7th October 2021

MASSIVE SULPHIDES INTERSECTED AT SNOOK TARGET - DEVELIN CREEK COPPER PROJECT

- **Massive sulphides have been intersected at the Snook Prospect - the first of eight targets to be drill tested. This is part of the current multi-rig drill program underway at the Develin Creek copper-zinc massive sulphide project in Queensland (ASX Release 2-Sep-21).**
  - **Near surface, massive and semi-massive sulphides intersected in 4 drill holes, ranging in zones up to 22m thick (pyrite dominant).**
  - **Massive copper-zinc sulphides intersected in 2 holes over 2m to 3m wide intervals, copper and zinc confirmed in field with pXRF - laboratory assays are awaited.**
  - **Mineralisation remains open with the target sequence extending along strike for multiple kilometres north to south.**
  - **The Company plans to undertake ground based electromagnetic surveying (EM) to assist with ongoing targeting.**
  - **Drilling confirms a fertile VMS system is present at Snook. These systems tend to occur in clusters as has already been identified to the north at Sulphide City.**
- **The current program of approximately 40 holes that will also assess the Sulphide City resource area where recent drilling returned strong massive copper-zinc sulphides in a twin hole program including (ASX Release 5-Jul-21).**
  - **34m @ 3.5% Cu+Zn, incl 10m @ 6.0% Cu+Zn, and**
  - **29m @ 3.5% Cu+Zn, incl 12.3m @ 6.7% Cu+Zn**
- **This drilling is part of a broader plan to build upon the existing JORC resource and add potential tonnage to the Develin Creek copper-zinc volcanogenic massive sulphide (VMS) inventory.**

Commenting on the drill program, Chairman Peter Bird said: *"VMS systems can be very high value. The results to date confirm the pervasive nature of the system at Develin Creek. We are very keen to add copper inventory to our existing resource base.*

As we have stated previously, we have an aggressive base and precious metals drill program underway within the business. A total of 12 drill rigs are active, this includes 5 within the Earaheedy Joint Venture Zinc discovery (EJV) where Zenith has a 25% equity position and 7 rigs operating on wholly owned assets. This activity places us in a strong position for success."

The Planned Drill Program and Estimated Timeline:

A total of eight copper-zinc targets and Sulphide City to be drill tested:

- Sulphide City – 4 targets (T1 – T4) – in progress
- Snook – 2 targets (S1 – S2) – initial test completed, requires follow-up
- Wilsons – 2 targets (W1 – W2) – in progress
- Sulphide City – resource drilling

ZENITH MINERALS

Corporate Details

Zenith Minerals Limited (ASX:ZNC)
ABN: 96 119 397 938

Issued Shares	323.1M
Unlisted options	15.7M
Mkt. Cap. ($0.21)	A$67.9M
Cash (5-Aug-21)	A$7.5M
Investments (9-Sep-21)	A$6.3M
Debt	Nil

Directors

Peter Bird	Exec Chair
Michael Clifford	Director-CEO
Stan Macdonald	Non-Exec Director
Julian Goldsworthy	Non-Exec Director
Graham Riley	Non-Exec Director
Nicholas Ong	Co Sec
Nick Bishop	CFO

Major Shareholders

Directors	6.3%
HSBC Custody. Nom.	9.8%
Citicorp Nom	7.6%
BNP Paribas. Nom.	6.5%
Granich	3.8%

Our Vision

Zenith has a vision to build a gold and base metals business with a team of proven project finders.

Focus is on 100% owned Zenith projects, whilst partners progress multiple additional opportunities using partner funds.

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Drilling of the total program is anticipated to take approximately 5 weeks, with assay results available some 3 - 4 weeks thereafter.

Snook Drilling Update

Massive sulphides have been intersected at the Snook prospect the first target to be drill tested as part of the current multi-rig drill program underway at the Develin Creek copper-zinc massive sulphide project in Queensland (ASX Release 2-Sep-21).

- Massive and semi-massive sulphides were intersected in 4 drill holes, ranging in zones up to 22m thick that are dominated by massive to semi-massive pyrite but with generally an upper 1m to 3m massive copper-zinc sulphide zone (Figures 1 – 3 and Table 1).
- Massive copper-zinc sulphides were intersected in 2 holes (ZSRC014 and ZSRC017) over widths of 2m to 3m intervals with the copper and zinc contents confirmed in field using a portable x-ray fluorescence analyser (pXRF).
- Copper-zinc sulphide mineralisation remains open with the target sequence extending along strike to the north and south for multiple kilometres.
- The Company plans to undertake ground based electromagnetic surveying (EM) to assist with targeting prior to additional drill follow-up.
- Drilling to date confirms a fertile VMS system is present and requires additional testing. VMS deposits are known to occur in clusters. The recognition of massive sulphides at Snook some 30km south of the known resource area confirms the highly prospective nature of Zenith's tenure at Develin Creek.

