Drilling returns high grade copper at Accrington

HIGHLIGHTS

- High grade copper has been intersected in drill hole FR18-007 which has returned **54m @ 1.4% Cu, 0.45% Zn, 0.19 g/t Au, 20 g/t Ag** from 46m including:
  - **14m @ 3.4% Cu, 1.15% Zn, 0.22 g/t Au, 28 g/t Ag from 82m**
- Channel sample results from the Massachusetts Mine has returned **72m @ 0.77% Cu, 0.3 g/t Au, 12 g/t Ag** including:
  - **18m @ 1.57% Cu, 0.35 g/t Au, 24 g/t Ag; and**
  - **12m @ 1.56% Cu, 0.86 g/t Au, 21 g/t Ag**
- Further assays from drill hole FR18-006 have extended the mineralised intercept from 206m to 216m depth, final results for the hole are:
  - **26m @ 0.38% Cu, 3.06% Zn, 16 g/t Ag from 48m including 10m @ 0.52% Cu, 6.6% Zn, 32 g/t Ag, 0.11 g/t Au from 52m; and**
  - **100m @ 0.41% Cu, 0.30% Zn, 7 g/t Ag from 116m to 216m including 6m @ 1.8% Cu, 0.17% Zn, 29 g/t Ag, 0.18 g/t Au**
- Drilling is continuing to test copper-zinc-lead-silver-gold bearing skarns with further results from drilling expected in November

