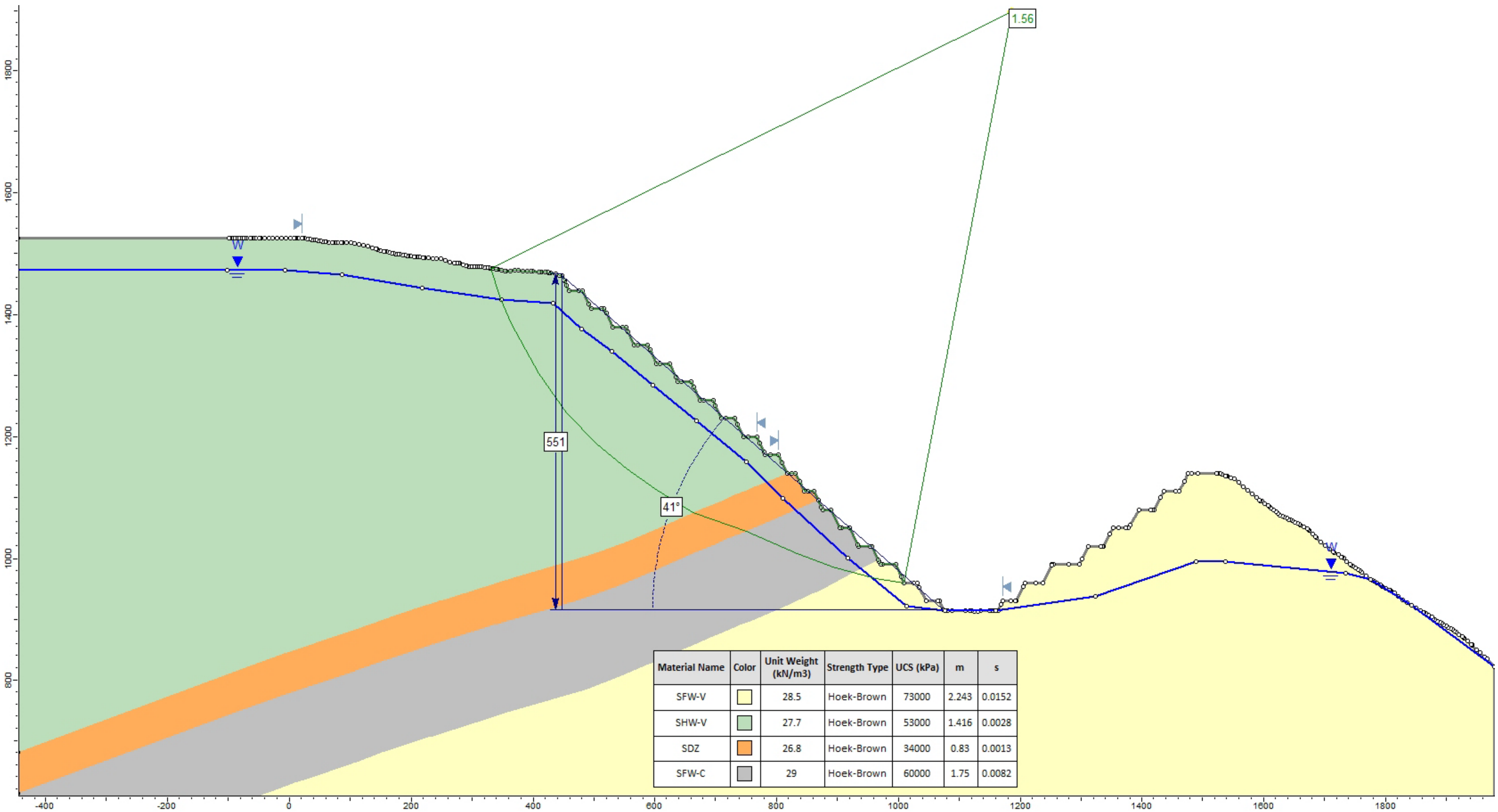
FIGURE TITLE:
MITCEHLL PIT – SECTION G

CLIENT:
SEABRIDGE GOLD INC.