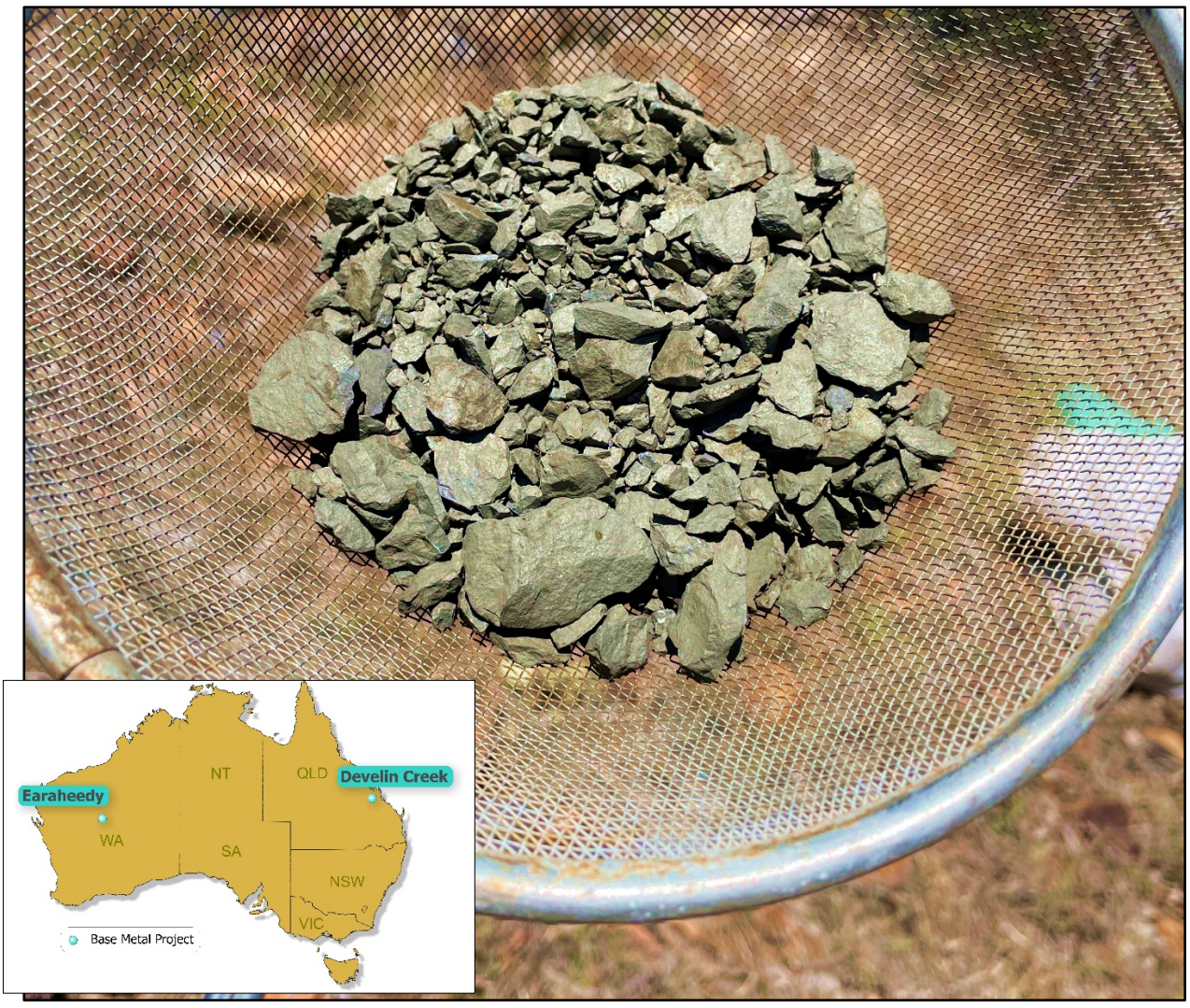

Figure 1- Massive Copper-Zinc Sulphide Drill Chips (ZSRC017 47 – 48m)