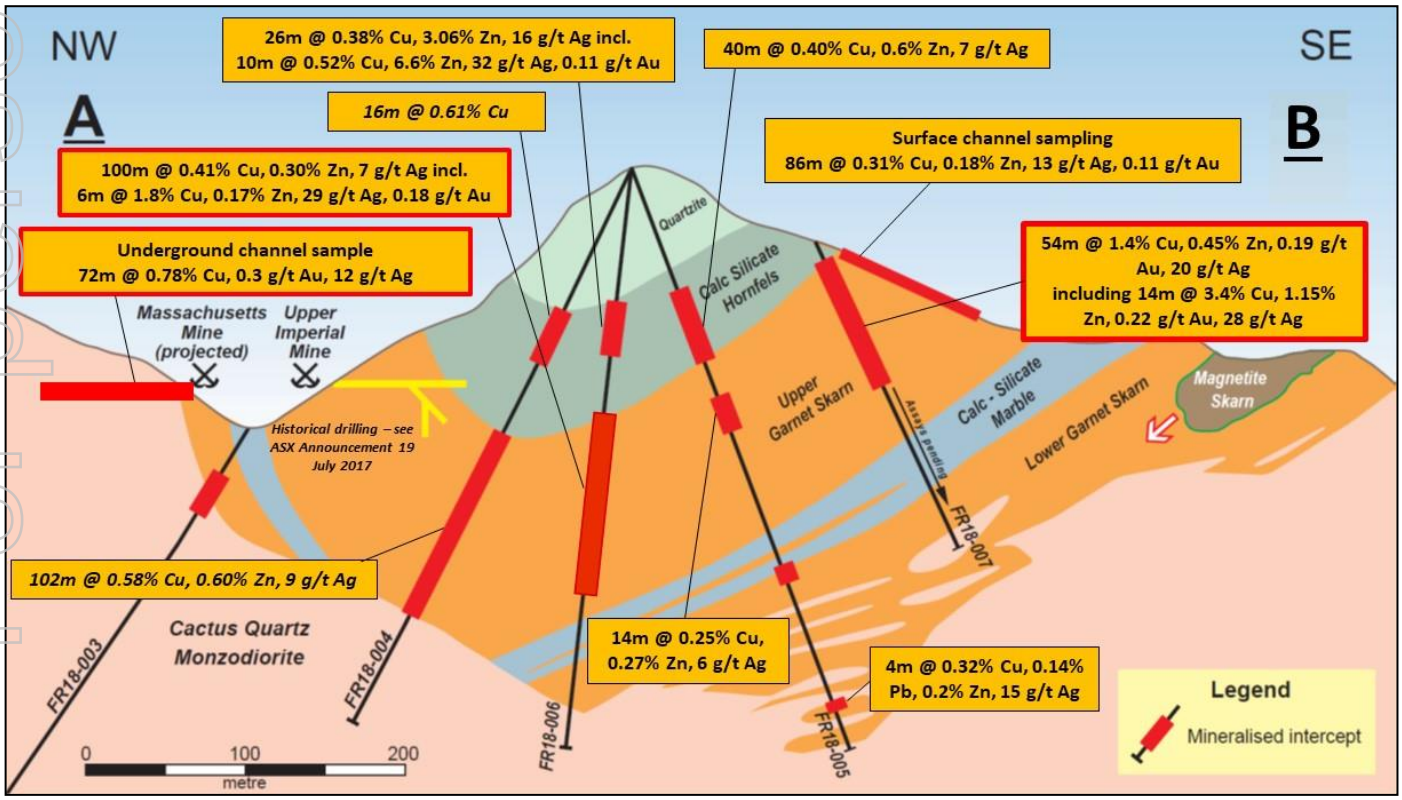

Figure 1: Conceptual cross section with intercepts from drilling and channel sampling.

Alderan Resources Limited (ASX: AL8) is pleased to provide an update on exploration at Accrington, part of the Company's Frisco Project located in Utah, USA. Further assay results from drilling of the Accrington skarn have been received with high grade intervals of copper.