PROJECT No.:
0638-013-30

FIGURE No.:
A-8



Material Name	Color	Unit Weight (kN/m3)	Strength Type	UCS (kPa)	m	s
SFW-V		28.5	Hoek-Brown	73000	2.243	0.0152
SHW-V		27.7	Hoek-Brown	53000	1.416	0.0028
SDZ		26.8	Hoek-Brown	34000	0.83	0.0013
SFW-C		29	Hoek-Brown	60000	1.75	0.0082

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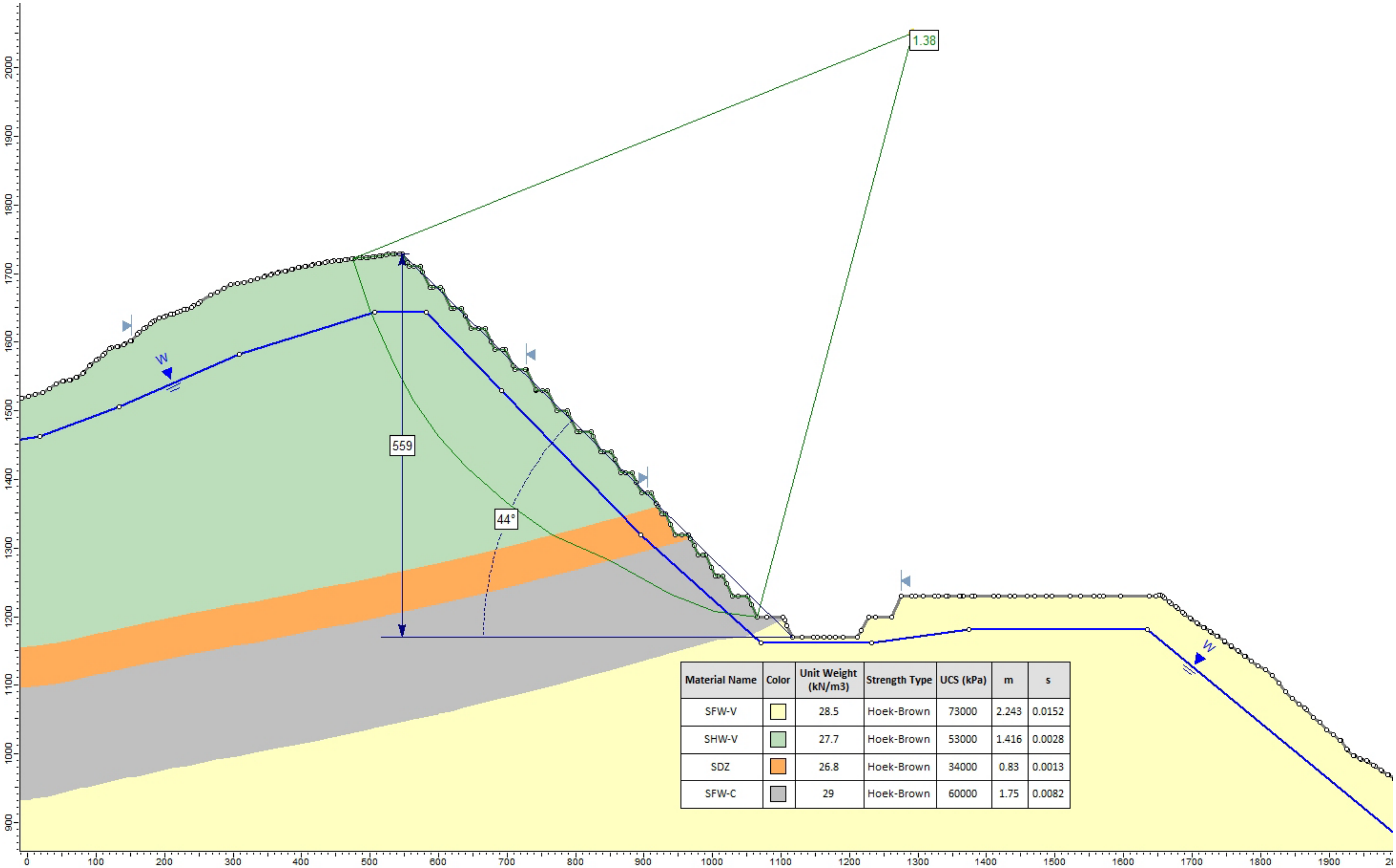
REPORT TITLE:
KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
OPEN PIT DESIGN REVIEW

FIGURE TITLE:
SULPHURETS PIT – SECTION H

CLIENT:
SEABRIDGE GOLD INC.

PROJECT No.:
0638-013-30

FIGURE No.:
A-9



Material Name	Color	Unit Weight (kN/m3)	Strength Type	UCS (kPa)	m	s
SFW-V		28.5	Hoek-Brown	73000	2.243	0.0152
SHW-V		27.7	Hoek-Brown	53000	1.416	0.0028
SDZ		26.8	Hoek-Brown	34000	0.83	0.0013
SFW-C		29	Hoek-Brown	60000	1.75	0.0082