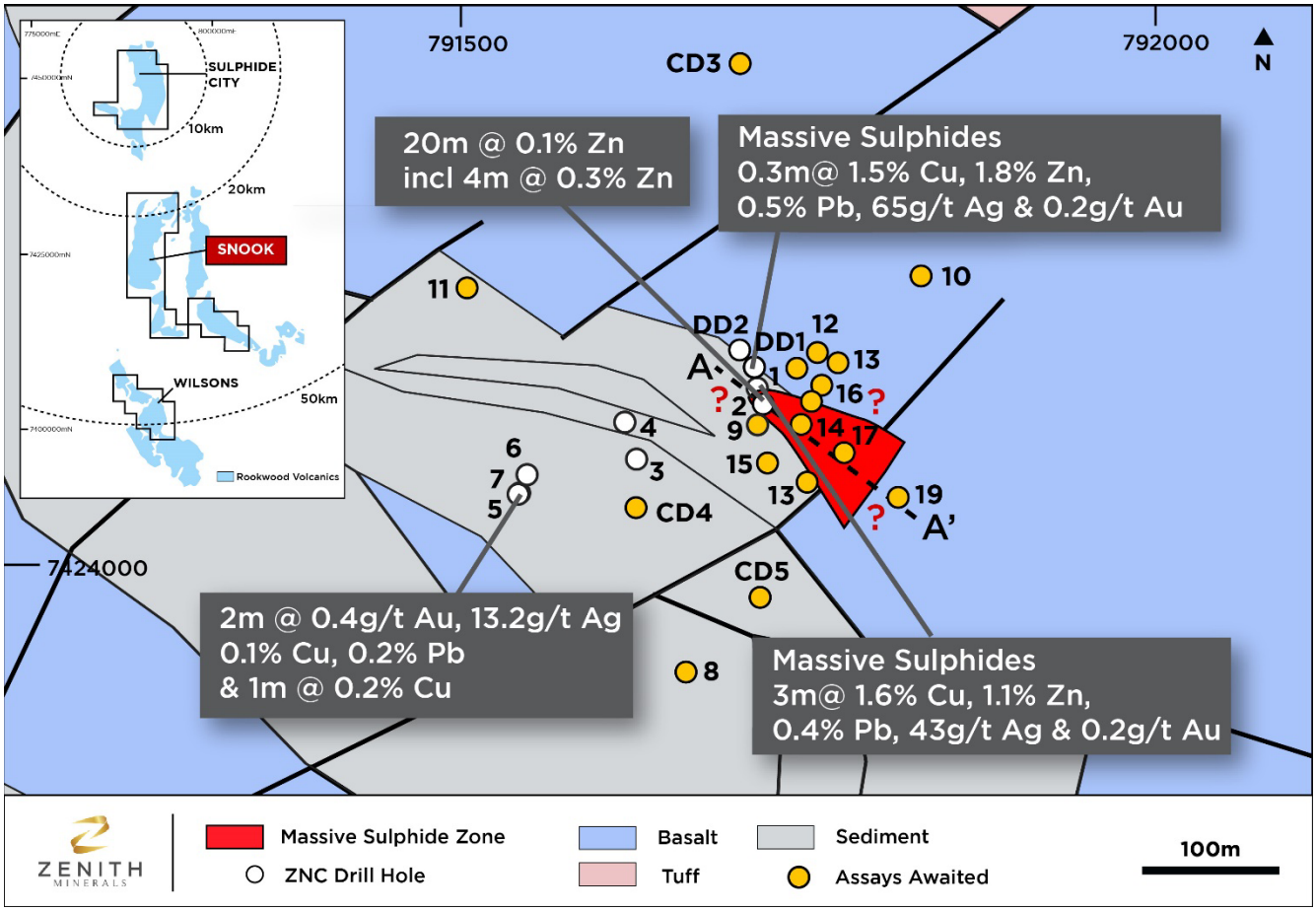

Figure 2: Snook Prospect Geology and Drill Location Map - Showing New Massive Sulphide Zone