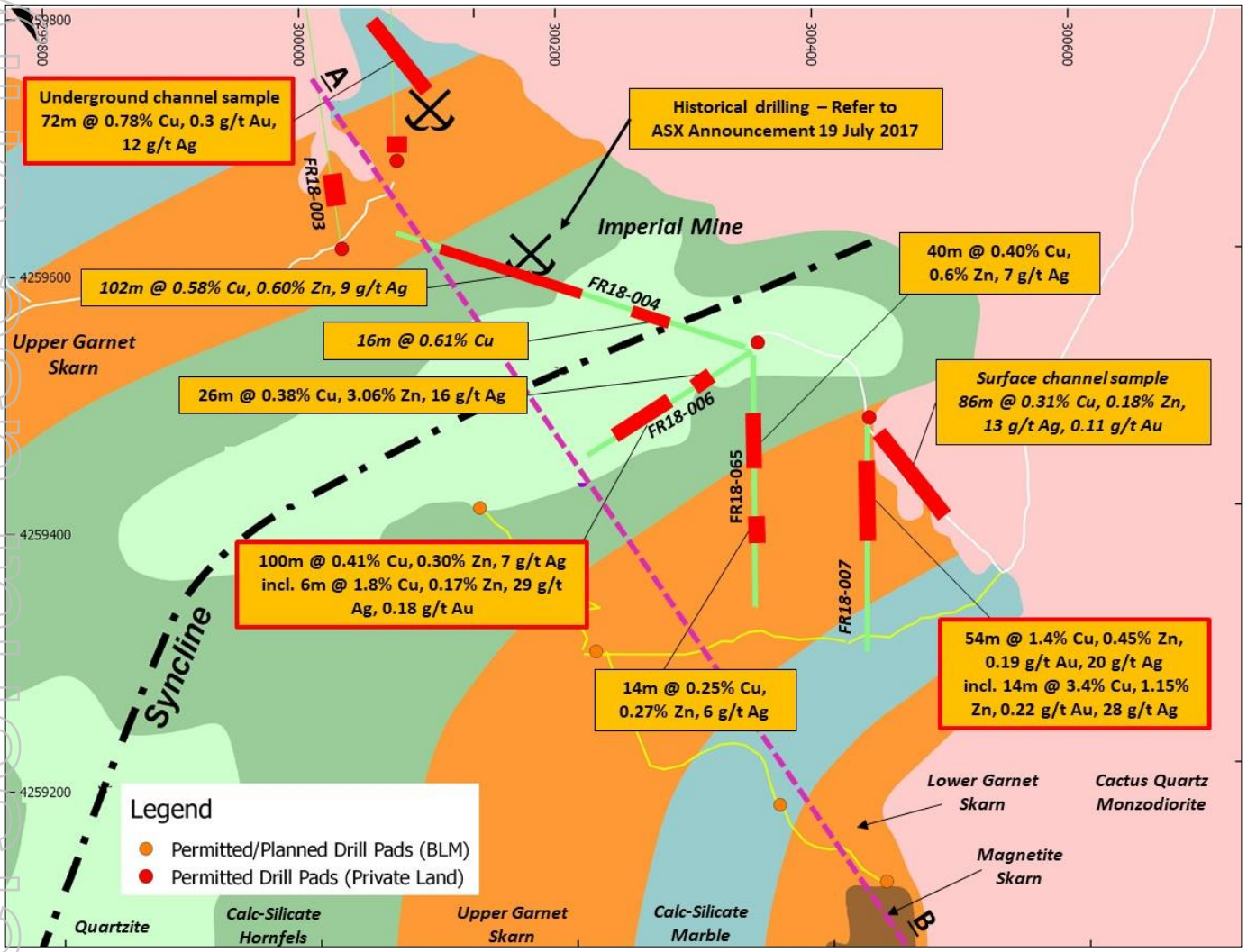

Figure 2: Geological plan of the Imperial to Accrington East Skarn Area showing drill holes and assay results.

The drill results provide further confidence in the potential for Accrington to host a large deposit amenable to modern low-cost bulk mining methods. Previous mapping by the Company indicates that the targeted garnet skarns, the principal host for mineralisation, are likely to extend further to the South-West. Current drilling is focusing on mineralised garnet skarns that outcrop from Imperial to Accrington East over approximately 1km strike.

Assays confirm high grade copper at Accrington

Assay results from Accrington confirm the potential of Accrington to host high grade copper mineralisation.

Drill hole FR18-007 was drilled approximately 100m to the south-east from FR18-006 targeting mineralisation within the upper garnet skarn that was previously intersected by channel sampling along

the new access road. The drill hole intersected well mineralised magnetite and garnet skarn from 46m to 100m and variably mineralised skarn thereafter with the Cactus stock being intersected at 209m. FR18-007 returned:

- 54m @ 1.4% Cu, 0.45% Zn, 0.19 g/t Au, 20 g/t Ag from 46m, including 14m @ 3.4% Cu, 1.15% Zn, 0.22 g/t Au, 28 g/t Ag from 82m

Further assays were also received for FR18-006 extending the zone of mineralisation beyond 206.5m to 216m. The Company previously reported partial results on 22 October 2018 to a depth of 206.5m. Final assays for FR18-006 are:

- 26m @ 0.38% Cu, 3.06% Zn, 16 g/t Ag from 48m including 10m @ 0.52% Cu, 6.6% Zn, 32 g/t Ag, 0.11 g/t Au from 52m; and
- 100m @ 0.41% Cu, 0.30% Zn, 7 g/t Ag from 116m to 216.6m including 6m @ 1.8% Cu, 0.17% Zn, 29 g/t Ag, 0.18 g/t Au.

Drilling at Accrington is targeting a large skarn where the Company has identified potential for a large-tonnage copper-zinc-silver deposit. The results confirm thick copper-zinc-silver bearing skarn across more than 500m strike. Drilling is currently taking place to the south of the Cactus Stock at Accrington East targeting the outcropping lower and upper garnet skarn in order to demonstrate the continuity of mineralised skarns to the south-west.

Historical drilling and minor mining activities were previously undertaken at the Imperial Mine. Drilling was undertaken by Bear Creek Mining Company in 1967. For a full description of historical drill results, including JORC Table 1, refer to the ASX announcement "Alderan Resources expands Frisco Project" published on 19 July 2017.

Channel Sampling at Massachusetts Copper Mine

Channel sampling was undertaken at the historical Massachusetts Copper Mine which is situated to the immediate west of the Imperial Mine. Previous drilling by the Company (FR18-001 and FR18-003) drilled from a road beneath these workings and did not intersect mineralised skarn associated with Massachusetts due to the presence of Cactus stock intrusives. Alderan recently undertook channel sampling at Massachusetts which comprised of 36 two-meter rock chip samples taken from within the adit. Refer to Figure 3 for sample locations. Assay results returned:

- 72m @ 0.78% Cu, 0.3 g/t Au, 12 g/t Ag including 18m @ 1.57% Cu, 0.35 g/t Au, 24 g/t Ag; and 12m @ 1.56% Cu, 0.86 g/t Au, 21 g/t Ag.