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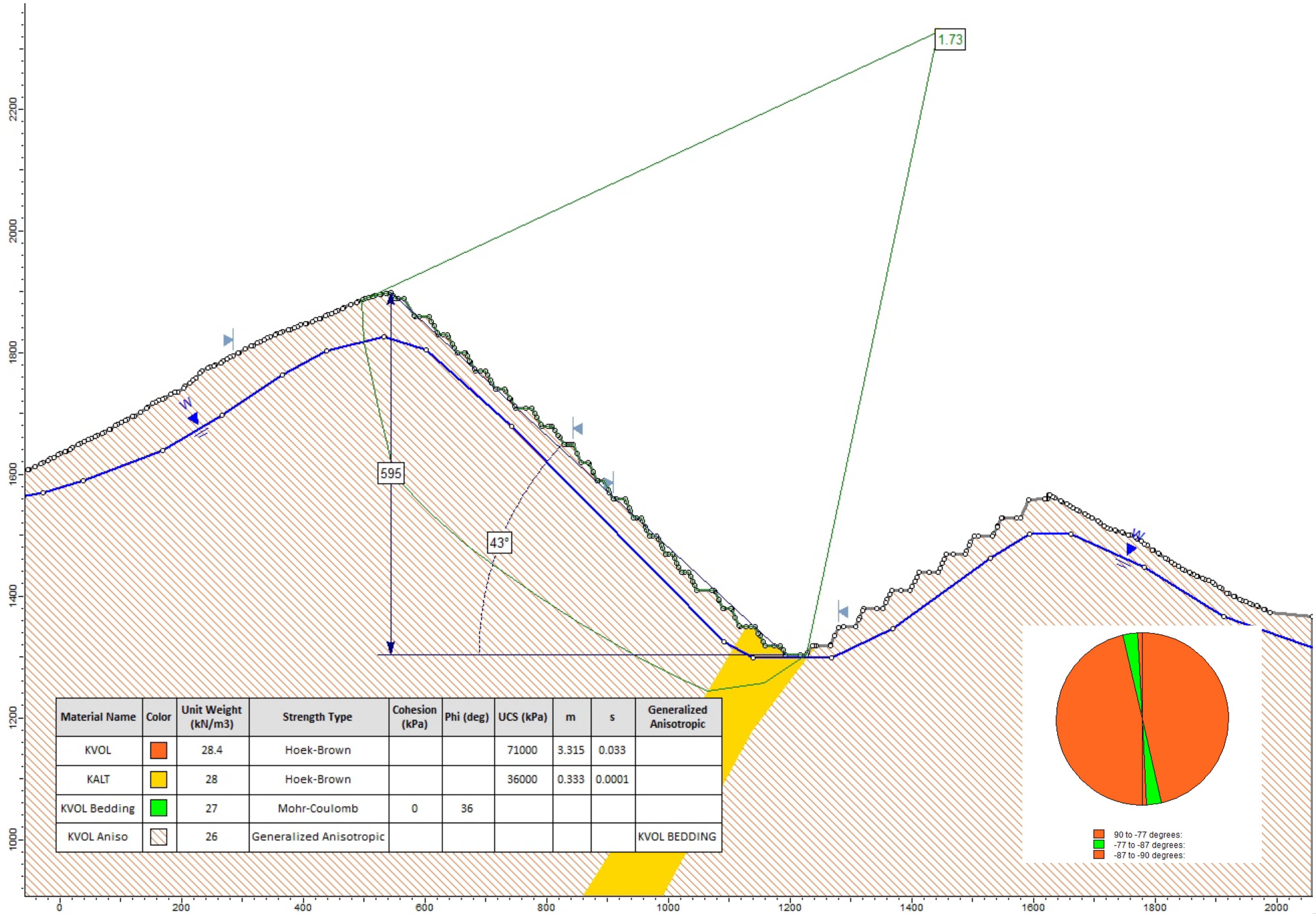
REPORT TITLE:
KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
OPEN PIT DESIGN REVIEW

FIGURE TITLE:
SULPHURETS PIT – SECTION I

CLIENT:
SEABRIDGE GOLD INC.

PROJECT No.:
0638-013-30

FIGURE No.:
A-10



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	UCS (kPa)	m	s	Generalized Anisotropic
KVOL	(orange)	28.4	Hoek-Brown			71000	3.315	0.033	
KALT	(yellow)	28	Hoek-Brown			36000	0.333	0.0001	
KVOL Bedding	(green)	27	Mohr-Coulomb	0	36				
KVOL Aniso	(hatched)	26	Generalized Anisotropic						KVOL BEDDING

