ASX ANNOUNCEMENT

21ST SEPTEMBER 2021

AVL PREPARES FOR VANADIUM PROJECT GROWTH OPPORTUNITY

Potential for increased vanadium resources and higher FeTi coproduct grades in southern blocks at the Australian Vanadium Project

KEY POINTS

- **Beneficiation testwork indicates higher vanadium and iron concentrate grades.**
- **Iron grades in fresh magnetic concentrate up to 61.0% Fe, demonstrating potential to improve value of AVL's FeTi coproduct after vanadium extraction is completed.**
- **Grades of up to 1.51% V_2O_5 in concentrate confirm near surface opportunities for higher vanadium concentrate grades and recoveries.**
- **New detailed ground geophysics in southern Block 90 confirms 1.5km extension of vanadium magnetite trend, with limited previous drilling.**
- **Infill drilling planned post-BFS to improve resource categories and extend the resource envelope.**
- **AVL's technical team has developed a unique understanding of vanadium (V_2O_5) and iron (Fe) recoveries to concentrate, enabling optimised outcomes in the mining and processing at the Project.**

Australian Vanadium Limited (ASX: AVL, "the Company" or "AVL") is pleased to advise that additional studies and testwork from its southern resource blocks have delivered positive outcomes and further progressed metallurgical characterisation. The results are significant in understanding the effect of material variability and potential value of the southern blocks' feed to the proposed beneficiation plant at the Australian Vanadium Project ("the Project"). Work outcomes show opportunity for increased grades and recoveries of Fe and V_2O_5 in the concentrate. The location of the Project, with Mineral Resource and entire deposit block numbering is shown in Figure 1.

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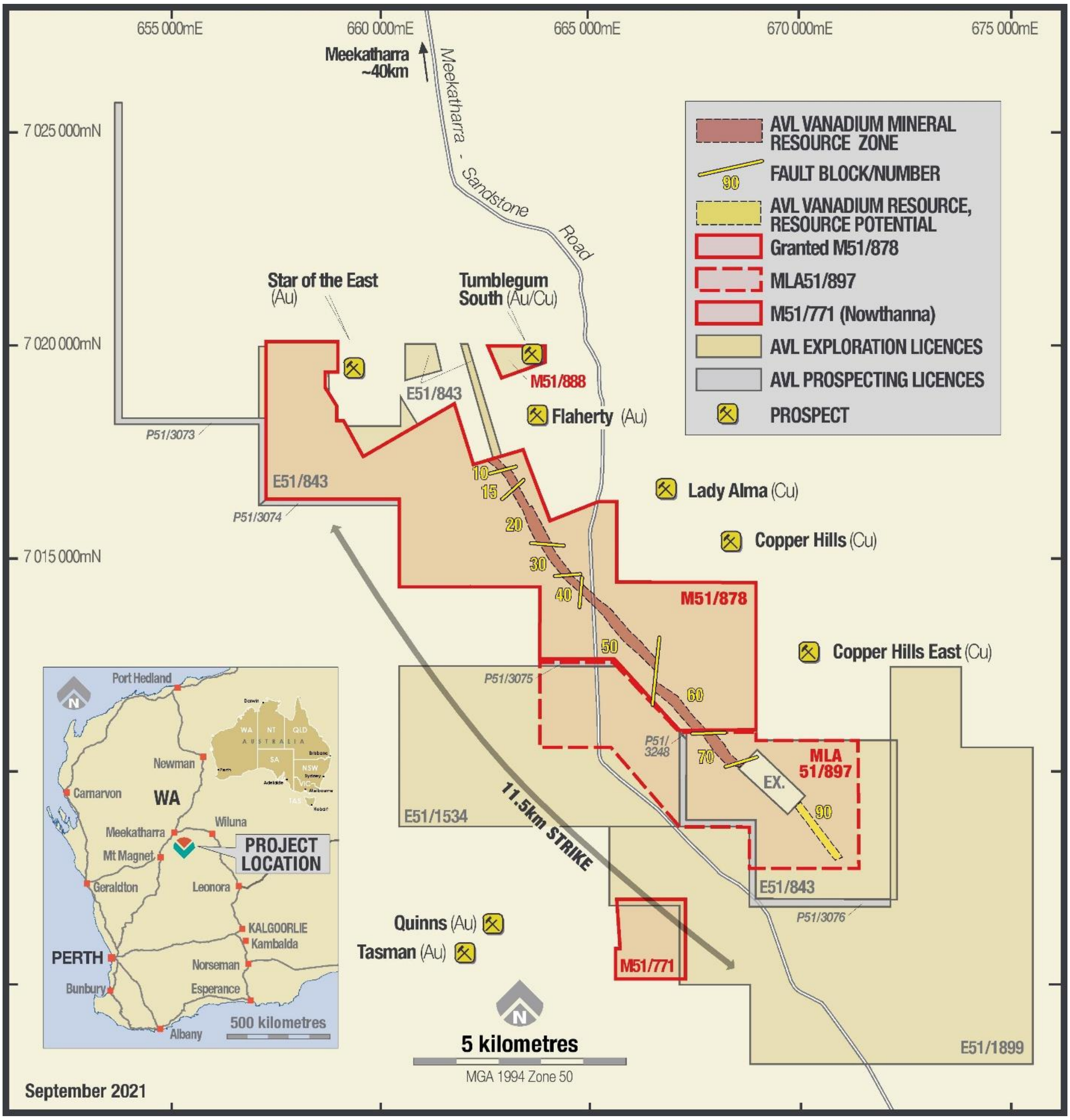

Figure 1 - Location Map, Fault Blocks and Tenure

Managing Director, Vincent Algar comments, *"Work that AVL's technical team has undertaken across the Project has provided the Company with a unique understanding of the mining recoveries we can achieve. As a critical and battery mineral, this deposit continues to demonstrate its importance to Australia, as supply chains around the world look to secure ethically and economically processed material. The southern blocks offer an opportunity to increase the planned 25 year life of the Project and contribute additional tonnes and grades of both vanadium and FeTi coproduct for the Company."*

The recent studies and testwork include:

- Preliminary mine designs for Block 70 – Mineral Resource category upgrade drill targeting, infrastructure location, mine planning
- Mineral Resource upside review – Block 90 ground magnetic survey, resource drill planning
- Variability testwork – supports further work on expanding Mineral Resource definition in southern blocks and optimisation studies due to positive results in upgrading Fe and V_2O_5

AVL's primary focus is on developing high value vanadium processing and recovery, maximising coproduct opportunities in Fe and maximising economics through detailed understanding of the mineralisation. Additional work will be conducted post the Bankable Feasibility Study (BFS) in this area.

Mineral Resource Block 70

The mine schedule presented in the Pre-Feasibility Study (PFS) Update[1] commences mining in Block 50 and 60, and largely advances northwards over the 25-year life of the Project. Block 70 mineralisation is currently excluded from the mine schedule for the BFS as it is located just south of the granted Mining Licence ML 51/878. Block 70 has an Inferred Mineral Resource of 14.2Mt at 0.99% V_2O_5 which AVL will upgrade to Indicated Mineral Resources with infill drilling, post BFS. As part of a resubmitted southern extensions mining lease application (MLA 51/897), further design and optimisation work was completed to understand the potential value of Block 70 in the mine schedule. The optimisation work also defines target depths of drilling for the proposed infill program.

Ground Magnetics Survey and Exploration Target

To further appraise prospectivity of Block 90, a ground magnetics survey was undertaken. Magnetic surveys, when processed to a simplified inversion model, correspond to estimations of the magnetic susceptibility measured in the drill samples. The information will be used to prioritise drilling in areas with higher magnetic susceptibility in Block 90, with probable better recovery through the proposed magnetic beneficiation circuit. The spacing of the ground magnetics survey was 25m between lines, effectively doubling the resolution from the previous 50m aeromagnetics lines flown during 2006.

The 2006 aeromagnetics survey for Total Magnetic Intensity and the resultant voxel created from the magnetic inversion, clearly shows the magnetite is still present in Block 90. This is further supported by the detailed ground magnetics data over the southern-most 2.5 km of deposit strike in the MLA area.

[1] See ASX announcement dated 22nd December 2020 *'Technical and Financial PFS Update'*

The strike length in Block 90 with strongest magnetic signature is 530m in length, which could represent 5.0 to 5.3 million tonnes down to 100 metres depth, doubling that tonnage if extrapolated to 200m below surface based on the tonnage defined in Block 70 (the closest block in AVL ground). Using the average grade of Block 70 in the HG10 domain, plus or minus 5%, this gives a grade range of about 0.95 – 1.05% V_2O_5 (rounding to the nearest 0.05). With both tonnage and grade assumptions, an Exploration Target of 5 – 10 million tonnes of HG10 at 0.95 – 1.05% V_2O_5 at Block 90 is calculated.

The potential quantity and grade of the Exploration Target is conceptual in nature and there has been insufficient exploration to estimate a Mineral Resource. It is uncertain if further exploration will result in the estimation of a Mineral Resource.

Table 1 - Exploration Target for Block 90

Block	Tonnes Range	V_2O_5 %	Calculation Method
90	5 – 10 million	0.95 – 1.05%	Tonnes per strike linear metre equivalent to HG10 domain in Block 70 ranging between 100 and 200 m from surface with average block model grade of HG10 domain in Block 70, plus and minus 5% (rounded to nearest 0.05% V_2O_5).

Figure 2 shows the Block 70 pit design outline and associated waste rock dump landforms from the recent optimisation study. Also shown is the ground magnetics survey, the 530m Exploration Target strike, and a further 1km of prospective magnetic trend that continues south of the Exploration Target. Figure 3 is the southern-most cross section from Block 70, showing the HG10 domain thickness and V_2O_5 grade. Existing drilling at Block 90, completed in 2008, intersected detrital deposits which are common on the margins of the magnetite, though was poorly targeted for the main HG10 zone. Figure 4 is a photo of drill core from GDH908 (on section shown in Figure 3), drilled during 2009 in Block 70, with V_2O_5 and Fe grades.

Drill testing of Block 90 will initially be completed at 140 metre spaced drill lines with 30 metre centres on each line, using reverse circulation drilling and up to 10% diamond core holes. Competent zones of magnetics will be carefully targeted using the new ground magnetics dataset. This work program is anticipated to commence during 2022.

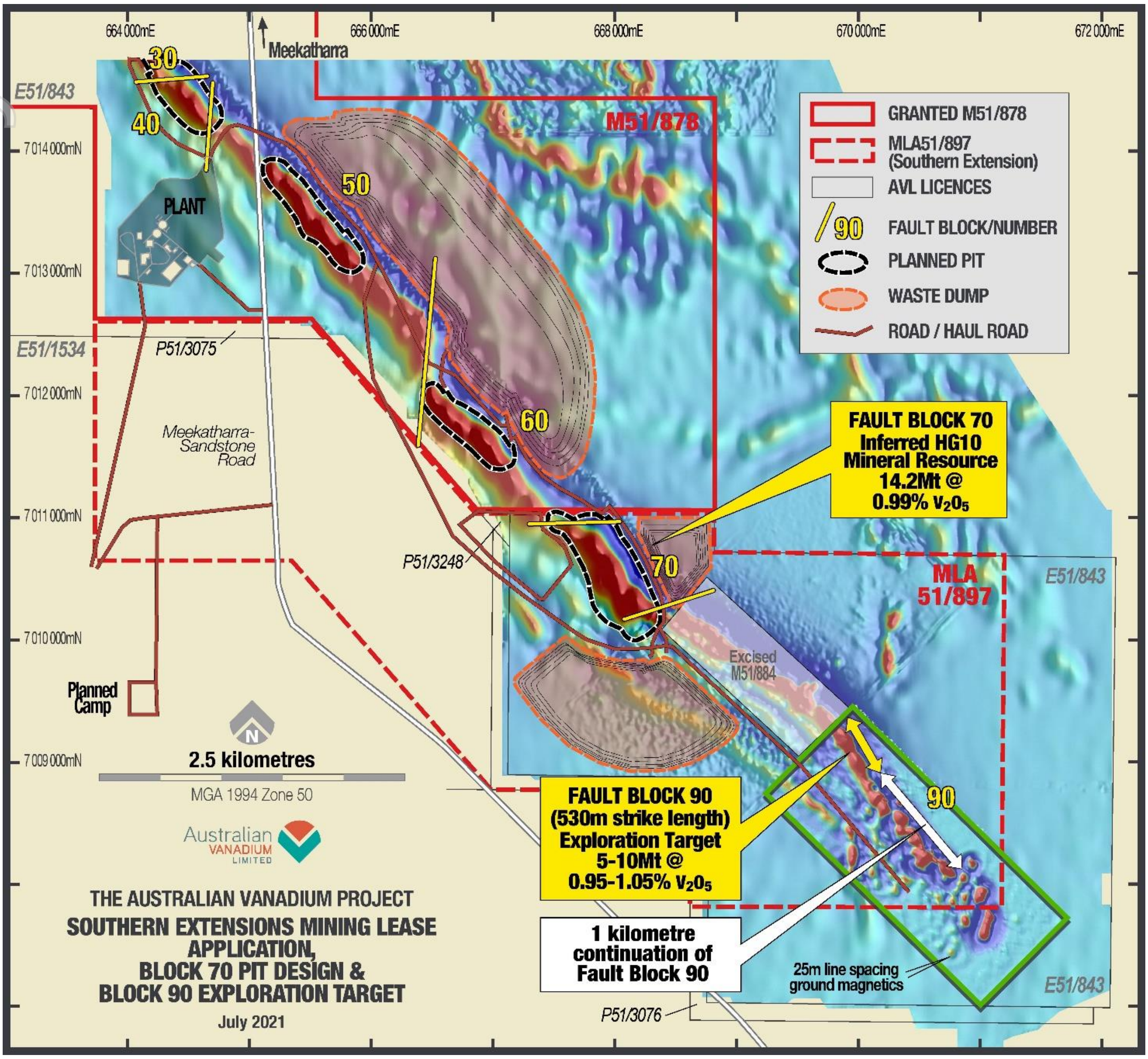

Figure 2 - Proposed Site layout for Block 70 ML 51/897 and Block 90 Exploration Target and Potential Extension[2]

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[2] *The potential quantity and grade of the Exploration Target is conceptual in nature and there has been insufficient exploration to estimate a Mineral Resource. It is uncertain if further exploration will result in the estimation of a Mineral Resource.*

