Appendix H: Red Dog One Year Mine Plan 2018

Red Dog Operations

Alaska, USA

ONE YEAR MINE PLAN - 2018

December 2017

Teck

ONE YEAR MINE PLAN - 2018

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ONE YEAR MINE PLAN - 2018

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SECTION 1. SUMMARY

1.1. Introduction

Utilizing Red Dog Mine's current stockpile blending criteria and equipment capabilities, a monthly mine production plan for 2018 has been prepared under the direction of the 2018 5-Year Mine Plan. The 2018 1-Year Mine Plan has an estimated production of 977 kt of zinc concentrate and 179 kt of lead concentrate. These estimates are based upon mill recovery formulas in the mine block model, with adjustments made by Mill Technical based on projected mill feed grades and mill feed for 2018. For 2018, all production will be mined from the Aqqaluk and Qanaiyaq deposits, and the waste will primarily be dumped back into the Main Pit. Mine production total for 2018 is forecasted to be 12,087 kt, which is the sum of 4,163 kt ore and 7,924 kt waste.

1.2. Mine Planning Parameters

The mine plan is based on two distinct block models; one for the Aqqaluk and the Qanaiyaq deposits respectively. Planning for the Aqqaluk Pit was based on the RED2015-G model, which was issued in March 2017 along with the Aqq12g pit shell. Planning for the Qanaiyaq Pit was based on the QAN2012-M model, which was also issued in March 2017 along with the Qan12f pit shell. The drilling and metallurgical understanding of both the Aqqaluk and Qanaiyaq deposits is sufficient for reserves classification.

February 2017 Reserve & Resource metal prices ($1.00/lb. Zn, $0.90/lb. Pb and $20.00/tr. oz. Ag) were used to calculate revenue and generate ore/waste cutoff values. Net value per tonne is converted to net value per second, using throughput formulae from the Teck sponsored AMIRA GeM mineral texture project, to account for ore throughput variability. An operating, rather than breakeven cutoff is utilized by Red Dog in order to provide a higher NPV mining schedule than that obtainable on a breakeven cutoff basis. A net value per second of $[redacted]/s is used as the operating cutoff to classify Mill Feed. The Low Grade ore, from $0.00/s up to [redacted] is stockpiled for processing at the end of mine life. However, due to sulfide reactivity, only the fraction of Low Grade ore that is classified as non-reactive is stockpiled. Once ore and waste reserves were determined, the ore was scheduled by grade and grade ratios according to the Red Dog Operations mill stockpile blending criteria.

Total production tonnage is considered a function of available truck hours. The first priority was to determine the total truck hours required to achieve 2018 mill feed and critical projects (e.g. Tailings Storage Facility (TSF) infrastructure). These hours were then subtracted from the total available truck hours for 2018 to determine the tonnage of waste able to be hauled. An average Physical Availability of 76.8%, Use of Availability of 82.0%, and Operating Efficiency of 87.0% were used to calculate the total truck hours available for 2018. All production is in line with the 2018 5-Year Mine Plan commitments.

1.3. Mine Production

Red Dog is anticipating 12,087 kt of total mine production from the Aqqaluk Pit and Qanaiyaq Pits as shown in Table 1.3-1. 4,163 kt of ore at [redacted] Zn and [redacted] Pb, plus 7,924 kt of waste are forecasted. Of the total ore production, the Aqqaluk Pit contributes 80% and the Qanaiyaq Pit 20%.

Table 1.3-1 2018 Mine Plan Summary

	Aqqaluk Pit	Qanaiyaq Pit	Total
Total (tonne)	7,569,466	4,518,305	12,087,771
Ore (tonne)	3,329,253	834,086	4,163,339
Zn (%)	[redacted]	[redacted]	[redacted]
Pb (%)			
Ba (%)	17.0	2.1	14.0
SiO2 (%)	0.0	23.2	4.6
Total Waste	4,240,213	3,684,219	7,924,432
SR	1.08	4.42	1.9

1.4. Equipment Fleets

Compared to 2017, one truck will be converted to the new water truck and one of the older units will be parked. The 2018 equipment schedule is shown in Table 1.4-1.

Table 1.4-1 2018 Equipment Schedule

Equipment	Description	Q1	Q2	Q3	Q4
Drills	DML	3	3	3	3
Trucks	777	10	10	10	10
Loaders	992/993	6	6	6	6
Dozers	D9/D10	4	4	4	4

1.5. Risks and Opportunities

Risks

1) Aqqaluk pit highwall stability
2) Main Pit Dump (MPD) stability
3) Selenium (Se) leaching
4) Incorporate 2017 Production Shortfall
5) Low Fleet Availabilities
6) Ammonia Levels in Main Pit Lake (MPL)

Opportunities

1) Operational technology implementation
2) Haul road and pit bench maintenance

1.6. Project Lists

Pit Dewatering

1) Aqqaluk pit dewatering
2) Qanaiyaq pit dewatering

Environmental Related Projects

1) Fugitive dust control

Other Projects

1) Pit wall/dump stability
2) Exploration drilling
3) Crushing

SECTION 2. MINE PLANNING PARAMETERS

Red Dog's ability to blend its highly variable run-of-mine zinc grade into stockpiles with a consistent feed grade (± 1% Zn) has been essential to optimizing concentrate production. The challenge for short-range mine planners is to create an achievable mine plan utilizing a variety of zinc and lead grades to aid stockpile blending. The following assumptions, standards, and methods have been applied to the 2018 Mine Plan.

2.1. Tonnage and Shot Calculations

With MineSight Interactive Planner (MSIP), Red Dog Engineering has divided and sequenced the 5-Year Mine Plan into mineable drill patterns for 2018. Beginning with the predicted 2017 end of year topography, shot boundaries (hereinafter cuts) were scheduled into a reasonable mining sequence based on ore grades, required waste stripping and haulage access. These cuts are also generated to achieve the designed pit phases. Once the mining sequence was determined, 2018 production was reported based on the block model and the scheduled cut geometries.

The 2018 mine plan is based on the RED2015-G and QAN2012-M models (both issued in March 2017). Relevant grade items used for planning include:

- STZN – Zinc % based on diamond drill hole core
- STPB – Lead % based on diamond drill hole core
- STFE – Iron % based on diamond drill hole core
- STBA – Barium % based on diamond drill hole core
- TOC – Total organic carbon based on diamond drill hole core
- SiO_2 – Calculated silica value

In addition to interpolated geologic information, the model also stores calculated data to value each block and to estimate recoveries for planning purposes. To balance Red Dog's polymetallic deposit, Red Dog's ore/waste cutoff is based on value (net smelter recovery) per second. Value is defined as the amount of revenue generated by the recoverable metal produced per second of mill operating time. Teck's long-range price forecast (February 2017) was utilized in determining the estimated revenue per block. Price assumptions include:

- Zinc - $1.00/lb.
- Lead - $0.90/lb.
- Silver - $20.00/oz.

Along with mill recoveries (calculated from historical geologic and mill data), the reserve prices are used to code each block in the model with a value per tonne. For each block in the block model, the site breakeven cost is subtracted from the Net Smelter Return (NSR) to determine the net value per tonne. This is then multiplied by the throughput to calculate the net value per second, which is used as the basis for the mine cutoffs. An operating cutoff [redacted]/s was selected for this mine plan to remain consistent with the 2018 5-Year Mine Plan. All blocks whose value exceeds the operating cutoff cost are tagged as Mill Feed for the plan. Of the remaining blocks, those whose value exceeds the breakeven (or mill) cutoff are tagged as Low Grade Ore. As of 2015, the Non-reactive classified fraction of the Low Grade Ore is being stockpiled separately at the north end of the MWD for potential milling at the end of mine. Remaining blocks are considered waste.

In addition to the ore and waste tonnages, the MineSight Interactive Planner reports % zinc, % lead, silver ounces per ton, % iron, % barium, total organic carbon, silica, and calculated mill recoveries for each cut. The cuts, their geologic data, and their recoveries are compiled and used to design stockpiles and estimate mill output.

2.2. Waste Segregation Criteria

In September 2013, the successful discharge of water to Red Dog Creek and predictions from an updated water balance allowed backfilling of Main Pit to restart. Backfilling of the Main Pit continues in 2018.

In order to select the disposal method required for waste material, the waste rock is further classified as Not Reactive (NR) or Possibly Reactive (PR). Waste with a Self-Heating Capacity (SHC) risk of 4 or below is considered NR whereas waste with a SHC risk of 5 or above is considered PR.

The current procedure for handling PR waste rock requires placing, whenever possible, into dump lifts at or below the planned closure water elevation of excavated open pits. Currently only the Main Pit is available. As the closure water level is planned at the 850 ft. elevation, PR waste would be placed into the 850' lift subzones for as long as these remained unfilled. The possibility will exist in the future to dump PR waste into pit closure water level dump lifts in the Aqqaluk and Qanaiyaq Pits. However, the designs for these pits and modeling of their hydrological regimes are still ongoing.

2.3. Stockpile and Mill Criteria

Historical experience building blended stockpiles from Red Dog's Main Pit deposit created a workable standard to optimize the deposit's highly rich and variable zinc grades. Once the cuts are run against the models, they are ordered and sequenced to be both mineable and blended to meet predetermined stockpile criteria. Optimizing mill feed requires blending weathered, baritic and siliceous ore types from both the Aqqaluk and Qanaiyaq deposits into stockpiles that meet the criteria set forth by the mill.

Ore cuts are sequenced and organized into roughly 190 kilotonne stockpiles that are built in seven lifts on the crusher pad. The stockpiles are designed such that the lifts, when mined in strips across the face, create a relatively consistent feed grade profile (Figure 2-1). Currently a stockpile should meet the following requirements to optimize mill throughput and recoveries, listed roughly in order of importance (Revision 19: November 27, 2016):

- Stockpile average +/- 1.5% Zn quarter average
- Zinc/Iron ratio: as close to quarter avg. as possible and >= 2.1
- Zinc/Lead ratio: as close to quarter avg. as possible and >= 3.0
- Soluble Pb ratio: <25%
- TOC: <= 0.50%
- Type 8: <10%, Type 9: <15%
- Qanaiyaq weathered ore < 15% total ore feed, total Qanaiyaq ore < 30% total ore feed

Mill feed for the 2018 mine plan is planned from the Aqqaluk and Qanaiyaq deposits.

When building blended stockpiles it is preferred to free dump the coarser, often higher grade ore on the odd numbered lifts as it has a higher angle of repose in truck dumped piles (Figure 2.3-1). The finer, more variable sized rock (typically lower grade, baritic ores) is positioned on the even numbered dozed lifts. This blending concept is adjusted as production blast hole assays and pit progression drives stockpile planning.

The 2018 plan attempts to create a sequence that reflects the separation and recovery efforts of Ore Control and Mine Operations.

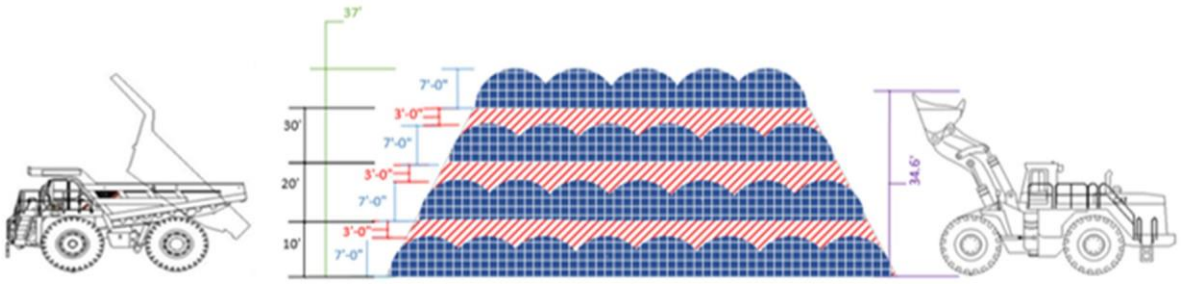


Figure 2.3-1 Ideal Stockpile Lift Sequence

The historical data comparison between mine stockpile release and actual mill feed (dry mass- balanced data from the Gencid 480 report) from October 2016 to November 2017 is shown in Table 2.3-1.

Table 2.3-1 Historical Stockpile Comparison (October 2016 to November 2017)

Stockpile	Stockpile Release					480 Mass Balance report					Variance				
	tonnes	Zn	Pb	Fe	Ba	tonnes	Zn	Pb	Fe	Ba	tonnes	Zn	Pb	Fe	Ba
477	185,069					195,594					10,525				
478	196,296					195,122					(1,174)				
479	182,945					206,749					23,804				
480	166,273					160,654					(5,619)				
481	179,767					158,007					(21,760)				
482	152,321					137,758					(14,563)				
483	179,484					164,043					(15,441)				
484	163,997					172,370					8,373				
485	172,691					160,148					(12,543)				
486	168,708					149,800					(18,908)				
487	172,287					161,566					(10,721)				
488	162,401					130,250					(32,151)				
489	157,052					177,919					20,867				
490	161,683					164,872					3,189				
491	165,303					159,501					(5,802)				
492	161,965					213,254					51,289				
493	163,026					163,359					333				
494	190,174					199,127					8,953				
495	178,063					178,220					157				
496	193,659					172,587					(21,072)				
497	183,835					173,949					(9,886)				
498	197,261					192,289					(4,972)				
499	199,641					207,396					7,755				
500	174,181					169,726					(4,455)				
501	187,779					179,089					(8,690)				
502	203,246					227,520					24,274				
503	188,134					209,829					21,695				
	4,787,241					4,780,698					(6,543)				

2.4. Equipment Operating Metrics

Physical availability (A) is calculated as:

$$\%\ \text{Availability} = \frac{\text{Total Hrs. in Period} - \text{Maintenance Hrs.}}{\text{Total Hrs. in Period}}$$

Use of Availability (UA) or Utilization is calculated as:

$$\%\ \text{Use of Availability} = \frac{\text{Total Hrs. in period} - \text{Maintenance Hrs.} - \text{Standby Hrs.}}{\text{Total Hrs. in Period} - \text{Maintenance Hrs.}}$$

Operating Efficiency (OE) is calculated as:

$$\%\ \text{Operating Efficiency} = \frac{\text{Total Hrs. in period} - \text{Maintenance Hrs.} - \text{Standby Hrs.} - \text{Delay Hrs.}}{\text{Total Hrs. in Period} - \text{Maintenance Hrs.} - \text{Standby Hrs.}}$$

Asset Utilization (AU) is calculated as:

$$\%\ \text{Asset Utilization} = \%\ \text{Availability} \times \%\ \text{Use of Availability} \times \%\ \text{Operating Efficiency}$$

Production hours are calculated as:

$$\text{Production Hrs.} = \text{Total Hrs. in Period} \times \%\ \text{Asset Utilization}$$

The current mine fleet operating metrics for 2017 year-to-date as of October 31st are listed in Table 2.4-1.

Table 2.4-1 Current Fleet Operating Metrics

Equipment	Description	Units Available	Physical Availability	Use of Availability	Operating Efficiency	Asset Utilization
Drills	DML	3	75.9%	61.4%	77.0%	35.9%
Trucks	777	12	70.5%	83.6%	86.1%	50.7%
Loaders	993/992	5	70.1%	73.8%	86.9%	45.0%
Dozers	D9/D10	4	65.9%	51.3%	87.0%	29.4%

2.5. Haul Cycle and Production Assumptions

Total production is based on the haul truck hours available per year and productivity per hour for each material to be moved. Productivities per hour for ore, waste and reclaim are calculated from the weighted average haul times from Wenco and target tonnages for each material.

Currently Red Dog has a fleet of five 777D, five 777F and two 777G CAT haul trucks available for haulage duty. These trucks are rated at 91 tonnes (100 short tons); however, empirical data for waste has shown that Red Dog typically averages less than 90 tonnes per load. Truck capacity based on material and deposit is shown in Table 2.5-1.

Table 2.5-1 Truck Capacity by Material (tonnes/load)

Model	Units	SP Reclaim		Ore		Waste	
		Aqqaluk	Qanaiyaq	Aqqaluk	Qanaiyaq	Aqqaluk	Qanaiyaq
777D/F/G	tonnes/load	90	90	90	90	90	85

The truck capacity and the average haul cycle time are used to determine the average productivity (tonnes/hour) for ore and waste production in the Aqqaluk and Qanaiyaq Pits and for hauling stockpiled ore to the crusher. The productivity is calculated as:

$$\text{Productivity} = \frac{\text{Payload (mt)}}{\text{average haul cycle (hrs.)}}$$

Productivities for other equipment are based on historic data and are summarized in Table 2.5-2. The respective productivities are divided by the scheduled tonnes per period and the required operating hours compiled by fleet.

Table 2.5-2 Loader, Drill, and Dozer Productivities

	Productivity (tonnes/operating hour)				
Equipment	Ore	SP Reclaim	COSP	Marginal Ore	Waste
993 Loader	869	869	-	-	869
DM-L Drill	1,078	-	-	1,078	1748
D9/D10 dozer	8,730	2,493	5,180	-	1,412

SECTION 3. MINE PRODUCTION

3.1. Overview

The 2018 mine plan production is divided into eight material classes: High Grade Ore (Mill Feed), Non-reactive Low Grade Ore, Possibly Reactive Low Grade Ore, Possibly Reactive Waste, Non-reactive Waste, Construction rock, Cover rock, and Non-sulphide Ore. The plan assumes all production is from the Aqqaluk and Qanaiyaq Pits. Waste will primarily backfill the Main Pit, though a significant amount of non-mineralized material will also be stockpiled on the Main Waste Dump for future reclamation. Ore production for the 2018 plan is forecast to meet or exceed the ore required to produce the forecasted 1,156 kt of concentrate in the 2018 mill budget. It is assumed that the mill will be capable of maintaining the feed rate outlined by the 2018 mine schedule. The 2018 mill budget has a scheduled production of 977 kt of zinc concentrate and 179 kt of lead concentrate.

3.2. 2018 Mine Schedule

The 2018 Mine Plan currently schedules 12,088 kt total mine production from Aqqaluk Pit and Qanaiyaq Pit as shown in Table 3-1. Of the total ore production (4,163 kt at [redacted] Pb), the Aqqaluk Pit contributes 80.0% and the Qanaiyaq Pit 20.0%. Waste production is estimated at 7,924 kt, which includes 802 kt of Non-reactive Low Grade Ore, 420 kt of Possibly Reactive Low Grade Ore, 429 kt of Possibly Reactive Waste, 5,420 kt of Non-reactive Waste, 0 kt of Construction rock, and 649 kt of Cover (reclamation) rock (Table 3.2-1).

Table 3.2-1 2018 Mine Plan Summary

	Aqqaluk Pit	Qanaiyaq Pit	Total
Total (tonne)	7,569,466	4,518,305	12,087,771
Ore (tonne)	3,329,253	834,086	4,163,339
Zn (%)	[redacted]	[redacted]	[redacted]
Pb (%)	[redacted]	[redacted]	[redacted]
Ba (%)	[redacted]	[redacted]	[redacted]
SiO2 (%)	[redacted]	[redacted]	[redacted]
Total Waste	4,240,213	3,684,219	7,924,432
SR	1.08	4.42	1.9

The average monthly ore production is 347 kt through 2018, which is slightly higher than the 2017 mine plan monthly average (338 kt). The monthly waste production averages are:

- 647 kt in Quarter 1,
- 660 kt in Quarter 2,
- 604 kt in Quarter 3 and,
- 731 kt in Quarter 4.

The monthly and quarterly mine plan summary are shown in Tables 3.2-2 and 3.2-3 respectively.

Table 3.2-2 2018 Monthly Mine Plan Summary

2018 Mine Plan Production Schedule -Total

Description / Activity	Units	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10	M11	M12	Total
Days	Days	31	28	31	30	31	30	31	31	30	31	30	31	365
Mine Production Summary														
Ore	t	**326,593**	**370,058**	**358,441**	**374,991**	**330,025**	**357,438**	**365,097**	**326,897**	**366,112**	**300,495**	**335,653**	**351,539**	**4,163,339**
Waste														
Low Grade - Non-reactive	t	40,243	90,536	17,825	-	42,877	156,614	84,209	106,416	89,868	63,291	79,811	30,793	802,483
Low Grade - Possibly Reactive	t	42,633	9,193	8,189	-	32,436	6,669	6,990	53,858	52,284	30,532	85,090	91,968	419,842
Non-sulphide Ore	t	-	-	41,794	16,131	42,301	-	11,474	44,157	6,938	14,235	15,962	11,217	204,209
Waste - Possibly Reactive	t	45,475	6,540	35,911	46,259	12,149	13,160	-	33,976	58,256	89,773	33,657	54,031	429,187
Waste - Non-reactive	t	574,199	428,950	540,983	645,920	531,156	434,310	529,588	235,725	139,889	360,518	472,283	526,157	5,419,678
Waste - Construction	t	-	-	-	-	-	-	-	-	-	-	-	-	-
Waste - Cover	t	4,720	-	53,104	-	-	-	-	117,764	239,524	199,788	18,962	15,171	649,033
Total Waste	t	707,270	535,219	697,806	708,310	660,919	610,753	632,261	591,896	586,759	758,137	705,765	729,337	7,924,432
Waste/Mill Feed Ratio	-	2.17	1.45	1.95	1.89	2.00	1.71	1.73	1.81	1.60	2.52	2.10	2.07	1.90
Total Mine Production	t	**1,033,863**	**905,277**	**1,056,247**	**1,083,301**	**990,944**	**968,191**	**997,358**	**918,793**	**952,871**	**1,058,632**	**1,041,418**	**1,080,876**	**12,087,771**
%Qanaiyaq Milled	%	**18.9%**	**17.9%**	**18.2%**	**19.2%**	**22.1%**	**21.1%**	**20.7%**	**21.6%**	**20.8%**	**20.0%**	**19.6%**	**20.5%**	**20.0%**
Mill Feed Summary														
Mill Feed	t	326,593	370,058	358,441	374,991	330,025	357,438	365,097	326,897	366,112	300,495	335,653	351,539	4,163,339
Zinc	%	[redacted]												[redacted]
Lead	%	[redacted]												[redacted]
Soluble Lead	%	0.9	0.9	1.0	1.1	1.0	1.0	1.1	1.1	1.5	0.9	1.0	1.3	1.1
Silver	g/t	73.3	80.6	72.3	75.2	79.2	83.0	80.0	75.4	90.6	80.3	79.2	82.7	79.4
Iron	%	4.4	7.4	4.6	5.5	4.2	4.3	5.4	5.0	4.8	4.9	4.4	8.2	5.3
Barium	%	14.6	15.1	15.3	15.1	14.4	13.9	14.0	13.9	12.9	12.4	13.0	12.9	14.0
TOC	%	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
SiO2	%	5.0	4.7	5.0	3.1	5.7	4.6	5.3	6.2	4.5	3.8	3.7	4.3	4.6
NSR	$/t	198.9	204.7	192.4	188.0	194.5	206.0	205.8	195.4	203.8	192.2	189.0	199.3	197.6
BMWi	kwh/t	12.2	11.3	11.2	11.8	11.9	11.9	11.7	12.1	11.4	12.3	12.1	10.9	11.7
A x b	- hrs	95.3	91.7	91.1	102.3	94.2	86.2	99.5	94.8	91.3	86.2	94.4	86.2	92.9
Grinding Hours	t/hr	662	697	662	753	682	696	718	665	704	611	695	643	8,186
Throughput		507.7	541.8	543.8	508.2	490.1	521.3	520.1	500.1	520.7	498.3	493.2	548.5	516.9
Ore Type														
Exhalite	%	46.5	9.4	39.7	10.8	43.8	42.3	30.6	36.8	38.5	44.0	50.2	15.0	33.4
Weathered	%	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.4	1.3	0.2	0.7	0.3
Baritic	%	39.4	41.3	47.7	34.7	38.4	43.3	39.4	34.5	39.7	34.5	32.1	38.0	38.7
Pyritic	%	8.2	44.4	2.7	35.8	7.7	12.0	17.1	19.5	2.3	12.6	4.3	38.5	17.4
Oxide	%	5.9	4.9	9.9	18.2	8.3	2.4	12.8	9.2	19.1	7.6	13.2	7.8	10.0
Veined	%	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grain Size														
T1	%	45.3	45.5	44.4	41.9	43.8	44.2	48.7	46.3	44.0	46.8	41.0	44.3	44.6
T2	%	7.1	9.4	6.5	7.1	7.7	5.5	11.5	10.5	7.2	5.9	8.7	11.0	8.2
T6	%	47.7	45.1	49.1	50.7	48.5	50.3	39.8	43.2	48.9	47.3	50.4	44.8	47.1
Mill Feed Ratios														
Zn/Fe	-	3.57	2.11	3.37	2.89	3.81	3.65	2.93	3.18	3.31	3.14	3.45	1.92	3.0
Zn/Pb	-	3.68	3.58	3.71	3.91	3.47	3.17	3.47	3.80	2.85	3.38	3.49	3.60	3.5
sPb/Pb	-	0.20	0.21	0.25	0.28	0.22	0.21	0.24	0.26	0.26	0.21	0.23	0.30	0.24
Production by Pit Phase														
A1	t	-	-	-	-	-	-	-	-	-	-	-	-	-
A2	t	265,294	281,135	319,187	192,265	328,493	242,805	125,861	240,555	224,619	246,490	171,970	123,621	2,762,295
A3	t	277,827	187,452	-	275,618	219,253	396,751	634,886	368,231	215,536	47,418	221,583	108,046	2,952,601
A4	t	-	-	197,145	94,366	-	-	-	94,201	293,935	403,049	260,180	511,694	1,854,570
Q1	t	490,742	436,690	539,915	521,052	443,198	328,635	236,611	215,806	218,781	361,675	387,685	337,515	4,518,305
Q2	t													