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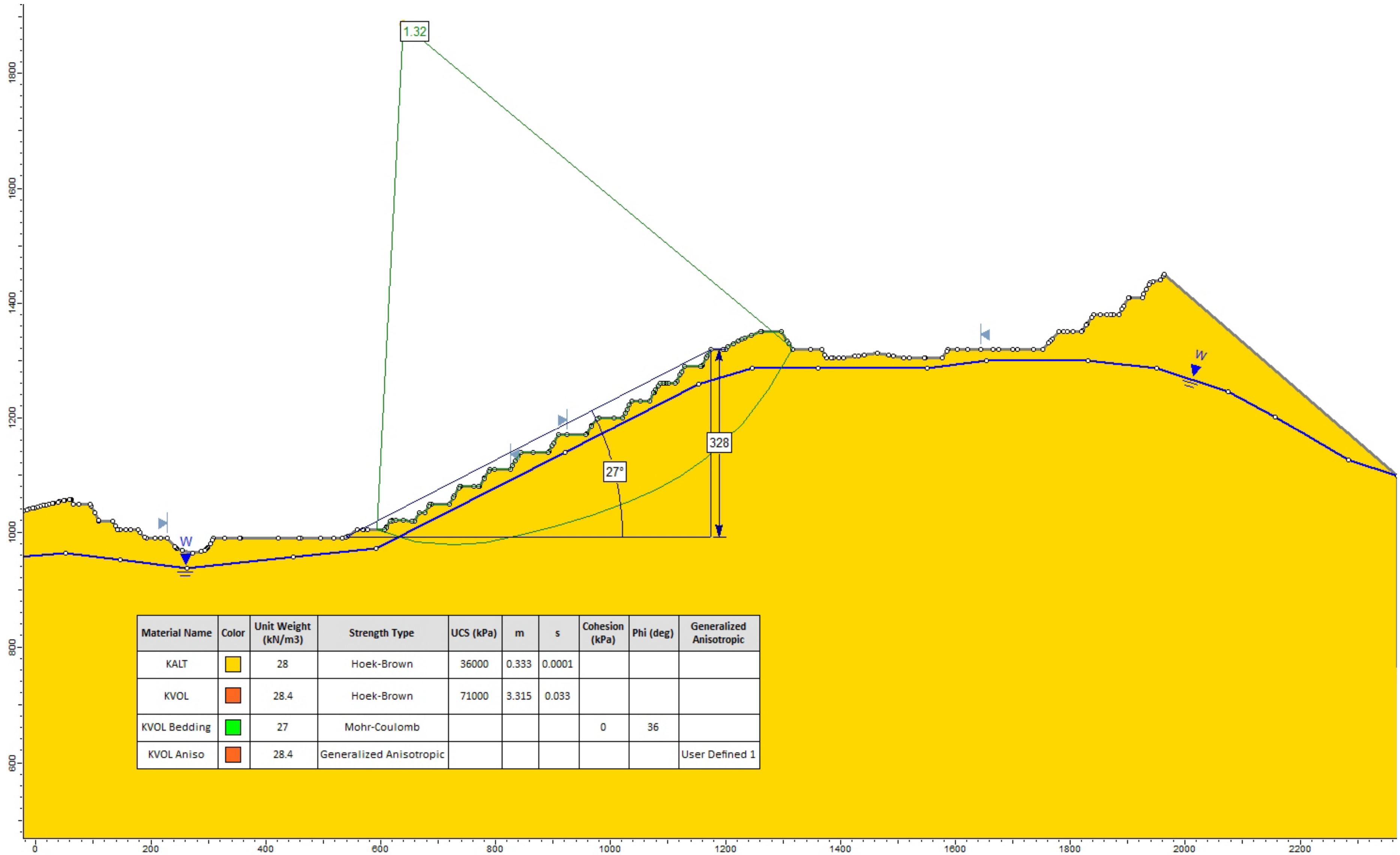
REPORT TITLE:
KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
OPEN PIT DESIGN REVIEW

FIGURE TITLE:
KERR PIT – SECTION J

CLIENT:
SEABRIDGE GOLD INC.

PROJECT No.:
0638-013-30

FIGURE No.:
A-11



Material Name	Color	Unit Weight (kN/m3)	Strength Type	UCS (kPa)	m	s	Cohesion (kPa)	Phi (deg)	Generalized Anisotropic
KALT		28	Hoek-Brown	36000	0.333	0.0001			
KVOL		28.4	Hoek-Brown	71000	3.315	0.033			
KVOL Bedding		27	Mohr-Coulomb				0	36	
KVOL Aniso		28.4	Generalized Anisotropic						User Defined 1