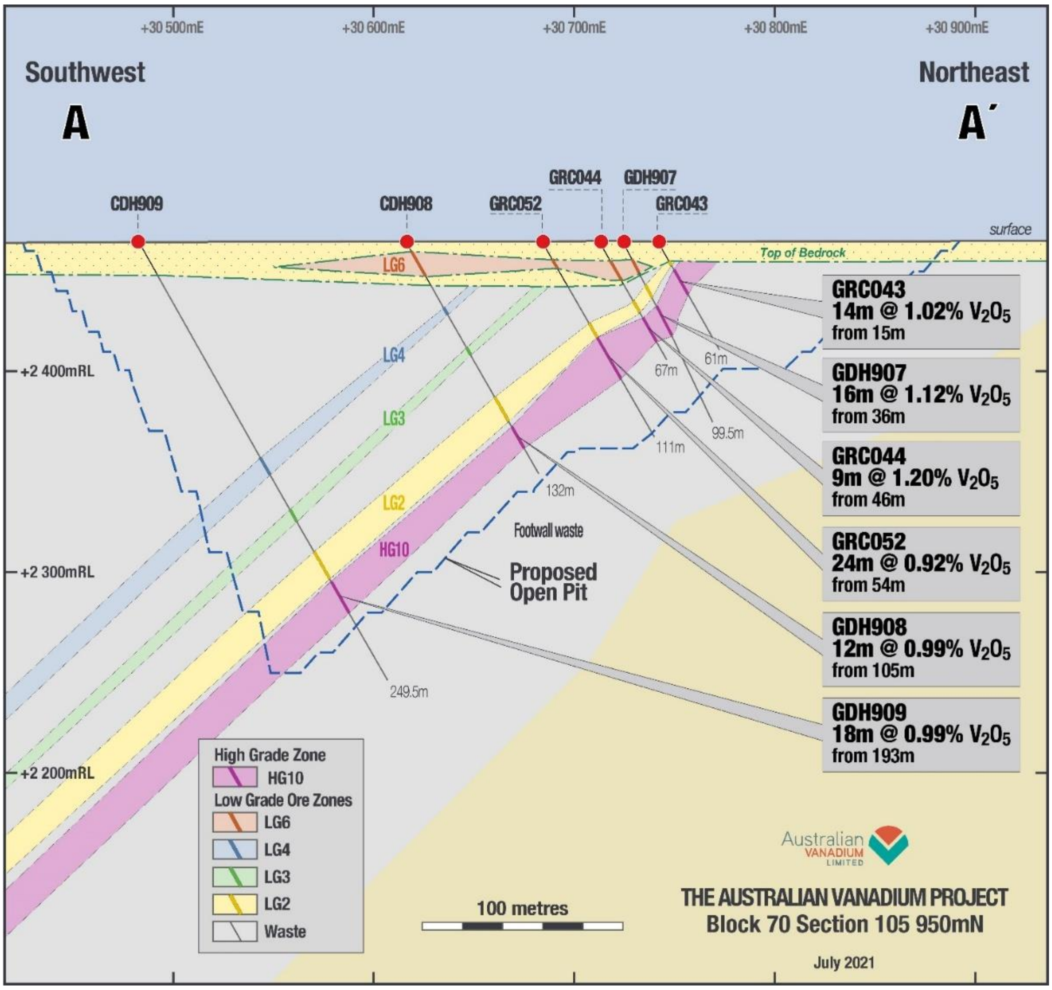

Figure 3 - Block 70 Southern-most Cross Section 105,950 m North with HG10 grades and thickness

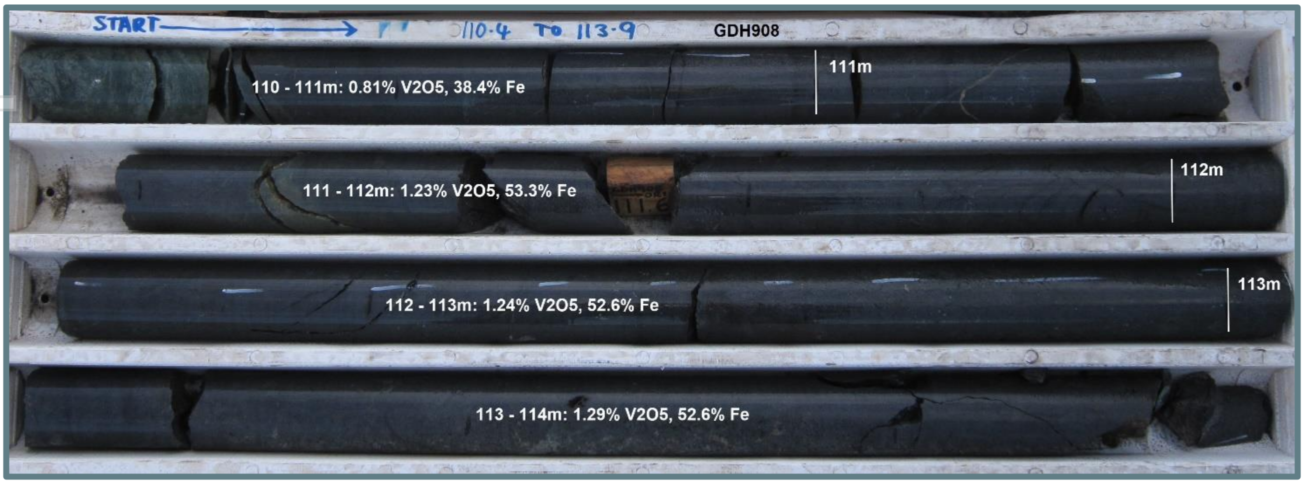

Figure 4 - HG10 domain drill core from GDH908 with Fe% and V_2O_5% grades

Variability Testwork Upside

Further analysis has been completed on the recovery variability in the southern blocks. A primary purpose of the variability program was to refine a proxy for predicting vanadium recovery and concentrate quality as defined in the updated PFS[1]. Previous pilot scale testwork focused on the northern ore blocks (20 and 30, see Figure 1), while these new results are sourced from the southern ore blocks (50, 60, and 70). The positive results support outcomes of the previous work, adding new supporting data and associated confidence that the designed processes will perform under all forecast process feed types. The variability test program results are being used to support resource block model process predictions including mass yield, vanadium recovery and concentrate quality, essential for effective mine planning.

Thirteen samples were collected from blocks 50 and 60, which are now part of the Ore Reserve (see Appendix 1) located on granted Mining Licence M51/878. Three additional samples were selected from Block 70 in Mining Lease Application (MLA) 51/896, of which two samples were considered unweathered. This latter area does not currently form part of the BFS, but is relevant as it further supports higher iron grades observed in the concentrates produced for the southern blocks. The location of the blocks where samples were selected for testwork are shown in **Figure 1**.

Average iron grade in magnetic concentrates increases in the southern resource blocks

Samples taken from reverse circulation (RC) drill cuttings and diamond core within the southern blocks 50, 60 and 70 were selected to evaluate the range of magnetic responses expected due to the weathering of magnetite to hematite. The dataset generated from these thirteen samples was added to the composite data completed in the PFS in 2018, and further metallurgy studies during 2019 which focussed on the northern blocks 15, 20 and 30.

Figure 5 illustrates the trend of iron grade in Davis Tube Recovery (DTR) concentrate by sample northing location. The grade in the fresh concentrates from the southern blocks 60 and 70 average over 60% iron. By comparison, for the northern blocks 15, 20 and 30, the concentrate iron grade is consistently under 60%, averaging 55%. The testwork indicates a gradual change in the fresh ore character (mineralogy and/or grain size) along strike. The ratio of iron to titanium in the concentrates decreases from south to north, while the ratio changes only slightly in the unconcentrated ore (Figure 6). This indicates that separation of titanium from iron is easier to achieve to the south, resulting in a higher overall iron content in the concentrates. The separation was conducted with a standard DTR procedure at 1500 gauss (G). This relatively low magnetic field strength can only be used effectively in unweathered mineralisation and allows the separation of magnetite from weakly magnetic minerals such as hematite or ilmenite.

This gradual change of character is a common feature of layered Intrusions, and can often present opportunities, such as in this case. Understanding variability from all possible ore locations and depths is critical to developing the best overall process flow sheet and project economics. This is central to AVL's testing philosophy.

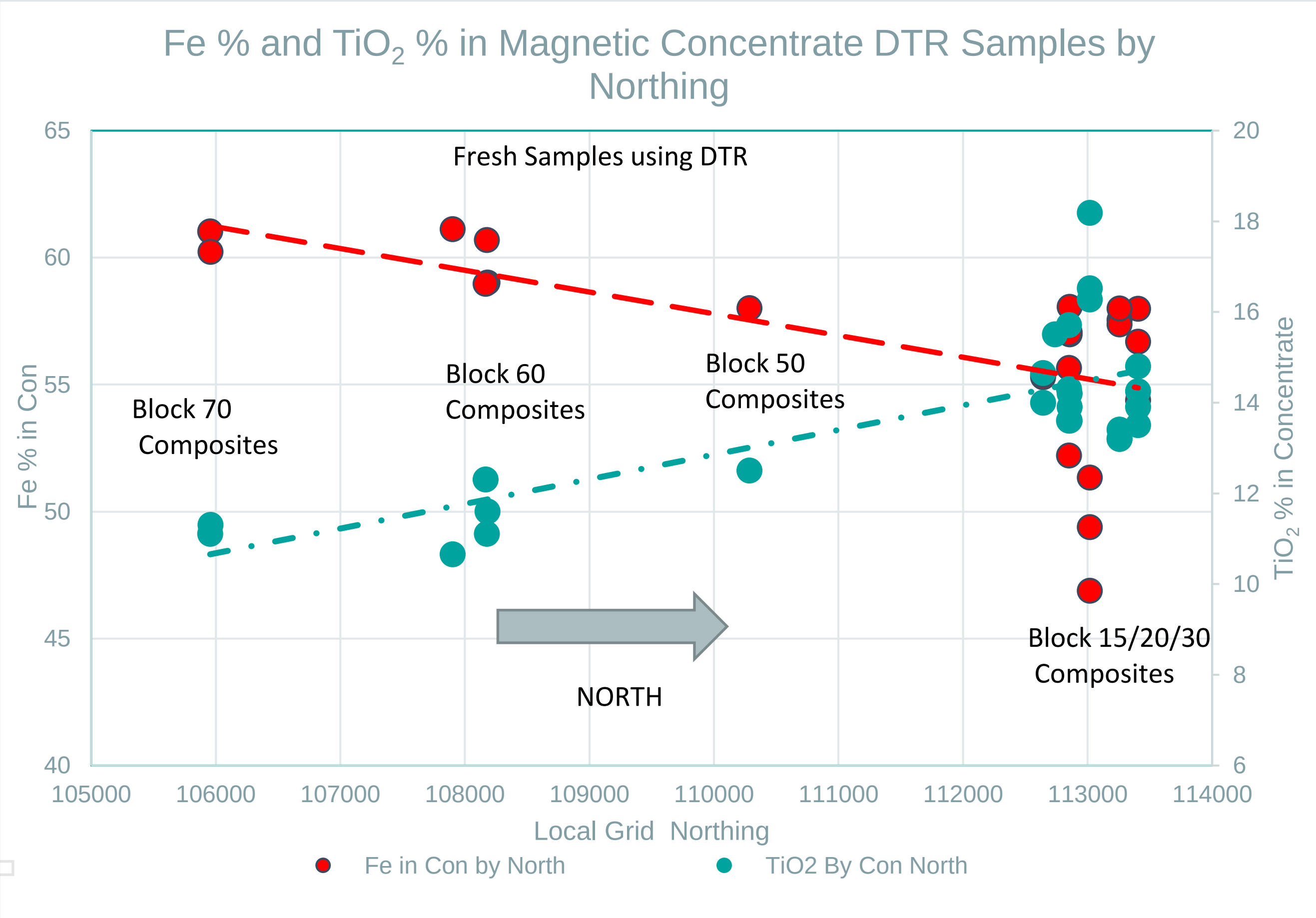

Figure 5 - Fe% and TiO_2 in Concentrate by Northing

For more weathered samples, a higher magnetic field is required to recover the weakly magnetic hematite (after magnetite). The use of a Wet High Intensity Magnetic Separator (WHIMS) with magnetic field at 8000 G results in other weakly magnetic minerals reporting to the concentrate, such as the titanium-bearing minerals. This tends to conceal the effect seen in the fresher samples and so overall there is no significant decrease in the iron to titanium ratio to the north as shown by the weathered 8000 Gauss trend line in Figure 6.

Further tests are planned to conclusively prove the spatial relationship, however testing by Technology Metals Australia on M51/884 (immediately south of Block 70) also supports the increasing iron grade trend and the relative decrease in titanium in the concentrate. Work will continue until mining commences to confirm and quantify the iron-titanium separation efficiency in AVL's southern blocks and any associated improvements in quality and value of AVL's FeTi coproduct.

AVL has designed and optimised its processing circuit through rigorous testing, to include blends of weathered and unweathered vanadium bearing material, attempting to maximise recovery of vanadium at the lowest possible cost from the whole orebody.