Table 3.2-3 2018 Quarterly Mine Plan Summary

2018 Mine Plan Production Schedule -Total

Description / Activity Days	Q1 90	Q2 91	Q3 92	Q4 92	Total 365
Mine Production Summary					
Ore	**1,055,092**	**1,062,454**	**1,058,106**	**987,687**	**4,163,339**
Waste					-
Low Grade - Non-reactive	148,604	199,491	280,493	173,895	802,483
Low Grade - Possibly Reactive	60,015	39,105	113,132	207,590	419,842
Non-sulphide Ore	41,794	58,432	62,569	41,414	204,209
Waste - Possibly Reactive	87,926	71,568	92,232	177,461	429,187
Waste - Non-reactive	1,544,132	1,611,386	905,202	1,358,958	5,419,678
Waste - Construction	-	-	-	-	-
Waster - Cover	57,824	-	357,288	233,921	649,033
Total Waste	**1,940,295**	**1,979,982**	**1,810,916**	**2,193,239**	**7,924,432**
Waste/Mill Feed Ratio	1.84	1.86	1.71	2.22	1.90
Total Mine Production	**2,995,387**	**3,042,436**	**2,869,022**	**3,180,926**	**12,087,771**
Mill Feed Summary					-
Mill Feed	1,055,092	1,062,454	1,058,106	987,687	4,163,339
Zinc	[redacted]				[redacted]
Lead	[redacted]				[redacted]
Soluble Lead	0.9	1.1	1.2	1.1	1.1
Silver	75.5	79.1	82.2	80.8	79.4
Iron	5.5	4.7	5.1	5.9	5.3
Barium	15.0	14.5	13.6	12.8	14.0
TOC	0.3	0.3	0.3	0.3	0.3
SiO2	4.9	4.4	5.3	3.9	4.6
NSR	198.7	196.0	201.9	193.7	197.6
BMWi	11.6	11.9	11.7	11.7	11.7
A x b	92.7	94.4	95.2	89.0	92.9
Grinding Hours	2,021	2,131	2,086	1,948	8,186
Throughput	531.9	507.0	514.1	514.4	516.9
Ore Type					
Exhalite	31.2	31.6	35.3	35.8	33.4
Weathered	0.0	0.6	0.1	0.7	0.3
Baritic	42.9	38.7	38.0	34.9	38.7
Pyritic	19.1	19.0	12.7	19.0	17.4
Oxide	6.9	9.8	13.9	9.6	10.0
Veined	0.0	0.1	0.0	0.0	0.0
Grain Size	0.0	0.0	0.0	0.0	0.0
T1	45.0	43.2	46.3	43.9	44.6
T2	7.7	6.8	9.7	8.6	8.2
T6	47.3	49.9	44.0	47.5	47.1
Mill Feed Ratios					0
Zn/Fe	2.83	3.38	3.13	2.62	3.0
Zn/Pb	3.65	3.50	3.31	3.49	3.5
sPb/Pb	0.22	0.23	0.26	0.25	0.24
Production by Pit Phase					
AQQ PH1	-	-	-	-	-
AQQ PH2	865,616	763,563	591,035	542,081	2,762,295
AQQ PH3	465,279	891,622	1,218,653	377,047	2,952,601
AQQ PH4	197,145	94,366	388,136	1,174,923	1,854,570
QAN Q1	1,467,347	1,292,885	671,198	1,086,875	4,518,305
QAN Q2					

3.2.1. Phases and Benches Mined

There are four phases in the Aqqaluk Pit, starting at the highest grade pit (A1) and ending at the ultimate pit (A4). There are two phases in the Qanaiyaq Pit, the starter (Q1) and the ultimate pit (Q2).

A summary of the benches mined by month is shown in Table 3.2-4. A graphical summary of all the phases by material type by month is shown in Figure 3.2-1.

Total materials mined:

- 0% is mined from AQQ A1,
- 22.9% is mined from AQQ A2,
- 24.4% is mined from AQQ A3,
- 15.3% is mined from AQQ A4,
- 37.4% is mined from QAN Q1,
- 0% is mined from QAN Q2.

Table 3.2-4 2018 Monthly Material Mined by Benches

Bench	Aqqaluk (kt)												
	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10	M11	M12	Total
1175	57												57
1150			197	94									292
1125													
1100													
1075													
1050								119	25				144
1025									269				269
1000										403	54		457
975											206	292	497
950												220	220
925													
900	318	100	77	276	88	221	70	184			18	108	1,459
875	84	313	150		229	176	463	35	107	47	103		1,707
850					146	243	154	186	109		101		939
825								80	225	135			439
800										112	172		284
775													
750													
725													
700													
675	84	55	92	192									425
650					85		74	99				124	382
Total	543	469	516	562	548	640	761	703	734	697	654	743	7,569

Bench	Qanaiyaq (kt)												
	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10	M11	M12	Total
1300	491	437	316	126	149								1,519
1275			224	395	294	329	237	216	77		117		1,888
1250									142	362	271	211	985
1225												126	126
Total	491	437	540	521	443	329	237	216	219	362	388	338	4,518

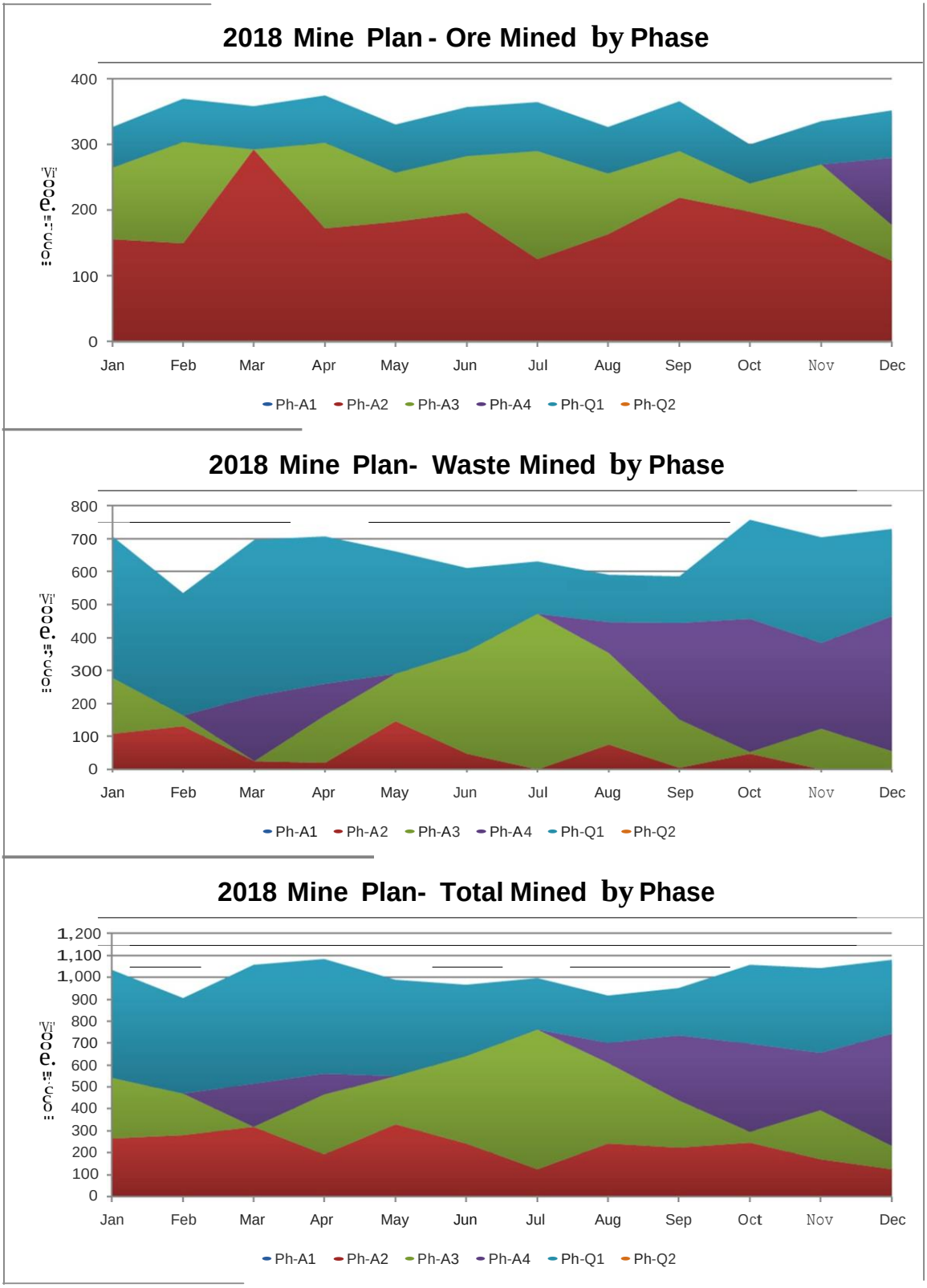


Figure 3.2-1 2018 Material Mined by Phase

3.2.2. Material Movement Classification

Material mined is classified as ore (mill feed), low-grade ore (non-reactive and possibly reactive), possibly reactive waste, non-reactive waste, construction rock and cover rock. Figure 3.2-2 shows the material mined by class by month. Figure 3.2-3 shows the total material moved by destination (stockpile and waste dump) by month.

Figure 3.2-2 Material Mined by Class

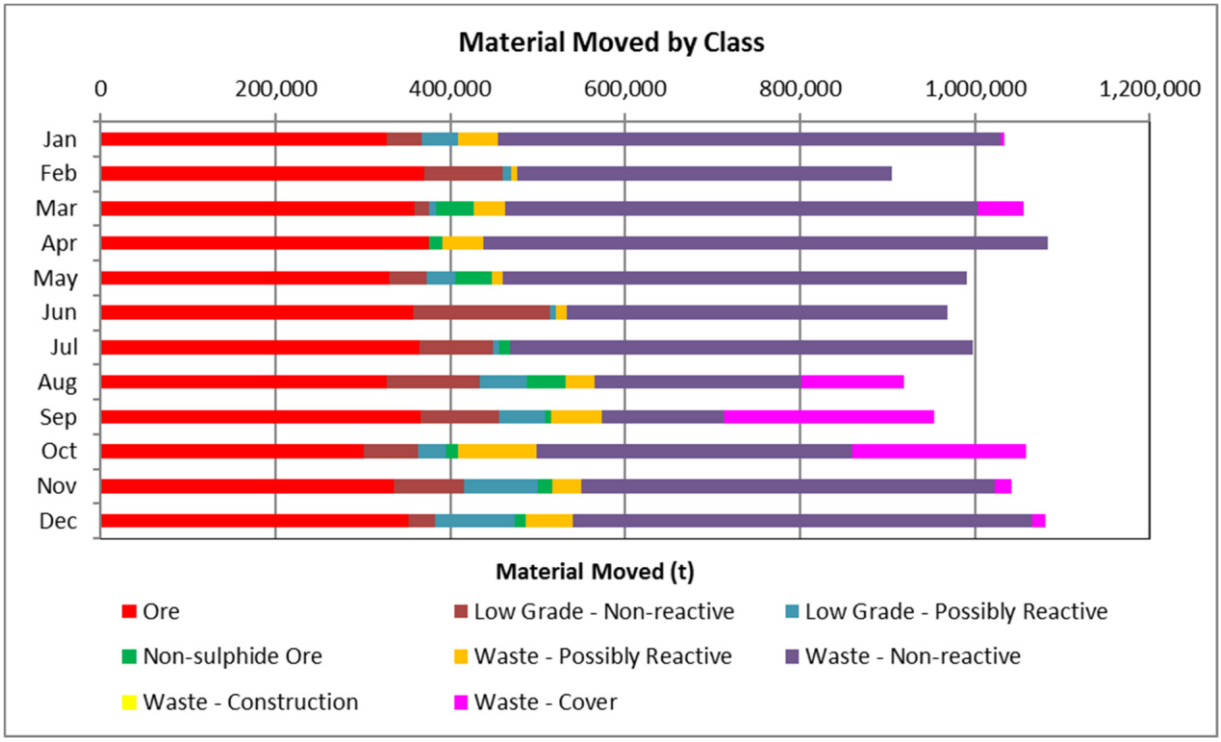
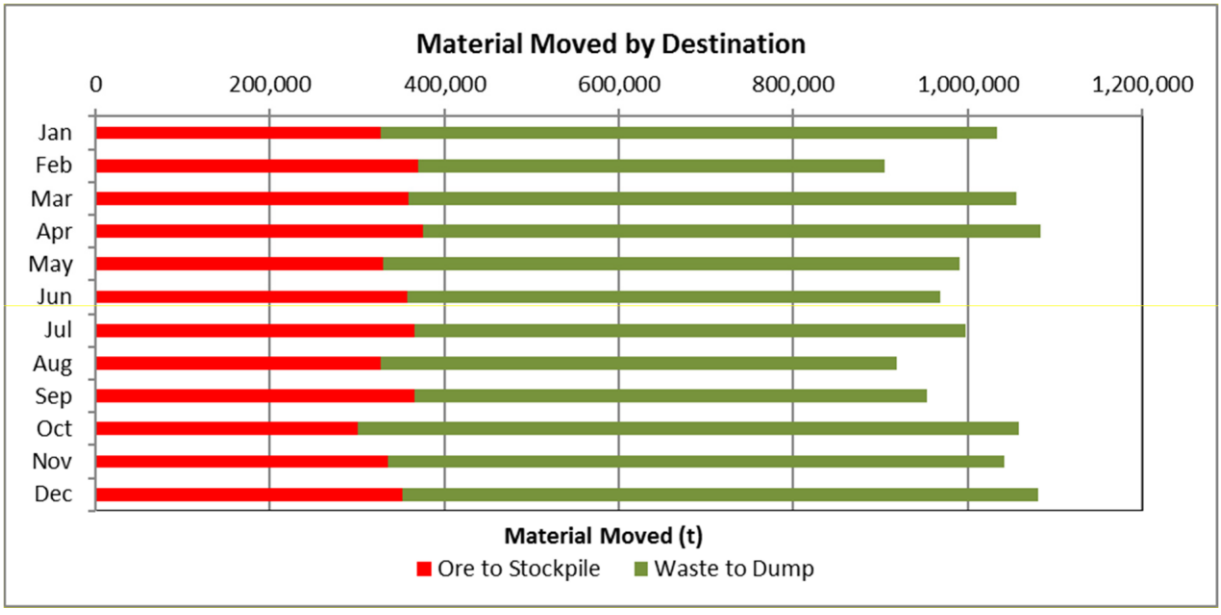


Figure 3.2-3 Material Mined by Destination



3.2.3. Monthly Plans

3.2.3.1. 1st Quarter

Total production is 2,995 kt for the 1st Quarter. Ore production is 1,055 kt at [redacted]% Zn and [redacted]% Pb. Table 3.2-5 gives the 1st Quarter Mine Schedule.

1) January 2018

Total January mine production is 1,034 kt. Ore production is 327 kt at [redacted]% Zn and [redacted]% Pb.

Waste stripping of the Aqqaluk Pit progresses in the northeast phase A4 on the 1175 bench. Mining of the Aqqaluk Pit progresses in phase A3 on the 900 bench and phase A2 on the 675 bench as well as beginning on the 875 bench (Figure 7.1-1).

Mining of the Qanaiyaq Pit progresses in phase Q1 on the 1300 bench. (Figure 7.1-13).

2) February 2018

Total February mine production is 905 kt. Ore production is 370 kt at [redacted]% Zn and [redacted]% Pb.

Mining of the Aqqaluk Pit progresses in phase A3 on the 875 and 900 benches and phase A2 on the 675 and 875 benches (Figure 7.1-2).

Mining of the Qanaiyaq Pit progresses in phase Q1 on the 1300 bench (Figure 7.1-14).

3) March 2018

Total March mine production is 1,056 kt. Ore production is 358 kt at [redacted]% Zn and [redacted]% Pb.

Waste stripping of the Aqqaluk Pit is progressing in the northeast phase A4 on 1150 bench. Mining of the Aqqaluk Pit progresses in phase A2 on the 675, 875 and 900 benches (Figure 7.1-3).

Mining of the Qanaiyaq Pit is progressing in the phase Q1 on the 1300 bench and begins on the 1275 bench (Figure 7.1-15).

Table 3.2-5 2018 1st Quarter Mine Schedule (by Cuts)

Q1	Prediction			Jan			Feb			Mar		
	Ore	Waste	Total	Ore	Waste	Total	Ore	Waste	Total	Ore	Waste	Total
Total Production	1,055,092	1,940,295	2,995,387	326,593	707,270	1,033,863	370,058	535,219	905,277	358,441	697,806	1,056,247
Q1300-015	0	68,678	68,678	0	68,678	68,678						
Q1300-014	0	101,034	101,034	0	101,034	101,034						
A900-387	0	47,978	47,978	0	47,978	47,978						
A675-116	61,052	0	61,052	61,052	0	61,052						
A875-358	2,319	81,783	84,102	2,319	81,783	84,102						
A900-373	69,006	27,691	96,697	69,006	27,691	96,697						
A900-380	83,360	20,331	103,691	83,360	20,331	103,691						
Q1300-013	14,729	70,413	85,142	14,729	70,413	85,142						
Q1300-011	0	88,779	88,779	0	88,779	88,779						
A900-386	25,792	43,710	69,502	25,792	43,710	69,502						
A675-103Ramp	23,443	0	23,443	23,443	0	23,443						
Q1300-016	0	59,149	59,149	0	59,149	59,149						
A1175-054	0	56,656	56,656	0	56,656	56,656						
Q1300-012	46,892	41,068	87,960	46,892	41,068	87,960						
Q1300-023	0	52,073	52,073				0	52,073	52,073			
A875-365	89,905	24,861	114,766				89,905	24,861	114,766			
Q1300-009	0	20,131	20,131				0	20,131	20,131			
Q1300-007	64,227	50,689	114,916				64,227	50,689	114,916			
A675-112	55,265	0	55,265				55,265	0	55,265			
A875-364	82,901	6,418	89,319				82,901	6,418	89,319			
A900-379	71,297	28,888	100,185				71,297	28,888	100,185			
Q1300-010	0	106,575	106,575				0	106,575	106,575			
A875-362	4,614	104,438	109,052				4,614	104,438	109,052			
Q1300-008	0	116,528	116,528				0	116,528	116,528			
Q1300-025	0	3,053	3,053				0	3,053	3,053			
Q1300-029	1,849	21,565	23,414				1,849	21,565	23,414			
Q1275-500	0	110,527	110,527							0	110,527	110,527
A1150-102	0	63,965	63,965							0	63,965	63,965
Q1300-005	0	67,198	67,198							0	67,198	67,198
A1150-104	0	65,569	65,569							0	65,569	65,569
A675-115	92,498	0	92,498							92,498	0	92,498
Q1300-027	42,161	26,764	68,925							42,161	26,764	68,925
Q1275-501	0	113,409	113,409							0	113,409	113,409
A875-367	56,384	14,556	70,940							56,384	14,556	70,940
A1150-103	0	67,611	67,611							0	67,611	67,611
Q1300-006	23,049	103,638	126,687							23,049	103,638	126,687
Q1300-028	58	53,111	53,169							58	53,111	53,169
A875-366	78,586	0	78,586							78,586	0	78,586
A900-374	65,705	11,458	77,163							65,705	11,458	77,163

3.2.3.2. 2nd Quarter

Total production is 3,042 kt for the 2nd Quarter. Ore production is 1,062 kt at [redacted]% Zn and [redacted]% Pb. Table 3.2-6 gives the 2nd Quarter Mine Schedule.

1) April 2018

Total April mine production is 1,083 kt. Ore production is 375 kt at [redacted]% Zn and [redacted]% Pb.

Waste stripping of the Aqqaluk Pit progresses in the northeast phase A4 on 1150 bench. Mining of the Aqqaluk Pit progresses in phase A2 on the 675 bench and in phase A3 on the 900 bench (Figure 7.1-4).

Mining of the Qanaiyaq Pit progresses in phase Q1 on the 1275 and 1300 benches (Figure 7.1-16).

2) May 2018

Total May mine production is 991 kt. Ore production is 330 kt at [redacted]% Zn and [redacted]% Pb.

Mining of the Aqqaluk Pit progresses in phase A2 on the 650 and 875 benches and as well as beginning on the 850 bench. Mining of the Aqqaluk Pit in phase A3 progresses on the 900 bench begins on the 875 bench (Figure 7.1-5).

Mining of the Qanaiyaq Pit progresses in phase Q1 on the 1275 and 1300 benches (Figure 7.1-17).

3) June 2018

Total June mine production is 968 kt. Ore production is 357 kt at [redacted]% Zn and [redacted]% Pb.

Mining of the Aqqaluk Pit progresses in phase A2 on the 850 bench and in phase A3 on the 875 and 900 benches (Figure 7.1-6).

Mining of the Qanaiyaq Pit progresses in phase Q1 on the 1275 bench (Figure 7.1-18).

Table 3.2-6 2018 2nd Quarter Mine Schedule (by Cuts)

Q2	Prediction			Apr			May			Jun		
	Ore	Waste	Total	Ore	Waste	Total	Ore	Waste	Total	Ore	Waste	Total
Total Production	1,062,454	1,979,982	3,042,436	374,991	708,310	1,083,301	330,025	660,919	990,944	357,438	610,753	968,191
Q1300-004	0	7,203	7,203	0	7,203	7,203						
Q1300-003	0	8,861	8,861	0	8,861	8,861						
A675-114	87,351	0	87,351	87,351	0	87,351						
Q1275-507	0	128,439	128,439	0	128,439	128,439						
Q1275-510	46,035	16,154	62,189	46,035	16,154	62,189						
A900-378	129,975	0	129,975	129,975	0	129,975						
A1150-106	0	94,366	94,366	0	94,366	94,366						
A675-109	35,663	16,588	52,251	35,663	16,588	52,251						
A900-389	0	47,110	47,110	0	47,110	47,110						
Q1300-002	0	110,241	110,241	0	110,241	110,241						
A675-110	50,063	2,600	52,663	50,063	2,600	52,663						
A900-390	0	38,968	38,968	0	38,968	38,968						
Q1275-502	0	119,522	119,522	0	119,522	119,522						
A900-388	0	59,565	59,565	0	59,565	59,565						
Q1275-509	25,904	58,693	84,597	25,904	58,693	84,597						
Q1300-026	0	81,453	81,453				0	81,453	81,453			
Q1275-510	26,720	3,305	30,025				26,720	3,305	30,025			
Q1275-513	42,486	26,037	68,523				42,486	26,037	68,523			
A875-368	81,949	15,555	97,504				81,949	15,555	97,504			
Q1275-508	3,670	113,085	116,755				3,670	113,085	116,755			
A850-276	0	53,110	53,110				0	53,110	53,110			
A850-281	16,275	76,359	92,634				16,275	76,359	92,634			
A875-359	0	131,650	131,650				0	131,650	131,650			
Q1275-503	0	78,997	78,997				0	78,997	78,997			
Q1300-001	0	67,445	67,445				0	67,445	67,445			
A650-101	84,042	1,203	85,245				84,042	1,203	85,245			
A900-377	74,883	12,720	87,603				74,883	12,720	87,603			
A850-283	58,047	0	58,047							58,047	0	58,047
A900-375	30,429	53,783	84,212							30,429	53,783	84,212
A900-376	55,279	81,236	136,515							55,279	81,236	136,515
Q1275-514	75,539	20,159	95,698							75,539	20,159	95,698
Q1275-505	0	68,040	68,040							0	68,040	68,040
A850-284	83,456	0	83,456							83,456	0	83,456
Q1275-504	0	46,470	46,470							0	46,470	46,470
Q1275-506	0	118,427	118,427							0	118,427	118,427
A875-261	0	176,024	176,024							0	176,024	176,024
A850-282	54,688	46,614	101,302							54,688	46,614	101,302

3.2.3.3. 3rd Quarter

Total production is 2,869 kt for the 3rd quarter. Ore production is 1,058 kt at [redacted]9% Zn and [redacted]% Pb. Table 3.2-7 gives the 3rd Quarter Mine Schedule.