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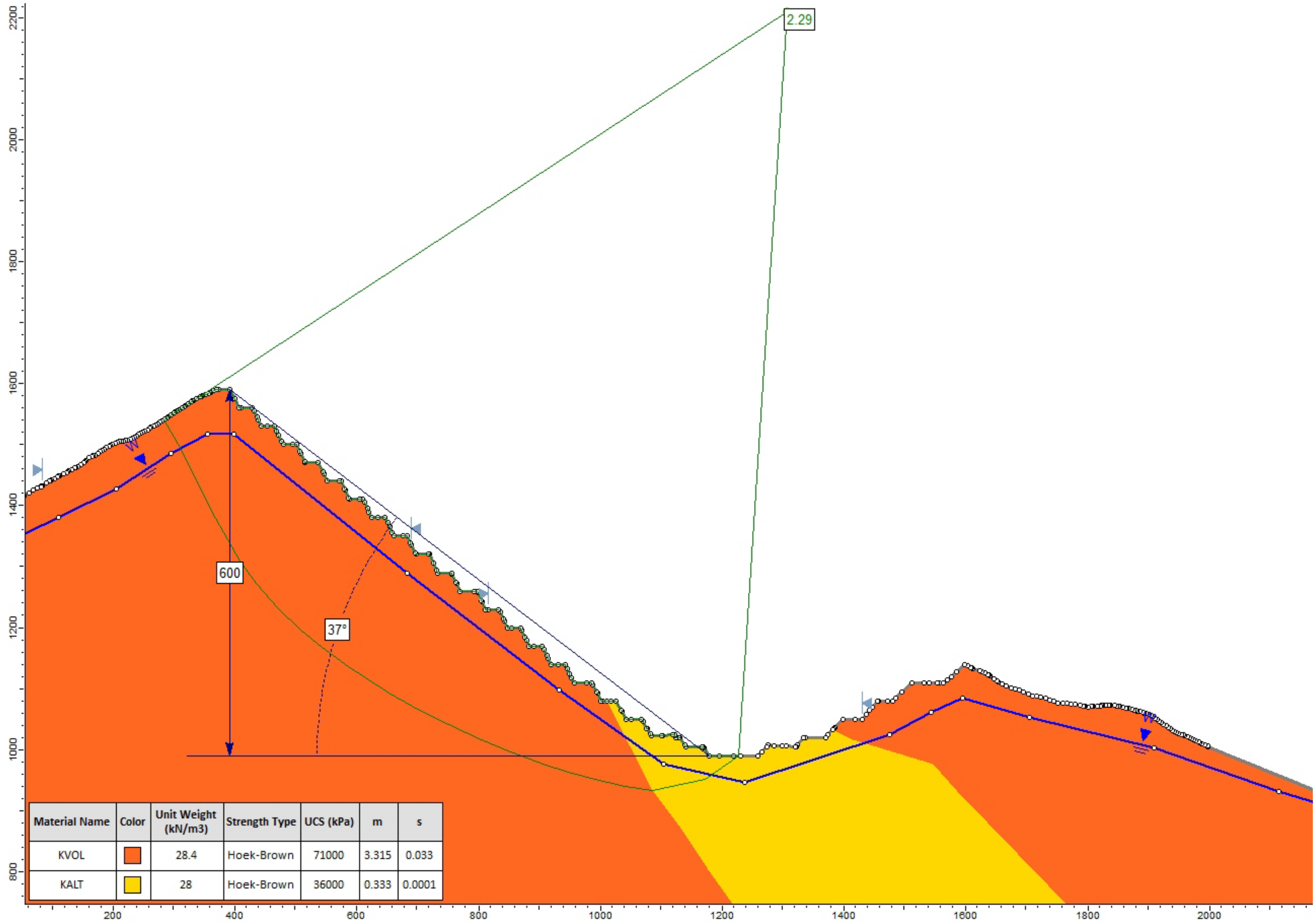
REPORT TITLE:
KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
OPEN PIT DESIGN REVIEW

FIGURE TITLE:
KERR PIT – SECTION K

CLIENT:
SEABRIDGE GOLD INC.

PROJECT No.:
0638-013-30

FIGURE No.:
A-12



Material Name	Color	Unit Weight (kN/m3)	Strength Type	UCS (kPa)	m	s
KVOL		28.4	Hoek-Brown	71000	3.315	0.033
KALT		28	Hoek-Brown	36000	0.333	0.0001

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REPORT TITLE:
KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
OPEN PIT DESIGN REVIEW