Mineralisation within the adit comprised partly oxidised chalcopyrite associated with garnet skarn and endoskarn. The adit terminates in Cactus stock intrusive.

The results confirm further significant mineralisation to the west of the Imperial Mine where historical drilling by Bear Creek Mining Company in 1967 returned significant copper-zinc-silver mineralisation.

About the Accrington Skarn

Accrington is a large mineralised skarn measuring approximately 4km by up to 2km. Historical mining activity has taken place throughout the skarn focused on high grade structurally controlled Zn-Cu-Au-Ag deposits and within extensive copper-zinc-silver bearing garnet skarn. Many prospect pits exposing mineralisation also occur throughout the skarn. Accrington is located 18 km to the west of the Valley Copper skarn deposit (located off the Company's claims), which was drilled by Anaconda in the 1960's. While no resource has been published on the Valley deposit, historical drilling was reported to have intersected thick copper-garnet skarn mineralisation across an area of approximately 1000m by 600m and from 200m to 1000m depth, highlighting the potential for large skarn hosted deposits in the region[1].

The principal focus of the Company is on the thick copper-zinc-lead-silver-gold bearing garnet skarns which outcrop at Accrington East and at the Imperial Mine, a distance of over 1km (refer to Figure 2). The Company believes that the Accrington skarn has the potential to host several significant deposits similar to other large skarns in North and South America (e.g. Battle Mountain, Pumpkin Hollow, San Martin, Carr-Fork).

Accrington is part of the Company's Frisco Project, which also hosts several tourmaline-chalcopyrite (copper) bearing breccia pipes and deeper porphyry copper potential. It is located in Beaver County, Utah, USA - a region with exceptional infrastructure, low cost power, a skilled workforce, an extremely competitive taxation system, proximal smelters and end users.

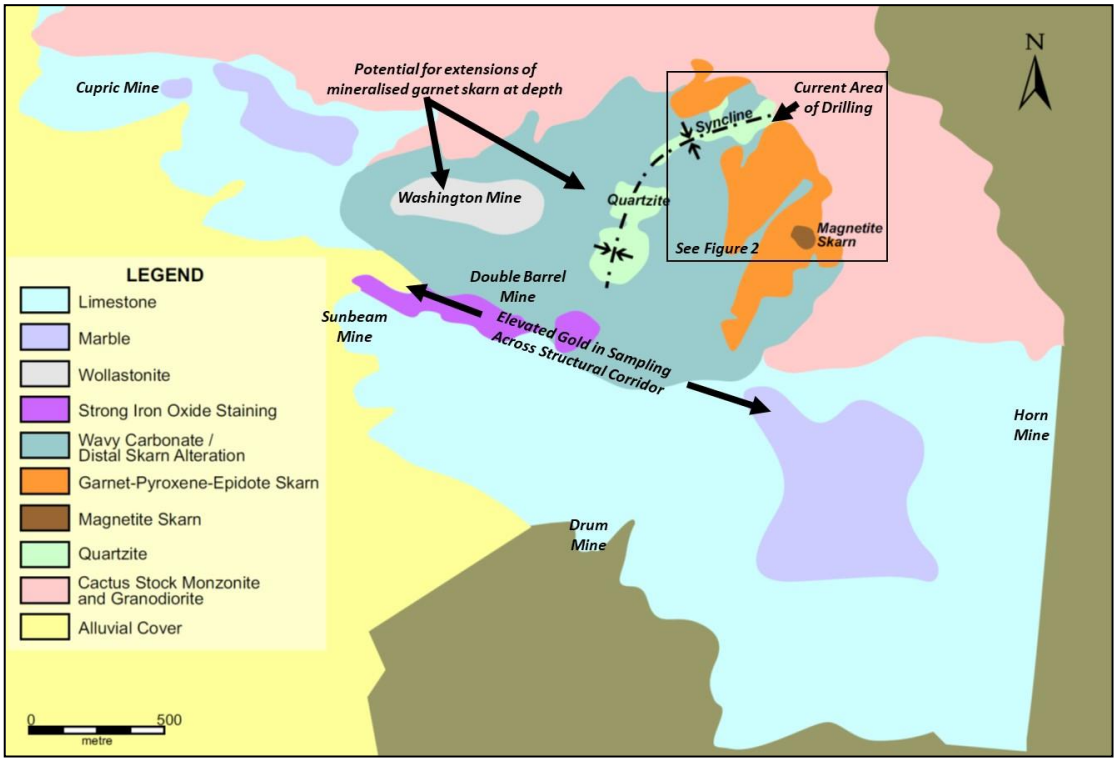

Figure 3: Simplified geology map of Accrington showing the principal areas where mineralisation has been identified through surface mapping and sampling.