1) July 2018

Total July mine production is 997 kt. Ore production is 365 kt at [redacted]% Zn and [redacted]% Pb.

Mining of the Aqqaluk Pit progresses in phase A2 on the 650 and 850 benches as well as in phase A3 on the 850, 875, and 900 benches (Figure 7.1-7).

Mining of the Qanaiyaq Pit progresses in phase Q1 on the 1275 bench (Figure 7.1-19).

2) August 2018

Total August mine production is 919 kt. Ore production is 327 kt at [redacted]% Zn and [redacted]% Pb.

Waste stripping of the Aqqaluk Pit commences in the northwest phase A4 on the 1050 bench. Mining of the Aqqaluk Pit progresses in phase A2 on the 650 and 850 benches as well as beginning on the 825 bench. Mining of the Aqqaluk Pit progresses in phase A3 on the 850, 875, and 900 benches (Figure 7.1-8).

Mining of the Qanaiyaq Pit progresses in phase Q1 on the 1275 bench (Figure 7.1-20).

3) September 2018

Total September mine production is 953 kt. Ore production is 366 kt at [redacted]% Zn and [redacted]% Pb.

Waste stripping of the Aqqaluk Pit progresses in the northwest phase A4 on the 1050 bench and begins on the 1025 bench. Mining of the Aqqaluk Pit progresses in phase A2 on 825 bench and in phase A3 on the 850 and 875 benches (Figure 7.1-9).

Mining of the Qanaiyaq Pit progresses in phase Q1 on the 1275 bench and begins on the 1250 bench (Figure 7.1-21).

Table 3.2-7 2018 3rd Quarter Mine Schedule (by Cuts)

Q3	Prediction			Jul			Aug			Sep		
	Ore	Waste	Total	Ore	Waste	Total	Ore	Waste	Total	Ore	Waste	Total
Total Production	1,058,106	1,810,916	2,869,022	365,097	632,261	997,358	326,897	591,896	918,793	366,112	586,759	952,871
A875-363	23,081	111,452	134,533	23,081	111,452	134,533						
A875-382	0	42,129	42,129	0	42,129	42,129						
Q1275-516	17,447	47,120	64,567	17,447	47,120	64,567						
A875-360	0	114,020	114,020	0	114,020	114,020						
A850-285	22,722	0	22,722	22,722	0	22,722						
A875-381	0	64,463	64,463	0	64,463	64,463						
A850-283	29,268	0	29,268	29,268	0	29,268						
A650-102	73,871	0	73,871	73,871	0	73,871						
A850-277	0	102,012	102,012	0	102,012	102,012						
Q1275-515	57,982	12,639	70,621	57,982	12,639	70,621						
A875-370	108,008	0	108,008	108,008	0	108,008						
Q1275-517	0	101,423	101,423	0	101,423	101,423						
A900-385	32,718	37,003	69,721	32,718	37,003	69,721						
A850-278	0	124,186	124,186				0	124,186	124,186			
A1050-230	0	24,844	24,844				0	24,844	24,844			
A900-384	71,387	22,137	93,524				71,387	22,137	93,524			
A825-239	13,707	65,989	79,696				13,707	65,989	79,696			
Q1275-518	0	54,346	54,346				0	54,346	54,346			
A900-383	20,702	69,718	90,420				20,702	69,718	90,420			
Q1275-520	27,640	55,402	83,042				27,640	55,402	83,042			
A650-103	98,887	0	98,887				98,887	0	98,887			
Q1275-519	26,285	35,085	61,370				26,285	35,085	61,370			
Q1275-511	16,779	269	17,048				16,779	269	17,048			
A850-285	51,510	10,462	61,972				51,510	10,462	61,972			
A1050-231	0	94,201	94,201				0	94,201	94,201			
A875-383	0	35,257	35,257				0	35,257	35,257			
A1025-241	0	156,830	156,830							0	156,830	156,830
A1050-232	0	25,429	25,429							0	25,429	25,429
A1025-240	0	111,676	111,676							0	111,676	111,676
A875-369	70,192	36,330	106,522							70,192	36,330	106,522
Q1275-511	39,996	37,077	77,073							39,996	37,077	77,073
A825-241	80,846	0	80,846							80,846	0	80,846
Q1250-500	0	45,328	45,328							0	45,328	45,328
A850-279	0	109,014	109,014							0	109,014	109,014
Q1250-502	36,246	60,134	96,380							36,246	60,134	96,380
A825-240	79,276	4,941	84,217							79,276	4,941	84,217
A825-242	59,556	0	59,556							59,556	0	59,556

3.2.3.4. 4th Quarter

Total production is 3,181 kt for the 4th quarter. Ore production is 988 kt at [redacted]% Zn and [redacted]% Pb. Table 3.2-8 gives the 4th Quarter Mine Schedule.

1) October 2018

Total October mine production is 1,059 kt. Ore production is 300 kt at [redacted]% Zn and [redacted]% Pb.

Waste stripping of the Aqqaluk Pit progresses in the northwest phase A4 beginning on the 1000 bench. Mining of the Aqqaluk Pit progresses in phase A2 on 825 bench and begins on the 800 bench. Mining of the Aqqaluk Pit progresses in phase A3 on the 875 bench (Figure 7.1-10).

Mining of the Qanaiyaq Pit progresses in phase Q1 on the 1250 bench (Figure 7.1-22).

2) November 2018

Total November mine production is 1,041 kt. Ore production is 336 kt at [redacted]% Zn and [redacted]% Pb.

Waste stripping of the Aqqaluk Pit progresses in the northwest phase A4 on the 1000 bench and begins on the 975 bench. Mining of the Aqqaluk Pit progresses in phase A2 on 800 bench and in phase A3 on the 850, 875, and 900 benches (Figure 7.1-11).

Mining of the Qanaiyaq Pit progresses in phase Q1 on the 1250 and 1275 benches (Figure 7.1-23).

3) December 2018

Total December mine production is 1,081 kt. Ore production is 352 kt at [redacted]% Zn and [redacted]% Pb.

Waste stripping of the Aqqaluk Pit progresses in the northwest phase A4 on the 975 bench and begins on the 950 bench. Mining in Aqqaluk progresses in phase A2 on the 650 bench and in phase A3 on the 900 bench (Figure 7.1-11).

Mining of the Qanaiyaq Pit progresses in phase Q1 on the 1250 bench and begins on the 1225 bench (Figure 7.1-23).

Table 3.2-8 2018 4th Quarter Mine Schedule (by Cuts)

Q4	Prediction			Oct			Nov			Dec		
	Ore	Waste	Total	Ore	Waste	Total	Ore	Waste	Total	Ore	Waste	Total
Total Production	987,687	2,193,239	3,180,926	300,495	758,137	1,058,632	335,653	705,765	1,041,418	351,539	729,337	1,080,876
Q1250-504	48,339	24,655	72,994	48,339	24,655	72,994						
A825-244	62,653	538	63,191	62,653	538	63,191						
A1000-312	0	98,640	98,640	0	98,640	98,640						
Q1250-501	65	151,682	151,747	65	151,682	151,747						
A1000-313	0	144,201	144,201	0	144,201	144,201						
A1000-311	0	96,439	96,439	0	96,439	96,439						
A825-243	51,526	0	51,526	51,526	0	51,526						
A1000-315	0	63,769	63,769	0	63,769	63,769						
Q1250-506	4,003	61,177	65,180	4,003	61,177	65,180						
A875-380	41,989	5,429	47,418	41,989	5,429	47,418						
A825-242	20,066	0	20,066	20,066	0	20,066						
Q1250-503	7,830	63,924	71,754	7,830	63,924	71,754						
A800-221	64,024	47,683	111,707	64,024	47,683	111,707						
A850-280	7,793	93,073	100,866				7,793	93,073	100,866			
A975-279	0	205,752	205,752				0	205,752	205,752			
Q1275-521	8,970	36,490	45,460				8,970	36,490	45,460			
A800-222	85,542	0	85,542				85,542	0	85,542			
A800-223	86,428	0	86,428				86,428	0	86,428			
A1000-314	0	54,428	54,428				0	54,428	54,428			
A875-380	72,709	30,185	102,894				72,709	30,185	102,894			
Q1250-507	697	130,063	130,760				697	130,063	130,760			
Q1250-510	10,071	38,576	48,647				10,071	38,576	48,647			
Q1250-505	46,199	44,929	91,128				46,199	44,929	91,128			
Q1275-512	0	71,690	71,690				0	71,690	71,690			
A900-381Ramp	17,244	579	17,823				17,244	579	17,823			
A975-282	0	44,986	44,986							0	44,986	44,986
A900-382	35,014	41,583	76,597							35,014	41,583	76,597
A975-281	0	66,491	66,491							0	66,491	66,491
A650-105	62,663	17	62,680							62,663	17	62,680
A900-381Ramp	18,718	12,731	31,449							18,718	12,731	31,449
Q1225-501	50,820	34,786	85,606							50,820	34,786	85,606
Q1250-508	0	107,406	107,406							0	107,406	107,406
Q1250-500	0	21,229	21,229							0	21,229	21,229
Q1250-509	0	82,800	82,800							0	82,800	82,800
A650-104	60,941	0	60,941							60,941	0	60,941
A950-330	93,595	35,888	129,483							93,595	35,888	129,483
Q1225-500	21,398	19,076	40,474							21,398	19,076	40,474
A975-280	0	180,070	180,070							0	180,070	180,070
A950-331	8,390	82,274	90,664							8,390	82,274	90,664

SECTION 4. EQUIPMENT FLEETS

4.1. Summary

Equipment required to achieve the 2018 plan is mostly similar to 2017. The major exceptions are that one Caterpillar 777 haul truck will be retired and one converted to a water truck, decreasing the production fleet size to 10 units. The 992 loader will be made available to the production fleet as needed.

The current major equipment fleets and associated operating metrics are listed in Table 4.1-1. The current truck fleet detail is shown in Table 4.1-2.

Table 4.1-1 Current Fleet Equipment Availability YTD October 31st, 2017

Equipment	Description	Units Available	Physical Availability	Use of Availability	Operating Efficiency	Asset Utilization
Drills	DML	3	75.9%	61.4%	77.0%	35.9%
Trucks	777	12	70.5%	83.6%	86.1%	50.7%
Loaders	993/992	5	70.1%	73.8%	86.9%	45.0%
Dozers	D9/D10	4	65.9%	51.3%	87.0%	29.4%

Table 4.1-2 Current Truck Fleet

Fleet	Model	Description	Year	Operating Hours (Oct. 31st, 2017)
77-07	CAT 777D	777-D 100-T HAUL TRUCK	2000	74,885
77-12	CAT 777D	777-D 100-T HAUL TRUCK	2004	62,848
77-13	CAT 777D	777-D 100-T HAUL TRUCK	2004	70,531
77-14	CAT 777D	777-D 100-T HAUL TRUCK	2004	70,357
77-15	CAT 777D	777-D 100-T HAUL TRUCK	2005	69,160
77-17	CAT 777F	777-F 100-T HAUL TRUCK	2008	51,370
77-18	CAT 777F	777-F 100-T HAUL TRUCK	2008	50,737
77-19	CAT 777F	777-F 100-T HAUL TRUCK	2010	42,098
77-20	CAT 777F	777-F 100-T HAUL TRUCK	2010	41,179
77-21	CAT 777F	777-F 100-T HAUL TRUCK	2010	41,072
77-22	CAT 777G	777-G 100-T HAUL TRUCK	2017	1,622
77-23	CAT 777G	777-G 100-T HAUL TRUCK	2017	212

4.2. 2018 Equipment Requirements

All planned project hours and forecasted production hours have been considered when determining the fleet requirements for the 2018 mine plan.

Table 4.2-1 gives the equipment hours needed for non-production projects.

Table 4.2-1 Monthly Non-Production Project Hours

Projects	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Total
	31	28	31	30	31	30	31	31	30	31	30	31	365
Non-Capital Project													
Drill hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Loader hours	6	6	6	0	0	0	0	0	0	0	6	6	30
Haultruck hours	18	18	18	0	0	0	0	0	0	0	18	18	90
Dozer hours	0	0	0	12	12	12	0	0	0	0	0	0	150
Quarry and Crush (DD2 / MS)													
Drill hours	0	0	0	0	0	57	0	0	0	0	0	0	57
Loader hours	0	0	0	0	0	58	58	0	0	0	0	0	115
Haultruck hours	0	0	0	0	0	88	88	0	0	0	0	0	175
Dozer hours	0	0	0	0	0	83	83	0	0	0	0	0	167
MLE													
Drill hours	0	0	0	0	0	0	154	154	0	0	0	0	308
Loader hours	0	0	0	0	0	0	0	310	310	0	0	0	620
Haultruck hours	0	0	0	0	0	0	0	778	778	0	0	0	1556
Dozer hours	0	0	0	0	0	0	0	449	449	0	0	0	897
Back Dam													
Drill hours	0	0	0	0	129	0	0	0	0	0	0	0	129
Loader hours	0	0	0	0	0	130	130	0	0	0	0	0	260
Haultruck hours	0	0	0	0	0	232	232	0	0	0	0	0	464
Dozer hours	0	0	0	0	0	188	188	0	0	0	0	0	377
Total													
Drill hours	0	0	0	0	129	57	154	154	0	0	0	0	495
Loader hours	6	6	6	0	0	188	188	310	310	0	6	6	1025
Haultruck hours	18	18	18	0	0	320	320	778	778	0	18	18	2285
Dozer hours	0	0	0	12	12	284	272	449	449	0	0	0	1477

1) Atlas Copco DML Drills

Three Atlas Copco DML drills will be required through 2018. Three DML drills are currently in service. Physical availability of 77.4%, use of availability of 66.1% and operating efficiency of 74.0% are forecast for 2018.

2) Caterpillar 992G/993K Production Loaders

Five Caterpillar 992/993 loaders will be required through the majority of 2018; a sixth unit will be used in the beginning of the year to make up waste stripping from 2017, as well as during the heavy project months of June and July. The sixth unit will be available throughout the year if needed. One 992 loader and four 993 loaders are currently in service. Physical availability of 76.5%, use of availability of 83.0% and operating efficiency of 87.0% are forecast for 2018.

3) Caterpillar 777D/F/G Haul Trucks

Ten Caterpillar 777 haul trucks will be required through 2018. Twelve 777 haul trucks are currently in service although one unit will be converted to a water truck and another older unit will be taken out of the fleet and parked. Physical availability of 76.8%, use of availability of 82.0% and operating efficiency of 87.0% are forecast for 2018.

4) Caterpillar D9 and D10 Dozers

Four Caterpillar dozers will be required through 2018. Two D9 dozers and two D10 dozers are currently in service. Physical availability of 79.2%, use of availability of 67.0% and operating efficiency of 84.0% are forecast for 2018.

Table 4.2-2 contains details on the number of units required in 2018 and the tasks for which those hours will be used.

Table 4.2-2 2018 Monthly Equipment Performance Forecast

	Units	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10	M11	M12	Total
DM-L Drill														
Units Available	ea	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Units Required	ea	2.8	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.9	2.9	3.0	3.0	2.9
Hours Available per unit	op hrs	273	239	261	264	295	277	308	300	264	273	269	278	3,302
Hours Used per unit	op hrs	257	238	258	262	291	276	307	295	253	260	269	273	3,237
Ore Drilling Hours Required	op hrs	303	343	333	348	306	332	339	303	340	279	311	326	3,862
Low Grade Drilling Hours Required		77	93	24	0	70	151	85	149	132	87	153	114	
Waste Drilling Hours Required	op hrs	357	249	384	405	335	256	310	247	254	380	309	347	3,834
Redrilling Hours Required	op hrs	33	30	33	32	33	32	33	33	32	33	32	33	387
Project Hours Required	op hrs	0	0	0	0	129	57	0	0	0	0	0	0	186
Main Dam Hours	op hrs	0	0	0	0	0	0	154	154	0	0	0	0	308
Drilling Hours Required	**op hrs**	**770**	**715**	**774**	**785**	**873**	**828**	**920**	**886**	**758**	**779**	**806**	**820**	9,712
Availability	%	80.0%	63.4%	65.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	77.4%
Use of Availability	%	62.0%	76.0%	73.0%	62.0%	67.0%	65.0%	70.0%	68.0%	62.0%	62.0%	63.0%	63.0%	66.1%
Operating Efficiency	%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%
Asset Utilization	%	36.7%	35.6%	35.1%	36.7%	39.7%	38.5%	41.5%	40.3%	36.7%	36.7%	37.3%	37.3%	37.8%
993/992G Loader														
Units Available	ea	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Units Required	ea	5.4	4.8	4.9	4.7	4.3	5.3	5.3	4.8	5.0	4.5	4.5	4.6	4.9
Hours Available per unit	op hrs	347	343	385	405	418	367	381	423	409	423	409	423	4,732
Hours Used per unit	op hrs	312	276	316	317	303	326	335	340	343	315	310	321	3,813
Ore Hours Required	op hrs	376	426	412	432	380	411	420	376	421	346	386	405	4,791
Reclaim Hours Required	op hrs	446	403	446	432	446	432	446	446	432	446	432	446	5,250
Waste Hours Required	op hrs	814	616	803	815	761	703	728	681	675	872	812	839	9,119
Non-pit Hours Required	op hrs	229	207	229	221	229	221	229	229	221	229	221	229	2,694
Project Hours Required	op hrs	6	6	6	0	0	188	188	0	0	0	6	6	405
Main Dam Hours	op hrs	0	0	0	0	0	0	0	310	310	0	0	0	620
Loading Hours Required	**op hrs**	**1,870**	**1,657**	**1,896**	**1,900**	**1,815**	**1,955**	**2,010**	**2,042**	**2,059**	**1,893**	**1,857**	**1,925**	22,879
Availability	%	66.2%	72.4%	73.2%	79.5%	79.5%	72.3%	72.5%	80.4%	80.4%	80.4%	80.4%	80.4%	76.5%
Use of Availability	%	83.0%	83.0%	83.0%	83.0%	83.0%	83.0%	83.0%	83.0%	83.0%	83.0%	83.0%	83.0%	83.0%
Operating Efficiency	%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%
Asset Utilization	%	47.8%	52.3%	52.9%	57.4%	57.4%	52.2%	52.4%	58.0%	58.0%	58.0%	58.0%	58.0%	55.2%
777 Haul Trucks														
Units Available	ea	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Units Required	ea	9.9	9.7	9.4	9.7	9.3	9.1	9.5	10.0	9.7	9.4	9.7	9.4	9.5
Hours Available per unit	op hrs	384	346	419	405	384	407	386	388	411	390	378	395	4,693
Hours Used per unit	op hrs	379	335	392	392	359	369	367	389	397	367	366	371	4,482
Ore Hours Required	op hrs	924	1,047	1,014	1,061	933	1,011	1,032	924	1,035	850	949	994	11,775
Reclaim Hours Required	op hrs	382	345	382	369	382	369	382	382	369	382	369	382	4,494
Waste Hours Required	op hrs	2,364	1,848	2,398	2,392	2,169	1,891	1,828	1,704	1,687	2,330	2,222	2,210	25,042
Non-pit Hours Required	op hrs	104	94	104	101	104	101	104	104	101	104	101	104	1,226
Project Hours Required	op hrs	18	18	18	0	0	320	320	778	778	0	18	18	2,285
Hauling Hours Required	**op hrs**	**3,791**	**3,351**	**3,916**	**3,923**	**3,588**	**3,691**	**3,666**	**3,892**	**3,971**	**3,666**	**3,660**	**3,708**	44,822
Availability	%	74.0%	74.0%	80.5%	80.5%	74.0%	80.9%	74.4%	74.8%	81.7%	75.2%	75.4%	76.0%	76.8%
Use of Availability	%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%
Operating Efficiency	%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%
Asset Utilization	%	**52.8%**	**52.8%**	**57.5%**	**57.4%**	**52.8%**	**57.7%**	**53.1%**	**53.4%**	**58.3%**	**53.6%**	**53.8%**	**54.2%**	**54.8%**
D9 & D10 Dozers														
Units Available	ea	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Units Required	ea	3.2	3.0	3.7	3.7	3.5	3.8	3.9	4.0	4.0	3.2	3.2	3.2	3.6
Hours Available per unit	op hrs	326	294	282	281	292	328	326	352	350	326	316	326	3,800
Hours Used per unit	op hrs	258	221	259	261	253	311	316	350	348	265	255	264	3,361
Ore Hours Required	op hrs	37	42	41	43	38	41	42	37	42	34	38	40	477
Reclaim Hours Required	op hrs	155	140	155	150	155	150	155	155	150	155	150	155	1,830
COSP Hours Required	op hrs	63	71	69	72	64	69	70	63	71	58	65	68	804
Waste Hours Required	op hrs	501	379	494	502	468	433	448	419	416	537	500	517	5,612
Other Mining Hours Required	op hrs	250	226	250	242	250	242	250	250	242	250	242	250	2,943
Non-pit Hours Required	op hrs	25	23	25	25	25	25	25	25	25	25	25	25	300
Project Hours Required	op hrs	0	0	0	12	12	284	272	0	0	0	0	0	579
Main Dam Hours	op hrs	0	0	0	0	0	0	0	449	449	0	0	0	897
Dozing Hours Required	**op hrs**	**1,032**	**882**	**1,035**	**1,046**	**1,012**	**1,243**	**1,263**	**1,399**	**1,394**	**1,060**	**1,020**	**1,056**	13,443
Availability	%	81.3%	81.3%	70.5%	72.5%	72.8%	84.3%	81.3%	81.3%	81.3%	81.3%	81.3%	81.3%	79.2%
Use of Availability	%	66.0%	66.0%	66.0%	66.0%	66.0%	66.0%	66.0%	71.0%	73.0%	66.0%	66.0%	66.0%	67.0%
Operating Efficiency	%	84.0%	84.0%	84.0%	84.0%	84.0%	84.0%	84.0%	84.0%	84.0%	84.0%	84.0%	84.0%	84.0%
Asset Utilization	%	45.1%	45.1%	39.1%	40.2%	40.4%	46.8%	45.1%	48.5%	49.8%	45.1%	45.1%	45.1%	44.6%

SECTION 5. RISKS AND OPPORTUNITIES

The key risks and opportunities relevant to the 2018 Mine Plan are described herein.

5.1. Risks

1) Aqqaluk Pit Highwall Stability

Certain zones within Aqqaluk pit have been identified as Geotechnical Hazard Zones (GHZ). If not properly monitored and/or managed, these zones could destabilize and present an imminent risk to pit operations. Of particular note is the south wall where water is entering the pit from the Main Pit Lake. In the event that these zones cannot be effectively managed with the current pit design, changes to the pit walls may be required which will have a significant impact on the Aqqaluk ore reserves. Golder Associates (Golder) are presently enlisted as the third party reviewers of the pit designs. Golder are also actively involved with the stability evaluation of the south wall and analysis of mitigation options.

2) Main Pit Dump (MPD) Stability

The continuous availability of the MPD areas is critical to execution of the mine plan. Destabilization of the dumps could result in the inability to deposit waste rock in Main Pit, with little alternate dump space available elsewhere on site. Currently, material quality is monitored and blended to ensure that poor quality waste rock is kept in the upper (dry) lifts, while material that is more competent is deposited below water level. Golder Associates (Golder) are presently enlisted as the third party reviewers of the dump designs.