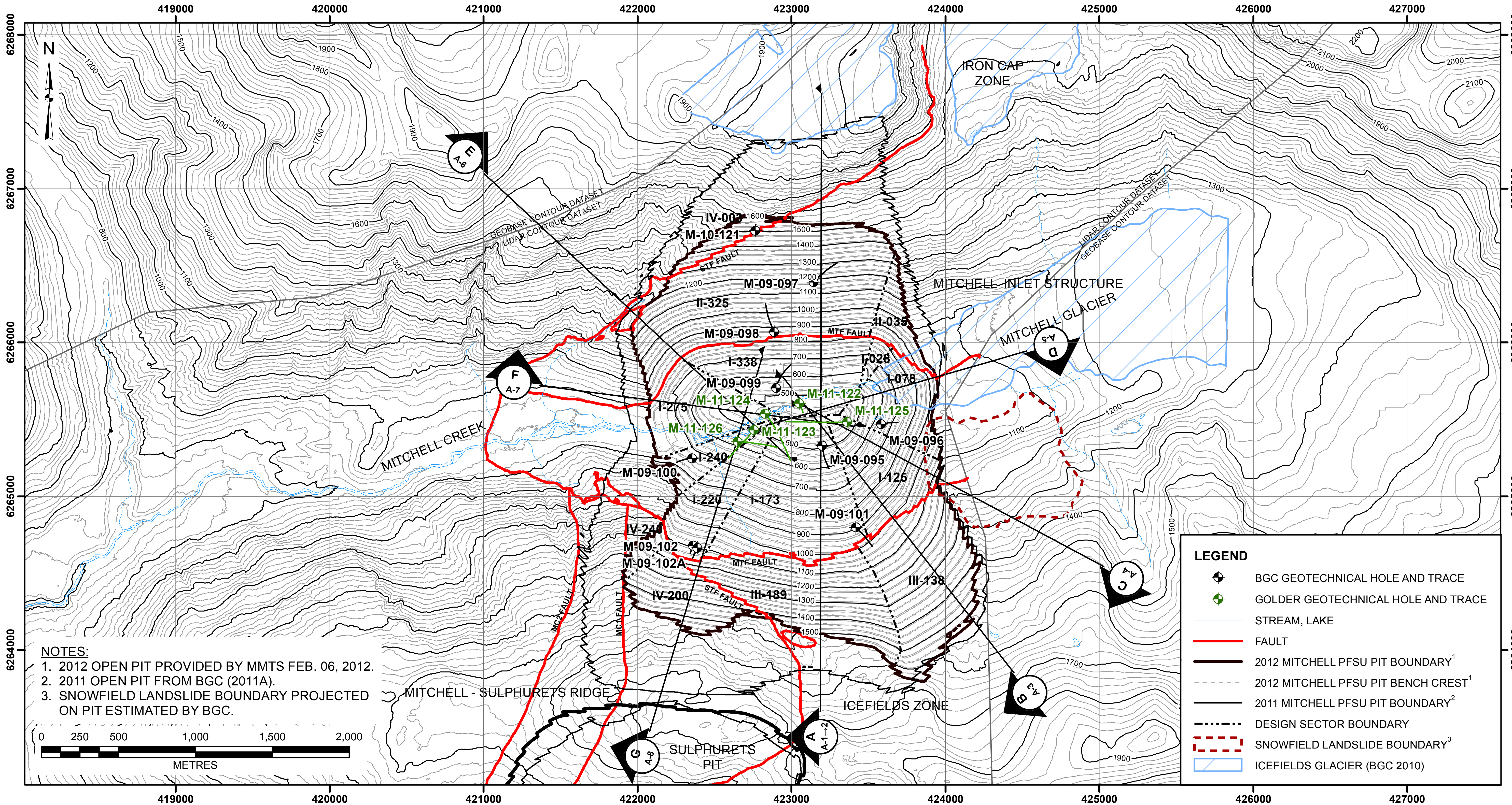
FIGURE TITLE:
KERR PIT – SECTION L

CLIENT:
SEABRIDGE GOLD INC.

PROJECT No.:
0638-013-30

FIGURE No.:
A-13

DRAWINGS



NOTES:
1. 2012 OPEN PIT PROVIDED BY MMTS FEB. 06, 2012.
2. 2011 OPEN PIT FROM BGC (2011A).
3. SNOWFIELD LANDSLIDE BOUNDARY PROJECTED ON PIT ESTIMATED BY BGC.

0 250 500 1,000 1,500 2,000
METRES

LEGEND
- BGC GEOTECHNICAL HOLE AND TRACE
- GOLDER GEOTECHNICAL HOLE AND TRACE
- STREAM, LAKE
- FAULT
- 2012 MITCHELL PFSU PIT BOUNDARY[1]
- 2012 MITCHELL PFSU PIT BENCH CREST[1]
- 2011 MITCHELL PFSU PIT BOUNDARY[2]
- DESIGN SECTOR BOUNDARY
- SNOWFIELD LANDSLIDE BOUNDARY[3]
- ICEFIELDS GLACIER (BGC 2010)

CONTOUR INTERVAL 20 m
NAD 1983 UTM Zone 9N

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	1:25,000
DATE:	JUNE 2012
DRAWN:	LL, WKL, JVC
DESIGNED:	DS
CHECKED:	DK
APPROVED:	HWN

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: SEABRIDGE GOLD

PROJECT: KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE OPEN PIT DESIGN REVIEW