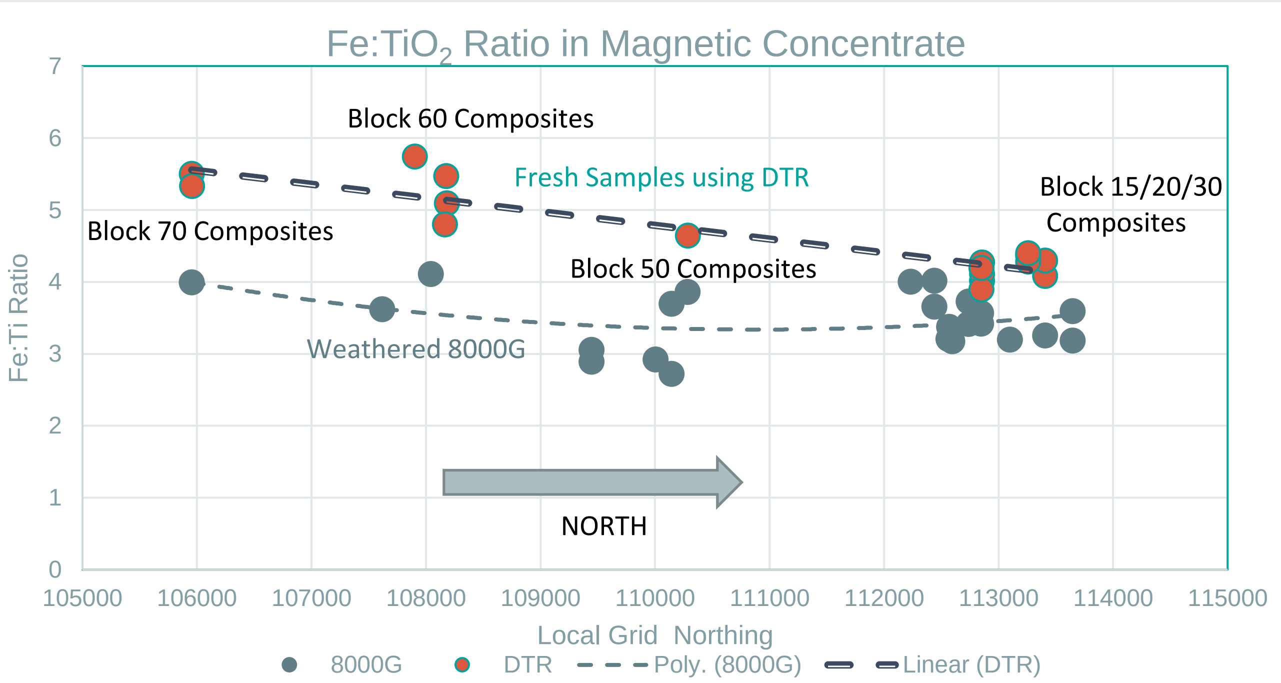

Figure 6 - Fe:Ti Ratio by Northing for Fresh (DTR 1500 G) and Weathered (WHIMS 8000 G) Testwork

Variability Results

Variability results for samples taken within MLA 51/897 show high mass recovery and iron, vanadium grade in concentrate.

The variability samples for Block 70 were collected from three diamond holes compositing five metres of diamond core each. Magnetic separation tests were completed to investigate variation in response between the higher more oxidised material types and the deeper unweathered zone.

The testing regime consisted of WHIMS at 8000 Gauss for the oxide sample and DTR at 1500 Gauss for the fresher samples. The results are shown in **Table 2**.

Table 2 - Variability Magnetic Separation Testwork Results

Sample	DTR Gauss	Ox State	Criteria	Mass (%)	V_2O_5 (%)	Fe (%)	TiO_2 (%)	SiO_2 (%)
GDH907 42 m – 47 m	WHIMS 8000 G	Oxide	Head grade		1 .25	50.9	13.5	3.1
			Con grade		1 .32	53 .1	13.3	2.3
			Recovery	91.8	95.7	94.9	92.9	67.4
GDH908 111 m – 116 m	DTR 1500 G	Transition	Head grade		1.20	51.4	12.9	4.2
			Con grade		**1.51**	**61**	11.1	**0.3**
			Recovery	74.5	92.8	88.3	64.5	5.29
GDH909 202 m – 207 m	DTR 1500 G	Fresh	Head grade		1.27	54	13.8	1.6
			Con grade		**1.47**	**60.2**	11.3	**0.1**
			Recovery	83.8	96.2	93.3	68.4	7.4

Decreasing depth of weathering in early mining stages

An analysis of the drill core conducted as part of the variability test work program indicates a gradual decrease in the depth of weathering moving south along the deposit. A similar trend is also apparent from the magnetic inversion based on a 50m spaced aerial survey completed in 2006 and reinterpreted in 2019. The shallowing of the weathering profile is interpreted to be a function of the amount of faulting which appears to be more dominant in the northern extent of the mineralisation. AVL's process flowsheet achieved excellent V_2O_5 recoveries in the pilot testing of oxidised feed blends, however the process feed must be blend managed to ensure that the SiO_2 in concentrate is below the 2% kiln feed specification. The most weathered feed is typically close to surface, and hence has a low strip ratio and related low mining cost. Having a component of deeper, less oxidised material available earlier in the mining schedule improves the blending opportunity for highly weathered material. AVL has developed reliable relationships to define the degree of oxidation within mine blocks and is optimising the final BFS mining schedule accordingly.

Testing and analysis of the additional variability samples has improved the AVL team's understanding of the mineralisation and therefore mine optimisation and forecasting concentrate grade and recovery from process feeds that can be scheduled during the life of mine. Several potential benefits to the Project have been identified relating to an improved concentration performance and a shallowing of the weathering zone indicated for high grade concentrate mineralisation to the south within the AVL tenements. Higher concentrate vanadium and iron grades have the potential to lower the unit cost of production and improve the FeTi coproduct value.

Next Steps

Following completion of the BFS, AVL will undertake further drilling to increase the Mineral Resource category in parts of Blocks 50, 60 and 70 and expand the Mineral Resource into Block 90.

Mineralogical studies will be completed to understand mineral variation across the deposit, to characterise areas where titanium better separates during magnetic beneficiation, resulting in a residual enrichment of iron within the concentrate.

Upon completion of drilling and further characterisation work, improved quantification of the location and amount of material that will produce a high iron-vanadium concentrate will be incorporated into the mine studies and financial modelling for the Project.

For further information, please contact:

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This announcement has been provided in accordance with the Company's published continuous disclosure policy and has been approved by the Board.

ABOUT AUSTRALIAN VANADIUM LTD

AVL is a resource company focused on vanadium, seeking to offer investors a unique exposure to all aspects of the vanadium value chain – from resource through to steel and energy storage opportunities. AVL is advancing the development of its world-class Australian Vanadium Project at Gabanintha. The Australian Vanadium Project is currently one of the highest-grade vanadium projects being advanced globally, with 208.2Mt at 0.74% vanadium pentoxide (V_2O_5), containing a high-grade zone of 87.9Mt at 1.06% V_2O_5, reported in compliance with the JORC Code 2012 (see ASX announcement dated 4th March 2020 *'Total Vanadium Resource at the Australian Vanadium Project Rises to 208 Million Tonnes'* and ASX announcement dated 22nd December 2020 *'Technical and Financial PFS Update'*).

VSUN Energy is AVL's 100% owned subsidiary which is focused on developing the market for vanadium redox flow batteries for energy storage.

The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and, in the case of estimates of Mineral Resources or Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

APPENDIX 1

The Australian Vanadium Project – Mineral Resource estimate by domain and resource classification using a nominal 0.4% V_2O_5 wireframed cut-off for low-grade and nominal 0.7% V_2O_5 wireframed cut-off for high-grade (total numbers may not add up due to rounding).

2020 Feb	Category	Mt	V_2O_5 %	Fe %	TiO_2 %	SiO_2 %	Al_2O_3 %	LOI %
HG	Measured	10.1	1.14	43.9	13.0	9.2	7.5	3.7
	Indicated	25.1	1.10	45.4	12.5	8.5	6.5	2.9
	Inferred	52.7	1.04	44.6	11.9	9.4	6.9	3.3
	Subtotal	**87.9**	**1.06**	**44.7**	**12.2**	**9.2**	**6.8**	**3.2**
LG 2-5	Indicated	44.5	0.51	25.0	6.8	27.4	17.0	7.9
	Inferred	60.3	0.48	25.2	6.5	28.5	15.3	6.7
	Subtotal	**104.8**	**0.49**	**25.1**	**6.6**	**28.0**	**16.1**	**7.2**
Trans 6-8	Inferred	15.6	0.65	28.4	7.7	24.9	15.4	7.9
	Subtotal	**15.6**	**0.65**	**28.4**	**7.7**	**24.9**	**15.4**	**7.9**
Total	Measured	10.1	1.14	43.9	13.0	9.2	7.5	3.7
	Indicated	69.6	0.72	32.4	8.9	20.6	13.2	6.1
	Inferred	128.5	0.73	33.5	8.8	20.2	11.9	5.4
	Subtotal	**208.2**	**0.74**	**33.6**	**9.0**	**19.8**	**12.1**	**5.6**

The Australian Vanadium Project - Ore Reserve Statement as at December 2020, at a cut-off grade of 0.7% V_2O_5

Ore Reserve	Mt	V_2O_5%	Fe_2O3%	TiO_2%	SiO_2%	LOI%	V_2O_5 production kt
Proved	9.8	1.08	59.9	12.4	8.7	3.5	63.2
Probable	22.4	1.04	61.7	11.8	8.3	2.8	158.9
Total Ore	**32.1**	**1.05**	**61.2**	**12.0**	**8.4**	**3.0**	**222.1**

Ore Reserve	Mt
Waste	244.5
Total Material	276.7
Strip Ratio	7.6

COMPETENT PERSON STATEMENT — MINERAL RESOURCE ESTIMATION

The information in this announcement that relates to Mineral Resources is based on and fairly represents information compiled by Mr Lauritz Barnes, (consultant with Trepanier Pty Ltd) and Mr Brian Davis (consultant with Geologica Pty Ltd). Mr Barnes and Mr Davis are both members of the Australasian Institute of Mining and Metallurgy (AusIMM) and the Australian Institute of Geoscientists (AIG). Both have sufficient experience of relevance to the styles of mineralisation and types of deposits under consideration, and to the activities undertaken to qualify as Competent Persons as defined in the 2012 Edition of the Joint Ore Reserves Committee (JORC) Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Specifically, Mr Barnes is the Competent Person for the estimation and Mr Davis is the Competent Person for the database, geological model and site visits. Mr Barnes and Mr Davis consent to the inclusion in this announcement of the matters based on their information in the form and context in which they appear.

COMPETENT PERSON STATEMENT — EXPLORATION RESULTS AND TARGETS

The information in this announcement that relates to Exploration Results and Targets is based on information compiled by Mr Ashley Jones, Consultant with Kamili Geology Pty Ltd. Mr Jones is a member of the Australasian Institute of Mining and Metallurgy (AusIMM). Mr Jones is a consultant to Australian Vanadium (AVL). Mr Jones has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Ashley Jones consents to the inclusion in this announcement of the matters based on his information in the form and context in which it appears.

COMPETENT PERSON STATEMENT — METALLURGICAL RESULTS

The information in this announcement that relates to Metallurgical Results is based on information compiled by independent consulting metallurgist Brian McNab (CP. B.Sc Extractive Metallurgy). Mr McNab is a Member of AusIMM. He is employed by Wood Mining and Metals. Mr McNab has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which is undertaken, to qualify as a Competent Person as defined in the JORC 2012 Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr McNab consents to the inclusion in the announcement of the matters based on the information made available to him, in the form and context in which it appears.

COMPETENT PERSON STATEMENT — ORE RESERVES

The technical information in this announcement that relates to the Ore Reserve estimate for the Project is based on information compiled by Mr Ross Cheyne, an independent consultant to AVL. Mr Cheyne is a Fellow of the Australasian Institute of Mining and Metallurgy. He is an employee and Director of Orelogy Mine Consulting Pty Ltd. Mr Cheyne has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a competent person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Cheyne consents to the inclusion in the announcement of the matters related to the Ore Reserve estimate in the form and context in which it appears.

APPENDIX 1: JORC, 2012 Edition Table 1, Sections 1 to 4

Section 1 - Sampling Techniques and Data

Criteria	JORC Code Explanation	Commentary
Sampling Techniques	Nature and quality of sampling (e.g. 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.	The Australian Vanadium Project deposit was sampled using diamond core and reverse circulation (RC) percussion drilling from surface. During 2019 43 RC holes were drilled; 30 RC holes were drilled for 2,236m in the December 2019 drilling on blocks 16 and 8, and 13 RC holes for 1,224m drilled during October 2019. A further 30 PQ diamond drill holes were completed by March 2019, to collect metallurgy sample for a plant pilot study. 12 were drilled down-dip into the high-grade zone. These were complimented by an additional 18 PQ diamond drill tails on RC pre-collars, drilling vertically. The down dip holes were measured by hand-held XRF at 50 cm intervals to inform metallurgy characterisation but will not form part of any resource estimation update as there is no certified laboratory analysis completed on the drill core, with material being used for metallurgical testwork. 14 of the 18 diamond tails were cut and a ¼ of the PQ sized core was sent for analysis. At the time of the latest Mineral Resource estimation (March 2020), a total of 280 RC holes and 50 diamond holes (24 of which are diamond tails) were drilled into the AVL portion of the deposit. 20 of the 330 holes were either too far north or east of the main mineralisation trend. One section in the southern part of the deposit (holes GRC0156, GRC0074, GRC0037 and GRC0038) was blocked out and excluded from the resource due to what appeared to be an intrusion which affected the mineralised zones in this area. Of the remaining 310 drill holes, one had geological logging, but no assays and one was excluded due to poor sample return causing poor representation of the mineralised zones. Two diamond holes drilled during 2018 were not part of the resource estimate, as they were drilled into the western wall for geotechnical purposes. The total metres of drilling available for use in the interpretation and grade estimation was 26 660.89m of drilling with 23,650.32 metres being RC and 3,010.57 metres of DDH over 305 holes at the date of the most recent resource estimate. 18 down-dip metallurgical drillholes and 4 metallurgical diamond tails contribute magnetic susceptibility and geological logging to the Mineral Resource estimation, but not assay data, being drilled to provide metallurgical sample. The initial 17 RC drill holes were drilled by Intermin Resources NL (IRC) in 1998. These holes were not used in the 2015, 2017, 2018 and 2020 estimates due to very long unequal sample lengths and a different grade profile from subsequent drilling. 31 RC drill holes were drilled by Greater Pacific NL in 2000 and the remaining holes for the project were drilled by Australian Vanadium Ltd (Previously Yellow Rock Resources Ltd) between 2007 and 2019. This drilling includes 50 diamond holes (24 of which are diamond tails) and 170 RC holes, for a total of 27,655.75m drilled. All of the drilling sampled both high and low-grade material and were sampled for assaying of a typical iron ore suite, including vanadium and titanium plus base metals and sulphur. Loss on Ignition was also assayed.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	PQ core from 2019 diamond tails was ¼ cored and sent for assay. The remaining core went to make up the pilot plant metallurgical sample. The down dip 2019 PQ core has not been sampled, though handheld XRF datapoints were captured, as well as magnetic susceptibility data. Handheld XRF machines being used to take ½ metre measurements on the core have been calibrated using pulps from previous drilling by the Company, for which there are known head assays. 2018 HQ diamond core was half-core sampled at regular intervals (usually one metre) with smaller sample intervals at geological boundaries. 2015 diamond core was quarter-core sampled at regular intervals (usually one metre) and constrained to geological boundaries where appropriate. 2009 HQ diamond core was half-core sampled at regular intervals (one metre) or to geological boundaries. Most of the RC drilling was sampled at one metre