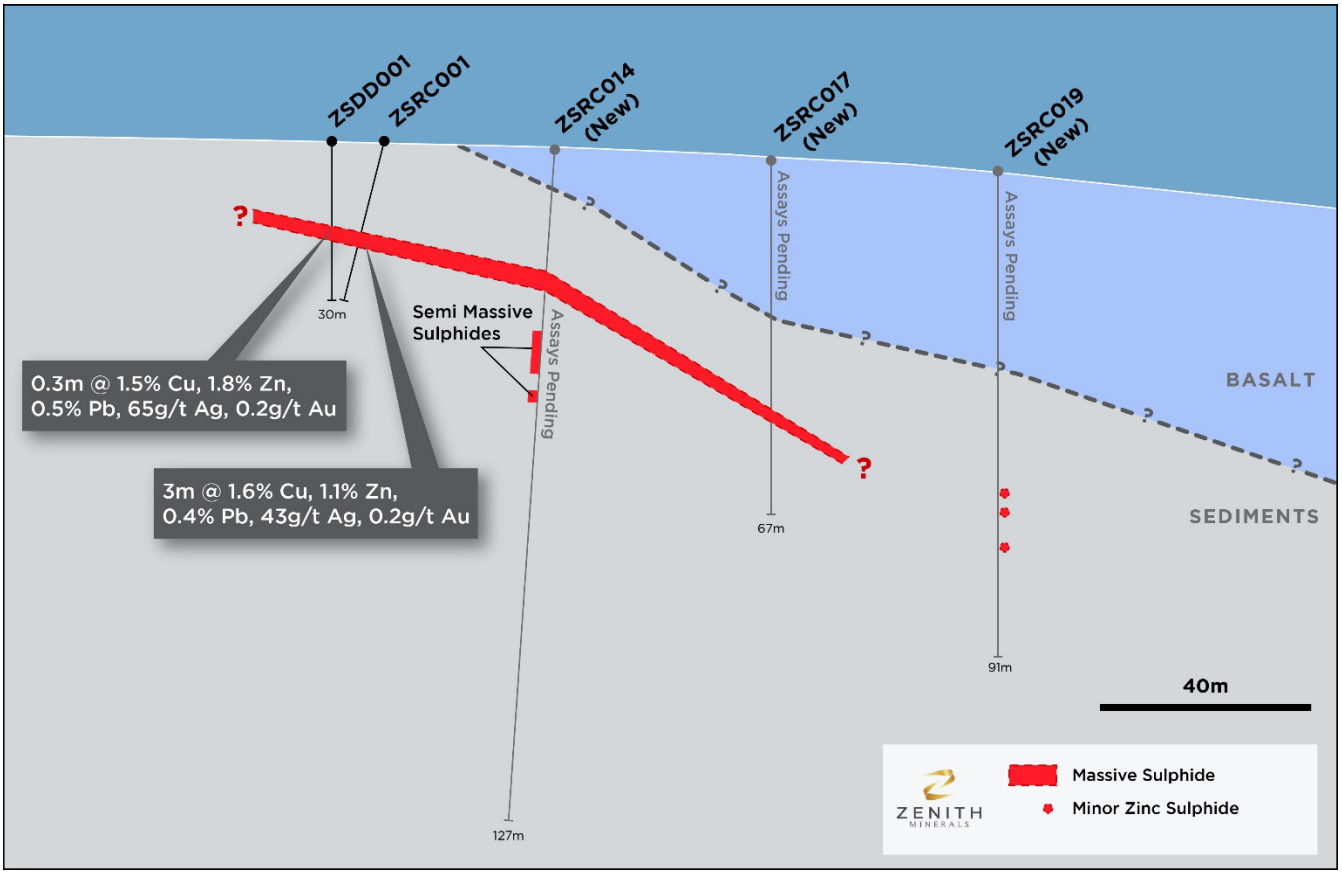

Figure 3: Snook Prospect Long Section - Showing New Massive Sulphide Zone

Develin Creek Project Background and Drill Targets

The Devein Creek project contains a VMS copper-zinc deposit with an Inferred Mineral Resource (JORC 2012) of: 2.57Mt @ 1.76% Cu, 2.01% Zn, 0.24g/t Au and 9.6g/t Ag (2.62% CuEq) released to ASX on 15-Feb-2015.

A recent program of 3 diamond drill holes at the Sulphide City resource area by the Company confirmed high-grade copper and zinc zones with associated gold and silver in massive sulphides (ASX Release 5-Jul-21). Results include:

- **ZDCDD002 - 29m @ 2.3% Cu, 1.2% Zn, 0.3 g/t Au & 4.2 g/t Ag**
  - **incl. 12.3m @ 4.2% Cu, 2.5% Zn, 0.6 g/t Au & 7.3 g/t Ag**
- **ZDCDD003 - 34m @ 2.0% Cu, 1.5% Zn, 0.2 g/t Au & 4.9 g/t Ag**
  - **incl. 10m @ 3.9% Cu, 0.4% Zn, 0.3 g/t Au & 6.9 g/t Ag**

Results point towards a potential increase in copper grade within the higher-grade portions of the existing Inferred Mineral Resource, although additional drilling is required to see if this trend can be extrapolated throughout the deposit. These new diamond drill holes also defined discrete zones of high-grade zinc within the copper rich intervals noted above. These zones were not identified in the historic resource drilling, and include:

- **ZDCDD002 - 4m @ 4.7% Cu, 6.1% Zn, 1.2 g/t Au & 9.8 g/t Ag**
- **ZDCDD003 - 10m @ 1.8% Cu, 4.2% Zn, 0.2 g/t Au & 5.4 g/t Ag**

This drilling is part of a broader plan to build upon this JORC resource and add others to the Develin Creek copper-zinc VMS inventory.

Table 1: Snook Drill Collar Location Table with Geological Observations

Hole_ID	Drill Type	East	North	RL	Depth	Pre-collar	Az	Dip	Geological Observation
ZSCD003	RC/DD	791734	7424386	139	220	150	250	-90	
ZSCD004	RC/DD	791627	7424042	161	170	150	200	-90	
ZSCD005	RC	791718	7423977	151	150		15	-90	
ZSRC008	RC	791613	7423900	200	129		215	-90	
ZSRC009	RC	791701	7423106	142	129		210	-90	
ZSRC010	RC	791836	7424211	134	100		280	-90	
ZSRC011	RC	791504	7424187	149	100		275	-90	
ZSRC012	RC	791753	7424150	144	150		255	-90	
ZSRC013	RC	791775	7434136	137	150		295	-90	
ZSRC014	RC	791749	7424104	139	127		320	-90	23-25m - 2m massive Cu-Zn sulphide 33-39m - 6m of semi-massive pyrite 44-45m - 2m semi-massive pyrite
ZSRC015	RC	791724	7424070	142	91		28	-60	39 - 41m -2m semi-massive pyrite
ZSRC016	RC	791762	7424121	144	70		208	-75	Sulphides on fractures
ZSRC017	RC	791782	7424080	143	100		0	-90	47 - 49m - 2m massive Cu-Zn sulphide
ZSRC018	RC	791760	7424060	138	85		0	-90	43 - 47m, 4m semi-massive pyrite
ZSRC019	RC	791816	7424054	140	91		0	-90	3 x 1m intervals of minor Zn sulphide

For further information please refer to the Company's website or contact the Company directly.