TITLE: MITCHELL PIT OVERVIEW

PROJECT No.:	DWG No.:	REV.:
0638-013-30	01	

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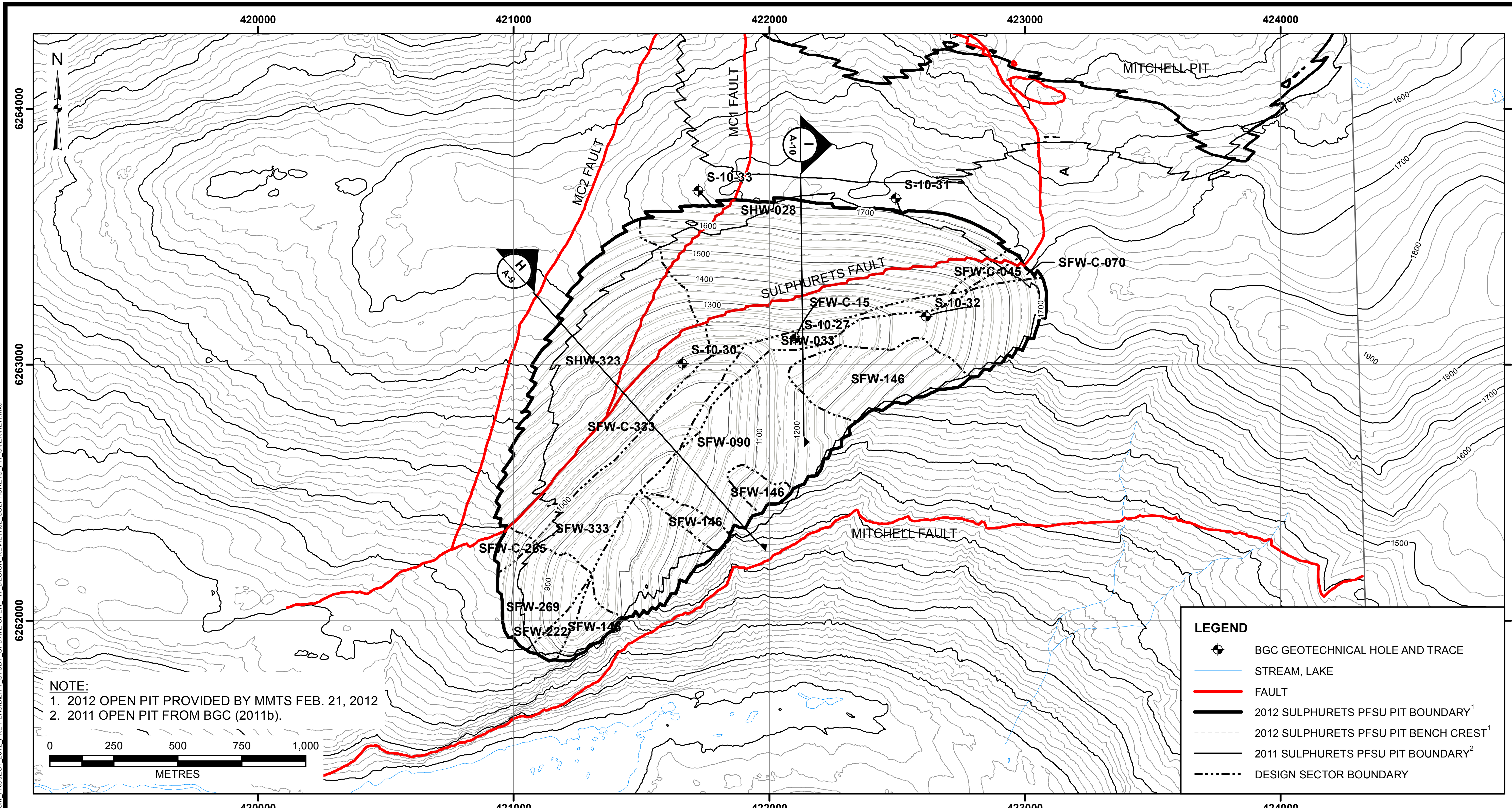
DWG TO BE READ WITH BGC REPORT TITLED "KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE - OPEN PIT DESIGN REVIEW" DATED JUNE 2012



CONTOUR INTERVAL 20 m
NAD 1983 UTM Zone 9N

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	1:15,000
DATE:	JUNE 2012
DRAWN:	LL, WKL, JVC
DESIGNED:	DS
CHECKED:	DK
APPROVED:	HWN

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:
SEABRIDGE GOLD

PROJECT:
KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
OPEN PIT DESIGN REVIEW