3) Selenium (Se) Leaching

Dissolved selenium levels have risen due to mining of weathered overburden and ore in the upper benches of the Aqqaluk Pit and Qanaiyaq Pit. Laboratory testing of various Qanaiyaq rock types, limiting the ore and waste mining rates for the deposit, and modelling the extraction based on this plan was undertaken to determine the quantity of selenium that could be produced. The result did not indicate that the quantity would be excessive; however, scaling from the laboratory to the outdoor environment introduces some uncertainty. Selenium solubility may require methods of mitigation in the Tailings Pond and Main Pit lake waters.

Mitigation of selenium release from the ore will primarily be controlled by limiting the milling rates of the Qanaiyaq ore to 850k tonnes per year or less. To minimize the amount of selenium release from waste rock, Qanaiyaq weathered waste material will be placed in the MPD above 850 ft. elevation to keep it out the water, layered and covered. Potential cover methods are under investigation.

4) Incorporate 2017 Production Shortfall

The shortfall in production from 2017 will be incorporated into the 2018 production to ensure necessary pit progression is achieved throughout 2018. Approximately 350kt of waste material from Phase 4 in the Aqqaluk Pit was taken from the 2017 Re-Forecast Mine Plan and worked into the budgeted 2018 Mine Plan. Since the completion of the 2018 Mine Plan an additional 415 kt of material, 186kt of ore and 229kt of waste, of production shortfall has accumulated. The additional shortfall will be worked into the mine plan throughout Q1 of 2018; the ore included in the additional 2017 production shortfall will be stockpiled on the Phase 3 ore stockpile. Due to the additional production, all twelve 777 haul trucks will continue to be utilized in Q1 2018. The fleet size will be re-assessed at the end of Q1.

5) Low Fleet Availabilities

The production fleet has experienced low availabilities throughout 2017. If this trend continues into 2018, the production schedule outlined in the mine plan will be challenging to achieve. The additional production from the shortfalls of 2017 magnify the importance of fleet availability. The Maintenance Department is

confident that the operating statistics provided for the 2018 Mine Plan are achievable by the Heavy Equipment Shop and with the focus on improving the maintenance of haul roads and pit benches the fleet availabilities are planned to be higher in 2018.

6) Ammonia Levels in Main Pit Lake (MPL)

Ammonia levels in MPL will continue to be monitored in 2018. In 2017, a total of 43% of all dry blastholes between the Aqqaluk and Qanaiyaq pits were loaded using liners. Drill and Blast will look to maximize the usage of blasthole liners in all dry holes in 2018 as well as manage the sleep time of loaded product to help reduce ammonia levels in MPL.

After a successful trial in Q3 2017 of the alternate DN11L surfactant used in the emulsion produced at RDO additional product was shipped on site for further testing in the colder months of the year and usage in 2018. The DN11L surfactant produces a higher viscosity emulsion that may reduce seepage of emulsion from the blasthole. Inefficiently or undetonated product resulting from seepage increases the amount of ammonia in the production material therefore a higher viscosity emulsion may help to reduce ammonia levels in the MPL

5.2. Opportunities

1) Operational Technology Implementation

The Wenco dispatch system continues to operate on the truck and loader fleets at RDO. Efforts are underway to elevate the current reliability level of the system back to acceptable levels. Once complete, the next evolution is the implementation of Mobile Equipment Monitoring (MEM) on both fleets early in 2018. This system utilizes the data from the Vital Information Monitoring System (VIMS) on board the units to provide real-time operating data to the Maintenance, Mine Operations and Reliability groups.

Information from the MEM system is intended to provide critical feedback to the Maintenance and Reliability groups in order to monitor the operating condition of equipment. The system will also allow Mine Operations to identify hazardous operating practices that can be targeted for training and development to avoid unnecessary wear and/or damage.

2) Haul Road and Pit Bench Maintenance

Pit road and bench maintenance has deteriorated to a state that is detrimental to both equipment availability as well as production efficiencies. A key area of focus in 2018 will be enhancing the quality of road and bench maintenance in order to eliminate unnecessary wear on equipment. In so doing, availabilities are expected to climb, providing additional fleet operating hours. The added attention to roads and benches will also elevate the haulage productivity by allowing trucks to travel at greater average speeds.

In order to capitalize on this opportunity, grader fleet requirements will be re-evaluated to ensure that sufficient equipment is available to maintain roads and benches. In addition, the training provided to grader operators will be evaluated and enhanced as necessary to ensure the capability of the Mine Operations group to effectively maintain haul roads and pit benches while not adversely affecting the availability of the grader fleet.

SECTION 6. PROJECTS

6.1. Dewatering

6.1.1. Aqqaluk Pit Dewatering

Mining activity is mainly taking place in the Aqqaluk pit in 2018. Current bottom of pit is at the 675 ft. elevation; but will advance to the bottom of the phase A2, 650 ft. elevation in 2018.

1) Current 2017 Dewatering

Current dewatering mainly depends on a 70HP electrical pump in the 775-bench pump station, through an insulated and heat traced six-inch HDPE pipe along the southeast side of pit connected to the main 16-inch HDPE heat-traced dewatering line on the 900 ft. elevation reporting to the Main Pit Lake (MPL). A 6 in. diesel driven pump delivers water from the 675-bench sump. A 14-inch HDPE dewatering line is also available from the 775-pump station to the main 16-inch reporting to the MPL when higher dewatering demands are required.

The main 16-inch line runs underground through MPD3 and flows to the Main Pit Lake (MPL). The current system configuration is shown in Figure 6.1-1.

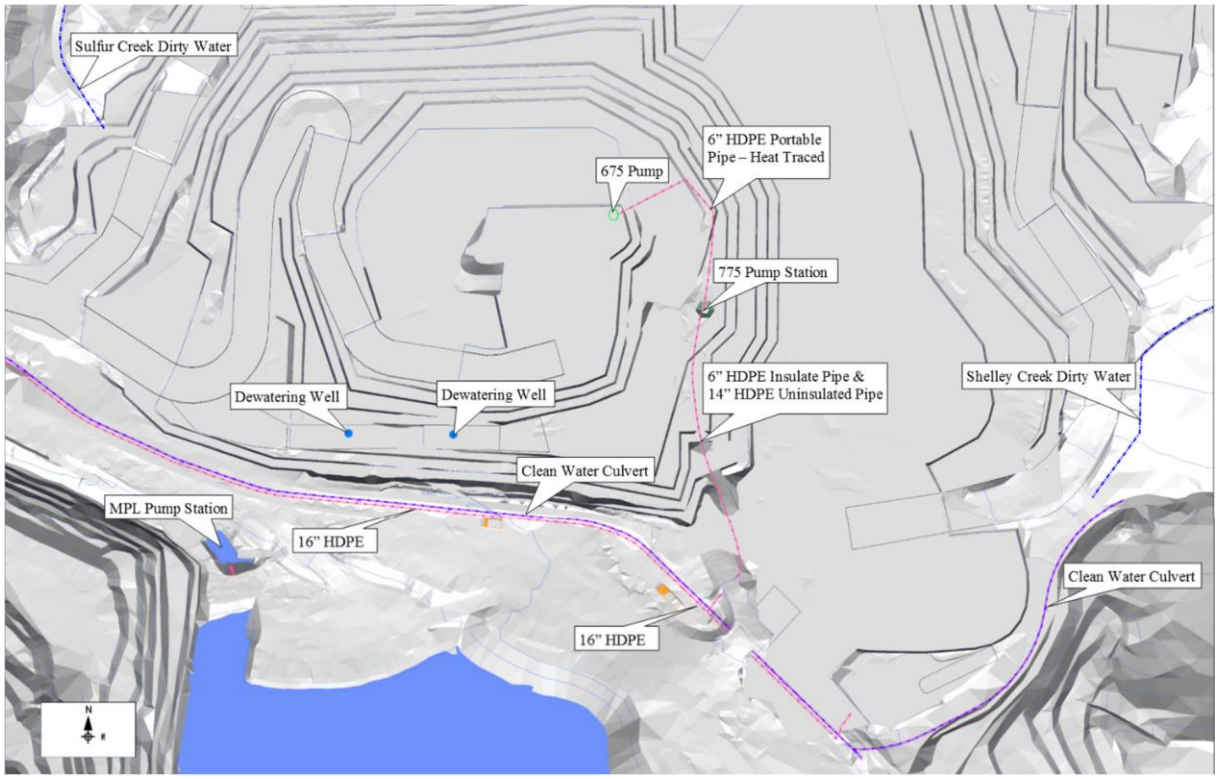


Figure 6.1-1 End of Year 2017 Dewatering

2) 2018 Pit Dewatering

Dewatering efforts in the Aqqaluk deposit for 2018 will include maintaining a dry working area for mining activity on the 650 to 900 benches, and removal of surface and substrate inflows. The pit bottom will descend to the 650 bench in 2018. Dewatering mainly depends on a 70HP electrical pump in the 775 bench lift sump. A portable diesel/electric pump will be used to remove water from the active work area to the 775 bench lift sump.

Water inflows into the Aqqaluk Pit were identified from potential sources such as Shelly Creek. Interceptions well(s) are planned in the Shelly Creek drainage upstream from the Aqqaluk Pit in attempt to intercept clean water and transport it into the Shelly Creek culvert to reduce inflow into the Aqqaluk Pit and have a positive impact on the overall site water balance.

With the required relocation of the dewatering system due to mining sequencing, an evaluation of the entire Aqqaluk dewatering system is being performed to determine alternative solutions to improve the efficiency and versatility of the system and make the system as maintenance free as possible. The schedule of the project is to have semi-detailed design and drawings for construction completed by end of Q1 to ensure any offsite construction can be performed and completed design and scope of work for contractors by end of Q2.

The projected end of 2018 configuration of existing system is shown in Figure 6.1-2.

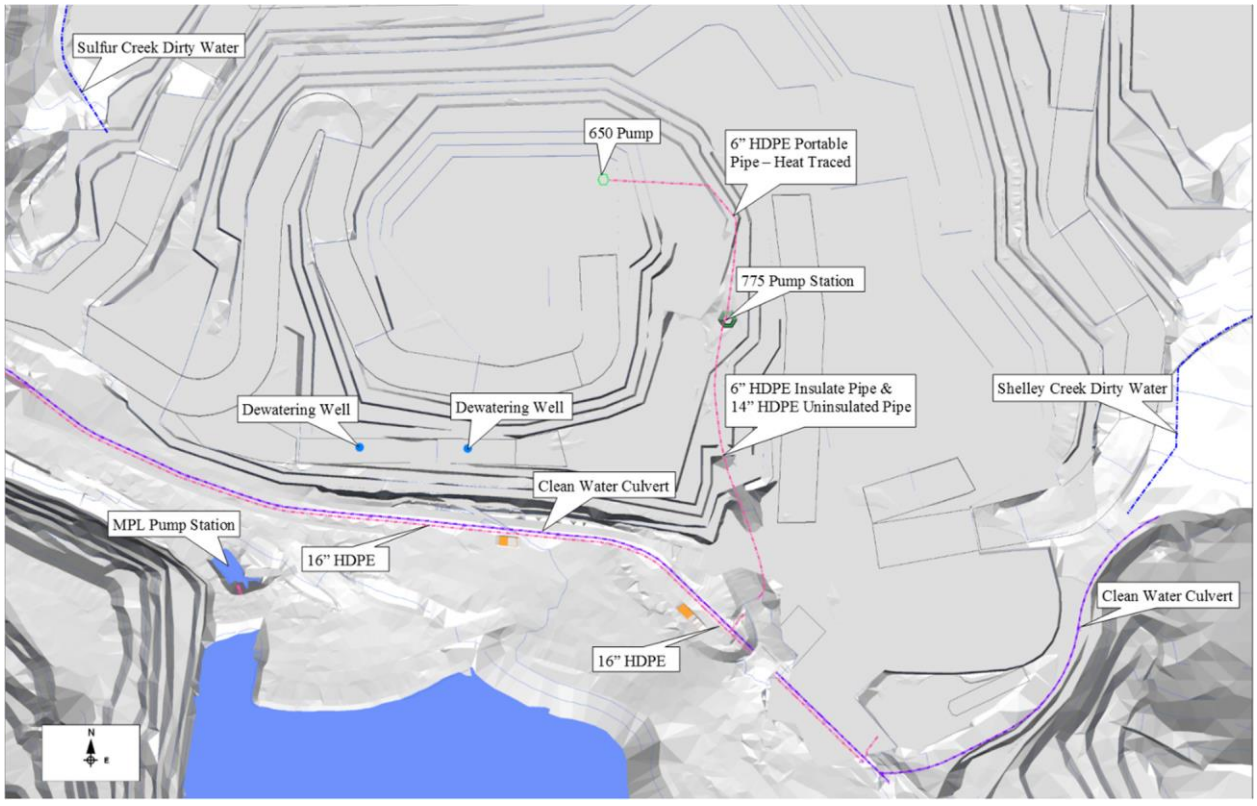


Figure 6.1-2 End of Year 2018 Dewatering

6.1.2. Qanaiyaq Pit Dewatering

Mining activity will continue in the Qanaiyaq pit in 2018. Current bottom of pit is at the 1300 bench, it will advance to the bottom of the Phase Q5, 1275 bench in 2018.

Dewatering efforts in 2017 were limited to ditching surface water from the working benches in the Qanaiyaq pit. As mining progresses, more engineered controls are required for water management. Water management will require developing a sump, pump and piping system to transport water from the Qanaiyaq pit to the Tailings Storage Facility (TSF) or Main Pit Lake, depending upon water quality requirements. A system to dewater the Qanaiyaq pit will be in placed for 2018 freshet, but improvements made to make it a more robust system installed in 2018 for the 2019 freshet season.

6.2. Environmental Related Projects

6.2.1. Fugitive Dust Control

Fugitive dust comes from the construction and reclamation of the ore stockpiles located in front of the gyratory crusher. The prevailing winds are from the NE, thus carrying dust from stockpile activity to the tundra located south and west of the tailings pond. Evaluation of options for mitigating the impact of dust from stockpiles will continue in 2018.

6.2.1.1. Water Truck Fill Station

To improve the control of fugitive dust from the active mining areas, the commissioning of the Water Truck Fill Station located adjacent to the main haul road into Aqqaluk Pit will occur in 2018. This project will reduce the cycle time of the water truck and increase the capacity of water spread on the haul roads when required. All parts and materials are on site, such that only pipe fusing and final tie-in to the tank are required in Q1 2018.

6.2.1.2. Test Application of Dust Suppressant for Stockpile Pad and Mine Roads

Once the new water truck fill station is in operation, a series of trial runs will be conducted to judge the feasibility of applying dust suppressant (e.g. calcium chloride) to the stockpile pad and mine roads. In order to efficiently and effectively mix a suppressant solution, the water truck fill station would be used as a mixing chamber, then the suppressant solution loading into the water truck for application to the pad and roads.

6.3. Other Projects

6.3.1. Pit Wall / Dump Stability

6.3.1.1. South Wall Mitigation Efforts

Golder was enlisted in 2017 to embark on a study of mitigation options for the south wall of Aqqaluk in response to the water transmission from Main Pit Lake. Golder is finalizing the evaluation of costs associated with the three mitigation options considered for the South Wall (depressurization wells, grout curtain, freeze wall). Regardless of which option is selected, it is planned to implement mitigation efforts in 2018. Early installation of this system will allow for sufficient monitoring to established its effectiveness on observed hydraulic gradients before completion of Phase 2 Pit, and, if necessary, adjustments to this system such that the gradient reduction targets are achieved.

6.3.1.2. Aqqaluk Perimeter Piezometer Installation

In order to gain a heightened understanding of the hydrogeological regimes surrounding Aqqaluk pit, additional piezometer wells will be installed. Particular targets include the Shelly Creek drainage, along

with the north and east walls. The goal of these wells is to obtain critical flow data required for planning of long-term pit dewatering wells.

6.3.1.3. Slope Stability Radar

An IBIS-FM slope stability radar was purchased in December 2016 and is in the process of being deployed on the 1000 bench of Aqqaluk pit, north of the Key Creek Prism Hut. The radar is currently monitoring the south wall of Aqqaluk pit which has exhibited transmission of water into the pit from the neighboring Main Pit Lake. Monitoring using the radar unit will be conducted throughout 2018 for the south wall as well as other problem areas that may require more attention.

6.3.1.4. Trimble Scanner for Highwalls and Dump Faces

The Trimble laser scanner was added to the tools available to the Mine Technicians in 2017. Full functionality and applicability of the unit is still being explored, though utilization as an active Geotechnical monitoring tool has been identified. In 2018, the application of the scanner will be trialed in the mine to map and monitor highwalls and active dump faces that are not accessible or feasible to inspect by other means.

6.3.2. Exploration Drilling

6.3.2.1. Aqqaluk Geotechnical Drilling

Additional geotechnical data is required along the eastern wall of the Aqqaluk pit to determine the ultimate pit slope angle. Details of the drilling program are as follows:

- 7 holes planned for 2018 (Figure 6.3-1).
- 4,400 ft. of oriented core drilling.
- Scheduled from the early-April through mid- May using one skid-mounted drill rig.
- Will require considerable coordination with Mine Engineering and Mine Operations.
- The drilling contractor will have its own dedicated dozer for drill moves and pad construction.

6.3.2.2. Aqqaluk Perimeter Drilling

A number of areas have been identified to the northwest and along the western margin of the Aqqaluk pit where there remains potential to identify relatively near surface, high grade mineralization that may support extending the limits of the currently planned open pit. Details of the planned 2018 drilling program are as follows:

- 18 holes planned for 2018.
- 8,430 ft. of oriented core drilling.
- Scheduled from early March through to late May using two to three skid-mounted drill rigs.
- Will require considerable coordination with Mine Engineering and Mine Operations.
- The drilling contractor will have its own dedicated dozer for drill moves and pad construction.

6.3.2.3. Qanaiyaq Geotechnical Drilling

Evaluation of the geotechnical drilling of the Qanaiyaq pit identified a small gap of information along the southern end of the deposit. The data can be collected from one geotechnical hole and the infill drilling program planned in 2018.

- One hole planned for 2018 (Figure 6.3-2).
- 155 ft. of core drilling.

- Scheduled from the early June using one skid-mounted drill rig.
- The drilling contractor will have its own dedicated dozer for drill moves and pad construction.

6.3.2.4. Qanaiyaq Perimeter Drilling

Drilling at the southern end of the Qanaiyaq deposit in 2016 identified a number of possible extensions to the previously identified mineralization in addition to the high Pb-Ag oxide mineralization. This drilling program will define the ore grade mineralization in the area and determine the necessary displacement of the planned pit. The details of the planned drilling programs are as follows:

- 24 holes planned for 2018.
- 3,710 ft. of oriented core drilling.
- Scheduled from April through May using one skid-mounted drill rig.
- The drilling contractor will have its own dedicated dozer for drill moves and pad construction.

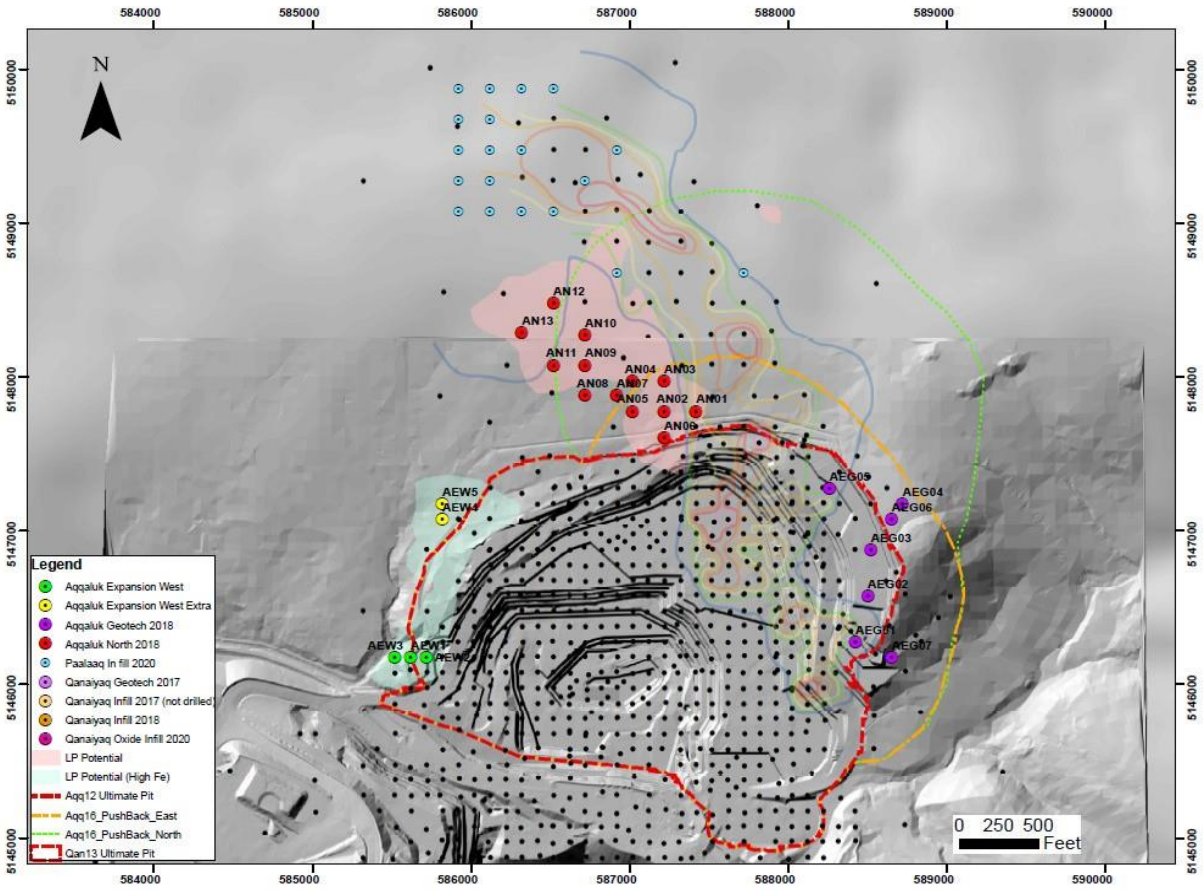


Figure 6.3-1 Proposed Aqqaluk In-fill and Geotechnical Drill Holes

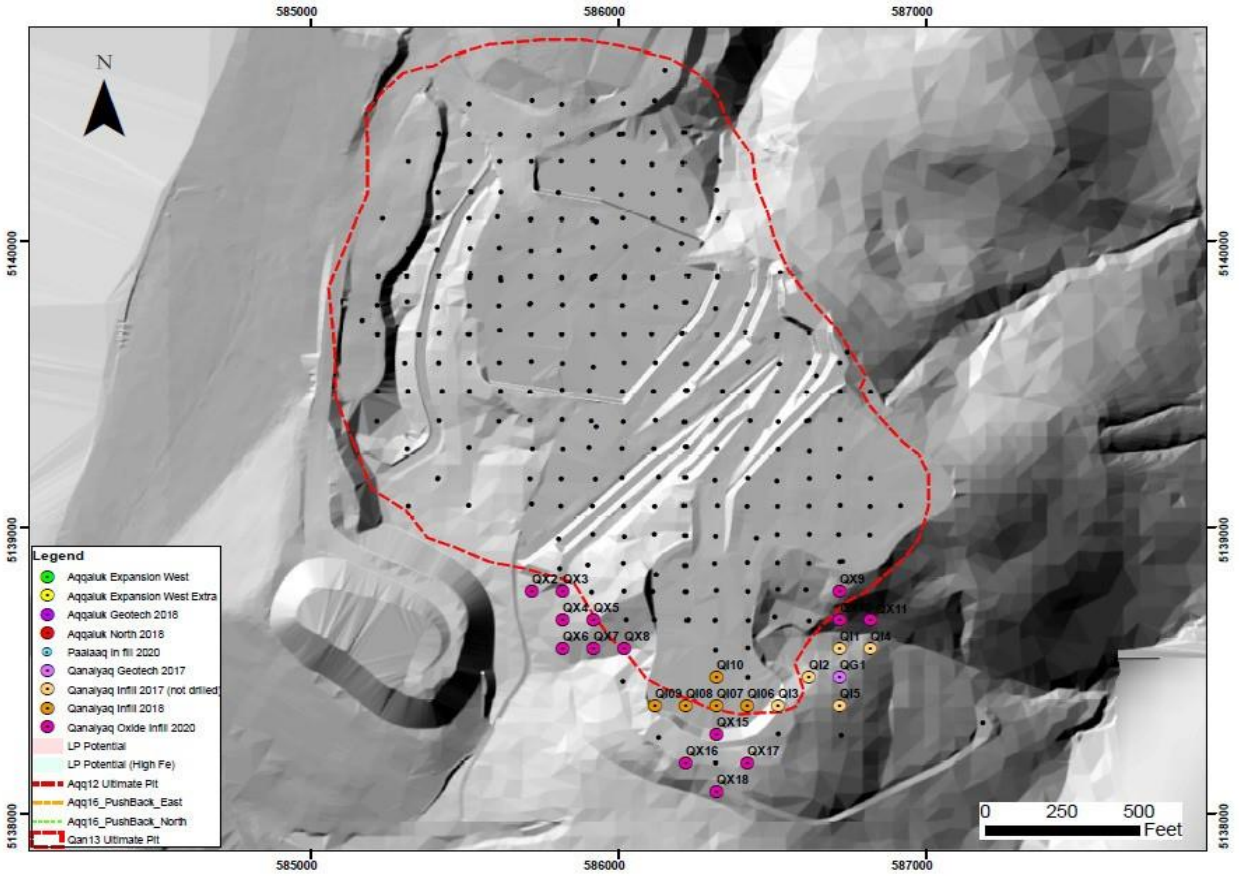


Figure 6.3-2 Proposed Qanaiyaq In-fill and Geotechnical Drill Holes

6.3.3. Project Support

6.3.3.1. Mine Life Extension (MLE)

MLE is planning to build an access road to the proposed underground mineral deposits at Anarraaq and Aktigiruq deposit. Mine Operations has planned equipment hours to haul road material from DD2 to a staging area for the MLE road.