Criteria	JORC Code Explanation	Commentary
		intervals, apart from the very earliest programme in 1998. RC samples have been split from the rig for all programmes with a cone splitter to obtain 2.5 – 3.5 kg of sample from each metre. Field duplicates were collected for every 40th drill metre to check sample grade representation from the drill rig splitter. During the October 2019 RC programme, field duplicates were collected from the rig splitter for every 30th drill metre. During the December 2019 RC programme, field duplicates were collected from the rig splitter for every 20th drill metre.
	Aspects of the determination of mineralisation that are Material to the Public Report.	RC drilling samples were collected at one metre intervals and passed through a cone splitter to obtain a nominal 2.5-3kg sample at an approximate 10% split ratio. These split samples were collected in pre-numbered calico sample bags. The sample was dried, crushed and pulverised to produce a sub sample (~200g) for laboratory analysis using XRF and total LOI by thermo-gravimetric analysis. Diamond core was drilled predominantly at HQ size for the earlier drilling (2009) and entirely HQ for the 2018 programme with the 2015 and 2019 drilling at PQ3 size. Field duplicates, standards and blanks have been inserted into the sampling stream at a rate of nominally 1:20 for blanks, 1:20 for standards (including internal laboratory), 1:40 for field duplicates, 1:20 for laboratory checks and 1:74 for umpire assays. For this RC programme completed in December 2019, the field duplicates were incorporated at a rate of 1:20, while standards 1:50 and blanks also 1:50.
Drilling Techniques	Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g. 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.).	Diamond drill holes account for 16% of the drill metres used in the Resource Estimate and comprises HQ and PQ3 sized core. RC drilling (generally 135 mm to 140 mm face-sampling hammer) accounts for the remaining 84% of the drilled metres. Six of the diamond holes have RC pre-collars (GDH911, GDH913 & GDH916, 18GEDH001, 002 and 003), otherwise all holes are drilled from surface. No core orientation data has been recorded in the database. 17 RC holes were drilled during the 2018 programme and three HQ diamond tails were drilled on RC pre-collars for resource and geotechnical purposes. The core was not orientated but all diamond holes were logged by OTV and ATV televiewer. Six RC holes from the 2018 campaign are not used in the resource estimate due to results pending at the time of the latest update, and two diamond holes drilled during 2018 were not used as they are for geotechnical purposes and do not intersect the mineralised zones. During 2019 a further 12 PQ diamond holes have been drilled down-dip on the high-grade zone for metallurgical sample but have not been sampled for assay analysis as they have been sampled for a metallurgy pilot study programme. As such they do not form part of any resource estimation. An addition 18 PQ diamond tails on RC pre-collars have been drilled vertically, of which 14 contribute to the resource. two were used for the metallurgy pilot study programme, one was not sampled due to core loss and a further core hole cut but not submitted for assay. A further 43 RC holes using a 140 mm face hammer on a Schramm drill rig have been completed during October and December 2019.

Criteria	JORC Code Explanation	Commentary
Drill Sample Recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	Diamond core recovery is measured when the core is recovered from the drill string. The length of core in the tray is compared with the expected drilled length and is recorded in the database. For the 2019, 2018 and 2015 drilling, RC chip sample recovery was judged by how much of the sample was returned from the cone splitter. This was recorded as good, fair, poor or no sample. The older drilling programmes used a different splitter, but still compared and recorded how much sample was returned for the drilled intervals. All of the RC sample bags (non-split portion) from the 2018 programme were weighed as an additional check on recovery. An experienced AVL geologist was present during drilling and any issues noticed were immediately rectified. No significant sample recovery issues were encountered in the RC or PQ drilling in 2015. No significant sample recovery issues were encountered in the RC or PQ drilling in 2019 except where core loss occurred in three holes intersecting high grade ore. This involved holes 19MTDT012 between 142.9m and 143.3m; 19MTDT013 from 149m to 149.6m, 151m to 151.4m and 159.5m to 160m; as well as 19MTDT016 between 29.5m and 30.7m down hole. In each case the interval lost was included as zero grade for all elements for the estimation of the total mineralised intercept.
	Measures taken to maximize sample recovery and ensure representative nature of the samples.	Core depths are checked against the depth given on the core blocks and rod counts are routinely carried out by the drillers. Recovered core was measured and compared against driller's blocks. 2019 diamond core samples had a coarse split created at the laboratory that was also analysed to evaluate laboratory splitting of the sample. RC chip samples were actively monitored by the geologist whilst drilling. Field duplicates have been taken at a frequency between every 30th and every 50th metre in every RC drill campaign. All drill holes are collared with PVC pipe for the first metres, to ensure the hole stays open and clean from debris.
	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.	No relationship between sample recovery and grade has been demonstrated. Two shallow diamond drill holes drilled to twin RC holes have been completed to assess sample bias due to preferential loss/gain of fine/coarse material. AVL is satisfied that the RC holes have taken a sufficiently representative sample of the mineralisation and minimal loss of fines has occurred in the RC drilling resulting in minimal sample bias.
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.	All diamond core and RC chips from holes included in the latest resource estimate were geologically logged. Diamond core was geologically logged using predefined lithological, mineralogical and physical characteristics (such as colour, weathering, fabric, texture) logging codes and the logged intervals were based on lithological intervals. RQD and recoveries were also

Criteria	JORC Code Explanation	Commentary
		recorded. Minimal structural measurements were recorded (bedding to core angle measurements) but have not yet been saved to the database. The logging was completed on site by the responsible geologist. All of the drilling was logged onto paper and was transferred to a SQL Server drill hole database using DataShed™ database management software. The database is managed by Mitchell River Group (MRG). The data was checked for accuracy when transferred to ensure that correct information was recorded. Any discrepancies were referred back to field personnel for checking and editing. All core trays were photographed wet and dry. RC chips were logged generally on metre intervals, with the abundance/proportions of specific minerals, material types, lithologies, weathering and colour recorded. Physical hardness for RC holes is estimated by chip recovery and properties (friability, angularity) and in diamond holes by scratch testing. From 2015, drilling also had magnetic susceptibility recorded, with the first nine diamond holes (GDH901-GDH909) having readings taken on the core every 30 cm or so downhole. Holes GDH910 to GDH917 had readings every 50 cm and RC holes GRC0159 to GRC0221 had readings for each one metre green sample bag. 2018 RC drill holes also have magnetic susceptibility data for each one metre of drilling. Pulps from historic drill hole have been measured for magnetic susceptibility, with calibration on results applied from control sample measurement of pulps from drill programmes from 2015 onwards where measurements of the RC bags already exist. All resource (vs geotechnical) diamond core and RC samples have been logged to a level of detail to support Mineral Resource estimation to and classification to Measured Mineral Resource at best. Geotechnical logging and OTV/ATV data was collected on three diamond drill holes from the 2018 campaign, by consultant company Dempers and Seymour, adding to an existing dataset of geotechnical logging on 8 of the 2015 diamond drill holes and televiewer data for four of the same drill holes. In addition, during 2018 televiewer data was collected on a further 15 RC drill holes from various drill campaigns at the project. PQ diamond drill holes completed during 2019 were geologically and geotechnically logged in detail by the site geologists.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Logging was both qualitative and quantitative in nature, with general lithology information recorded as qualitative and most mineralisation records and geotechnical records being quantitative. Core photos were collected for all diamond drilling.
	The total length and percentage of the relevant intersections logged.	All recovered intervals were geologically logged.

Criteria	JORC Code Explanation	Commentary
Sub-Sampling Techniques and Sample Preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	The 2018 and 2009 HQ diamond core were cut in half and the half core samples were sent to the laboratories for assaying. Sample intervals were marked on the core by the responsible geologist considering lithological and structural features. No core was selected for duplicate analysis. The 2015 PQ diamond core was cut in half and then the right-hand side of the core (facing downhole) was halved again using a powered core saw. Quarter core samples were sent to the laboratories for assaying. Sample intervals were marked on the core by the responsible geologist considering lithological and structural features. No core was selected for duplicate analysis. 14 of the 18 total vertical diamond PQ diamond drill holes from 2019 have been quarter core sampled and assayed. Sample intervals were marked on the core by the responsible geologist considering lithological and structural features.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	RC drilling was sampled by use of an automatic cone splitter for the 2019, 2018 and 2015 drilling programmes; drilling was generally dry with a few damp samples and occasional wet samples. Older drilling programmes employed riffle splitters to produce the required sample splits for assaying. One in 40 to 50 RC samples was resampled as field duplicates for QAQC assaying, with this frequency increasing to one in 30 for the October 2019 RC drilling, and one in 20 for the December 2019 RC drilling.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	The sample preparation techniques employed for the diamond core samples follow standard industry best practice. All samples were crushed by jaw and Boyd crushers and split if required to produce a standardised ~3kg sample for pulverising. The 2015 programme RC chips were split to produce the same sized sample. All samples were pulverised to a nominal 90% passing 75 micron sizing and sub sampled for assaying and LOI determination tests. The remaining pulps are stored at an AVL facility. The sample preparation techniques are of industry standard and are appropriate for the sample types and proposed assaying methods.
	Quality control procedures adopted for all sub-sampling stages to maximize representivity of samples.	Field duplicates, standards and blanks have been inserted into the sampling stream at a rate of nominally 1:20 for blanks, 1:20 for standards (including internal laboratory), 1:40 for field duplicates, 1:20 for laboratory checks and 1:74 for umpire assays. Also, for the recent sampling at BV, 1 in 20 samples were tested to check for pulp grind size. For 2019 diamond core samples, duplicates were created from the coarse crush at a frequency of 1 in 20 samples at the laboratory and assayed.
	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.	140mm diameter RC hammer was used to collect one metre samples and either HQ or PQ3 sized core was taken from the diamond holes. Given that the mineralisation at the Australian Vanadium Project is either massive or disseminated magnetite/martite hosted vanadium, which shows good consistency in interpretation between sections and occurs as percentage values in the samples, Geologica Pty Ltd considers the sample sizes to be representative.

Criteria	JORC Code Explanation	Commentary
		Core is not split for duplicates, but RC samples are split at the collection stage to get representative (2.5-3kg) duplicate samples. The entire core sample and all the RC chips are crushed and /or mixed before splitting to smaller sub-samples for assaying.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	As all of the variables being tested occur as moderate to high percentage values and generally have very low variances (apart from Cr_2O_3), the chosen sample sizes are deemed appropriate.
	The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.	All samples for the Australian Vanadium Project were assayed for the full iron ore suite by XRF (24 elements) and for total LOI by thermo-gravimetric technique. The method used is designed to measure the total amount of each element in the sample. Some 2015 and 2018 RC samples in the oxide profile were also selected for SATMAGAN analysis that is a measure of the amount of total iron that is present as magnetite (or other magnetic iron spinel phases, such as maghemite or kenomagnetite). SATMAGAN analysis was conducted at Bureau Veritas (BV) Laboratory during 2018. Although the laboratories changed over time for different drilling programmes, the laboratory procedures all appear to be in line with industry standards and appropriate for iron ore deposits, and the commercial laboratories have been industry recognized and certified Samples are dried at 105˚C in gas fired ovens for 18-24 hours before RC samples being split 50:50. One portion is retained for future testing, while the other is then crushed and pulverised. Sub-samples are collected to produce a 66g sample that is used to produce a fused bead for XRF based analysing and reporting. Certified and non-certified Reference Material standards, field duplicates and umpire laboratory analysis are used for quality control. The standards inserted by AVL during the 2015 drill campaign were designed to test the V_2O_5 grades around 1.94%, 0.95% and 0.47%. The internal laboratory standards used have varied grade ranges but do cover these three grades as well. During 2018 and 2019, three Certified Reference Materials (CRMs) were used by AVL as field standards. These covered the V_2O_5 grade ranges around 0.327%, 0.790% and 1.233%. These CRMs are also certified for other relevant major element and oxide values, including Fe, TiO_2, Al_2O_3, SiO_2, Co, Ni and Cu (amongst others). Most of the laboratory standards used show an apparent underestimation of V_2O_5, with the results plotting below the expected value lines, however the results generally fall within ± 5-10% ranges of the expected values. The other elements show no obvious material bias. Standards used by AVL during 2015 generally showed good precision, falling within 3-5% of the mean value in any batch. The standards were not certified but compared with the internal laboratory standards (certified) they appear to show good accuracy as well. Field duplicate results from the 2015 drilling all fall within 10% of their original values. The BV laboratory XRF machine calibrations are checked once per shift using calibration beads made using exact weights and they performed repeat analyses of sample pulps at a rate of 1:20 (5% of all samples). The lab repeats compare very closely with the original analysis for all elements.

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		2019 PQ diamond core has been assayed, and studies on all results for QAQC sample performance is in progress. Geologica considers that the nature, quality and appropriateness of the assaying and laboratory procedures is at acceptable industry standards.
	For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.	The geophysical readings taken for the Australian Vanadium Project core and RC samples and recorded in the database were magnetic susceptibility. For the 2009 diamond and 2015 RC and diamond drill campaigns this was undertaken using an RT1 hand magnetic susceptibility meter (CorMaGeo/Fugro) with a sensitivity of 1 x 10^{-5} (dimensionless units). The first nine diamond holes (GDH901 – GDH909) were sampled at approximately 0.3m intervals, the last eight (GDH910 – GDH917) at 0.5m intervals and the RC chip bags for every green bagged sample (one metre). During 2018 and 2019 RC and diamond core has been measured using a KT-10 magnetic susceptibility metre, at 1 x 10^{-3} ssi unit. In addition to the handheld magnetic susceptibility described above the 2019 diamond drilling included downhole magnetic susceptibility. This was taken using a Century Geophysical 9622 Magnetic Susceptibility tool. The 9622 downhole tool sensitivity is 20 x 10^{-5} with a resolution of 10cm 2019 diamond core was analysed using an Olympus Vanta pXRF with a 20 second read time. The unit is calibrated using pulp samples with known head assays from previous drill campaigns by the Company. Standard deviations for each element analysed are being recorded and retained. Elements being analysed are: Mg, Al, Si, P, S, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Se, Rb, Sr, Y, Zr, Nb, Mo, Ag, Cd, Sn, Sb, W, Hg, Pb, Bi, Th, and U. Four completed diamond drill holes were down hole surveyed by acoustic televiewer (GDH911, 912, 914 and 915) as a prequel to geotechnical logging during the 2015 drill campaign. A further six holes from the 2018 campaign have been down hole surveyed using acoustic televiewer and optical televiewer (18GEDH001, 002 and 003 and partial surveys of 18GERC005, 008 and 011) for 627 metres of data. Televiewer data was also collected during 2018 on some of the holes drilled in 2015 and prior. The holes surveyed were GRC0019, 0024, 0168, 0169, 0173, 0178, 0180, 0183, 0200 and Na253, Na258 and Na376 for a further 286.75 m of data. All 12 of the 2019 down dip PQ holes have been televiewer surveyed.
	Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.	QAQC results from both the primary and secondary assay laboratories show no material issues with the main variables of interest for the recent assaying programmes.