[1] "Mines and Geology of the Rocky and Beaver Lake Districts", Beaver County, Utah, 2012

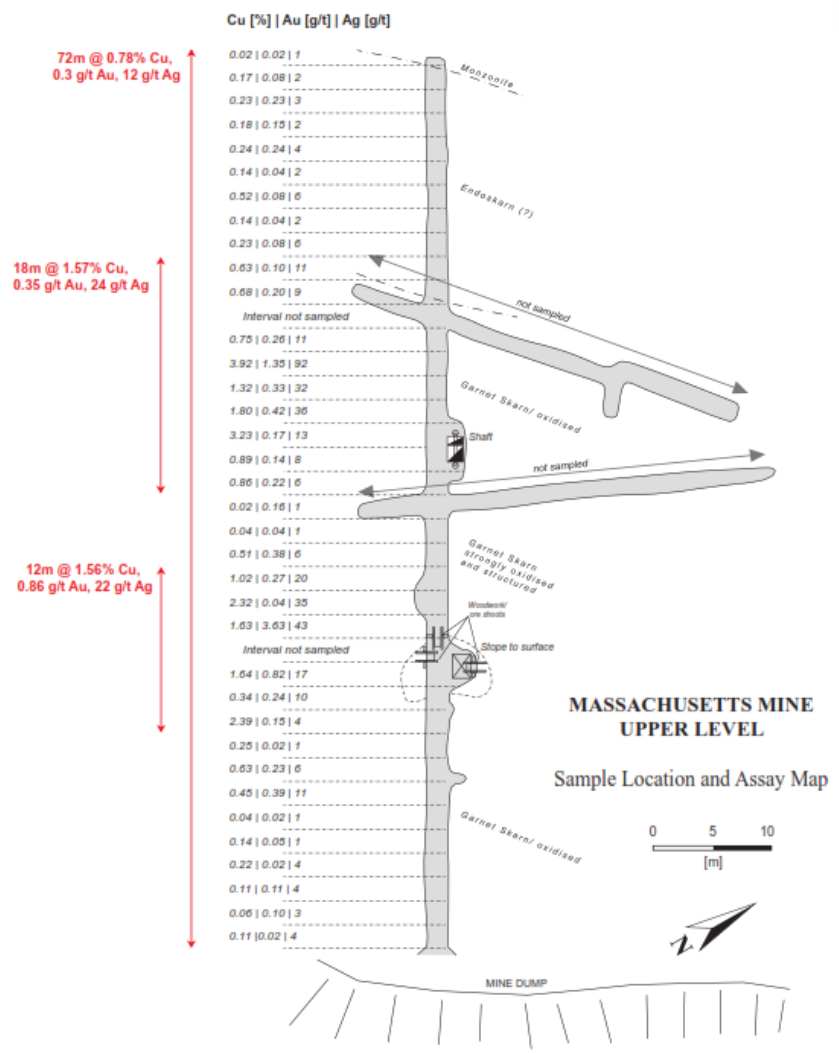

Figure 4: Massaschusetts Mine sample location and assay map.