6.3.3.2. Stage IV Back Dam Construction

A lift is planned on the Back Dam in 2018; Mine Operations has equipment hours allocated to the project to support the haulage of dam construction material. Mine Operations will work with contractors to either haul material to a staging area for placement of material by contractors' equipment.

6.3.4. Crushing

Quarrying and crushing are typically carried out from May to September. Approximately 264,400 bank cubic yards of material will be blasted in 2018 (Table 6-1). Approximately 70% of this volume is planned to be sourced from the DD2 quarry. The portable crusher feed will use 146,900 cu yd. and approximately 117,500 cu yd. will be run-of-pit rock for the back dam and MLE access road. Crusher products include material for yards and road gravel, back dam lift construction, VIP2 fuel tank at Port and the MLE access road. A three year forecast for gravel and run-of-pit material is under development. Some haulage will be required to remove crushed material to remote stockpiles. Drilling will be accomplished with one of the mine production drills.

Table 6.3-1 Estimated DD2 Quantities for 2018

Product Size Required	Project/Code	Amount (cyd)	Quarry Location
3-1/2" minus (Structrual Fill)	VIP2 Fuel Tank at Port	11,000	MS-2
1" minus (Structrual Fill)	VIP2 Fuel Tank at Port	2,000	MS-2
1" minus	Port Road	25,000	MS-9
3/4" Select	Dam & Transportation Corridor	25,000	DD2
1-1/2" minus (Type 3)	Dam & Transportation Corridor	5,500	DD2
3/8" minus (Type 4)	Dam & Transportation Corridor	3,000	DD2
4" minus	Dam & Transportation Corridor	10,000	DD2
8" Riprap w/ little fines	Dam & Transportation Corridor	500	DD2
3/4" minus	Yards & Roads	2,000	DD2
2" minus	Yards & Roads	4,000	DD2
4" minus	MLE Access Road	107,000	DD2
1-1/2" minus	MLE Access Road	27,000	DD2
1-1/2" minus	Slurry Pump House	2,400	DD2
Stemming 1" -1/2"	Mine	20,000	Mine
3" Road Sand	Mine	20,000	Mine
		264,400	**CYD**

SECTION 7. APPENDICES

7.1. 2018 Mine Plan and Waste Dump 3D View Maps

Table 7.1-1 Legend for Maps

Type	Legend	VALS Range ($/s)
Ore		
Low Grade Ore		$0.00-$6.00
Ore		$6.01-$20.00
Ore		$20.01 - $40.00
Ore		>$40.00
Dumps		
MPD 850 Elevation		
MPD 904 Elevation		
MPD 1015 Elevation		
OXD 1379 Elevation		

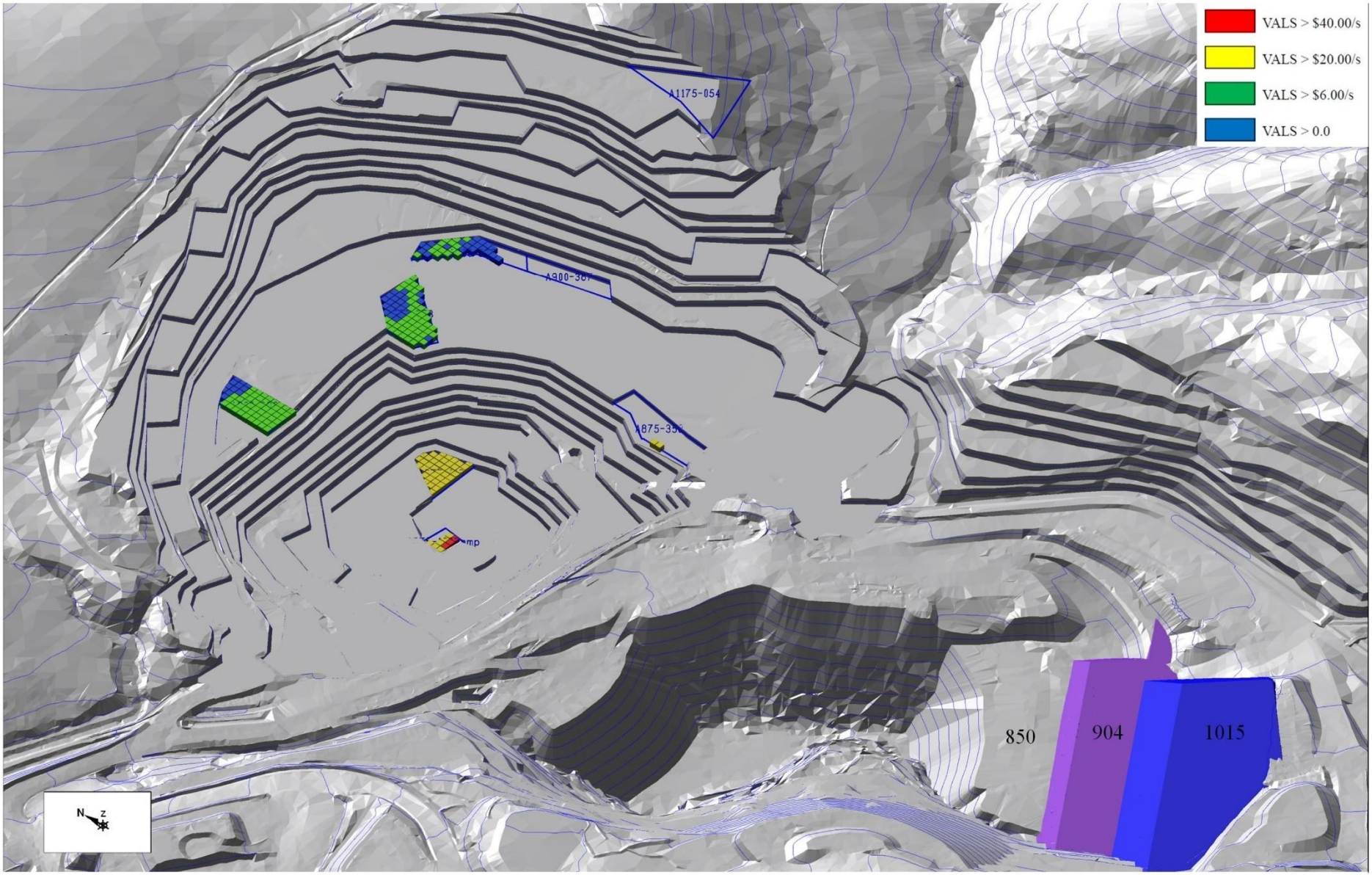


Figure 7.1-1 January 2018 Mine Plan 30 View (AQQ)

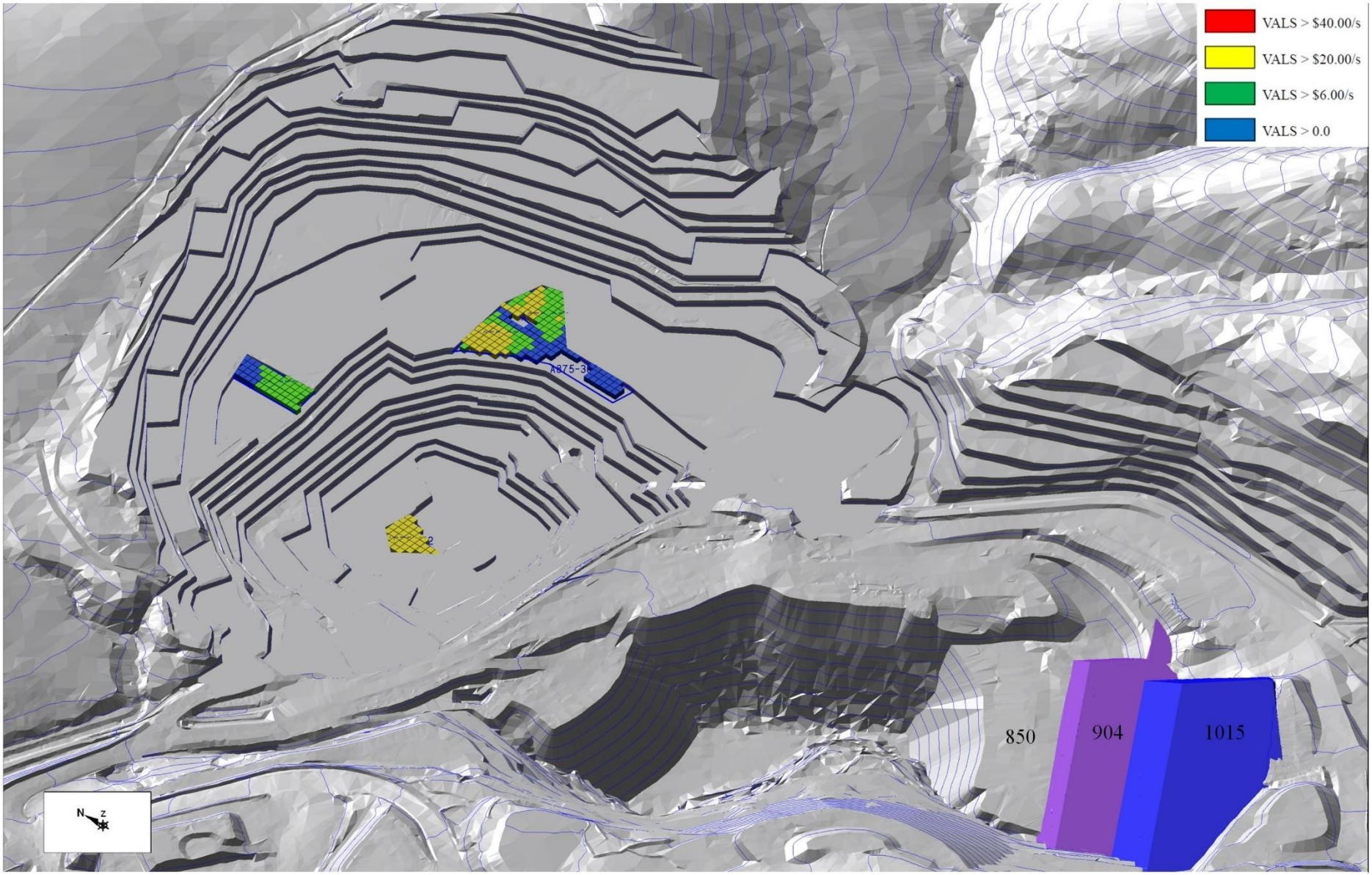


Figure 7.1-2 February 2018 Mine Plan 30 View (AQQ)

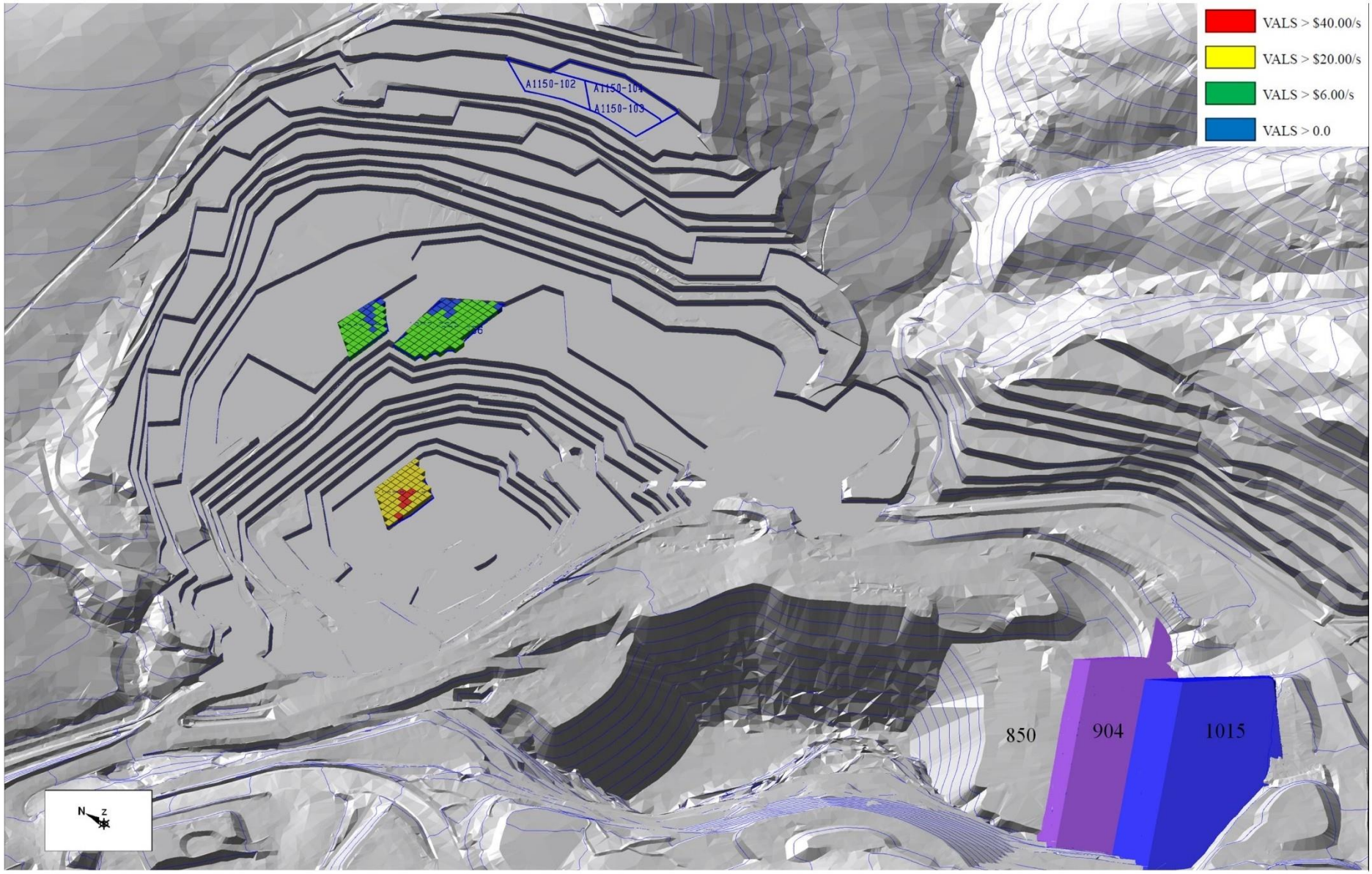


Figure 7.1-3 March 2018 Mine Plan 30 View (AQQ)

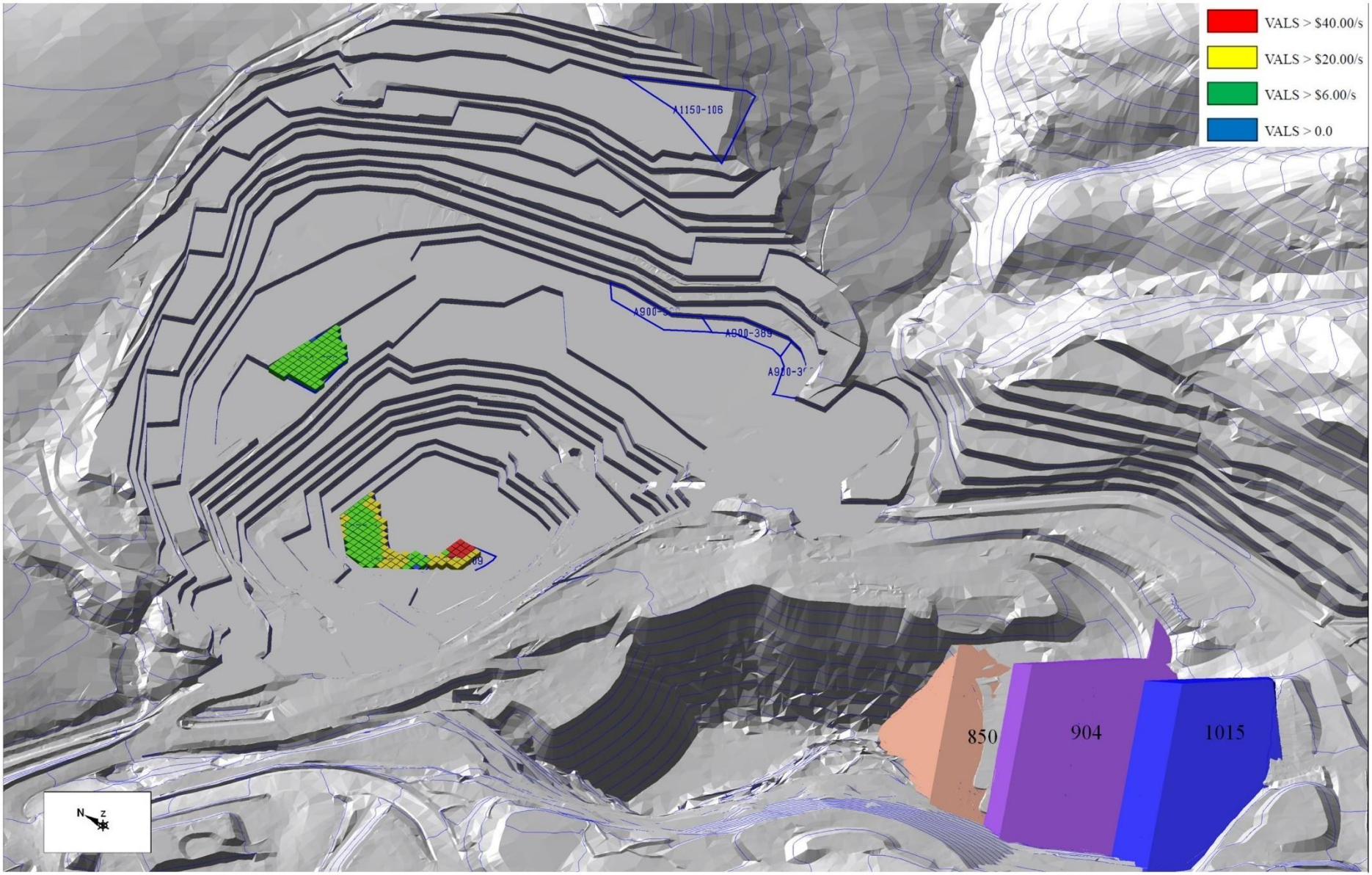


Figure 7.1-4 April2018 Mine Plan 30 View (AQQ)

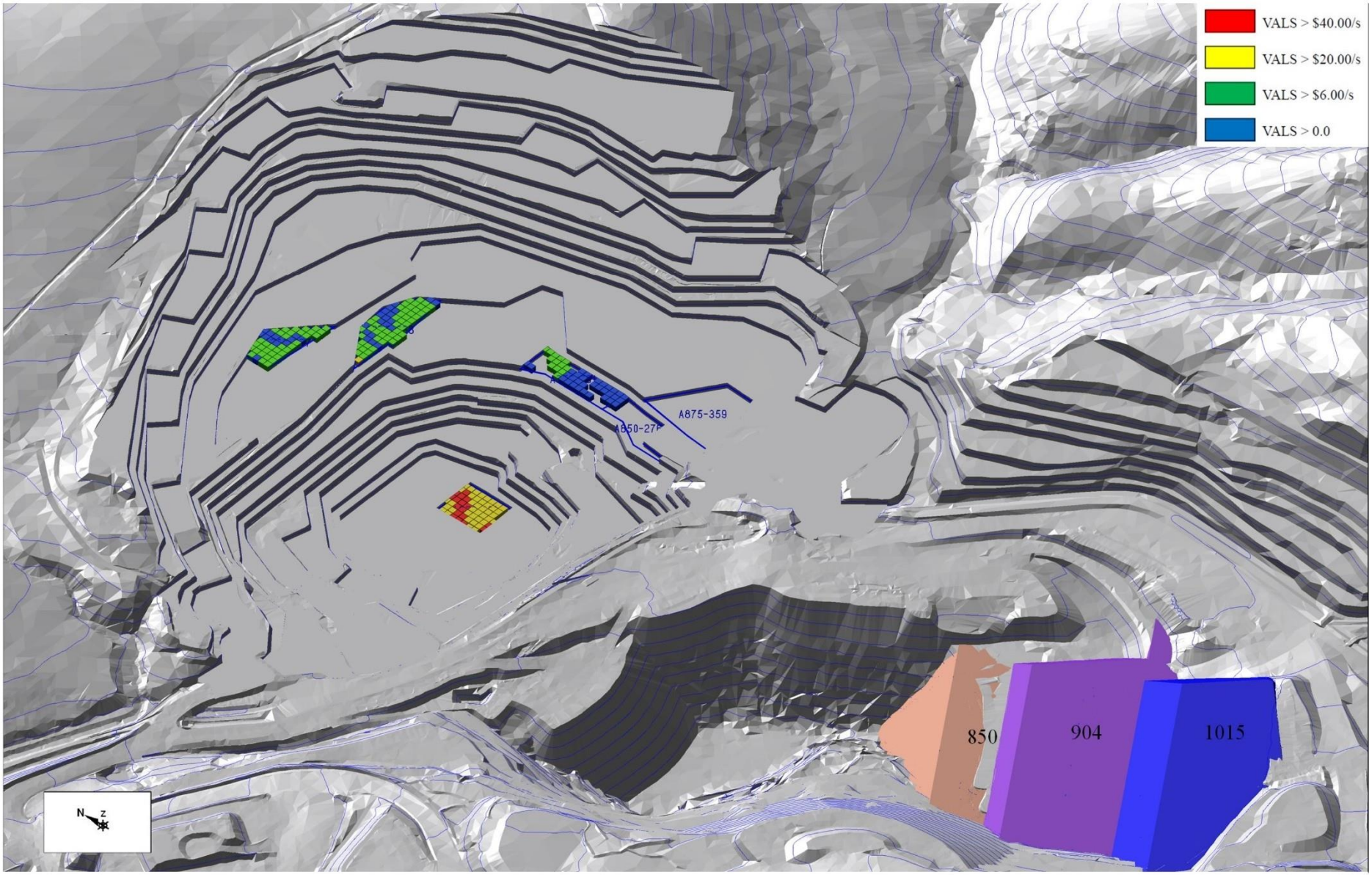


Figure 7.1-5 May 2018 Mine Plan 30 View (AQQ)