Criteria	JORC Code Explanation	Commentary
Verification of Sampling and Assaying	The verification of significant intersections by either independent or alternative company personnel.	Diamond drill core photographs have been reviewed for the recorded sample intervals. Geologica Pty Ltd Consultant, Brian Davis, visited the Australian Vanadium Project site on multiple occasions and the BV core shed and assay laboratories in 2015 and 2018. Whilst on site, the drill hole collars and remaining RC chip samples were inspected. All of the core was inspected in the BV facilities in Perth and selected sections of drill holes were examined in detail in conjunction with the geological logging and assaying. Resource consultants from Trepanier have visited site during 2019 and the company core storage facility in Bayswater and reviewed the core trays for select diamond holes during 2018.
	The use of twinned holes.	Two diamond drill holes (GDH915 and GDH917) were drilled to twin the RC drill holes GRC0105 and GRC0162 respectively. The results show excellent reproducibility in both geology and assayed grade for each pair.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	All primary geological data has been collected using paper logs and transferred into Excel spreadsheets and ultimately a SQL Server Database. The data were checked on import. Assay results were returned from the laboratories as electronic data which were imported directly into the SQL Server database. Survey and collar location data were received as electronic data and imported directly to the SQL database. All of the primary data have been collated and imported into a Microsoft SQL Server relational database, keyed on borehole identifiers and assay sample numbers. The database is managed using DataShed™ database management software. The data was verified as it was entered and checked by the database administrator (MRG) and AVL personnel
	Discuss any adjustment to assay data.	No adjustments or calibrations were made to any assay data, apart from resetting below detection limit values to half positive detection values.
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.	For the 2019 and 2018 drilling, all collars were set out using a handheld GPS or DGPS. After drilling they were surveyed using a Trimble RTK GPS system. The base station accuracy on site was improved during the 2015 survey campaign and a global accuracy improvement was applied to all drill holes in the Company database. For the 2015 drilling, all of the collars were set out using a Trimble RTK GPS system. After completion of drilling all new collars were re-surveyed using the same tool. Historical drill holes were surveyed with RTK GPS and DGPS from 2008 to 2015, using the remaining visible collar location positions. Only five of the early drill holes, drilled prior to 2000 by Intermin, had no obvious collar position when surveyed and a best estimate of their position was used based on planned position data. Downhole surveys were completed for all diamond holes, using gyro surveying equipment, as well as the RC holes drilled in 2015 (from GRC0159). Some RC drill holes from the 2018 campaign do not have gyro survey as the hole closed before the survey could be done. These holes have single shot camera surveys, from which the dip readings were used with an interpreted azimuth (nominal hole setup azimuth). The holes with interpreted azimuth are all less than 120m depth. All other RC holes were given a nominal -60° dip measurement. These older RC holes were almost all 120m or less in depth.

Criteria	JORC Code Explanation	Commentary
	Specification of the grid system used.	The grid projection used for the Australian Vanadium Project is MGA_GDA94, Zone 50. A local grid has also been developed for the project and used for the latest Mineral Resource update (March 2020). The grid is a 40 degree rotation in the clockwise direction from MGA north.
	Quality and adequacy of topographic control.	High resolution Digital Elevation Data was captured by Arvista for the Company in June 2018 over the M51/878 tenement area using fixed wing aircraft, with survey captured at 12 cm GSD using an UltraCam camera system operated by Aerometrex. The data has been used to create a high-resolution Digital Elevation Model on a grid spacing of 5m x 5m, which is within 20 cm of all surveyed drill collar heights, once the database collar positions were corrected for the improved ground control survey, that was also used in this topography survey. The vertical accuracy that could be achieved with the 12 cm GSD is +/- 0.10 m and the horizontal accuracy is +/- 0.24m. 0.5m contour data has also been generated over the mining lease application. High quality orthophotography was also acquired during the survey at 12cm per pixel for the full lease area, and the imagery shows excellent alignment with the drill collar positions. Outside M51/878, high resolution Digital Elevation Data was supplied by Landgate. The northern two thirds of the elevation data is derived from ADS80 imagery flown September 2014. The data has a spacing of 5M and is the most accurate available. The southern third is film camera derived 2005 10M grid, resampled to match it with the 2014 DEM. Filtering was applied and height changes are generally within 0.5M. Some height errors in the 2005 data may be +/- 1.5M when measured against AHD but within the whole area of interest any relative errors will mostly be no more than +/- 1M. In 2015 a DGPS survey of hole collars and additional points was taken at conclusion of the drill programme. Trepanier compared the elevations the drill holes with the supplied DEM surface and found them to be within 1m accuracy. An improved ground control point has been established at the Australian Vanadium Project by professional surveyors. This accurate ground control point was used during the acquisition of high quality elevation data. As such, a correction to align previous surveys with the improved ground control was applied to all drill collars from pre-2018 in the Company drill database. Collars that were picked up during 2018 and subsequently are already calibrated against the new ground control.
Data Spacing and Distribution	Data spacing for reporting of Exploration Results.	2019 RC drilling in Fault Block 50 and 60 (previously 16 and 8 respectively) has drilled out portions of the fault block to 140 m spaced lines with 30 m drill centres on lines. Some sections are closer together where new drilling bracketed existing drill lines to maintain a minimum 140 m spacing between lines. 2019 diamond tail drilling has intersected the HG at about 60 m downdip from the last existing drill hole on select sections that are at 80 m spacing. The 2018 RC drilling in Fault Block 30 and 40 (previously 17 and 6 respectively) has infilled areas of 260 m spaced drill lines to about 130m spaced drill lines, with holes on 30 m centres on each line. The closer spaced drilled areas of the deposit now have approximately 80m to 100m spacing by northing and 25m to 30m spacing by easting. Occasionally these spacings are closer for some pairs of drill holes. Outside of the main area of relatively close spaced drilling (approximately 7015400mN to 7016600mN), the drill hole spacing increases to between 140m and 400m in the northing direction but maintains roughly the same easting separation as the closer spaced drilled area.

Criteria	JORC Code Explanation	Commentary
	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 classifications applied.	The degree of geological and grade continuity demonstrated by the data density is sufficient to support the definition of Mineral Resources and the associated classifications applied to the Mineral Resource estimate as defined under the 2012 JORC Code. Variography studies have shown very little variance in the data for most of the estimated variables and primary ranges in the order of several hundred metres.
	Whether sample compositing has been applied.	All assay results have been composited to one metre lengths before being used in the Mineral Resource estimate. This was by far the most common sample interval for the diamond drill hole and RC drill hole data.
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.	The grid rotation is approximately 45º to 50º magnetic to the west, with the holes dipping approximately 60º to the east. The drill fences are arranged along the average strike of the high-grade mineralised horizon, which strikes approximately 310º to 315º magnetic south of a line at 7015000mN and approximately 330º magnetic north of that line. The mineralisation is interpreted to be moderate to steeply dipping, approximately tabular, with stratiform bedding striking approximately north-south and dipping to the west. The drilling is nearly all conducted perpendicular to the strike of the main mineralisation trend and dipping 60° to the east, producing approximate true thickness sample intervals through the mineralisation. The exception is 18 RC pre-collar, diamond tail holes drilled vertically to intersect the deposit at depth, and 12 down-dip diamond holes drilled from surface down-dip in the high grade domain to gain metallurgical sample. These holes do not contribute assay data to the estimation.
	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.	The orientation of drilling with respect to mineralisation is not expected to introduce any sampling bias. Drill holes intersect the mineralisation at an angle of approximately 90 degrees. The 2019 PQ diamond holes are deliberately drilled down dip to maximise the amount of metallurgy sample collected for the pilot study, with all material used for metallurgy purposes (hence not being available for assay). They are not intended to add material to the resource estimation, or to define geological boundaries, though where further control on geological contacts is intercepted, this will be used to add more resolution to the geological model.
Sample Security	The measures taken to ensure sample security.	Samples were collected onsite under supervision of a responsible geologist. The samples were then stored in lidded core trays and closed with straps before being transported by road to the BV core shed in Perth (or other laboratories for the historical data). RC chip samples were transported in bulk bags to the assay laboratory and the remaining green bags are either still at site or stored in Perth. RC and core samples were transported using only registered public transport companies. Sample dispatch sheets were compared against received samples and any discrepancies reported and corrected.
Audits or Reviews	The results of any audits or reviews of sampling techniques and data.	A review of the sampling techniques and data was completed by Mining Assets Pty Ltd (MASS) and Schwann Consulting Pty Ltd (Schwann) in 2008 and by CSA in 2011. Neither found any material error. AMC also reviewed the data in the course of preparing a Mineral Resource estimate in 2015. The database has been audited and rebuilt by AVL and MRG in 2015. In 2017 geological data was revised after missing lithological data was sourced.

Criteria	JORC Code Explanation	Commentary
		Geologica Pty Ltd concludes that the data integrity and consistency of the drill hole database shows sufficient quality to support resource estimation.

Section 2 - Reporting of Exploration Results

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.	There is no current native title claim on the proposed mine site or processing plant following a decision by the Federal Court that the Yugunga-Nya native title claim (WC1999/46) was not accepted for registration. A Heritage survey was undertaken prior to commencing each drilling campaign which only located isolated artefacts but no archaeological sites *per se.* Mining Lease M51/878 covering most of E 51/843 and P51/2567, and all of P51/2566 and E51/1396 has been granted by DMIRS during 2020, covering 70% of the Vanadium Project. The remainder of the deposit resource area is covered by Mining Lease Application MLA51/897 that overlies a portion of E51/843, P51/3076 and E51/1534 that are held by AVL. AVL has no joint venture, environmental, national park or other ownership agreements on the lease area. A Mineral Rights Agreement has been signed with Bryah Resources Ltd for base metals and gold exploration on the AVL Gabanintha tenements. Bryah Resources Limited (ASX: BYH) holds the Mineral Rights for all minerals except V/U/Co/Cr/Ti/Li/Ta/Mn & iron ore

Criteria	JORC Code Explanation	Commentary
		which are retained 100% by AVL. AVL owns shares in BYH and holds a 0.75% Net Smelter Return royalty upon commencement of production by BYH.
	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.	At the time of reporting, there are no known impediments to obtaining a licence to operate in the area and the tenements are in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	The Australian Vanadium deposit was identified in the 1960s by Mangore P/L and investigated with shallow drilling, surface sampling and mapping. In 1998, Drilling by Intermin Resources confirmed the down dip extent and strike continuation under cover between outcrops of the vanadium bearing horizons. Additional RC and initial diamond drilling was conducted by Greater Pacific NL and then AVL up until 2019. Previous Mineral Resource estimates have been completed for the deposit in 2001 (Mineral Engineering Technical Services Pty Ltd (METS) and Bryan Smith Geosciences Pty Ltd. (BSG)), 2007 (Schwann), 2008 (MASS & Schwann), 2011 (CSA), 2015 (AMC), 2017 (Trepanier) and 2018 (Trepanier).
Geology	Deposit type, geological setting and style of mineralisation.	The Australian Vanadium Project at Gabanintha is located approximately 40kms south of Meekatharra in Western Australia and approximately 100kms along strike (north) of the Windimurra Vanadium Mine. The mineralisation is hosted in the same geological unit as Windimurra, which is part of the northern Murchison granite greenstone terrane in the north west Yilgarn Craton. The project lies within the Gabanintha and Porlell Archaean greenstone sequence oriented approximately NW-SE and is adjacent to the Meekatharra greenstone belt. Locally the mineralisation is massive or bands of disseminated vanadiferous titano-magnetite hosted within the gabbro. The mineralised package dips moderately to steeply to the west and is capped by Archaean acid volcanics and metasediments. The footwall is a talc carbonate altered ultramafic unit. The host sequence is disrupted by late stage dolerite and granite dykes and occasional east and northeast -southwest trending faults with apparent minor offsets. The mineralisation ranges in thickness from several metres to up to 20 to 30m in thickness. The oxidized and partially oxidised weathering surface extends 40 to 80m below surface and the magnetite in the oxide zone is usually altered to Martite.
Drill hole Information	A summary of all information material to the understanding of the exploration results including a tabulation of the	All drill results relevant to the mineral resource updates were disclosed at the time of the resource publication (see Announcement dated 4th March 2020).

Criteria	JORC Code Explanation	Commentary
	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.	
Data aggregation methods	In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.	Length weighed averages used for exploration results are reported in spatial context when exploration results are reported. Cutting of high grades was not applied in the reporting of intercepts.
	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.	There were negligible residual composite lengths, and where present these were excluded from the estimate.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalent values have been used.
Relationship between mineralisation widths and intercept lengths	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Drill holes intersect the mineralisation at an angle of approximately 90 degrees. Diamond PQ holes in the 2019 program were drilled vertically (-90 degrees). This decreases the angle of intersection with the mineralisation.
Diagrams	Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should	See Figures in the ASX release of 4th March 2020.

Criteria	JORC Code Explanation	Commentary
	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.	Comprehensive reporting of drilling details has been provided in the body of the announcement of 4th March 2020.
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.	All meaningful & material exploration data has been reported
Further work	The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).	Extensional resource infill drilling is under consideration for the remaining 5 km of mineralisation that is currently drilled at broad spacing.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	The decision as to the necessity for further exploration at the Australian Vanadium Project is pending completion of mining technical studies on this resource update. Figure 11 in this report shows total magnetics imagery over the strike extent of the project. The entire strongly magnetic trend is considered prospective for massive magnetite V-Ti mineralisation.

Section 3 - Estimation and Reporting of Mineral Resources

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	All the drilling was logged into Microsoft Excel, or logged onto paper and then transferred to a digital form and loaded into a Microsoft SQL Server relational drill hole database using DataShed™ management software. Logging information was reviewed by the responsible geologist and database administrator prior to final load into the database. All assay results were received as digital files, as well as the collar and survey data. These data were transferred directly from the received files into the database.