Table 1: Assay results

Drillhole ID	Target	From (m)	To (m)	Interval (m)	Cu (%)	Zn (%)	Ag (g/t)	Au (g/t)
FR18-001	Perseverance	2	12	10	0.55	NSR	11	
FR18-003	Perseverance	50	66	16	0.22	NSR	NSR	
FR18-004	Accrington Skarn	84	100	16	0.62	NSR	NSR	
and		194	296	102	0.58	0.60	9	
FR18-005	Accrington Skarn	104	144	40	0.40	0.60	7	
		180	194	14	0.25	0.27	6	
FR18-006	Accrington Skarn	48	72	26	0.38	3.06	16	
	Including	52	62	10	0.52	6.6	32	0.11
	and	**116**	**216**	**100.6**	**0.41**	**0.30**	**7**	
	Including	144	150	6	1.80	0.17	29	0.18
FR18-007	**Accrington Skarn**	**46**	**100**	**54**	**1.4**	**0.45**	**20**	**0.19**
	Including	**82**	**96**	**14**	**3.4**	**1.15**	**28**	**0.22**

Notes:

1. Reported mineralisation is quoted in downhole depths. True width may be less than downhole intercept width (apparent width), and insufficient work has been completed to enable accurate calculation of true widths. No cut-off grade has been applied.

Table 2: Drillhole Location Details

Drillhole ID	Easting	Northing	Dip	Azimuth	Depth (m)	Drill Type
FR18-001	300100	4259693	-60	360	310.94	Diamond
FR18-002	Not utilised/abandoned					
FR18-003	300043	4259611	-61	353	1016.3	Diamond
FR18-004	300375	4259528	-55	290	362.18	Diamond
FR18-005	300368	4259525	-60	190	429.38	Diamond
FR18-006	300368	5259525	-55	245	367.9	Diamond
FR18-007	300445	4259483	-58	180	228.25	Diamond

Notes:

1. FR18-001 was previously called ALIM001 and FR18-003 was previously called ALIM003.

Table 3: Channel sample assay results

From (m)	To (m)	Interval (m)	Au (g/t)	Ag (g/t)	Cu (%)	Notes
0	76	72m	0.30 ppm	12 ppm	0.78%	22-24m, 50-52m no sample taken
includes						
18	38	18m	0.35 ppm	24 ppm	1.60%	22-24m no sample taken
44	58	12m	0.86 ppm	21 ppm	1.60%	50-52m no sample taken

- - - Ends - - -

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Competent Persons Statement

The information in this presentation that relates to exploration targets, or exploration results is based on information compiled by John Schloderer, a competent person who is a member of the Australian Institute of Geoscientists (AIG). John Schloderer is the Exploration Manager of Alderan Resources Limited. {insert name} has sufficient experience that is relevant to the style of mineralisation and type of deposits under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 edition of the JORC Code (JORC Code). John Schloderer consents to the inclusion of this information in the form and context in which it appears.

Mr John Schloderer confirms that that the information provided in this announcement provided under ASX Listing Rules Chapter 5.12.2 to 5.12.7 is an accurate representation of the available data and studies for the proposed exploration programmes that relate to this "material mining project".

Forward Looking Statement

Statements contained in this release, particularly those regarding possible or assumed future performance, costs, dividends, production levels or rates, prices, resources, reserves or potential growth of Alderan Resources Limited, are, or may be, forward looking statements. Such statements relate to future events and expectations and, as such, involve known and unknown risks and uncertainties. Actual results and developments may differ materially from those expressed or implied by these forward-looking statements depending on a variety of factors.

JORC Code, 2012 Edition – Table 1 report

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• This release refers to multi-element assay results of holes FR18-006, FR18-007. • Underground rock samples were taken as 2m composite continuous channel samples along adit walls representative of the exposed rock
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• Drilling is by diamond core of HQ (61mm) diameter. FR18-006 and FR18-007 used standard tube and the Reflex ACT II orientation device. • The ACT II device requires competent core at the core lifter in order to result in a useable orientation line. Sections of core which are broken results in limited or no oriented core in these intervals.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.*	• Core is measured by a qualified geologist using downhole marking blocks placed by the driller. Zones of cave or fill are assessed by competence, texture and geologic relationship to surrounding rock, as well as reported cave from drill crew.