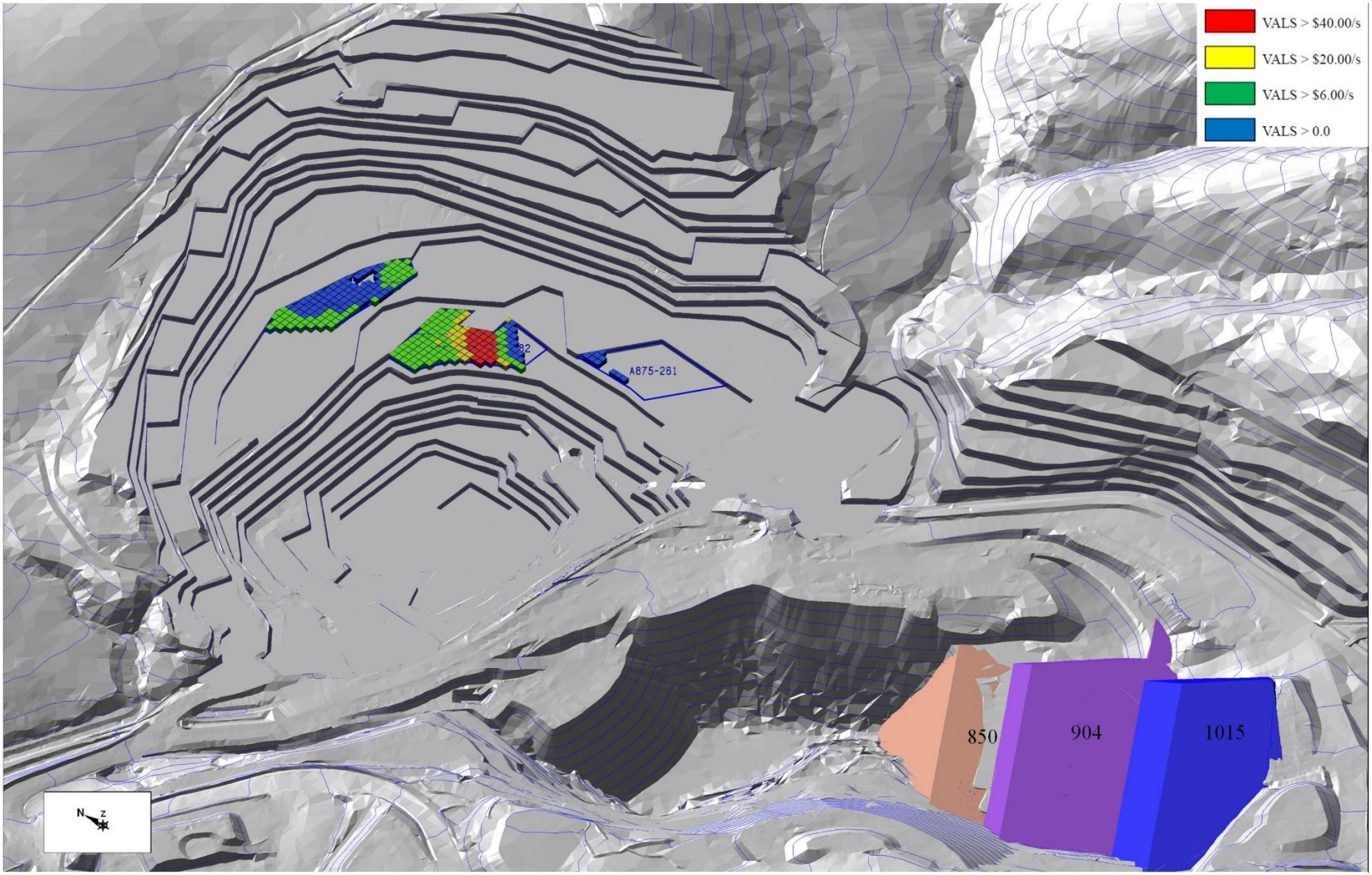


Figure 7.1-6 June 2018 Mine Plan 30 View (AQQ)

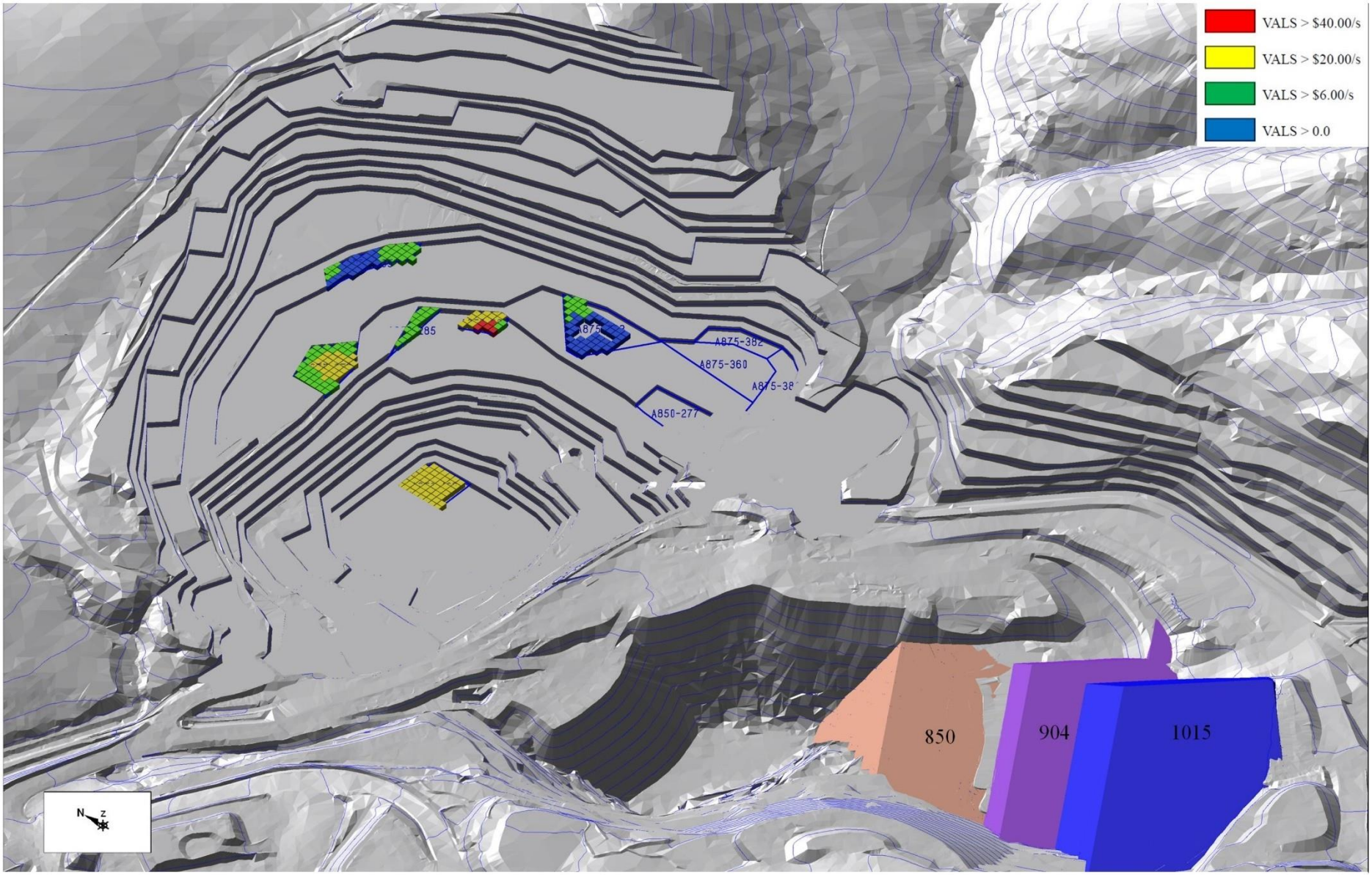


Figure 7.1-7 July 2018 Mine Plan 30 View (AQQ)

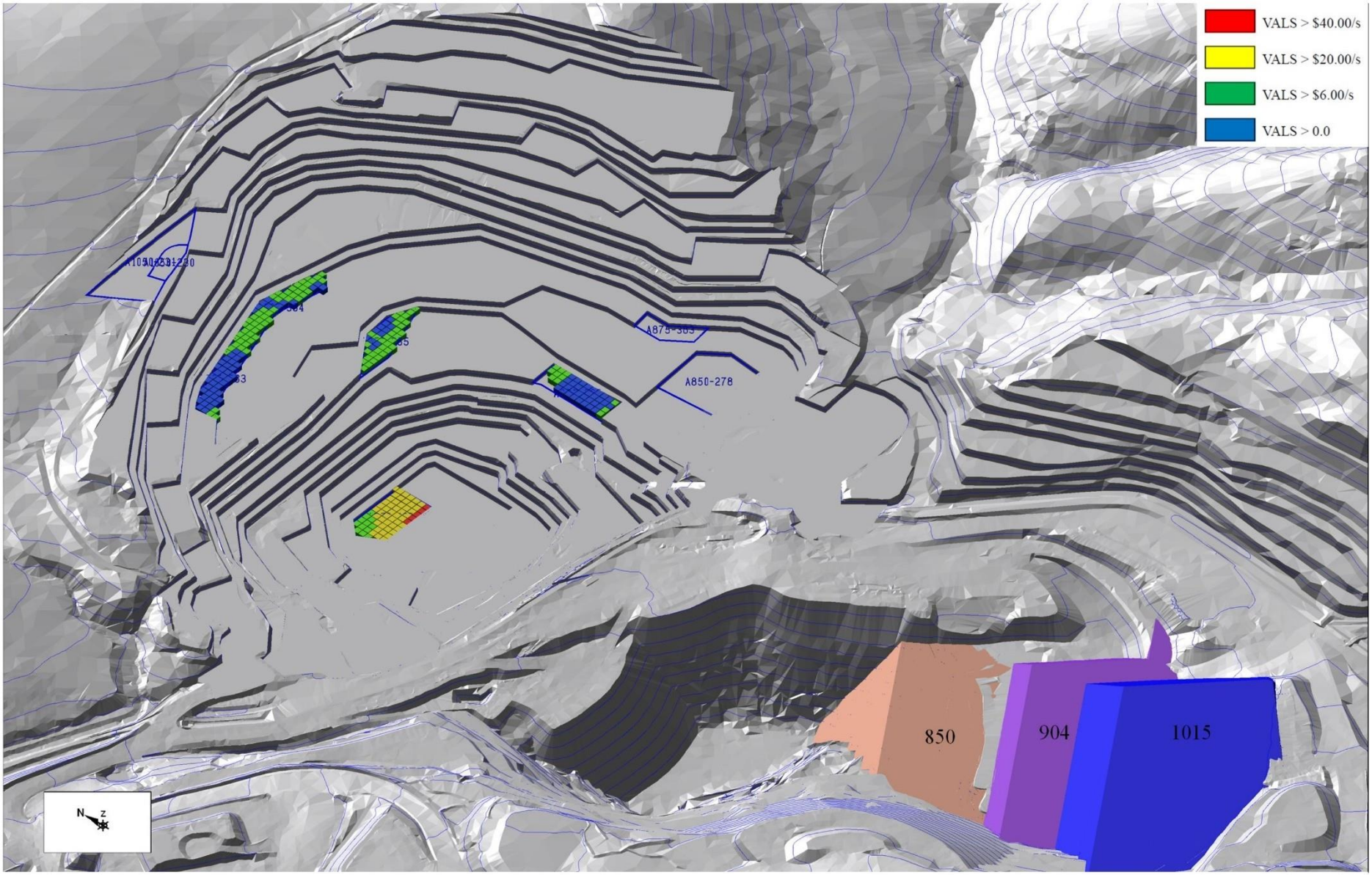


Figure 7.1-8 August 2018 Mine Plan 30 View (AQQ)

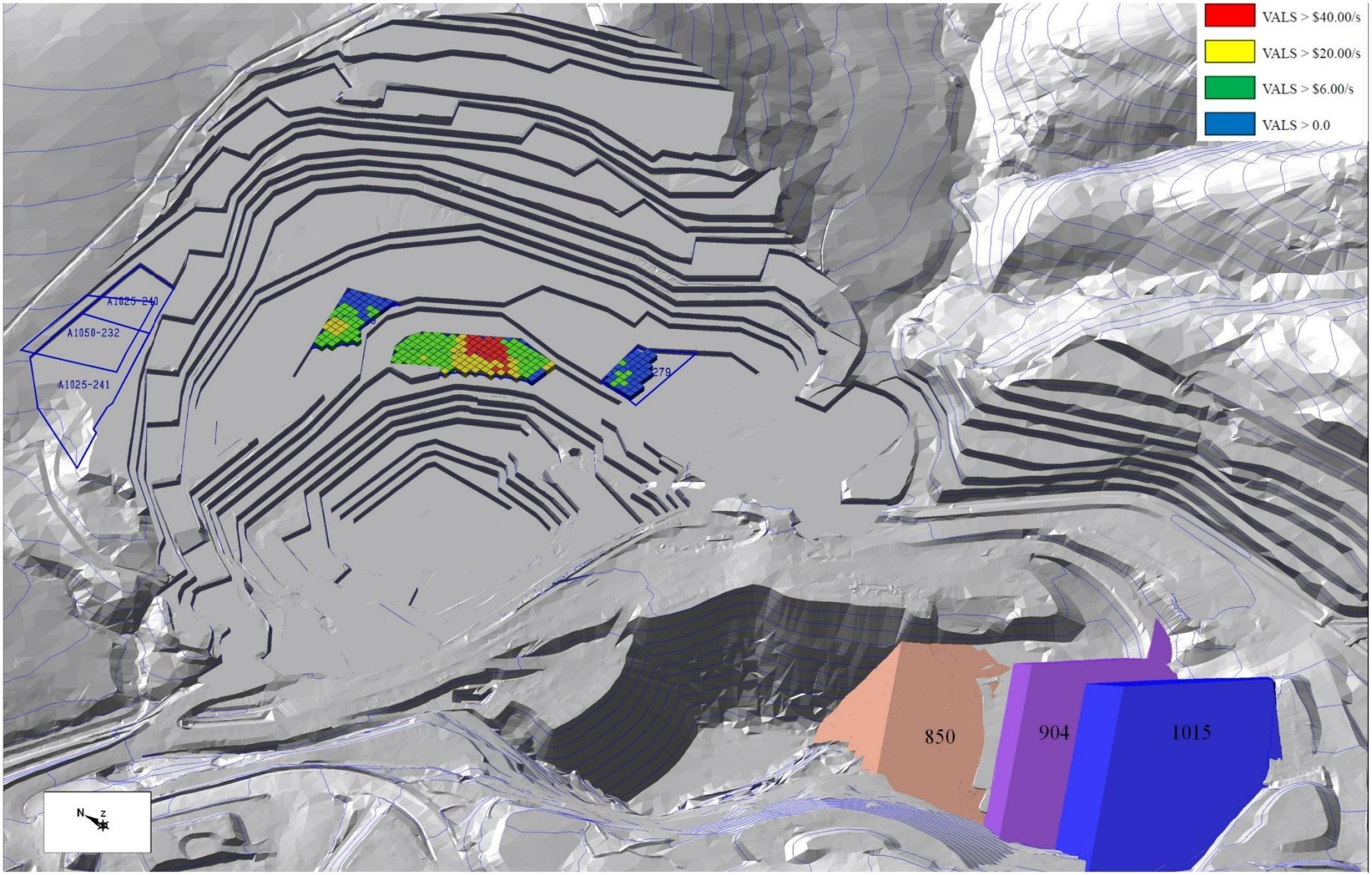


Figure 7.1-9 September 2018 Mine Plan 30 View (AQQ)

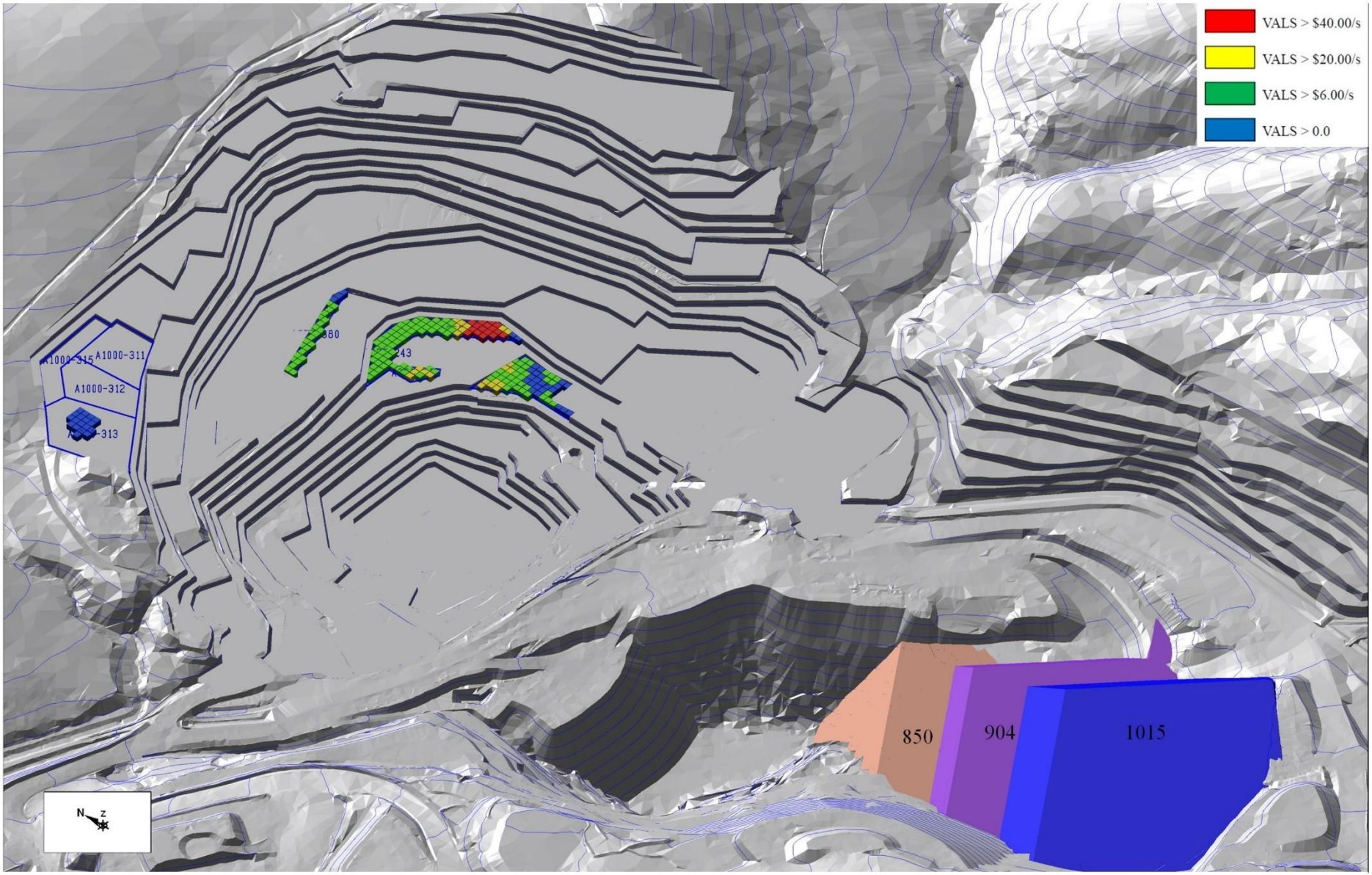


Figure 7.1-10 October 2018 Mine Plan 30 View (AQQ)

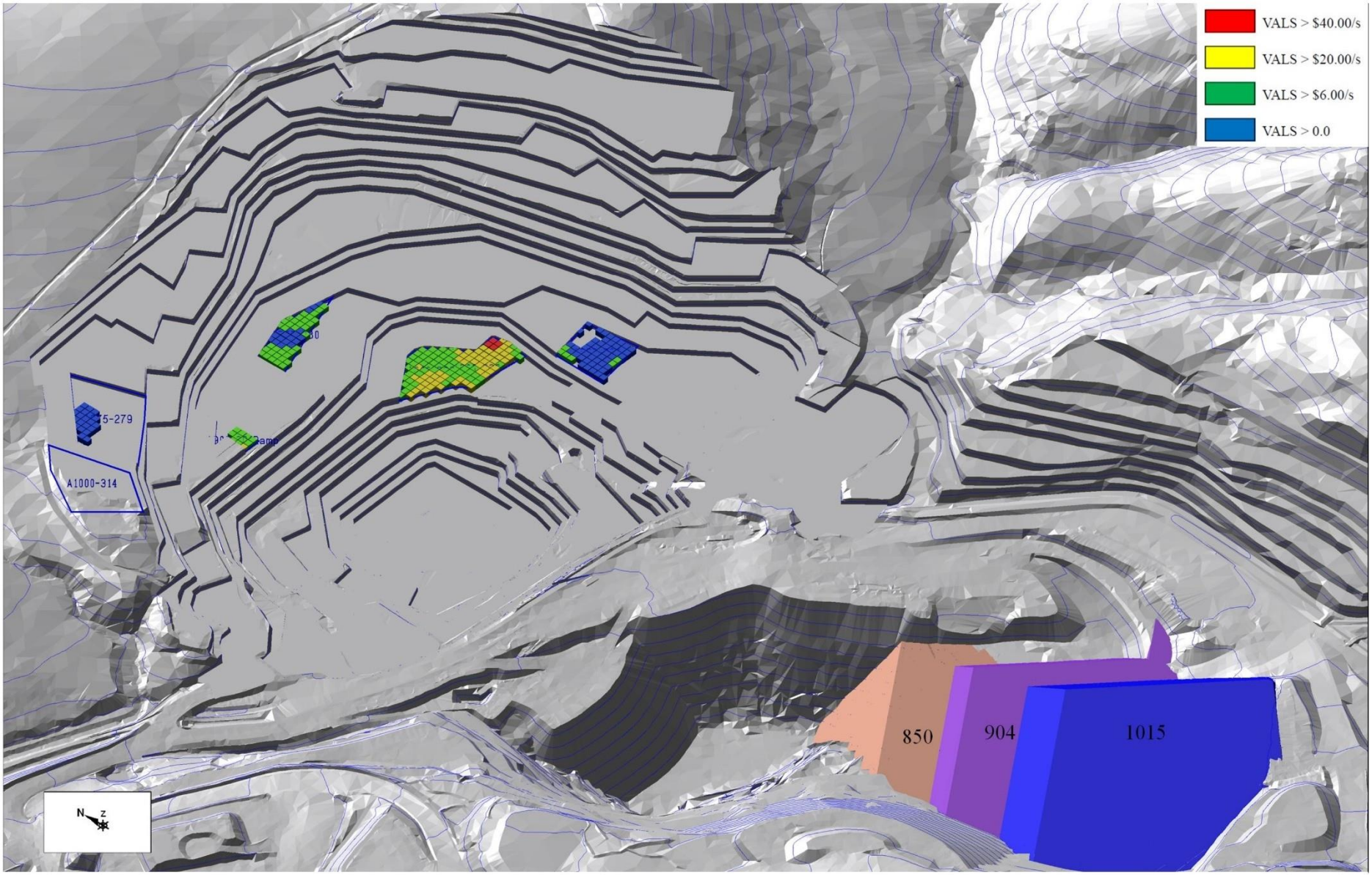


Figure 7.1-11 November 2018 Mine Plan 3D View (AQQ)