Authorised for release by the Zenith Minerals Limited Board of Directors – 7th October 2021

For further information contact Zenith Minerals Limited:

Directors Michael Clifford or Peter Bird
E: mick@zenithminerals.com.au / peter@zenithminerals.com.au (Phone +61 8 9226 1110)

Competent Persons Statement

The information in this report that relates to Exploration Results and Mineral Resources is based on information compiled by Mr Michael Clifford, who is a Member of the Australian Institute of Geoscientists and an employee of Zenith Minerals Limited. Mr Clifford 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'. Mr Clifford consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

Material ASX Releases Previously Released

The Company has released all material information that relates to Exploration Results, Mineral Resources and Reserves, Economic Studies and Production for the Company's Projects on a continuous basis to the ASX and in compliance with JORC 2012. The Company confirms that it is not aware of any new information that materially affects the content of this ASX release and that the material assumptions and technical parameters remain unchanged.

About Zenith Minerals Limited (ASX:ZNC)

Zenith has a vision to build a gold and base metals business with a team of proven project finders. Focus is on 100% owned Zenith projects, whilst partners progress multiple additional opportunities using third party funds.

Zenith is continuing to focus on its core Australian gold and copper projects including:

Earaheedy	Zinc	Western Australia	25% free carry to BFS

New major zinc discovery to be fast tracked with extensive accelerated exploration program underpinned by a recent $40M capital raising by partner Rumble Resources Limited (ASX:RTR) (ASX Releases 28-Apr-21, 2-Jun-21, 8-Jun-21).

Develin Creek	Copper - Zinc	Queensland	100% Owned

Inferred Mineral Resource 2.57Mt @ 1.76% Cu, 2.01% Zn, 0.24% Au & 9.6g/t Ag (ASX Release 15-Feb-15). Testing 8 targets with multi-rig drill campaign.

Sulphide City (ASX Release 5-Jul-21).	**34m @ 3.5% Cu+Zn**	**29m @ 3.5% Cu+Zn**
	incl 10m @ 6.0% Cu+Zn	**incl 12.3m @ 6.7% Cu+Zn**

Red Mountain	Gold	Queensland	100% Owned

Drilling is following-up the high-grade near surface gold and silver intersected in the maiden & subsequent drill programs (ASX Releases 3-Aug-20 & 13-Oct-20, 9-Nov-20, 21-Jan-21).

Results incl:	**13m @ 8.0 g/t Au**	**15m @ 3.5 g/t Au**
	5m @ 10.4 g/t Au	**12m @ 4.9 g/t Au**

Split Rocks	Gold	Western Australia	100% Owned

Zenith drilling returned - high-grade near surface gold mineralisation at multiple targets (ASX Release 5-Aug-20, 2-Sep-20, 19-Oct-20, 28-Oct-20, 15-Jan-21, 11-Mar-21, 21-Apr-21, 24-Jun-21, 30-Sep-21). Results include:

Dulcie North	**32m @ 9.4 g/t Au, incl 9m @ 31.4 g/t Au**	**16m @ 1.3 g/t Au**
Dulcie Laterite Pit	**2m @ 14.5 g/t Au**	**18m @ 2.0 g/t Au**
	14m @ 3.5 g/t Au	
Estrella	**2m @ 9.8 g/t Au**	
Dulcie Far North	**5m @ 5.6 g/t Au**	**4m @ 10.2 g/t Au**
Water Bore	**3m @ 6.6 g/t Au**	
Scotts Grey	**12m @ 1.7 g/t Au**	**2m @ 7.6 g/t Au**

Investments

BRADDA HEAD **43.9M shares in Bradda Head Holdings Limited (AIM)**

RUMBLE RESOURCES LTD **3M shares in Rumble Resources Limited (ASX:RTR)**

AMERICAN RARE EARTHS **2.5M shares in American Rare Earths (ASX:ARR)**

NICKEL X LIMITED **0.5M shares in Nickel-X Limited (ASX:NKL)**

Section 1 Sampling Techniques and Data

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

Criteria	JORC Code explanation	Commentary
Sampling techniques	*Nature and quality of sampling (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.*	Visual observations of massive and semi-massive sulphides from chip logging of new RC holes reported only. Observations cross-checked with a pXRF but those results have been used for internal validation and cross reference purpose only and are not reported here.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	All RC samples to be assayed, selected diamond drill core has been assayed based on geological observations.
	Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.	RC drilling was used to take 1m samples, these were riffle split. HQ diamond drill core was ½ core sawn and will be assayed.
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.).*	RC from surface with 2 holes drilled with 150m deep pre-collars and diamond tails
Drill sample recovery	*Method of recording and assessing core and chip sample recoveries and results assessed.*	Diamond core and RC chips were logged by a qualified geologist on site, data recorded in field on paper logs and transferred to digital database
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	RC was generally drilled dry to achieve maximum recoveries, DD core recoveries were high throughout with very limited zones of loss noted.
	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 indications of sample bias based, assay results awaited.