TITLE:
SULPHURETS PIT OVERVIEW

PROJECT No.:	DWG No.:	REV.:
0638-013-30	02	

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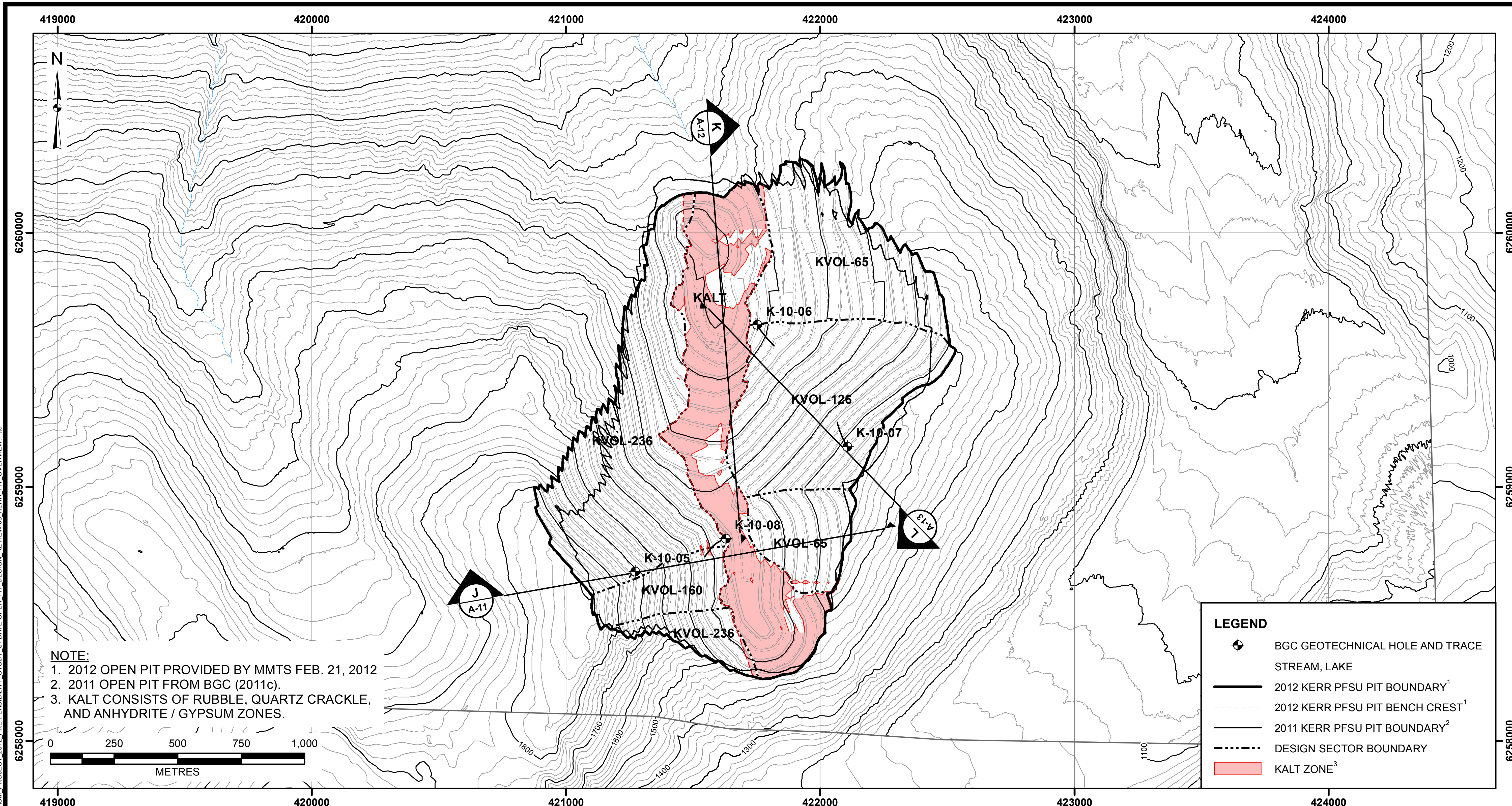
DWG TO BE READ WITH BGC REPORT TITLED "KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE - OPEN PIT DESIGN REVIEW" DATED JUNE 2012



CONTOUR INTERVAL 20 m
NAD 1983 UTM Zone 9N

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REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE:	1:15,000
DATE:	JUNE 2012
DRAWN:	LL, WKL, JVC
DESIGNED:	DS
CHECKED:	DK
APPROVED:	HWN

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: SEABRIDGE GOLD

PROJECT: KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE
OPEN PIT DESIGN REVIEW

TITLE: KERR PIT OVERVIEW

PROJECT No.:	DWG No.:	REV.:
0638-013-30	03	

DWG TO BE READ WITH BGC REPORT TITLED "KSM PROJECT 2012 PRE-FEASIBILITY STUDY UPDATE - OPEN PIT DESIGN REVIEW" DATED JUNE 2012