Criteria	JORC Code Explanation	Commentary
	initial collection and its use for Mineral Resource estimation purposes.	All other data collected for the Australian Vanadium Project were recorded as Excel spreadsheets prior to loading into SQL Server. The data have been periodically checked by AVL personnel, the database administrator as well as the personnel involved all previous Mineral Resource estimates for the project.
	Data validation procedures used.	The data validation was initially completed by the responsible geologist logging the core and marking up the drill hole for assaying. The paper geological logs were transferred to Excel spreadsheets and compared with the originals for error. Assay dispatch sheets were compared with the record of samples received by the assay laboratories. Normal data validation checks were completed on import to the SQL database. Data has also been checked back against hard copy results and previous mines department reports to verify assays and logging intervals. Both internal (AVL) and external (Schwann, MASS, CSA and AMC) validations were/are completed when data was loaded into spatial software for geological interpretation and resource estimation. All data have been checked for overlapping intervals, missing samples, FROM values greater than TO values, missing stratigraphy or rock type codes, downhole survey deviations of ±10° in azimuth and ±5° in dip, assay values greater than or less than expected values and several other possible error types. Furthermore, each assay record was examined and mineral resource intervals were picked by the Competent Person. QAQC data and reports have been checked by the database administrator, MRG. MASS & Schwann and CSA both reported on the available QAQC data for the Australian Vanadium Project.
Site Visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The drill location was inspected by John Tyrrell of AMC in 2015 for the initial 2012 JORC resource estimation. Consulting Geologist Brian Davis of Geologica Pty Ltd has visited all the Australian Vanadium Project drilling sites since 2015 and has been familiar with the Australian Vanadium Project iron-titanium-vanadium orebody since 2006. Consulting Geologist Lauritz Barnes of Trepanier Pty Ltd visited the Australian Vanadium Project drilling sites in March 2019. The geology, sampling, sample preparation and transport, data collection and storage procedures were all discussed and reviewed with the responsible geologist for the 2015, 2017, 2018 and 2019 drilling. Visits to the BV laboratory and core shed in Perth were used to add knowledge to aid in the preparation of this Mineral Resource Estimate.
	If no site visits have been undertaken indicate why this is the case.	N/A
Geological Interpretation	Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.	The Australian Vanadium Project's vanadium mineralisation lies along strike from the Windimurra Vanadium Mine and the oxidised portion of the high-grade massive magnetite/martite mineralisation outcrops for almost 14km in the company held lease area. Detailed mapping and mineralogical studies have been completed by company personnel and contracted specialists between 2000 and 2019, as well as multiple infill drilling programmes to test the mineralisation and continuity of the structures. These data and the relatively closely-spaced drilling has led to a good understanding of the mineralisation controls.

Criteria	JORC Code Explanation	Commentary
		The mineralisation is hosted within altered gabbro and is easy to visually identify by the magnetite/martite content. The main high grade unit shows consistent thickness and grade along strike and down dip and has a clearly defined sharp boundary. The lower grade disseminated bands also show good continuity, but their boundaries are occasionally less easy to identify visually as they are more diffuse over a metre or so.
	Nature of the data used and of any assumptions made.	No assumptions are made regarding the input data.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	Alternative interpretations were considered in the current estimation and close comparison with the 2015 and 2018 resource models was made to see the effect of the new density data and revised geology model. Continuity of the low grade units, more closely defined from lithology logs, is now better understood and the resulting interpretation is more effective as a potential mining model. The near-surface alluvial and transported material has again been modelled in this estimation. The impact of the current interpretation as compared to the previous interpretation is a greater confidence in areas of infill drilling.
	The use of geology in guiding and controlling Mineral Resource estimation.	Geological observation has underpinned the resource estimation and geological model. The high grade mineralisation domain has a clear and sharp boundary and has been tightly constrained by the interpreted wireframe shapes. The low grade mineralisation is also constrained within wireframes, which are defined and guided by visual (from core) and grade boundaries from assay results. The low grade mineralisation has been defined as four sub-domains, which strike sub-parallel to the high grade domain. In addition there is a sub parallel laterite zone and two transported zones above the top of bedrock surface. The resource estimate is constrained by these wireframes. Domains were also coded for oxide, transition and fresh, as well as above and below the alluvial and bedrock surfaces. The extents of the geological model were constrained by fault block boundaries. Geological boundaries were extrapolated to the edges of these fault blocks, as indicated by geological continuity in the logging and the magnetic geophysical data.
	The factors affecting continuity both of grade and geology.	Key factors that are likely to affect the continuity of grade are: • The thickness and presence of the high grade massive magnetite/martite unit, which to date has been very consistent in both structural continuity and grade continuity. • The thickness and presence of the low grade banded and disseminated mineralisation along strike and down dip. The low grade sub-domains are less consistent in their thickness along strike and down dip with more pinching and swelling than for the high grade domain. • SW-NE oriented faulting occurs at a deposit scale and offsets the main orientation of the mineralisation. These regional faults divide the deposit along strike into kilometre scale blocks. Internally the mineralised blocks show very few signs of structural disturbance at the level of drilling.

Criteria	JORC Code Explanation	Commentary
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.	The massive magnetite/martite unit strikes approximately 14 km, is stratiform and ranges in thickness from less than 10m to over 20m true thickness. The low grade mineralised units are sub-parallel to the high grade zone, and also vary in thickness from less than 10m to over 20m. All of the units dip moderately to steeply towards the west, with the exception of two predominantly alluvial units (domains 7 and 8) and a laterite unit (domain 6) which are flat lying. All units outcrop at surface, but the low grade units are difficult to locate as they are more weathered and have a less prominent surface expression than the high grade unit. The high and low grade units are currently interpreted to have a depth extent of at least approximately 250m below surface. Mineralisation is currently open along strike and at depth.
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.	Grade estimation was completed using Ordinary Kriging (OK) for the Mineral Resource estimate. Surpac™ software was used to estimate grades for V_2O_5, TiO_2, Fe_2O_3, SiO_2, Al_2O_3, Cr_2O_3, Co, Cu, Ni, S, magnetic susceptibility and loss on ignition (LOI) using parameters derived from statistical and variography studies. The majority of the variables estimated have coefficients of variation of significantly less than 1.0, with Cr_2O_3 being the exception. Drill hole spacing varies from approximately 80 m to 100 m along strike by 25 m to 30 m down dip, to 500 m along by 50 m to 60 m down dip. Drill hole sample data was flagged with numeric domain codes unique to each mineralisation domain. Sample data was composited to 1 m downhole length and composites were terminated by a change in domain or oxidation state coding. No grade top cuts were applied to any of the estimated variables as statistical studies showed that there were no extreme outliers present within any of the domain groupings. Grade was estimated into separate mineralisation domains including a high grade bedrock domain, four low grade bedrock domains and low grade alluvial and laterite domains. Each domain was further subdivided into a fault block, and each fault block was assigned its own orientation ellipse for grade interpolation. Downhole variography and directional variography were performed for all estimated variables for the high grade domain and the grouped low grade domains. Grade continuity varied from hundreds of metres in the along strike directions to sub-two hundred metres in the down-dip direction although the down-dip limitation is likely related to the extent of drilling to date.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Prior to 2017, there had been five Mineral Resource estimates for the Australian Vanadium Project deposit. The first, in 2001 was a polygonal sectional estimate completed by METS & BSG. The subsequent models by Schwann (2007), MASS & Schwann (2008) and CSA (2011) are kriged estimates. AMC (2015) reviewed the geological interpretation of the most recent previous model (CSA 2011), but used a new interpretation based on additional new drilling for the 2015 estimate. In 2017 a complete review of the geological data, weathering profiles, magnetic intensity and topographic data as well as incorporation of additional density data and more accurate modelling techniques resulted in a re-interpreted mineral resource. This was revised in July and December 2018. The most recent Mineral Resource (adding magnetic susceptibility and new drill data) was completed in March 2020. No mining has occurred to date at the Australian Vanadium Project, so there are no production records.

Criteria	JORC Code Explanation	Commentary
		Addition infill drilling and extensional diamond core holes have resulted in further adjustments to the interpretation.
	The assumptions made regarding recovery of by-products.	Test work conducted by the company in 2015 identified the presence of sulphide hosted cobalt, nickel and copper, specifically partitioned into the silicate phases of the massive titaniferous vanadiferous iron oxides which make up the vanadium mineralisation at the Australian Vanadium Project. Subsequent test work has shown the ability to recover a sulphide flotation concentrate containing between 3.8 % and 6.3% of combined base metals treating the non-magnetic tailings produced as a result of the magnetic separation of a vanadium iron concentrate from fresh massive magnetite. See ASX Announcements dated 22 May 2018 and 5 July 2018. Leached calcine of 54.5% Fe, 0.96% Si and 1.53% Al has been generated from the pilot scale testwork and is considered a co-product (iron concentrate) when generated from AVL's relocated processing plant site at Tenindewa. Further characterisation testwork and exploration of avenues to improve the calcine product quality are under review.
	Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterization).	Estimates were undertaken for Fe_2O_3, SiO_2, TiO_2, Al_2O_3, and LOI, which are non-commodity variables, but are useful for determining recoveries and metallurgical performance of the treated material. Estimated Fe2O3% grades were converted to Fe% grades in the final for reporting (Fe% = Fe_2O_3/1.4297). Estimates were also undertaken for Cr_2O_3 which is a potential deleterious element. The estimated Cr_2O_3% grades were converted to Cr ppm grades (Cr ppm = (Cr_2O_3*10000)/1.4615).
	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.	The Australian Vanadium Project block model uses a parent cell size of 40 m in northing, 8 m in easting and 10 m in RL. This corresponds to approximately half the distance between drill holes in the northing and easting directions and matches an assumed bench height in the RL direction. Accurate volume representation of the interpretation was achieved. Grade was estimated into parent cells, with all sub-cells receiving the same grade as their relevant parent cell. Search ellipse dimensions and directions were adjusted for each fault block. Three search passes were used for each estimate in each domain. The first search was 120m and allowed a minimum of 8 composites and a maximum of 24 composites. For the second pass, the first pass search ranges were expanded by 2 times. The third pass search ellipse dimensions were extended to a large distance to allow remaining unfilled blocks to be estimated. A limit of 5 composites from a single drill hole was permitted on each pass. In domains of limited data, these parameters were adjusted appropriately. No selective mining units were considered in this estimate apart from an assumed five metre bench height for open pit mining. Model block sizes were determined primarily by drill hole spacing and statistical analysis of the effect of changing block sizes on the final estimates.

Criteria	JORC Code Explanation	Commentary
	Any assumptions about correlation between variables.	All elements within a domain used the same sample selection routine for block grade estimation. No co-kriging was performed at the Australian Vanadium Project.
	Description of how the geological interpretation was used to control the resource estimates.	The geological interpretation is used to define the mineralisation, oxidation/transition/fresh and alluvial domains. All of the domains are used as hard boundaries to select sample populations for variography and grade estimation.
	Discussion of basis for using or not using grade cutting or capping.	Analysis showed that none of the domains had statistical outlier values that required top-cut values to be applied.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	Validation of the block model consisted of: • Volumetric comparison of the mineralisation wireframes to the block model volumes. • Visual comparison of estimated grades against composite grades. • Comparison of block model grades to the input data using swathe plots. As no mining has taken place at the Australian Vanadium Project to date, there is no reconciliation data available.
Moisture	Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	All mineralisation tonnages are estimated on a dry basis. The moisture content in mineralisation is considered very low.
Cut-Off Parameters	The basis of the adopted cut-off grade(s) or quality parameters applied.	A nominal 0.4% V_2O_5 wireframed cut off for low grade and a nominal 0.7% V_2O_5 wireframed cut off for high grade has been used to report the Mineral Resource at the Australian Vanadium Project. Consideration of previous estimates, as well as the current mining, metallurgical and pricing assumptions, while not rigorous, suggest that the currently interpreted mineralised material has a reasonable prospect for eventual economic extraction at these cut off grades.
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	AVL completed a mining Scoping Study in October 2016 for the Australian Vanadium Project. The primary mining scenario being considered is conventional open pit mining. In September 2018, AVL released a base case PFS which included key assumptions supporting a planned open pit vanadium mining operation at the Australian Vanadium Project. The March 2020 Mineral Resource is the basis for new optimisation studies during 2020 for an open pit mine plan incorporating the additional Indicated resources, upon which this PFS Update is based.

Criteria	JORC Code Explanation	Commentary
	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.	Costings to a PFS level of accuracy have been completed and demonstrate economic extraction of the vanadium-titanium-iron ore is achievable.
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.	The metallurgical work conducted since the previous Australian Vanadium Project Mineral Resource Estimate (AVL: ASX announcement 28 November 2018) has been significant with programs designed to support a Bankable Feasibility Study flowsheet, approximately 98% complete. The work included bench scale variability testwork and pilot scale testwork on indicative process feed blends to validate an optimised CMB flowsheet and the sodium salt roasting section of the vanadium refining flowsheet. Preliminary bench scale hydrometallurgical processing of leach liquors from the pilot test program has generated product that meets typical >98.5% V_2O_5 flake chemical specification. An optimisation testwork program is almost complete, which will finalise the vanadium purification stages of the flowsheet and so set the process design for the bankable feasibility study. Other metallurgical programs are underway assessing routes to upgrade the iron rich co product that will be generated by the vanadium extraction process. Metallurgical studies supporting the PFS (Q4 2018) focused on bench scale comminution and magnetic separation test work on 24 contiguous drill core intervals from the high-grade vanadium domain. These samples included 10 off from the “fresh” rock zone, 9 off from the zone defined as “transitional” and 5 off from the near surface oxidised horizon, “oxide”. Some preliminary bench scale roast and leach testing was carried out and used to support process design criteria applied in the PFS. Metallurgical studies supporting the PFS Update (Q4 2020) included bench scale variability tests on both diamond core and RC material and pilot testing of bulk samples made up from diamond drill core to represent average early years (0-5) and life of mine (LOM) process feed. The pilot testing of the optimised beneficiation circuit generated two controlled batches (total 2.2 tonne) of concentrate that were used to develop and optimise a grate kiln process, similar to a pelletisation process for iron ore. Significantly higher vanadium leach extraction has been achieved relative to conventional processing of fine concentrate in a rotary kiln, as applied in the PFS flowsheet. The following table provides a summary of the metallurgical testing supporting the PFS Update and so the Mineral Resources statement. The cut-off date for testwork supporting the PFS Update design basis was 30 September 2020.