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.*	Drill core and chips were logged by a qualified geologist on site. No reporting of resources.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Drill core logging is qualitative, all core and drill hip trays have been photographed.
	The total length and percentage of the relevant intersections logged.	All intervals logged and sampled
Sub-sampling techniques and sample preparation	*If core, whether cut or sawn and whether quarter, half or all core taken.*	New diamond drill core cut for assay
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	Riffle split samples have been taken for assay
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Samples will be analysed at ALS Laboratories in Brisbane, the samples were crushed, pulverised and assayed by gold using fire assay and silver & base metals by ICP-AES.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	No new assay results reported
Sub-sampling techniques and sample preparation - continued	*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.*	No new assay results reported
	Whether sample sizes are appropriate to the grain size of the material being sampled.	No new assay results reported
Quality of assay data and laboratory tests	*The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.*	No new assay results reported
	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.	Refer to details of geophysical surveys in Section 2 – Other Substantive Exploration Data. Visual observations of massive and semi-massive sulphides from chip logging of new RC holes reported only. Observations cross-checked with a pXRF but those results have been used for internal validation and cross reference purpose only and are not reported here.
	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.	Certified reference material and blanks will be included in each sample batch.
Verification of sampling and assaying	*The verification of significant intersections by either independent or alternative company personnel.*	Company personnel have observed the samples
	The use of twinned holes.	No

	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Field data were all recorded in field laptops and sample record books and then entered into a database
	Discuss any adjustment to assay data.	No adjustments were made.
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.*	Holes reduced to a 1m digital elevation model based on LIDAR.
	Specification of the grid system used.	The grid system used to compile data was MGA94 Zone 56
Location of data points - continued	*Quality and adequacy of topographic control.*	Topography control is +/- 25mm.
Data spacing and distribution	*Data spacing for reporting of Exploration Results.*	Drill holes shown in Figures in text and Table 1.
	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 data alone will not be used to estimate mineral resource or ore reserve
	Whether sample compositing has been applied.	No new assays results reported
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.*	Orientation of mineralisation based on initial observations from drill holes, indicates near surface shallow south dipping mineralised zone.
	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.	As above
Sample security	*The measures taken to ensure sample security.*	Samples are kept in numbered and secured bags until delivered to the laboratory
Audits or reviews	*The results of any audits or reviews of sampling techniques and data.*	Not applicable

Section 2 Reporting of Exploration Results

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

Criteria	*JORC Code explanation*	Commentary
Mineral tenement and land tenure status	*Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.*	The Sulphide City Copper-Zinc Prospect is part of the Develin Creek VMS project, that lies on EPM17604. The project is 100% owned by a wholly owned subsidiary of Zenith Minerals Limited. The prospect area is on private grazing lands with access subject to a land access agreement between Zenith & the landholder.
	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.	All tenements are 100% held by Zenith and are in good standing with no known impediment to future granting of a mining lease.
Exploration done by other parties	*Acknowledgment and appraisal of exploration by other parties.*	• Mineralisation was first identified in late 1992 by Queensland Metals Corporation (QMC) over what is now the Scorpion deposit. Between 1993 and mid-1995, QMC undertook an extensive geological and geophysical exploration program focused on the Develin Creek area and other prospects to the South. • In July 1995, QMC entered into a joint venture agreement with Outokumpu Mining Australia Pty Ltd (OMA) to continue exploration. OMA completed the first resource estimate for the Develin Creek deposits, then withdrew from the joint venture in 1996 and QMC (later changed names to Australian Magnesium Corporation) maintained the tenements until relinquishment in 2002. • Icon Limited (Icon) acquired the tenement and in 2007 completed this resource estimate for Sulphide City, Scorpion and Window from historical drilling data. • Fitzroy Resources acquired the project from Icon and listed via prospectus dated October 2010 and subsequently completed a HeliTEM survey, minor DHEM, some geochemical sampling and drilling of 12 holes). Of those 12 holes, 6 diamond holes were drilled to the south and east of the Develin Creek resource. • Drill hole FRWD0002 collared near the southern edge of the resource intersected 13.5m grading 3.3%Cu, 4.0%Zn, 0.5g/t Au and 30g/t Ag in massive sulphide from 182m. The mineralisation was intersected in a position that extends the known limits of the resource by around 40m to the south where it remains open to further upside. • In addition, Fitzroy completed 3 RC holes at the Lygon Prospect and a further 2 south of the Develin Creek resource area.
Geology	*Deposit type, geological setting and style of mineralisation.*	Sulphide City, Scorpion and Window are later Permian age volcanogenic massive sulphide deposits hosted with the Rookwood Volcanics basaltic sequence. Mineralisation observed at the Snook Copper prospect is consistent with this style of mineralisation. Copper observed at surface occurs within bleached and altered sedimentary rocks that are interbeds within the basalt sequence.