Criteria	JORC Code explanation	Commentary
	• *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• Drilling through poor ground conditions has resulting in minor zones of poor drill recovery. • FR18-005 - Casing depth is 6m. Average core recovery is 93-96%. • FR18-006 – Casing depth is 6m. Average core recovery is 93-96%. • No relationship between core recovery and grade has yet been established as recovery is quite high.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• All core has been geologically logged to a level of detail to support future geological modelling and resource estimation. • All logging is qualitative with visual estimates of various characteristics conducted by a qualified geologist. • All core is photographed by DMT Corescan and photographs recorded in a proprietary database.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• Core is cut with an Almonte core saw and half core is sent in for multi-element analysis. • Sample prep includes crushing the entire sample to 70% pasing -2mm, Boyd rotary split off 250g and pulverize split to better than 85% passing 75 microns. • Sample prep for underground rock chips is using the same method as described above for core
Quality of assay data and laboratory	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc,*	• Analysis is done by ALS Geochemistry North American laboratories • Au analysis is by fire assay and AAS using 30g nominal sample weight.

Criteria	JORC Code explanation	Commentary
tests	*the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	• Multi element analysis is by four acid digestion and ICP-AES • Standards, blanks or field duplicates are inserted exery 8 to 9 samples. • Acceptable levels of accuracy are 2 standard deviations. • Underground rock samples have been assayed by four acid digestion for 34 elements using an ICP-AES finish. Au analysis is by fire assay and AAS using 30g nominal sample weight.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Significant intersections are done by a competent person and checked by the staff exploration manager. • Data is managed by a dedicated data base manager using Data Shed software with electronic storage and periodic backup.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• Collar locations are set with handheld GPS with a positional accuracy of +/3m. Upon completion of drilling, collar locations will be surveyed with DGPS to a positional accuracy of +/-0.1m, to be conducted by a licensed surveyor. • Progress downhole surveys are conducted by Major Drilling personnel at 30m intervals using a Reflex EZshot single shot magnetic survey tool. • Grid coordinate system is WGS84 Zone 12, UTM (m) units. • Upon completion of drilling, topographic control will be provided by DGPS to a positional accuracy of +/-0.1m, to be conducted by a licensed surveyor. • Underground samples are located underground following surveying of the mine adits and workings
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and*	• At this early exploration stage, the data spacing is variable as the focus is on identifying new zones of mineralisation. • Reconnaissance drilling only, no resource estimation being

Criteria	JORC Code explanation	Commentary
	classifications applied. • *Whether sample compositing has been applied.*	undertaken at this time. • No sample compositing is applied. Drill core is sampled at 2 meter intervals.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• FR18-006 Orientation of 245/-56 intersects potential stratigraphy controlled skarn at as near a true angle as possible. • FR18-007 Orientation of 181/-60 intersects the potentially statigraphy controlled skarn at as near a true angle as possible. • Insufficient data exists to properly asses degree of structural control or True Width.
Sample security	• *The measures taken to ensure sample security.*	• Samples are maintained in a secured warehouse and the chain of custody is ALS Laboratories supervision from site location pick up to the laboratory in secured ALS transport
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• No external audits have been undertaken. These would be part of future resource estimation work.

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• The Frisco Prospect comprises 275 patented and 252 unpatented claims, which are governed by the Horn, Cactus and Northern Carbonate lease agreements entered into with the private landowner, Horn Silver Mines Inc. • The Horn and Cactus lease agreements grant Alderan all rights to access the property and to explore for and mine minerals, subject to a retained royalty of 3% to the landholder. Alderan holds options to reduce the royalty to 1% and to purchase the 231 patented claims. • The Northern Carbonate Lease grants Alderan with all rights to access the property and to explore for and mine minerals, subject to a retained royalty of 3% to the landholder. Alderan holds options to reduce the royalty to 1% and to purchase the 231 patented claims. • Alderan was in full compliance with both lease agreements and all claims were in good standing at the time of reporting.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• A large amount of historical exploration has been carried out by numerous different parties dating back to the 1800's. • Historical mining records including level plans and production records exist for the period between 1905 and 1915 when the vast majority of production occurred • Historical drilling has been carried out by multiple parties including Anaconda Company, Rosario Exploration Company, Amax Exploration and Western Utah Copper Corporation/Palladon Ventures • Data has been acquired, digitized where indicated, and interpreted by Alderan.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• Porphyry style mineralised district with several expressions of mineralisation at surface, such as breccia pipes, skarns, structurally-hosted mineralisation, and manto style mineralised zones. • Part of the larger Laramide mineralising event. • Overprinted by Basin and Range tectonics.