Criteria	JORC Code Explanation	Commentary
		Flowsheet Area / **Type of test** / **Number of tests**

Flowsheet Area	Type of test	Number of tests
Concentration	Comminution	
	• Bond ball mill work index	31 tests
	• Bond rod mill work index	15 tests
	• UCS	12 tests
	• SMC	30 tests
	• JKDWi	3 tests
	Bench scale silica reverse flotation	34 tests
	Tails and concentrate thickening	20 tests
	Concentrate filtration	12 tests
	Pilot scale beneficiation	4 tests (optimised conditions)
	Concentrate characterisation	2 size by assay tests
		2 XRD tests
	Variability test program	47 small scale WHIMS tests
		32 DTR or DTW tests
		26 REMS Stick tests
		6 LMA tests
		1 LIMS/WHIMS test
		1 silica reverse flotation test
		16 Qemscan analyses
Vanadium Extraction	Bench scale roast and leach	41 muffle furnace roast tests
		6 pot roast tests
		5 agitated tank leach tests

Criteria	JORC Code Explanation	Commentary		
				3 bottle roll leach tests
				5 counter current pellet leach tests
			Pilot scale roasting	31 small batch pelletising tests
				44 large batch pelletising tests
				55 Grate Kiln roast tests and 47 batch water leach tests
			Bond ball mill work index	1 calcine regrind test
			Large scale batch leach	5 bulk static tank leach tests
				1 bulk agitated tank leach test
				2 column leach tests
				3 spiral leach tests
		Vanadium Purification	Evaporation	14 tests
			Bench scale desilication	3 tests
			Bench scale AMV precipitation	10 tests
			Bench scale APV precipitation	8 tests
			Bench scale deammoniation	5 tests
		Calcine Upgrading	Calcine characterisation	3 XRD tests
				3 TGA tests
				2 TCLP tests
			Calcine upgrading	8 roast tests
				12 DTR tests
				4 Carpco magnetic fractionation tests
		Albeit a prefeasibility study update, through the pilot scale testing and additional variability testwork undertaken in 2019 and 2020, the metallurgical understanding and confidence in the process design has improved considerably. The following		

Criteria	JORC Code Explanation	Commentary
		metallurgical summary supports the Resource Statement and grounds for justifying reasonable prospects of eventual economic extraction. • The oxide, transitional and fresh materials are similar in comminution behaviour and exhibit a moderate rock competency and ball milling energy demand. The abrasiveness of the massive iron mineralisation (vanadium enriched zone) is on average low, indicating grinding media and wear liner unit consumption rates will be low when processed. • Most of the vanadium exists within massive iron mineralisation which can effectively be recovered to a magnetic concentrate at a grind size P_{80} ranging 106 to 160 µm. A positive and consistent response to magnetic separation has been shown from Davis Tube recovery (DTR) testing of fresh un-oxidised material within the high-grade domain. The degree of weathering impacts the magnetic susceptibility of the mineralisation and therefore the response to magnetic separation. Testwork has confirmed wet high intensity magnetic separation (WHIMS) to be an effective scavenger for upper profile transitional and well oxidised material. • Lower vanadium grade assay intervals (0.4 to 0.7% V_2O_5) are common at the boundary of the high-grade massive iron zone but are observed to be more related to inclusion of mafic rock (gangue), often intercalated. Lower vanadium grade material representing the expected mine dilution was included in the pilot testwork feed blends and when individually tested has recovered a magnetic concentrate. There are reasonable grounds to propose that eventual economic extraction of low-grade material (0.4 to 0.7% V_2O_5) could be viable at least at the end of the project via a preconcentration step not yet within the beneficiation flowsheet. • The processing of blends of fresh and variably oxidised material can achieve a low silica (1.8%) and alumina grade (2.8%) concentrate when the magnetic concentrate is reground to P_{80} 75 µm and cleaned in a silica reverse flotation circuit. • The beneficiation flowsheet adopted for the PFS Update has been validated by pilot scale testwork which involved processing two blends of diamond core material designed to be indicative of average PFS schedule process feed. The optimised flowsheet includes medium intensity magnetic separation (MIMS), a scavenger WHIMS circuit, combined magnetic concentrate regrinding and final cleaning via a silica reverse flotation circuit. Concentrates from the pilot plant of 1.4% V_2O_5 were achieved at 69 and 76% vanadium recovery for the years 0-5 and LoM blends respectively. The higher vanadium recovery sample contained a component of fresh material (45% by mass). • Optimised pilot scale testing of a grate kiln process with mixes of concentrate, sodium salt and a binder in the form of green pellets, has achieved vanadium water leach extraction of 92 to 93%. • Preliminary bench scale testing of desilication and ammonium meta vanadate (AMV) precipitation has proven vanadium in leach liquor generated by the pilot testing can be purified to generate a product with acceptable chemistry for the >98.5% V_2O_5 flake market. This traditional vanadium hydrometallurgical purification path has been adopted for the flowsheet supporting the PFS Update. Similar leach liquor purification flowsheets were applied in Xstrata's Windimurra refinery flowsheet in Western Australia and at Largo Resources Maracas vanadium project in Bahia, Brazil. • Leached calcine of 54.5% Fe, 0.96% Si and 1.53% Al has been generated from the pilot scale testwork and is considered a co-product (iron concentrate) when generated from AVL's relocated processing plant site at Tenindewa. Further characterisation testwork and exploration of avenues to improve the calcine product quality are under review.

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 greenfield 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.	Environmental studies and impact assessment are currently being undertaken for Feasibility and approvals work. For the PFS it was assumed that the tails stream from the concentrator can be effectively stored and rehabilitated within an integrated mine waste landform. Tailings seepage characterisation at Gabanintha is required to determine controls required to prevent adverse impacts from tailings seepage into subterranean fauna habitat. Waste streams from the processing plant at Tenindewa, including calcine residue and a sodium sulphate rich bleed solution are assumed to be managed within a lined storage facility.
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.	Bulk density determinations (using the Archimedes' method) were made on samples from 15 diamond drill holes. Bulk density data from 313 direct core measurements were used to determine average densities for each of the mineralisation and oxide/transition/fresh domains. Bulk Density was estimated for HG, LG, Alluvial and waste material in Core taken to represent the main lithological units.
	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.	The water immersion method was used for direct core measurements; all 231 of the latest measurements have been done using sealed core, the previous 97 measurements were not wrapped. AMC's observation of the core indicates that observable porosity was not likely to be high for most of the core at the deposit.

<table>
<tr><th>Criteria</th><th>JORC Code Explanation</th><th>Commentary</th></tr>
<tr><td></td><td>Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.</td><td>
The average bulk density values for at the Australian Vanadium Project are:
<table>
<tr><th>Domain</th><th>Oxidation State</th><th>Bulk Density</th></tr>
<tr><td>10 (high grade)</td><td>Oxide</td><td>3.39</td></tr>
<tr><td>10 (high grade)</td><td>Transition</td><td>3.71</td></tr>
<tr><td>10 (high grade)</td><td>Fresh</td><td>3.67</td></tr>
<tr><td>2-8 (low grade)</td><td>Oxide</td><td>2.13</td></tr>
<tr><td>2-8 (low grade)</td><td>Transition</td><td>2.20</td></tr>
<tr><td>2-8 (low grade)</td><td>Fresh</td><td>2.62</td></tr>
<tr><td>Alluvial</td><td>Oxide</td><td>2.63</td></tr>
<tr><td>(waste)</td><td>Oxide</td><td>2.02</td></tr>
<tr><td>(waste)</td><td>Fresh</td><td>2.45</td></tr>
</table>
All values are in t/m3.
Regressions used to determine bulk density based on iron content are as follows:

Oxide: BD = (0.0344 x Fe_2O_3 %) + 0.9707
Transition: BD = (0.0472 x Fe_2O_3 %) + 0.3701
Fresh: BD = (0.0325 x Fe_2O_3 %) + 1.4716

The final bulk density used for reporting of the Australian Vanadium Project Mineral Resource is based on the regression as it provides a more reliable local estimated bulk density.
</td></tr>
<tr><td>Classification</td><td>The basis for the classification of the Mineral Resources into varying confidence categories.</td><td>
Classification for the Australian Vanadium Project Mineral Resource estimate is based upon continuity of geology, mineralisation and grade, consideration of drill hole and density data spacing and quality, variography and estimation statistics (number of samples used and estimation pass).
The current classification is considered valid for the global resource and applicable for the nominated grade cut-offs.
</td></tr>
<tr><td></td><td>Whether appropriate account has been taken of all relevant factors (i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values,</td><td>
At the Australian Vanadium Project, the central portion of the deposit is well drilled for a vanadium deposit, having a drill hole spacing from a nominal 80 m to 100 m x 25 m to 30 m in northing and easting in the zone of closest drilling, to 140 m x 25 to 30 m in northing and easting throughout the rest of the Indicated Resource area. The lower confidence areas of the deposit have drill hole spacings ranging up to 500 m x 25 m to 30 m in northing and easting directions.
The estimate has partially been classified as Measured Mineral Resource in an area restricted to the fresh portion of the high-grade domain where the drill hole spacings are less than 80 to 100m in northing (Fault Blocks 20 and 30). Indicated Mineral
</td></tr>
</table>

Criteria	JORC Code Explanation	Commentary
	quality, quantity and distribution of the data).	Resource material is generally restricted to the oxide high grade and oxide and fresh low grade in the same area of relatively closely spaced drilling plus areas of infill drilling in Fault Blocks 40, 50 and 60. Inferred Mineral Resource has been restricted to any other material within the interpreted mineralisation wireframe volumes and limited by constraining wireframes down-dip. The background waste domain estimate has not been classified, due to very low possibility of economic extraction and limited data.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	Geologica Pty Ltd and Trepanier Pty Ltd believe that the classification appropriately reflects their confidence in the grade estimates and robustness of the interpretations.
Audits or Reviews	The results of any audits or reviews of Mineral Resource estimates.	The current Mineral Resource estimate has not been audited.
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 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 resource classification represents the relative confidence in the resource estimate as determined by the Competent Persons. Issues contributing to or detracting from that confidence are discussed above. No quantitative approach has been conducted to determine the relative accuracy of the resource estimate. The Ordinary Kriged estimate is considered to be a global estimate with no further adjustments for Selective Mining Unit (SMU) dimensions. Accurate mining scenarios are yet to be determined by mining studies. No production data is available for comparison to the estimate. The local accuracy of the resource is adequate for the expected use of the model in the mining studies. Further investigation into bulk density determination and infill drilling will be required to further raise the level of resource classification.
	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 levels of confidence and accuracy relate to the global estimates of grade and tonnes for the deposit.
	These statements of relative accuracy and confidence of the estimate should be	There has been no production from the Australian Vanadium Project deposit to date.

Criteria	JORC Code Explanation	Commentary
	compared with production data, where available.	

Section 4 - Estimation and Reporting of Ore Reserves – 2020 PFS Update

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.	The most recent Mineral Resource estimate was declared on 4th March 2020 and has been used in the PFS Update. Refer to the ASX release of 4th March 2020 for material assumptions and further information. The Measured and Indicated Resources from Section 3 have been used as the basis for conversion to the Ore Reserve. The Mineral Resources are inclusive of the Ore Reserve.
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.	No site visit was undertaken by the Competent Person for Ore Reserves at the time of this release due to Covid-19 restrictions. A site visit will be undertaken by the Competent Person prior to completion of the final PFS Update report. There are no current facilities at the project site.
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.	A 2020 Pre-Feasibility Study update to the previous 2018 PFS has been prepared.

CRITERIA	JORC CODE EXPLANATION	COMMENTARY
CUT-OFF PARAMETERS	The basis of the cut-off grade(s) or quality parameters applied.	The economic break-even cut-off calculation is detailed: $$Cut\ off\ grade = \frac{(process + overhead\ cost) \times (1 + Mining\ Dilution(\%))}{Payable\ Vanadium\ Price\ \times Process\ Recovery\ (\%)}$$ As the process recovery varies across the resource model on the basis of magnetic susceptibility and Fe grade, the breakeven cut-off grade also varies locationally. However, a cut-off grade of 0.7% V_2O_5 was utilised to define “ore” for the purposes of reporting an Ore Reserve as metallurgical testing suggests unpredictable recoveries below this chosen value. This is a relatively conservative approach as this value is considerably higher than the calculated breakeven cut-off grade values within the model.
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 Mineral Resources have been optimised using Whittle software followed by detailed final pit design. The Ore Reserve is the Measured and Indicated Resources within the pit design, after allowing for ore loss and mining dilution. In selecting the optimised pit shell used for pit designs the conservative pit shell with a revenue factor of 0.82 was selected.
	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 mining method selected is open pit, selective mining of ore and waste on nominal 2.5 m benches using a backhoe excavator. Pit ramps are designed at a 10% gradient and 25.5 m wide, except for lower pit levels where the ramp reduces to 13.5 m wide and then 15 m.
	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).	A Pre-Feasibility Study level geotechnical study had been completed by independent geotechnical consultants Dempers and Seymour for the northern mining areas as part of the previous 2018 PFS. The pit design parameters from this study have been used for the pit optimisations and designs for this area. An updated geotechnical evaluation of the southern mining area carried out by independent geotechnical consultants Pells Sullivan Meynink (PSM) as part of this PFS update. Orelogy determined that the PSM study recommended slopes in the southern oxide profile be flattened by 5 degrees on the steeper hanging wall side to remain consistent with the Dempers & Seymour recommendations for the northern area. Grade control will be based on additional RC drilling, pit mapping and sampling from production drilling where necessary. An RC drilling pattern of 15 m along strike and 15 m across strike pattern has been allowed for.

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	The mining dilution factors used.	Mining dilution was estimated to be 5%, at zero grade. This was carried over from the 2018 PFS and was based on consideration of the width, continuity and orientation of the orebody and the planned mining method.
	The mining recovery factors used.	Ore recovery of 95% was carried over from the 2018 PFS and to allow for losses from blasting and grade control.
	Any minimum mining widths used.	A minimum mining width was set at 20 m.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Inferred Resources within the pit design make up 4% of the total contained Mineral Resources and have not been considered for Ore Reserve estimate. Conversely Measured and Indicated material that lie within the Inferred pushbacks used for the LOM schedule have also not been included in the Ore Reserve estimate.
	The infrastructure requirements of the selected mining methods.	Infrastructure required for the open pit mining operation includes, but is not limited to mining contractor workshop, heavy equipment washpad, mining offices, water storage dam, ROM pad, fuel and explosives storage.