		Massive sulphides intersected in RC & subsequent diamond drilling
Drill hole Information	*A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:*	Refer to Tables 1
	o easting and northing of the drill hole collar	
	o elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar	
	o dip and azimuth of the hole	
	o down hole length and interception depth	
	o hole length.	
	If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.	
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.*	Visual observations of massive and semi-massive sulphides from chip logging of new RC holes reported only. Observations cross-checked with a pXRF but those results have been used for internal validation and cross reference purpose only and are not reported here.
	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.	As above
Data aggregation methods - continued	*The assumptions used for any reporting of metal equivalent values should be clearly stated.*	No metal equivalents
Relationship between mineralisation widths and intercept lengths	*These relationships are particularly important in the reporting of Exploration Results.*	The intersections in drill holes are interpreted to be close to true widths. Host sequence confirmed as shallow dipping.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	The intersections in drill holes are interpreted to be close to true widths.
	If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').	As above
Diagrams	*Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	Refer attached maps & sections
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.*	Results for all new holes are reported

Other substantive exploration data	*Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	The Devein Creek project contains a VMS copper-zinc deposit with an Inferred Mineral Resource (JORC 2012) of: 2.57Mt @ 1.76% copper, 2.01% zinc, 0.24g/t gold and 9.6g/t silver (2.62% CuEq) released to ASX on 15- -Feb-2015. Upside to resource grades are considered likely with Zenith RC hole twinning previous 1993 percussion hole returning significantly higher copper, zinc, gold and silver grades (300% to 700% higher). Initial **metallurgical testwork** results show positive first stage "rougher" recoveries of 90%. The Company holds exploration permits that cover the highly prospective host rocks over 50km north – south. The **Snook IP** survey was completed by Fender Geophysics. Equipment used included a GDD TxII 5kVA Transmitter (Tx) and a GDD RX-32 IP Receiver (Rx). Receiving electrodes were standard non-polarising porous pots and transmitter electrodes were buried aluminium plates. The Snook IP survey was completed using a standard roll along Dipole-Dipole (DDIP) configuration. Figure 2 illustrates the survey layout. The Snook IP survey specifications were as follows: DDIP : • Dipole Size 50m • Rx Array Length 800m (16 Channels) • Number of lines 3 • Line spacing 100m/200m • Line Length 1 x 1.7km, 2 x 1.3km The survey was completed on a local grid system. The conversion between the local grid system and GDA94 / MGA55 coordinates is as follows: Local 10000E 20000N = GDA94/MGA55 791214.7E 7423564.5N, Line Bearing = 050.0º Data review and processing was completed by RAMA Geoscience of QLD. Raw IP data supplied by Fender was imported into TQIPdb, an IP data quality control and processing software package. Individual chargeability decays from each station were inspected and any noisy decays, bad repeat readings, or readings with very low primary voltage were flagged in the database. Any readings flagged for low quality are not used at any subsequent stage of the processing. Data quality for the Snook IP surveys was generally very good. Signal levels were high, and repeatability excellent. The validated data was exported from TQIPdb for subsequent plotting and inversion processing. The chargeability was calculated using an integration window of 590ms to 1540ms. Shuttle Radar Topography Mission (SRTM) elevation data downloaded from the USGS Earth Explorer portal

and transformed to the AUSGeoid09 datum was utilised for the topography.

For the Snook DDIP data, 2D inversion modelling was completed using Res2D from Geotomo Software. Res2D determines a 2D resistivity and chargeability model of the subsurface that satisfies the observed DDIP data to within an acceptable error level. This is a robust way of converting the observed pseudo-section data into resistivity and chargeability model sections which reflect the likely geometry and location of anomaly sources.

Using default parameters for the inversion processing generally produces smooth models. As the geology is expected to be mostly flat lying or shallowly dipping at Snook, weighting towards horizontal formations has been applied to the models presented.

The **Wilson IP** survey was completed by Fender Geophysics. Equipment used included a GDD TxII 5kVA Transmitter (Tx) and a GDD RX-32 IP Receiver (Rx). Receiving electrodes were standard non-polarising porous pots and transmitter electrodes were buried aluminium plates.

The Wilson IP survey was completed using a standard roll along Dipole-Dipole (DDIP) configuration. Figure 5 illustrates the survey layout, and Table 1 lists the survey coverage.

The Wilson IP survey specifications were as follows:
DDIP : Dipole Size 50m

- Rx Array Length 800m (16 Channels)
- Number of lines 4
- Line spacing 200m
- Line Length 1.4km
- The survey was completed using the GDA94/MGA55 coordinate system.

Data review and processing was completed by RAMA Geoscience of QLD. Raw IP data supplied by Fender was imported into TQIPdb, an IP data quality control and processing software package. Individual chargeability decays from each station were inspected and any noisy decays, bad repeat readings, or readings with very low primary voltage were flagged in the database. Any readings flagged for low quality are not used at any subsequent stage of the processing.

Data quality for the Wilson IP surveys was generally very good. Signal levels were high, and repeatability excellent.

The validated data was exported from TQIPdb for subsequent plotting and inversion processing. The chargeability was calculated using an integration window of 590ms to 1540ms. Shuttle Radar Topography Mission (SRTM) elevation data downloaded from the USGS Earth Explorer portal and transformed to the AUSGeoid09 datum was utilised for the topography.

For the Wilson DDIP data, both 2D and 3D inversion modelling was completed.

The 2D inversion modelling was completed using Res2D produced by Geotomo Software. Res2D determines a 2D resistivity and chargeability model of the subsurface that satisfies the observed DDIP data to within an acceptable error level. This is a robust way of converting the observed pseudo-section data into resistivity and chargeability model sections which reflect the likely geometry and locations of anomaly sources.