Criteria	JORC Code explanation	Commentary
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* ○ *easting and northing of the drill hole collar* ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* ○ *dip and azimuth of the hole* ○ *down hole length and interception depth* ○ *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	• Details for hole FR18-007 ○ *Easting WGS84 Zn12 – 300445mE* ○ *Northing WGS84 Zn12 – 4259483nN* ○ *Elevation - 2343m asl* ○ *Collar dip -60º, Azimuth 181º* ○ Hole completed at 228.25m. • Details for hole FR18-006 ○ *Easting WGS84 Zn12 – 300368mE* ○ *Northing WGS84 Zn12 – 4259525nN* ○ *Elevation - 2343m asl* ○ *Collar dip -56º, Azimuth 245º* ○ Hole completed at 362.93m.
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• Significant intercepts use a weighting average technique using a quoted cut of grade or an indiction of no curtoof grade.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	• Reported mineralisation is quoted in downhole depths. True width may be less than downhole intercept width (apparent width), and insufficient work has been completed to enable accurate calculation of true widths.

Criteria	JORC Code explanation	Commentary
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• Widths of the down hole intervals are reported.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• Details of other exploration results are recorded in the Independent Geologist's Report, contained in the Prospectus and on the announcement dated 28 June 2017.
Further work	• *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Details of intended exploration activities are mentioned in the report above and in previous announcements made by the Company and also recorded in the Independent Geologist's Report, contained in the Prospectus.

Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in section 1, and where relevant in section 2, also apply to this section.)

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• No resource estimation has been undertaken
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	•
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	•
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	•
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of*	•

Criteria	JORC Code explanation	Commentary
	economic significance (eg sulphur for acid mine drainage characterisation). • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	•
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	•
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	•
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	•

Criteria	JORC Code explanation	Commentary
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	•
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	•
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	•
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	•
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence*	•

Criteria	JORC Code explanation	Commentary
	limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate. • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	

Section 4 Estimation and Reporting of Ore Reserves

(Criteria listed in section 1, and where relevant in sections 2 and 3, also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	• *Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.* • *Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.*	• No resource estimation has been undertaken
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	•
Study status	• *The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.* • *The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.*	•
Cut-off parameters	• *The basis of the cut-off grade(s) or quality parameters applied.*	•
Mining factors or assumptions	• *The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).* • *The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.* • *The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production drilling.* • *The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).* • *The mining dilution factors used.*	•

Criteria	JORC Code explanation	Commentary
	• *The mining recovery factors used.* • *Any minimum mining widths used.* • *The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.* • *The infrastructure requirements of the selected mining methods.*	
Metallurgical factors or assumptions	• *The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.* • *Whether the metallurgical process is well-tested technology or novel in nature.* • *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.* • *Any assumptions or allowances made for deleterious elements.* • *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.* • *For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?*	•
Environmen-tal	• *The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.*	•
Infrastructure	• *The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	•
Costs	• *The derivation of, or assumptions made, regarding projected capital costs in the study.* • *The methodology used to estimate operating costs.*	•

Criteria	JORC Code explanation	Commentary
	• *Allowances made for the content of deleterious elements.* • *The source of exchange rates used in the study.* • *Derivation of transportation charges.* • *The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.* • *The allowances made for royalties payable, both Government and private.*	
Revenue factors	• *The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.* • *The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.*	•
Market assessment	• *The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.* • *A customer and competitor analysis along with the identification of likely market windows for the product.* • *Price and volume forecasts and the basis for these forecasts.* • *For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.*	•
Economic	• *The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.* • *NPV ranges and sensitivity to variations in the significant assumptions and inputs.*	•
Social	• *The status of agreements with key stakeholders and matters leading to social licence to operate.*	•
Other	• *To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:*	•

Criteria	JORC Code explanation	Commentary
	• *Any identified material naturally occurring risks.* • *The status of material legal agreements and marketing arrangements.* • *The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.*	
Classification	• *The basis for the classification of the Ore Reserves into varying confidence categories.* • *Whether the result appropriately reflects the Competent Person's view of the deposit.* • *The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).*	•
Audits or reviews	• *The results of any audits or reviews of Ore Reserve estimates.*	•
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.*	•

Criteria	JORC Code explanation	Commentary
	• *It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	