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?	The metallurgical processes applied for the PFS Update include: • **Beneficiation circuit** - crushing, grinding, magnetic separation and reverse flotation to generate a 1.39% V_2O_5 concentrate • **Refining circuit** - pelletisation, roasting, grinding, water leaching, desilication, ammonium metavanadate (AMV) precipitation, deammoniation and flaking to produce a >98.5% V_2O_5 vanadium product and a 54-55% iron co product (leached calcine). The metallurgical processes proposed are well-tested technologies and considered appropriate for the styles of mineralisation. The approach of pelletising the concentrate prior to roasting is not typical but has precedent in the vanadium hard rock industry. The grate kiln technology proposed is common in the iron ore pellet industry and has been validated at pilot scale. Extensive bench and pilot scale metallurgical testwork have been carried out under the direction of Wood Mining and Metals and includes: • Comminution • Magnetic separation • Silica reverse flotation • Thickening and filtration • Pelletisation • Grate kiln roasting • Leaching • Desilication • AMV precipitation • Deammoniation Two composites, made up of 9 tonnes each of diamond core intervals designed to be indicative of an average first five year and life of mine blend, have been tested at pilot scale through the beneficiation flowsheet. For the Y0-5 concentrate significant testing has been completed on the major cost areas of the vanadium refining flowsheet. Process design for the PFS Update is based on these pilot test results, bench scale testwork and industry experience for some of the lower cost unit process at the tail end of the refining flowsheet. Metallurgical domains within the vanadium bearing massive iron mineralisation are based on the degree of oxidation as determined by the proxy “Ln (Volume susceptibility (SI) x 1000/%Fe)”. Using this scale, the definition of fresh rock is >2, transitional >-1 and <2, and oxide <-1. Vanadium recovery forecasts for the concentrator have been determined from testwork outcomes and are underpinned by the two pilot scale test outcomes (69 and 76% vanadium recovery). The following vanadium recovery functions have been applied for mine block modelling and predicting process performance based on achieving a 1.39% V_2O_5 concentrate grade. Ln (Volume susceptibility (SI) x 1000/%Fe) — Concentrator Vanadium Recovery (%) $x < 1.76$ — $= -0.362805x^2 + 6.115625x + 66.342253$ $1.76 > x < 2.0$ — $= 75.485315x - 57.136140$

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		x > 2.0 = 93.834 Vanadium recovery, as with confidence in predicting concentrate grade and vanadium recovery of the beneficiation circuit, depreciates as weathering/oxidation increases. Furthermore, there is evidence of some variation in metallurgical behaviour (mineralogy / concentrate vanadium, iron and titanium grade) along strike and due to weathering effects (e.g., leaching and depletion) which are under investigation. The proposed mining and processing strategy at this stage is therefore to blend control process feed to maintain an average target vanadium grade and an average oxidation range greater than 0.38 on the Ln (Volume susceptibility (SI) x 1000/%Fe) scale. As reference, the two pilot feed blends were measured at 0.48 and 1.76 on this scale. The basis of the PFS Update is an 88% vanadium recovery for the refining flowsheet. Vanadium recovery forecasts for the refining flowsheet have been based on: • Optimised pilot scale roasting test results which have demonstrated 92 to 93% vanadium leach extraction • Bench scale tests results or industry experience for downstream hydrometallurgical circuits (desilication, AMV, deammoniation, flaking and packaging). The basis of the iron co product mass recovery and 54 to 55% Fe grade has been determined from pilot scale testwork. One dry tonne of concentrate equates to 1.0 dry tonne equivalent of iron co product. Based on the metallurgical testwork completed thus far, deleterious elements are assumed to be manageable by the process flowsheets considered. Recoveries of vanadium and iron co product for the Ore Reserves were applied according to the recovery equations or values as stated. Further optimisation testwork is in progress which will set the processing plant flowsheet and recovery basis for use in a bankable level study.
ENVIRONMENTAL	The status of studies of potential environmental impacts of the mining and processing operation.	At the mine location, studies have been completed for flora, fauna, subterranean fauna, surface water, groundwater, and waste characterisation. The Project is not likely to have highly significant environmental impacts that are of public interest. All potential environmental and social impacts associated with the Project have been considered and no issue has been identified that cannot be mitigated or managed to an acceptable degree. Further work is required to quantify the potential impact for some aspects, particularly for subterranean fauna.

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	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.	Stage 1 geochemical characterisation was undertaken in 2020 and identified that the risk of acid mine drainage at the Project is very low. Kinetic or leachate testing is required to determine the risk of enriched metals leaching into soil and groundwater from waste rock stockpiles or concentrate stockpiles. Management of surface runoff and seepage from the waste dumps and pit walls during operation will need to be managed and final waste dumps capped with suitable materials to minimise water infiltration. Geochemical characterisation of tailings solids or liquids has not been undertaken to determine the likely seepage quality. Chemicals that will be introduced during the primary processing are environmentally hazardous to aquatic invertebrates and these chemicals are expected to report to the tailings storage. The degradation and concentration of these chemicals in the tailings storage and risk of seepage into soil and groundwater has not been quantified.
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.	The Sandstone to Meekatharra Road passes close to the mine lease area, however an access road will be constructed from the Great Northern Highway to the west to the operational area, along the same pathway as a pipeline route for water supply from Reedy's Mine (operated by West Gold Resources). This road will give access to Great Northern Highway for haulage of concentrate to the Tenindewa site for final processing. It will also provide a link road to the Meekatharra – Sandstone Road for all road users, as well as access for trucks bringing site supplies. Meekatharra is about 55 km to the north and can be accessed by the existing Meekatharra – Sandstone Road. Power will be generated on site at Gabanintha using a diesel power station, supplemented by a solar photo voltaic farm with Vanadium Redox Flow Battery energy storage. At Tenindewa, a spur line will be installed from the existing nearby gas pipeline with power for the processing plant and administration buildings provided by a gas-fed power plant. At Gabanintha, construction water will be sourced from onsite pit dewatering and the CMB plant will use water piped across from Reedy's mine site. At Tenindewa, preliminary studies suggest water bore fields can be found in the vicinity to supply water for the processing plant. The mining lease is sufficiently extensive to accommodate all the required infrastructure. A communications tower and related equipment will be installed on site at both Gabanintha and Tenindewa for phone and data communications. Accommodation will be constructed on site adjacent to the Project at Gabanintha. Daily commute to the Tenindewa Processing Plant will be possible from the local communities nearby (eg, Geraldton and Mullewa)

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COSTS	The derivation of, or assumptions made, regarding projected capital costs in the study.	Wood Mining and Metals has estimated capital costs for the Project to ± 25% . This includes the direct and indirect cost associated with electrical distribution, site preparation and construction for the following mining infrastructure: • HV & Truck Workshop • Parts Store/Warehouse • HV & LV Washdown Pad Facility • Fuel Storage and Dispensing Facility • MOC Building (Offices. Muster Room/Training Facility, Toilets, Cribroom) • Water Storage and Distribution • Sewage Disposal • Explosive Magazine Compound and Access Track • Tyre Changing Equipment & Tyre Storage
	The methodology used to estimate operating costs.	Mining operating costs have been developed from a first-principle basis utilising: • Up-to-date (Q3 2020) equipment costs (capital and operating) from OEMs • Current salary and labour rates based on a combination for 9:5 and 2:1 rosters • Diesel cost of A$0.50/l based on average of two supply quotation • Allowance for equipment financing and insurance Mining costs were calculated for the following activities: • Clearing and grubbing • Topsoil removal and storage • Road building • Drilling and blasting • Loading and hauling (including support equipment) • Contractors personnel • Owner personnel • Cost of capital (including finance) A contractor's margin of 5% was applied, assuming that the contractor would be able to utilise purchasing power to obtain cheaper equipment capital that the book price provided. An allowance for dayworks was also included. The result LOM cost of A$3.49/tonne mined is in line with the A$3.54/tonne moved generated by the pit optimisation process. Processing costs have been estimated based on the plant design and detailed costings derived by Wood Mining and Metals.
	Allowances made for the content of deleterious elements.	Not applicable

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	The source of exchange rates used in the study.	For mining optimisation and design, the exchange rate used was A$:US$ 0.74. The exchange rate used in financial modeling was A$:US$ 0.72. The exchange rate used for Capex and Opex derivation was set on 8th November 2018 at A$:US$ 0.728, A$:EUR 0.637 and A$:GBP 0.555. The exchange rates were sourced from publicly available data produced by banks.
	Derivation of transportation charges.	The transport cost related to haulage of the product to the port of Fremantle has been estimated by Wood Mining and Metals. This has been estimated based on a rate A$50t of V_2O_5 product sold FOB Fremantle. Backhaul rates after delivery of consumables to site have been assumed.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Processing and refining costs have been derived by Wood Mining and Metals based on their design of the processing plant.
	The allowances made for royalties payable, both Government and private.	The royalty paid to the West Australian government will be 2.5% of revenue.
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.	Head grade has been calculated in the Mining Reserve using a 5% dilution factor at an assumed grade of 0% V_2O_5. Revenue for pit optimisation assumes a V_2O_5 sale price of US$8/lb. This is based on an FOB price for the V_2O_5 flake product. The sales price used for base case financial analysis was US$8.67/lb V_2O_5. The vanadium price is of a highly cyclical nature. Imbalances in supply have driven prices up above US$30/lb twice during this time, and there was a prolonged period where prices hovered around US$5/lb from 2012 to 2017. FeTi coproduct is produced after extraction of vanadium. This FeTi product has been determined to have a market value of 70% of the 62% Fe Fines Reference price. The financial model uses US$67.2/t for FeTi sales from a long-term price of $US96/t. For mining optimisation and design, the exchange rate used was A$:US$0.74. The exchange rate used in financial modeling was A$:US$0.72. The exchange rate used for Capex and Opex derivation was set on 26 October 2020 at A$:US$0.72, A$:EUR 0.60, A$:ZAR 11.6, A$:CNY 4.78, and A$:CAD 0.94. Sensitivity analysis demonstrated the project internal rate of return is most impacted by the Exchange Rate and Capex.

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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.	The market for Vanadium Pentoxide is substantially based on its use in steel alloys and now also in batteries. In the last few years the vanadium price recovered, reaching over US$30/lb in November 2018 and since then has price slumped to around US$5/lb due to COVID-19 related production cuts in the non-Chinese consuming countries Demand for vanadium outstripped supply between mid-2015 and 2019, corresponding to Evraz Group's Highveld Steel and Vanadium's (South Africa) closure. In late 2015, Chinese stone coal producers began to shut down due to Chinese environmental regulations, further reducing supply. Supply and demand were not in balance. In 2019, prices began to fall on substitution with Niobium in rebar and have not recovered into 2020 due to COVID-19 related drops in demand. Since April 2020, Chinese demand has grown rapidly supporting new plants the size of AVL's proposed Gabanintha project to meet future needs.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Vanadium Redox Flow Battery (VRFB) technology uptake could have a large impact on medium to long-term vanadium demand. If VRFBs capture even a small piece of the renewable energy storage demand, it could require thousands of MTV that are not currently available.
	Price and volume forecasts and the basis for these forecasts.	A market assessment analysis has been completed internally with information supplied by Daniel Harris (Technical Director AVL).
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	Vanadium products include various oxides of Vanadium, that are converted to Ferro Vanadium or Vanadium Carbo-Nitride products for use in steelmaking. Refined Vanadium pentoxide, V_2O_5 produced as a powder is supplied as a chemical and can be used in the production of vanadium electrolyte solutions for Vanadium Redox Flow Batteries. Typical grade for the steel industry is 98.5% V_2O_5, while specialty chemical, VRFB's, and the aerospace industry are more stringent but vary according to application, industry, and individual costumer. Final vanadium products are assayed via standardised laboratory analysis for sale.

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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.	Crirical inputs to the economic model are A$:US$ 0.72, pricing for vanadium pentoxide sale of $8.67, FeTi coproduct pricing at 30% discount to 62% Platts iron ore average CIF North China. NPV is calculated using an 8% discount rate. NPV ranges from A$909M ± A$400M based on 30% change in all values measured - for all variables measured. These included V_2O_5 price (long and short-term), FeTi coproduct price, capex, opex, and A$:US$ exchange. IRR ranges from 17.5 ± 7.3%. The post-tax NPV 8% of the Project using a schedule based on the Ore Reserve only and utilising the long-term historical pricing was estimated to be A$720M ± A$5M, clearly indicating: 1. The Ore Reserve is valid in and of itself and generates a significant cashflow 2. the Project is not reliant on the use of Inferred Resources in the LOM schedule to be economically viable. Detailed sensitivity analysis at the optimization stage was not carried out for the purposes of the PFS Update. Sensitivity analysis was undertaken as part of the Project financial analysis.
SOCIAL	The status of agreements with key stakeholders and matters leading to social licence to operate.	There is no registered native title claim on the proposed mine site or processing plant following a decision by the Federal Court that the Yugunga-Nya native title claim (WC1999/46) was not accepted for registration. A draft mining agreement between AVL and the Yugunga-Nya Native Title Claim Group was prepared in November 2017. A standard Heritage agreement is in place with the Yugunga-Nya Native Title Claim Group. No land use agreements are in place with other local landowners at Gabanintha, but good relations are maintained. An Option to Purchase for 440 Ha of land at the Tenindewa proposed processing plant location was signed during 2019 and extended in 2020.

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OTHER	To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:	
	Any identified material naturally occurring risks.	No material naturally occurring risks have been identified.
	The status of material legal agreements and marketing arrangements.	No material legal or marketing agreements have been entered into.
	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.	Mining tenement M51/878 has been granted with standard mining tenement conditions that restrict surface mining within a road or road reserve. Amendments to the mining tenement conditions and realignment of the Meekatharra-Sandstone Rd is required to facilitate surface mining within roads and road reserves. Preparation of the primary environmental impact assessment for referral to the Environmental Protection Authority (EPA) is well-progressed. Following submission, the timeframe for assessment by the EPA may vary depending on their approach for assessment, what additional information they request, and how quickly this can be provided. Preparation of secondary environmental approval applications will require additional technical studies and design details. Application for the mining environmental approval has not started but there are no impediments expected to this process.
CLASSIFICATION	The basis for the classification of the Ore Reserves into varying confidence categories.	Measured Resources have been converted to Proved Reserves. Indicated Resources have been converted to Probable Reserves.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The estimated Ore Reserves are, in the opinion of the Competent Person, appropriate for these deposits.
AUDITS OR REVIEWS	The results of any audits or reviews of Ore Reserve estimates.	No audits have been undertaken.