The 3D inversion modelling was completed using Res3D from Geotomo Software. Res3D determines three-dimensional resistivity and chargeability distributions that satisfy the observed DDIP data to within an acceptable error level. Data from all four DDIP lines collected at Wilson was used as the input data. The resulting 3D models consist of values of resistivity and chargeability distributed over a 3D mesh of cells. The cell dimension used for the model mesh was 25m x 50m x 12.5m.

Using default parameters for the inversion processing generally produces smooth models. To add more geological structure to the models, weighting towards narrower discrete sub-vertical formations has been applied to all the models presented.

VTEM

A VTEM airborne electromagnetic (EM) trial survey was carried out at Zenith Minerals' Develin Creek Project, QLD, by Geotech Airborne Ltd, during May 2015.

The VTEM "Max" airborne E system was trialled over the known VMS deposits: Sulphide City, Scorpion and Window, to determine if these deposits produce a discernible VTEM response.

Principal geophysical sensors included a versatile time domain electromagnetic (VTEM max) system, and a caesium magnetometer. Ancillary equipment included a GPS navigation system and a radar altimeter.

In-field data quality assurance and preliminary processing were carried out on a daily basis during the acquisition phase. Preliminary and final data processing, including generation of final digital data and map products were undertaken from the office of UTS Geophysics in Aurora, Ontario.

The geophysical surveys consisted of helicopter borne EM using the versatile time-domain electromagnetic (VTEM max) with Full-Waveform processing. Measurements consisted of Vertical (Z) and In-line Horizontal (X) components of the EM fields using an induction coil and the aeromagnetic total field using a caesium magnetometer. A total of 33 line-km of geophysical data were acquired during the survey.

During the survey the helicopter was maintained at a mean altitude of 84 metres above the ground with an

		average survey speed of 80 km/hour. This allowed for an actual average transmitter-receiver loop terrain clearance of 46 metres and a magnetic sensor clearance of 74 metres. The on-board operator was responsible for monitoring the system integrity. He also maintained a detailed flight log during the survey, tracking the times of the flight as well as any unusual geophysical or topographic features. The electromagnetic system was a Geotech Time Domain EM (VTEM max) full receiver wave form streamed data recorded system. The “full waveform VTEM system” uses the streamed half-cycle recording of transmitter and receiver waveforms to obtain a complete system response calibration throughout the entire survey flight. VTEM, with the serial number 24 had been used for the survey. Fortyfive time measurement gates were used for the final data processing in the range from 0.026 to 12.250 msec. Zero time for off-time sampling scheme is equal to current pulse width and defined as the time near the end of the turn-off ramp where the dI/dt waveform falls to 1/2 of its peak value. VTEM max system specification: Transmitter - Transmitter loop diameter: 35 m - Effective Transmitter loop area: 3848 m2 - Number of turns: 4 - Transmitter base frequency: 25 Hz - Peak current: 294 A - Pulse width: 4.93 ms - Wave form shape: trapezoid - Peak dipole moment: 1,131,312 nIA - Average transmitter-receiver loop terrain clearance: 46 metres above the ground Receiver - X Coil diameter: 0.32 m - Number of turns: 245 - Effective coil area: 19.69 m2 - Z-Coil diameter: 1.2 m - Number of turns: 100 - Effective coil area: 113.04 m2 The calibration is performed on the complete VTEM system installed in and connected to the helicopter, using special calibration equipment. The procedure takes half-cycle files acquired and calculates a calibration file consisting of a single stacked half-cycle waveform. The purpose of the stacking is to attenuate natural and manmade magnetic signals, leaving only the response to the calibration signal. The Full Waveform EM specific data processing operations included: - Half cycle stacking (performed at time of acquisition); - System response correction; - Parasitic and drift removal.

		A three-stage digital filtering process was used to reject major sferic events and to reduce system noise. Local sferic activity can produce sharp, large amplitude events that cannot be removed by conventional filtering procedures. Smoothing or stacking will reduce their amplitude but leave a broader residual response that can be confused with geological phenomena. To avoid this possibility, a computer algorithm searches out and rejects the major sferic events. The signal to noise ratio was further improved by the application of a low pass linear digital filter. This filter has zero phase shift which prevents any lag or peak displacement from occurring, and it suppresses only variations with a wavelength less than about 1 second or 15 metres. This filter is a symmetrical 1 sec linear filter. The results are presented as stacked profiles of EM voltages for the time gates, in linear - logarithmic scale for the B-field Z component and dB/dt responses in the Z and X components. B-field Z component time channel recorded at 0.880 milliseconds after the termination of the impulse is also presented as contour colour images. VTEM max has two receiver coil orientations. Z-axis co il is oriented parallel to the transmitter coil axis and both are horizontal to the ground. The X-axis coil is oriented parallel to the ground and along the line-of-flight. This combined two coil configuration provides information on the position, depth, dip and thickness of a conductor. Additional validation and interpretation of the VTEM data was carried out by Resource Potentials of Western Australia
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).*	Follow-up drill planning in progress, diamond drill core will provide new samples for metallurgical testwork. EM surveying at Snook is planned
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Refer to figures in body of report.