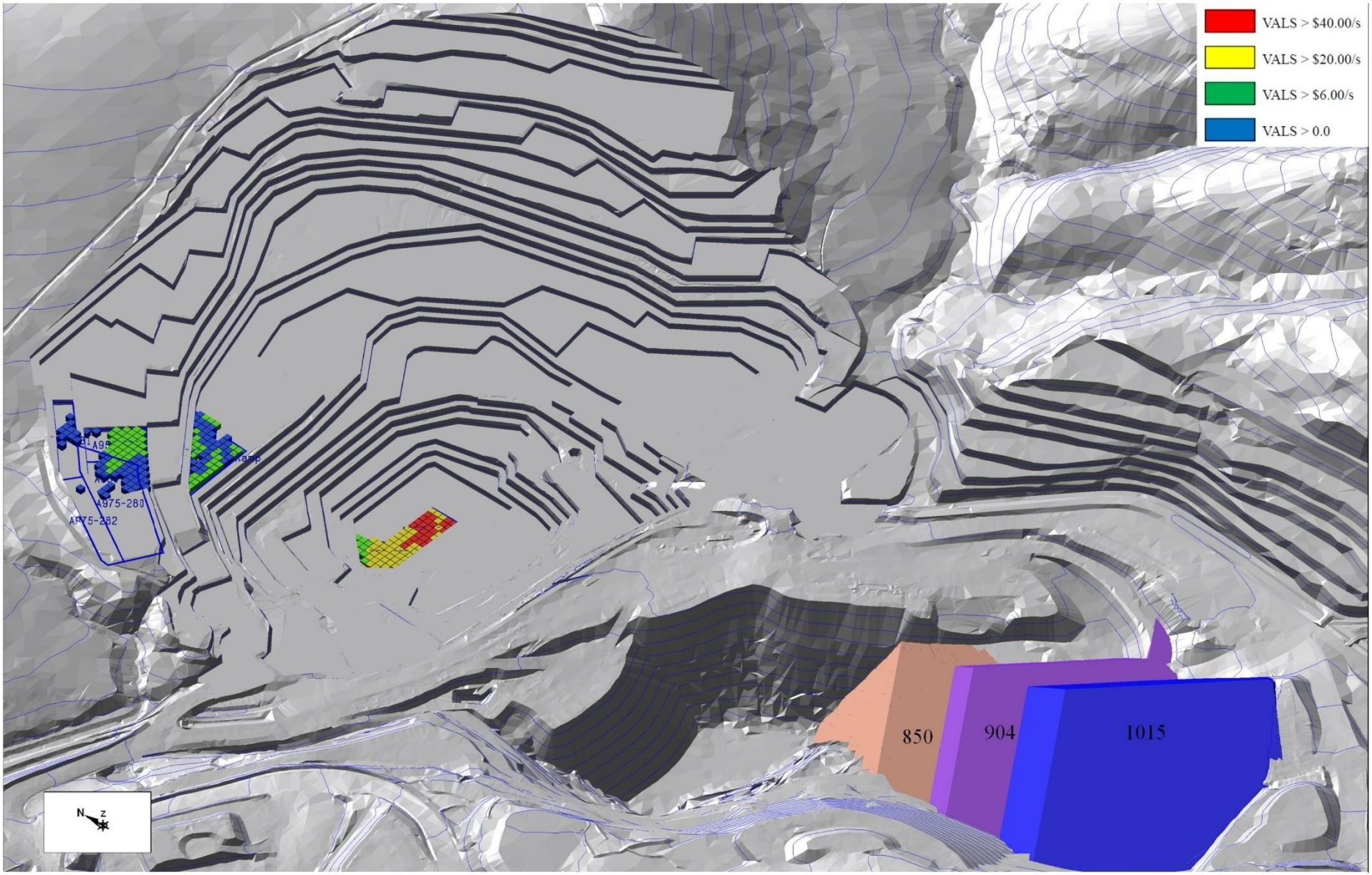


Figure 7.1-12 December 2018 Mine Plan 30 View (AQQ)

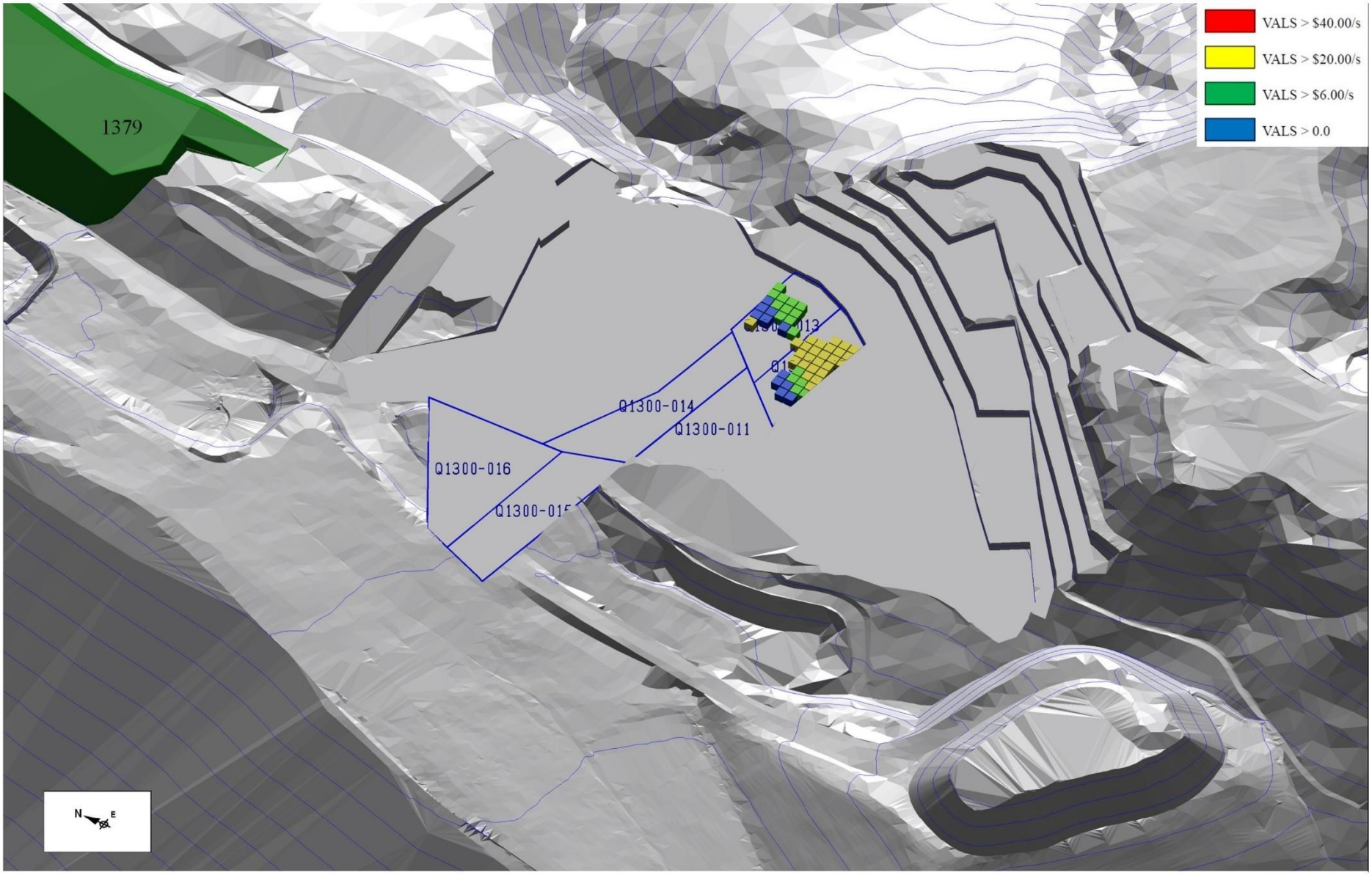


Figure 7.1-13 January 2018 Mine Plan 30 View (QAN)

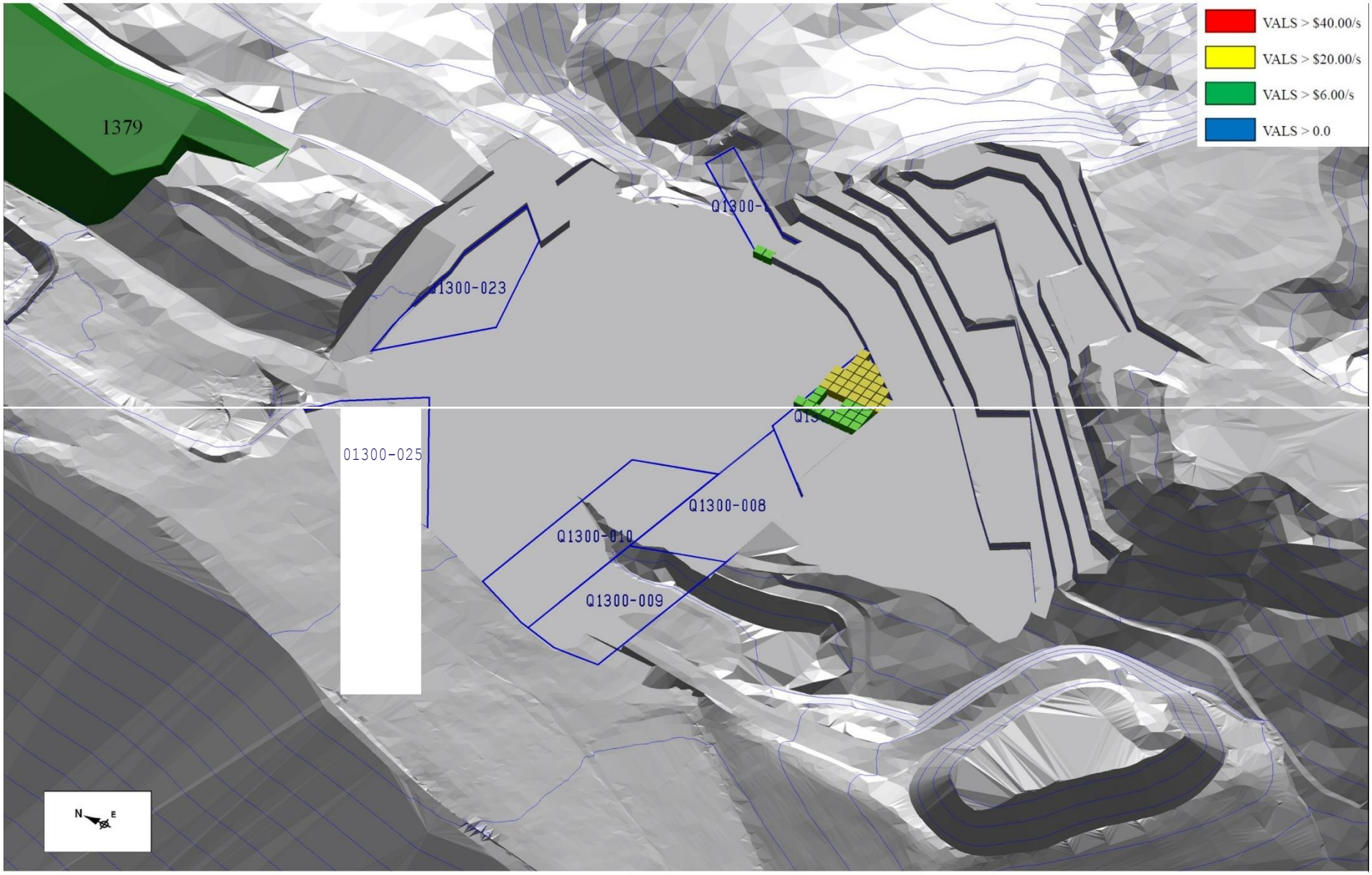


Figure 7.1-14 February 2018 Mine Plan 30 View (QAN)

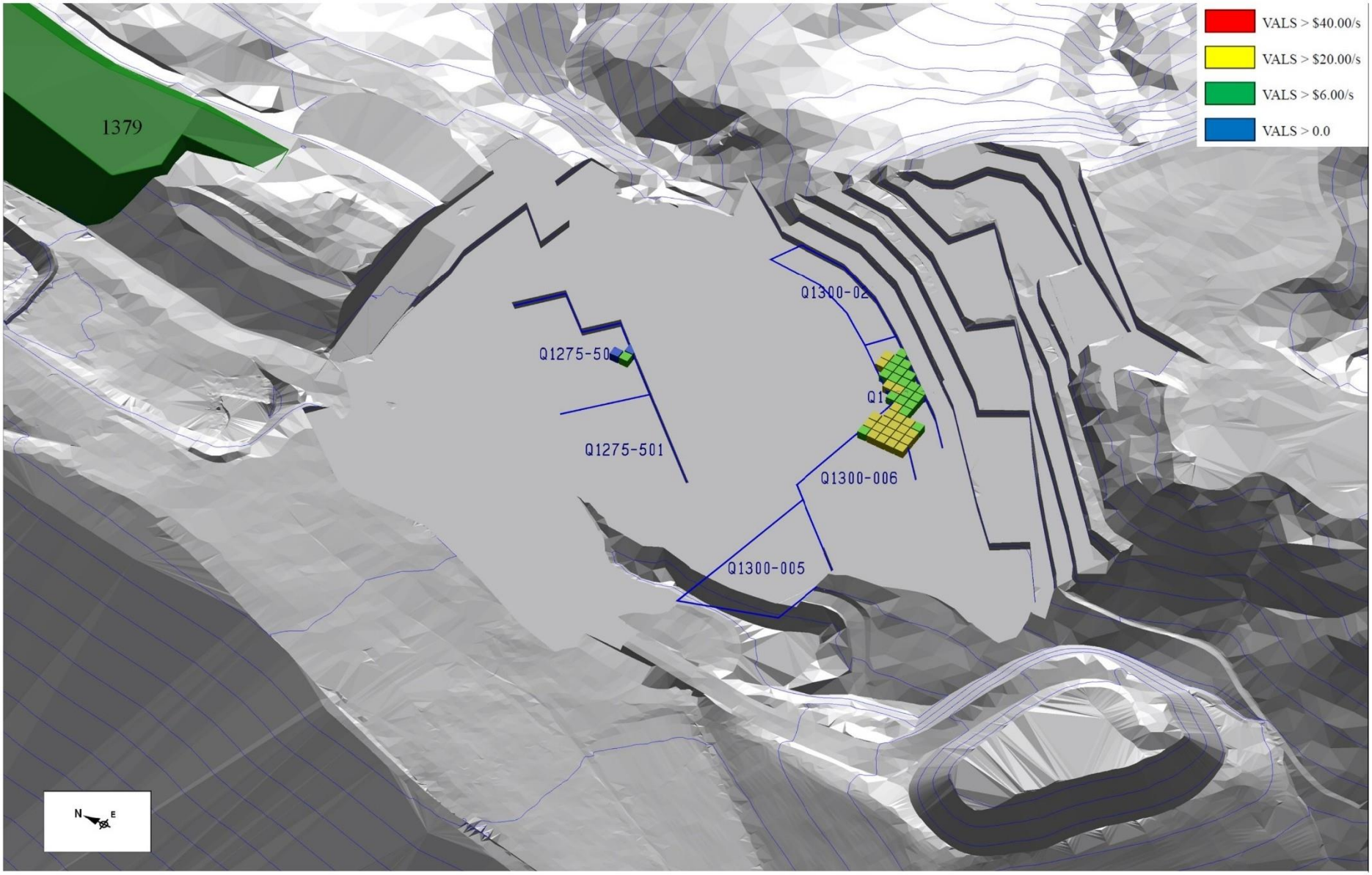


Figure 7.1-15 March 2018 Mine Plan 30 View (QAN)

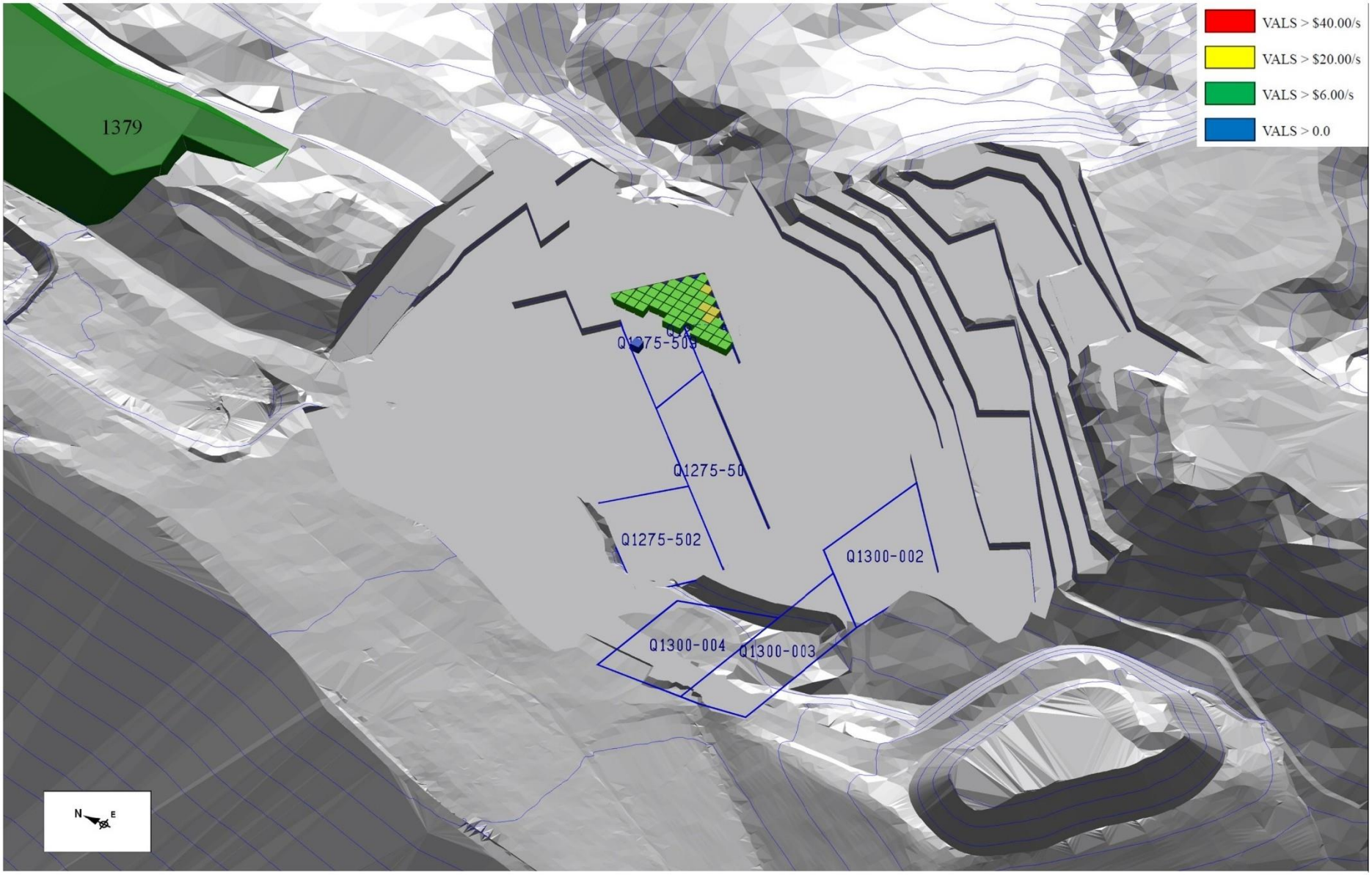


Figure 7.1-16 April2018 Mine Plan 30 View (QAN)

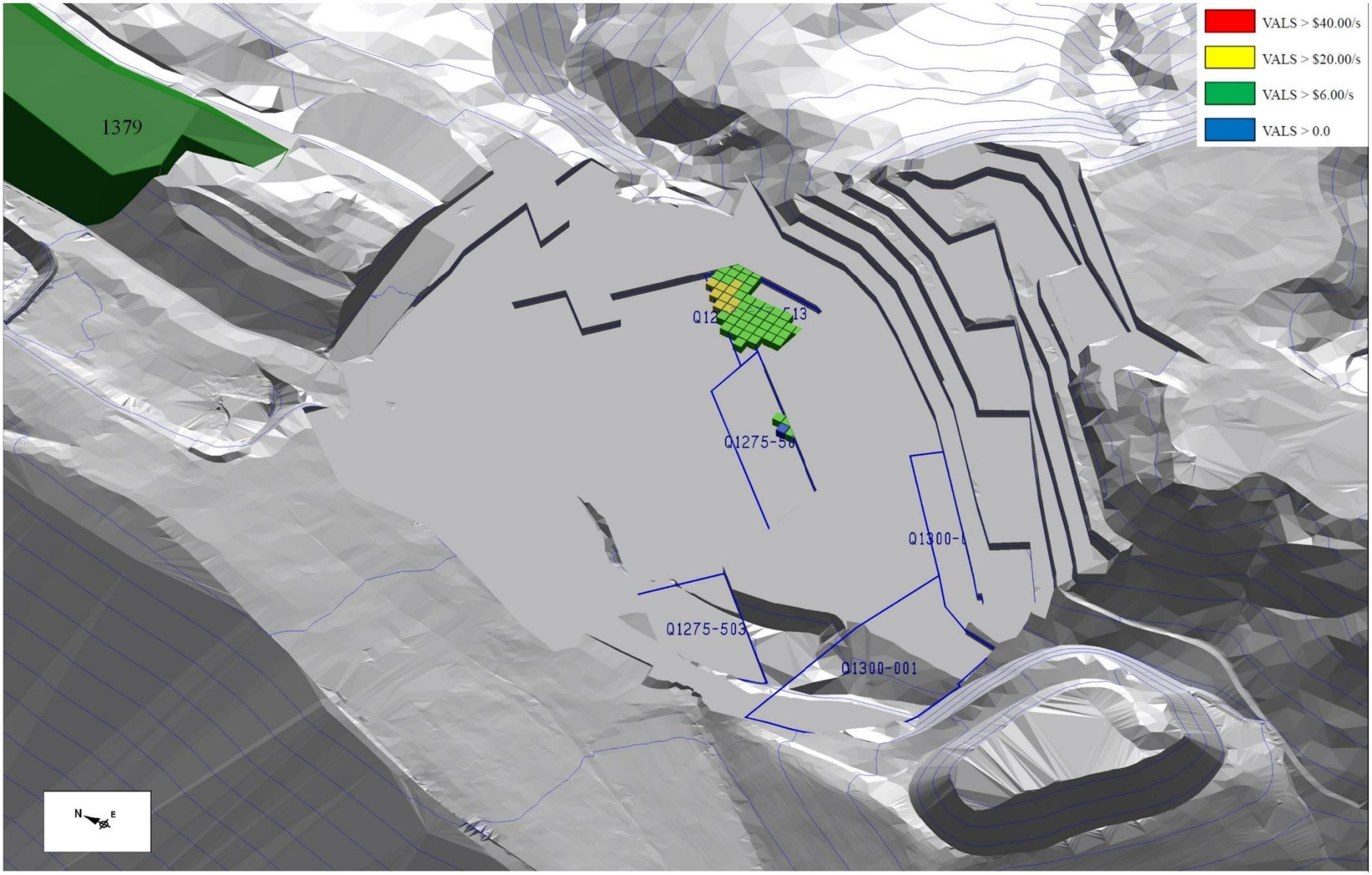


Figure 7.1-17 May 2018 Mine Plan 3D View (QAN)

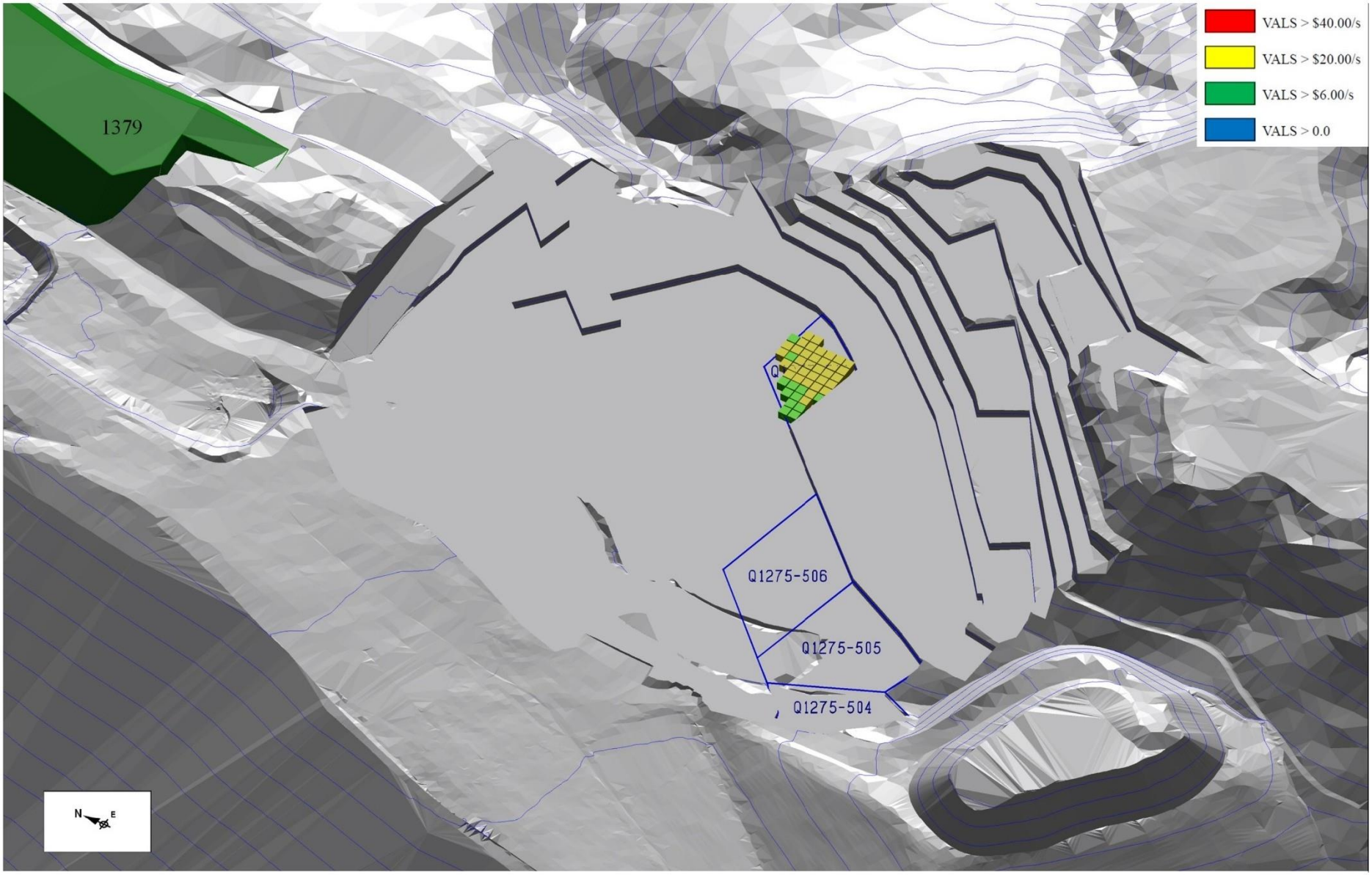


Figure 7.1-18 June 2018 Mine Plan 30 View (QAN)

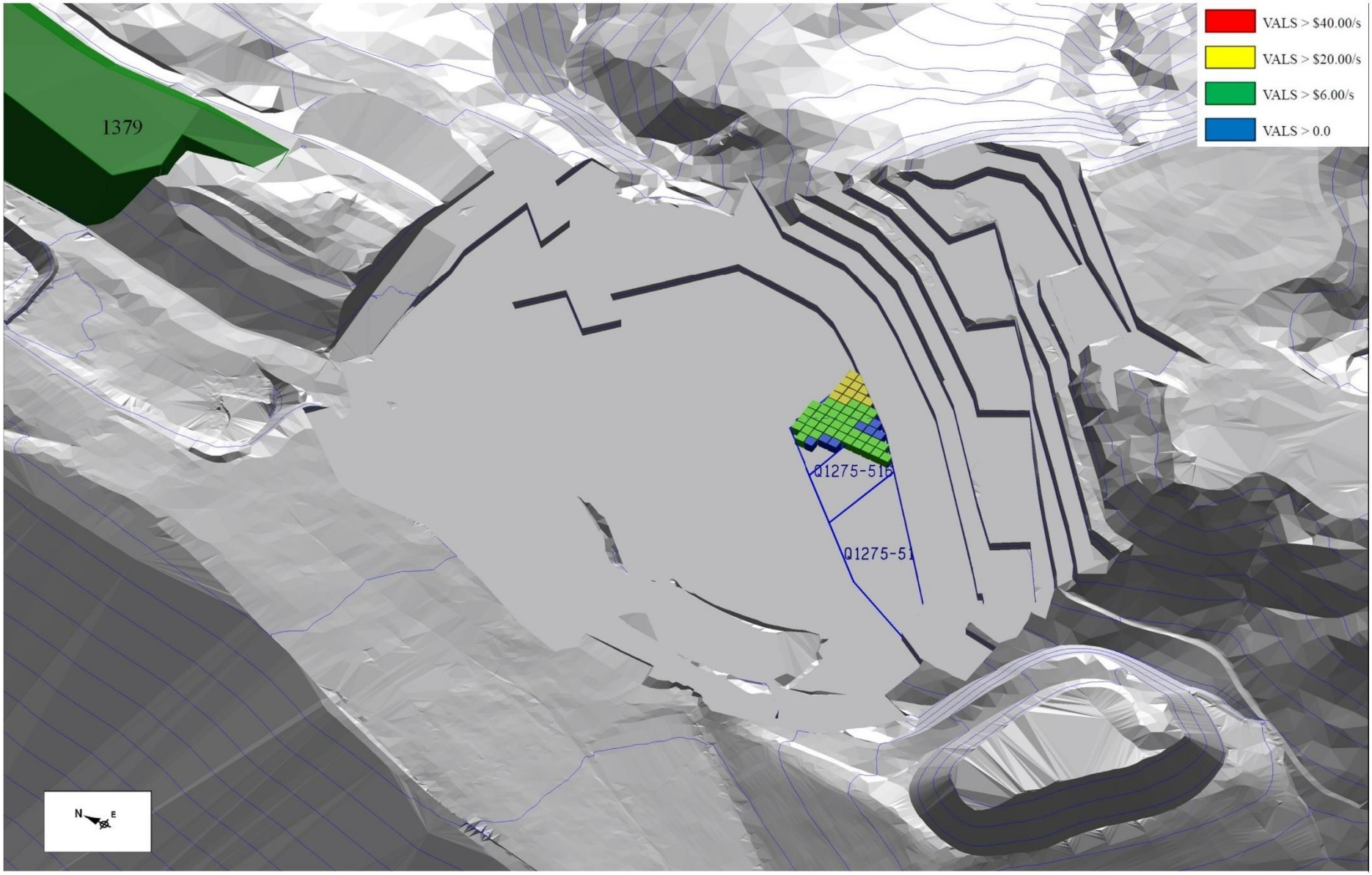


Figure 7.1-19 July 2018 Mine Plan 30 View (QAN)

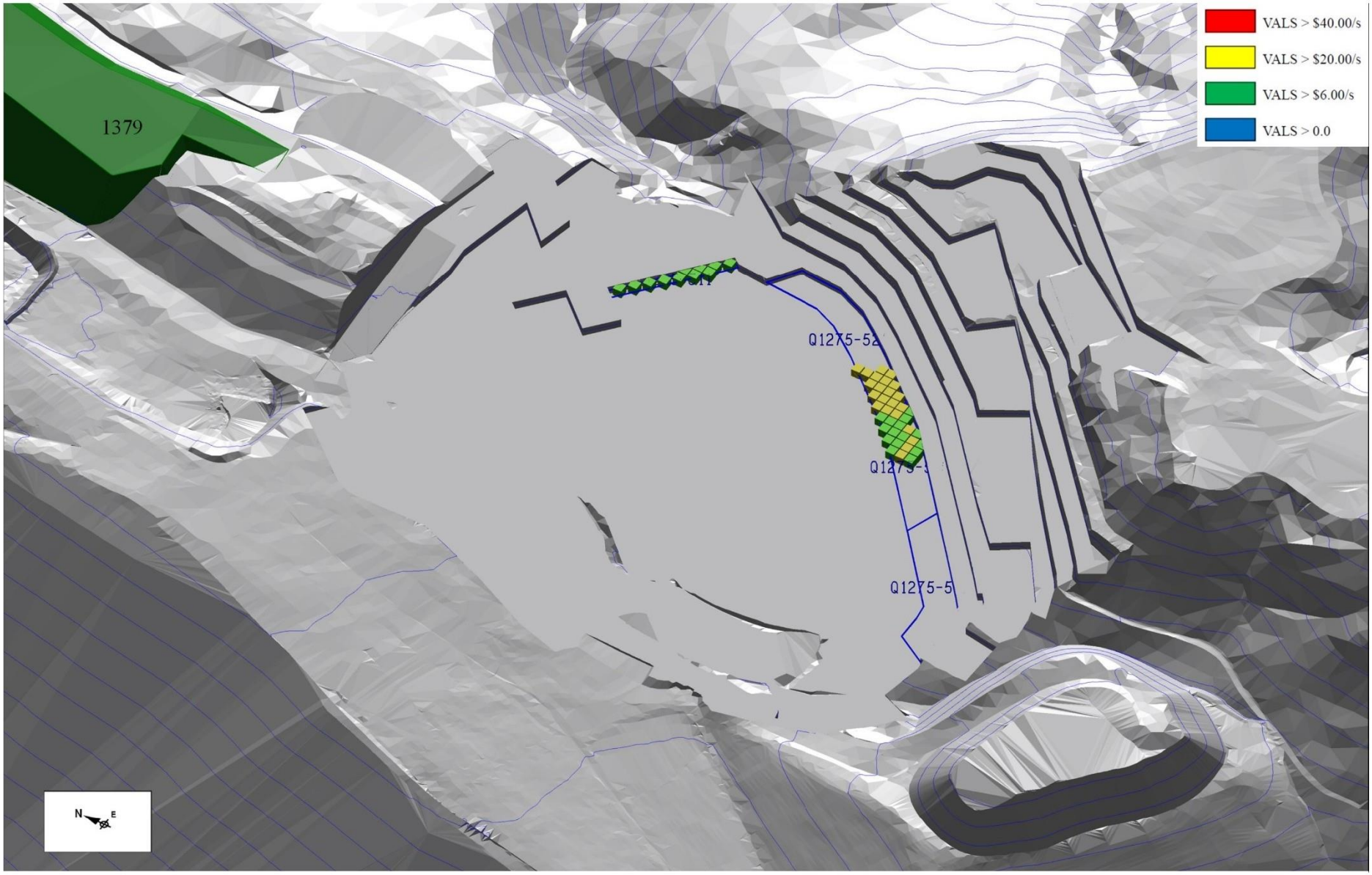


Figure 7.1-20 August 2018 Mine Plan 30 View (QAN)

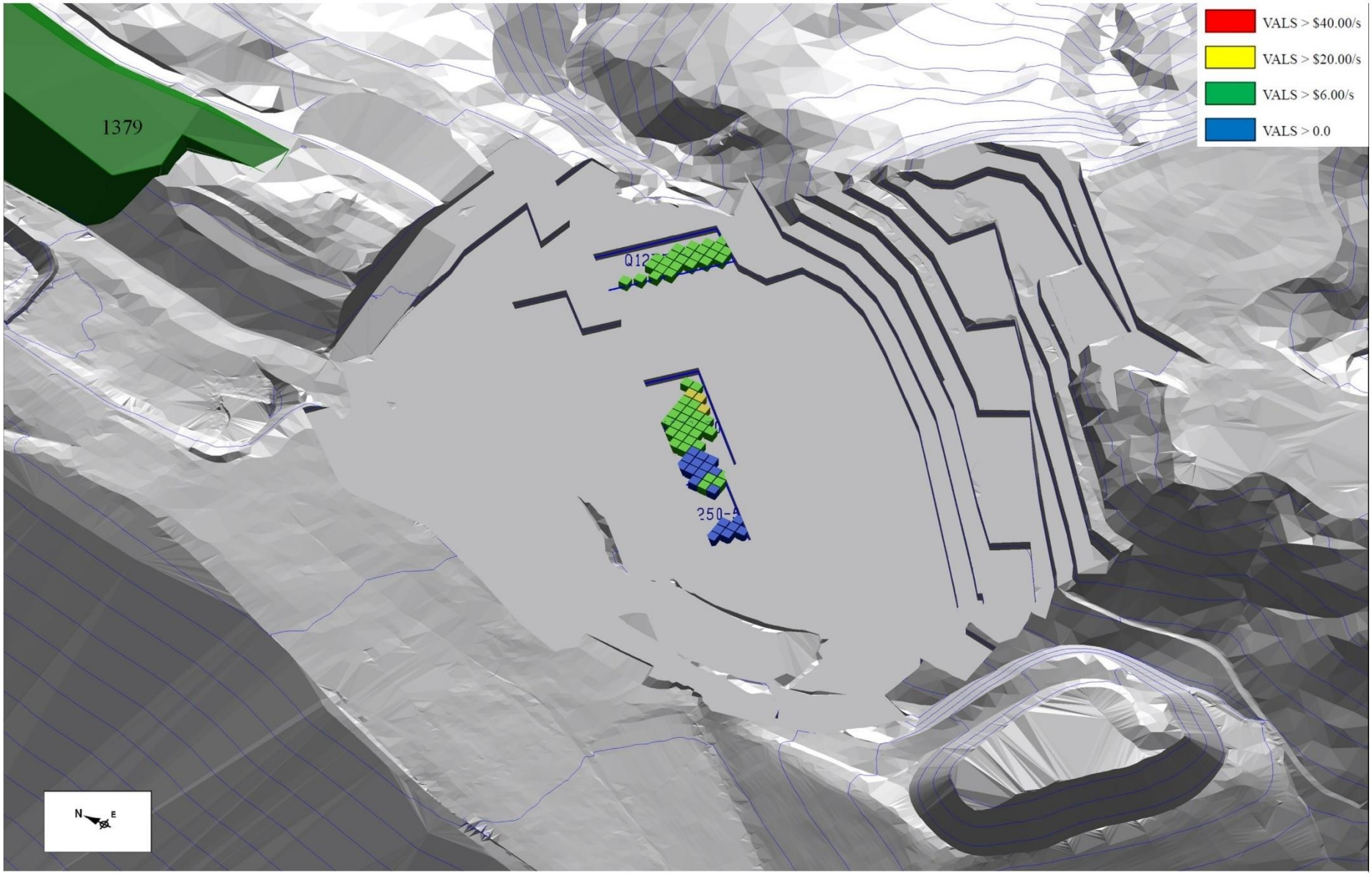


Figure 7.1-21 September 2018 Mine Plan 30 View (QAN)

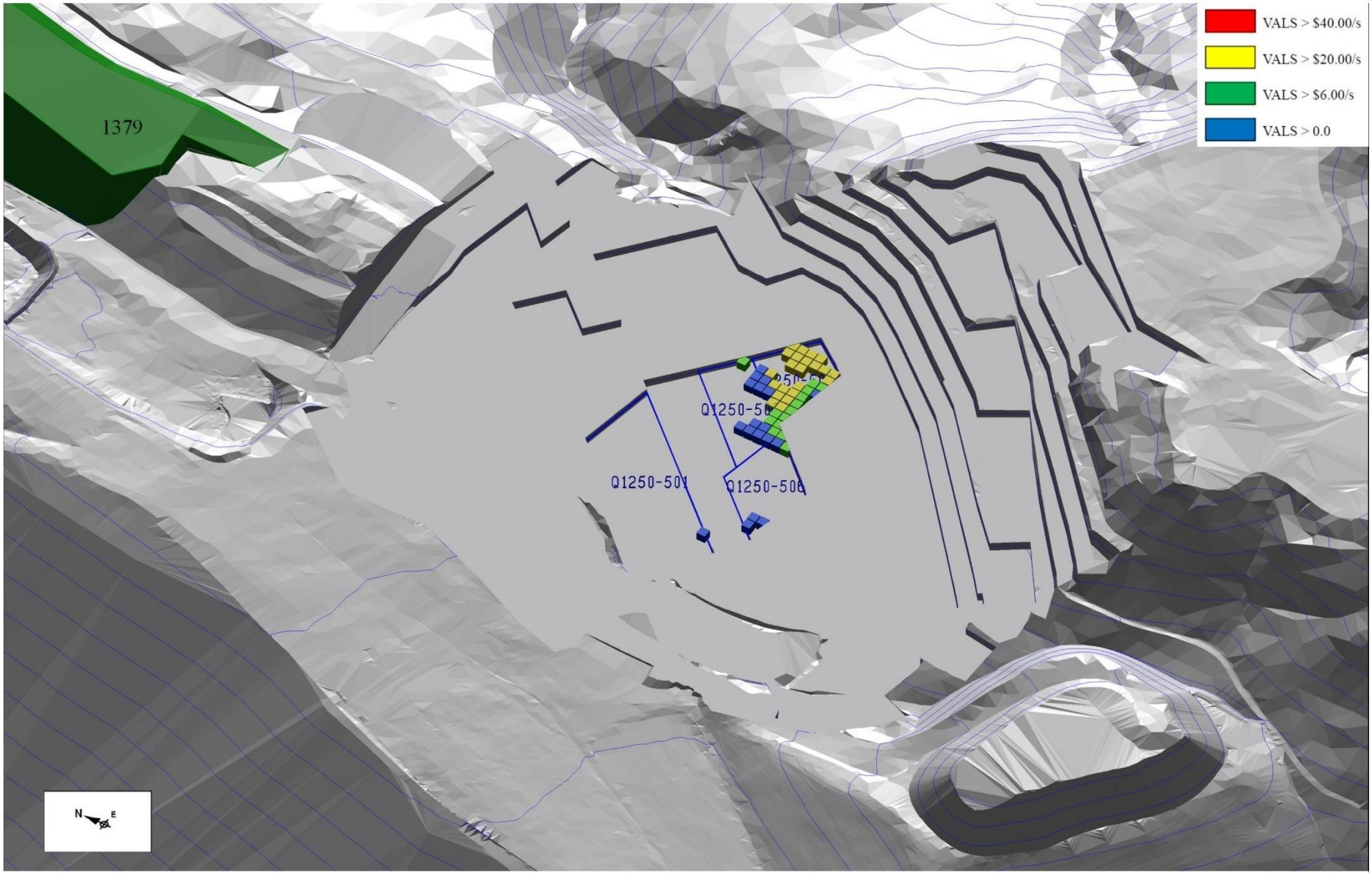


Figure 7.1-22 October 2018 Mine Plan 30 View (QAN)

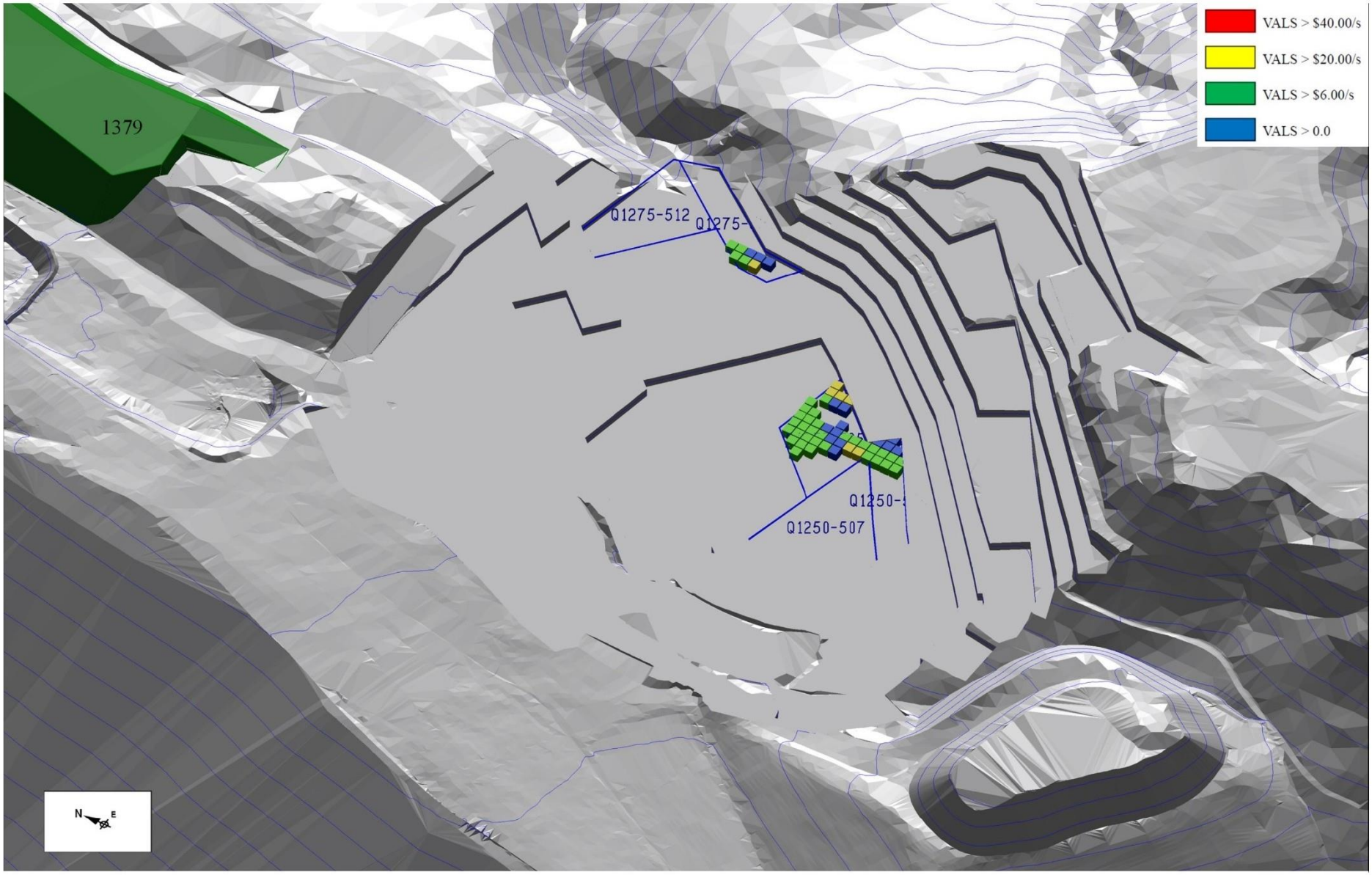


Figure 7.1-23 November 2018 Mine Plan 30 View (QAN)

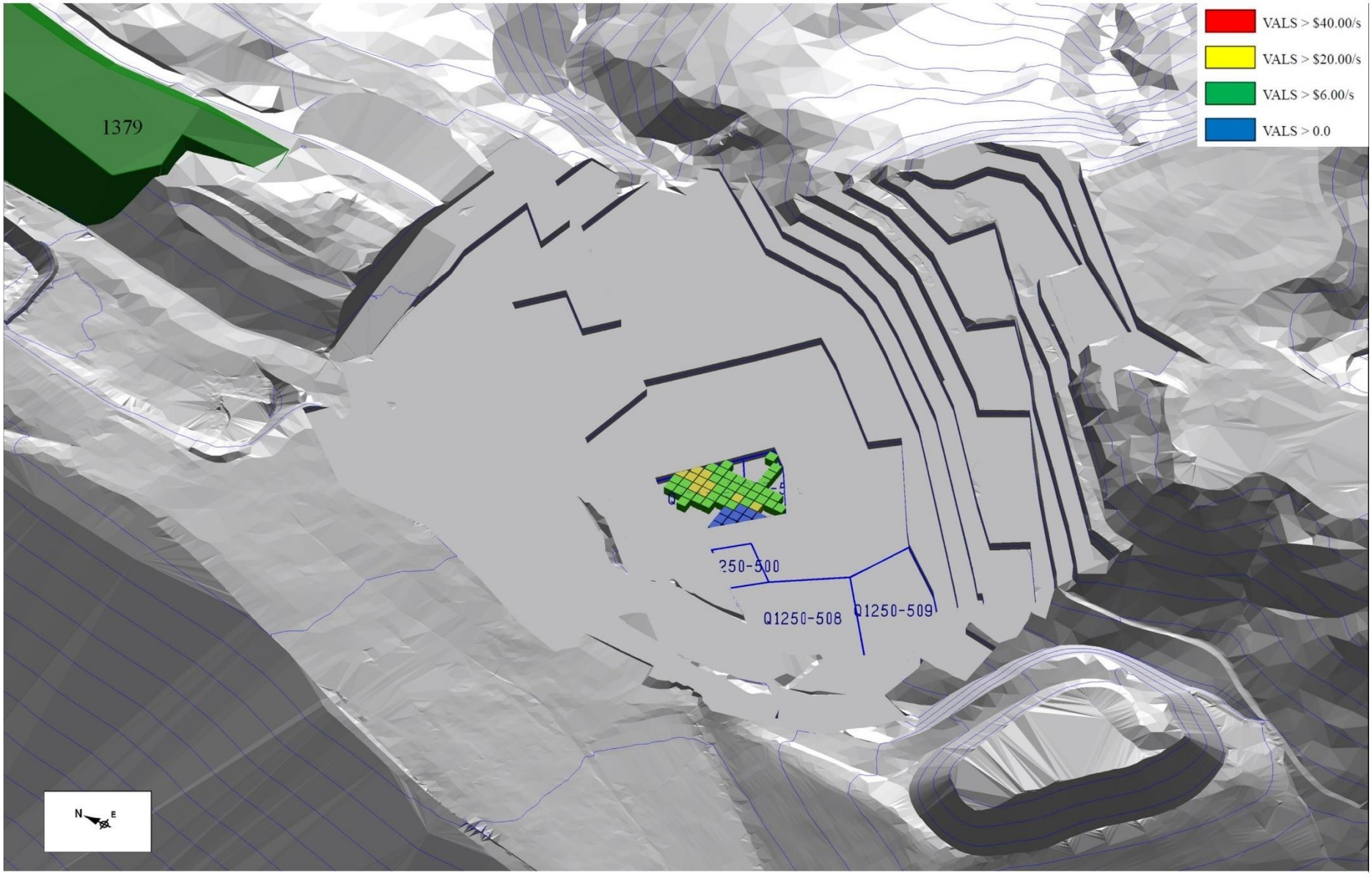


Figure 7.1-24 December 2018 Mine Plan 30 View (QAN)